Introduction to Health Assessment for the Nursing Professional (2024) - Canadian edition

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Editors: Dr. Jennifer L. Lapum and Michelle Hughes

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Introduction - MAIN

"Introduction to Health Assessment for the Nursing Professional" is an open educational resource (OER) created for **undergraduate nursing students** at the introductory level. Educators co-curated this resource in collaboration with students for students. This resource is a unique contribution to nursing education as content is theoretically informed by **health promotion** in the **Canadian context** and by an **inclusive approach** to health assessment that incorporates culturally-responsive techniques related to race/ethnicity, gender/sex/sexual orientation, body sizes/types, and ability/disability. It is the first health assessment resource that is informed by **clinical judgement** with the goal to facilitate students' clinical decision making and ability to prioritize care by recognizing and acting on cues and signs of clinical deterioration. Interactive clinical judgement activities and formative assessments to evaluate a student's learning are integrated throughout the resource. The integration of clinical judgement throughout this resource will support students' capacity to enhance patient safety and equitable health outcomes as well as their success in writing national nursing exams to become licensed to work as a Nurse.

This book is **best viewed via the online, Pressbooks format so that you can view the videos and participate in the interactive activities**. However, a PDF format is made available.

Other nursing-related resources include:

Introduction to communication in nursing: link

Documentation in nursing: 1st Canadian edition: link

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An introduction to anti-racism for the nursing professional: A focus on anti-black racism: link

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If you are having problems accessing any content within the book, please contact: Dr. Jennifer Lapum at jlapum@torontomu.ca Please let us know which page you are having difficulty with and include which browser, operating system, and assistive technology you are using.

Recent Edits

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CHAPTER 1 - INTRODUCTION TO HEALTH ASSESSMENT

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Learning Outcomes

- Understand the role of health assessment.
- Apply the cognitive steps of clinical judgement.
- Understand approaches to health assessment.
- Recognize the role health promotion plays in health assessment.

Introduction to Health Assessment

Health **assessment** is the first phase of the nursing process and involves the **collection** and **analysis of client data**. Although it is the first phase, it is an ongoing process. Data collected as part of the health assessment process can be categorized as subjective and objective data. See **Table 1** for an overview and examples of **subjective** and **objective** data.

Table 1: Overview and examples of subjective and objective data – adapted from Lapum et al., https://ecampusontario.pressbooks.pub/healthassessment/

Data	Example
Subjective Information that a client or another person (i.e., family, caregiver) shares with the nurse spontaneously or in response to questions.	• A client says, "I have had a rash on my ankle and leg for the last two weeks." • A parent says, "My eight-month-old son is having trouble breathing." • A client's reason for seeking care is "diarrhea for 10 days." • A client types, "I feel sick to my stomach."
Objective Information that the nurse observes when conducting a physical examination, and collecting lab and diagnostic results.	• The nurse observes that a client has a bright red rash on the dorsal side of the foot, the lateral malleolus, and anterior and lateral side of the lower leg. • The nurse observes the client sitting upright, leaning forward, breathing fast with eyes wide open. • The nurse measures the client's blood pressure and records it as 112/84 mm Hg and pulse of 84 beats per minute. • Lab test results: potassium (K^+) 4.0 mmol/L, fasting glucose 4.8 mmol/L. • Chest X-ray report: lungs well inflated and clear. No evidence of pneumonia or pulmonary edema.

Subjective data can include information about both symptoms and signs. **Symptoms** are something that the client feels (e.g., nausea, pain, fatigue). The nurse will not know about a symptom unless the client shares this information. **Signs** are observable, such as a rash, bruising, or skin perspiration. Signs can be categorized as subjective or objective because the client may tell you about their rash, and you as the nurse may also observe the rash. As reflected in **Figure 1**, a symptom is noted in the image on the left as "I'm having pain" while a sign can be observed in the image on the right, which is the bruising on the left arm.

Figure 1: Symptoms and signs
(Attribution: Taken from https://ecampusontario.pressbooks.pub/healthassessment/)

Age ranges are important to consider when determining normal and abnormal findings during health assessment. Depending on the source, these ranges can vary. Unless specified, we use the following terms and estimates in this resource:

- Newborns and neonates: newborns are birth to a few hours old and neonate is up to 28 days.
- Young children: clients who are 5 years and younger, including infants (28 days to 1 year), toddlers (1–2 years), and preschoolers (3–5 years).
- Older children and adolescents: clients who are 6–17 years, including older children/school-age children (6–12 years) and adolescents (13–17 years).
- Adults and older adults: clients who are 18 years and older, including adults (18 years and older) and older adults (65 years and older).

Health Assessment: Related Legislation

Any health assessment you perform must fall within your **nursing scope of practice** and be informed by the appropriate nursing College or association **practice standards**. In Ontario, the College of Nurses of Ontario (CNO) is the legal governing body for nurses, so as a nurse, you must perform health assessment within the CNO legislated scope of practice, the practice standards, and also based on your individual level of competence (i.e., knowledge and expert practice to perform an action).

It is important to be aware of **controlled acts**, which are activities that are considered harmful if performed by someone who is unqualified as per the Regulated Health Professions Act (RHPA) (CNO, 2020a). As per the RHPA, a controlled act must only be **performed with an order** or when permitted by specific regulations and you must be **competent to perform** the skill/procedure (CNO, 2020a). For example, it is within your scope of practice to perform health assessments that move "below the dermis or mucous membrane" or involve putting your finger/hands or an instrument beyond "the external ear canal," regions where the nasal passages narrow, the larynx, urethra, labia majora, anal verge, or "into an artificial opening in the body" as long as there is an order from a physician AND you are competent to perform this skill/procedure (CNO, 2020a).

Clinical Tip

As a nursing student, you are not yet a registered nurse. Therefore, with guidance from your supervisor/preceptor/clinical instructor, you must assess your competence to perform the controlled act and do so safely. If the decision is that you do not have the knowledge and skill to perform the controlled act, you may observe and use this as a learning opportunity.

Keep in mind that many controlled acts are related to interventions (e.g., treatment procedures) that you perform as a nurse, and some controlled acts relate to assessment techniques (e.g., performing an invasive technique).

When you perform an assessment, it is important to inform the client what you are assessing and typically share some of the findings that are within your scope of practice (e.g., I noticed inflammation around your ear drum). However, you are **not permitted to communicate a diagnosis** about what is causing the inflammation around the ear drum. Communicating a diagnosis is not permitted because this is considered a **controlled act** and outside of the registered nursing specific controlled acts (CNO, 2020b). Communicating a diagnosis is done by certain regulated health professionals such as a physician or nurse practitioner. However, you may be expected to communicate a diagnosis if you are delegated to do so by a physician or nurse practitioner and you have the knowledge to do so.

In performing any health assessment, you are also required to adhere to the CNO practice standards. **Common practice standards** that apply to **health assessment** include information related to consent and permission to touch, privacy and confidentiality, therapeutic nurse-client relationship, and documentation. Many of these CNO documents are based on health laws. It is important to recall that nurses are legally obligated to document their health assessment findings as per the CNO Documentation practice standard, as shown in Documentation in Nursing: 1st Canadian edition.

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Clinical Judgement and Nursing

When collecting subjective and objective data, you need to consider clinical judgement. In nursing, the purpose of health assessment is to facilitate **clinical judgement**, which is defined as:

- A determination about a client's health and illness status.
- Their health concerns and needs.
- The capacity to engage in their own care.
  AND
- The decision to intervene/act or not – and if action is required, what action (Tanner, 2006).

The nursing process is the foundation of clinical judgement. However, clinical judgement is more comprehensive, action-oriented, and guided by the philosophy of client safety. Thus, it is important to learn when to act to prevent **clinical deterioration**, a worsening clinical state related to physiological decompensation (Padilla & Mayo, 2017).

To facilitate clinical judgement, you must determine if the collected data represent **normal findings** or **abnormal findings**. When findings are abnormal, you must act on these cues as they signal a potential concern and require action. Failing to recognize abnormal findings and act on these cues can lead to negative consequences including sub-optimal health and wellness – and more importantly, **clinical deterioration**. Some abnormal findings are considered **critical findings**that place the client at further risk if the nurse does not act immediately.

The process leading to clinical judgement is described as **clinical reasoning**. This process involves:

- Thoughtfully considering all client data as a whole, whether each piece of information is relevant or irrelevant, and how each piece of information is related or not related.
- Recognizing and analyzing **cues**. Is the information collected a normal, abnormal, or critical finding? Can the information be clustered to inform your clinical judgment?
- Interpreting problems. What is the priority problem and what are the factors causing it? What else do you need to assess to validate or invalidate your interpretation? What other information do you need to collect to make an accurate clinical judgment?
- Determining, implementing, and then evaluating appropriate actions (Dickison et al., 2019; Tanner, 2006).

The clinical reasoning process is encompassed by **critical thinking**. This means that when engaging in the process of clinical reasoning, you should systematically analyze your own thinking so that the outcomes are clear, rational, creative, and objective with limited risk of judgment and error.

Clinical Judgement

A client tells you "I have a headache." As the nurse, you immediately recognize the cue: headache. However, you do not have sufficient information to analyze this cue and identify the significance. Thus, you may ask a series of subjective questions such as "When did the headache start? What were you doing when it started?

Have you ever had this type of headache before?" The client's response will provide you detailed information to facilitate your critical thinking and the process of hypothesizing what is going on, and thereby helping you determine what actions to take.

Clinical judgement is facilitated by cognitive steps that help you determine when and how to act to prevent clinical deterioration; see **Table 2**. Like the nursing process, these steps should be performed in an iterative manner as per the client situation and your clinical reasoning process.

Table 2: Clinical judgment steps (developed based on NCSBN, 2020)

Steps	Considerations
Recognize cues	Recognizing cues involves identifying findings that require action because they are abnormal. This involves what Tanner (2006) calls "noticing" (i.e., recognizing when something is abnormal). You should be asking yourself what matters most?
Analyze cues	Analyzing cues involves interpreting/making sense of the collected data, what it means, and how it may relate to possible pathophysiological processes. This involves what Tanner (2006) calls "interpreting", making sense of the collected data.
Prioritize hypotheses	Prioritizing hypotheses involves figuring out where to start and how to prioritize care. This step involves what Tanner (2006) refers to as "responding" to the collected data
Generate solutions	Generating solutions involves identifying the various options (e.g., actions/interventions) to address the problem or the abnormal findings/cues. This may involve identifying which solutions are **indicated/effective**, **nonessential**, **unrelated**, and **contraindicated**.
Take actions	Taking actions involves identifying the action that should be taken. Examples of actions are specific but could be related to notifying the physician or nurse practitioner, calling for help, monitoring the client, collecting further data.
Evaluate outcomes	Evaluating outcomes involves determining if the action taken was effective. It may include identifying outcomes that are considered improved, unchanged, or worsened.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=178#h5p-139

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Priorities of Care

Why is clinical judgment important? How does it guide the provision of care?

Clinical judgment is important to ensure the nurse's actions are based on the client's most important needs. Clients often have several needs, and some are more important than others. As such, nurses need to assess and evaluate the **priorities of care:** what actions are most important to take first, and then what actions can follow. Typically, priority actions are those that prevent clinical deterioration and death.

Maslow's Hierarchy of Needs

Priorities of care can be determined using several frameworks such as **Maslow's Hierarchy of Needs.** For example, at the most basic level, life requires an open airway to breathe, the physiological process of breathing, and the circulation of blood and oxygen throughout the body. Airway, breathing, and circulation are the ABCs, which you might have learned if you have taken a cardiopulmonary resuscitation (CPR) course.

Maslow's Hierarchy of Needs was developed to consider **basic human needs** and motivations of healthy individuals (Bouzenita & Wood Boulanouar, 2016; Francis & Kritsonsis, 2006; Gambrel & Cianci, 2003). Although not well known, Maslow's work was closely influenced by the Blackfoot tribe in Canada (James & Lunday, 2014). One version includes **five** levels of needs: those related to **physiological, safety, love, esteem,** and **self-actualization** (Maslow, 1943), which can help prioritize care in nursing. **Figure 2** presents one adapted version of Maslow's Hierarchy.

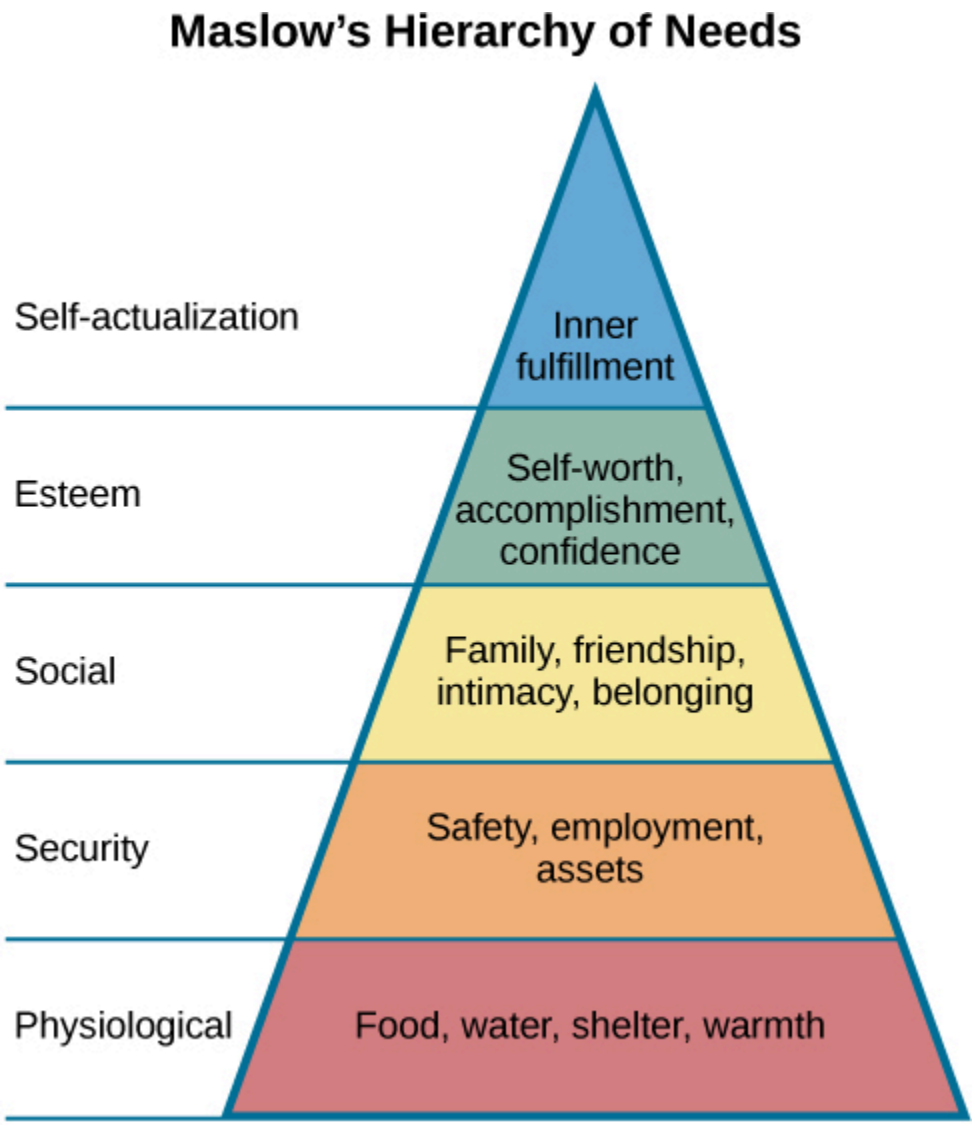

Figure 2: Maslow's Hierarchy of Needs (see attribution statement at bottom of page)
Drawing upon this framework, a nurse can use health assessments to explore five levels of needs:

- **Physiological needs** – fundamental physical needs required for survival such as air, food/drink, sleep, warmth/clothing/shelter.
  - Are these basic physiological needs being met? Is the client's breathing and circulation supported?
- **Safety** – needs related to a secure physical and emotional environment.
  - Does the client feel safe and secure in general in life? Does the client feel safe and secure in the healthcare environment? Is the bed lowered to the lowest position when you finish your assessment? Is the call bell in reach?
- **Love and belongingness** – needs related to relationships including friendship and family, intimacy and affection, work, and trust and acceptance.
  - Does the client feel love and belongingness in general in their relationships? More specifically, does the client feel cared for by nurses and other healthcare providers?

- **Esteem** – feelings related to self-worth, dignity, respect, and achievement.
    - Does the client feel respected and valued in general by others? Does the client feel respected and valued within the healthcare environment?
- **Self-actualization** – a process or action of reaching one's full potential and self-fulfillment.
    - What is important to the client in terms of what they want to achieve in life in general? What are the client's goals that they may have for themselves in their own health and healing journey? Does the client feel satisfied, confident, and accomplished?

You can use Maslow's Hierarchy of Needs as a guide, but it is important to be aware of the **critiques** and possible limitations in its application. See **Video 1** of a conversation between Dr. Lisa Seto Nielsen and Mahidhar Pemasani.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=180#oembed-1*

Video 1: A discussion about Maslow's Hierarchy of Needs

Criticisms of Maslow's hierarchy are related to it being ethnocentric, based on individualistic societies, and not necessarily taking into account diversity in culture, gender, and age (Bouzenita & Wood Boulanouar, 2016; Francis & Kritsonsis, 2006; Gambrel & Cianci, 2003). It should not be arbitrarily applied to all healthcare encounters. Although you may initially focus on physiological needs to ensure the client is stable, the client may have different priorities that are more important to them. By drawing upon Indigenous knowledge, it is vital to recognize the role of community and advocacy in reaching self actualization at every level (Bennett & Shangreaux, 2005). This is particularly important in the context of systemic racism and oppression and the existing disparities among racialized populations including Black communities and Indigenous People.

Levels of Priority of Care

Because of the importance of recognizing clinical deterioration in a client, a nurse must always be attuned to the set of physiological needs that are important to maintain life and prevent death. These priorities of care are related to the ABCs – airway, breathing, and circulation – introduced above. These priorities of care are often categorized as first, second, or third level, with the first level taking a priority (see **Table 3**).

Table 3: Priorities of care

Priority of care	Examples
First-level priority of care are problems/issues that **reflect critical findings, clinical deterioration** and/or are **life-threatening** – and therefore require **urgent action.** Urgent means that action must be taken immediately.	A client in respiratory distress as evident by **tachypnea**, nasal flaring, laboured breathing, **intercostal retractions**, and decreasing oxygen levels or a client with **hemodynamic instability** such as chest pain or the absence of or decreasing pulse or blood pressure.
Second-level priority of care are problems/issues that **may lead** to clinical deterioration and **may become** life-threatening without intervention – and therefore require **prompt action.** Prompt means that action must be taken quickly.	A client with signs and symptoms such as: altered level of orientation, decreased level of consciousness/confusion, elevated temperature, increasing pain levels, and cold extremities. This may include a client with a head injury who can deteriorate quickly in some cases. You should assess if they experienced a loss of consciousness and have any associated symptoms with a concussion.
Third-level priority of care are problems and issues that are typically focused on **functional health**, **client education**, and **counselling**. These should be addressed, but they are non-urgent and can wait until the client is stable. The problem/issue is **not acute in nature**, but intervention is required to support the client's activities of daily living, their knowledge level, and their mental health and wellbeing	A client who is post-operative and requires assistance with hygiene and mobility, a client who reports increasing stress levels and problems sleeping, or a client who is newly diagnosed with diabetes and requires education around nutrition and monitoring their blood glucose levels.

With regard to levels of care, it is essential to consider what is **most important to the client**. You should treat the client as the expert in their own life – and also as the expert in decisions about their own healthcare, if they choose. Although a client may have plummeting blood pressure, you need to consider tailoring the intervening action to their wishes. Some clients may not wish for intervention in a life-threatening circumstance. Therefore, you always need to be open to the client's wishes, but also consider whether they are able to weigh the consequences of their decision (i.e., are they competent to consent?).

Urgent Priorities of Care: Mental Health

In practice, mental health is typically not categorized as a first- or second-level priority of care unless the client is showing signs of clinical deterioration based on the examples noted in **Table 3**. In some situations, mental health may be positioned as a third-level priority of care, for example when a client is experiencing anxiety, depression, grief, but shows no signs of suicidal ideation. These symptoms should be addressed, but according to this framework, they are considered less urgent compared to first- and second-level priorities of care. However, sometimes, you should think differently about how **mental health is a priority of care**.

In some situations, **mental health may take precedence.** For example, a client who has attempted suicide or has just overdosed will probably have other physical symptoms as a result and therefore require urgent intervention and constant observation as per **Table 3**. However, the descriptions of the priorities of care presented in the table do not account for a client who has voiced a specific plan for suicide and has identified when and how. This client is at very high risk and requires urgent intervention regardless of what may be viewed as their physical health state or history. The description of priorities of care listed above does not account for this except as a third-level priority – but a client with suicide ideation or has voiced wanting to

hurt others requires urgent action to protect their own wellbeing and others and the possibility of clinical deterioration as a result of their actions.

Intervention Types

As illustrated by the text box above, you will need to use your own judgement to determine how to act when a cue presents itself and how to categorize these interventions. This could involve four general **types of interventions** that you need to be aware of (see **Table 4**) including **effective, ineffective, unrelated,** and **contraindicated.** These types of interventions will become more clear as you begin to learn about normal, abnormal, and critical findings for various body systems, and how interventions and actions will affect these findings and the client.

Table 4: Types of interventions

Type of Intervention	Example The client has no pulse, their chest is not rising, and they are not responsive. As a nurse you need to make a clinical judgment on how to act based on these cues.
Effective (or **indicated)** interventions are actions that are adequate to produce the intended result and help the client.	Begin CPR immediately. This is also an evidence-informed intervention because a delayed response results in poor outcomes as per the research.
Ineffective interventions are actions that are not adequate to produce the intended result and therefore will not help the client.	Provide mouth-to-mouth resuscitation; without compressions, the oxygen will not circulate.
Unrelated (or non-essential) interventions are actions that will not produce an effect (positive or negative) and therefore will not help the client.	Notify the client's employer.
Contraindicated interventions are actions that are not recommended because they have the potential to cause harm to the client.	A contraindicated intervention is to delay resuscitation until a physician is present.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=180#h5p-140

Attribution statement for Figure 2
Authors: Spielman et al. Publisher/website: OpenStax Book title: Psychology 2e. Publication date: Apr 22, 2020 Location: Houston, Texas. Book URL: https://openstax.org/books/psychology-2e/pages/1-introduction Section URL: https://openstax.org/books/psychology-2e/pages/1-2-history-of-psychology. Textbook content produced by OpenStax is licensed under a Creative Commons Attribution License 4.0 license.

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Guiding Approaches of Health Assessment

The guiding approaches of health assessment refer to specific conventions of when and what type of health assessment to perform. For example, how often should you perform an assessment on the client? What type of assessment should you perform and how comprehensive should it be? Approaches always depend on the **context of the situation.** As you become more experienced, you will also be able to pick up on cues that require additional assessment.

Health Assessment Frequency

The frequency of a health assessment is determined by the **setting** (e.g., primary care, long term care, acute care) and the **health** and **clinical status** of the client.

- The frequency of a **primary care** visit depends on the client's age and their health status and needs. For example, guidelines have been established for the frequency of well-baby and childhood visits and maternal health visits. Also, clients with complex healthcare needs (such as multiple **morbidities**) will need to see their primary care practitioner more often than a healthy adult.
- The frequency of assessment in a **long-term care** setting is often determined by concerns voiced by the client, the personal support worker (PSW), or the registered practical nurse (RPN). PSW and RPN typically have more 1:1 contact with clients in long-term care settings and will draw the registered nurse's attention to concerns that may require further assessment.
- The frequency of assessment in **acute care** (such as medical or surgical units) will be at least every four hours. In critical care, this frequency is increased to usually every 1–2 hours at least. Clients in critical care are usually on a monitor in which their heart rhythm and vital signs such as oxygen saturation and heart rate are constantly monitored and alarm bells will signal if there is an abnormal change. Although there may be a standard for the frequency of assessment based on the unique population you care for or the institution policy, you must be aware that escalation of care and increased frequency may be needed based on the nurse's assessment and the client's clinical status. For example, at times clients may require constant observation (e.g., post-surgery, in critical care environments, a client who is unstable or may show signs of deterioration, or a client in mental health distress with suicide ideation or post-attempt).

Brief Scan

A brief scan is a type of health assessment that is typically conducted with each patient at the **start of your shift** and/or each time you see them. A brief scan provides a **quick** and **general overview** of the client. It can be performed when the client enters the room or alternatively when you are entering the room. Your initial observations provide insight into how the client may need to be supported during the assessment, ways you may need to modify the assessment, and cues that require further investigation.

The brief scan may be referred to by some practitioners as, and include components of, the **general survey** and **mental health assessment**. How the brief scan is performed in practice will depend on the client population and

institution (e.g., long term, acute, primary care). The brief scan may be tailored to a particular body system as you will see throughout this learning resource.

For the purposes of this chapter, a brief scan will include the following four components:

(1) Mobility and body positioning

- Does the client move independently and/or have any mobility aids?
- Are there any mobility or gait impairments observed?
- Are there any concerns based on the client's movements or lack of movements?
- Is the client sitting or standing upright or are they slumped forward or to the side?

(2) Bodily and physical appearance

- If not in a gown, is the client wearing appropriate clothing for the temperature outside?
- Is the client appropriately groomed with no hygiene issues of concern?
- Is there a change in the client's bodily and physical appearance?

(3) Level of consciousness

Level of consciousness is the client's state of awareness and response to stimuli (voice/sound or physical). Their level of consciousness is described as:

- Alert and oriented: This means that the client is awake (or easily arouses to your voice), engages appropriately in interactions with you, responds appropriately to your questions, and oriented to person, place, time, and self.
- Confused and disoriented: This means that the client shows altered cognition such as difficulty in memory retention, difficulty following commands, uncertain about the environment around them, inattention, and shows signs of disorientation in terms of person, place, time, and self. They may have delayed or inappropriate/incorrect responses to your questions.
- Lethargic: This means that the client is slow/sluggish to arouse to stimuli. For example, you need to say their name loudly or multiple times or physical shake their arm. They are sleepy, lack energy, slow to respond to your questions, but answers appropriately and are oriented.
- Obtunded: This means that the client has a significant impairment in their level of consciousness and requires a significant and continuous stimuli (loud voice, vigorous shaking of the arm). They have difficulty to respond because of the impairment, need constant coaxing to respond, can only answer very simple questions with one word responses that are difficult to hear and understand. Without stimuli, they will immediately return to sleep.
- Unconsciousness: This means that the client does not respond to any stimuli and has no purposeful motor responses.

(4) Level of orientation

Leve of orientation is assessed by asking the client questions related to:

- Place (questions to ask: Do you know where you are? They may know they are in a hospital because of the room. Thus, you may probe with the question, do you know what hospital you are in?).
- Time (questions to ask: Do you know what date it is? Do you know what day of the week it is? Do you know what month it is? Do you know what year it is?).
- Person (question to ask: Do you know who I am? They may say "yes", but you should probe with the question, can you tell me who I am? They may be able to identify you as a nurse, but forget your name in some cases).
- Self (question to ask: Do you know who you are? If they respond "yes", you should probe with the question, can you tell me your name?).

A normal response is that the client is alert and oriented to place, time, person and self. If they are disoriented, you indicate what they are disoriented to. You may indicate oriented to place, person and self, disoriented to time. It is important to consider context when assessing level of orientation. For example, a client may not be aware of the specific date, but knows the day of the week or month or year.

Contextualizing Inclusivity

It is important to integrate considerations of age, fashion style, and socioeconomic status that may affect your assessment of appearance. Appearance can be a personal and unique component of each person and thus, your own bias may influence what you identify as "normal" versus "abnormal" findings related to appearance. Additionally, socioeconomic status may affect a client's capacity to maintain appropriate hygiene and grooming as well as clothing appropriate to the temperatures outside. Use unconditional positive regard and cultural humility to explore any concerns you may have.

Priorities of Care

It is important to consider cues that are a **priority of care**. This means they require your attention first (out of all of your assessment findings) because they are concerning and/or they suggest that the client may be about to **deteriorate** or is deteriorating. In terms of the brief scan, **new onset** of abnormal findings should draw your attention as a priority of care. For example, new onset altered level of consciousness and/or disorientation are important cues that could indicate clinical deterioration and thus, require immediate

intervention. If not yet completed, a primary survey should be done and findings shared with the physician or nurse practitioner – details on how to conduct a primary survey are provided below in **Table 5**.

Other Health Assessment Types

In addition to the brief scan, there are several other health assessment types. In this chapter, we refer to four types including: primary survey; focused assessment; head-to-toe (abbreviated version); and complete health assessment. As per **Table 5**, the type of health assessment to be performed is determined based on the context of the situation.

Table 5: Types of health assessment

Type of Assessment	Recommendations
Primary survey Airway (patency) Breathing (respiratory rate, work of breathing, oxygen saturation) Circulation (pulse rate/rhythm, BP, urine output) Disability (level of consciousness, speech, pain) Exposure (temperature, skin integrity, pressure injuries, wounds, dressings, drains, lines, ability to transfer/mobilise, bowel movements) (Douglas et al., 2016)	According to current recommendations, all assessments should begin with a primary survey because this structured assessment helps nurses recognize and act on signs of clinical deterioration (Considine & Currey, 2014) that are correlated with death (Douglas et al., 2016). A primary survey collects data in order of importance, and it is aligned with most institutions' **rapid response systems** (Considine & Currey, 2014). This recommendation marks a change from the tradition of beginning an assessment with vital sign measurement (Considine & Currey, 2014) or doing a head-to-toe assessment. A primary survey will help you determine if urgent intervention is needed or whether you should perform a focused assessment or a head-to-toe assessment. This change in assessment practice is still relatively new. Thus, you may encounter healthcare professionals who are not familiar with this shift in practice and the primary survey. It can provide an opportunity for discussion and learning.
Focused assessment An assessment that is specific to a health concern/reason for seeking care.	This type of assessment is performed in all areas of care (e.g., primary care, emergency, long-term care, medical, surgical). Because of its specificity, it usually involves a focus on a limited number of body systems based on the health concern, similar to an episodic database. For example, a client's reason for seeking care may be an "achy knee." Thus, the nurse's assessment will be focused on the musculoskeletal system. Another example may be chest pain. Because there are multiple causes of chest pain, you may need to do a cardiac, respiratory, and musculoskeletal assessment. Another example is a **follow-up assessment**: a client may have been prescribed a new medication for high blood pressure and needs a follow-up assessment a couple of weeks later to determine the effects.
Head-to-toe assessment (abbreviated) A head-to-toe assessment follows a **cephalocaudal** approach, assessing several body systems, and provides an overview of the client's current health status.	Typically, a head-to-toe assessment should take about 10 minutes and should be performed at the beginning of your shift and when you first interact with a client. There are variations of this assessment based on the client situation, reason for seeking care, and institution/unit. A head-to-toe assessment usually includes attention to overall wellbeing/needs, pain, vital signs, specific assessments related to neurological, cardiovascular, peripheral vascular, skin, respiratory, gastrointestinal, genitourinary, activity/rest, and wounds/dressings, IV sites, drains/tubes, and oxygen. Based on the collected data, this type of assessment may influence the need for a more focused examination of a specific body system. For example, you may notice the client has a bloated and hard abdomen. Based on these cues, you should complete an abdominal assessment. A more complete assessment/head-to-toe may be needed in certain situations when a comprehensive assessment is warranted (see next section on complete health assessment).

Complete health assessment A complete health assessment is similar to a head-to-toe assessment, but it is more comprehensive. It involves a subjective and objective assessment of all body systems. It provides a full overview of the client's current health status.	A complete health assessment may take 30–60 minutes depending on the client and the complexity of their health issues. It may be performed for several reasons, often when clients have complex care needs. It is often performed upon admission to a long-term care home or rehabilitation, and sometimes in a primary care setting with new clients. It may also be performed in acute settings when a client has complex health problems and diagnoses have been problematic. This kind of assessment can vary based on the client situation, developmental stage, reason for seeking care, and institution/unit.

Clinical Tip

When you are new to a work environment, you should inquire about the typical conventions surrounding assessment frequency and type. It is also always helpful to ask your clinical instructor/preceptor about their approach to assessment.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=182#h5p-141

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Health Promotion

Health promotion is an integral element of health assessment and part of the nurse's role. Public Health Ontario (2021) describes **health promotion** as a "process of implementing a range of social and environmental interventions that **enable people** and **communities** to **increase control** over and to improve their health." An important part of this statement are the words "enable" and "control" because health promotion is focused on promoting the agency of the client. Health promotion is an important component of preventing disease.

Health is a **resource for everyday living**, meaning that health is needed for social, economic, and personal prosperity and growth (Ottawa Charter for Health Promotion, 1986). As a nurse, you should create a space where individuals and communities feel empowered with the capacity to act on what is important to them to enhance their health.

As part of the Ottawa Charter for Health Promotion, the Government of Canada (1986) specified that health promotion includes attention to the following elements:

- Peace and stable ecosystem along with social justice and equity.
- Education, food, income, and healthy living.
- Sustainable resources.
- Healthier choices and avoidance of harmful products.

The following sections describe the three broad approaches to health promotion:

- Behavioural.
- Relational.
- Structural.

References

Government of Canada (1986). *Ottawa charter for health promotion: An international conference on health promotion*. https://www.canada.ca/en/public-health/services/health-promotion/population-health/ottawa-charter-health-promotion-international-conference-on-health-promotion.html

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Behavioural Health Promotion

A **behavioural health promotion** approach focuses on lifestyle and behaviours at the individual level. For example, behavioural health promotion strategies could include healthy eating, smoking cessation, reducing alcohol consumption, or exercise programs.

This approach to health promotion is based on the **ideology of choice** – the assumption or belief that people choose their health behaviours. Therefore, healthcare providers work collaboratively with clients to help them build life skills that address unhealthy behaviours, for example by providing information and/or education. It is important to note that this health promotion approach, although common, has been critiqued for reinforcing **victim blaming,** an approach that is devoid of contextual understanding and instead emphasizes agency. It has also been critiqued for neglecting the social context in which people live, including the social determinants of health.

Example

An RN working in a diabetic clinic offers educational sessions to clients with Type II Diabetes on healthy eating to promote balanced blood sugar levels. This is considered a behavioural approach because it focuses on the behaviour of the individual with no consideration of context. For example, this approach does not consider contextual factors such as whether the client has access to healthy food.

Relational Health Promotion

A **relational health promotion** approach emphasizes social change at the relational level, meaning the relationships between people, places, environments, spaces, beliefs, meanings, and events. For example, relational health promotion strategies could include pesticide restrictions, family-centred interventions, and bike rallies for persons living with HIV/AIDS. Here, health promotion emerges in the **relations between social beings** and their **surrounding environments.** This approach is broader than a behavioural approach because it extends beyond the individual.

Example

An RN is working in occupational health at a large automotive distribution plant and implements an initiative to install HEPA filters in spaces with many employees to reduce the transmission of disease and enhance air quality. This is considered a relational approach because it focuses on the interrelationship between individuals and their environment.

Structural Health Promotion

A **structural health promotion** approach focuses on structural aspects of health and wellbeing. In other words, it addresses policies and practices that affect health at a broader community level, such as systemic discrimination. For example, structural health promotion strategies may include advocating for access to traditional Indigenous healing options in healthcare, campaigning government for publicly accessible addiction services, and creating a transportation program for underserviced communities.

This approach to health promotion recognizes that **broader social structures** play an important role in health, and that one's participation and access within a community are shaped by one's social location. The goal is to dismantle the (often hidden) social processes that contribute to the maintenance of social exclusion and to actively promote health equity.

Example

A Street Nurse implements a mailbox program for clients with no fixed address and actively advocates for more subsidized housing locally. This is considered a structural approach because it attends to the broader needs of the community while advocating for systemic change.

Health Determinants

The Ottawa Charter for Health Promotion from the 1980s remains relevant, but in the 1990s there was a shift to a more expansive understanding of health determinants. See **Table 6** for some examples of health determinants.

Table 6: Health determinants. (adapted from the Canadian Public Health Association, 1996).

Health determinants	Considerations
Healthy child development.	Assessment of healthy child development focuses on the physical, cognitive, and emotional development of the child and whether their needs are being met and developmental milestones are being reached.
Lifelong learning.	This type of learning involves the personal and professional pursuit of knowledge. It can involve developing job skills and improving employability, and thus socioeconomic stability. It may also inspire personal development and foster a continual pursuit of knowledge even into older adulthood
Absence of **racism** and **discrimination** associated with culture, gender, and sexual orientation.	Discrimination and racism can negatively affect a person's health and wellbeing. Therefore, you should assess for the presence of these in a client's life and how it affects them.
A life free of violence.	A life free of violence positively influences health and wellbeing. It is important to be aware of the negative effects of violence on a person's life and how you can screen and assess for it.
Work opportunities and adequate income.	Access to work opportunities supports an individual's development over the course of their life and also provides access to adequate income. Limited access to these opportunities can have negative effects on health and wellbeing.
Healthy lifestyles (nutrition, activity/exercise, sleep/rest, coping and stress management, and smoke free).	A range of lifestyle factors can negatively affect health and wellbeing and lead to certain disease processes. Inquiring about these factors is part of many assessments.
Healthy, social relationships.	Healthy, social relationships are positive health determinants throughout all life stages. These can include parenting relationships, friends, work, and intimate partner relationships: all of these can support development and quality of life.
Protection from infectious diseases and environmental hazards.	Living in an environment free from and/or protected from infectious diseases and environmental hazards is important to overall health and wellbeing.

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Canadian Public Health Association (1996). *Action statement for health promotion in Canada.* https://www.cpha.ca/action-statement-health-promotion-canada

Integrative Approach to Health Promotion and Assessment

As a nurse conducting a health assessment, you have an obligation not only to document and respond to the data you yield through your health assessment, but also to offer guidance to your clients. An **integrative, individualized,** and **adapted** approach to health promotion means that you partner with clients to identify their needs. You may apply all three approaches – behavioural, relational, and structural – to health promotion. For example, some situations may call for a behavioural approach: perhaps the client is seeking strategies to reduce their cholesterol. Other occasions may call for a relational approach, such as working with a family experiencing a loss; still others may require a structural approach, such as helping a client complete application forms to cover their medication costs.

All of the health promotion approaches and strategies rely on the nurse's assessment skills and their capacity to **prioritize what is important** to the client, their family and community in that particular moment. Although health determinants remain relevant, Gewurtz et al. (2016) also proposed approaching health promotion by focusing on "the integration of physical, mental, social and spiritual components of health and well-being. … [within the context of the person's] **patterns of daily activity**" (p. e205).

This marks a change from the traditional prescriptive nature of past approaches, which neglected to truly **engage the client as an expert in their own lives** – it also includes considering the client's daily patterns of activity that should be the driving force of health promotion interventions. An effective and integrated health promotion approach that is shaped by the client's daily patterns of activity, will require that you **understand the person's day-to-day life** and **what is important** to them.

Therefore, when collaboratively developing a health promotion intervention with a client, your assessment should include questions like:

- Tell me about your day-to-day activities.
  - What does a typical day look like for you?
  - Who is involved in these activities with you?
- Have you had any recent changes in your day-to-day activities in the past year?
- In order to be a healthier you, how would you like these day-to-day activities to be different?

Table 7 presents an adapted example based on Gewurtz et al.'s (2016) health promotion approach: it is based on patterns of activity. This example is informed by clinical judgment, which requires identifying health-related cues and the identifying of actions to promote a client's health and wellbeing. As with all interventions, you should engage the client in identifying what is important to them in terms of their health and wellbeing.

Table 7: Example of health promotion

Client description	Clinical judgement	Health promotion
An international student has moved to a large city to attend their first year of university. They had a close group of friends and family in the small town they grew up in, and now feels lonely. Their day-to-day activities used to be much fuller and they used to feel engaged, and now they just go to class and study.	The nurse recognizes the cues of missing a social group. The student's activity patterns have been disrupted, leading to loneliness and disengagement. To further analyze these cues, the nurse should explore what other activities the student used to do where they grew up and what activities they may enjoy here.	Health promotion interventions should be collaboratively co-created with the student based on their needs and wants. Interventions might include connecting with their old social circle via social media/video-conference, and also developing new patterns of social activities at the university, for example by joining extra-curricular groups.

Clinical Tip

A focus on health promotion is important in all healthcare settings including primary care settings and hospital/acute care settings. Although health promotion is categorized as a third-level priority of care, you should integrate knowledge of health determinants into all assessments. A focus on health promotion can help promote client engagement and overall health and wellbeing while reducing negative effects.

References

Gewurtz, R., Moll, S., Letts, L., Lariviere, N., Levasseur, M., & Krupa, T. (2016). What you do every day matters: A new direction for health promotion. *Canadian Journal of Public Health*, 106(2), e205-e208. https://doi.org/10.17269/CJPH.107.5317

Clinical Judgement: Case Study

Read the following case study and begin to work through the clinical judgement activity as the case unfolds.

A 20-year-old client was brought into the emergency room (ER) by their roommate with abnormal vital signs. The client had a rapid heartbeat of 160 beats per minute, chest pain, shortness of breath with elevated respiration rate of 32 breaths per minute that are shallow and rapid. The client arrived at the ER sweating, shaking, stating they feel nauseous, chills, lightheaded, tingling sensation in their fingers, and as if they are going to faint. The paramedics were unable to get an O2 saturation reading due to the client's hands shaking and said the last blood pressure (BP) was elevated at 150/92 mmHg. The client's friend is frantic in the waiting room and calling the client's parents.

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=196#h5p-142

After the healthcare team provided treatment and asked the client a series of health history questions, they concluded the client had a panic attack. After 20 minutes, the client's vital signs began to stabilize: heart rate 100 beats per minute, respiration rate 22 breaths per minute, BP 130/82, and O2 rate of 96%. The client shared they had been experiencing a lot of stress at school because their midterm exams are next week. The client hasn't been sleeping, had been drinking a lot of coffee to stay up to study, and had just broke up with their partner. The client stated they had never had a panic attack before, but that their mother used to have them when she was younger.

Generating solutions involves identifying the various options (actions and interventions) to address the abnormal findings/cues. This may involve identifying which solutions are indicated, unrelated, or contraindicated.

Drag the following actions and interventions in the appropriate category before Checking your answer.

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Health promotion is an integral element of health assessment and focuses on promoting the agency of the client.

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=196#h5p-145

Key Takeaways

- Health assessment involves collecting subjective and objective data and must be performed within a nurse's scope of practice.
- Clinical judgment is an important component of health assessment resulting in the decision whether or not to act/intervene, and if action is required, what action.
- Prioritizing care in nursing is informed by Maslow's Hierarchy of Needs, as well as priorities of care (first, second, or third), and should also consider the client's wishes.
- Guiding approaches to health assessment include types of assessment such as primary survey, focused assessment, abbreviated head-to-toe assessment, and a complete health assessment.
- Health promotion is an integral element of health assessment informed by behavioural, relational, and structural approaches.

CHAPTER 2 - INCLUSIVE APPROACHES TO HEALTH ASSESSMENT

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Learning Outcomes

- Describe the concept of inclusive health assessment.
- Define key principles of inclusive health assessment.
- Outline an anti-oppressive approach to inclusive health assessment.

Introduction

A health assessment is a "felt" experience for clients.

Pause for a moment and put yourself in a client's shoes. Imagine seeking care and having the nurse diminish your feelings, make you feel unimportant, and exclude you from the care process. How would this make you feel? Probably **disrespected**, **disengaged**, and that **you don't matter** – maybe even **silenced.**

Now, imagine the alternative: the nurse values your feelings, perspectives, experiences, and considers what is important to you. How would you feel? Probably **included**, **respected**, and **engaged**.

The difference here is between health assessments that are **exclusive/oppressive** versus **inclusive/liberating**.

Learning to **conduct a health assessment** is an important part of nursing education and practice. Health assessments help nurses understand the health needs of each client and set priorities for their care. Acquiring this understanding requires:

- **objective knowledge**, which is obtained through assessment techniques and skills.
- **subjective knowledge**, which is obtained through empathetic, relational, and interactional skills.

During a health assessment, you will need to communicate and engage critically and empathetically with each unique client to understand how to care for them in relevant and holistic ways.

We are all different, and our illness experiences are informed by, and are as unique as, our social experiences, so you cannot apply a one-size-fits-all care plan. **Individual health assessments** are important to help you understand each client and tailor a **unique plan** for them. You will need to embrace all aspects of the client's humanity and be mindful and attentive to any personal and unconscious biases that may negatively influence your views and interactions with them – this is what is meant by an **inclusive health assessment**.

Safe nursing practice requires an **inclusive approach to health assessment**. Nurses are expected to protect the physical and psychological safety of clients. If clients have experienced trauma in the past, they may have psychological and physiological reactions (Cohen et al., 2006) that affect how they engage with health professionals and health interventions. It is especially important to protect the **psychological safety** of clients who have experienced racial or social trauma, or any type of trauma for that matter. The ongoing global social justice movement has brought to light how experiences with **systemic oppression** – especially discrimination and racism – lead to socioeconomic disparities that eventually have devastating impacts on health. You must consider this reality during any health assessment.

Unfortunately, the healthcare system is **not free of discriminatory** and **exclusionary practices**, and as a result, this can make clients feel unsafe. **Black**, **Indigenous**, and **LGBTQI2SA+** (Lesbian, gay, bisexual, transgender, queer, intersex, Two-spirit and asexual) populations continue to experience **inequitable care** and **access disparities**, which can lead to distrust of healthcare providers, including nurses.

A health assessment is one of the first points of contact between nurse and client. It can be a critical step where a nurse starts to address the experiences of, and repair the harm done to, these groups and others through assessment approaches that **uplift**, **not oppress**. For some time, nurses and other healthcare professionals have been encouraged to consider the cultural experiences of clients. However, it is important to transcend the usual emphasis on culture awareness: you should also include **anti-oppressive**, **humanistic practices** in health assessments.

This chapter explores what it means to be inclusive during a health assessment, in terms of **intent** and **process**.

Reference

Cohen, J. A., Mannarino, A. P., & Deblinger, E. (2006). *Treating trauma and traumatic grief in children and adolescents*. The Guilford Press.

What is an Inclusive Assessment?

To answer this question, let us first locate its relevance in the context of social justice.

Human existence is defined by differences: different people, experiences, cultures, and perspectives. **Social justice** is most commonly defined as **fairness** in terms of opportunities, regardless of differences.

Social injustice is rooted in differences and has led to terrible human suffering in our society. These injustices are the greatest point of weakness for humanity and come in many forms including:

- **Racism** (e.g., anti-Black, anti-Asian, anti-Indigenous racism)
- **Inequality** (e.g., sex, gender, racial inequality)
- **Ageism**
- **Ableism**

Social injustice can lead to social paralysis for some groups in society because of differential access to resources and opportunities, marginalization, exclusion, and discrimination. Social paralysis is a state of social stagnation imposed by inequity and injustice that hinders social and economic progress of groups in society.

Social injustice can also fuel what is known as "**othering discourse**" – discourse that promotes an "us" versus "them" mentality (Inokuchi & Nozaki, 2005). Othering is a process of exclusion and marginalization whereby groups of people are made to seem fundamentally different and inferior from dominant social groups, even to the point of making that group seem less than human. This can make marginalized groups feel unworthy and lead to powerlessness, fear, stress, trauma, and vulnerability to illnesses. From a health perspective, extreme manifestations of social injustice can include illnesses such as cancer, heart disease, diabetes, and respiratory disease. For example, researchers have demonstrated that structural injustices related to racism are the root cause of disparities in the prevalence and control of diabetes, as well as diabetes-related deaths, among racial and ethnic minorities (Ogunwole & Golden, 2021)

Without **understanding the social roots of illness**, it can be easy to blame clients for their illness outcomes, or even to perpetuate injustice in how a client is treated, with differential practices of health assessments across clients. All clients need to feel that their health and their health needs matter – and that **they matter**. Health assessments should make clients feel safe, respected, and engaged. If they feel marginalized or feel that they are being excluded or treated differently, this can foster injustices in their health outcomes, and in the healthcare system more broadly.

Inclusive health assessments should be grounded in **social justice**. Nurses must uphold the humanity of all clients in all aspects of care, regardless of the client's race, ethnicity, gender, sexuality, age, ability, and any other factor that makes them who they are.

Inclusive health assessments are based on **four key principles:**

1. **Treat every health assessment as an act of humanity**. What does it mean to be treated like a human being? We all want to be accepted, respected, and feel a sense of belonging. If you make a client feel otherwise, you are engaging in an act of oppression, which can affect human dignity and capacity to grow and transform. It is important to recognize that even though nursing is a caring profession, nurses have the **power** to oppress. You must acknowledge differences among clients, while committing to dismantle social injustices within healthcare systems that render clients inhumane.
2. **Health assessments are not about sameness.** Every client is different, so health assessments have to go beyond the "normal" or standardized approaches to physical assessment. "Normal" is a social construct: a common social idea based on cultural values and relative norms. You need to obtain a nuanced understanding of each client's unique health and illness experiences and help them move towards a path of healing. A health assessment should be more than a physical assessment: talk with the client to obtain their health history and get to know them. An inclusive health assessment means that you recognize and integrate the client's unique experiences and knowledge in their care.

3. **Examine your own personal biases**. Everyone carries biases that are acquired through socialization. These may include biases about different races, cultural practices, body sizes, or religious practices. These biases can affect how you present yourself during a health assessment, and consequently how clients feel and respond in your presence. By learning about your own biases – how they developed and how they influence your actions – you can both understand how they lead to further injustices in nursing practice, and how **you** can **start to unlearn them**.
4. **Cultivate a safe environment of care**. Create an environment where the focus is on what matters to the client. Approach each client with a "spirit of inquiry" (Registered Nurses' Association of Ontario, 2007, p. 26). Keep an open mind as you learn about the client's needs and perspectives: accept the client for who they are, value their feelings and experiences, and don't judge them. A safe space is important for clients to express themselves without fear of being judged and discriminated against. Clients will engage more when they feel they are collaborating with the nurse on a common goal in terms of what is important to the client. Feeling safe promotes self-worth and a feeling of belonging, which are critical outcomes of social justice in the healthcare system.

Clinical Tip

Take a moment to test your own **biases** by taking the Harvard Implicit Association Test. When you go to this link, you can click on "Background" to learn more about the origins and purpose of this test or click on "Take a demo test" to test your biases.

The following diagram (**Figure 1**) shows how these key principles are inter-connected. You should incorporate all of them while engaging in an inclusive health assessment. As discussed above, social justice is central to inclusive health assessment, and is therefore located in the middle of the diagram. Importantly, as indicated, social justice is rooted in anti-oppressive perspectives, as discussed later in the chapter. The dotted line signifies the direct interaction between the practice of inclusive assessment in the healthcare system and its continuing impacts in communities.

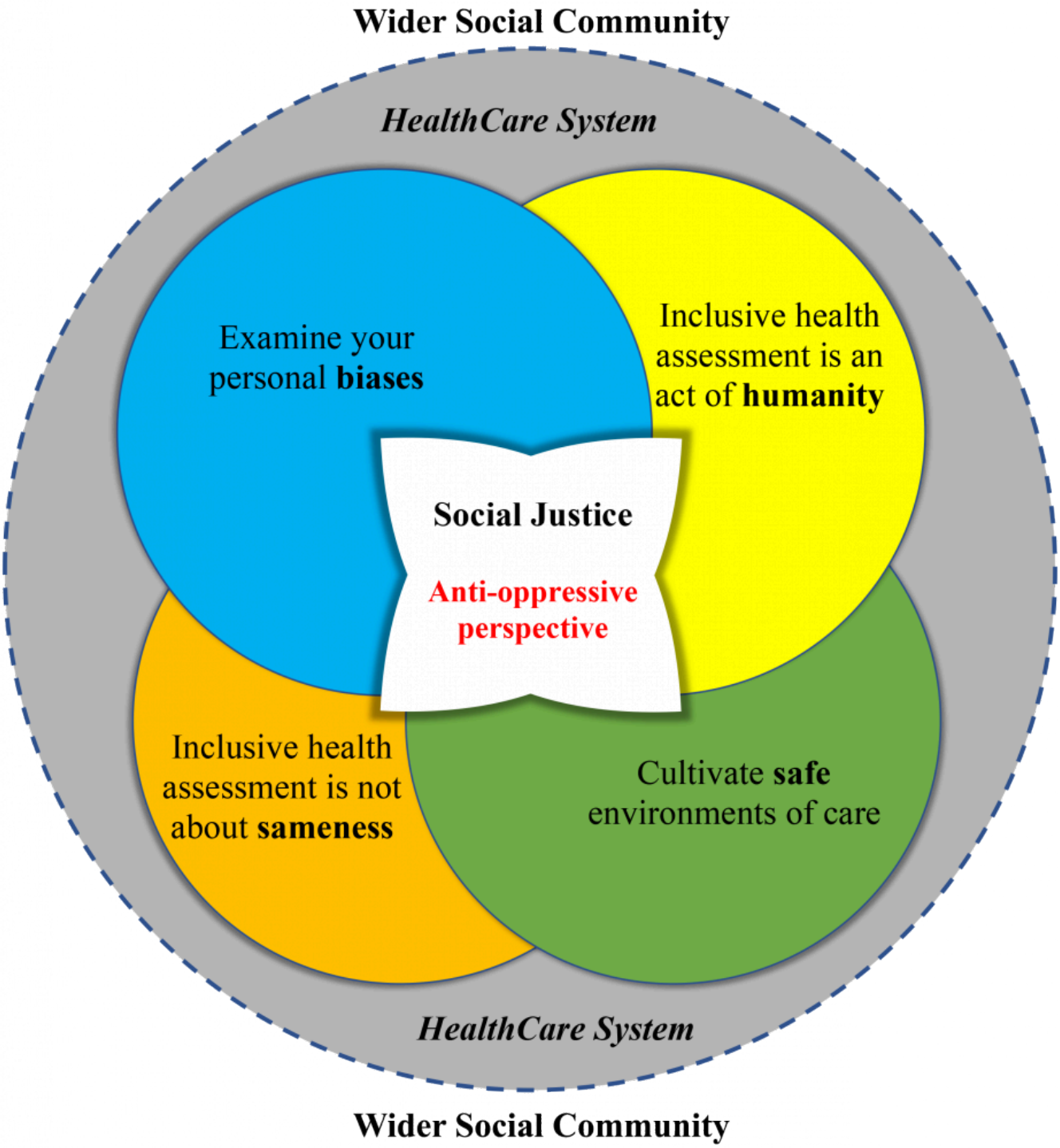

Figure 1: Principles of inclusive health assessments (illustrated by Levar Bailey)

Activity: Check Your Understanding

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Moving Beyond Culture in Health Assessment

As healthcare professionals, **nurses have power**. You have power.

If not applied carefully, this **professional power** can make clients feel marginalized or dismissed. In recent years, progressive developments in theoretical perspectives have guided nursing practice toward more humanistic care and considerations for marginalized clients and communities. New concepts have been introduced to help inform clinical judgement, honour the cultural values/beliefs of clients, and support therapeutic relationship building. These concepts include: cultural sensitivity, cultural competence, cultural humility, and cultural safety. They have helped clarify how personal biases can influence health assessments and other nursing interventions, and have also helped many nurses learn how to minimize their own biases.

Culture can be defined as the **beliefs**, **practices**, and **values** of a racial/ethnic group; it can also include other dimensions such as **gender**, **sexual orientation**, **ability/disability**, **age**, **class**, and **language** (Greene-Moton & Minkler, 2020; Hughes et al., 2019).

Reflect on each client's culture:

- What are their cultural beliefs, values, and identity?
- What should you do once you are aware of a client's culture and cultural differences?
- Most importantly, can this understanding of culture help you conduct an inclusive health assessment?

The following discussion explores these questions, beginning with an exploration of how four main concepts of culture relate to health assessments.

Cultural Sensitivity

- In nursing, cultural sensitivity **focuses on self** in terms of the **nurse's awareness** and **understanding** of a client's culture as well as attitude toward culture (Srivastava, 2007).
- Cultural sensitivity, therefore, largely rests on the nurse's ability to be compassionate, considerate, and understanding of clients, including effective communication with clients from different cultures (Foronda, 2008).

Cultural Competency

- In the past, cultural competency has been narrowly operationalized as a **checklist of cultural knowledge** required by healthcare providers to demonstrate competence when working with various racial and ethnic groups (Curtis et al., 2019; Greene-Moton & Minkler, 2020).
- A nurse who is culturally competent is able to provide effective care to clients from different cultural backgrounds (Sharifi et al., 2019).
- However, if you do not know the cultural beliefs and practices of an ethnic group, does that make you culturally "incompetent"? This kind of ambiguity in the concept of cultural competency has led to the urgency of other effective frameworks for nurses to use, including cultural humility and cultural safety.

Cultural Humility

- Cultural humility is a **life-long process of reflection** and **self-critique** in addressing **power imbalances** within systems to develop mutually beneficial partnerships and relationships (Tervalon & Murray-Garcia, 1998).
- Healthcare professionals should engage in continuous, critical reflection on power and privilege, and find ways to interact with clients of different race, sex, gender, age, and ability that don't perpetuate oppression.
- It involves being able to "humbly" recognize and be open to the idea that you are a learner as related to understanding a patient's experience (First Nations Health Authority, n.d.).

Cultural Safety

- Cultural safety requires that nurses **recognize power differentials** and broader social structures that affect **health equity** (Curtis et al., 2019).
- Nurses must challenge power imbalances in client care, considering the effects of oppression on health (Parisa et al., 2016).
- Culturally safe practice is essential in addressing health and social disparities and inequities, to ensure equitable and client-centred care.

Integration of Concepts

Nurses can **apply these four concepts of culture** to understand cultural differences and embrace respectful ways of interacting with clients from different cultural backgrounds. This can be a starting point for broader considerations of historical, social, economic, and political factors that also shape health inequities (Smye & Browne, 2002).

Despite the large body of theoretical work on culture and safe practices, many healthcare professionals continue to be intolerant of differences. So, beyond an understanding of culture, **what else is needed for nurses to uphold all the elements of social justice** in nursing care broadly and in health assessments specifically?

The next section explores how you can apply an **anti-oppressive perspective** to ensure health assessments are inclusive. This involves confronting and dismantling oppressive practices that are accepted as the status quo in health assessments and the healthcare system more broadly, especially in the care of marginalized groups.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=208#h5p-1

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Moving Toward Anti-Oppression Perspectives in Health Assessments

Understanding **anti-oppression** first requires understanding what oppression is.

Oppression

Oppression can be defined as the **unjustified use of power** and **privilege** to stagnate others socially, politically, and psychologically. Oppression is imposed through demoralizing interactions, discriminatory and exclusive policies/practices, deprivations in access to resources, and publicly propagated stereotyping that create barriers to opportunities, growth, acceptance, and recognition for some groups in society (Banks & Stephens, 2018).

Oppression is often framed in opposition to **privilege**, which can be defined as the **unearned**, **unobstructed access to resources**, **respect**, **acceptance**, and **opportunities awarded to others**.

Both oppression and privilege are unscripted laws of society that, whether exercised knowingly and unknowingly, govern how we think about and interact with those considered "different."

Oppression is both **experienced** and **felt**. Social oppression is structural, meaning it operates at all levels and systems in society, but it is experienced at the individual/group level in the form of powerlessness, trauma, feelings of unworthiness, and an indefensible struggle for recognition and acceptance. This struggle has yielded a legacy of resilience and resistance in Canada, especially among racialized and Indigenous populations, but the persistent navigation of structural barriers and personal biases has had consequences for these groups, including trauma and illness (Matheson et al., 2019).

Anti-Black racism rooted in slavery and anti-Indigenous racism rooted in colonization are known to be **illness-inducing forms of oppression**. Experiences of anti-Black and anti-Indigenous racism often translate to less educational and job opportunities, increased rates of incarceration, and more exposure to violence. Black and Indigenous children are more likely to be in the child welfare system (Matheson et al., 2019). These experiences increase the possibility of these individuals coming into contact with the healthcare system.

Anti-Oppression

As you engage with clients in the **health** and **healing process**, try to focus on **restorative** practices. Try to **recognize** and **interrupt** the negative consequences of discrimination, racism, colonization, and social injustice. As a nurse, you should operate from a position of cultural sensitivity, cultural competence, cultural humility, and cultural safety, with an **overarching professional responsibility** to **anti-oppressive** practices.

An **anti-oppressive framework** of practice is an all-encompassing commitment to **social justice** and the **flourishing of human dignity**.

When you apply an anti-oppressive perspective to a health assessment, you will be acutely aware of the many ways that health inequities can negatively transform the health of clients, their worldviews, and their responses and interactions. This kind of understanding will help ensure that you **do not stagnate** the client's healing process, and

prompt you to take action to confront discriminatory and exclusive practices within the healthcare system that might hinder the client's access to equitable care.

Contextualizing Culture

For example, Black youth in Toronto are disproportionately affected by gun violence deaths and injuries. The social stigma of experiences with gun violence often has negative effects on the care they receive from healthcare providers (Khenti, 2018). When assessing a young Black man with an injury, a nurse who is aware of the concepts of culture will understand that race puts the client at risk for this type of injury. From an anti-oppressive perspective, the nurse further understands that racial inequities and social stigma associated with this type of injury may affect healthcare workers' views and interactions with this young man and put him at risk for discriminatory care. Awareness of this possibility might prompt the nurse to obtain information needed to help advocate for health resources for the client, and also to support all members of the healthcare team in providing accessible and empathetic care.

As you conduct a health assessment from an anti-oppression perspective, you should consider how **structural barriers** and **internalized powerlessness** resulting from oppression can silence the voices of marginalized clients and prevent them from advocating for themselves in the healthcare system. Recognizing how to collaborate with these clients to **advocate for health needs** is an important part of an anti-oppressive approach to health assessments. Always be aware that feelings of disrespect and unworthiness are common consequences of social oppression, so it is critical that you remain **professional** and **respectful** to clients of diverse lived experiences in all interactions.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=210#h5p-147

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Practical Considerations and Application of Inclusive Health Assessment

In the next section, we focus on examples of clients from three populations (Indigenous, Black, and LGBTQI2SA+) to demonstrate key actions and considerations for inclusive assessments.

We chose these groups based on their historical and current experiences with intersecting oppressions and inequities that have impacted on their care in the healthcare system.

We recognize that humanistic nursing care goes beyond race, gender, and sexuality. Therefore, as you learn about these three cases, consider what inclusive assessment and anti-oppressive care might look like for other clients who might experience oppression: immigrant clients, elderly clients, or those with a disability, or other differences (related to religion and other forms of culture) that might lead to oppression.

Inclusive Health Assessments with Indigenous Clients

Case Application: Joyce Echaquan

Joyce Echaquan was a **37-year-old Indigenous woman who died** in a Canadian hospital in September 2020. Before she died, she posted a Facebook Live video of a nurse and another healthcare worker **demoralizing her** with **racist slurs**, calling her stupid and saying, "she'd be better off dead" (CBC, 2021). CBC Joyce Echaquan-coroner-inquest

Take a moment to reflect on this. The healthcare workers did not interact with Joyce in a way that **uplifted her humanity**.

How might Joyce's story have been different?

Here are a few strategies to consider when engaging in an inclusive assessment with Indigenous clients:

1. Always try to **understand the cultural experiences that affect their health**. A nurse interacting with someone like Joyce should be aware that as an Indigenous woman, she may have experienced trauma from colonization, anti-Indigenous racism, and systemic oppression, all of which may have affected her health. The experiences of residential schools have inflicted trauma and abuse on Indigenous children and families, which have resulted in problems including addictions, violence, and suicide (Aguiar & Halseth, 2015; Bourassa et al., 2015). It is important to **convey respect** for Indigenous clients and their family and **empathy** for their positionality.
2. When working with Indigenous people, you should **recognize their trauma experiences**. Ensure your interactions do not aggravate oppression and health disparities within the healthcare system. Healthcare providers have historically contributed to inequities for Indigenous people, and anti-Indigenous racism persists today in healthcare systems, which has perpetuated systemic discrimination and barriers in healthcare for Indigenous people (Richmond & Cook, 2016). As a result, many Indigenous individuals are distrustful of Canadian institutions including hospitals. **Use inclusive and anti-racist communication**: language should put clients at ease and promote belonging. Joyce's case illustrates how treatment by healthcare workers reinforced social oppression and trauma, and stripped Joyce of her dignity before her death.
3. Try to **uphold their self-determination**. Consider how historical and current policies affect all aspects of health and acknowledge the inherent right to self-determination among all clients (Richmond & Cook, 2016). Even if you lack this kind of knowledge, you can engage in assessments that uphold self-determination. Resist controlling or paternalistic approaches to care and instead **prioritize the client's right to make decisions for themselves**. In this context, this means that you need to engage in active learning about:

    - Systemic discrimination directed at Indigenous Peoples.
    - The privileging of Western forms of knowledge within healthcare.
    - Inter-generational trauma caused by historical events like residential schools.

4. **Reflect** on your own **bias** and **assumptions** about Indigenous people. Reducing inequities in health care for Indigenous people requires being **conscious of implicit biases that may affect your view of Indigenous people**. Implicit bias toward Indigenous people has become normalized in the healthcare system, such that many are desensitized to it (Wylie & McConkey, 2019). Nurses must engage in critical self-reflection about how their own biases affect their professional practice and the health of their clients (Hughes et al., 2020). When applying an inclusive approach to health with an Indigenous client, you should **share the space**, **listen**, and **attend** to the needs expressed by the client.

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Inclusive Health Assessments with Black Clients

Case Application: Mireille Ndjomouo

Mireille Ndjomouo was a **44-year-old Black mother** of three children who **died in a Canadian hospital** in March 2021. In a video she posted to social media before her death, she begged for help: "it's as if they're killing me little by little … I have children. I don't want to die and leave my children." She was begging to be moved from that hospital, stating that she had been treated with penicillin despite telling hospital staff she was allergic (World News, 2021). https://www.vice.com/en/article/pkdnpn/mireille-ndjomouo-posts-video-begging-for-help-in-quebec-hospital-days-before-she-died

Mireille was clearly feeling a **sense of powerlessness**; her voice and her own knowledge of her health needs were **not respected**.

How might Mireille's story have been different?

Here are a few strategies to consider when engaging in an inclusive assessment with Black clients as offered by Dr. Nadia Prendergast, a nurse scholar who focuses on anti-Black racism research:

1. **Be mindful** that experiences with racism in society and the healthcare system affect responses to healthcare professionals. The historical injustices of a 200-year tradition of slavery have caused multigenerational traumas that can make Black clients distrust individuals and interventions within healthcare systems (Kennedy et al., 2007). This distrust may lead them to perceive assessment questions as intrusive. Black clients' historical experiences with the healthcare system may make them reluctant or abrupt in answering some questions. Some healthcare professionals may view this as aggression – you should avoid perceiving this reluctance as aggression. Instead, explain your reasons for asking the questions and reassure confidentiality. Gauge whether it is safe to ask about their previous experiences with the healthcare system, as this may be seen as interrogating. If the nurse had considered Mireille's experiences with racism, outcomes might have been different. **Try to break down any potential or apparent barriers with consistent acceptance, friendliness, genuine care, and patience**.
2. **Be aware of your own assumptions about Blackness**. Blacks share the common experience of oppression resulting from slavery and present-day racial injustices, but they are not a homogenous group. Media and common myths have led to false perceptions of Blackness, including the false idea that Black people do not feel pain because their nerve endings are different. For example, pain is the most disabling symptom of sickle cell disease, but physicians often deny pain medication to Black sickle cell disease clients, seeing them as drug seekers or drug addicted (Bergman & Diamond, 2013). A Black male youth presenting with pain and asking for morphine might be perceived and treated as a drug addict, when he is actually having a **sickle cell crisis**. This kind of incorrect assumption can lead to improper assessments and care, as with Mireille. Always invite Black clients to share their own knowledge. **Being willing to learn from the client creates an equitable environment for healing**. Culture is exercised and interpreted differently by everyone, so it is unrealistic for you to learn everything about other cultures; instead, try to come from a place of recognition, awareness, and desire to dismantle racism.
3. **Be attuned to your own biases** about Black clients. Systemic oppression has worked to influence perceptions of

Blacks as primitive and unintelligent (Smiley & Fakunle, 2016). Linked with this are biases around people who speak with an accent as being perceived as not intelligent or being less intelligent, as well as the use of gesticulations and loud voice volumes as being signs of mental health, violence, and uneducatedness. These biases can affect how you engage with Black clients – and even when not intentional, Black clients may interpret behaviours that are dismissive and judgemental as racism. Racism manifests in our biases about racialized people as lesser beings, and therefore, less deserving of the respect and human honouring that are important aspects of an inclusive assessment. Remember that racialized clients are also assessing you as the nurse. It is vital that you actively strive to be anti-racist as opposed to merely claiming that you are not racist. You must always be conscious of your own biases, and in this context, especially about Black intelligence. You should **respect the knowledge that Black clients bring to health assessments**. In Mireille's case, her knowledge of her penicillin allergy was not respected.

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Inclusive Health Assessments with LGBTQI2SA+

Case Application: Cody

Cody is a **16-year-old** who identifies as a **transgender male**. He presents to the emergency department with anxiety. While at hospital, he experiences discrimination from hospital staff by being misgendered and not being called by his preferred name. In this virtual simulation game, you can see Cody's interactions with the healthcare system. https://soginursing.ca/eresource/index.html#/lessons/rf4jDfaDQfwab1IIq3E6xF6zF-9o4jkT

LGBTQI2SA+ individuals have historically experienced stigmatization, discrimination, and marginalization in society and in accessing healthcare.

How might Cody's story have been different?

Initial interactions during a health assessment can affect whether the client feels comfortable disclosing their sexuality and gender identity, and whether they will return for services (Bosse et al., 2015). When talking to clients about gender and sexuality, always **avoid making assumptions**.

It is important to have even a **basic understanding of gender identity**. Gender identity is one's **sense of their gender**, often identified as male or female, and can be classified as cisgender or transgender: an individual who identifies as **cisgender** has a gender identity that aligns with their sex at birth, whereas an individual who identifies as **transgender** has a gender identity that is incongruent with their sex at birth (Bourns, 2019). Individuals who identify as **non-binary** may not identify as male or female, or they may identify with no gender, or as a gender other than male or female, or as more than one gender (James et al., 2016). Within the Indigenous population, those who identify as **Two-Spirit** may describe their gender, sexual, or spiritual identity as a person who embodies both a male and a female spirit (TransCare BC, 2017).

Sexuality refers to an individual's experience and how they express themselves sexually. A person refers to their **sexual orientation** based on who they are sexually attracted to. Individuals who are attracted to the opposite gender identify as **heterosexual**, whereas those who are attracted to the same gender identity as **homosexual**. Individuals who are attracted to two genders may identify as **bisexual** (Rainbow Health of Ontario, 2020). **Heteronormativity** is the assumption that heterosexuality is the norm, which remains prevalent (Searle, 2019). It is critical to be aware of heteronormative assumptions during a health assessment.

Contextualizing Culture

For example, imagine you are doing a health assessment on an 18-year-old female with the identified pronouns she/her. If you are asking about her sexual activity and ask if she has a boyfriend, you have made a heteronormative assumption, which can have negative effects on trust and the nurse–client relationship. Instead, ask if she is sexually active, who she has sex with, and her sexual orientation.

Stigma, discrimination, homophobia, and transphobia have created social isolation and mental health challenges, including suicide risks, for LGBTQI2SA+ individuals. Therefore, it is important to ensure an inclusive and gender-affirming environment during each health assessment.

Here are a few strategies for fostering inclusive health assessments with LGBTQI2SA+ individuals:

1. Before every interaction, **reflect** on the beliefs or assumptions that you have about LGBTQI2SA+ individuals and how these assumptions may conflict with the principles of inclusive health assessments
2. When meeting a new client, introduce yourself with your name and pronoun and **ask which name** and **pronoun they use**. This normalizes gender identity and reduces stigma for transgender and **gender non-conforming** individuals.
3. When doing an assessment, ask the client their **preferred words** for their **body parts**. Using the term genitals instead of vagina or penis can be important for transgender and non-binary individuals (Bosse et al., 2015).

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Conclusion

We hope that this chapter contributes to your advocacy work and inspires you to engage in confronting oppression by dismantling the systems that support it. You can begin by engaging with clients in health assessments that are **respectful** and **recognize their humanity**.

Power and privilege negatively affect the health of marginalized people. It is important to consider the effects of power structures at the individual level – think about illness and its roots. Consider how social oppression shapes the everyday struggles of marginalized groups. These individuals must struggle to overcome the effects of these forces: over time, a client's resistance to intersecting levels of oppression can be internalized and affect their health. When interacting with clients in health assessments, try to make a **deliberate attempt to dismantle oppressive structures**.

Honour the knowledge of the client you are caring for. Your clients have knowledge of themselves, their being, and their experiences. This knowledge is important. If we as healthcare providers frame ourselves as the knower of all people, we are assessing and delivering care from a position of power: we are missing out on what it means to do an inclusive and individualized health assessment. You should embrace the knowledge clients have of their own bodies and minds. Clients also do their own assessment of nurses – they assess how well you tap into their knowledge and wisdom. You will need to reach a place where you understand your own privilege and power and can be attentive and conscientious about yourbiases.

Recognize your biases. How can you care for clients without imposing your biases? Health assessments involve a nurse's subjective as well as objective knowledge. If your subjective views are influenced by bias, this can affect client engagement and ultimately the outcomes of health assessments. **Think about what you need to relearn and unlearn**.

Key Takeaways

- Health assessments require both objective knowledge (knowledge obtained through assessment techniques and skills) and subjective knowledge (knowledge about the unique needs and experiences of clients, obtained through empathetic and relational skills).
- Illness experiences are informed by our social experiences. They are unique, so a one-size-fits-all model of care will not suit all clients.
- An inclusive health assessment involves embracing all aspects of the client's humanity and being mindful and attentive to any personal and unconscious biases that may negatively influence your views and interactions with the client.
- Inclusive health assessments require that you understand what it is to be human and what it means to be oppressed.
- Without understanding the social roots of illness, it is easy to blame clients for their illness outcomes, or even perpetuate injustice in how a client is treated, and in differential practices of health assessments across clients.
- Nurses should operate from positions of cultural sensitivity, cultural competence, cultural humility, and cultural safety; they have an overarching professional responsibility to anti-oppressive practices.

CHAPTER 3: THE COMPLETE SUBJECTIVE HEALTH ASSESSMENT

Published in December 2019

About eCampusOntario

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Legend

Throughout this text you will encounter various learning–teaching strategies. Here is a short summary:

- **Textual information** describes the content.
- **Points of Consideration** provide additional information to push your thinking beyond the main point to consider in practice. Points of consideration are visually separated from the rest of the textual information using a text box.
- Findings that require intervention, highlighted as **take action**, such as abnormal or critical findings or findings that require health promotion.
- **Activities** give you an opportunity to evaluate your learning.
- **Videos** and **podcasts** help you understand the information in a different way.
- Important phrases are **bolded**.
- Unfamiliar and complex terms are **bolded** and included in the **glossary** at the end of the book. If reading the book online, hover your cursor over a bolded word to reveal the definition.

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Learning Outcomes

- Describe the categories of a complete subjective health assessment.
- Explain the relevance for conducting a complete subjective health assessment across the lifespan.
- Formulate questions based on categories of a complete subjective health assessment.
- Recognize the sequence of subjective data collection.
- Appraise normal, abnormal, and critical subjective findings.

The Complete Subjective Health Assessment

The complete subjective health assessment is commonly referred to as a **health history**. It provides an overview of the client's current and past health and illness state. You conduct it by interviewing the client as illustrated in **Figure 1**, asking them questions, and listening to their narrative.

Figure 1: *Nurse interviewing the client*

This information is often shared verbally with you or in the way that the client can best communicate. It is also sometimes collected through a standardized form that the client completes. In some cases, it also includes information shared by a family member, friend, or another health professional when the client is unable to communicate.

Points of Consideration

Clients are sometimes accompanied by **care partners**. Care partners are family and friends who are involved in helping to care for the client. You may hear care partners being referred to as "informal caregivers" or

"family caregivers," but "care partner" is a more inclusive term that acknowledges the energy, work, and importance of their role.

The complete subjective health assessment is part of assessment, the first component of the nursing process (assessment, analysis/diagnosis, planning, implementation and evaluation) outlined in **Figure 2**.

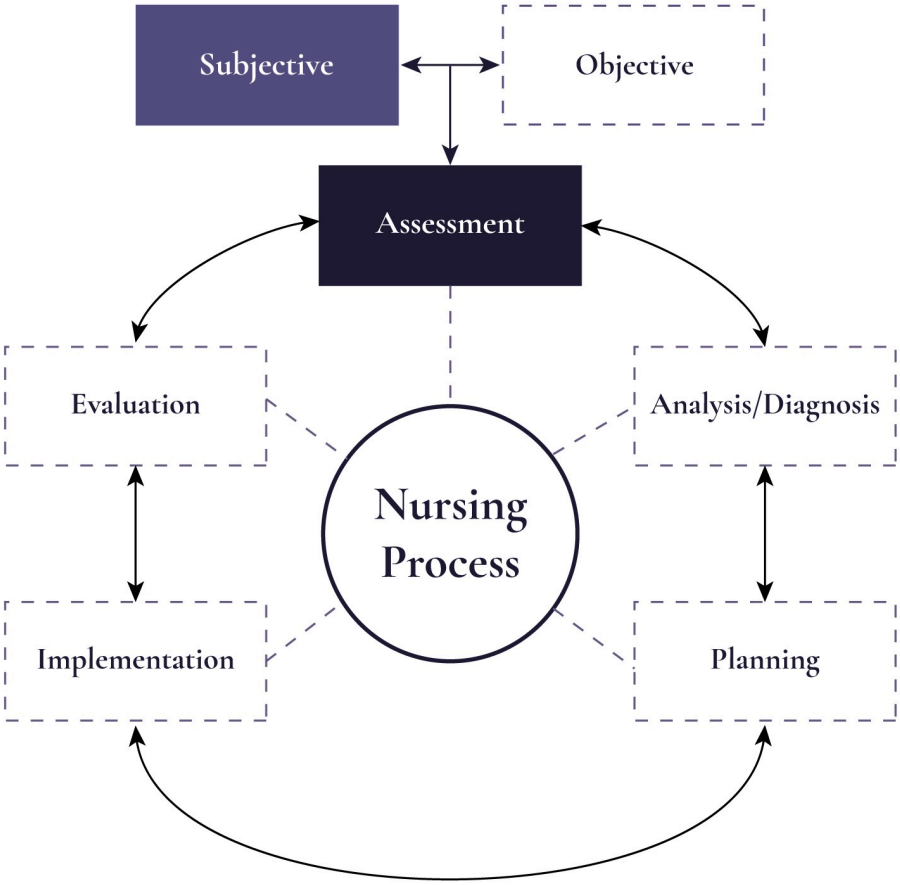

***Figure 2**: The nursing process*

As illustrated in **Figure 2**, the assessment phase of the nursing process involves collecting **subjective data** (information that the client shares) and **objective data** (information that you collect when performing a physical exam). See **Table 1** for an overview and examples of subjective and objective data. This book focuses on subjective data collection in the context of the complete subjective health assessment.

Table 1: Overview and examples of subjective and objective data

Data	Example
Subjective Information that the client shares with you spontaneously or in response to your questions.	• The client states, "I have had a rash on my ankle and leg for the last two weeks." • The parent states, "My eight-month-old son is having trouble breathing." • The client's reason for seeking care is "diarrhea for 10 days." • The client types, "I feel sick to my stomach."
Objective Information that you observe when conducting a physical assessment, and lab and diagnostic results.	• You observe that a client has a bright red rash on the dorsal side of the foot, the lateral malleolus, and anterior and lateral side of the lower leg. • You observe the client sitting upright, leaning forward, breathing fast with eyes wide open. • You take the client's blood pressure and report it as 112/84 mm Hg and pulse at 84 beats per minute. • Lab test results: K+ 4.0 mmol/L, fasting glucose 4.8 mmol/L. • Chest X-ray report: Lungs well inflated and clear. No evidence of pneumonia or pulmonary edema.

As the word "subjective" suggests, this type of data refers to information that is spontaneously shared with you by the client or is in response to questions that you ask the client. Subjective data can include information about both symptoms and signs. In the context of subjective data, **symptoms** are something that the client feels, as illustrated in **Figure 3** (e.g., nausea, pain, fatigue). You won't know about a symptom unless the client tells you. **Signs** are something that the health professional can observe, such as a rash, bruising, or skin perspiration, also illustrated in **Figure 3**. Although you can observe signs, in the context of a subjective assessment, the client shares this subjective information with you. For example, a rash is both subjective and objective data as it could be something that the client shares with you, but it is also something that you can observe. On the other hand, if the client says that the rash is itchy, that would be considered subjective data and, in this case, it would be a symptom because it is something the client feels and you can't observe.

Figure 3: *Symptom versus sign*

Reflective questions

1. What type of data do you collect when completing a complete subjective health assessment?
2. How do you differentiate symptoms from signs?

Test Yourself

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Reasons for Conducting a Complete Subjective Health Assessment

The aims of the nursing process are to identify main health and illness concerns, determine the underlying issues/etiology, collaborate with the client to address and resolve these concerns and issues, and engage in health promotion. To meet these aims, you engage in a process of diagnostic reasoning by critically exploring and analyzing both subjective and objective data to identify **cues** that require further investigation and the health needs of the client. The complete subjective health assessment is an important component of this process as it allows **insight into the client's state of health and illness**. Depending on the context and the client's main health needs, the complete subjective health assessment may occupy the bulk of your time with the client.

You should conduct a complete subjective health assessment when a **comprehensive overview** of the client's health and illness is needed. For example, you may conduct a complete subjective health assessment when a client moves into a long-term care institution, and depending on the institution, this may be repeated monthly. This assessment is also conducted when a client is admitted to a hospital, and a shortened version of it is often completed at the start of each shift. However, how frequent and how comprehensive the assessment is depends on the client's needs, the situation, and the institution's policies.

More **focused assessments** are required when collecting specific subjective data based on the health issues and/or need to clarify or follow up on previous information provided. Situations that warrant a focused assessment as opposed to a complete subjective health assessment include:

- An emergency (i.e., a situation with imminent catastrophic risk if untreated). In this case, you focus on collecting data that is vital to stabilizing a life-threatening illness; it may be specific to airway, breathing, and circulation. An example is a client who arrives at the emergency department reporting "crushing chest pain." In this case, a focused assessment is conducted that attends to the reason for seeking care and may focus on questions about the cardiac and respiratory system.
- A continual in-hospital assessment. In this case, you assess a client several times throughout your shift. The assessment focuses on the client's current main health issues and following up on health issues that were previously addressed.
- Primary care assessment. In this case, you focus your assessment on an emergent issue that has arisen for a client (e.g., a rash, pain in their knee, a fever). However, some primary assessments require a complete subjective health assessment particularly if this is a client you are meeting for the first time or they have a complex health issue.

Reflective questions

1. When should you conduct a complete subjective health assessment?

Test Yourself

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Categories and Influencing Factors

Categories

Categories of the complete subjective health assessment (as illustrated in **Figure 4**) vary depending on the framework you follow, but generally include:

- Introductory information: Demographic and biographic data.
- Main health needs (reasons for seeking care).
- Current and past health.
- Mental health and mental illnesses.
- Functional health.
- Preventive treatments and examinations.
- Family health.
- Cultural health.

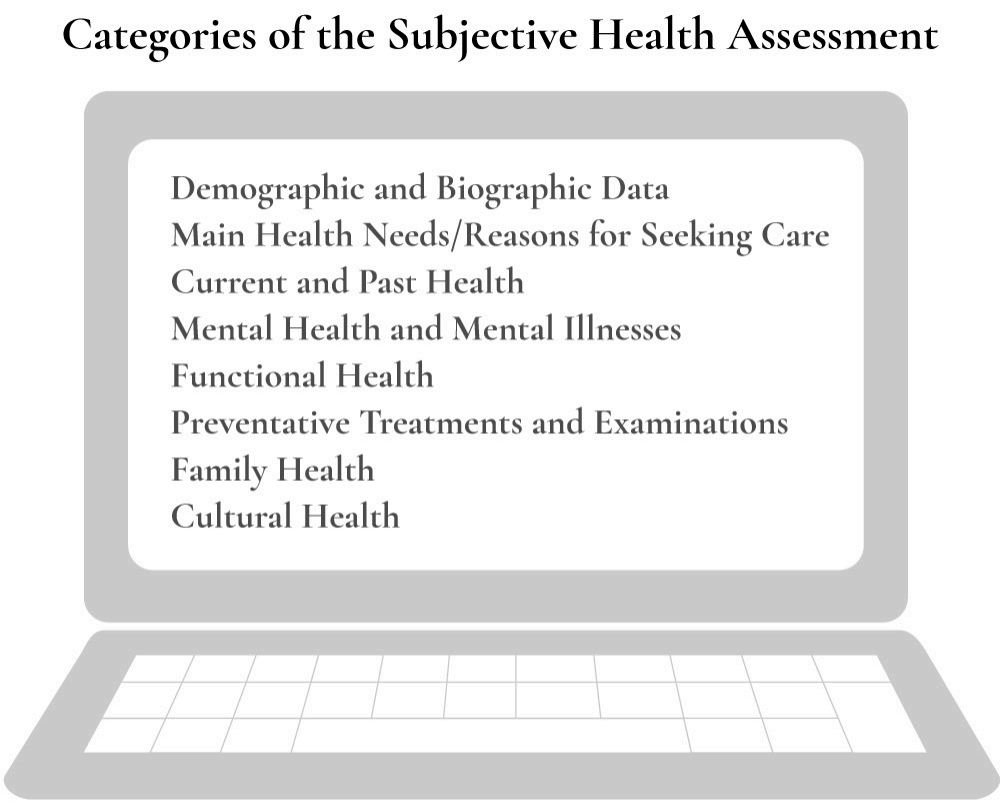

Figure 4: *Categories of the Subjective Health Assessment*

You begin the assessment with an introduction followed by collecting information about demographic and biographic data and then, main health needs. Afterwards, there is no specific order in which these categories must be assessed.

Often it depends on the client's main health needs or reasons for seeking care. Sometimes it depends on the natural flow of conversation that occurs with the client. Usually, you assess sections that involve sensitive questions as well as cultural health towards the end when you have had the opportunity to develop a level of trust with the client. Remember, when introducing yourself state your full name, designation, and pronouns, and then ask the client what name and pronouns you should use to refer to them. It is important not to use the term "preference" when referring to pronouns and gender as these are not preferences.

In addition to these categories, you may incorporate subjective questions specific to each of the body's systems; this phase is called a **Review of the Systems**. These questions give you insight into each body system (e.g., skin, eyes, cardiovascular, musculoskeletal). Depending on the client's response and the reporting of **cues** that prompt your concern, you may probe further with more specific questions. In other readings, you will learn about subjective questions related to each body system.

Clinical Tip

Always ask one question at a time.

Influencing Factors

Influencing factors constitute common situational issues that can arise during a subjective data assessment. Always consider **factors that may influence how you ask questions** and the validity and reliability of the subjective data collected. These situational factors can be difficult to both assess and address in certain cases (see **Table 2**).

Table 2: Influencing factors and strategies

Factors	Strategies
Clients may be hyperaware of the situation and wonder why you are asking certain questions.	• Begin by sharing with the client why you are asking these types of questions. • Encourage the client to ask you questions if they are uncertain about why certain information is being sought. • Normalize sensitive questions by stating: "I ask all clients about X so that I can better understand the context of their health and illness."
Clients may downplay or exaggerate what they tell you.	• Seek clarification. • Reframe the questions you ask. • Paraphrase what the client says and ask if you have captured their meaning correctly.
Clients may withhold information because they fear sharing information, feel judged by sharing certain information, and/or have a condition that is often stigmatized.	• Emphasize confidentiality. • Introduce sensitive questions later in the interview once you have established a therapeutic and trusting relationship.
Clients may not be fully conscious or oriented due to a physical injury, a mental health condition, a traumatic event, or substance use.	• It is important to be patient and give clients time to think and respond to your questions. • You may need to delay asking some questions until the client begins recovering. • If appropriate, ask other people who can share information about the client to corroborate it. **Note**: With a client who is under the influence of a substance, it is important to avoid prejudice, remain nonjudgmental, treat them with respect, speak slowly and clearly with simple language, provide a safe environment for them, and continue to monitor while observing changes in behaviour and level of consciousness.
Clients may function at a developmental age (as opposed to actual age). Developmental age is the age that a client functions at on a cognitive, physical, emotional, and social level. You need to consider this factor with all ages across the lifespan.	• Tailor your language and tone of voice to the client's developmental age. • Always use a respectful and professional tone. • Create space for others to be involved and/or invite a care partner to be present.

Points of Consideration

It is important to document who provides the subjective data. Usually, subjective data is provided by the client (**primary source**), but in some situations it may be collected from the client's chart, family members, friends, co-workers, care partners, or interpreters (**secondary sources**). In certain cases, the client may be unable to speak or share information, or may speak a different language than you, or be unconscious. Additionally, a care partner (such as a family member) may

need to provide subjective data for a newborn or a client with developmental, cognitive, or mental health states that prohibit them from speaking.

Reflective questions

1. What strategies should you use to address influencing factors of common situational issues that can arise during a complete subjective data assessment?
2. How should you begin a complete subjective health assessment?
3. What are the categories of a complete subjective health assessment?

Test Yourself

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Introductory Information: Demographic and Biographic Data

"Introductory information" refers to the **demographic and biographic data** that you collect from the client. This data provides you with basic characteristics about the client, such as their name, contact information, birthdate and age, gender, gender pronouns, allergies, languages spoken and preferred language, relationship status, occupation, and resuscitation status.

Although this data is brief and succinct, the intent of collecting it is not to be reductionist or to label clients. Rather, it is meant as a **brief overview** of the client and to provide the information you need to reach next of kin in an emergency, to be attentive to allergies at a glance, and to tend to the client in a caring manner. See **Film Clip 1** of a nurse conducting an assessment of a client's demographic and biographic data. See **Table 3** for suggested questions and statements you can use to collect this data in an inclusive and caring manner, as well as an example of a demographic and biographic form below.

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Film Clip 1: Nurse assessing demographic and biographic data (Keep in mind that is best to just ask "What gender pronouns do you use?" as opposed to using the language "preferred pronouns." **This video was created prior to the shift in language**).

Table 3: Introductory information: Collecting demographic and biographic data

Data	Questions and Statements
Name/contact information and emergency information	• What is your full name? • What name do you prefer to be called by? • What is your address? • What is your phone number? • Who can we contact in an emergency? What is their relationship to you? What number can we reach them at?
Birthdate and age	• What is your birthdate? • What is your age?
Gender	• Tell me what gender you identify with. • Not everyone uses a gender pronoun, but if you do, what gender pronouns do you use? (If the person asks you to use a pronoun that you are not familiar with, it is okay for you to respectfully respond, "I am not familiar with that pronoun. Can you tell me more about it?")
Allergies	• Do you have any allergies? • If so, what are you allergic to? • How do you react to the allergy • What do you do to prevent or treat the allergy? **Note:** You may need to prompt for information on medications, foods, etc.
Languages spoken and preferred language	• What languages do you speak? • What language do you prefer to communicate in (verbally and written)? **Note**: You may need to inquire and document if the client requires an interpreter.

Relationship status	• Tell me about your relationship status. **Note**: Avoid questions such as “Are you married?” or “Do you have boyfriend?” or “Do you have a wife?” as they assume normative behaviour and heterosexuality.
Occupation/school status	• What is your occupation? Where do you work? • Do you go to school? **Note**: Reassure the client that this information provides insight into the nature of their work (e.g., the physical or mental impact) and environmental exposures, and that the question is not intended to evaluate the client.
Resuscitation status	• We ask all clients about their resuscitation status, which refers to medical interventions that are used or not used in the case of an emergency (such as if your heart or breathing stops). You may need more time to think about this, and you may want to speak with someone you trust like a family member or friend. You should also know that you can change your mind. At this point, if any of this happens, would you like us to intervene? **Note**: Depending on the client’s answer, you will need to collaborate with the broader healthcare team, explore the details of the client’s wishes further, and have them complete a requisite resuscitation form.

Demographic Information Form (Example)

Clicking the hyperlinked question mark **(?)** next to the example form fields will take you to some suggested questions to ask your patient.

Interview Date: _____

Client Name: _____ **(?)**

Date of Birth: _____ **(?)**

Age: _____ **Sex:** Male / Female / Another Option _____

Gender You Self Identify With: _____ **(?)** **Pronouns:** _____

Healthcard Number: _____

Primary Language: _____ **(?)**

Relationship Status: _____ **(?)**

Phone Number:

Address:

Allergies: _____ **(?)**

Occupation/Education: _____ **(?)**

Resuscitation Status: (?)

Emergency Contact: **Relationship to Patient:**

Phone Number:

Information from: Patient / Other

Patient Accompanied: Yes / No **Accompanied's Details:**

Test Yourself

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Main Health Needs (Reasons for Seeking Care)

The client's main health needs are referred to in a variety of ways depending on the environment or institution that you work in. At first point of contact, "main health needs" are often referred to as "**reasons for seeking care**" or "main concerns or issues." In an institution where the client is already admitted, "**main health needs**" is more commonly used.

Whichever term is used, it recognizes that clients are complex beings, with potentially multiple co-existing health needs, and often there is a pressing issue that requires most immediate care. This is not to suggest that other issues be ignored, but rather it allows providers, clients, and care partners to stay focused.

Most often, providers will document in the client's own words what the main health needs are. **Table 4** offers example questions to ask to determine a client's main health needs in different scenarios, along with sample responses.

Clinical Tip

It is important to avoid asking questions that begin with "why," which may suggest to the client that they did something wrong or that they are to blame for what is happening to them.

Table 4: Determining main health needs (reasons for seeking care)

Client	Assessment	Sample Responses
Presenting to a clinic or a hospital emergency or urgent care (first point of contact).	Tell me about what brought you here today. **Probes** • Tell me more. • How is that affecting you?	• “I have a rash” • “I have been feeling quite depressed lately” • “I’m having pain”
Already admitted, and you are starting your shift.	Tell me about your main health concerns today. **Probes** • Tell me more. • How is that affecting you?	• “When will I be discharged?” • “I’m really hungry, can I eat something today?”

Take Action

As a health professional, you need to identify whether a client's symptomology is considered: **normal**; **abnormal** and requiring intervention; or a **critical finding** that requires prompt intervention. Your subjective data assessment may be cut short if critical findings arise that require immediate intervention. In such a case, you focus on the critical finding and resume the complete subjective health assessment later, when appropriate. Some findings, even though normal, will require **health promotion** interventions.

Examples of subjective data that are identified as **critical findings** and require **prompt intervention** include but are not limited to:

- Chest pain.
- Severe difficulty breathing.
- Sudden change in vision or ability to speak.
- Sudden weakness or paralysis in a limb.
- Uncontrollable bleeding.
- Post-operative pain or vomiting not relieved by medication.
- Suicidal or homicidal ideation with a plan.

Points of Consideration

"Door-handle conversations" describe the situation of a client sharing something with a health professional just as they are about to leave the room (their hand is on the door handle as illustrated in **Figure 5**). Often it is at the last minute when clients gather the courage to speak about a health issue that they are embarrassed or feel shameful about. It may be about something that is stigmatized, or they feel they may be judged on. In these cases, it is important to make time for the client and listen in a non-judgmental manner.

Figure 5: *Door-handle conversation*

Test Yourself

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The PQRSTU Assessment

There are many tools to help you further explore a client's symptoms or signs. A common one follows the **mnemonic PQRSTU** as illustrated in **Figure 6**, which offers a systematic approach to asking assessment questions without leaving out any details.

Figure 6: *The PQRSTU assessment mnemonic*

The mnemonic is often used to assess pain, but it can also be **used to assess many signs and symptoms** related to the client's main health needs, and other signs and symptoms that are discussed during the complete subjective health assessment. **Table 5** lists examples of prompting questions using this mnemonic.

Table 5: The PQRSTU assessment mnemonic

PQRSTU	Questions Related to Pain	Questions Related to Other Symptoms
Provocative	• What makes your pain worse?	• What makes your breathing worse?
Palliative	• What makes your pain feel better?	• What makes your nausea better?
Quality	• What does the pain feel like? **Note**: If the client struggles to answer this question, you can provide suggestions such as "aching," "stabbing," "burning."	• What does the itching feel like?
Quantity	• How bad is your pain?	• How bad is the itching?
Region	• Where do you feel the pain? • Point to where you feel the pain.	• Where exactly do you feel the nausea?
Radiation	• Does the pain move around? • Do you feel the pain elsewhere?	• Do you feel the nausea elsewhere?
Severity (severity scale)	• How would you rate your pain on a scale of 0 to 10, with 0 being no pain and 10 being the worst pain you've ever experienced? **Note**: The severity scale is an important assessment of pain and when used can provide evaluation of a treatment's effectiveness. After eliciting a baseline, you may provide some sort of pain control intervention and then reassess the pain to see if it was effective.	• How would you rate your breathing issues on a scale of 0 to 10, with 0 being no problems and 10 being the worst breathing issues you've ever experienced?
Timing	• When did the pain start? • What were you doing when the pain started? • Where were you when the pain started? • Is the pain constant or does it come and go? • If the pain is intermittent, when did it last occur? • How long does the pain last?	• When did your breathing issues begin? • What were you doing when the itching first started? • Where were you when the itching first started? • Is the nausea constant or does it come and go? • If the nausea is intermittent, when did it last occur? • How long did the nausea last?
Treatment	• Have you taken anything to help relieve the pain? • Have you tried any treatments at home for the pain?	• Have you taken anything to relieve the itching better? • Have you tried any treatments at home for the itching?
Understanding	• What do you think is causing the pain?	• What do you think is causing the rash?

The order of questions you ask will often depend on the symptom or sign and the flow of the conversation with the client. You will also want to **be aware of responses that don't seem to align**. For example, if a client responds to the question about quantity of pain by saying "the pain isn't too bad," but then rates the severity of their pain as being 8/10, you should probe further. It is okay to say to the client, "I noticed you rated your pain fairly high, at 8/10, but you said it isn't too bad. Can you tell me more about that?"

Clinical Tip

When using the PQRSTU mnemonic for assessment, be sure to apply it comprehensively so that you elicit a full understanding of a particular sign or symptom. See **Film Clip 2** for effective demonstration of using the PQRSTU mnemonic, and **Film Clip 3** for ineffective demonstration of using the PQRSTU mnemonic.

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Film Clip 2: Effective use of the PQRSTU mnemonic

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Film Clip 3: Ineffective use of the PQRSTU mnemonic

Developmental and Cultural Considerations

Younger children or clients with developmental delays or disabilities, or cognitive impairments, may not be able to answer the types of questions shown in **Table 5**. The care partner might be able to help answer some of these questions, and in that case, you should explore "why" and "how" questions. For example, if the care partner indicates that the infant's pain started two weeks ago, you should ask "Why or how do you know that it started then?" Or if you are working with a young child, you will need to modify your language to be more understandable (e.g., "Where does it hurt?" "Where is your owie?").

You can also assess pain in young children using the Wong-Baker FACES Pain Rating Scale (see **Figure 7**). When using this scale, ask the client to choose the face that best depicts the pain they are experiencing. You may need to explain

what the faces mean: Face 0 doesn't hurt at all, Face 2 hurts just a little bit, Face 4 hurts a little bit more, Face 6 hurts even more, Face 8 hurts a whole lot, and Face 10 hurts as much as you can imagine.

Figure 7: *Wong-Baker FACES® Pain Rating Scale Wong-Baker FACES Foundation (2019). Wong-Baker FACES® Pain Rating Scale. Retrieved May 29, 2019, with permission from http://www.WongBakerFACES.org (see their website for licensing)*

Alternative scales exist to assess pain and other symptoms that are more relevant to certain cultures. See **Figure 8** for an example of a Sun-Cloud-Pain Scale. On this sliding scale, 0 indicates that the client feels very well whereas 5 indicates that the client is feeling very unwell.

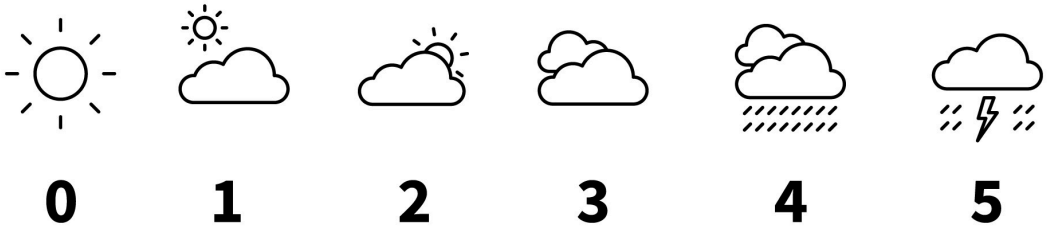

Figure 8: *Sun-Cloud-Pain Scale. Graphic Created Using Icons by Linseed Studio from the Noun Project.*

Reflective questions

1. What mnemonic should you use to assess a client's reason for seeking care?

Test Yourself

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Current and Past Health

Understanding the client's **current and past health** is important and may provide an explanation or rationale for the client's current health status as illustrated in **Figure 9**. Furthermore, these data can provide insight into health promotion needs and co-morbidities. It is helpful to understand the current and past health profiles before assessing other aspects of health, as the information will inform subsequent questions.

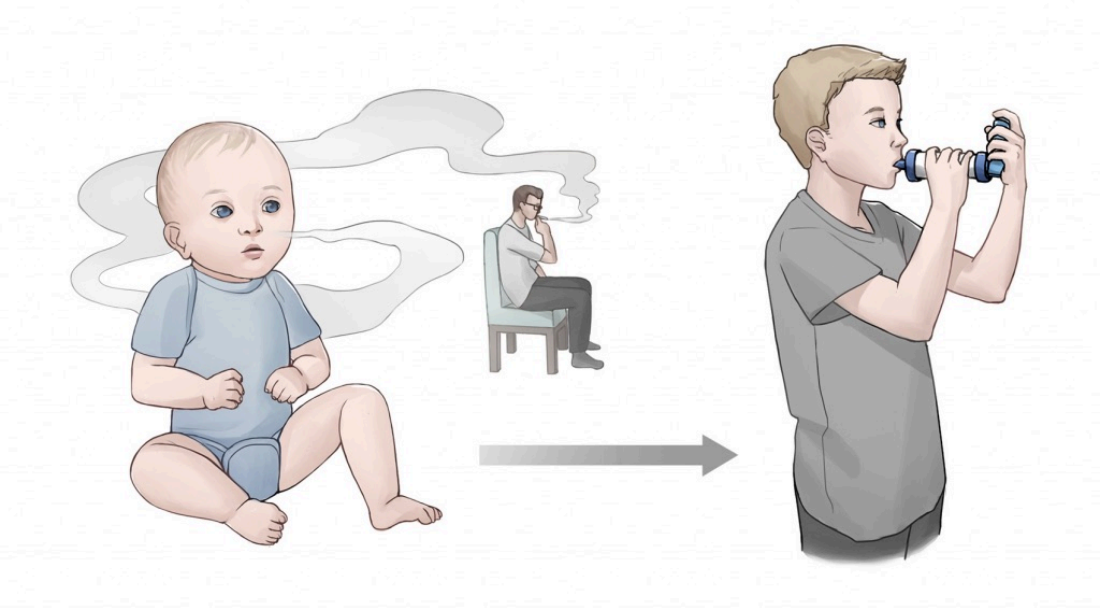

Figure 9: *The influence of past health on current health*

The order of the questions about current and past health, and the detail elicited, often depends on the client's main health needs and developmental status. Not all questions apply to every client; their use and phrasing is contingent on the individual client and their situation.

Clinical Tip

Your questions should also be based on the client's response to the previous question.

As you develop your clinical judgment, which comes with practice, you will become more astute about **which questions are appropriate** and **how to frame** the questions. **Table 6** provides sample questions for assessing current and past health, but other questions may arise that you may need to ask depending the client's main health needs and their responses.

Table 6: Current and past health assessment

Health Items	Questions and Statements	Considerations
Current health Issues other than their previously noted main health needs/reasons for seeking care.	Are there any other issues affecting your current health? **Probes** • Tell me more. • How is that affecting you?	Although the client may not have made the connection, other health issues are sometimes related to their main health need. For example, they may report a fever in addition to an earache.
Childhood illnesses Type, timing, treatment, hospitalizations, complications, disability	• Tell me about any significant childhood illnesses that you had. • When did it occur? • How did it affect you? • How did it affect your day-to-day life? • Were you hospitalized? Where? How was it treated? • Who was the treating practitioner? • Did you experience any complications? • Did it result in a disability?	The probing questions may be more important to ask when the illnesses may impact the client later in life.
Chronic illnesses Type, timing, impact, treatment, hospitalizations, complications, disability	Tell me about any chronic illnesses you currently have or have had (e.g., cancer, cardiac, hypertension, diabetes, respiratory, arthritis). **Probes** • How has the illness affected you? • How do you cope with the illness? • When were you diagnosed? • Who was the treating practitioner? • How was the illness being treated? • Have you been hospitalized? Where? • Have you experienced any complications? • Has the illness resulted in a disability? • How does the illness affect your day-to-day life?	Chronic illnesses can significantly impact a client's life both physically and psychosocially.

Acute illnesses, accidents, or injuries Type, timing, treatment, hospitalizations, complications, disability	Tell me about any acute illnesses that you have had. Tell me about any accidents or injuries you currently have or have had. **Probes** • When did it occur? • Were you hospitalized? Where? • How was it treated? • Who was the treating practitioner? • Did you experience any complications? • Has it resulted in a disability? • How did it affect your day-to-day life?	Falls are an increasing health issue as a person ages or if they are taking several medications. This is partly related to decreases in muscle strength and balance and multimorbidity. It is important to assess the client's risk for falls and fall prevention. Check out the Registered Nurses' Association of Ontario (2017) best practice guideline: Preventing Falls and Reducing Injury from Falls
Obstetrical health Number of pregnancies, full-term deliveries, pre-term deliveries, number of living children, fertility treatments, miscarriages, abortions, and other data related to current or past pregnancy	• Have you ever been pregnant? • Do you have plans to get pregnant in the future? • Tell me about your pregnancies. • Have you ever had difficulty conceiving? • How was your labour and delivery? • Tell me about your postpartum experience. • Were there any issues or complications?	These questions do not apply to all clients. Additionally, you should be aware that the feelings about pregnancy can be complex and may not always be happy.

Clinical Tip

The parents or a care partner are often present during an assessment of an infant or child. The adult child or care partner are sometimes present during an assessment of an older adult, particularly if the client has an acute or chronic illness, or a cognitive impairment or developmental delay. Care partners are important advocates in care planning. Thus, a family-centred approach can help you assess the client, as well as the level of caregiver burden and the need for additional resources.

Take Action

In addition to a comprehensive assessment, you should engage in **health promotion** discussions about a client's current and past health. For example, this may include helping the client to address any resolved issues associated with chronic and acute illnesses. Additionally, you should consider how the client can develop control over, and improve their physical, mental, and social well-being. You should assess and discuss with them their social and personal resources to do so. Also, evaluate and intervene with critical findings related to current and past health that include anything that puts the **client's life at risk**.

Test Yourself

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=686#h5p-10

Mental Health and Mental Illnesses

A client's mental health refers to their **emotional and psychological well-being** that affects their day-to-day functioning. The World Health Organization (2014) defines mental health as a "state of well-being in which every individual realizes … [their] own potential, can cope with normal stresses of life, can work productively and fruitfully, and is able to make a contribution to … [their] community." Mental health is often underscreened, which reveals a significant gap considering that stress is pervasive in society.

Clinical Tip

Mental health is a component of every person—a state of well-being that fluctuates throughout life.

Mental illness includes conditions such as depression, anxiety, addiction, schizophrenia, post-traumatic stress disorder, among others. By definition, **mental illness is a disruption in everyday function**, which means a person's employment, relationships, and civil participation can all be impaired by mental illness.

It is important to assess a client's mental health, and if present, mental illnesses. You want to begin this component of the assessment with a statement such as, "Mental health is an important part of our lives and so I ask all clients about their mental health and any concerns or illnesses they may have."

See **Table 7** for a selection of questions and statements that you may ask clients to elicit data about their mental health. Note also that there are many other factors that influence mental health, such as violence and trauma, which are addressed under the next section, Functional Health.

Table 7: Mental health and illness assessment

Question or Statement	Considerations
Tell me about your mental health.	This question broadly focuses on health and invites a dialogue. The statement should not be asked in isolation or as a one-off question, as societally and culturally there are different meanings of what constitutes mental health and a client may not identify themselves as having mental health issues. If a client responds "Good," consider probing a bit further with "Tell me about how so," or "What do you mean by good?" which allows them to respond in more depth.
Tell me about the stress in your life.	Stress, by and large, is a relatable term that many clients have experienced and that is something they are likely more comfortable talking about than more difficult health issues because it is so ubiquitous. It's important to be attentive to the client's language and consider terms they may use, such as "extreme stress," "severe stress," "unmanaged stressed," or "debilitating stress," as these may indicate an underlying mental health issue or stress that requires intervention.
How does stress affect you?	Understanding how stress affects the client provides insight into the mental, physical, and social impact on them. You may need to probe about how stress affects the client physically, mentally, and socially.
How do you cope with this stress? (may include positive or negative coping strategies.)	This question invites discussion about coping strategies. It is important to be attentive to any self-harm coping strategies such as substance abuse, isolation/disengagement, food restriction, purging, cutting, compulsions, and phobias as these could indicate a mental health issue. Additionally, you want to use a **strength-based approach** to your assessment and facilitate the client's capacity to identify and use positive coping strategies.
Have you experienced a loss in your life or a death that is meaningful to you?	Inviting discussions about loss and grief could be helpful for clients who have not had an outlet to speak openly about their emotions and the impact. Allowing for loss and grief to be talked about and understanding to what degree grief is affecting health is an important aspect of a mental health assessment.
Have you had a recent breakup or divorce?	Estrangement, emancipation, disruption, or severance of a relationship are not necessarily an indication of a mental illness. However, a pattern in relational disruption may indicate underlying issues such as, but not limited to, ineffective relationship skills, poor coping, or low self-esteem. Assess further if the client reports a breakup or divorce.
Have you recently lost your job or been off work?	Many clients define themselves through their work, and job loss can be disruptive to everyday life. Understanding the meaning of loss of employment is an important dimension of mental health.

Have you recently had any legal issues?	Asking about legal issues should be purposeful, not invasive. For example, a pattern of driving under the influence or possession of illicit drugs could indicate an underlying addiction. Use your clinical judgment when asking questions about legal issues, and be sure to convey an **unconditionally accepting way of being** with the client.
Have you purchased any weapons?	The purchase of weapons by itself is not an indication of mental illness. In Canada, some people enjoy hunting and other recreational activities that involve weapons. However, the purchase of weapons in response to threats to personal safety or to feelings of self-harm could indicate an underlying mental illness.

If the client identifies that they have a mental illness, you want to assess the onset of it, and the associated impacts, treatments, hospitalizations, complications, and disabilities. Here are some questions and statements that you may use to elicit more information about the client's well-being in light of having a mental illness:

- How does that illness affect you?
- How does that illness affect your day-to-day life?
- How do you cope with the illness?
- What resources do you draw upon to cope with your illness?
- When were you diagnosed?
- Who was the treating practitioner?
- Have you been hospitalized? Where?
- Tell me about your treatment (e.g., medications, counselling).
- Have you experienced any complications?
- Has the illness resulted in a disability?
- Do you have any concerns that have not been addressed related to your illness?

Take Action

Health promotion is a vital component of all mental health assessments. You should collaborate with the client on how to develop healthy behaviours to promote their mental health. Also, chronic and sustained stress is an influencing factor of certain diseases such as heart disease and cancer. Furthermore, some coping behaviours related to stress, such as using alcohol and cigarettes, can **exacerbate** the onset of these diseases. Thus, assessment and **collaborative interventions** are important.

You also need to be attentive to critical findings that require intervention. For example, if a client talks about feeling despair, hopeless, or depressed, it is important to **screen for suicidal thinking**. You should begin with a general probing question, such as "Have you ever felt like hurting yourself?" If the client responds with a "yes," then you should progress with more exploratory and specific questions that assess the immediacy and the intensity of the feelings. For example, you may say, "Tell me more about that feeling. Have you been thinking about hurting yourself today? Have you put together a plan to hurt yourself?"

Points of Consideration

1. The client **most at risk** is one who has a specific plan about self-harm, specifying how and when, particularly if it is within 48 hours. The age of the client is not a factor in this determination. Under these circumstances, you should not leave the client alone. You should collaborate with them about an immediate emergency plan of care.
2. It is important that you not make assumptions about a client's mental health based on their appearance, facial expression, and capacity to function in their daily life. For example, you shouldn't assume that a person dressed nicely with a smile or neutral expression is mentally healthy or that a dishevelled person in a gown (see **Figure 10**) has mental health issues.

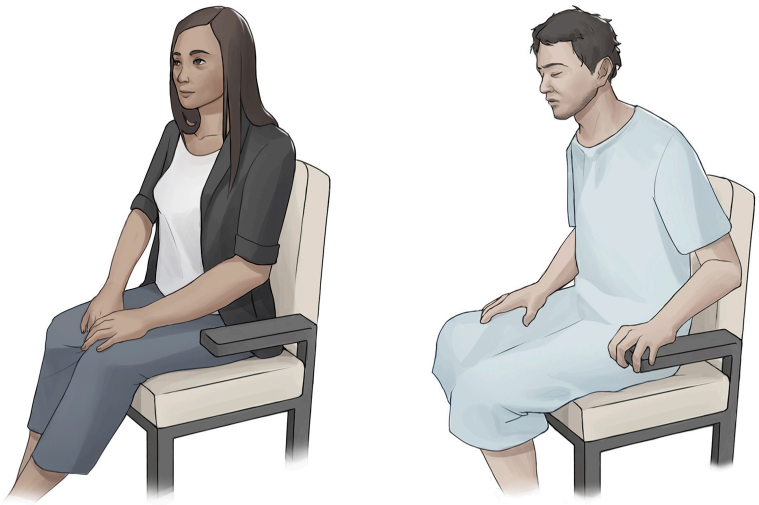

Figure 10: *A person dressed nicely with a neutral expression, and a person who appears dishevelled in a gown*

Reference

The World Health Organization (2014). Mental health: A state of well-being. Retrieved from https://www.who.int/features/factfiles/mental_health/en/

Functional Health

Functional health involves the assessment of the client's **physical and mental capacity to participate in day-to-day activities**. It includes assessment of:

- **Activities of Daily Living (ADL)** as illustrated in **Figure 11** are daily basic tasks that are fundamental to everyday functioning (e.g., hygiene, elimination, dressing, eating, ambulating/moving).
- **Instrumental Activities of Daily Living (iADL)** as illustrated in **Figure 12** are more complex daily tasks that allow clients to function independently (e.g., managing finances, paying bills, purchasing and preparing meals, managing one's household, taking medications, facilitating transportation). Assessment of iADL may be particularly important to inquire about with adolescents or young adults who have just moved into their first place and clients who are older and/or have disabilities.

Figure 11: *Activities of daily living*

Figure 12: *Instrumental activities of daily living*

It is important to assess functional health because the data collected could expose an opportunity for preventive action and health promotion, palliation, or assistance. Because **health extends beyond the absence of disease**, it is important to consider broader dimensions of health as a holistic and complete assessment.

You may start this section of the interview by saying, "Next, I would like to ask you some questions related to your day-to-day life and factors that affect your ability to function in your day-to-day life." **Table 8** outlines possible questions and statements to apply to the various sub-categories of functional health, along with some considerations. For interview demonstrations, see **Film Clip 4** about elimination and **Film Clip 5** about substance use.

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Film Clip 4: Interview demonstrating assessment of elimination

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Film Clip 5: Interview demonstrating assessment of substance use

Table 8: Functional health assessment

Items	Questions and Statements	Considerations
Nutrition Refers to food and fluid intake, financial ability to purchase food, time and knowledge to prepare and make meals, and appetite or change in appetite. You also want to elicit data related to a client's usual diet and goals related to their nutrition. Additionally, you need to probe so that an adequate amount of detail is obtained. **Take action** This is an opportune time to engage in health promotion discussions about healthy eating. It is also important to be aware of risks for malnutrition and obesity, specifically assessing for patterns of rapid and excessive weight loss or weight gain.	• Tell me about your diet. • What foods do you eat? • What fluids do you drink? (Probe about caffeinated beverages, pop, and energy drinks.) • What have you consumed in the last 24 hours? Is this typical of your usual eating pattern? • Do you purchase and prepare your own meals? • Tell me about your appetite. Have you had any changes in your appetite? • Do you have any goals related to your nutrition? • Do you have the financial capacity to purchase the foods you want to eat? • Do you have the knowledge and time to prepare the meals you want to eat?	The types of questions asked and the level of detail required depends on the developmental age or health of the client. • Infants: Breast milk or formula, amount, frequency, supplements, problems and introductions of new foods. • Pregnant women: nutritional intake and presence of nausea and vomiting, intake of folic acid, iron, omega-3 fatty acids, vitamin D, and calcium. • Older adults or clients with disabling illnesses: Ability to purchase and cook their food, decreased sense of taste, ability to chew or swallow foods, loss of appetite, enough fibre and nutrients.
Elimination Refers to the removal of waste products through the urine and stool. Healthcare providers refer to urinating as "voiding." Stool is referred to as a "bowel movement." You want to assess urine concentration, frequency, and odour. For stool, you want to assess frequency, colour, and consistency. You want to use terminology that clients understand. Thus, you may find yourself using less medicalized terms, such as "pee" and "poo" when speaking with some clients. **Take action** Findings that require further investigation include pain or difficulty upon urination, blood in the stool, melena (black, tarry stool), constipation; diarrhea, excessive laxative use.	• How often do you urinate each day? • What colour is it (amber, clear, dark)? • Have you noticed a strong odour? • How often do you have a bowel movement? • What colour is it (brown, black, grey)? • Is it hard or soft? • Do you have any problems with constipation or diarrhea? If so, how do you treat it? • Do you take laxatives or stool softeners?	Toilet training takes several months, occurs in several stages, and varies from child to child. It is influenced by culture and depends on physical and emotional readiness, but most children are toilet trained between 18 months and three years. Constipation and diarrhea are common symptoms associated with aging and medication usage. Thus, health promotion is needed in this area particularly related to safe food preparation, drinking enough water, sufficient activity, and fibre intake (e.g., fruits and vegetables). Clients may experience nausea and abdominal pain with constipation and diarrhea.

Sleep and rest Refer to a client's pattern of rest and sleep and any associated routines or aids. Although it varies for everyone, it is suggested that people should get approximately eight hours of sleep per night. **Take action** Findings that require further investigation include disruptive sleep patterns and reliance on sleeping pills or other sedative medications.	• Tell me about your sleep routine. **Probes** • How much do you sleep? • Do you wake up at all? • Do you feel rested when you wake? What do you do before you go to bed? (e.g., use the phone, watch TV, read) • Do you take any sleep aids? • Do you have any rests during the day?	Disruption in sleep patterns can occur across the lifespan. Assessing sleep patterns and routines will contribute to collaborative interventions. The use of social media and phones prior to bed can disrupt sleep patterns. Pain and stress can also disrupt sleep patterns
Mobility, activity, exercise Mobility refers to a client's ability to move around (e.g., sit up, sit down, stand up, walk). Activity and exercise refer to informal and/or formal activity (e.g., walking, swimming, yoga, strength training). **Note:** In addition to exercise, it is important to assess activity because some people may not engage in exercise but still have an active living lifestyle (e.g., walking to school, working in a physically demanding job). **Take action** Findings that require further investigation include insufficient aerobic exercise and strength training and identified risk for falls.	• Tell me about your ability to move around. • Do you have any problems sitting up, standing up or walking? • Do you use any mobility aids (e.g., cane, walker, wheelchair)? • Tell me about the activity and/or exercise that you engage in. What type? How frequent? For how long?	Type of mobility and activity depends on developmental age and a client's health and illness status. With infants, it is important to assess their ability to meet specific developmental milestones at each well baby visit. Mobility can become problematic for clients who are ill or are aging and can result in self-care deficits. Thus, it is important to assess how their mobility is affecting their ADL.

Violence and trauma There are many types of violence, including abuse and neglect, physical, sexual, psychological, and financial. Trauma can be a result of violence or other distressing events in a life. **Take action** Collaborative intervention with the client is required when violence and trauma are identified. In Ontario, you are legally mandated to report suspected cases of child abuse or neglect to a children's aid society. You are also legally mandated to report suspected cases of elder abuse when the client resides in a long-term care or retirement home to the Ministry of Health and long-term care director. You are also required to report to the College of Nurses of Ontario if you suspect that a nurse has abused or sexually abused a client. At any time, if you or the client is in immediate danger, call the police.	• Many clients experience violence or trauma in their lives. Can you tell me about any violence or trauma in your life? • How has it affected you? • Tell me about the ways you have coped with it. • Have you ever talked with anyone about it before? • Would you like to talk with someone?	People respond in different ways to trauma. It is important to use a **trauma-informed approach** when caring for clients who have experienced trauma. For example, a client may respond to the situation in a way that seems unfitting (such as laughter, ambivalence, denial). This does not mean the client is lying; such a response could be symptoms of trauma. To reduce the effects of trauma, it is important to include social and psychological assessments of recent traumatic events (e.g., sudden loss, near-death experience, gravely ill child) and, more importantly, collaborative interventions to support clients experiencing trauma. The gendered and racialized experience of violence and trauma are important to assess. In addition to children, people with disabilities, and elderly people, there are other cohorts who are more at risk and respond to violence and trauma based on their identity.
Relationships and resources Refer to influential relationships in the client's life, whether positive or negative. **Take action** Findings that require further investigation include indications that a client does not have any meaningful relationships or has "negative" or abusive relationships in their lives. Sometimes the action involves providing a safe space for the client to talk about their experiences and working with them to identify goals.	• Tell me about the most influential relationships in your life. • Tell me about the relationships you have with your family. • Tell me about the relationships you have with your friends. • Tell me about the relationships you have with any other people. **Probes** • How do these relationships influence your day-to-day life? Your health and illness? • Who are the people that you talk to when you require support or are struggling in your life?	It is not the number of social contacts, but the social interconnectedness and meaning in relationships that is most important. Some clients can have a lot social contacts but not describe any of them as meaningful. When clients feel isolated or lack meaning in their relationships, it can influence their physical and mental health making them feel fatigued, sad or depressed, and make them eat more or eat less.

Intimate and sexual relationships Refer to sexual feelings, attractions, and preferences toward other people. It involves a combination of emotional connection and, physical companionship (holding hands, hugging, kissing) and sexual activity. It is also linked with a person's identity and part of their physical and mental health. **Take action** Assess further if a client describes, or if you observe, a partner who is controlling, reinforces stereotypical gendered roles (domineering), acts jealous or possessive, or has volatile moods. Although you are not legally responsible for reporting abuse in the adult context, it is important to fully assess and work with the client in developing a safety plan.	• I always ask clients about their intimate and sexual relationships. To start, tell me about what you think is important for me to know about your intimate and sexual relationships. • Tell me about the ways that you ensure your safety when engaging in intimate and sexual practices. • Do you have any concerns about your safety?	Gender is a social construction that exists along a continuum. It is a *way of being* with other people and not a **binary** . Gender is different than sexuality. It is important to be attentive to your language and expectations related to gendered roles within a relationship and not make assumptions about things such as who drives, who takes care of the children, or who earns the family income within a relationship.

Substance use Refers to the intake of alcohol, tobacco products (e.g., smoking, chewing tobacco), cannabis, or any illegal drugs (e.g., cocaine, heroin, meth, inhalants, fentanyl). Assess the type, frequency, quantity, patterns, making a distinction between use and abuse. Substance misuse typically constitutes a disruption in everyday function because of a dependence on a substance (e.g., loss of employment, deterioration of relationships, loss of home or precarious living circumstances). **Take action** Action is needed if clients indicate that they have a problem with substance use or show signs of dependence, addiction, or binge drinking.	• To better understand a client's overall health, I ask everyone about substance use such as tobacco, herbal shisha, alcohol, cannabis, and illegal drugs. • Do you or have you ever used any tobacco products (e.g., cigarettes, pipes, vaporizers, hookah)? If so, how much? • When did you first start? If you used to use, when did you quit? • Do you drink alcohol or have you ever? If so, how often do you drink? • How many drinks do you have when you drink? • When did you first start drinking? If you used to drink, when did you quit? • Do you use or have you used any cannabis products? If so, how do you use them? How often do you use them? • When did you first start using them? • Do you purchase them from a regulated or unregulated place? • If you used to use cannabis, when did you quit? • Do you use any illegal drugs? If so, what type? How often do you use them? • Tell me about the ways that you ensure your safety when using any of these substances. • Have you ever felt you had a problem with any of these substances? • Do you want to quit any of these substances? • Have you ever tried to quit?	It is important to use a non-judgmental approach when assessing a client's use of substances so they feel accepted and not stigmatized. Substance use can affect people of all ages. Binge drinking is a health issue that sometimes affects adolescents and young adults. Also, use of some substances can influence the effectiveness of prescription medication.

Environmental health and home/occupational/school health Environmental health refers to the safety of a client's physical environment, which is a determinant of health. Examples include exposure to community violence, air pollution, and insect infestations. This may include health and safety in the school and workplace (e.g., hazardous materials, noise, body mechanics). **Take action** Findings that require further investigation include a client being exposed to unsafe environments. This includes prolonged exposure to second- and third-hand cigarette smoke, which is particularly hazardous for children (e.g., smoking in vehicles with children in the car).	• Tell me about any factors in your environment that may affect your health. Do you have any concerns about how your environment is affecting your health? • Tell me about your home. Do you have any concerns about safety in your home or neighbourhood? • Tell me about your workplace and/or school environment. • What activities are you involved in or what does your day look like? **Note:** These questions will help you determine if probing, detailed questions are needed. For example, if a student or an office worker indicates they are on the computer most of the day, you may need to probe about ergonomics. If a client is working in a healthcare setting, you may need to probe about hazardous materials.	It is important to understand exposure to environmental hazards as nuanced. Not all exposure is the same. For example, during pregnancy, a client may be more attentive to environmental exposures. Some municipalities have banned pesticide use as even small dose exposure can have long-term health effects. It is important to ask about clean and safe water, more so in particular areas than others.
Self-concept and self-esteem Self-concept refers to all the knowledge a person has about themselves that makes up who they are (i.e., their identity). Self-esteem refers to a person's self-evaluation of these items as being worthy or unworthy. It is best to assess these items toward the end of the interview because you will already have collected data that potentially contributes to an understanding of the client's self-concept and self-esteem. **Take action** Findings that require further investigation include a client having low self-esteem, which can be inextricably related to mental health and wellness. Indeed, a criterion for diagnosing mental illness includes low-self-esteem, which can contribute to illnesses such as depression and anxiety.	The factors that contribute to self-concept and self-esteem vary from person to person, so it is assessed best by using open-ended statements. You may need to prompt a client's responses by saying, "Tell me more" or "Please explain." • Tell me what makes you who you are. • Are you satisfied about where you are in your life? • Can you share with me your life goals?	The factors that influence a client's self-concept vary from person to person. Often these items involve valued elements of life such as talents, education, accomplishments, family, friends, career, stability and financial status, and spirituality and religion.

Other iADL Refers to more complex daily tasks that allow clients to function independently. **Take action** Findings that require further investigation include risk for falls in the home for clients with mobility limitations. These falls can occur while the client is trying to take care of their home (e.g., when cleaning or cooking). A previous history of falls is an important predictor of future falls. If the client reports a fall at home, brainstorm with them to identify hazards in the home (e.g., loose rugs, wet floors, socks without traction) and strategies for safety (e.g., mobility devices, removing tripping hazards, installing handrails).	• Tell me about how you take care of yourself and manage your home. • Do you have sufficient finances to pay your bills and purchase food, medications, and other needed items? • Do you have any current or future concerns about being able to function independently?	Avoid making assumptions about a client based on their age. It is important to maintain an optimistic view and work collaboratively with the client.

Test Yourself

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Preventative Treatments and Examinations

Assessing for other **preventive treatments and examinations** includes gathering data on medications, examination and diagnostic tests, and vaccinations. See **Table 9** for sample questions and statements, along with specific considerations. You might begin this section by asking the client, "What are the ways that are most important for you to optimize your health?" (you may have already discussed this as part of the functional health section).

It is important to ask the client about their current, past, and known future medication regime, examinations, and immunizations to form a profile of the treatment that the client has received and plans to receive. This information will tell you a lot about the client's current health status based on the care they have and will receive.

Note: The client may refer to items that have already been discussed as part of the functional assessment or other items not yet discussed. You may need to probe with statements such as, "Tell me more," and "How does that affect you?"

Table 9: Preventative treatments and examinations

Items	Questions and Statements	Considerations
Medications Name, dose, frequency, reason for taking it, when they first started taking it, and whether they take it as prescribed. This applies to both prescribed and over-the-counter medications, such as vitamins, pain relievers, homeopathic medicines, and cannabis. **Take action** Medication misuse refers to taking medications outside their prescribed purpose. It can include snorting or injecting medications or taking excessive (large) non-prescribed dosages of medications such as opioids, sedatives, stimulants, and hypnotics. Assess further if you suspect medication misuse.	• Do you have the most current list of your medications? • Do you have your medications with you? (If not, you should ask them to list each medication they are prescribed and if they know the dose and frequency.) • Can you tell me why you take this medication? • How long have you been taking this medication? • Do you take the medications as prescribed? (If they answer “no” or “sometimes,” ask them to tell you the reasons for not taking the medications as prescribed.)	Some clients and their care partners are active in their care and will be able to answer all these questions. Other clients may not be able to answer all these questions particularly in the context of **multimorbidity** and **polypharmacy**. Sometimes, clients do not take the medications as prescribed because they are experiencing adverse effects, have insufficient income to purchase the medications, and/or have received insufficient health promotion education and discussions when the medication was prescribed.

Examination and diagnostic dates Primary care provider (physician or nurse practitioner), specialists, blood pressure, blood tests, chest radiographic, electrocardiogram, dental, vision or hearing. (See **Appendix A** for a list of links to screening recommendations.) **Take action** Assess further if the client is an older adult who has never received any screening such as blood pressure. It is important to explore with the client the reasons they have not received prior screening.	• When was the last time you saw [name the primary care provider, nurse or specialist]? • Can you share with me why you saw them? • When was the last time you had your [name screening] tested? • Do you know what the results were?	This is an opportune time for health promotion, particularly if you identify that examinations such as dental or vision have not been completed based on screening recommendations. Genetic screening during pregnancy is optional. In collaboration with their health professionals, some parents choose to screen for any abnormalities and others do not. A finding of an abnormal result can be extremely difficult for some parents to experience, and some will decide not to act on such a result.

Vaccinations Type, date received, and any significant reactions (check the provincial or territorial immunization schedule). Immunization schedules for Ontario and immunization requirements for school attendance in Ontario can be found at immunizations. Schedules for other provinces and territories are also available on the Internet. **Take action** Follow up on clients whose immunizations are not up-to-date.	• Can you tell me about your immunization status? • Can you tell me what immunizations you have had, the dates you received them, and any significant reactions? • Do you have your immunization record? • When was your last flu vaccine? If the client's immunizations are not up-to-date or you noted vaccination hesitancy, you may ask: • Can you tell me the reasons that your immunizations are not up-to-date? • Can you tell me why you are hesitant to receive immunizations? (You may need to explore this further.) Depending on the client's age and main health needs/ reasons for seeking care, you may ask about specific immunizations such as: • Tetanus if they have an injury or wound in which the skin is not intact. • Childhood vaccinations and adult boosters. Vaccines for older adults such as influenza, pneumococcal, and shingles.	Vaccine hesitancy is a current global issue referring to the delay or refusal of vaccinations. Nurses and other health professionals play a vital role in addressing this issue. You should use a non-judgmental approach and work in partnership with your client to better understand their concerns. Using a relational inquiry approach will allow you to understand what is important to the client and, thus, be able to address existing knowledge gaps. Some clients who are immune-compromised cannot receive vaccinations. During times of outbreaks, they are at risk for exposure.

Test Yourself

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Family Health

Assessing the current and past health of a client's family is important because diseases sometimes have a **genetic component**. These data provide you with a risk profile for inherited conditions. While it is important to understand the risk and likelihood of illness based on family health, these factors do not determine health and wellness. Sometimes health professionals construct genograms to document this information as illustrated in **Figure 13**. There are various ways to construct genograms, this is one example.

You want to ask questions that elicit information about the health status, age, and if applicable, cause of death and age at time of death of blood relatives (parents, grandparents, siblings, children, nieces, nephews). Questions to ask include:

- Tell me about the health of your blood relatives.
    - Do they have any chronic or acute diseases (e.g., cardiac, cancer, mental health issues)?
- Have any of your blood relatives died?
    - If so, do you know the cause of death?
    - And at what age did they die?

You also want to assess the health status of non-blood relatives and individuals that clients have had close encounters with or live with; this can be an important part of the assessment particularly in terms of **communicable diseases** (i.e., diseases spread through air, food, physical contact, contaminated surfaces, and insect and animal bites). Questions to ask include:

- Tell me about the health status of those you live with.
    - Has anyone been sick recently?
    - If so, do you know the cause?
    - What symptoms have they had?
- Have you been around anyone else who was sick recently (e.g., at work, at school, in a location that involved a close encounter such as a plane or an office)?

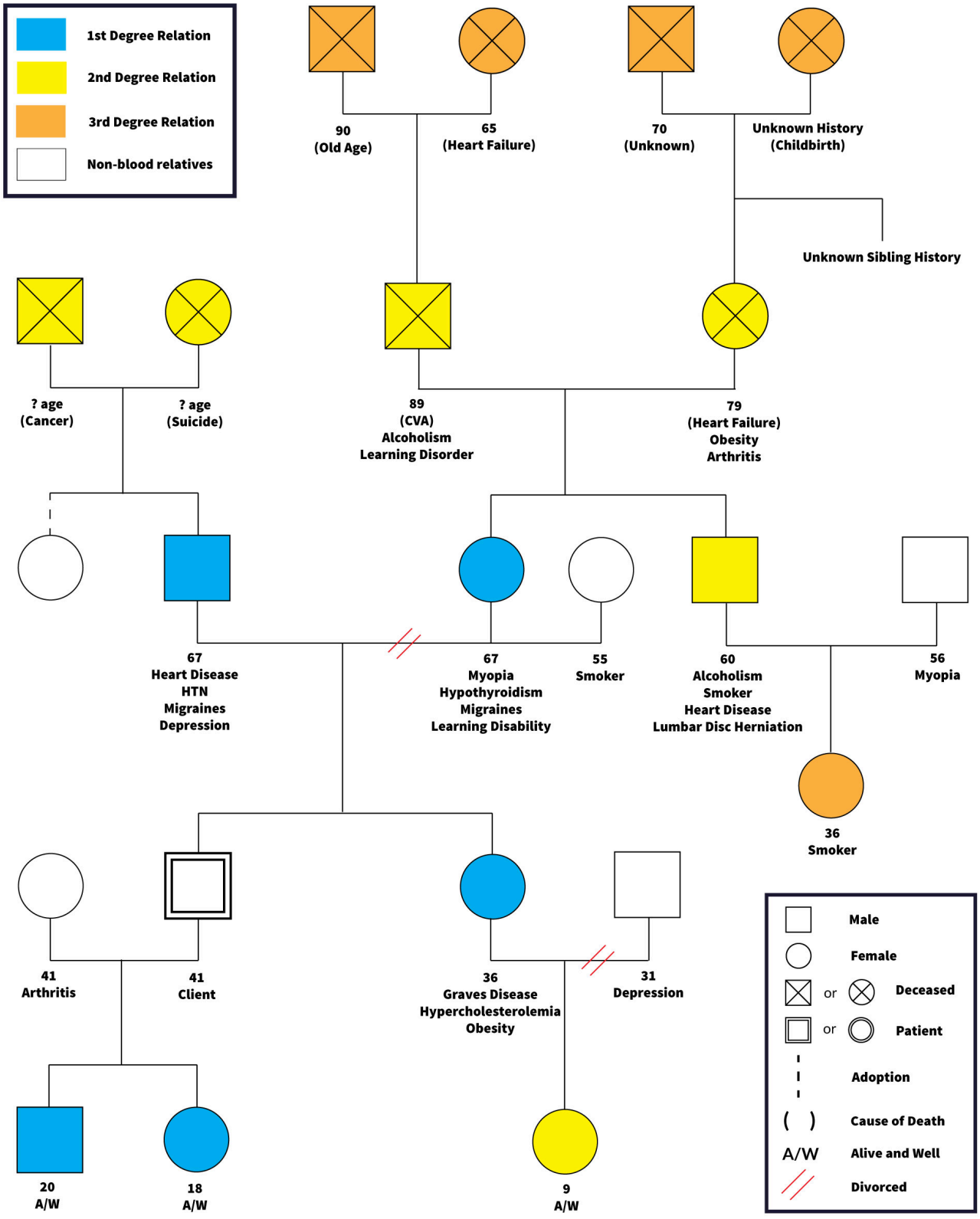

Figure 13: *A genogram for a 41 year old client*

Points of Consideration

Many people seek genetic information to better understand their family health. This information may be available from genetic counsellors, who are health professionals who offer informational and supportive resources for persons seeking to better understand their genetic health history and risk for genetic disorders and inherited conditions. Also popular today are the DNA tests available commercially to determine family ancestry and **health predispositions**. Despite their popularity, the accuracy and privacy risks of this latter type of testing is questionable.

Test Yourself

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=698#h5p-13

Cultural Health

Assessing cultural health involves gathering data on factors related to a **person's cultural background** that may influence their health and illness status.

An **open-ended question** allows the client to share what they believe to be most important. For example, you may ask, "I am interested in your cultural background as it relates to your health. Can you share with me what is important about your cultural background that will help me care for you?"

It is best to let clients spontaneously answer this question. Give them time to think. You should explore further any factors that they choose to share (e.g., "Tell me more." "How does that affect your health and illnesses?" "Is there anything else you want to share about how these factors act as resources in your life?")

Assessing cultural health once meant having a checklist about different cultural groups. This approach is antiquated because it assumes culture is static and measurable. It is important to encourage each client to speak about what is important to them. You may find that clients speak about information related to how they grew up and their way of life, their values and beliefs, traditions related to food, their spirituality or religion, among many other things.

Points of Consideration

It is important to let the client tell you their cultural health information without interruption or assumption.

Reflective question

1. If a health professional was conducting a complete subjective health assessment of you, what would you want them to do in order to create a safe and comfortable environment?

Care Partners

Care partners (as illustrated in **Figure 14**) contribute significant unpaid care work that helps the care recipient while also sustaining the healthcare system. They often interact with the healthcare system in a multitude of ways (e.g., providing care, navigating care services, advocating for better care, coordinating services, and communicating with health professionals).

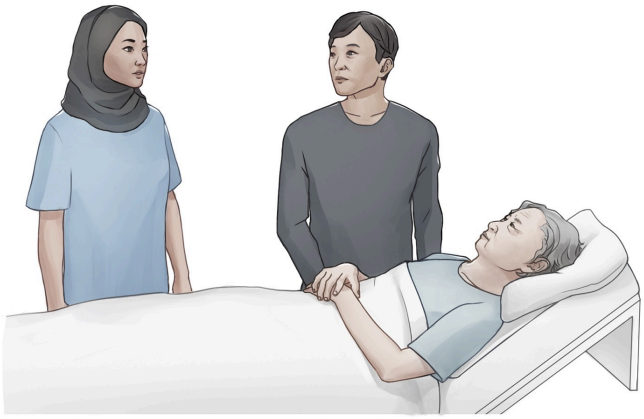

Figure 14: *Care partner present with the client and health professional*

Certain cohorts of the population take up the role of care partner more than others. Most often care partners are women and older adults. Many adult children are also care partners, who are sometimes referred to as the "sandwich generation" because they are "sandwiched" between caring for their aging parents as well as their own young children.

In your assessment, you should consider families as the recipients of care, not just the individual client. This way of practice is important considering that care work can take a toll on the physical and mental well-being of care partners. The well-being of the client and thus, the intensity of care work, can influence a care partner's well-being. Likewise, a care partner's well-being can influence the well-being of the client. This influence becomes more pronounced with aging and with home care where there is a strong reliance on each other for well-being.

Reflective question

1. How should you include care partners when conducting a complete subjective health assessment of a client?

Cultural Safety

It is important to conduct the complete subjective health assessment in a culturally safe manner. **Cultural safety** refers to the **creation of safe spaces** for clients to interact with health professionals without judgment, racial reductionism, racialization, or discrimination.

Cultural safety begins with an **understanding of dominant cultural structures** that serve to exclude persons based on their cultural practices (e.g., beliefs, attire, language) or cultural identity (e.g., ethnicity). For example, dominant structures overtly reproduce exclusion when services are only available in English or French. The system covertly reproduces exclusion when persons are made to feel different, or "other," for their beliefs or views about health.

When seeking cultural health information or any subjective data from a client, it is important to bring a **critical lens** that acknowledges colonial history, power inequity, and injustice. Consider why you are asking information: is it for racial reductionism or to better understand the client health and illness profile? As described in **Table 10**, today, a **critical self-reflective approach** is more appropriate, where the health professional questions their own assumptions and challenges stereotypes.

Table 10: Creating a culturally safe space

Self-reflective questions	Rationale
How do I describe my own culture?	Reflecting on how you would respond to a question that you pose to a client is always good practice when self-analyzing. Consider whether you are clear or confused by the question. Dig deep to think about how you define and think about culture. We all practise culture, some being more closely aligned with dominant culture than others. For some, when they align with the dominant culture, they may perceive themselves as not having a culture or not recognizing their own culture. Reflect on what it means to be closely aligned or not with the dominant culture and how this may be perceived in your nursing practice.
What assumptions or biases do I hold about culture?	Bias becomes problematic when it is acted upon and taken up as legitimacy. Reflecting on how assumptions and bias have influenced your thinking about culture, including primary language, mainstream knowledge, and concepts about health and illness, is important for you to understand how to create culturally safe spaces. In addition to thinking about "setting aside" your bias or assumptions, give thought to the belief system that has contributed to your own biases. What has informed your thinking?
How might historical legacies affect and inform the healthcare I provide?	Historically, healthcare was a vehicle for imperial and religious practices, and these legacies have contributed to the context of healthcare today. Western healthcare embodies a belief system predicated on empirics, while elsewhere on the globe other practices are taken up. Recognizing that all clients bring a historical cultural context to their interactions with health professionals is helpful in creating cultural safe spaces.
How does my use of language affect cultural safety?	We all become indoctrinated to language. It is often emblematic of a greater belief system. This indoctrination influences how we practise (e.g., how we refer to people and our interactions with clients). For example, labelling someone by their race or religion reinforces "othering," where their identity is imposed on them. "Objectified language" refers to language that leads to the objectification of someone (e.g., "the diabetic," "the alcoholic") implying that the person is devoid of nuance beyond their pathology and defined by a biomedical system. When thinking about your own language, consider its effects on the client.

Test Yourself

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=709#h5p-14

Health History Summary

There are two main components to concluding the complete subjective health assessment. First, you want to provide a brief summary to the client of their subjective health. This summary may include main health issues that require intervention as well as the client's health strengths and coping strategies. Second (after the summary), you should ask the client whether there is anything else that is important for them to share. You may phrase the question as, "Is there anything else that you think I should know about your current and/or past health and illnesses in order to care for you?"

Reflective questions

1. How do you conclude a complete subjective health assessment?
2. Practise conducting a complete subjective health assessment on a peer, a friend, or a family member. Afterwards, ask them what made them feel comfortable and uncomfortable during the assessment, or ask, "As your healthcare provider, how could I have made the experience better for you?" You should also ask yourself three questions: "What did I do well?" "What did I struggle with?" and "How can I improve?"

Key Takeaways

In this book, you learned about the nature of subjective data and the timing and comprehensiveness of a complete subjective health assessment. This book provided you with the opportunity to both understand the categories of a complete subjective health assessment and reflect on how questions are formulated and meaningfully taken up in the context of the assessment. In summary, it is important to recognize the diversity of a client's experiences within the healthcare system and how to create a culturally safe, inclusive, and responsive environment while conducting a complete subjective health assessment.

Appendix A: Screening Recommendations and Organizations

General

- **Up-to-date recommendations based on the current evidence:** Canadian Task Force on Preventive Health Care, established by the Public Health Agency of Canada, offers clinical practice guidelines that support primary care providers in delivering preventive health care: Canadian Task Force on Preventive Health Care Guidelines
- **Provincial/territorial government programs and services**, including coverage and recommendations for screening. Search for your region (e.g., the Ontario Ministry of Health and Long Term Care: Ontario Ministry of Health and Long Term Care).

Blood Pressure

- **Hypertension screening recommendations:** Canadian Task Force on Preventive Health Care Hypertension Screening Recommendations
- **Clinical article:** "Recommendations on screening for high blood pressure in Canadian adults," by P. Lindsay and colleagues (2013). Published in *Canadian Family Physician*, 59(9), 927-933, and available at Recommendations on screening for high blood pressure in Canadian adults

Breast, Colorectal, and Cervical Cancer Screening Guidelines

- Ontario Ministry of Health and Long-Term Care Screening Guidelines
- Canadian Task Force on Preventive Health Care Cervical Cancer Screening Recommendations

Prostate Cancer and the PSA Test

- Ontario Ministry of Health and Long-Term Care Prostate and PSA Test

Diabetes

- Canadian Task Force on Preventive Health Care Diabetes Screening Recommendations

Dental

- **Canadian Dental Association (CDA):** Recommendations for dental screening, cleaning, and X-rays vary based on several factors such as your dental health and age. The CDA suggests a dental exam approximately every six months. They are not specific about the frequency of X-rays other than to say that if a client has not had any problems, such as cavities for a couple of years, then an X-ray is not required at every appointment. See Canadian Dental Association
- **American Dental Association:** Recommendations for X-rays are every two to three years if the client has good oral health and minimal risk of dental problems.

Vision

- **Canadian Ophthalmological Society:** Recommendations are for an eye exam at six months of age and then frequency based on the client's eye health and risk of eye problems. They note that a client should see an ophthalmologist when they experience vision problems or changes to the eye: Canadian Ophthalmological Society

Hearing

- Canadian Academy of Audiology

Appendix B: Complete Subjective Health Assessment – Interview Guide

Introductory Information: Demographic and Biographic Data

Name/contact information and emergency information

- What is your full name?
- What name do you prefer to be called by?
- What is your address?
- What is your phone number?
- Who can we contact in an emergency? What is their relationship to you? What number can we reach them at?

Birthdate and age

- What is your birthdate?
- What is your age?

Gender

- Tell me what gender you identify with.
- What gender pronouns do you use? (If the person asks you to use a pronoun that you are not familiar with, it is okay for you to respectfully respond, "I am not familiar with that pronoun. Can you tell me more about it?")

Allergies

- Do you have any allergies?
- If so, what are you allergic to?
- How do you react to the allergy?
- What do you do to prevent or treat the allergy?

Note: You may need to prompt for information on medications, foods, etc.

Languages spoken and preferred language

- What languages do you speak?
- What language do you prefer to communicate in (verbally and written)?

Note: You may need to inquire and document if the client requires an interpreter.

Relationship status

- Tell me about your relationship status?

Occupation/school status

- What is your occupation? Where do you work?

- Do you go to school?

Resuscitation status

- We ask all clients about their resuscitation status, which refers to medical interventions that are used or not used in the case of an emergency (such as if your heart or breathing stops). You may need more time to think about this, and you may want to speak with someone you trust like a family member or friend. You should also know that you can change your mind. At this point, if any of this happens, would you like us to intervene?

Main Health Needs (Reasons for Seeking Care)

Presenting to a clinic or a hospital emergency or urgent care (first point of contact)

- Tell me about what brought you here today.

Probes

-
  - Tell me more.
  - How is that affecting you?

Already admitted, and you are starting your shift

- Tell me about your main health concerns today.

Probes

-
  - Tell me more.
  - How is that affecting you?

The PQRSTU Mnemonic

Provocative

- What makes your pain worse?

Palliative

- What makes your pain feel better?

Quality

- What does the pain feel like?

Quantity

- How bad is your pain?

Region

- Where do you feel the pain?
- Point to where you feel the pain.

Radiation

- Does the pain move around?
- Do you feel the pain elsewhere?

Severity

- How would you rate your pain on a scale of 0 to 10, with 0 being no pain and 10 being the worst pain you've ever experienced?

Timing

- When did the pain start?
- What were you doing when the pain started?
- Where were you when the pain started?
- Is the pain constant or does it come and go?
- If the pain is intermittent, when did it last occur?
- How long does the pain last?

Treatment

- Have you taken anything to help relieve the pain?
- Have you tried any treatments at home for the pain?

Understanding

- What do you think is causing the pain?

Current and Past Health

Current health

- Are there any other issues affecting your current health?

Childhood illnesses

- Tell me about any significant childhood illnesses that you had.
- When did it occur?
- How did it affect you?
- How did it affect your day-to-day life?

- Were you hospitalized? Where? How was it treated?
- Who was the treating practitioner?
- Did you experience any complications?
- Did it result in a disability?

Chronic illnesses

- Tell me about any chronic illnesses you currently have or have had (e.g., cancer, cardiac, hypertension, diabetes, respiratory, arthritis).

Probes

- How has the illness affected you?
  - How do you cope with the illness?
  - When were you diagnosed?
  - Who was the treating practitioner?
  - How was the illness being treated?
  - Have you been hospitalized? Where?
  - Have you experienced any complications?
  - Has the illness resulted in a disability?
  - How does the illness affect your day-to-day life?

Acute illnesses, accidents, or injuries

- Tell me about any acute illnesses that you have had.
- Tell me about any accidents or injuries you currently have or have had.

Probes

- When did it occur?
  - Were you hospitalized? Where?
  - How was it treated?
  - Who was the treating practitioner?
  - Did you experience any complications?
  - Has it resulted in a disability?
  - How did it affect your day-to-day life?

Obstetrical health

- Have you ever been pregnant?
- Do you have plans to get pregnant in the future?
- Tell me about your pregnancies.
- Have you ever had difficulty conceiving?
- How was your labour and delivery?
- Tell me about your postpartum experience.
- Were there any issues or complications?

Mental Health and Mental Illnesses

Mental health is an important part of our lives and so I ask all clients about their mental health and any concerns or illnesses they may have.

Mental health

- Tell me about your mental health.
- Tell me about the stress in your life.
- How does stress affect you?
- How do you cope with this stress? (this may include positive or negative coping strategies.)
- Have you experienced a loss in your life or a death that is meaningful to you?
- Have you had a recent breakup or divorce?
- Have you recently lost your job or been off work?
- Have you recently had any legal issues?
- Have you purchased any weapons?

Mental illness

- How does that illness affect you?
- How does that illness affect your day-to-day life?
- How do you cope with the illness?
- What resources do you draw upon to cope with your illness?
- When were you diagnosed?
- Who was the treating practitioner?
- Have you been hospitalized? Where?
- Tell me about your treatment (e.g., medications, counselling).
- Have you experienced any complications?
- Has the illness resulted in a disability?
- Do you have any concerns that have not been addressed related to your illness?

Functional Health

Nutrition

- Tell me about your diet.
- What foods do you eat?
- What fluids do you drink? (Probe about caffeinated beverages, pop, and energy drinks.)
- What have you consumed in the last 24 hours? Is this typical of your usual eating pattern?
- Do you purchase and prepare your own meals?
- Tell me about your appetite. Have you had any changes in your appetite?
- Do you have any goals related to your nutrition?
- Do you have the financial capacity to purchase the foods you want to eat?
- Do you have the knowledge and time to prepare the meals you want to eat?

Elimination

- How often do you urinate each day?
- What colour is it (amber, clear, dark)?
- Have you noticed a strong odour?
- How often do you have a bowel movement?
- What colour is it (brown, black, grey)?
- Is it hard or soft?
- Do you have any problems with constipation or diarrhea? If so, how do you treat it?
- Do you take laxatives or stool softeners?

Sleep and rest

- Tell me about your sleep routine.

Probes

- How much do you sleep?
  - Do you wake up at all?
  - Do you feel rested when you wake? What do you do before you go to bed (e.g., use the phone, watch TV, read)?
  - Do you take any sleep aids?
  - Do you have any rests during the day?

Mobility, activity, exercise

- Tell me about your ability to move around.
- Do you have any problems sitting up, standing up or walking?
- Do you use any mobility aids (e.g., cane, walker, wheelchair)?
- Tell me about the activity and/or exercise that you engage in. What type? How frequent? For how long?

Violence and trauma

- Many clients experience violence or trauma in their lives. Can you tell me about any violence or trauma in your life?
- How has it affected you?
- Tell me about the ways you have coped with it.
- Have you ever talked with anyone about it before?
- Would you like to talk with someone?

Relationships and resources

- Tell me about the most influential relationships in your life.
- Tell me about the relationships you have with your family.
- Tell me about the relationships you have with your friends.
- Tell me about the relationships you have with any other people.

Probes

- How do these relationships influence your day-to-day life? Your health and illness?
  - Who are the people that you talk to when you require support or are struggling in your life?

Intimate and sexual relationships

- I always ask clients about their intimate and sexual relationships. To start, tell me about what you think is important for me to know about your intimate and sexual relationships.
- Tell me about the ways that you ensure your safety when engaging in intimate and sexual practices.
- Do you have any concerns about your safety?

Substance use and abuse

- To better understand a client's overall health, I ask everyone about substance use such as tobacco, herbal shisha, alcohol, cannabis, and illegal drugs.
- Do you or have you ever used any tobacco products (e.g., cigarettes, pipes, vaporizers, hookah)? If so, how much?
- When did you first start? If you used to use, when did you quit?
- Do you drink alcohol or have you ever? If so, how often do you drink?
- How many drinks do you have when you drink?
- When did you first start drinking? If you used to drink, when did you quit?
- Do you use or have you used any cannabis products? If so, how do you use them? How often do you use them?
- When did you first start using them?
- Do you purchase them from a regulated or unregulated place?
- If you used to use cannabis, when did you quit?
- Do you use any illegal drugs? If so, what type? How often do you use them?
- Tell me about the ways that you ensure your safety when using any of these substances.
- Have you ever felt you had a problem with any of these substances?
- Do you want to quit any of these substances?
- Have you ever tried to quit?

Environmental health and home/occupational/school health

- Tell me about any factors in your environment that may affect your health. Do you have any concerns about how your environment is affecting your health?
- Tell me about your home. Do you have any concerns about safety in your home or neighbourhood?
- Tell me about your workplace and/or school environment.
- What activities are you involved in or what does your day look like?

Self-concept and self-esteem

- Tell me what makes you who you are.
- Are you satisfied about where you are in your life?
- Can you share with me your life goals?

Probes

-
  - Tell me more.
  - Please explain.

Other iADL

- Tell me about how you take care of yourself and manage your home.
- Do you have sufficient finances to pay your bills and purchase food, medications, and other needed items?

- Do you have any current or future concerns about being able to function independently?

Preventive Treatments and Examinations

Medications

- Do you have the most current list of your medications?
- Do you have your medications with you? (If not, you should ask them to list each medication they are prescribed and if they know, the dose and frequency.)
- Can you tell me why you take this medication?
- How long have you been taking this medication?
- Do you take the medications as prescribed? (If they answer "no" or "sometimes," ask them to tell you the reasons for not taking the medications as prescribed.)

Examination and diagnostic dates

- When was the last time you saw [name the primary care provider, nurse or specialist]?
- Can you share with me why you saw them?
- When was the last time you had your [name screening] tested?
- Do you know what the results were?

Vaccinations

- Can you tell me about your immunization status?
- Can you tell me what immunizations you have had, the dates you received them, and any significant reactions?
- Do you have your immunization record?
- When was your last flu vaccine?

If the client's immunizations are not up-to-date or you noted vaccination hesitancy, you may ask:

- Can you tell me the reasons that your immunizations are not up-to-date?
- Can you tell me why you are hesitant to receive immunizations. (You may need to explore this further.)

Family Health

- Tell me about the health of your blood relatives.
    - Do they have any chronic or acute diseases (e.g., cardiac, cancer, mental health issues)?
- Have any of your blood relatives died?
    - If so, do you know the cause of death?
    - And at what age did they die?
- Tell me about the health status of those you live with.
    - Has anyone been sick recently?
    - If so, do you know the cause?
    - What symptoms have they had?

- Have you been around anyone else who was sick recently (e.g., at work, at school, in a location that involved a close encounter such as a plane or an office)?

Cultural Health

- I am interested in your cultural background as it relates to your health. Can you share with me what is important about your cultural background that will help me care for you?

Probes:

-
  - Tell me more.
  - How does that affect your health and illnesses?
  - Is there anything else you want to share about how these factors act as resources in your life?

CHAPTER 4 - PAIN ASSESSMENT

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Learning Outcomes

Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgement.
4. Integrate an inclusive approach to pain assessment.

Introduction to Pain

Almost everyone has experienced the physical sensation of pain. You may have felt a headache, a backache, or pain from a paper cut or a burn from touching a hot surface.

Consider the last time you experienced pain. What did it feel like? How did it affect you? (e.g., physically, emotionally, socially). Was there tissue damage? These questions help us understand the nature of pain and how it affects each person.

Pain is a **complex phenomenon**, so we need to understand how it is conceptualized, classified, and the various types of pain. All of these components influence best practices related to pain assessment. It is important to be aware of the RNAO (2025) best practice guidelines related to pain assessment and management. These guidelines provide information and resources related to assessment, planning, implementation and evaluation of pain, among other recommendations.

Let's begin by exploring the phenomenon of physical pain.

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RNAO (2025). Pain: prevention, assessment and management of pain. 4th edition. https://rnao.ca/bpg/guidelines/assessment-and-management-pain

Conceptualizing Pain

The International Association for the Study of Pain [IASP] (2020) recently redefined their 1979 definition of pain as "an **unpleasant** and **sensory experience** associated with, or resembling that associated with, **actual** or **potential tissue damage**." The IASP's definitions are widely known and accepted, and highlight the emotional, the sensory, and the potential tissue damage associated with pain.

However, pain researchers and clinicians continue to critique and expand on the IASP's definition because it has the potential to overshadow important components. Additional considerations include:

- More emphasis on the subjective nature of pain in terms of how it is personalized to the client.
- The need to emphasize the **somatic nature of pain** in terms of how it is embedded within the body (Cohen et al., 2018).
- A more **comprehensive descriptor** of pain than "unpleasant", which may act to minimize what may be described as quite distressing for some (Craig & MacKenzie, 2021).
- The **cognitive** and **social features** of pain (Craig & MacKenzie, 2021) in terms of how pain affects one's cognitive capacity (how one thinks, reasons, and remembers) and social functioning (engaging in social interactions and interpersonal relationships).
- Also, keep in mind, that not all physical pain is associated with tissue damage.

By expanding and critiquing how pain is conceptualized, we can obtain a more comprehensive and inclusive understanding of what pain is and as a result, how it is best assessed and managed. What is important to take away from these definitions is that **pain is complex** and **multifaceted.**

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Classifying Pain

Pain can be classified in many ways. The next sections present several classifications. It is important to recognize that these are not mutually exclusive, and a person may experience multiple classifications of pain at the same time. See **Figure 1** for classifications of pain.

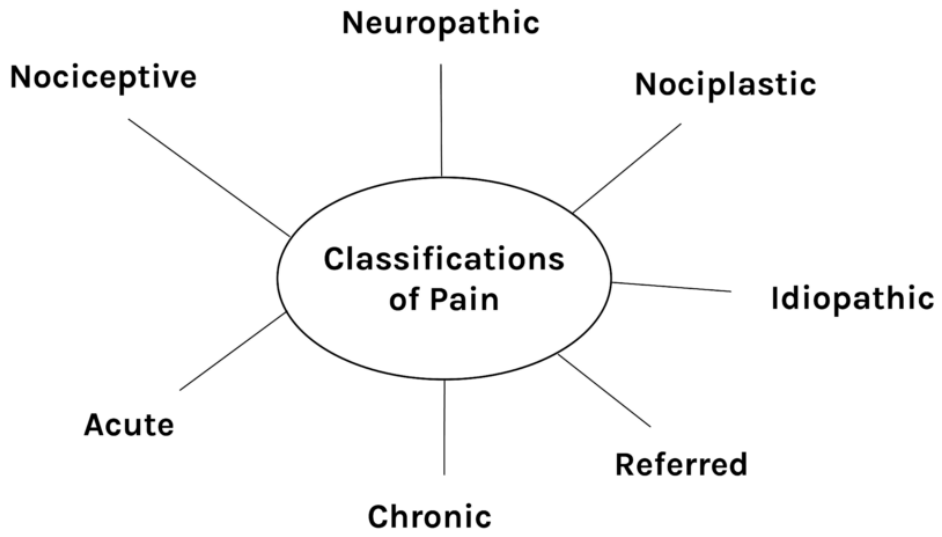

Figure 1: Classifications of pain.

Acute Pain

Acute pain is **short or limited in duration** and often **caused by something specific**. Types of acute pain are surgical pain during the operative and postoperative period, a headache, bee sting, labour pains, menstrual pain, and injuries such as an ankle sprain, fracture, or burn. Although acute pain can shift into chronic pain, it typically follows a **predictable trajectory** and **subsides when the cause of pain is resolved** or healed. Acute pain can last anywhere from a moment to upwards of three to six months. Beyond this timeframe, it is typically considered chronic pain.

The intensity of acute pain can range from mild to severe. The intensity may also influence the signs and symptoms of pain that are associated with sympathetic nervous stimulation and the fight or flight response including the stimulation of hormones such as cortisol and adrenaline.

The cascade of **signs and symptoms** during the acute pain period may include:

- Changes in vital signs: tachycardia, tachypnea, shallow breathing, elevated blood pressure, and elevated temperature. Sometimes oxygen saturations can decrease, particularly when clients are breathing fast and shallow and as such not taking a full inspiration. Prolonged changes in these vital signs can lead to ischemia, thus pain management is essential.
- With increased body temperature, the nervous system stimulates the sweat glands to help cool the body. Thus, clients may experience diaphoresis.
- Digestive enzymes and peristalsis are reduced which leads to difficulty with digestion and gastrointestinal upset

including nausea, vomiting, and constipation.
- Other signs of pain may include increased blood glucose levels and pupil dilation.

Chronic Pain

Definitions of chronic pain have evolved and become more specific, but this kind of pain is still referred to as **pain that continues to occur and recurs** (persistent and recurrent) for about **three months or more** (Treede et al., 2019). Some definitions suggest six months or more, but in general it is fine to refer to persistent or recurrent pain that lasts three to six months or longer as chronic pain. Another conceptualization of chronic pain (when associated with an injury) is a type of pain that **persists beyond the typical or expected healing time**. For some, chronic pain never goes away: it may be experienced daily or recur regularly.

Common types of chronic pain include back pain, migraines, arthritis, cancer-related pain, **fibromyalgia**, and postsurgical and posttraumatic pain.

Chronic pain can be categorized in two broad ways:

- Secondary chronic pain refers to a type of pain that manifests as a result of a disease or condition such as arthritis, cancer, or ear infection – it is "secondary" to these pathological conditions (Treede et al., 2019). It can also be pain that is secondary to, or a result of, treatment such as cancer-related treatment.
- Primary chronic pain is a more recent classification. It is a type of pain based on a condition that is often poorly understood and cannot be accounted for by another cause or disease process (Nicholas et al., 2019; Treede et al., 2019, 2015). Common types of primary chronic pain include many types of neck and back pain, fibromyalgia syndrome, and irritable bowel syndrome (Nicholas et al., 2019).

In patients with chronic pain, the physiological and vital sign changes are not necessarily evident because the body adapts to the pain to a certain extent. The **effects of chronic pain** typically include cognitive and social changes, such as:

- Sleep disruptions.
- Mood disturbances including depression.
- Interference with daily activities.
- Cognitive impairment including the ability to think clearly.
- Social and relational effects.

Nociceptive Pain

Nociceptive pain involves a **noxious stimulus** (mechanical, thermal, or chemical) that activates nociceptors with the potential to cause non-neural tissue injury (Bonezzi et al., 2020). This is a common type of pain that many of us have experienced and is often categorized as:

- Mechanical (e.g., stubbing your toe, receiving a needle, straining a muscle).
- Thermal (e.g., touching a hot surface like a stove).
- Chemical (e.g., exposure to a chemical such as bleach).

(Bonezzi et al., 2020).

These stimuli activate the nociceptors, which are receptors in the periphery of the **somatosensory nervous system**

(IASP, 2021). Considering these stimuli, it makes sense that nociceptive pain is described as localized with a specific location in the body. Nociceptive pain can be categorized as somatic and visceral. Somatic refers to a type of pain that originates in peripheral tissues such as the skin, bone, muscles, tendons, or ligaments, whereas visceral refers to a type of pain that originates in the body's internal organs (e.g., heart, intestines, appendix, kidneys) (Bonezzi et al., 2020).

Neuropathic Pain

Neuropathic pain originates from a "**lesion or disease of the somatosensory nervous system**" (IASP, 2021). Neuropathic pain has a different subjective sensation than nociceptive pain and is often described as burning, stabbing, numbness, tingling, and shooting (electric-shock like) with sensitivity to touch and temperature. As such, the client's qualitative description of their pain is important to assess in order to help you better understand the causative factors. Causes can be related to trauma along a nerve, conditions such as carpal tunnel syndrome, spinal cord injury, stroke, diabetes, and multiple sclerosis, and infections such as herpes simplex virus (cold sore) or varicella-zoster virus (shingles).

Nociplastic Pain

Nociplastic pain originates from "**altered nociception**" with **unclear evidence of actual or potential tissue damage** (IASP, 2021). This classification of pain has no obvious nociceptor activation or neuropathy, but involves altered nociceptive function, which can be confirmed by sensory testing (Kosek et al., 2016). To be clear: although there is no obvious tissue damage (e.g., a cut in the skin) or nociceptor activation (a stimulus that has caused pressure or extreme temperature to activate the neurons), there is an inference of altered nociceptive function that can be confirmed through sensory testing such as measuring the brain's electrical activity (Kosek et al., 2016). This classification is relatively new compared to nociceptive and neuropathic pain and was introduced in 2016 (Kosek et al., 2016). The theory is that nociplastic pain is associated with chronic pain conditions such as fibromyalgia and irritable bowel syndrome (Kosek et al., 2016; Bonezzi et al., 2020). It requires careful consideration in terms of assessment and management because of the complexity in how it presents subjectively as well as the lack of **biomarkers** (Fitzcharles et al., 2021).

Idiopathic Pain

Idiopathic pain or pain of an **unknown origin** can also be considered a fourth classification. With this type of pain there is no obvious pathology. Although the origin and the cause may be unknown, the pain is very real for clients. Your assessment here becomes extremely important to help understand the client's pain.

Referred Pain

Referred pain is pain **felt at a bodily location that is different from the site of origin**. For example, the site of origin of cardiac ischemia (lack of oxygen to the heart muscle, commonly referred to as chest pain) is the heart. However, cardiac ischemia can be felt in referred locations such as pain down the left arm or in the jaw or neck. This kind of pain referral has a neural basis in which the site of origin shares common neural pathways with another part of the body. See **Figure 2** for common pain referral pathways.

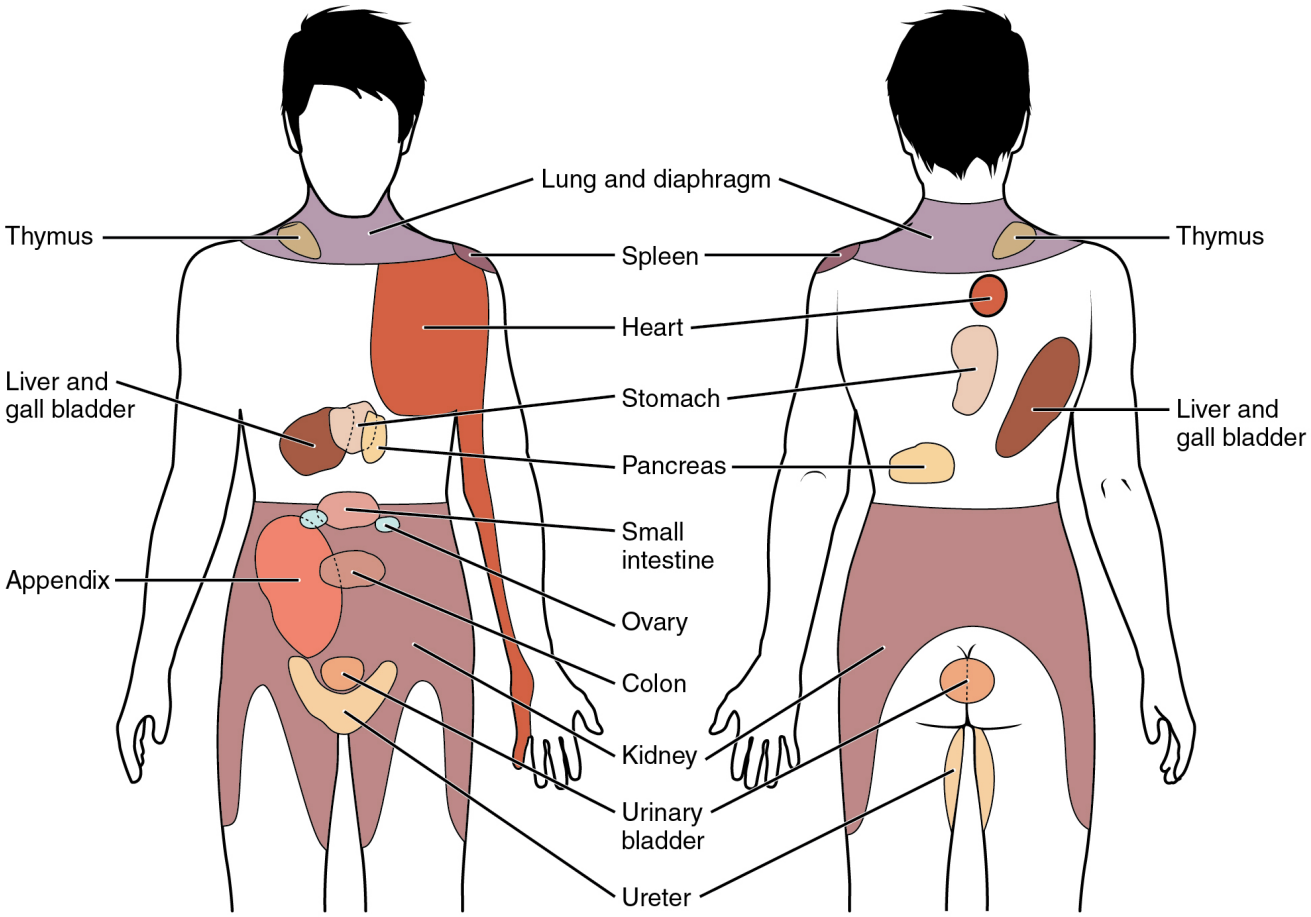

Figure 2: Common pain referral pathways

Attribution statement: Gordon Betts, J., Young, K.A., Wise, J.A., Johnson, E., Poe, B., Kruse, D.H., Korol, O., Johnson, J.E., Womble, M., & DeSaix, P. (2013). The Autonomic Nervous System. In Anatomy and Physiology. OpenStax. Creative Commons Attribution License v4.0. Book URL: https://openstax.org/books/anatomy-and-physiology/pages/1-introduction Section URL: https://openstax.org/books/anatomy-and-physiology/pages/15-2-autonomic-reflexes-and-homeostasis

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Reflecting on Your Own Biases

Everyone has biases, meaning preconceived notions about something (such as pain) or someone. Biases can be related to race/ethnicity, gender/sex, age, and medical conditions, and they can develop as a result of various factors including culture, personal experiences, and popular media.

When we first see a client, we tend to make assumptions about the presence and even the severity of pain based on cues that are readily available to us (e.g., facial expression, body positioning, vocalizations) (Riva et al., 2011). These **assumptions are rooted in our biases** regarding what pain looks and even sounds like. These biases may emerge from our own personal experiences. Our initial impressions of a client's pain can form what is called an "anchor" or have an "anchor effect" in which all additional assessments of the client's pain are influenced by these initial impressions (Riva et al., 2011). These assumptions can also be based on racist ideas (discussed further in the next section) or on ageist ideas, for example that older people or newborns do not feel pain. Another biased assumption is that people living with cognitive impairment (such as dementia) do not feel pain in the same way as others because they may have difficulty articulating that pain. These assumptions can mean that pain is underassessed and undertreated in certain populations.

It is also very important to be aware that some people may openly talk about their pain and cry out in agony, while others may be stoic and hide their pain. Some people may stay home in bed when they are in pain while others may continue with their daily life and go to work.

Unexplored biases can have a strong influence on pain assessment. This is particularly important considering that healthcare professionals have been found to underestimate pain in comparison with the client's own self-report (Seers et al., 2018). As such, it is vital that you constantly reflect upon and explore your biases related to pain and pain assessment.

For example, try to explore your own inherent biases related to what pain looks like by reflecting on the following questions:

- How would someone know that you are in pain?
- Could they tell by your facial expression or body position?
- What behaviours would you display if you were in pain? Would you be quiet, grimacing, or smiling? Would you isolate yourself? Would you be trying to sleep, walk around, or talk to others?
- Would you tell someone you were in pain or keep it to yourself? How bad would the pain have to be for you to be concerned or for you to tell someone?
- Would you exaggerate or minimize the level of pain (or pain of a family member) when describing it to a healthcare provider due to fear of discrimination?

Your answers to these questions form part of your cultural bias. If you are not aware of your cultural biases, you may judge the validity of another person's pain based on your own answers. Ultimately, a person's pain should be acknowledged, respected, and acted upon (RNAO, 2013).

What we might leave you with is: although your own personal experiences inform your biases, these experiences may also provide you insight into a client's pain.

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Racism and Pain Assessment

Racism is killing people, and the silence around racism is killing people (Jones, 2021).

Some Canadians, including leaders, are beginning to recognize racism as real, present, and as a public health issue, but many remain silent on the issue and deny the presence of systemic racism in Canada and in healthcare.

Systemic racism includes processes embedded in practices and policies that disadvantage and oppress non-dominant racialized groups (Williams et al., 2019). Social institutions perpetuate racial hierarchies and socialize members of society to accept that non-dominant racialized groups are inferior (Williams et al., 2019). Racism, such as anti-Black racism, affects non-dominant groups from birth to death, and is evidenced in Canadian healthcare by the disparities affecting non-dominant racialized groups (Dryden & Nnorom, 2021).

Some examples to reflect upon:

- Disparities are visible through elevated risks of prematurity and low birthweight, lower income, and lack of access to education, resources, and opportunities for non-dominant racialized groups – all affecting their health and well-being (Williams et al., 2019).
- The stress of racism is very real. It is a vicious circle that perpetuates racial inequities negatively affecting mental and physical health in many ways for nondominant racial groups (Levy et al., 2013).
- A specific example is research funding. Cystic fibrosis mainly affects white people and receives 7–11 times more funding than sickle cell disease, which mainly affects Black people with sub-Saharan African ancestry (Power-Hays & McGann, 2020). This is a clear example of systemic racism: sickle cell disease affects substantially more North Americans, but receives substantially less research funding.
- Some racism is blatant (verbal slurs), but it is also important to consider subtle racism, such as a healthcare professional's overuse of medication as a restraint or way to control a client.

It is essential to keep in mind that **racial disparities can NOT be explained by biological differences** (Dryden & Nnorom, 2021). Yet, racism – and accompanying ideas about biological differences – continues to be systemically engrained in healthcare practices and perpetuates inequities. This includes practices surrounding pain assessment and pain management. Racism and systemic inequities have led to undiagnosed pain in non-dominant racialized groups (Morais et al., 2022), including sub-optimal and even catastrophic outcomes for Black people when their pain is not believed or recognized (Akinlade, 2020). Racism and inequities in pain assessment and management is clearly manifested in the treatment of Black clients with sickle cell disease (Power-Hays & McGann, 2020). Pain among this population is often dismissed, leading to reduced quality of life and increased mortality rates: Black people describe being labelled as drug seekers when reaching out for pain management and purposefully dressing nicely before seeking help to minimize racist attitudes (Power-Hays & McGann, 2020).

These general **racist attitudes** contribute to **racialized disparities in pain assessment** and **pain management** (Morais et al., 2022). Additionally, long-held myths and stereotypes that Black people are subhuman were historically used to justify slavery, and these beliefs have also led to pain practices that are clearly not evidence-based.

> @joelbervell
>
> Episode 3 of the #racialbias series. Let's talk about pain. #greenscreen #healthcare #medicine #race #bias #doctor #black #blm #education #premed
> ♫ Blade Runner 2049 – Synthwave Goose

Reflect on the following examples:

- Hoffman and colleagues (2016) discuss the false and dangerous belief that Black people are different biologically

(e.g., thicker skin, fewer nerve endings) and thus, feel less pain. This will lead to an inaccurate assessment of pain and also to disparities and inequities in pain management (Hoffman et al., 2016).

- Another example highlights the existence of racial bias in pain perception. In a multi-stage experiment, participants were shown a series of Black and white faces in pain. The researchers found that white participants had more stringent thresholds to perceive pain on Black versus white faces and would perceive pain earlier on white versus Black faces (Mende-Siedlecki et al., 2019). In addition to affecting assessment practices in terms of observations, this effect is likely to result in Black clients being provided less medication, or to be given non-narcotic pain medication, compared to white clients who often receive narcotic pain medications (Mende-Siedlecki et al., 2019).
- Another study found that Indigenous clients in Canada reported feeling judged by healthcare providers and reporting discrimination when in pain or requesting medication for conditions involving chronic pain (Nelson & Wilson, 2018). This kind of experience has negative effects on the quality of care that Indigenous clients receive, and may result in them choosing not to access needed services.
- Another example of anti-Indigenous racism involves Joyce Echaquan, an Atikamekw client in Quebec. She had gone to the emergency room for stomach pain and described being overmedicated by healthcare providers (APTN News, n.d.). The coroner concluded that systemic racism played a role in how Joyce was treated and in her death (Richardson, 2021). This case highlights the importance of individualized pain assessment and listening, believing, and responding to the client.

These are just some of many examples of systemic racism that the nursing profession must challenge. It is important to recognize that pain in non-dominant racialized people may go undetected, undiagnosed, untreated, and undertreated. Moreover, these individuals may be fearful to seek out healthcare services because of past treatment and **racial trauma**. Many Black and Indigenous people fear hospitals due to the stigma and institutionalized racism they face.

When **assessing pain**, healthcare providers must **be aware of and remain sensitive to racism**. When we see racism, we need to name it. It's killing people. We need to speak up. Have a discussion. **Act and advocate**. Advocating takes courage. Start with reflecting and having conversations with others. Voice what you are seeing and collaborate with others to challenge racism.

Clinical Tip

Always remember: pain is what the client tells you it is.

This is important for all nurses and healthcare professionals to recall because people hold unconscious biases without evidence to support them. A beginning place for change is to identify and sit with your bias – even if you believe people from all races are equal, you may still have bias (Akinlade, 2020).

Anti-racist training can help you understand and address your biases, understand how privilege (such as white privilege) perpetuates pain inequities in care, and learn how to take a critical perspective in your practice (Morais et al., 2022). In fact, anti-racist training can help you understand more than just privilege related to race, but other types of privilege too. In addition to recognizing each other's humanity, we must advocate against racist practices including pain assessment. Remaining silent in the face of racism is the "sound of privilege", and with racism – "silence is loud" (Jones, 2021, p. 5).

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1036#h5p-68

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Pain Assessment

You have an important role to play in screening for and assessing pain (RNAO, 2013).

You will often be the first person to recognize that a client is in pain as a result of your assessment including observations. Nurses also spend sustained periods of time with clients, so clients are more likely to share this information with you than with other healthcare professionals. If they say they are in pain, **believe them**. Trust will disintegrate if clients feel you do not believe them.

Unassessed pain can lead to inadequate pain management and/or untreated pain. This is a serious problem because it can affect many body systems as well as a client's cognitive capacity and quality of life, and even whether they live or die.

Pain can be difficult to assess because it is a personal experience that **affects clients in different ways**. Clients may also have difficulty articulating their pain and describing what it feels like. Sometimes pain is invisible, making it difficult to recognize, particularly in someone with chronic pain. The next sections explore the dimensions of pain so that you can develop an understanding of how pain may appear.

Dimensions of Pain Assessment

Pain has many dimensions in terms of how it affects a person (see **Table 1**). The various dimensions of pain can involve various descriptions and considerations (Cleeland, 2009). It is important to be aware that these dimensions are not necessarily separate; for example, the subjective dimension includes cognitive, psychological, and social features. Consider the many dimensions in terms of your pain assessment of the client and which pain assessment tools may be best in certain situations and populations (this will be discussed in more detail later).

Table 1: Dimensions of pain and related considerations.

Dimension	Considerations
Subjective A report of pain by the person who is experiencing it is important because they know their pain best and how to describe it. This is sometimes referred to as the sensory dimension of pain, which includes a client communicating the intensity of pain and other descriptors.	• A subjective assessment of pain is often referred to as a self-report. This commonly includes a verbal self-report, but also can involve pointing or a written self-report. • Subjective description of pain is only one way to express pain, and inability to communicate by no means indicates that a person is not experiencing pain (International Association for the Study of Pain, 2020).
Physiological Common physiological responses from pain may include tensing of muscles, pupil dilation, dry mouth, and a change in vital signs.	• With acute pain, physiological responses can be important to consider, particularly with certain populations who are pre-verbal or non-verbal. • However, it is important to note that vital signs cannot discriminate between pain and other states of distress such as fear. Additionally, underlying disease processes and medications such as sedation can affect vital signs.
Behavioural Behaviours associated with pain can include facial and bodily responses such as grimacing, moaning, crying, fidgeting, guarding, and laying still. Other behaviours associated with pain include change in sleep patterns and eating patterns.	• Behavioural dimensions of pain vary widely among clients. Don't assume someone isn't in pain if they are not demonstrating any of these behaviours. The presence of these behaviours may be more apparent with acute versus chronic pain. • Some responses are based on developmental stages and cultural influences. For example, a common behavioural response to pain among infants is grimacing and crying. Another consideration is related to culture and gender. For example, when young boys experience pain, parents often respond by saying "don't cry, be a big boy." Among individuals identifying as male, this can lead to more inhibited expressions of pain. Additionally, people with physical disabilities may exhibit pain behaviours in different ways.
Cognition Pain can affect a person's cognitive functioning in terms of their ability to think, reason, acquire and remember knowledge, attention span, and learning.	• Cognitive dimensions of pain will vary based on a client's developmental stage. • Effects of pain on cognition can be assessed based on self-reports and empirical tests.
Psychological and social Clients may become anxious, irritable and upset, or have a flat affect (lack of reaction on the face). Chronic pain can affect a client's identity and social relationships and can lead to social withdrawal and depression.	• It is important to assess a client's psychological and social response to pain. This can help you understand how pain affects them, their coping strategies, and priorities of care. For example, depression is a serious issue that can affect overall health and well-being.
Reactive This dimension refers to the ways that pain interferes with daily functioning (Cleeland, 2009).	• Reactive dimensions are important to assess in order to understand interference with activities such as walking, sleep, relationships, and mood (Cleeland, 2009).

Contextualizing Inclusivity

Sex and gender biases and discrimination pervade every aspect of social life, including pain assessment in healthcare. In one study, individuals were shown video clips of female and male faces expressing pain. The authors concluded that females tend to be perceived as in less pain than men (Zhang et al., 2021). This experiment did not involve healthcare professionals, but this kind of gender bias can pervade all settings including healthcare. A systematic review revealed that healthcare providers do not take women's pain as seriously as men's pain and often psychologized women's pain ("it's all in her head") (Samulowitz et al., 2018). Gender bias influences perceptions of women being more sensitive and emotional to pain and also influences treatment options (Laitner et al., 2021; Samulowitz et al., 2018). For example, healthcare providers are more likely to recommend surgical interventions for men than women (Laitner et al., 2021). Women are also less likely to be prescribed opioids as pain medications and are more likely to be prescribed antidepressants and to be given mental health referrals for pain compared to men (Samulowitz et al., 2018).

Activity: Check Your Understanding

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Timing and Frequency of Screening for and Assessment of Pain

All clients should be **screened for the presence of pain**. If pain is present, then you should **assess the pain**.

Timing and **frequency** of screening for and assessment of pain depends on **several factors**. It can be useful to check with the unit/institution where you work about pain assessment frequency. You should perform routine screening for and assessment of pain at specific times and during certain situations such as:

- **Admission** to a healthcare setting.
- **Primary** healthcare visit.
- **Start of shift** when first assessing a client.
- **Change** in the client's condition (e.g., change in vital signs) or other potential physiological or behavioural signs of pain. Oftentimes, pain is assessed with each set of vital signs.
- **Prior to** a procedure or activity to establish a **baseline** (e.g., walking for the first time postoperatively) as well as during and after a procedure or activity.
- **After** treatment (e.g., after the provision of pain medication such as **analgesics**) and continued reassessment until treatment takes effect. Reassessment is often based on the medication's onset of action (how long the medication takes to begin taking effect), peak effectiveness (how long it takes for the medication to be at its maximum concentration in the body, thus its greatest therapeutic effect) and duration (length of time that a medication produces a therapeutic effect) (Chippewa Valley Technical College, n.d.). Continued reassessment of pain may be needed so that you can determine whether additional treatment is required.
- When there is a **written order** for pain assessment. For example, physicians and nurse practitioners sometimes provide written orders for pain assessments (e.g., pain assessment every four hours or pain assessment every eight hours).

Pain assessments are often **repeated to evaluate the effectiveness** of treatment and medication. First, you should assess the client's baseline and review the client's chart to get a full picture of the client's pain. The timing of repeat pain assessments will depend on several factors (see **Table 2**). Always **compare your findings to the client's baseline**.

Table 2: Pain reassessment.

Factor	**Consideration**
Time for the medication to take effect.	Some over-the-counter oral pain medications can start taking effect in 15–30 minutes, but peak effectiveness usually takes one hour and up to two hours. Typically, pain is reassessed between **30–60 minutes after oral medication** is given. Intravenous quick acting opioid pain relievers (e.g., morphine) can take effect within 1–2 minutes with peak effects between 5–15 minutes. Opioids may have even quicker peak effects, e.g., 2–5 minutes for fentanyl (Vahedi et al., 2019).
Specific situation	In acute situations where you are attempting to control the pain quickly with an intravenous medication, you may reassess within **2–5 minutes**. Additionally, you should assess for adverse effects such as respiratory depression with opioid administration. Do not assume that a client is not in pain because their eyes are closed, or because they are smiling or talking. In other situations, a client may be given an oral pain medication at bedtime; thus, you may not reassess until they wake up or in the morning. You might ask the client to ring their call bell if the pain has not subsided in an hour.

Contextualizing Inclusivity

Consider forms of pain management other than traditional Western medications when making decisions regarding pain reassessment. For example, **cannabis** is now legal in Canada, and prescription of medical cannabis has become more common, particularly for cancer pain and neurological conditions such as multiple sclerosis (Health Canada, 2016). Cannabis may be taken alone or in conjunction with other medications and can be taken through inhalation or oral ingestion (foods/oils/capsules). Based on the onset of action (Health Canada, 2016), reassessment may be appropriate within 15 minutes, or within 30 minutes with oral ingestion. As a nurse, you will need to assess the many other forms of pain management that a client may choose to use (e.g., mindfulness meditation, acupuncture, play for children) and assess effectiveness as needed.

An **open-ended and inclusive question** to ask clients is: Tell me about the ways you manage your pain?

Some Indigenous clients may choose to utilize **traditional medicines** instead of, or along with, Western medications. To learn more about treating Indigenous clients using traditional medicines, see Pain, Pain Killers and Indigenous Peoples: Choose the right medicine for you in partnership with your physician.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1040#h5p-70

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Subjective Assessment Overview

A **subjective assessment** is an important component of evaluating a client's pain. It is often referred to as a **self-report** because the client is reporting and describing their own pain as opposed to your observations as a nurse (objective assessment).

A **cultural humility approach** can help you better understand the meaning of a client's pain. This kind of approach involves having an authentic conversation with the client. How do they understand pain? Some people reserve the word "pain" to describe severe sensations, so they might not refer to a mild symptom as pain. Others may associate pain with vulnerability and use alternative words to describe it. Therefore, if they initially tell you they are not in pain, try rephrasing your question using words such as discomfort, hurt, tenderness, and sensations. When probing further about their pain, it is also a best practice to use the words the client uses.

Another issue is that some clients believe "good" clients do not "complain" about pain. Thus, it is important to show that you care when you ask about the client's pain and use a professional and serious tone. It may be helpful to use permission statements depending on the situation. For example, you may say "pain is common after this procedure, do you have any pain?"

Contextualizing Inclusivity

Although subjective assessment is an important way to evaluate pain, be aware that not everyone can verbally communicate their pain (e.g., clients who are pre-verbal or non-verbal). Therefore, you should use other types of assessment that focus on **behavioural** and **physiological cues**.

Always remember: **Pain is what the client tells you it is**. This important adage is worth repeating, because unconscious bias and/or long-held myths that have no evidence to support them still influence practice. In addition to institutional racism, there are out-dated beliefs that newborns and elderly do not feel as much pain as others, and that people who use illegal substances do not require pain management.

It's your job to advocate and ensure that decisions are made based on evidence. The client's subjective experience is as important as your objective assessment, because you can't always observe pain.

The **main components** of a subjective assessment include:

- Presence of pain: do they have pain? If so, how long have they had it?
- Location of pain: where is it located?
- Severity/quantity of pain: how bad is the pain?
- Descriptors of pain: how do they describe the pain? Is it constant or intermittent?
- Associated factors and triggers of pain: are there any associated signs or symptoms with the pain? Is there anything that triggers their pain or makes it worse? What were they doing when the pain started?
- Impact of pain: how is it affecting them?
- Management of pain: have they tried to manage or treat it?

Priorities of Care

Certain cues require prompt and urgent action. New onset and severe pain are critical findings that require prompt action. This is especially true for chest pain, which could be **angina**, and is considered a first-level priority of care. In this case, ask a colleague to notify the physician or nurse practitioner while you keep the client at rest, assess pulse, blood pressure, and oxygen saturations. Depending on the setting and if appropriate, adhere to existing directives such as order an electrocardiogram and blood work, administer oxygen, initiate intravenous access, and give nitroglycerin and morphine. If you are in a home setting and/or do not have access to these treatments, call 911 if this is new onset angina for the client as they may be having a myocardial infarction. The client can chew and swallow acetylsalicylic acid (usually low-dose ASA, 81 mg) as long as there are no contraindications; this can be helpful to prevent the clot from getting bigger.

Clinical Tip: Opioid Use, Stigma, and Language Examples

Opioid misuse is a serious issue across Canada. Although opioids are beneficial when treating certain types of pain when used as prescribed, the risk for misuse has been described as a crisis in Canada as well as in other countries. Opioid misuse is also a stigmatizing condition and as a result can influence individuals to avoid treatment or not discuss their opioid use.

Try to use a cultural humility and harm reduction approach during your subjective health assessment, with non-judgemental and supporting language and an open interviewing approach. Specific strategies include:

- Do not judge clients or belittle them for their decisions.
- Avoid objectifying language in which people are labeled, such as “addict” and “abuser.”
- Use supportive language such as “substance use disorder” or “a client who uses drugs/substances.”
- Ask questions with an open mind so that you can better understand their opioid use and the reasons behind it.
- Support the agency of clients in making their own decisions even if you disagree with them.
- Use a harm-reduction approach including non-coercive strategies in which you help them minimize harm in their opioid use.
- Let them know about available supports and resources if they become interested in stopping their use.

Some clients may refuse opioid medications for fear of addiction or because of a history of opioid misuse. Thus, a client-centred and interprofessional approach to pain management is important.

Check out this additional Video to support your learning: Language. How do you talk about addiction? [7:37]

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1042#h5p-71

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Pain Assessment Tools

Pain assessment tools are used to explore the relevant dimensions of pain in an organized way. Many have been developed: you should choose one that has been validated (RNAO, 2013). The following sections explore a few different types of pain assessment tools and discuss which may be most appropriate in various contexts.

Choice of the **correct tool** is informed by several factors:

- The reason for assessing. For example, are you assessing the pain to obtain an overview or comprehensive perspective of the pain? Are you assessing the pain to determine the effectiveness of a treatment?
- The client's developmental stage. There are validated tools based on a client's capacity to cognitively appraise their pain and communicate it.
- The client's health status. At times, you will need a quick assessment of pain because the client's health status is critical, or the client is deteriorating. Other times, you will need a more comprehensive understanding of the pain.
- The institution and unit. Many units specify the pain assessment tools to be used so that consistency of assessment is maintained; they may also offer training for all healthcare providers in that specific tool.
- Culture. Some people from different cultural backgrounds in terms of ethnicity and language may not be able to cognitively appraise their pain using some of the common pain tools. Thus, it is important to recognize the limits of pain tools.

Contextualizing Inclusivity

Everyone experiences pain, but not everyone has the cognitive or language capacity to understand it and optimally communicate it (e.g., newborns, infants, toddlers). Children as young as four can self-report their pain using tools that are appropriate to their developmental stage (Freund & Bolick, 2019). Other pain assessment approaches involve observing behavioural cues (e.g., crying) and physiological measures (e.g., heart rate, blood pressure). When appropriate, a combination of self-report and observation is best (Parker & Brown, 2019). With all children, but particularly those who are cognitively or developmentally delayed, you should partner with their caregiver (e.g., parent) as they are familiar with the child's baseline behavioural cues (Freund & Bolick, 2019).

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Unidimensional Pain Assessment Tools

Unidimensional pain tools assess **one element of pain**, typically **intensity**, which refers to the magnitude or the severity of pain. These unidimensional tools are important because they can be used to:

- Provide a baseline of the severity of a client's pain.
- Determine the need for pain management/treatment.
- Evaluate treatment effectiveness.

For example, if a client has pain, you might manage the pain through repositioning or medication, and then reassess the pain again. Unidimensional pain tools are effective at evaluating pain over time between one time period to the next. However, it is important to note that because they have only one focus, they neglect other dimensions of the pain experience (Lapkin et al., 2021). Another issue is that tools should be selected for each client based on cognitive and cultural factors.

The next sections explore four unidimensional pain tools involving self-report, and that focus on assessing pain intensity.

Numeric Rating Scale

The Numeric Rating Scale (NRS) is a widely used **11-point pain scale from zero to ten** (Slomp, 2019). When using the NRS, you commonly ask clients: "On a scale of zero to ten with zero being no pain and ten being the worst pain imaginable, how do you rate your pain?"

The NRS tool is used because:

- It is simple to use.
- It gives a quick assessment of the client's pain intensity and provides a baseline.
- It is useful for frequent or repeat pain assessments such as after a treatment or medication is provided.

It is the most commonly used pain tool to **evaluate pain intensity**. However, it is not appropriate to use with young children. The general consensus has been that it can be used with children as young as eight and possibly younger (von Baeyer, 2009). A more recent systematic review found a strong recommendation for its use with children as young as six when assessing acute pain (Birnie et al., 2019). Use of this tool for any client should be based on their developmental age and capacity to engage with numbers. Again, keep in mind that the NRS is unidimensional: it only measures pain intensity at a specific time period (Slomp, 2019).

Visual Analogue Scale

The Visual Analogue Scale (VAS) provides a **horizontal (or vertical line) with two anchors**. The left side (or bottom) is marked "no pain" and the right side (or top) is marked "worst imaginable pain." Clients may use their finger to point where on the line where their pain is; digital versions are also now available (see **Figure 3**).

The VAS is used for similar reasons as the NRS, but it is useful when clients do not resonate with rating pain according to numbers. It is best used with adults considering that a recent systematic review found a weak recommendation for its use with children when assessing acute or chronic pain (Bernie et al., 2019).

Figure 3: Example of VAS

Verbal Descriptor Tool

The Verbal Descriptor Tool (VDT) provides an opportunity for clients to **describe the intensity of their pain using words** (Pathak et al., 2018). The client is asked: "Which word best describes your pain intensity?" (Karcioglu et al., 2018). Various versions of the VDT have been developed (see **Figure 4**): the descriptors often have numbers associated with them, and additional modifiers of the descriptors such as "very mild" and "very severe" can be added.

The VDT is also used for similar reasons as the NRS, but as with the VAS it is useful when a client does not resonate with rating pain according to numbers and prefers descriptors.

Figure 4: Verbal Descriptor Tool

FACES Pain Scales

Several pain scales involving faces have been developed specifically for children to rate the intensity of their pain. Young children do not have the same cognitive and linguistic capacity as adults, so these types of scales are more developmentally appropriate, particularly for those aged 3–7 years and even older depending on their developmental age. The two most common are the Wong-Baker FACES Pain Rating Scale and the FACES Pain Scale – Revised Version (FPS-R).

The **Wong-Baker FACES Pain Rating Scale** (**Figure 5**) is a self-assessment tool that must be understood by the patient, so they are able to choose the face that best illustrates the physical pain they are experiencing. The tool is not for use with infants or patients who are unresponsive. It is not a tool to be used by a third person (i.e., parents, healthcare professionals, or caregivers) to assess the patient's pain. This tool has actually been used across the lifespan as well including in adolescents and adults.

Ask the child to **choose the face that best shows the physical pain** they are experiencing. You may need to explain what the faces mean: Face 0 doesn't hurt at all, Face 2 hurts just a little bit, Face 4 hurts a little bit more, Face 6 hurts even more, Face 8 hurts a whole lot, and Face 10 hurts as much as you can imagine.

Figure 5: Wong-Baker FACES® Pain Rating Scale Wong-Baker FACES Foundation (2019).

Similarly, the **Faces Pain Scale – Revised Version** (FPS-R) provides a series of six faces with different expressions to illustrate pain (Hicks et al., 2001) – check out the FPS-R by clicking on the link. This **revised version does not include faces with smiles or tears**, which can help remove bias; for example, a smiling face may be interpreted as happiness, which does not necessarily mean the individual is not in pain.

When using this scale, say to the child something like: "These faces show how much something can hurt. This face [point to left-most face] shows no pain. The faces show more and more pain [point to each from left to right] up to this one [point to right-most face] – it shows very much pain. Point to the face that shows how much you hurt" you feel right now (Hicks et al., 2001, p. 176).

Based on the findings of a systematic review, the FPS-R is recommended for children as young as seven for acute pain (Birnie et al., 2019).

Contextualizing Inclusivity

Like all tools, including pain tools, the FACES pain scale may not translate to all cultures. The Northern Pain Scale is another adapted version of the FACES scale. It was translated into Inuktitut and recreated with facial expressions and dress to reflect the culture of Inuk people in Canada (Ellis et al., 2011). As a nurse, it is important to consider the use of culturally relevant pain tools.

Sun-Cloud-Pain Scale

Another scale that may be more relevant to assess pain and other symptoms in clients from certain cultures is the **Sun-Cloud-Pain Scale**. On this scale, 0 indicates that the client feels very well, whereas 5 indicates that the client is feeling very unwell specific to their pain (see **Figure 6**) (Lapum et al., 2019).

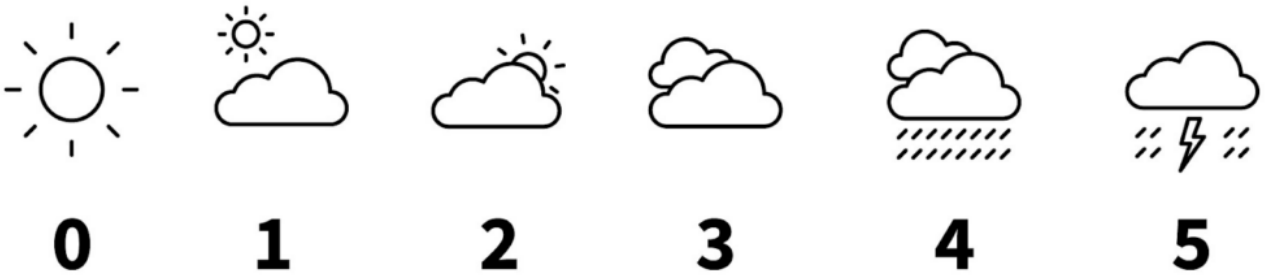

Figure 6: Sun-Cloud-Pain Scale. Graphic created using icons by Linseed Studio from the Noun Project.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1050#h5p-72

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Multidimensional Pain Assessment Tools

Multidimensional pain assessment tools are used to assess the **many ways that pain affects a person**. Although unidimensional pain assessment tools are typically used to assess pain intensity, particularly when frequent measurements are needed, multidimensional pain assessment tools are used to obtain a **comprehensive understanding of pain**.

Many different multidimensional pain assessment tools may be used depending on the client population, the reason for the assessment, and the unit/hospital/area of care you work. For example, when treating certain populations such as pre-verbal and non-verbal clients, your assessment may focus on behavioural cues. When treating clients with chronic pain, you may focus on understanding the many ways that pain affects a person including psychologically, socially, and functionally.

The following sections explore:

1. PQRSTU mnemonic.
2. Brief Pain Inventory.
3. Pain scales related to cognitive impairment.
4. FLACC Pain Tool.
5. Behavioural Pain Scale and Critical Care Pain Observation Tool.

Let's check out these tools!

PQRSTU Mnemonic

The **PQRSTU mnemonic** is a **multidimensional pain assessment tool** that is commonly used in practice to evaluate several components of pain beyond just intensity (see **Table 3**). It is used when first assessing a client's report of pain on initial assessment. It is generally used for adolescents and adults, but you may be able to simplify some of the questions for younger children, possibly age five and up. For example, you might use the word "hurt" or "owwie."

The order of questions you ask will depend on the client's responses and also on priority. What do you need to know first? When a client first reports pain, you will usually ask about the region (where it is located) and the intensity. Pay attention to responses that appear not to align. For example, if a client responds to the question about the quantity of pain by saying "the pain isn't too bad," but then rates the severity of their pain as being 8/10, you should probe further in a non-confrontational manner. You might say, "I noticed you rated your pain fairly high, at 8/10, but you said it isn't too bad. Can you tell me more about that?"

The PQRSTU mnemonic is similar to the **McCaffrey Initial Pain Assessment Tool**, which assesses the various components of pain beyond intensity (e.g., location, quality) as well as how the client expresses their pain and how pain affects them (e.g., sleep, emotions) (McCaffery & Pasero, 1999). Here is a link to the McCaffrey Initial Pain Assessment Tool.

Table 3: PQRSTU mnemonic (Adapted from https://ecampusontario.pressbooks.pub/healthassessment/)

PQRSTU	Questions Related to Pain
Provocative Palliative	What makes your pain worse? What makes your pain feel better?
Quality	What does the pain feel like? Note: If the client struggles to answer this question, you can provide suggestions such as “aching,” “stabbing,” “sharp,” “burning.”
Quantity	How bad is your pain? **Note**: for example, the client may say “very bad.”
Region and Radiation	Where do you feel the pain? Can you point to where you feel the pain? Do you feel the pain elsewhere? Does it radiate anywhere?
Severity (used interchangeably with intensity)	How would you rate your pain on a scale of 0 to 10, with 0 being no pain and 10 being the worst pain you’ve ever experienced?
Timing	When did the pain start? Did the pain begin suddenly? What were you doing when the pain started? Where were you when the pain started? Is the pain constant or does it come and go? If the pain is intermittent, when did it last occur? How long does the pain last? Is there a time of day when it is the worst?
Treatment	Have you taken anything to help relieve the pain? Have you tried any treatments at home for the pain?
Understanding	What do you think is causing the pain? How has it affected your usual activities or daily life? What concerns do you have about your pain?

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1054#h5p-73

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Brief Pain Inventory

The **Brief Pain Inventory (BPI)** (is a commonly used multidimensional tool for assessing pain in clinical environments (Cleeland, 2009). It was originally developed to assess cancer-related pain, but it is also a valid and reliable measure with other conditions (Cleeland, 2009). For example, a systematic review found a moderate quality of evidence for its clinical use related to postoperative pain assessment (Lapkin et al, 2021).

In comparison to the PQRSTU mnemonic, the **BPI provides a more comprehensive evaluation of pain** and has been more widely tested (Cleeland, 2009):

- It focuses on assessing pain intensity over the past week and interference with a client's daily life.
- It takes 5–10 minutes to complete.
- It can be self-administered by clients who are literate or administered by healthcare professionals when the client has reduced literacy.
- It can be translated into other languages for clients who do not speak English, and has already been validated in many languages including French, Japanese, Chinese, Korean, Italian, Russian, German, and Spanish, among others.

Because of its focus on **assessing pain over time** and **interference with daily lives**, it is commonly used in primary care and for assessing chronic pain. A long version and short version are available; the shorter version has become the standard in clinical practice (Cleeland, 2009) – thus we encourage you to review the short version and understand it. Here is a link to a user guide with information about the tool's development, scoring, **psychometric testing**, and relevant literature.

Clinical Tip

Provide clients with enough time to complete the BPI. The tool is often used at in-patient units and for clients with chronic pain, who may require additional time because pain can affect cognitive functioning. Many in-patient oncology units have clients complete the BPI on admission, and then weekly, to evaluate their pain over periods of time.

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Pain Scales: Clients with Cognitive Impairment

Assessment of pain in clients who are **cognitively impaired** requires a different approach because they may not be able to optimally communicate their pain via self-report. Instead, you **may need to use observational tools** that incorporate and sometimes rely on dimensions of pain such as behavioural and physiological cues (Lichtner et al., 2014). For example, clients with late-stage dementia often have limited cognitive capacity and are unable to understand and answer questions.

Systematic use of pain assessment tools enables better evaluation and management of pain in individuals who are cognitively impaired (Ludvigsson et al., 2020). However, to date no one tool has been widely adopted and internationally recognized for assessing pain in clients who are cognitively impaired (Kunz et al., 2020).

Over the last 30 years, many clinicians and researchers have developed and evaluated various tools for this population. One commonly used tool is the Abbey Pain Scale, and another more recent tool is the Pain Assessment in Impaired Cognition (PAIC15). All tools should be used with caution considering the complexity of psychometric testing of the validation and clinical utility of pain assessment tools with clients who have cognitive impairments like dementia (Lichtner et al., 2014).

Abbey Pain Scale

Development of the Abbey Pain Scale began in the 1990s, with the goal of **assessing pain in people with late-stage dementia whose communication is severely impaired** (Abbey, 2004). The scale is appropriate for clinical practice because it is simple and efficient to use and can be used by various healthcare providers; it is not time consuming and is effective with a reasonable degree of validity.

As shown in **Figure 7**, the scale is based on **behavioural observations** including:

- Vocalization.
- Facial expression.
- Changes in body language.
- Behavioural changes.
- Physiological changes.
- Physical changes.

The tool is a movement-based assessment, and therefore should be performed while moving a client such as assisting them to sit or bathing them (Abbey et al., 1998; 2002). Movement can induce pain, so assessment during movement is most informative. Higher scores indicate higher pain levels.

The Abbey Pain Scale is commonly used in long-term care settings where reassessment over time is frequently required.

Abbey Pain Scale

For measurement of pain in people with dementia who cannot verbalise.

How to use scale: While observing the resident, score questions 1 to 6

Name of resident: .....

Name and designation of person completing the scale: .....

Date: .....**Time:** .....

Latest pain relief given was.....at .....hrs.

Q1. **Vocalisation**
eg. whimpering, groaning, crying **Q1** ☐
Absent 0 Mild 1 Moderate 2 Severe 3

Q2. **Facial expression**
eg: looking tense, frowning grimacing, looking frightened **Q2** ☐
Absent 0 Mild 1 Moderate 2 Severe 3

Q3. **Change in body language**
eg: fidgeting, rocking, guarding part of body, withdrawn **Q3** ☐
Absent 0 Mild 1 Moderate 2 Severe 3

Q4. **Behavioural Change**
eg: increased confusion, refusing to eat, alteration in usual patterns **Q4** ☐
Absent 0 Mild 1 Moderate 2 Severe 3

Q5. **Physiological change**
eg: temperature, pulse or blood pressure outside normal limits, perspiring, flushing or pallor **Q5** ☐
Absent 0 Mild 1 Moderate 2 Severe 3

Q6. **Physical changes**
eg: skin tears, pressure areas, arthritis, contractures, previous injuries. **Q6** ☐
Absent 0 Mild 1 Moderate 2 Severe 3

Add scores for 1 – 6 and record here ⇨ **Total Pain Score** ☐

Now tick the box that matches the Total Pain Score ⇨

0 – 2 No pain	3 – 7 Mild	8 – 13 Moderate	14+ Severe

Finally, tick the box which matches the type of pain ⇨

Chronic	Acute	Acute on Chronic

Dementia Care Australia Pty Ltd
Website: www.dementiacareaustralia.com

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Figure 7: Abbey Pain Scale.

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Clinical Tip

Nurses play an important role in assessing pain with clients who are cognitively impaired, because they provide the most regular care and are aware of the client's baseline behaviours. It is important to assess pain regularly when establishing a baseline. Remember that the Abbey Pain Scale is designed to be used when the client is in movement: you can assess pain while assisting the client with bathing, dressing, or transferring to a chair. The assessment is quick, so you can use it frequently, for example hourly and then every four hours over a 24-hour period until an effective pain-relieving intervention is achieved.

Pain Assessment in Clients with Impaired Cognition (PAIC15)

The PAIC15 Scale is a recently developed and interesting tool for use with individuals who are **cognitively impaired**, particularly those with dementia. It was developed through a large multidisciplinary collaboration of clinical, research, and methodological experts, including nurses, from several European countries (Kunz et al., 2020). The team of experts developed this new meta-tool over a period of seven years, during which team members empirically evaluated items from all existing pain-related observational tools (including the Abbey Pain Scale) and reached consensus on the 15 most promising items, based on validity and reliability (Kunz et al., 2020).

As shown in **Figure 8**, the PAIC15 includes of **15 descriptors with five items** each for:

- Facial expression.
- Body movements.
- Vocalization.

The PAIC15 is helpful when you have limited time with the client, as you can quickly assess pain either at rest or with movement. You can go to the PAIC15 Scale website for additional information about the tool and free online training.

Name of the patient: Date:

Pain Assessment in Impaired Cognition (PAIC 15)

Item	Meaning of items	Not at all	Slight degree	Moderate degree	Great degree	Not scorable
FACIAL EXPRESSION						
Frowning	lowering and drawing brows together	0	1	2	3	x
Narrowing eyes	narrowed eyes with tension around the eyes	0	1	2	3	x
Raising upper lip	upper lip raised, nose may be wrinkled	0	1	2	3	x
Opening mouth	the lips are parted, jaw is dropped	0	1	2	3	x
Looking tense	facial display of strain or worry	0	1	2	3	x
BODY MOVEMENTS						
Freezing	stiffening, avoiding movement, holding breath	0	1	2	3	x
Guarding	protecting affected area, holding body part, avoiding touch, moving away	0	1	2	3	x
Resisting care	resisting being moved or resisting care, being uncooperative	0	1	2	3	x
Rubbing	tugging or massaging affected area	0	1	2	3	x
Restlessness	fidgeting, wringing hands, rocking back and forth	0	1	2	3	x
VOCALIZATION						
Using pain-related words	using pain words, like "ouch", "ow", or "that hurts"	0	1	2	3	x
Shouting	using a loud voice to express words	0	1	2	3	x
Groaning	making a deep, inarticulate sound	0	1	2	3	x
Mumbling	uttering words and/or sounds indistinctly	0	1	2	3	x
Complaining	expressing being unhappy, sick, uncomfortable, and/or in pain	0	1	2	3	x
	SUM=					

In which situation did you observe the person?

☐ At rest
☐ During an activity of daily living (ADL), please describe:

☐ During guided movement, please describe:

PAIC15

Figure 8: PAIC-15 (*Attribution: Abbey, J; De Bellis, A; Piller, N; Esterman, A; Giles, L: Parker, D and Lowcay, B. Funded by the JH & JD Gunn Medical Research Foundation 1998 – 2002 (This document may be reproduced with this acknowledgement retained). Permission to display this image was provided by Miriam Kunz and the pdf and online version is accessible from https://paic15.com/wp-content/uploads/paic15_en.pdf*)

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FLACC Pain Tool

The **Face, Legs, Activity, Cry, and Consolability** (FLACC) tool was originally designed to **assess pain in nonverbal (young) children**, based on **observations of behaviours** (Merkel et al., 1997). As suggested by its name, the tool includes five categories:

- Face.
- Legs.
- Activity.
- Cry.
- Consolability.

The maximum total score is 10, with scores for each category ranging from 0 to 2 (Merkel et al., 1997). This is helpful, because the FLACC findings can be easily compared to those of other common pain rating systems that are rated out of 10, such as the NRS (Voepel-Lewis et al., 2010).

The FLACC tool can be used with **children as young as 2 months of age or any child who is too distressed or sedated to accurately self-report** (Freund & Bolick, 2019). It has demonstrated good psychometric testing (Voepel-Lewis, 2010) and has been translated into several languages including French and Chinese, so it can be used across many client populations (Voepel-Lewis, 2010. It has also been used in practice with non-verbal adults with cognitive impairment and critically ill adults (Voepel-Lewis, 2010).

A **revised FLACC pain assessment tool** is also available, with additional behavioural descriptors for clients with cognitive impairment (Malviya et al., 2005). To **compare the FLACC** and the **revised FLACC**, check out the **table** at this link: (https://www.connectedcare.sickkids.ca/quick-hits/2019/8/29/volume6-efnk4-nyn48-max8h-45bm7)

Clinical Tip

Like all behavioural tools, the FLACC **cannot distinguish between pain and other forms of distress** (Parker & Brown, 2019). Think critically when interpreting behaviours that may be pain-related and when making treatment decisions based on the FLACC total score. You should observe the client for at least 2–5 minutes before assigning a score (Parker et al., 2019).

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Pain Assessment in Critical Care

A vital part of client care is assessing pain assessment in those who are **critically ill and/or in intensive care**. If they are alert and oriented, they may be able to self-report. They can do so verbally or by pointing to a number if they cannot speak, but clients are often too critically ill to communicate. Additionally, they may be unable to self-report due to factors such as altered levels of consciousness, distress, sedation, and mechanical ventilatory support (Gélinas, 2016; Suzuki, 2017).

In this context, the **nurse's observations of pain indicators** are **vital to pain assessment**. These observations are most often focusing on the **behavioural dimensions** of pain. Typically, **physiological pain indicators** do not provide a valid assessment of pain because vital signs are influenced by the client's condition (i.e., pathological processes) and medications (i.e., **sedation** and **vasopressors**) that are often used in critical care situations.

Of the many tools used in clinical practice, the Behavioral Pain Scale and the Critical Care Pain Observation Tool are recommended for assessing pain intensity, and often used in critical care (Suzuki, 2017). They are also the most validated and translated tools (Kerbage et al., 2021).

Behavioral Pain Scale (BPS)

The development and psychometric testing of the BPS was published in 2001 by Payen and colleagues (2001), and used for **assessment of pain in critically ill clients who are on mechanical ventilation**. It is user-friendly and has strong psychometric properties in terms of assessing pain in non-communicative critical care clients (Payen & Gelinas, 2014).

The BPS incorporates **three items**:

- Facial expression.
- Upper limb movement.
- Compliance with ventilation.

(Payen et al., 2001).

Each item is scored from one to four with higher scores indicating more pain. The cut-off score for when pain is identified as present is greater than five (Payen et al., 2007).

To view tool, see: external link

Critical-Care Pain Observation Tool (CPOT)

The CPOT was developed for assessing **pain in ventilated and non-ventilated clients** (Gélinas et al., 2006). It was initially developed in French and later translated into English (Gélinas et al., 2009) and other languages.

The CPOT has **four components**:

- Facial expression.
- Body movement.
- Muscle tension.
- Compliance with the ventilator for intubated clients or vocalization for extubated clients.

Each of these sections is scored from 0 to 2, yielding a total score from 0 to 8 (Gélinas et al., 2006). The cut-off score indicating pain is a score of greater than two (Gélinas et al., 2009).

Tips for using the CPOT:

- While at rest, observe the client's facial expression, body movements, and presence of vocalization for one minute.
- Next, perform a passive range of motion of the lower arm (flexion and extension of elbow) while holding the client's hand and elbow to assess for muscle tension.
- Upon movement (such as turning them on their side), observe the client's facial expression, body movements, and presence of vocalization.

(Kaiser Permanente National Patient Care Services, 2011).

Check out this external link for the: CPOT

For more information, check out this video on how to use the CPOT.

Clinical Tip

Use critical thinking when assessing pain in a critical care client, because self-reporting is often compromised. In critical care, you will encounter situations where pain indicators other than behavioural responses should be considered. Behavioural pain assessment tools should only be used when the client's motor function is intact: consider other practices for clients with limited or altered motor function such as in cases of deep sedation, paralysis, and brain injury (Gélinas, 2016). Another limitation of behavioural pain assessment tools is they only evaluate the presence of pain and no other characteristics such as intensity (Kerbage et al., 2021).

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Summary: Subjective Assessment and Pain Assessment Tools

Subjective assessment of pain is an integral step of pain management. Be aware of your own biases concerning pain: do not make assumptions. The main focus of subjective assessment is self-report, which can be elicited through a verbal account or having the client point or write it down.

The use of pain tools is also important in combination with subjective and objective forms of assessment. Many tools are available to assess pain; we have introduced you to a few, but you will come across others in your clinical practice and from reading the literature. **Best practices in tool selection** should focus on the reason for the assessment, developmental considerations, and the client situation and acuity. Another part of decision-making considering tool selection is related to where you work, as units and areas of care will commonly identify specific tools and procedures in using these tools. They may also provide training related to tool implementation, with the goal of ensuring all healthcare practitioners use it consistently and as it was designed. See summary in **Table 4**.

Table 4: Summary of pain tools.

Tools	**Description**
Numerical Rating Scale	Most commonly used tool with older children and adults who are able to rate their pain on a scale of zero to 10. Recall: this tool focuses on rating of pain severity only.
PQRSTU mnemonic	Commonly used in many settings and populations when a more comprehensive understanding of pain is needed, beyond intensity.
Brief Pain Inventory	Used to elicit a more comprehensive understanding of pain and is often used in primary care settings, in-patient units, and to assess chronic pain.
Abbey Pain Scale and PAIC15	Commonly used for older clients with cognitive impairments such as dementia.
FACES Pain Scale-Revised Version	Often used with young children, who can point to the face that corresponds to their pain level
FLACC Pain Tool	Used with pre-verbal or non-verbal children as young as 2 months of age or any children who are too distressed or sedated to accurately self-report. It has also been used with other populations including non-verbal adults with cognitive impairment and critically ill adults.
Behavioral Pain Scale and the Critical-Care Pain Observation Tool.	Common tools used in critical care that have a focus on behavioural dimensions of pain.

Clinical Tip

Pain intensity ratings are often categorized by healthcare providers as follows:

- 1–3: Mild pain.
- 4–6: Moderate pain.
- 7–10: Severe pain (and sometimes a 10 or above may be described as very severe).

These **ratings** and **categories** can be useful to provide a baseline for pre- and post-pain treatment so you know whether treatment has been effective for this specific client. However, the **categories above are qualitative descriptors** that have a subjective element to them and the **potential for bias**. For example, you might categorize a client's pain as moderate if they have rated it a five, but if asked, the client might describe their pain as severe. Therefore, it is important to engage in comprehensive assessments that are client-centred and be **careful about making judgements** about the "number" the client provides.

Determining whether treatment is needed is dependent on the **acuity of the situation** and the **specific client**. Each situation is different in terms of an acceptable level of pain. For example:

- In an acute care situation when a client is having angina pain, treatment should result in no pain. With angina pain, think about the pathological processes leading to the pain (i.e., narrowing coronary arteries in which insufficient blood and oxygen is feeding the heart muscle). Treatment should resolve this pathological process and result in no pain.
- In a client who has chronic pain related to arthritis, typically treatment should result in no pain or to a level that is manageable for the client and does not significantly interfere with their functioning.

Depending on the situation, remember that treatment includes many possibilities such as medication, repositioning, activity, distraction, and other modalities.

Priorities of Care

Some of the main priorities of care related to pain assessment include:

- **Angina pain**: this is a critical finding that requires immediate action.
- A **significant increase** in pain, particularly when rated higher on intensity scales and the pain does not respond to treatment (e.g., medication). An increase in pain should prompt you to think critically about

what is going on and what could be causing the increase. In this case, a full subjective and objective assessment of the pain is required and it should be promptly reported to the physician or nurse practitioner.

- **Inadequately managed postoperative pain** is of concern because of the physiological effects of pain on the body, such as tachycardia and hypoxia. Additionally, poorly controlled postoperative pain has been correlated with prolonged opioid use (Goesling et al., 2016). Thus, if the prescribed medications are not controlling the pain, you should do a full subjective and objective assessment of the pain and discuss with the healthcare team alternative medications and pain management approaches.
- **Pain upon movement with a suspected fracture**. Complications associated with fractures include **hemorrhage** and blood vessel damage, which can cause **ischemia** distal to the fracture due to a disruption in blood flow, nerve damage, and **pulmonary embolism** (usually associated with hip and pelvis fractures). Therefore, during the acute period you should immobilize the affected area/limb and continually assess peripheral blood flow (temperature, pulses), quality of breathing, breath sounds, respiration rate, and heart rate. When blood flow is disrupted distal to the periphery, this can cause cool skin temperature and decreased pulse force or absent pulse in the affected limb. Notify the physician or nurse practitioner of this pain and any associated critical findings immediately.
- **Back pain associated with potential spinal cord compression**: this is a serious issue that may require urgent intervention. The client should remain at rest while you report findings to the physician or nurse practitioner. Compression may be suspected with new onset and severe back pain associated with loss of bladder and/or bowel function and numbness and tingling in the arms and/or legs.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1066#h5p-74

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Objective Assessment

It is always important to perform an objective assessment following a subjective assessment, but this is particularly the case for infants, young children, and non-verbal clients who may have difficulties with self-reporting.

The type of objective assessment used will depend on the location of the pain, the related body systems, and the acuity of the situation. Specific focused assessments on a body system may be necessary. For example, if a client describes knee pain, you should do a focused assessment on the musculoskeletal system. If a client describes chest pain, you should do a focused assessment on the cardiovascular and the respiratory system and possibly the musculoskeletal system.

The objective assessment does not follow a specific order; it depends on the acuity of the situation and the stability of the client. Common components of an objective assessment of pain include:

- **Full set of vital signs.**
  Vital signs can be affected by pain, particularly acute pain. Collection and assessment of vital sign data may provide important information related to the client's stability and the potential for clinical deterioration. Vital signs are also an important component of pain tools that include physiological measures; these can be particularly helpful in clients who are pre-verbal or non-verbal such as newborns, young children, clients that may have a developmental challenge, and clients who are unconscious. However, vital sign changes cannot help you differentiate between pain and other forms of distress such as fear and anxiety. You should always consider the context when interpreting vital signs, because they can be affected by level of consciousness, medications, and sedation. Therefore, your clinical judgement will be based on a comprehensive subjective and objective assessment, along with critical thinking.

- **Inspection of the area.**
  Typically, you will inspect the area on the body where a client indicates they are having pain. Inspection is performed bilaterally in which you compare the left side to the right side. For example, if a client is having eye pain, you should compare the left eye to the right eye. Inspect for and note any abnormalities such as discoloration (e.g., redness), bruising, swelling, scarring, incisions, masses, deformities, asymmetry, lesions, non-intact skin, and pressure injuries. With chest pain, you should also inspect for cardiac heaves (forceful movements observed on the skin over the chest wall) and epigastric pulsations. With abdominal pain, you should also inspect for abdominal contour and peristaltic movements.

- **Palpation of the area.**
  After conducting a subjective assessment, you should palpate the area (and related areas) in which the client is having pain. Palpation is performed bilaterally: compare the left side to the right side. For example, if a client is having left shoulder pain, you should palpate the right shoulder first and then the painful left shoulder. Similarly, if a client is having abdominal pain, you should palpate the painful area last. During palpation, you should assess skin temperature, swelling, masses, deformities, and **crepitation** if associated with a joint. You should also observe any signs of pain during palpation, such as a change in respiration (e.g., holding their breath), facial grimacing, withdrawing their body/limb, and guarding.

- **Auscultation and percussion**.
  Perform auscultation and percussion when a client is describing chest or abdominal pain. For example, with chest pain, you should auscultate the lungs, and the apical pulse and cardiac valves. With abdominal pain, you should auscultate the abdomen for bowel sounds and percuss the abdominal area.

Clinical Tip

Always compare the right and left side of the body when inspecting and palpating, because the best standard of comparison is the client's own anatomy. The presence of a bilateral versus a unilateral finding is often of clinical significance. For example, the left ankle should be symmetrical with the right ankle. The presence of edema in one ankle versus both ankles is meaningful when making judgements about the underlying pathology.

When palpating an area, be aware of responses that may be categorized as allodynia or hyperalgesia. For example, if you press gently on an area (a stimulus that does not normally result in pain) and the client communicates pain, this is considered allodynia. Additionally, if you press firmly on an area (a stimulus that would normally result in pain) and the client communicates an exaggerated response to the pain, this is considered hyperalgesia. These conditions are different, but may coexist in the presence of diseases such as migraines and diabetes.

Clinical Judgement: Case Study

A 78-year-old client in a long-term care home tells a personal support worker (PSW) that they are going to stay in bed and skip breakfast. The PSW asks "are you sure?" The client smiles and says "yes dear, thank you." The PSW asks the client if they can bring them breakfast and the client states "no." The PSW notifies the nurse who says "I am going to check on the client since they just had hip surgery three weeks ago and were just transferred back home here a week ago. If I recall, their pain was fully assessed and controlled last evening before bed."

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1070#h5p-75

Key Takeaways

- Pain is a complex phenomenon that is often conceptualized as an unpleasant, sensory experience associated with, or resembling that associated with, actual or potential tissue damage.
- Although self-report is generally considered the gold standard, pain can affect individuals in many ways, so a multifaceted approach to assessment is required.
- If you are not aware of your cultural biases, you may judge the validity of another person's pain based on your own answers.
- Always remember: pain is what the client tells you it is. This is an important tip because of the unconscious bias and myths concerning pain that result in institutional racism and ageism.
- Pain assessments are often repeated to evaluate the effectiveness of treatment and medication.
- Choosing the correct pain tool, and using a combination of subjective and objective assessments along with critical thinking, are vital to the accuracy of your assessment.

CHAPTER 5 - PHYSICAL EXAMINATION TECHNIQUES: A NURSE'S GUIDE

Published in 2021

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Objective Assessment

Objective assessment involves the collection of data that you can **observe and measure** about the client's state of health. Examples of objective assessment include observing a client's **gait**, physically feeling a lump on a client's leg, listening to a client's heart, tapping on the body to elicit sounds, as well as collecting or reviewing laboratory and diagnostic tests such as blood tests, **urinalysis**, X-ray etc. Typically, an objective assessment is conducted following the collection of **subjective data**.

The purpose of the objective assessment is to identify normal and abnormal findings. The abnormal findings are cues that signal a potential concern. An important part of the nursing process to ensure **client safety** and **effective care** is:

- **Recognizing** abnormal cues.
- **Acting** on abnormal cues.

Failing to recognize or act upon abnormal cues can lead to significant negative consequences for the client.

Objective data are analyzed in combination with your subjective assessment to make a clinical judgement. A **clinical judgement** is the outcome of thinking critically about the data, analyzing the cues as a whole, making decisions about the most significant concerns to address, and identifying how to best address these concerns based on the existing evidence (National Council of State Boards of Nursing, 2018). As a healthcare professional, developing strong clinical judgement is essential to ensuring client safety and maintaining your competency. Your clinical judgement will guide the prioritization and sequencing of assessment techniques. Your assessment of cues (both subjective and objective) will help you determine what data warrant further investigation and assessment. Therefore, it is important to think critically about the findings you collect during an assessment: Are they normal or abnormal for this specific client? Do they require you to act and/or seek further assistance?

Clinical Tip

Recognizing and acting on assessment findings

As a nursing student, you must have timely discussions with your clinical instructor or preceptor to assess the significance of abnormal findings. You will need to take initiative, develop confidence in seeking assistance, and never ignore an abnormal finding.

In this chapter, you will focus on four objective assessment techniques: **inspection**, **palpation**, **percussion**, and **auscultation.** These involve your senses of sight, hearing, and touch (see **Figure 1**). You should also be aware of your sense of smell when conducting any physical assessment, as certain odours can act as a cue; for example, a foul odour may indicate an infection.

- Inspection involves your visual sense to observe the client.
- Palpation involves your sense of touch to physically feel areas of the body.
- Percussion involves a combination of touch and hearing, but your focus is on hearing sounds when tapping the areas of the body.
- Auscultation involves your sense of hearing while listening to areas of the body with a stethoscope.

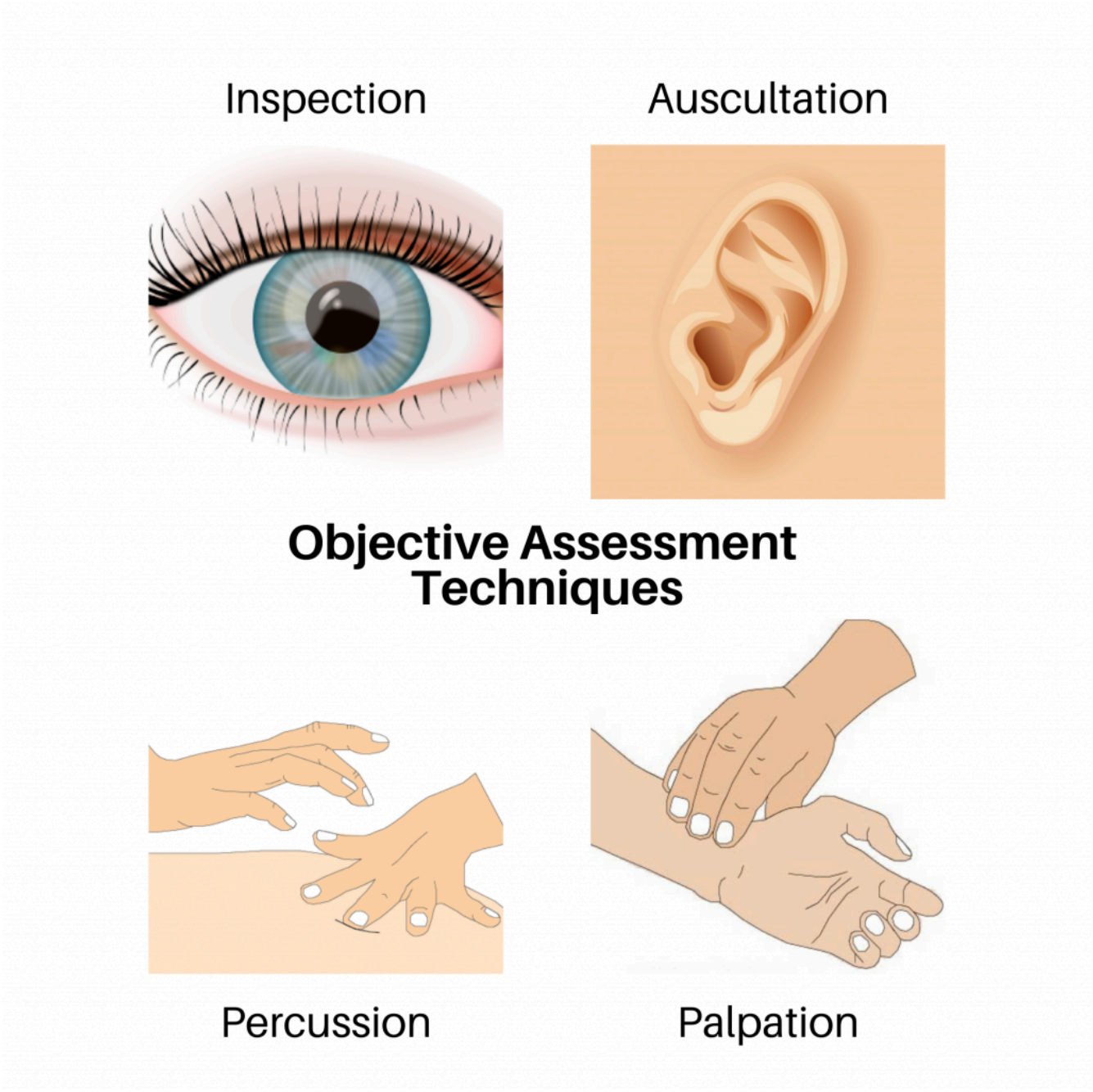

Figure 1: Objective assessment techniques

These techniques should be performed with methodical and deliberate action. Always perform **inspection first** because it is the least invasive and does not involve physical touch. Inspection also allows you to establish a baseline for your assessment. For example, if you observe someone crouched over in pain, this will inform the sequence of your subsequent assessment techniques. Typically, palpation, percussion, and then auscultation follow inspection. The **sequencing of techniques may be rearranged** for several reasons, including which system is being assessed and for safety reasons. For example, when assessing the abdomen, auscultation is generally performed before percussion and palpation. Client safety and comfort also influence the sequence of objective techniques. For example, with a sleeping infant, you should perform inspection and auscultation while the child is calm and to avoid awakening the client. You will learn more about modifications to the sequencing of techniques as you learn about specific body systems. Determining technique sequence also comes with experience.

When applicable, these IPPA techniques are used to assess body systems (e.g., eyes, ears, heart and neck vessels,

lungs and thorax, abdomen, musculoskeletal). However, not all techniques are applicable to all systems. For example, you would not auscultate an eye because it does not emit a sound that would give you relevant data. Additionally, developmental stage and age can influence how some IPPA techniques are performed and also the determination of normal and abnormal findings. For example, normal heart rates vary significantly between a newborn compared to an adult.

Voices of Experience

Your foundational IPPA assessment techniques and the resultant findings will give you a baseline understanding of the client's health status. These physical assessment skills, combined with subjective health assessment, are important parts of clinical judgement and can act as a prompt for urgent action, transfer to a higher level of care, and further diagnostic technologies. Your IPPA assessment skills will be even more important in areas with less access to resources and diagnostics (e.g., rural and remote areas and underdeveloped regions).

Activity: Check Your Understanding

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Trauma-informed Assessment

Performing an objective assessment involves the nurse **physically touching** the client. This touch can make clients feel vulnerable, particularly if they have experienced **trauma** in their life. Clients may also be anxious, fearful, and/or uncertain about undergoing a physical assessment for many other reasons: it may be their first time undergoing a physical assessment; they may be experiencing physical ailments that they consider embarrassing; they may be self-conscious or have body image concerns; they may identify as transgender or gender-diverse; they may be children who are fearful of unfamiliar people; and they may have had a previous assessment conducted by a healthcare professional who was judgemental, prejudiced, not compassionate, or not accepting.

Because you will not necessarily know whether the client has experienced trauma or is fearful or self-conscious, it is important to use a **trauma-informed approach** with every client when performing an objective assessment.

Steps to inform a trauma-informed objective assessment include:

- Introduce yourself (name), your role/designation, and pronouns.
- Explain why you are there.
- Use the client's identified name and pronouns.
- Provide the client the option to have someone present who they trust and/or feel comfortable with (e.g., a friend, partner, family member).
- Give the client choices about how to proceed.
- Explain what you are doing as you proceed.
- Provide privacy by closing the door and using a drape so that you only need to expose the areas that you are assessing.
- Ask permission to touch.

Clinical Tip

For each client, but particularly clients who have experienced trauma, you will need to modify your objective assessment based on their needs. For example, pay attention to cues or signals that notify you when they are feeling discomfort and distress. Cues may include becoming quiet, breathing fast or holding their breath, facial grimacing, and muscle contractions. It is good practice to continually obtain permission before touching areas of the body and narrate your steps aloud for clients so that they can anticipate touch and know what to expect and for how long. For example, you could state "I'm going to listen to valves of your heart by placing my stethoscope in four locations over your chest, I will listen for a few heart beats over each location. Feel free to stop me at anytime, if you need to take a break or if you have questions. Is it okay if I begin?"

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Preparing for the Objective Assessment

In preparation for the objective assessment, you should consider several things.

Inquire whether the client needs to **go to the bathroom.** Clients will be more comfortable during assessments if they have an empty bladder and bowels. This is especially true when performing assessments on the abdomen or assessments of pregnant women, because palpation may cause discomfort if the bladder or bowels are full. In addition to client comfort, it is important to anticipate other steps or possible actions when preparing for an objective assessment. For example, if the client's reason for seeking care is pain upon urination, you will likely ask the client to collect a urine sample while they empty their bladder.

You should also **prepare the environment** before beginning, including organizing the necessary equipment and supplies (e.g., hand sanitizer, alcohol pads, penlight, stethoscope, drape). See **Figure 2** below for an overview of equipment used.

Figure 2: Equipment

When caring for young children, you might want to engage them in helping you set up the equipment. Children are often fearful or curious about equipment, and engaging them in setting up equipment can make the assessment and equipment seem less scary and also make them more familiar with you. You might show them your stethoscope and let them touch it. Infants and toddlers may be calmer if the care partner holds them on their lap. Make sure the room is well lit for the examination, and ensure the client's privacy by closing the curtains or the door.

Ensure the **client's privacy** and **warmth**.

- You should **close** the room door and/or the curtains.
- Depending on the assessment, you may need the client to put on a **gown**. For example, a gown is appropriate if you are doing a complete head-to-toe assessment. Most clients wear gowns when they are in hospital, but sometimes they prefer to wear their own clothing. If a gown is required, provide it to the client and explain that it should be tied up at the back, but occasionally the front, depending on the examination being performed. You should also indicate whether all clothing should be removed or whether they can leave on socks and undergarments. For privacy, leave the room as the client changes into the gown, unless they require assistance.
- Use a **drape** and only expose the area of the body that you are assessing, and then cover the client back up. You can engage the client by having them hold the drape and guide them on how to cover themselves up. There are two types of drapes:
    - **Disposable drapes** – these are non-reusable and should be discarded in the garbage when done. They are often used in primary care clinics.
    - **Reusable drapes** – these are usually made of cotton or flannel and are like a small sheet. They can be disposed of in the laundry, washed, and reused.

You may need to reposition the client depending on the part of the body being examined. Consider what **body positioning** will be needed for you to conduct the examination. You should minimize repositioning as much as possible, especially with clients who have mobility difficulties, those who are experiencing pain, and those who may be medically unstable. Although this applies to all clients, you should be attentive to the older adults who tend to have more mobility and balance issues than younger clients. You may involve a **care partner** in helping position a young child or older adult who needs assistance. With young children, it can be helpful to engage care partners in the assessment so that the child feels more comfortable with you. For example, you may encourage the care partner to hold the child in their lap as you assess so that the child is comfortable and you can obtain the best results.

Consider **your own body positioning** and the importance of ergonomics and body mechanics to prevent or reduce any risk of injury. For example, raise the bed to a working level: this is usually to a height between your upper thigh to your waist, depending on the task. This will help you minimize twisting your body and having to reach down or up to perform the examination.

> Perform **physical techniques on bare skin**, so that your assessment is accurate.

Modify your approach to the client's **developmental stage**, which does not always align with their chronological age. This will require attention to elements such as language and cognitive and socio-emotional development. At times, you may need to modify your communication so that you are appropriately engaging with the client at a level that they understand. Specifically, you might want to:

- Involve care partners (usually parents) when assessing **infants** and **children** to help position them. Use playful approaches, a friendly **vocal intonation**, and smile to avoid frightening children. You could play peekaboo and let children grasp objects like stethoscopes. You might incorporate their favourite objects such a teddy bear or a blanket into the physical assessment, for example by using your stethoscope on their teddy bear. Distracting children from the assessment technique and engaging them in play while performing techniques will require practice.
- You may or may not have a care partner present when performing a physical assessment of an **adolescent** client. It will often depend on the specific client, but you might consider offering options such as, "would you like to have your parent present for the first part of the physical exam, and then they can step out at the end?" This population will be experiencing changes in their body, so a non-judgemental and accepting attitude is important, as well as

the use of permission statements.

- With **older adults,** you should modify your approach to their specific needs. Some older adults are quite independent and healthy, while others are experiencing significant changes in their body and its functioning. Thus, you should assess for hearing, vision, physical strength, and balance, which may affect how you explain and perform the assessment; this might also be needed for clients in other age groups.

Clinical Tip

If there is a care partner present, **ask the client** whether they would like the care partner to step out or be present for the examination. It is common to have a care partner present for examinations of young children and some clients with cognitive impairments. It is common for a parent to hold infants during a physical examination.

Activity: Check Your Understanding

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Infection Prevention and Control

Infection prevention and control (IPAC) refers to practices that **prevent or reduce the transmission of microorganisms**.

As a healthcare professional, you have an **important role** to play in IPAC, and so do clients, care partners, and visitors. You should **educate** clients, care partners, and visitors about appropriate IPAC measures. Healthcare institutions usually display signs indicating to clients and visitors when to wash their hands or wear a mask, but nurses also play an important role in reminding people about the shared responsibility in reducing the spread of disease, particularly when specific precaution protocols are in place (e.g., in an isolation room, wearing a mask if someone has a cough).

> **The #1 action you can take to prevent healthcare-associated infections (HAI) is hand hygiene**
>
> (Public Health Agency of Canada, [PHAC] 2012).

Hand hygiene practices include: using an alcohol-based hand rub (ABHR), sometimes referred to as hand hygiene gel/hand sanitizer, and handwashing with soap and water. It may also include surgical hand antisepsis, which is beyond the scope of this chapter.

You should perform hand hygiene with an ABHR in front of the client prior to beginning and at the end of the examination (see **Figure 3** below). The ABHR should have 70–90% alcohol concentration (Public Health Ontario, 2014). Each institution should have a policy, but typically you should rub your hands with ABHR for at least 20 to 30 seconds until hands are dry.

Figure 3: Hand hygiene

Certain occasions will require handwashing instead of relying on ABHR. You must **wash your hands with soap and water** if your hands are visibly soiled, have been exposed to any body fluids, have been exposed to norovirus or clostridium difficile, and following glove removal (PHAC, 2012; Public Health Ontario, 2014). The mechanical action of washing hands is important to remove bacteria and takes a minimum of 20 to 30 seconds. See **Film Clip 1** of how to properly wash your hands.

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Film Clip 1: Handwashing

Reusable equipment that touches intact skin and does not touch mucous membranes **must be cleaned** between clients. Examples of this equipment include stethoscopes, BP cuffs, and pulse oximeters. Most of this equipment does not become visibly soiled, so disinfecting the equipment with a wipe is usually sufficient (IPAC, 2018). Depending on the equipment size, this can be achieved with an alcohol pad or a larger disinfectant wipe with 60–80% alcohol concentration (Public Health Ontario, 2018).

You should also **consider your own health and safety** as you provide care to clients. **Personal protective equipment** (**PPE**) such as gloves, masks, gowns, goggles, and face shields can prevent you from contact with microorganisms. Other precautions to think about include being mindful not to touch your face as you provide care because bacteria such as MRSA (methicillin-resistant staphylococcus aureus) and COVID-19 can live in the nasal passage for extended periods of

time. Other ways to reduce exposure to microorganisms is to keep nails trimmed short and to keep hair tied back if it is longer than your shoulders. Avoid wearing jewelry and nail polish as they can harbor microorganisms. In addition to using PPE when appropriate, you may need to use isolation precautions for a client with a known or suspected infectious disease.

Let's move on and talk about each of the techniques now!

Activity: Check Your Understanding

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Anatomical Locations

You need to be familiar with **anatomical locations** when performing a physical assessment for two reasons:

- First, you need to use parts of your own hands to do particular assessments. **Figure 4** illustrates the parts of your hands that are commonly used to perform a physical assessment, including the dorsal and palmar aspect of the hands, fingertips, the ulnar surface, and the distal interphalangeal joints.

- Second, you need to be able to accurately note the anatomical locations when communicating and documenting normal and abnormal findings. For example, it is too vague for a nurse to say that a client is having pain in their left arm. A more specific and accurate statement is the client is having pain on the anterior side of their left arm, two inches superior to the wrist. Therefore, it is important that you have access to a ruler or measuring tape so that you can accurately identify the location of any variations. For example, you may note swelling 2.5 cm distal to the right medial malleolus. This most accurately describes the location and allows you to measure any changes over time.

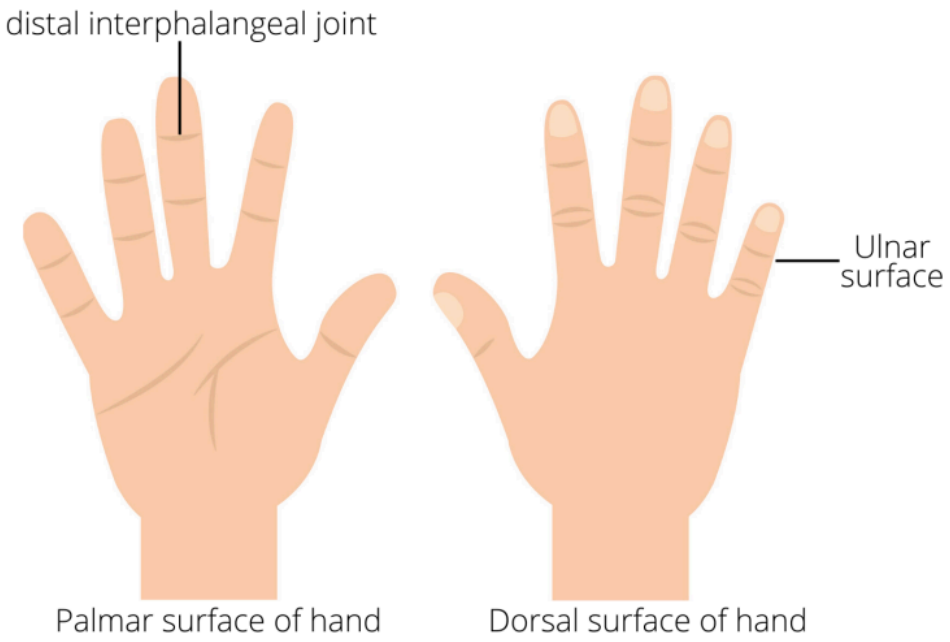

Figure 4: Hands

Let's examine how to identify these anatomical locations.

You need to understand what the **anatomical position** is so that you can note findings based on this position. See **Figure 5** and **Figure 6** for an overview of the anterior and posterior view of the anatomical position with the client standing upright, facing forward, arms positioned at the side with palms of hands facing forward, and feet slightly apart and facing forward.

Figure 5: Anterior view of anatomical position

Figure 6: Posterior view of anatomical position

Specific anatomical reference points will help you identify and note locations. Avoid using vague terminology that can be misinterpreted, such as "beneath," "inside," "beside," "above," or "below." Instead, use anatomical reference points such as proximal or distal, inferior or superior, medial or lateral, and superficial or deep.

See **Figure 7** for an overview of anatomical reference points and the descriptions here:

- **Anterior** – the front side or further to the front (also sometimes referred to as ventral)
- **Posterior** refers to the back side or further to the back (also sometimes referred to dorsal).
- **Medial** – the midline of the body (e.g., a longitudinal line that runs down the centre of the body dividing it into the right and left side of the body) whereas **lateral** refers to moving further away from this line.
- **Proximal** – nearest the trunk or centre of the body whereas **distal** refers to further away from the trunk of the body. These terms are typically used when referring to a point on the limbs (e.g., the arm or the leg).
- **Inferior** – something below an anatomical location or near to the feet whereas **superior** refers to something above an anatomical location or near to the head.
- **Superficial** – something close to the surface of the body whereas **deep** refers to something further away from the surface of the body.

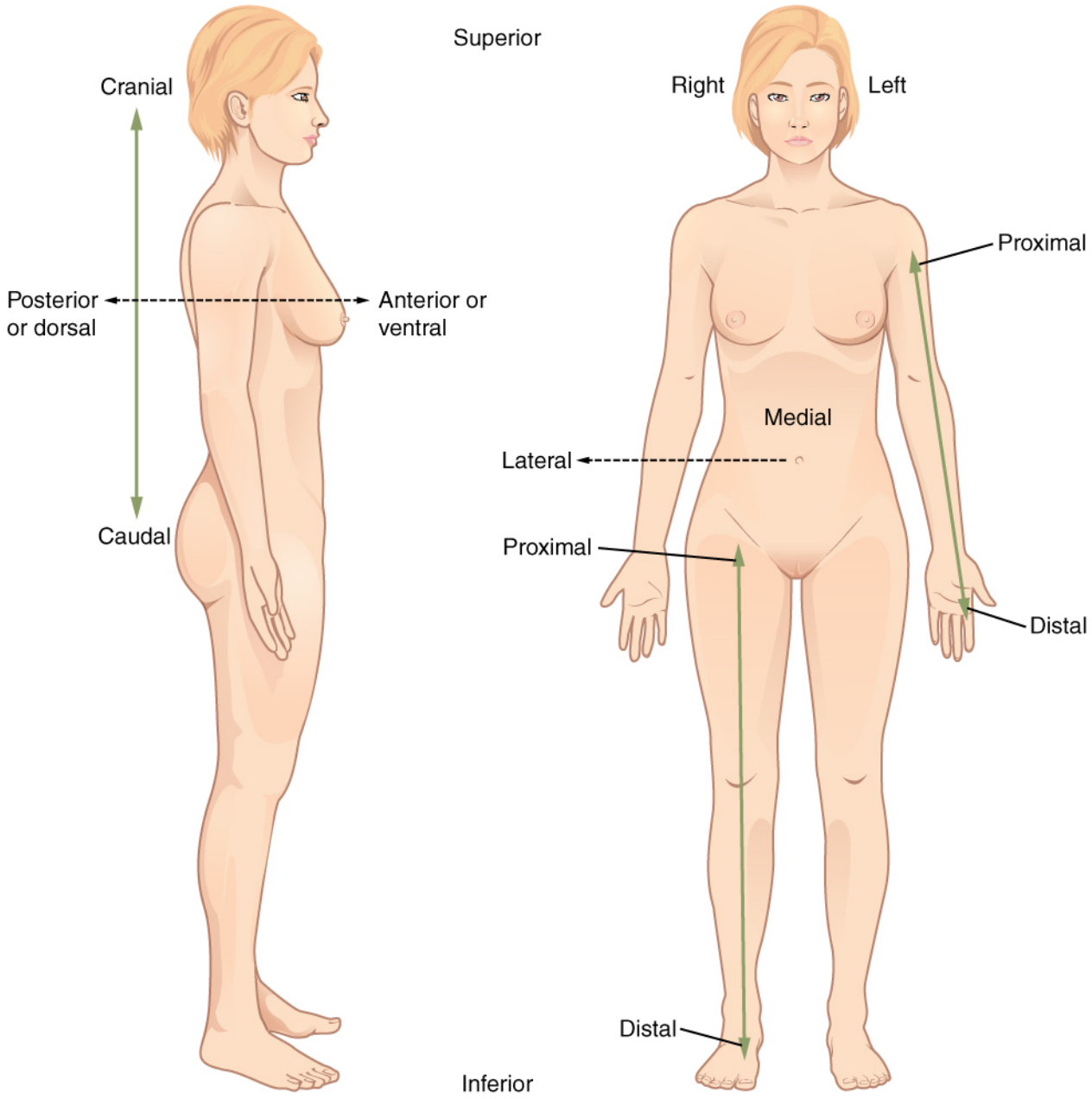

Figure 7: Anatomical reference points, from Betts, et al., 2013. Licensed under CC BY 4.0.

Each body system has specific anatomical reference points, which are explained in more detail in other resources related to each body system. And last, you will need to position the client in several different positions when performing a physical assessment including sitting upright on the edge of the bed, supine, lateral, high-fowlers, and semi-fowlers.

Inspection

Inspection is the technique of **purposeful** and **systematic observation** of the client – note that this does not involve touching, only careful visual observation. It begins as soon as the client walks in the room or you enter the client's room and ends when you or the client leaves the room: you should maintain inspection constantly throughout the examination.

Clinical Tip

Good overhead lighting is important to help you see the client. Tangential lighting with a penlight is also effective to help you see specific body areas or lesions, as it focuses the light and highlights contours and protrusions on a relatively flat surface. Tangential lighting involves using the penlight at a low angle and to one side of the area that you are viewing. For example, tangential lighting is often used to inspect the thyroid, the jugular pulsation, the apical impulse, and skin lesions. A magnifying glass may also be helpful to let you get a better look at a specific area.

While inspecting, you should note both **normal** and **abnormal** findings. When doing so, you should complete a **bilateral comparison** in which you compare the left side of the body to the ride side for comparison. For example, if you notice that the upper left eye lid is drooping, is this the same for the upper right eye lid? This comparison is helpful because symmetry is usually a good thing, whereas asymmetry should draw your attention as a potential cue for an abnormal finding.

The systematic process involves **inspecting the client overall** to gain a general impression, and then **inspecting specific body areas** and body systems to focus your assessment. For example, when inspecting the client overall, you may assess the following:

- **Body position and posture**
  - Are they standing or sitting upright or are they bent/slumped over or leaning to one side? For example, findings may include "client sitting erect in chair" or "leaning to right side."
- **Gait** (i.e., balance and movement of limbs while walking)
  - Is it coordinated and balanced? Do they limp, stagger, shuffle, or is their gait uncoordinated or rigid? For example, findings may include "balanced gait" or "slow, shuffling feet with rigid movement of body and limbs."
- **Symmetry**
  - Are facial features symmetrical and are limbs symmetrical in length? Do you notice any bony protrusions or deformities on one side of the body, but not the other? For example, findings may include "symmetrical facial features with no deformities" or "asymmetrical facial features with left-sided facial droop."
- **Skin**
  - Do you notice any discolouration, bruising, **lesions**, swelling, perspiration? It is important to note that not all discolouration is a cue for concern; hyperpigmentation, which is when patches of skin can become darker – this is common as people age and common in people with darker skin tones. For example, findings may include "redness and swelling on left **radiocarpal joint**."
- **Behaviour**

- Is their **disposition** and **affect** appropriate for the environment? Or does their facial expression and behaviours display cues that you should be concerned about (e.g., laughing or crying uncontrollably, unable to sit still)? Appropriate behaviour varies based on a client's developmental age, so you should take this into consideration. For example, findings may include "client constantly moving in chair, fidgeting with hands, moving right leg up and down."

- **Dress and hygiene**
  - Is the client dressed appropriately for the environment? Are there any body odours or concerning scents? Be aware that clothing style and its appropriateness varies based on a client's age, their geographical or cultural background, and their style preferences. For example, findings may include "client dressed appropriately for the weather."

You will need to inspect specific body areas as you assess specific body systems. For example, you will inspect the chest area when you assess the cardiac system (i.e., the heart). Doing so in this systematic manner will allow you to only expose the area that you are assessing, while ensuring appropriate draping. It will also help you keep track of what you have and have not yet done.

Voices of Experience

Always consider what you are inspecting in the context of the overall presentation of the client. With infants, when exposing parts of their body, cover them up quickly to keep them warm; you should try to keep them covered as much as you can to prevent heat loss. This can also be an opportune time to inspect children while they are playing or interacting with their care partner. For toddlers, use a calm soothing voice and let them gradually get acquainted with you while inspecting. It is important to address the client's developmental stage; for example, toddlers are more likely to be engaged and respond to your direction if you make them feel important.

Activity: Check Your Understanding

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Palpation

Palpation is the technique of using your hands/fingers to assess the client based on your **sensation of touch**. It provides the opportunity to use your sense of touch to assess the body and further examine cues that were identified during inspection.

As you prepare to touch the client, it is important that you:

- Ask **permission to touch**. Touch can sometimes be misinterpreted, so it is essential to be purposeful with each movement and explain what you are doing.
- Consider the **warmth of your hands**. Cold hands can be uncomfortable for the client. Do not blow on your hands to warm them up as this will transfer germs from your mouth to your hands. Instead, rub your hands together to create heat.
- Avoid **staccato touch** unless indicated. The jerk-like movement can be difficult to anticipate for the client. When touching the client, use firm pressure unless otherwise indicated. Light pressure can be ticklish. In this case, sometimes incorporating the client's hands, where possible, into your palpation technique to reduce tickling.

Palpation provides useful information to assess and evaluate findings related to temperature, texture, moisture, thickness, swelling, elasticity, contour, lumps/masses/deformities, consistency/density, organ location and size, vibration, **pulsatility** , **crepitation** , and presence of pain. See **Table 1** for specifics of how to conduct palpation based on what you are attempting to assess.

Clinical Tip

Always compare the right side and the left side of the body when palpating, because the best standard of comparison is the client's own anatomy. The presence of a bilateral versus a unilateral finding is of clinical significance. For example, the left ankle should be symmetrical with the right ankle. The presence of edema in one ankle versus both ankles is meaningful for making judgements about the underlying pathology.

Table 1: Palpation techniques

Technique and rationale	Consideration
The dorsal aspect of your hand has thin skin relative to the rest of your hand and is therefore more sensitive to temperature. See **Figure 8**.	**Temperature** refers to the degree of heat or cold an object holds. Use the dorsal surface of your own hands (i.e., the back of the hands), to assess the temperature of a surface (e.g., skin). For example, findings may include "warm skin temperature on arms, equal bilaterally."
Your fingertips are densely innervated and therefore sensitive to tactile discrimination. Recall your thumb has a pulse and therefore is not ideal for assessing pulsatility (e.g., pulses) of the client.	**Texture** refers to the smoothness or roughness of a surface. For example, findings may include "smooth skin on anterior and posterior aspects of legs."
	Thickness refers to how thin or thick an object is. For example, the palmar aspects (inside) of the hands and the plantar surface (bottoms) of the feet tend to have thicker skin than the rest of the body.
	Moisture refers to the amount of wetness/liquid on a surface. Is the skin dry or moist? For example, perspiration can be a normal finding in certain situations such as in a warm environment or after exercise. It can also be an abnormal finding at rest or when it is excessive, for example "**diaphoresis** on face, arms and legs, bilaterally."
	Swelling and **masses** are often assessed using your fingertips. You can also use a grasping motion with the fingertips and thumb, particularly when you are assessing the size and density of a mass. For example, some findings may include "round mass two centimetres by two centimetres midline and superior to umbilicus."
	Pain/tenderness is best assessed while palpating with your fingertips in which your hand and wrist are kept parallel to the body so that the action does not involve poking or jabbing the client with your fingertips. Always assess a painful area last.
	The fingertips are often used to assess the various **glands** of the body and the **organ location, size**, and **density**, but the specific technique often depends on the organ and gland that you are assessing. For example, the fingertips can be used to assess the thyroid, lymph nodes, liver, spleen, kidney, intestines, stomach, and bladder. Findings may include "soft abdomen in all four quadrants."

Pulsatility refers to pulsations associated with the cardiovascular system. Most commonly, this involves placing the pads of your three fingers (starting with the index finger) over a location to assess a client's pulse (e.g., the radial pulse or carotid pulse). You can also assess the apical impulse using the pad of your index finger. This will be discussed in more detail when you learn about the cardiac system.

One type of **crepitus** is when air becomes trapped in the subcutaneous tissues of the chest/neck area; this is called subcutaneous crepitus. To palpate this crepitus, place your fingers over the chest and palpate in various areas. This will be discussed in more detail when you learn about the respiratory system.

Cupping of hand or grasping with fingers and thumbs will allow you to gain coverage of an anatomical area while feeling for abnormalities.

Bones and **muscles** (and associated deformities) as well as the **trachea** and **testicles** are often assessed using a gentle grasping motion of the fingers and thumbs.

Another type of **crepitation** is an abnormal grating or crunching sound or sensation felt and heard over joints at the location where bones meet. It occurs when the articular surface of bones grinds together. It is different than the sounds that are made when a person cracks their fingers or joints (which are caused by the slipping of tendons/ligaments over bony surfaces). Listen and place your hand on (i.e., cup your hand over) the joint, or grasp the joint with your fingers and thumb, while asking the client to move their joints through a range of motion. This will be discussed in more detail when you learn about the musculoskeletal system.

The metacarpophalangeal joints (base of fingers on the palmar surface) (**Figure 9**) or ulnar surface of hands/fingers (**Figure 10**) are the most sensitive to movement discrimination (vibration and pulsatility).

Vibration is a subtle oscillating movement that resembles a quivering or shaking motion. It may be comparable to the sensation of an off-balanced washing machine, standing on a platform when the train is entering, or the sensation from a mild earthquake. Vibrations may be felt over the lungs, termed tactile fremitus; this will be discussed in more detail when you learn about the respiratory system.

Pulsatility, also referred to as abnormal pulsations felt over the heart, can be assessed with the ulnar surface of your hands or the palmar surface of your metacarpophalangeal joints. These abnormal pulsations are referred to as "thrills" and will be discussed in more detail when you learn about the cardiovascular system. For example, findings may include "a thrill was palpated over second intercostal space left sternal border."

Figure 8: Palpating for temperature with dorsa of hands

Figure 9: Palpating with metacarpophalangeal joints

Figure 10: Palpating with ulnar surfaces

Voices of Experience

Distinguishing normal and abnormal findings comes with practice. It helps to familiarize yourself with common anatomy. Lab time is a unique opportunity to practice your skills and get a feel for human anatomy.

Palpation is not just an assessment technique, it is a means of communicating with your patient through touch. Consider what message you are trying to convey through touch. With young children, try to incorporate play and involve the care partner when possible. You can incorporate a child's toy or teddy bear into the assessment. If a child is ticklish, you can engage them by placing their hand on top of yours and ask them to move your hand to various positions to palpate.

For all clients – children, adolescents, and adults – assess their readiness to touch. For example, you may begin by palpating non-invasive areas such as the hands first, and always explain what you will be doing. It is important to observe facial expression as an indicator of how the client is responding and also whether they are in pain.

Activity: Check Your Understanding

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Percussion

Percussion involves **tapping the body to elicit sounds** and determining whether the sounds are appropriate for a particular organ or area of the body. Try tapping different surfaces with your fingertips and compare the sounds: a firm hard surface like a wood desk or table, a thick textbook, a window, or even a drum. As you tap these surfaces, you can hear that each surface elicits a different sound based on the object's consistency. This concept also applies to the body.

Each body part that you percuss provides information about the consistency as well as the size and borders of the underlying structure. For example, the percussion sounds can tell you if the organ is:

- **Air filled** (e.g., lungs)
- **Fluid filled** (e.g., bladder and stomach)
- **Dense** (e.g., liver)

Percussion can also help reveal the presence of **masses**, particularly if they are close to the surface of the body.

There are three approaches to percussion, but the most widely used is **indirect percussion,** which is the application of a mediated force using parts of both of your hands. See **Figure 11** demonstrating the technique of indirect percussion.

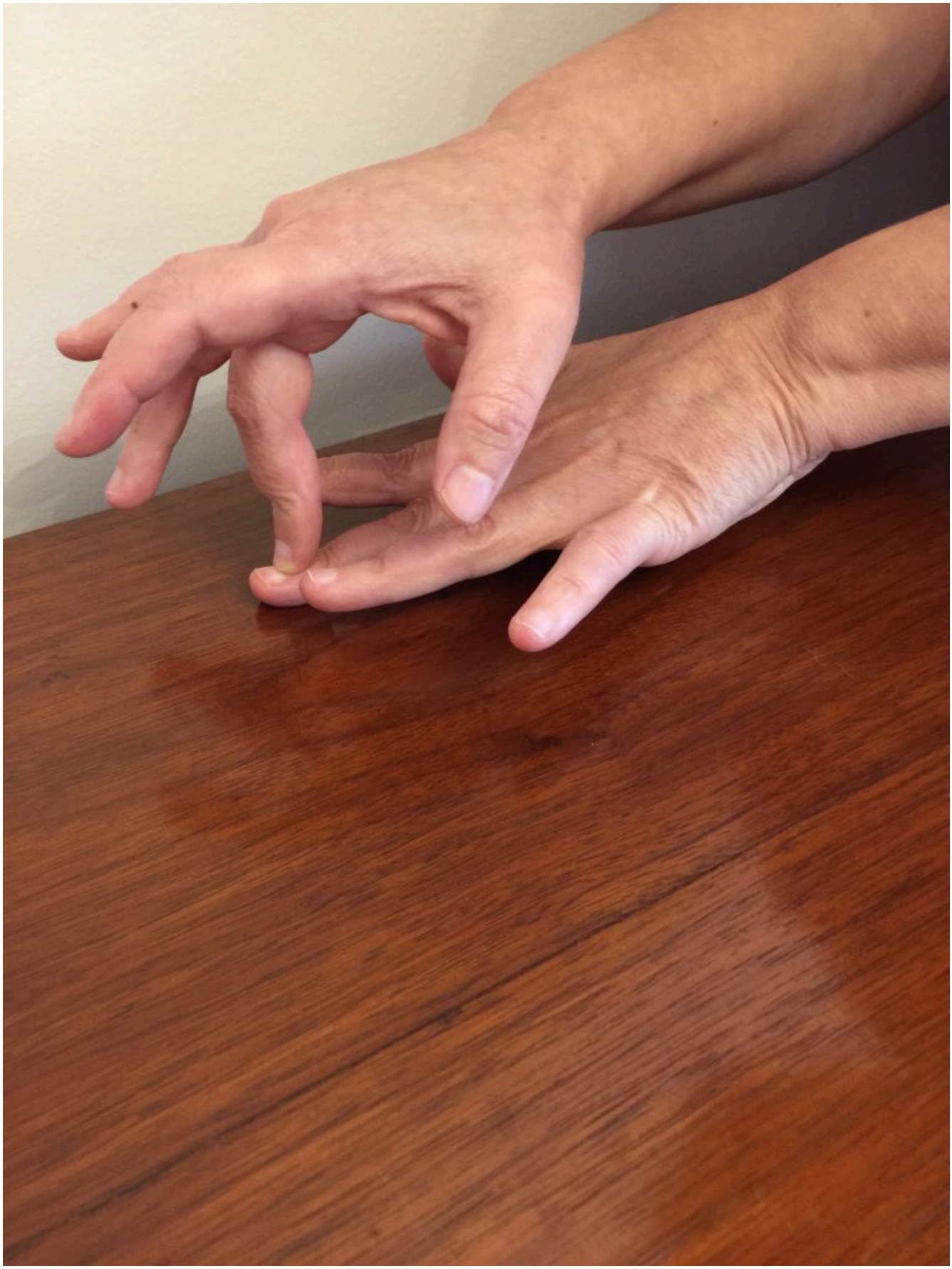

Figure 11: Indirect percussion technique

Indirect percussion is often used to assess the lungs and the abdomen (e.g., bowels, bladder, liver). The steps of this technique are as follows:

1. **Non-dominant hand**: With your hand parallel to the body, place the distal interphalangeal joint of the pleximeter (middle) finger of your non-dominant hand firmly on the body region to percuss. Ensure that only your interphalangeal joint is touching the body (and not the rest of the hand) and that the finger is fully extended.
2. **Dominant hand**: Flex (bend) the pleximeter finger of your dominant hand and with the tip of your finger, tap twice on the distal interphalangeal joint of your non dominant hand. The pleximeter finger of your dominant hand should be at a 90-degree angle to the surface of the body. The motion should be firm and quick with a very short duration. To optimize this motion, the wrist of your dominant hand should be relaxed and loose with your forearm parallel to the person's body. This skill requires lots of practice, so start by practicing the technique on a table or your own leg.

As a nurse, you need to become familiar with the expected percussion sounds so that you can identify what is normal and what is abnormal. See **Figure 12** for the expected location of percussion sounds and **Table 2** for an explanation of the types of percussion sounds heard including resonance, hyperresonance, tympany, dullness, and flatness.

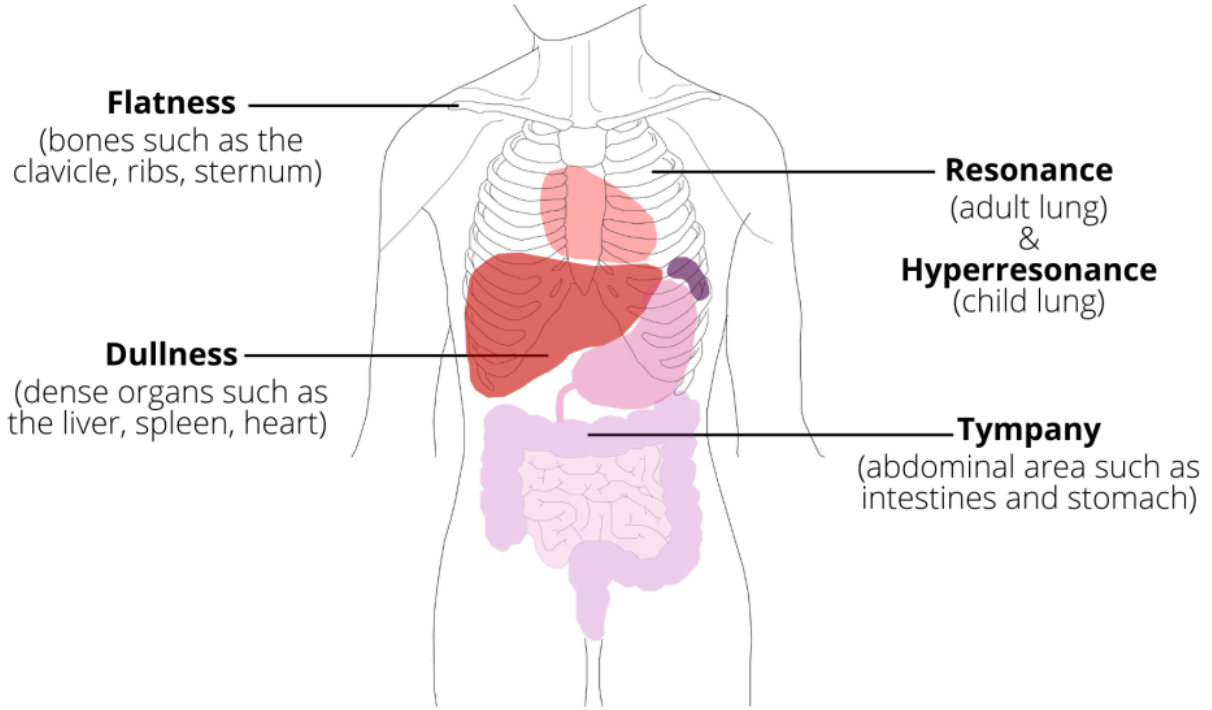

Figure 12: Expected location of percussion sounds

Table 2: Percussion sounds

Sound	Body locations
Resonance is a low-pitched sound that is hollow in terms of sound quality with a moderate duration.	Resonance is the normal sound heard when percussing the lungs because they are filled with air rather than dense tissue. However, it may be more of a dull or flat sound if a client has adipose tissue or a muscular chest, because this increased density modifies the sound. For example, findings may include "resonance anteriorly in all lobes of the lungs."
Hyperresonance is also low-pitched but is more of a booming sound in terms of sound quality and has a longer duration than resonance.	Hyperresonance can be a normal lung sound in small children or children with thin chest walls when percussing because of the round anatomical shape of their thorax. However, hyperresonance in older children and adults can be a cue that should alert you to the possible hyperinflation of lungs that occurs with many conditions (e.g., emphysema, pneumothorax). In this case, hyperresonance occurs because trapped air hyperinflates the lungs over time and changes the anatomical shape of the thorax. For example, findings may include "resonance in lungs equal bilaterally" or "resonance in right lung and hyperresonance in left lung."
Tympany is high-pitched and sounds like a drum in terms of quality with longer duration than resonance and hyperresonance.	When performing percussion, tympany is normally heard over fluid-filled organs such as the stomach, bladder, and bowels. The combination of air and fluid creates a drum-like sound. However, the sound may be more dull or flat if a client has adipose tissue or muscles over the abdomen, because of the increased density. This can also occur if the bowels are full of stool or in the presence of **ascites** . For example, findings may include "tympany with scattered dullness through all quadrants of the abdomen with dullness in upper portion of right upper quadrant."
Dullness is a quiet thud in terms of quality with a high pitch and short duration.	Dullness is the normal sound heard when percussing tissues that are dense in consistency, such as the liver. Dullness is typically considered an abnormal sound if elicited with percussion over the lungs or the intestines, stomach, or bladder. In this case, it could represent intestines that are filled with stool, indicating constipation, a bowel obstruction, or some sort of mass. For example, findings may include "dullness in left lower quadrant."
Flatness is even more quiet than dullness with an even shorter duration and a high pitch.	Flatness is elicited when percussing muscle and bone because they are very dense tissues and often close to the body's surface, but these areas are usually not percussed because this does not generally provide relevant data. Hearing flatness over an area that typically elicits resonance or tympany should be a cue for you to engage in more careful examination. Although it may suggest adipose or muscular tissue, it can also indicate a mass.

Another form of **indirect percussion** is used to assess the kidneys; this technique will be discussed in more detail when you learn about abdominal assessment.

Direct percussion involves an unmediated approach with the use of only one of your hands; it is used to assess pain/tenderness associated with the sinuses or assessing the newborn/infant's lungs. The steps of this technique involve flexing the index and pleximeter fingers of your dominant hand, and directly tapping the body's surface with the tips of these fingers at a 90-degree angle.

A third approach, **tool-facilitated percussion**, involves using an instrument to tap the body (e.g., a reflex hammer); this technique will be discussed in more detail when you learn about neurological assessment.

Clinical Tip

You must keep your nails trimmed short to perform indirect and direct percussion so that you can perform the technique accurately and elicit a useful sound. It takes practice to perfect the technique. Keep in mind the phrase "don't be a woodpecker" – when percussing, just use two taps on the pleximeter finger in each location, and focus on listening for sounds. With children, it is important to engage the client and incorporate play when appropriate.

Voices of Experience

Percussion is one of the least used of all physical assessment techniques. It is a technique that is better confirmed using more accurate tests such as an X-ray. However, when such diagnostic tests are not readily available, such as in rural, remote or underdeveloped regions, percussion is an important non-invasive technique. Additionally, percussion is not effective when the client has a significant amount of adipose tissue or is very muscular, as these types of tissues modify the sounds you expect to hear.

Activity: Check Your Understanding

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Auscultation

The assessment technique of **auscultation** involves **listening** to the body. Although this is typically performed with a **stethoscope**, you can sometimes hear sounds from the body using just your ear. For example, you have probably heard your own or another person's stomach growling; another example is heavy breathing after exercise.

You can perform auscultation on the body to hear several sounds including:

- **High-pitched sounds** like lung sounds, bowel sounds, and some heart sounds.
- **Low-pitched sounds** like some heart sounds, as well as sounds associated with abnormal vascular sounds of the carotid arteries and the aorta.

To perform auscultation, you need a high-quality stethoscope. See **Figure 13** for an **acoustic stethoscope** with a separate diaphragm on one side and a bell on the other side. The **diaphragm** is used for auscultating high-pitched sounds, while the **bell** is used for auscultating low-pitched sounds. Another option is an acoustic stethoscope in which the diaphragm and bell are manufactured as one piece: using this type of stethoscope, you can alternate pressure to auscultate for high- or low-pitched sounds, using light pressure to accentuate low-pitched sounds and firmer pressure to accentuate high-pitched sounds. There are also electronic stethoscopes to help amplify sounds for people with hearing loss. Some advanced stethoscopes facilitate better ambient noise reduction, sound amplification, and capability to record sounds (Leng et al., 2015). Unlike electronic stethoscopes, an acoustic stethoscope does not amplify the body's sounds; it simply reduces interference from extraneous noises around you.

Figure 13: Stethoscope with a separate diaphragm and bell

Use of the stethoscope

Proper use of a stethoscope involves several steps.

1. Begin by **explaining the procedure** and asking **permission to touch**.
2. Next, create a **quiet environment**. Turn off or mute the sound on cell phones, radios, or televisions. Ask the client to not speak or move while you are listening. Also, many clinical environments have ambient noise that you cannot control, particularly in hospitals, when beds are close together, or in an open concept unit such as an emergency room. You will need to focus your hearing; it may help to close your eyes when listening.
3. Third, **cleanse the stethoscope**. The stethoscope is a potential vector of transmission that can carry pathogenic bacteria (Horiuchi et al., 2018; Tschopp et al., 2016). Clean the entire stethoscope using an alcohol pad on the earpieces and the end piece **immediately prior to use**. Always clean the stethoscope from cleanest to dirtiest areas, therefore earpieces first and bell/diaphragm last.
4. Next, place the **earpieces** in your ears so that they are **pointing toward your nose** as per **Figure 14**. This positioning aligns with the angle of your ear canal and enhances your capacity to hear. You may need to wiggle them into place so that they are comfortable and angling down your ear canal.
5. Last, **open or close the diaphragm or bell** depending on which end piece you want to use. It is important to tap on the diaphragm to ensure sounds are heard if using the diaphragm or not heard if using the bell. See **Film Clip 2** on how to open and close the diaphragm and bell.

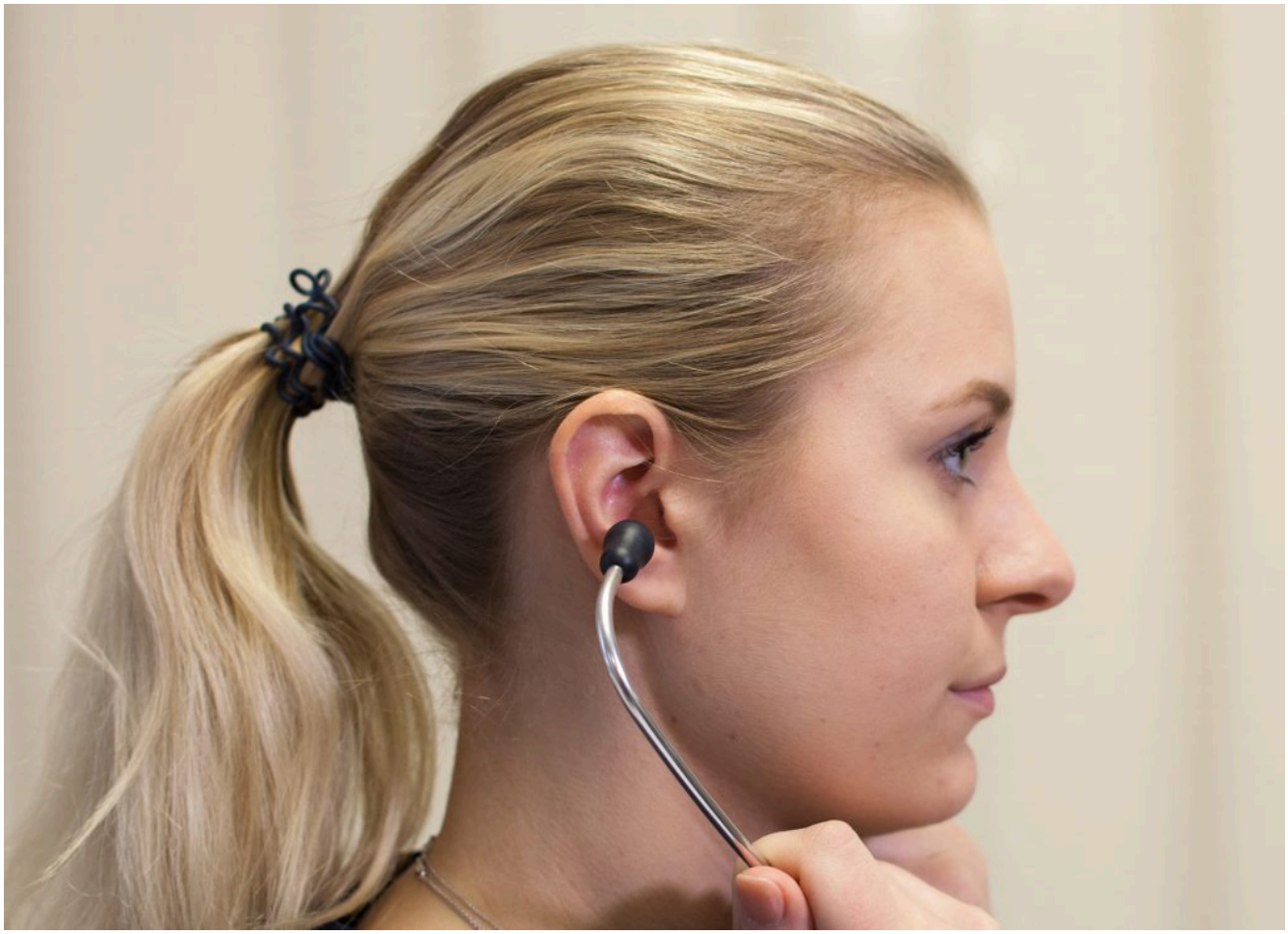

Figure 14: Positioning in the ears

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Film clip 2: Opening and closing the stethoscope

Make note of your findings when performing auscultation. For example, findings may include "clear air entry bilaterally in all lobes" or "high-pitched gurgling bowel sounds present in all four quadrants."

Clinical Tip

How best to listen

The best practice, supported by evidence, is to conduct assessments on bare skin. Always place the end piece of the stethoscope on bare skin, and never listen over the client's gown or clothing as this can modify the sounds that you are hearing. In the clinical setting, you will witness many healthcare providers listening over clothing, but this is not the correct way to auscultate sounds. Substantial amounts of hair (e.g., on the chest, back or abdomen) can also create extraneous noise, making it difficult to hear the expected sounds.

For infants, the best time to auscultate is while the infant is sleeping or quiet; if they start crying, encourage the care partner to console the infant by repositioning, breastfeeding/bottle, or soother (if permitted). If you are trying to auscultate the lungs of a young child, you could ask the child to take a big breath and pretend they are blowing bubbles or blowing out candles on a birthday cake.

Voices of Experience

It is important to know the expected normal sounds and the abnormal sounds. You should trust what you are hearing. If you are struggling to identify the sounds you are hearing, try closing your eyes and focusing. If a sound is not normal, act on this and/or ask for a second opinion from your clinical instructor or preceptor. It is always good practice to listen to body sounds in partnership with an expert nurse.

Activity: Check Your Understanding

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=101#h5p-158

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Closing of the Objective Assessment

You should **notify the client** when you have completed the physical assessment and the collection of your objective data. You can provide a **brief summary** of your findings and the **next steps** based on these findings. You should also **inquire** whether there is anything you might not have seen or assessed that the client thinks might be of note.

Here are some examples of what you might say:

- "The physical assessment is coming to a close. There were no abnormal findings, but you will have your blood taken next. Before I finish, is there anything else that you would like to share with me or have me look at?"
- "The physical assessment is coming to a close. I am going to notify the physician of the mole on your back that you and I were talking about. Because of the changes in the mole colour and size, it is important that the physician looks at it to see if further assessment is required. Before I finish, do you have any concerns that I have not addressed or any questions?"

At the end of the assessment, ensure that you **lower the bed** and place the **call bell** in reach if the client is on an inpatient unit. Otherwise, you can notify the client that you will step out of the room and they can get dressed; you should also tell them where to place their gown.

Always finish by asking if the client has any questions, and of course, perform hand hygiene.

Key Takeaways

Key Takeaways

- Use a trauma-informed approach and treat clients with respect and compassion as they may feel vulnerable and afraid during a physical assessment.
- Always compare findings bilaterally.
- Ensure you clean equipment before you use it.
- Perform hand hygiene before and after each physical assessment.

CHAPTER 6 - ANTHROPOMETRIC BODY MEASUREMENT ASSESSMENT

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Learning Outcomes

- Apply skills related to anthropometric body measurements.
- Understand the racist origins of anthropometric body measurements.
- Examine the impact of unreliable anthropometric body measurements.
- Integrate inclusive and anti-racist approaches to anthropometric body measurements.

Introduction to Anthropometric Body Measurement Assessments

Anthropometric body measurements are **non-invasive** and **quantitative** measurements related to body size and **adipose tissue**. Examples of measurements discussed in this chapter include: height, weight, body mass index (BMI), waist and hip circumference, waist-to-hip ratio, and waist-to-height ratio.

It is important to first note that these measurements are **not diagnostic tools** and should never be used alone in assessing a person's health. Anthropometric body measurements are important in healthcare and are assessed and evaluated for several reasons:

- Broadly speaking, these measurements can provide information about a client's state of health, nutritional status, and help evaluate risks associated with certain diseases.
- In particular, these measurements help determine a client's growth throughout the lifespan (e.g., development and patterns) and potential growth problems such as growth delays in children.
- In primary care or long-term care, these measurements help evaluate **trends** over time such as weight loss or weight gain or height loss associated with aging and disease processes.
- In acute care and also with chronic illnesses, weight measurements can provide information about fluid gain and fluid loss and are also important in relation to the calculation of certain medication dosages particularly with children.
- Sometimes, it is important to elicit a baseline weight which is then reassessed at each healthcare visit and in certain cases, daily.

In this chapter, we will problematize anthropometric body measurements and discuss an inclusive approach

Contextualizing Inclusivity

The dominant discourse about health and well-being in nursing and medicine is one that focuses on weight-centred discussions (O'Hara & Taylor, 2018). And yet, these discussions negate a myriad of factors related to health and well-being. Additionally, it has been found that dieting is a strong predictor of weight gain (O'Hara & Taylor, 2018). Thus, we need to shift these discussions so that they are **focused on health and well-being**, the social determinants of health, and factors contributing to **health equity** (O'Hara & Taylor, 2018).

Clinical Tips

The limitation of one-time body measurement assessments is that they are restricted to one point in time. It is best to consider trends in body measurements across a period of time.

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=783#h5p-15

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Problematizing Anthropometric Body Measurement Assessments

It is important to **problematize** the assessment and evaluation of anthropometric body measurements and reflect on **how these measurements are used** since they are **biased and not neutral.** For example, these body measurements may bring to the forefront body image issues that are closely related to one's personal identity (Puhl, 2022). Additionally, the origins of these measurements are deeply embedded in racist, sexist, and ableist discourse. Evidence concerning how to use these measurements has shifted and is continuing to shift. We delve into this evidence in this chapter.

It is important to be **attentive and critical** of how weight and health are constructed within society, and especially within the media. In Western society, dominant body ideals of thinness have existed for many years. In many of today's cultures (including Western society), a thinner body often suggests an **illusion of health** (Farrell, 2011). But this is not necessarily true, and it is important to NOT assume someone is healthy just because they are thin. Additionally, when a person does not fit this thin ideal, their body image and personal identity can be adversely affected leading to and/or exacerbating physical and mental health issues.

We live in a culture where fat shaming is normalized; people who are overweight and obese are stigmatized and made to feel ashamed of and blamed for their body size and medical issues that may arise (Dolezal & Spratt, 2022; Spratt, 2021). The cultural stigma surrounding weight/obesity inhibits the ability to fully examine health issues and health outcomes (Farrell, 2011). This stigma can limit individuals (such as healthcare providers) to identify and recognize medical concerns versus aesthetic concerns (Farrell, 2011).

Contextualizing Inclusivity

In the context of healthcare, a **neoliberal** discourse can be marginalizing because it can **negate** the influence of **social determinants of health.** It also reinforces a shaming/blaming discourse in which the individual is solely responsible for their weight. Similarly, while body positivity and the Health At Every Size movements have recently come to frame wellness as acceptance and empowerment, this also places an onus on the individual to achieve "health" and prove health through other forms of measurement such as blood pressure, heart rate, and cholesterol levels (Gibson, 2022). It is important to see how such discourses may place a moral obligation on individuals to project health, whilst ignoring the social and biological influences which may constrain efforts (Gibson, 2022).

These kinds of discourse can have a **negative impact** on physical and mental health in which the person may gain additional weight as a result of a negative feedback loop (Brewis & Wutich, 2019; Meulman, 2019). The stigma surrounding obesity can also lead to eating disorders and mental health conditions such as depression (Chakravorty, 2021; Puhl et al., 2014). It **assumes that obesity is a choice** and negates social determinants of health such as structural and socioeconomic factors (Dolezal & Spratt, 2022). This neoliberal and shaming/blaming discourse is problematic because: it assumes a singular notion of health; it assumes that access to healthy food choices and healthy lifestyles is equal across populations; and does not address the complex causes of obesity (Spratt, 2021).

Knowledge Bites

See FoodShare TO's (2021) panel titled **"Dismantling fat shaming and weight stigma in health and wellness spaces."** This panel discussion problematizes the singular notion of health and will help you understand the concept of "fat oppression" and "body liberation" and the important role you play in activism.

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Inclusive Approaches to Anthropometric Body Measurement Assessments

Although it is important to assess and evaluate anthropometric body measurements, **how you do so** is just as important in order to promote inclusivity. An **inclusive approach** to body measurement assessment is an approach that works towards ensuring that clients feel valued, involved, and heard. It is also an approach that aligns with and supports what is important to the client as opposed to what is important to you as a healthcare professional – these two do not always align.

An important component of inclusive approaches is **anti-racism**. Anti-racism involves an active approach to centring the voices of racialized people and dismantling all forms of racism including systemic and institutional racism (Hassen et al., 2021). It is important to recognize that racism affects every aspect of a racialized person's life (Prendergast, 2023). And that means, racism affects body measurement assessments and evaluations. Although we will get deeper into this discussion, you need to consider how you can engage in anthropometric measurements from a critical and anti-racist stance.

For example, in order to do so, one must critically examine and reflect upon concepts of **power and oppression.** An anti-racist approach must actively **challenge whiteness**: which "is not about being white … [but about] the racial power which has claimed normative dominance" and continues to nurture, sustain, and reproduce racist institutions and systems (Patel, 2021). Recall the history and origins of these measurements and whether they apply to all bodies.

As a nursing professional, it is important to consider what you can do to ensure body measurement assessments are performed in an inclusive manner. See **Table 1** for guiding principles of inclusive practice to anthropometric body measurement assessments.

Table 1: Principles of inclusive practice to anthropometric body measurement assessments

Principle	Considerations and examples
Broaden your understanding of **unconscious (implicit) biases** surrounding weight	There is evidence showing the role of unconscious bias surrounding weight and racism (Lofton et al., 2023). This unconscious bias influences healthcare professionals' anti-fat attitudes (FitzGerald & Hurst, 2017). You should reflect on your own unconscious biases because they can have a negative effect on clients' health and wellness. For example, it has been found that Black clients who are overweight (in comparison to white clients who are overweight) report poorer healthcare provider communication including spending less time with them and explaining things less clearly (Wong et al., 2015).
Consider whether and how a **body positive approach** is appropriate	A body positive approach is the acceptance of all bodies at any size, shape, ability or any other characteristic. Focusing on a client's strengths is important, but it is also important to not lay the onus regarding health on the client solely. Thus, a body positive approach must be used cautiously. Keep in mind that there are many social determinants of health that influence health and wellness and that clients cannot fully control all factors that influence their body or these factors are outside of the control of clients (e.g., racism, safe housing, access to food). You should engage in conversations and assessment in ways that are non-judgmental and empathetic.
Actively listen to the client and amplify their voice	It is important to spend time listening to all clients and amplifying their voices. Their experiences and stories are vital to helping you understand factors in their life that may influence their health and body measurement findings. Additionally, what is important to them should help inform your thinking and approach.
Avoid generalizations when assessing clients	Normal anthropometric body measurements can sometimes be a misnomer considering the many factors that influence weight among other measurements. Thus, you should avoid generalizations in terms of merely inferring from broad principles and standards. Rather, you should consider each person as an individual and recognize variations.
Avoid reliance on one measurement in time in assessment practices	An anthropometric measurement only provides a one-time snapshot of the client's health and well-being. Considering trends over time and over multiple anthropometric measurements provides a more comprehensive overview of their health and well-being. Also, considering that measurements can fluctuate (e.g., weight can fluctuate on a daily basis and throughout the day due to factors such as hormones and fluid intake), it is important to consider weight ranges. For example, you may ask the client: "what is your normal/usual weight range?"
Avoid reliance on one anthropometric body measurement related to clients	Evidence concerning the various anthropometric body measurements continues to shift in terms of which ones best predict disease and mortality. Currently, it is best to use a combination of body measurements (more to be discussed later in this chapter).
Recognize the **multi-dimensional causes** of obesity	There is the misperception that the sole cause of obesity is behavioural-related (i.e., eating too much and an inactive lifestyle) when in fact the causes of obesity are multi-dimensional and also much more complex. It is important to consider the social, economic, genetic, environmental, metabolic and hormonal dimensions as well as factors related to one's physical and mental health. For example, trauma can contribute to weight gain or weight loss.

Contextualizing Inclusivity

Supporting a client's **agency and providing choice** is important in terms of sharing information with clients about their body measurements. For example, it may not be important to a client to know their weight. Rather, they may monitor their weight/size by the fit of their clothes. Additionally, body measurements may not be important or even a factor in how clients monitor their health and quality of life.

As you reflect on the various anthropometric body measurements, it is important to recognize that the suggested norms vary based on sex, ethnicity, and age (WHO, 2008). In this chapter, a preliminary understanding of how these vary based on body size/frame, body composition, and body fat distribution is shared.

Knowledge Bites

An inclusive approach to anthropometric body measurements involves attention to **intersectionality** in terms of the interconnected nature of social identities (e.g., race-gender-sexuality-class-ability). For example, weight stigma is interwoven within these social identities and also the discrimination that may arise from them. Attention to intersectionality will help you understand how weight stigma is interwoven with multiple forms of oppression and institutional injustice; measures of the physical body are deeply rooted in white superiority, patriarchy, ableism, capitalism and colonialism.

You should consider the **social determinants of health** when discussing anthropometric measurements, weight, and obesity management. **Food insecurity** is when individuals cannot access food, often due to financial reasons, and results in inadequate nutritional intake (Raphael et al., 2020). Food insecurity has become a major issue in Canada as the cost of inflation and groceries continue to rise, and clients who are food insecure may make choices that do not support their health and well-being including healthy weight and nutrition goals.

Clinical Tip

1. **Explain the purpose** of anthropometric body measurements and how information will be used (to determine the broader picture of a client's health).
2. Ask for **client consent** to collect information.
3. **Seek permission** to touch as needed to complete assessments and/or measurements.
4. **Listen** to the client to gain a better understanding of their health from their perspective, to identify any influencing factors, and their personal health goals.
5. **Be mindful** of your non-verbal cues/body language when measuring clients. You may come across as being judgemental without that intent.
6. **Avoid commenting** on a client's weight-related physical appearance, body shape and size (e.g. you have such skinny legs, you have a bit of a tummy).

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=787#h5p-16

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Weight and Height

Weight refers to the amount that a person weighs (ie., how heavy they are) and is typically reported in kilograms in Canada (metric system). However, if you ask clients their weight, they will probably provide it to you in pounds (imperial system). Thus, you may need to convert weight from the imperial to the metric system and vice versa. **1 kilogram = 2.2 lbs**. Thus, if a client tells you that they are 50 lbs, then to convert to kg, you would divide 50 by 2.2 which equals 22.7 kg.

Height refers to the distance upward (ie., how tall a person is) and is typically reported by healthcare professionals in metres/centimetres in Canada (metric system). However, if you ask clients their height, they will probably provide it to you in feet/inches (imperial system). Thus, you may need to convert height from the imperial to the metric system and vice versa. **1 metre = 3.28 feet** = 39.37 inches (1 foot = 12 inches). Thus, if a client tells you that they are 5.2, then to convert to metres, you would divide 5.2 by 3.28 = 1.58 metres.

These measurements are often assessed together particularly in childhood and adolescence and/or with a first healthcare visit. In adulthood, weight is often assessed as needed during preventative primary healthcare visits or at each visit with a specialist when undergoing long-term treatments for conditions such as cancer, diabetes, and heart failure.

Weight measurement

In a primary care setting, weight measurement is usually done on a **mechanical beam scale,** which has a balance bar as opposed to a digital scale. They have been shown to be more accurate than digital scales. **See Figure 1**.

If using a mechanical beam scale, the **steps in measuring weight** are:

1. Ensure accurate calibration by checking to see that the balance bar is in the middle of the balance bar window when the small and large weight indicators are at zero.
2. Ask the client to remove their shoes and any heavy garments such as a coat. If there are concerns, you may have the client wear a gown.
3. Ask the client to step on the scale. (when they do so, the balance bar will move up)
4. Now, you will move the large weight indicator followed by the small weight indicator until the balance bar is in the middle of the balance bar window. If the balance bar is above the middle of the balance bar window, you need to increase the weight indicators. If the balance bar is below the middle of the balance bar window, you need to decrease the weight indicators.
5. You can note the weight when you have adjusted the weight indicators until the balance bar is in the middle of the balance bar window. To note the weight, you should add the large and small weight indicators together.
6. For example, in **Figure 1**, the weight in pounds is 72.8 lbs. Since 1 kg =2.2 lbs, you would divide 72.8 lbs by 2.2 to get a weight of 33.09 kg.

Here is a video that shows you how to use a mechanical beam scale, although please note it is in pounds.

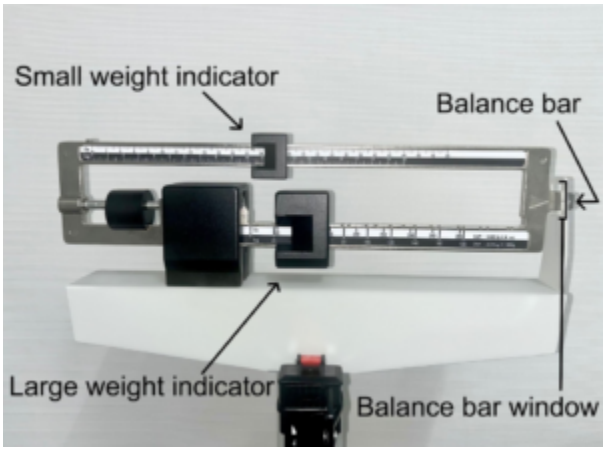

Figure 1: Mechanical beam scale (illustrated by Tayiba Rahman)

Height measurement

Height measurement can be done with a device that consists of a vertical ruler and an adjustable horizontal height rod that can be adjusted up or down so that the headpiece rests on the crown of the head (i.e., the top of the head). See **Figure 2**. This device is often attached to the mechanical beam scales in healthcare facilities particularly in primary care.

Figure 2: Height measurement (By Biswarup Ganguly, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=60558118)

If using this device, **steps in measuring height** are:

1. Ask the client to remove their shoes, hat/head pieces, and bulky clothing.
2. Have them stand on the scale facing backwards with their head in a neutral position looking straight forward (the scale will be on a flat surface).
3. Have them stand with legs straight and arms straight and hanging at the side.

4. Pull the upper height rod up above their head and then pull the headpiece out so that it is at a right angle to the wall.
5. Lower the upper height rod until the headpiece touches the crown of the client's head and remains at a right angle to the wall.
6. Ask the client to step off the scale.
7. Note the client's height at the indicator line (where it says "read") on the lower height rod (ruler).

- If this device is not readily available, you can also measure a client's height with the back of their head, shoulders and buttocks touching the wall and use a flat ruler at a right angle to the wall/client to mark an area on the wall. Then, measure from that area down to the floor to determine the client's height.

Here is a video that shows how to use height rods, but please note that it is in feet/inches.

Contextualizing Inclusivity

It is always important to engage in respectful and open discussions with the client in order to ensure an inclusive assessment. This is particularly important when accommodations are needed. You should always be sensitive and responsive to the potential need for accommodations with clients. Some examples are:

- It is important that height measurement is at the crown of the head. However, some clients may have hair or a headpiece or head covering that is higher than the crown of their head.
- Some clients may feel uncomfortable removing clothing or head pieces/head coverings. For example, some female Muslim and Jewish clients may wear a head covering and feel uncomfortable removing it at all or removing it in the presence of the opposite gender. Although it may be viewed as okay to do so for medical reasons, the client may still feel uncomfortable about it or prefer not to. Additionally, Sikh men often wear a turban as part of their faith.

Some of your clients will not be able to stand. Thus, you can measure their height while lying supine from the bottom of the feet to the crown of the head. For weight measurement, there are some beds that have a scale built into them in which you can weigh the client. Also, for clients that are in wheelchairs, there are often scales in which they can be wheeled onto the scale so that they can be weighed; you would need to weigh the wheelchair separately and subtract that from the total.

Priorities of Care

In acute settings, there may be times in which weighing the client daily is important or when symptoms

related to certain diseases (e.g., heart failure, kidney disease) suggest sudden weight gain. For example, a daily increase of 2.5 kg in a 24 hour period should prompt you to consider what is causing this (e.g., fluid accumulation), how it is affecting the client (e.g., swelling, shortness of breath), consequences in terms of worsening condition, and the potential for medical intervention. In addition to reporting these findings to the physician or nurse practitioner, you should inquire about any associated symptoms and assess the client's vital signs, auscultate lungs, and inspect for fluid accumulation (e.g., swollen legs and arms).

Clinical Tips

When a client requires regular weight checks due to a specific health condition, be sure to measure their weight at the same time each day (typically before breakfast) and have them wear the same or similar clothing each time such as a hospital gown. When possible, it is best to use the same scale with continuous measurements as the equipment can sometimes affect accuracy.

Considering that weight can be a sensitive and difficult topic, it is important to **use an inclusive approach** such as:

- Use a straightforward, matter of fact approach with all measurements. Provide relevance to measurements. "I need to measure your weight because…"
- Maintain privacy. This can sometimes be difficult when scales are often in a common area or hallway in clinical settings.
- Consider posting a chart with height/weight conversions. Although the metric system (kilograms and metres) is used in Canada, many clients will still ask for height in feet/inches and weight in pounds (and many health care settings automatically tell clients these measurements as they know they are going to ask).
- Always be open to and recognize that some clients will turn their back to the scale and will not want to know the actual number. It is important to offer and respect this choice and inquire if the client wants to know their weight.
- Unless it is essential to know a client's weight, consider accepting their word, until you have a therapeutic relationship with that individual; this may well be at a future clinical visit.

Knowledge Bites

Weight scales must be calibrated as per the equipment guidelines. If you notice that they are not accurately calibrated, there is usually a tech expert in your institution that can fix the scale. However, it is not too difficult to do it yourself. As additional information, here is a video that shows how to fix a scale that is not properly calibrated.

Activity: Check Your Understanding

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Body Mass Index

Body Mass Index (BMI) is an anthropometric body measurement that is calculated by **weight divided by height**. See **Figure 3** for the formula based on the imperial and metric system calculations. Adapted from WHO, Health Canada (2003) describes the following categories of BMI:

- Underweight (BMI less than 18.5) – increased risk of developing health problems.
- Normal weight (BMI 18.5 to 24.9) – least risk of developing health problems.
- Overweight (BMI 25 to 29.9) – increased risk of developing health problems.
- Obese (BMI 30 and over) – high risk of developing health problems.

Also, you can check out the nomograms provided by Health Canada, called the Canadian Guidelines for Body Weight Classification in Adults – Quick Reference Tool for Professionals.

Steps in measuring BMI are:

- Measure height and weight.
- Calculate BMI based on formula outlined in **Figure 3**. Round the BMI to one decimal point. For example, if the client weighs 50 kilograms and is 1.5 metres, then the BMI is: 22.2. If the client's weight is 160 lbs and is 5.2 in feet, then, the BMI is: 29.3.

Metric system	Imperial system
$\frac{\text{Weight (in kilograms)}}{\text{Height}^2\text{ (in metres)}}$	$\frac{\text{Weight (in pounds)}}{\text{Height}^2\text{ (in inches)}} \times 703$

Figure 3: BMI formulas

Knowledge Bites

Although it is important to be aware of this formula, it is **essential to be aware of how it is a flawed and racist** health standard particularly for people of colour and for people with high muscle mass.

Let's start by briefly reflecting on the **origins of BMI**, which will help you begin to understand its limitations.

BMI is commonly known as an indirect reflection of total body obesity. Originally, BMI was developed based on data from **European populations of white men** (Nair, 2021; AMA as cited by Tanne, 2023; Stewart, 2022). This is an important point considering that body shape, structure, and composition are influenced by factors such as sex, race, and age (Tanne, 2023). For example, people who are Black have higher levels of bone mineral content and density than people who are white (Wager & Heyward, 2000). In addition, it has been found that in comparison to white women, Black women have muscles and bones that are heavier and have an increased quantity of body water (Aloia et al., 1997). Also, the BMI measurement can't differentiate fat from muscle (Karasu, 2016). As a result, someone with increased muscle mass may be identified as obese according to the BMI standard. Additionally, people who are South Asian typically have smaller body frames which influences BMI (Nair, 2021). These differences make a measurement such as BMI (which focuses merely on weight and height) an inaccurate measurement of body fat and obesity.

Despite Billewicz and colleagues writing in the 1960s that formulas like BMI couldn't measure fat, it still remains a well known and commonly used measure in today's society to identify obesity (as cited in Karasu, 2016). It is only recent that organizations such as the American Medical Association (2023) have finally highlighted that **BMI alone is not appropriate for measuring body fat and that it doesn't take into consideration differences across age, sex, and race**.

Contextualizing Inclusivity

If using BMI in your practice, keep in mind that you need to **use the sex assigned at birth** in the trans and gender-diverse population when determining a client's normal BMI. This can be quite distressing for some clients so it is important to be sensitive to this. There may be weight requirements for certain gender-affirming surgery making a sex-based measurement such as BMI problematic in this population.

Health Canada (2003) indicates that the BMI classification system **should be used carefully** with certain racialized groups, people with lean or muscular builds and those over 65 years of age. If BMI data is collected in the setting you work, it is important to **have a critical eye** in how you use it and possibly draw your colleagues' attention to its limitations particularly with racialized groups. Additionally, be aware of how

the data may affect different clients from an emotional, psychological, and physical perspective. For example, some Black adolescents are constantly told to lose weight because their BMI is high. This can be distressing for them, and can result in mental health issues, eating disorders, and maladapted healthcare seeking behaviours (i.e., avoiding going to health care visits).

Based on the North American standards for BMI, it may appear that many Asians have a lower incidence of obesity. However, in a study on Asian Americans, it was noted that they are more likely to gain weight centrally which is associated with comorbidities such as diabetes and cardiovascular disease (Li et al., 2022). Lower cut-offs for BMI for Asians may be needed to better reflect the difference in patterns of adiposity (Li et al., 2022).

Cases to reflect upon:

(1) A young black female was assessed as being overweight based on the original BMI scores. This led to the young female joining a weight loss program and losing most of the required weight. However, when she got to what was considered the high end of her weight range, her family became extremely concerned because she was becoming very thin and rather gaunt. A family physician was consulted and indicated that her weight loss be considered successful at the top end of the scale.

(2) A college football player has a low body fat percentage but a BMI of 33. As the healthcare provider, you may recognize that this BMI is in the obese range. Without acknowledging the limitations of BMI measurements, one might suggest a lifestyle change. However, it is important to recognize that BMI cannot differentiate between muscle and fat.

Priorities of Care

If someone's BMI is high or low, you should have a discussion with the client **focusing on their health and well-being**. It is important to ensure they are an **active partner** in the discussion and the health decisions made. When engaging in discussions, be sure you consider social determinants of health such as food security. If someone isn't food secure, you should consider discussing resources that may support them (e.g., food banks and certain healthy alternatives). You should also consider trends in BMI and whether there has been a trend upward or downward; thus, comparing the measurement to previous BMI is important.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Other Anthropometric Body Measurement Assessments

There are several other anthropometric body measurements used in healthcare settings. In this section, three additional measurements are discussed including:

- Waist and hip circumference.
- Waist-to-hip ratio.
- Waist-to-height ratio.

These measurements provide data related to **central adiposity**. Some research has suggested these body measurements are better predictors of certain diseases (such as diabetes) in comparison to BMI measurements (Mirzaei & Khajeh, 2018).

A **vinyl, flexible, non-stretch tape measure** should be used to assess waist and hip circumference. Its flexible nature allows for accuracy and the vinyl composition allows for cleaning after use. For both waist and hip circumference, discuss with the client that their waist and hip will need to be clear of any clothing. It is best to perform measurements on bare skin. You should stand at the client's side and ask them to stand with arms hanging down at their side.

Waist circumference

Waist circumference refers to the **distance around the waist**. This measurement is used as an indicator of health risk based on excess adipose tissue around the waist (Health Canada, 2003). Although not currently used as common in practice as BMI, it has been found that waist circumference may be a better marker of health risk because of its focus on central adiposity around the abdomen (Ross et al., 2020). It is suggested that waist circumference provides information about the quantity of fat surrounding the body's main organs (e.g., heart, liver, kidneys). However, it is suggested that BMI and waist circumference measurements together (as opposed to alone) are a better approach in measuring obesity (Ross et al., 2020). Bosomworth (2019) indicates that a measurement that reflects central obesity is a better indicator of disease and mortality than BMI, and that a combination of the two is best.

Steps in measuring **waist circumference** include:

- Wrap the tape measure around the waist so that it is placed halfway between the lower margin of the ribs (at the mid-axillary line) and the lateral/superior edge of the iliac crest (the outside and top of the ilium). See **Figure 4**. This is the most common protocol, but keep in mind that it varies across and within institutions and countries. If your institution doesn't have a protocol, document your measurement location.
- Ensure the tape measure lays flat around the waist and parallel to the floor (it should be snug around the waist, but doesn't compress the skin).
- Ask the client to take two or three normal breaths and measure the waist just after the client breathes out when they are relaxed.
- It is best to repeat the process twice to confirm accuracy.

The guidelines indicate that there is increased risk of developing health problems when the waist circumference is greater than or equal to 102 centimetres (40 inches) in men and greater than or equal to 88 centimetres (35 inches) in women (Adapted from WHO, Health Canada, 2003). However, Obesity Canada (Rueda-Clausen et al., 2020) has proposed waist circumference cut-off points to take into consideration ethnicities. For additional information check out (pg. 5): this link

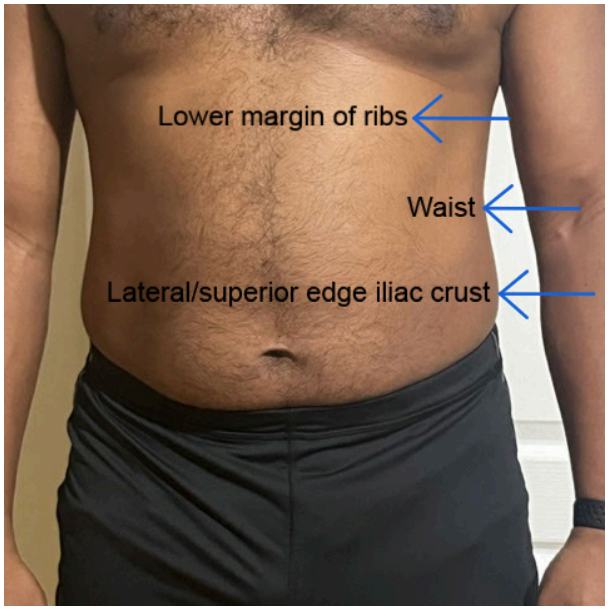

Figure 4: Waist circumference location

Waist-to-hip ratio

The **waist-to-hip ratio** refers to **waist circumference divided by hip circumference** (Andreacchi et al., 2021).

Steps in measuring waist-to-hip ratio include:

- Measure the waist circumference (as previously described)
- Wrap the tape measure around the hips so that it is aligned at what is typically referred to as the widest portion of the buttocks and hips (Andreacchi et al., 2021). See **Figure 5**.
- Then, you follow this formula: waist circumference divided by the hip circumference. For example, if the waist circumference is 76 centimetres and the hip circumference is 91 centimetres, the waist-to-hip ratio is: .84

The WHO (2008) guidelines indicate that increased risk is associated with waist-to-hip ratios of greater than or equal to .90 centimetres in men and greater than or equal to .85 centimetres.

Figure 5: Hip circumference location

Waist-to-height ratio

The **waist-to-height ratio** is a measurement of central adiposity (Yoo, 2016). The formula is: **waist circumference divided by height.**

Steps in measuring waist-to-height ratio include:

- Measure the waist circumference (as previously described) and measure the height (as detailed earlier).
- Then, you follow this formula: waist circumference divided by the height. For example, if if the waist circumference is 76 centimetres and the height is 162 centimetres, the waist-to-height ratio is: .47

It is suggested that a waist-to-height ratio of .5 or higher means the client may have an increased risk for certain diseases. The optimal waist-to-height ratio is based on the belief that the client's waist measurement should be less than half their height.

Contextualizing Inclusivity

It is best to use a trauma-informed approach when taking these measurements. For example, place the tape measure at the side of the waist/hips and ask the client to hold it momentarily while you walk around them and wrap the tape measure around the waist/hips. This approach is less intrusive than reaching up and around the client to place the tape measure around them.

Knowledge Bites

There is research on how fat distribution varies across individuals from different cultural backgrounds. Wagner and Heyward (2000) note that many individuals who are Black and/or of African descent show patterns of carrying more adipose tissue on the body's trunk than the legs. Thus, waist circumferences could be affected.

Clinical Tips

You should inquire about food/fluid intake, constipation or gas, and any swelling on the day of measurements because the amount of fluid/water, gas, and edema can affect waist measurements.

Activity: Check Your Understanding

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=798#h5p-20

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Children and Body Measurements

Anthropometric body measurements (including weight, height and BMI) are commonly used to measure and **track growth over time in children** (infants, children, adolescents). Unlike adulthood, there are substantial periods of growth and development in childhood. As a result, it becomes even more important to not make judgments or decisions based on one measurement in time with children but rather consider measurements over a period of time (Dieticians of Canada and Canadian Paediatric Society, 2014). Keep in mind that health comes in all sizes and shapes (OSF Healthcare System, 2023).

Height, weight, BMI and other body measurements are considered in the context of **growth charts** which are **percentile curves in reference or relative to children of the same age and sex** (Dieticians of Canada and Canadian Paediatric Society, 2014). In this chapter, you are introduced to percentiles for children aged 2 to 19 years of age. In Canada, these are based on the World Health Organization.

Boys' individual charts (based on sex assigned at birth):

- 2 to 19 years: boys – height-for-age and weight-for-age percentiles
- 2 to 19 years: boys – body mass index (BMI) for age percentiles

Girls' individual charts (based on sex assigned at birth):

- 2 to 19 years: girls – height-for-age and weight-for-age percentiles
- 2 to 19 years: girls – body mass index (BMI) for age percentiles

Interpretations

See **Table 2** for cut-off points for percentiles from the Dieticians of Canada and Canadian Paediatric Society (2014). Keep in mind that this table provides a simple understanding and in fact a full understanding of these cut-off points is much more complex. These are commonly used in primary care. When using these, additional training is suggested. Please see Dietitians of Canada for more information about training and additional interpretations.

In terms of how to read percentiles: an example is if a child's BMI is 80th percentile, that means that the child's BMI is more than 80% of children the same age and sex.

Table 2: Cut-off points

Growth status and indicator	2 to 5 years of age percentile	5 to 19 years of age percentile
Underweight Weight-for-age	<3rd	<3rd
Severely underweight Weight-for-age	<0.1st	<0.1st
Stunted Height-for-age	<3rd	<3rd
Severely stunted Height-for-age	<0.1st	<0.1st
Wasted BMI-for-age	<3rd	<3rd
Severely wasted BMI-for-age	<0.1st	<0.1st
Overweight BMI-for-age	>97th	>85th
Obese BMI-for-age	>99.9th	>97th
Severely obese BMI-for-age	n/a	>99.9th

Priorities of Care

Unexpected downward or sharp upward trends should be closely evaluated. Keep in mind that a trend is a general direction/change over a period of time and multiple measurements. For example, if a client shows a decrease in weight over multiple primary healthcare visits, this is something that should draw your attention. You may begin with a discussion about whether they have noticed the weight loss and whether there are any factors that may be contributing to this finding. You will want to continue to monitor whether this in fact is a trend that is of concern or whether it is just temporary.

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Dieticians of Canada and Canadian Paediatric Society (2014). A health professional's guide for using the WHO growth charts for Canada. Childhood percentiles

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Key Takeaways

- Anthropometric body measurements are non-invasive and quantitative measurements related to body size and adipose tissue.
- It is important to problematize the assessment and evaluation of anthropometric body measurements.
- An inclusive approach to body measurement assessment is an approach that works towards ensuring that clients feel valued, involved, and heard.
- Height refers to the distance upward (ie., how tall a person is) and is typically reported by healthcare professionals in metres/centimetres in Canada and weight refers to the amount that a person weighs (ie., how heavy they are) and is typically reported in kilograms in Canada.
- Although it is important to be aware of the BMI formula, it is essential to be aware of how it is a flawed and racist health standard particularly for people of colour and for people with high muscle mass.
- Other anthropometric body measurements used in healthcare settings include waist and hip circumference, waist-to-hip ratio, and waist-to-height ratio.

CHAPTER 7: VITAL SIGNS

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Learning Outcomes

- Define the vital signs used in healthcare.
- Integrate knowledge about anatomy and physiology with vital sign measurement.
- Evaluate influencing factors related to vital sign measurement.
- Synthesize knowledge about various methods and techniques of vital sign measurement across the lifespan.
- Integrate knowledge about alternative methods of vital sign measurements.
- Assess normal and abnormal vital sign values.
- Evaluate significance of vital sign findings.
- Generate best interventions based on vital sign findings.

Overview

The purpose of this chapter is to help you develop best practices in **vital sign measurement**. It will provide you with the opportunity to read about, observe, practice, and test vital sign measurement. Boxes with helpful tips are provided throughout the chapters:

- **Technique Tips** provide helpful information about measurement techniques, and
- **Points to Consider** highlight key points to consider about vital sign measurements and findings.

A **Chapter Summary** and **Printable Flashcards** highlighting techniques for each vital sign measurement are provided at the end of each chapter. These printable flashcards are all located together in the textbook's conclusion chapter.

You can review the full textbook or advance to sections that you have identified as areas you want to work on. The textbook has a self-directed format and provides an interactive and engaging way for you to learn about and develop competence in the measurement of vital signs while integrating knowledge about anatomy and physiology.

You will learn about various vital signs including **temperature**, **pulse**, **respiration**, **blood pressure**, and **oxygen saturation**. Measurement of vital signs is a foundational, psychomotor skill for healthcare providers and students in post-secondary health-related programs. These measurements provide information about a person's overall state of health and more specifically about their cardiovascular and respiratory status. These measurements can also reveal changes in a client's vital signs over time and changes in their overall state of health. Proficiency in vital sign measurement is essential to client safety, care, and management. Measurements can influence clinical decision-making related to therapeutic interventions.

General Points to Consider in Vital Sign Measurement

Therapeutic Environment and Informed Consent

It is important to seek informed consent while creating a therapeutic and safe environment during all encounters with clients. You will usually begin by introducing yourself by **name** and **designation** so the client knows who you are. Next, explain what you are going to do and always ask permission to touch before beginning vital sign measurement. For example, an appropriate introduction is:

> "Hello, I am XXX (state first and last name). I am a XXX (state designation, e.g., I am a registered nurse). Today, I am here to take your vital signs. It will involve me touching your arm, are you okay with that?"

Although not legally required, it is best practice to share your pronouns and ask what pronouns the client uses. It is also important to ensure the client's privacy by closing the curtains or the door to the room.

Infection Prevention and Control

Clean hands and clean equipment are essential to infection prevention and control when measuring vital signs. Ensuring cleanliness helps reduce communicable and infectious diseases, particularly health care-associated infections, which are infectious organisms acquired by a client while in hospital. Common infections include clostridium difficile (C. diff), vancomycin-resistant enterococcus (VRE), and methicillin-resistant staphylococcus aureus (MRSA).

Ensuring your hands are clean is the best way to prevent and control infection. **Hand hygiene** can include cleansing with **hand gel** (see **Figure 1**) and **hand washing**. (see **Figure 2**). Use an alcohol-based sanitizer before and after contact with clients. Place gel on your hands and rub all hand surfaces until hands are dry – most guidelines now recommend 20-30 seconds). When washing hands using soap and water, wet your hands and apply soap. Rub all hand surfaces for about 20 to 30 seconds, then rinse your hands. If the tap is not automatic, then turn it off with a paper towel.

Points to Consider

Hand gel is the preferred method of hand hygiene because it kills more bacteria and is easily accessible to healthcare providers. Soap and water is used when hands/gloves come into contact with bodily fluids.

Figure 1: Hand gel

Figure 2: Hand washing

Equipment

Healthcare providers always inspect equipment before use to ensure it is in good working condition. Equipment (e.g., stethoscopes, pulse oximeters) can be cleaned with alcohol-based solutions to disinfect the surfaces. Automated devices should be regularly serviced to ensure accuracy. Biomedical technicians/experts are responsible for preventative maintenance and calibration to optimize functioning.

Click on the hotspots to learn about the following pieces of equipment:

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Pain Assessment

A pain assessment is conducted in conjunction with the measurement of vital signs because pain can influence the

findings. Pain can activate the sympathetic nervous system and increase pulse, respiration, and blood pressure. Pain is a complex issue, and a comprehensive discussion of pain assessment is beyond the scope of this e-book.

Briefly, because pain is subjective, self-reports are the most effective way to assess pain. The choice of pain assessment tool depends on the client situation: healthcare providers frequently use a numeric rating scale such as "rate your pain on a scale of 0 to 10 with zero being no pain and ten being the very worst pain that you have ever felt." The response is often recorded on the vital sign record and expanded on in the narrative notes. Another common tool is the PQRSTU mneumonic in which each letter corresponds to a series of questions.

- P – Provocative/Palliative (e.g., What makes the pain worse? What makes the pain better?)
- Q – Quality/Quantity (e.g., Can you describe what the pain feels like? How bad is the pain?)
- R – Region/Radiation (e.g., Where is the pain located? Does it radiate anywhere else?)
- S – Severity (as noted above, rate the pain on a scale of zero to ten)
- T – Timing/Treatment (When did the pain begin? Is it constant? Have you taken anything to help the pain? If so, what?)
- U – Understanding (What do you think is causing the pain?)

Order of Vital Sign Measurement

The order of vital sign measurement is influenced by the client situation. Healthcare providers often place the pulse oximeter probe on a client while proceeding to take pulse, respiration, blood pressure, and temperature. However, in some situations this order is modified and the healthcare provider needs to critically assess the situation to prioritize the vital sign measurement order. For example, with newborns/infants, it is best to proceed from least invasive to most invasive, so it is best to begin with respiration, pulse, oxygen saturation, temperature and if required, blood pressure. Generally, it is important to conduct a complete set of vital signs unless otherwise indicated.

Significance of Measurements

Determining the significance of vital sign measurements involves a process of diagnostic reasoning. The healthcare provider analyzes client data and makes decisions about whether the vital signs are normal or abnormal and whether the findings are significant: the following chapters provide normal vital sign ranges. The healthcare provider also considers agency policy, if applicable, about vital sign ranges to assess any abnormal variations and clinical significance. Additionally, the healthcare provider considers the client's baseline vital signs to obtain a better sense of the client's 'normal' and allow comparison (e.g., of trends) over time. The diagnostic reasoning process also involves considering other available objective and subjective data.

Documentation

Timely documentation of vital sign measurements is imperative as a form of communication, to observe trends in vital sign measurements, and to ensure effective intervention when needed. Documentation occurs on paper-based vital sign records or electronic systems depending on the agency. Healthcare providers follow the agency's documentation policy and the professional standards of practice. If using a vital sign record, healthcare providers use the symbols noted on the legend of the record.

Test Your Knowledge

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Pulse

What is Pulse?

Pulse refers to a pressure wave that expands and recoils the artery when the heart contracts/beats. It is palpated at many points throughout the body. The most common locations to accurately assess pulse as part of vital sign measurement include **radial**, **brachial**, **carotid**, and **apical pulse** as shown in **Figure 3.** The techniques vary according to the location, as detailed later.

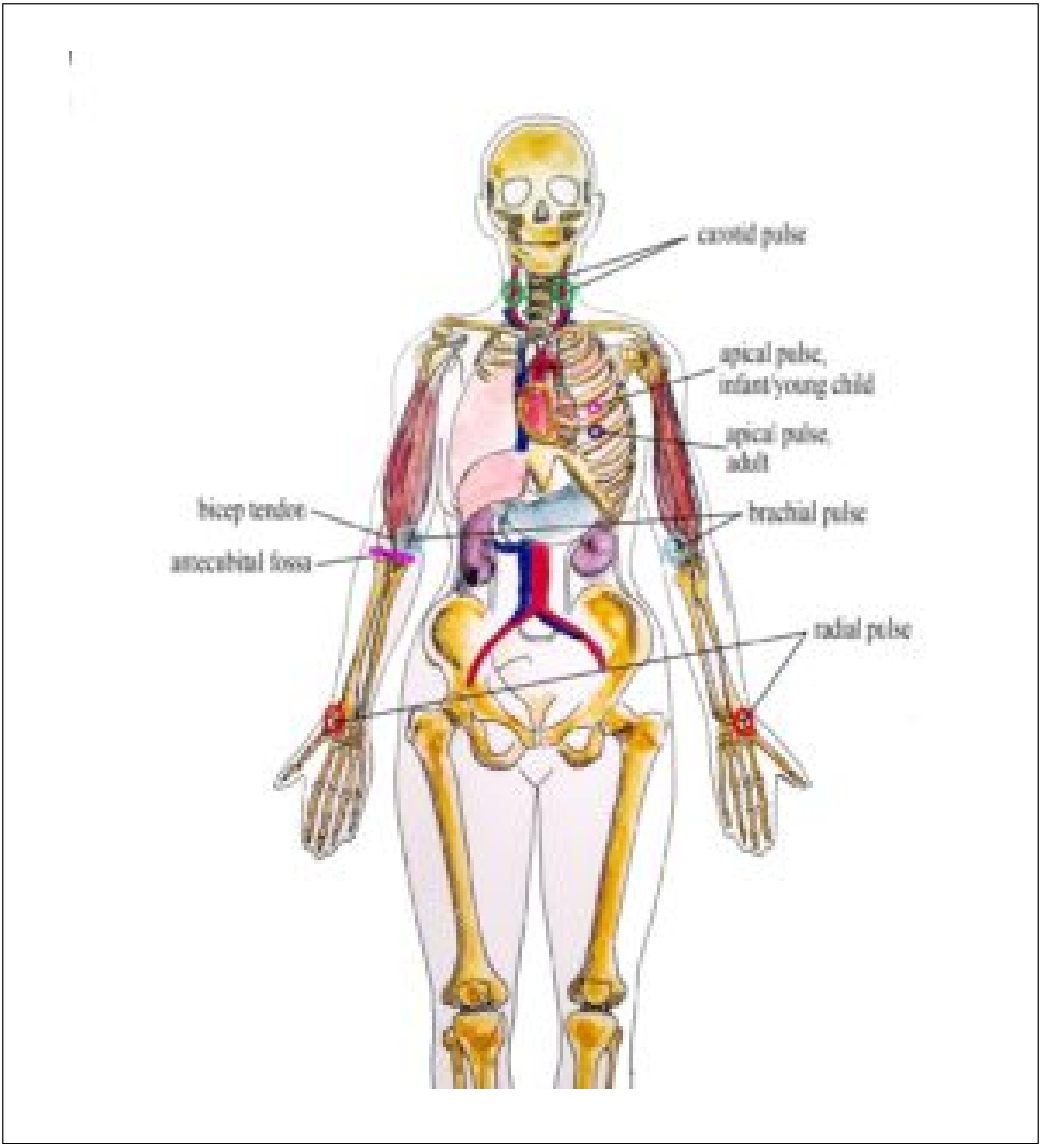

Figure 3: Radial, brachial, carotid and apical pulse (Illustration credit: Hilary Tang)

The heart pumps a volume of blood per contraction into the aorta. This volume is referred to as stroke volume. Age is one factor that influences stroke volume, which ranges from 5–80 mL from newborns to older adults.

Pulse is measured in beats per minute, and the normal adult pulse rate (heart rate) at rest is 60–100 beats per minute (OER #1, OER #2). Newborn resting heart rates range from 100–175 bpm. Heart rate gradually decreases until young adulthood and then gradually increases again with age (OER #2). A pregnant women's heart rate is slightly higher than her pre-pregnant value (about 15 beats). See **Table 3.1** for normal heart rate ranges based on age.

Table 1: Heart Rate Ranges

Age	Heart rate (beats per minute)
Newborn to one month	100–170
One month to two years	90–160
Age 2–6 years	70–150
Age 7–11 years	60–130
Age 12–17 years	50–110
Adult and older adult	60–100

Points to Consider

The **ranges noted in Table 3.1 are generous**. It is important to consider each client and situation to determine whether the heart rate is normal. For example, heart rate is considered in the context of a client's baseline heart rate. The healthcare provider also considers the client's health and illness state and determinants such as rest/sleep, awake/active, and presence of pain. You can expect higher pulse values when a client is in a stressed state such as when crying or in pain; this is particularly important in the newborn. It is best to complete the assessment when the client is in a resting state. If you obtain a pulse when the client is not in a resting state, document the circumstances (e.g. stress, crying, or pain) and reassess as needed.

Why is Pulse Measured?

Healthcare providers measure pulse because it provides information about a client's state of health and influences diagnostic reasoning and clinical decision-making.

Tachycardia

Tachycardia refers to an elevated heart rate, typically above 100 bpm (OER #2) for an adult. Developmental considerations are important to consider, such as higher resting pulse rates in infants and children. For adults, tachycardia is not normal in a resting state but may be detected in pregnant women or individuals experiencing extreme stress (OER #2). Tachycardia can be benign, such as when the sympathetic nervous system is activated with exercise and stress. Caffeine intake and nicotine can also elevate the heart rate. Tachycardia is also correlated with fever, anemia, hypoxia, hyperthyroidism, hypersecretion of catecholamines, some cardiomyopathies, some disorders of the valves, and acute exposure to radiation (OER #2).

Bradycardia

Bradycardia is a condition in which the resting heart rate drops below 60 bpm (OER #2) in adults. In newborns, a resting heart rate below 100 bpm is considered bradycardia. However, a sleeping neonate's pulse may be as low as 90 bpm. People who are physically fit (e.g., trained athletes) typically have lower heart rates (OER #2). If the client is not exhibiting other symptoms, such as weakness, fatigue, dizziness, fainting, chest discomfort, palpitations, or respiratory distress, bradycardia is generally not considered clinically significant (OER #2). However, if any of these symptoms are present, this may indicate that the heart is not providing sufficient oxygenated blood to the tissues (OER #2). Bradycardia can be related to an electrical issue of the heart, ischemia, metabolic disorders, pathologies of the endocrine system, electrolyte imbalances, neurological disorders, prescription medications, and prolonged bedrest, among other conditions (OER #2). Bradycardia is also related to some medications, such as beta blockers and digoxin.

Points to Consider

It is vital that healthcare providers assess clients with tachycardia or bradycardia to determine whether the findings are significant and require intervention.

Please answer the two questions in the following question set.

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Pulse Qualities

The pulse rhythm, rate, force, and equality are assessed when palpating pulses.

Pulse Rhythm

The normal **pulse rhythm** is regular, meaning that the frequency of the pulsation felt by your fingers follows an even tempo with equal intervals between pulsations. If you compare this to music, it involves a constant beat that does not speed up or slow down, but stays at the same tempo. Thus, the interval between pulsations is the same. However, sinus arrhythmia is a common condition in children, adolescents, and young adults. Sinus arrhythmia involves an irregular pulse rhythm in which the pulse rate varies with the respiratory cycle: the heart rate increases at inspiration and decreases back to normal upon expiration. The underlying physiology of sinus arrhythmia is that the heart rate increases to compensate for the decreased stroke volume from the heart's left side upon inspiration.

Points to Consider

If a pulse has an irregular rhythm, it is important to determine whether it is regularly irregular (e.g., three regular beats and one missed and this is repeated) or if it is irregularly irregular (e.g., there is no rhythm to the irregularity). Irregularly irregular pulse rhythm is highly specific to atrial fibrillation and is more concerning. Atrial fibrillation is an arrhythmia whereby the atria quiver. This condition can have many consequences including decreased stroke volume and cardiac output, blood clots, stroke, and heart failure.

Pulse Rate

You count the **pulse rate** for thirty seconds if the rhythm is regular (even tempo) and multiply by two to report in beats per minute. Count for one minute if the rhythm is irregular. In children, pulse is counted for one minute considering that irregularities in rhythm are common. When the clock is at zero, you say zero and then, the first beat felt by your fingers is counted as one.

Pulse Force

The **pulse force** is the strength of the pulsation felt when palpating the pulse. For example, when you feel a client's pulse against your fingers, is it gentle? Can you barely feel it? Alternatively, is the pulsation very forceful and bounding into your fingertips? The force is important to assess because it reflects the volume of blood, the heart's functioning and cardiac output, and the arteries' elastic properties. Remember, stroke volume refers to the volume of blood pumped with each contraction of the heart (i.e., each heart beat). Thus, pulse force provides an idea of how hard the heart has to work to pump blood out of the heart and through the circulatory system.

Pulse force is recorded using a four-point scale:

- 3+ Full, bounding
- 2+ Normal/strong
- 1+ Weak, diminished, thready
- 0 Absent/non-palpable

Practice on many people to become skilled in measuring pulse force. While learning, it is helpful to assess pulse force along with an expert because there is a subjective element to the scale. A 1+ force (weak and thready) may reflect a decreased stroke volume and can be associated with conditions such as heart failure, heat exhaustion, or hemorrhagic shock, among other conditions. A 3+ force (full and bounding) may reflect an increased stroke volume and can be associated with exercise and stress, as well as abnormal health states including fluid overload and high blood pressure.

Pulse Equality

Pulse equality refers to whether the pulse force is comparable on both sides of the body. For example, palpate the radial pulse on the right and left wrist at the same time and compare whether the pulse force is equal. Pulse equality is assessed because it provides data about conditions such as arterial obstructions and aortic coarctation. However, **the carotid pulses should never be palpated at the same time** as this can decrease and/or compromise cerebral blood flow.

These are the upper body pulse points that will be covered in the following sections.

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Radial Pulse

Technique

Use the pads of your first three fingers to gently palpate the radial pulse (OER #1). The pads of the fingers are placed along the radius bone, which is on the lateral side of the wrist (the thumb side; the bone on the other side of the wrist is the ulnar bone). Place your fingers on the radius bone close to the flexor aspect of the wrist, where the wrist meets the hand and bends. See **Figure 4** for correct placement of fingers. Press down with your fingers until you can best feel the pulsation. Note the rate, rhythm, force, and equality when measuring the radial pulse (OER #1).

Figure 4: Correct placement of fingers

Technique Tips

When timing the pulse rate, acknowledge/note when your watch is at zero, and then the first beat felt against your fingers is "1" and then continue to count.

Test Yourself!

While watching the interactive video on pulse and respiration measurement, apply your knowledge and critical thinking skills to answer the questions throughout the video.

This video is also at the end of the chapter, uninterrupted, to enable seamless practice.

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What should the healthcare provider consider?

You may need to adjust the pressure of your fingers when palpating the radial pulse if you cannot feel the pulse. For example, sometimes pressing too hard can obliterate the pulse (make it disappear). Alternatively, if you do not press hard enough, you may not feel a pulse. You may also need to move your fingers around slightly. Radial pulses are difficult to palpate on newborns and children under five, so healthcare providers usually assess the apical pulse or brachial pulse of newborns and children.

Points to Consider

You can use a Doppler ultrasound device if you are struggling to feel the pulse and are concerned about perfusion into the limbs. This is a handheld device that allows you to hear the whooshing sound of the pulse. The Doppler device is also used following surgery or insertion of a central line to assess blood flow. These devices are most commonly used when assessing peripheral pulses in the lower limbs, such as the dorsalis pedis pulse or the posterior tibial pulse. See **Film clip 3.1** for use of a Doppler device. The doppler device is also used to locate the brachial pulse and assess blood pressure in infants.

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Film clip 1: Use of doppler device

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Carotid Pulse

May be taken when radial pulse is not present or is difficult to palpate (OER #1).

Technique

Ask the client to sit upright. Locate the carotid artery medial to the sternomastoid muscle (between the muscle and the trachea at the level of the cricoid cartilage, which is in the middle third of the neck). With the pads of your three fingers, gently palpate the carotid artery, one at a time. See **Figure 5** for correct placement of fingers.

Figure 5: Correct placement of fingers

What should the healthcare provider consider?

Although other pulses can be taken simultaneously to assess equality, the **carotid pulses are NEVER taken at the same time**. Gently palpate one artery at a time so that you do not stimulate the vagus nerve and compromise arterial blood flow to the brain. Avoid palpating the upper third of the neck, because this is where the carotid sinus area is located. You

want to avoid pressure on the carotid sinus area because this can lead to vagal stimulation, which can slow the heart rate, particularly in older adults.

Technique Tips

Never palpate the carotid pulses simultaneously as this will reduce and/or compromise cerebral blood flow.

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Brachial Pulse

Brachial pulse rate is indicated during some assessments, such as with children, in whom it can be difficult to feel the radial pulse. A Doppler can be used to locate the brachial pulse if needed.

Technique

The brachial pulse can be located by feeling the bicep tendon in the area of the antecubital fossa. Move the pads of your three fingers medial (about 2 cm) from the tendon and about 2–3 cm above the antecubital fossa to locate the pulse. See **Figure 6** for correct placement of fingers along the brachial artery.

Figure 6: Correct placement of fingers

What should the healthcare provider consider?

It can be helpful to hyper-extend the arm in order to accentuate the brachial pulse so that you can better feel it. You

may need to move your fingers around slightly to locate the best place to most accurately feel the pulse. You will usually need to press fairly firmly to palpate the brachial pulse.

Apical Pulse

Apical pulse is auscultated with a stethoscope over the chest where the heart's mitral valve is best heard. In infants and young children, the apical pulse is located at the fourth intercostal space at the left midclavicular line. In adults, the apical pulse is located at the fifth intercostal space at the left midclavicular line (OER #1). See **Figure 7** below.

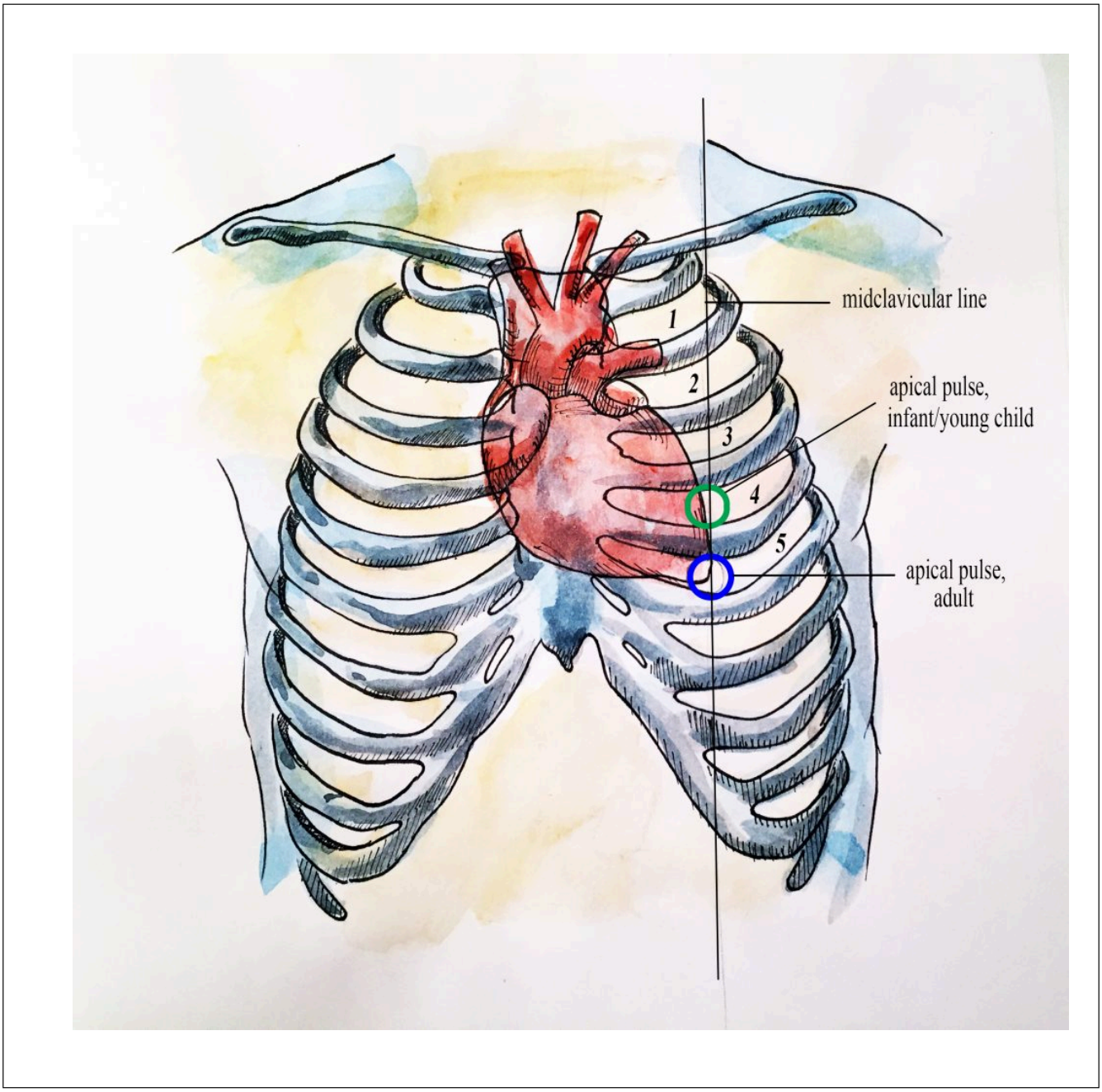

Figure 7: Apical Pulse (Illustration credit: Hilary Tang)

Apical pulse rate is indicated during some assessments, such as when conducting a cardiovascular assessment and when a client is taking certain cardiac medications (e.g., digoxin) (OER #1). Sometime the apical pulse is auscultated pre and post medication administration. It is also a best practice to assess apical pulse in infants and children up to five years of age because radial pulses are difficult to palpate and count in this population. It is typical to assess apical pulses in

children younger than eighteen, particularly in hospital environments. Apical pulses may also be taken in obese people, because their peripheral pulses are sometimes difficult to palpate.

Technique

Position the client in a supine (lying flat) or in a seated position. Physically palpate the intercostal spaces to locate the landmark of the apical pulse. Ask the female client to re-position her own breast tissue to auscultate the apical pulse. For example, the client gently shifts the breast laterally so that the apical pulse landmark is exposed. Alternatively, the healthcare provider can use the ulnar side of the hand to re-position the breast tissue and auscultate the apical pulse. Ensure draping to protect the client's privacy.

Either the bell or diaphragm are used to auscultate the client's heart rate and rhythm. There is a pediatric-size stethoscope for infants. Typically, apical pulse rate is taken for a full minute to ensure accuracy; this is particularly important in infants and children due to the possible presence of sinus arrhythmia. In adults, if you are assessing the apical pulse due to an irregular rhythm then count for one minute. Upon auscultating the apical pulse, you will hear the sounds "lub dup" – this counts as one beat. Continue counting the apical pulse and note the rate and rhythm.

Listen to **Audio clip 1** and count the apical pulse. For practice, we have made this clip 30 seconds so you will need to multiply it by two to report it as beats per minute (but remember, **the most accurate measurement is to count the apical pulse for one minute**).

Audio clip 1: Counting apical pulse rate
Listen to the audio clip below and count the pulse rate.

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What should the healthcare provider consider?

Although pulses are best measured at rest, sometimes this is not possible. It is important to document other factors such as when a person is in pain or an infant/child is crying.

Technique Tips

Feel the intercostal spaces to accurately locate the apical pulse and obtain a physical landmark. There is a space below the clavicle, but the first intercostal space is located below the first rib. You can also slide your fingers down the manubrium where it meets the sternum: this is called the sternal angle (angle of Louis). The second rib extends out from the sternal angle.

Pulse Check! Test Your Knowledge

Now, you find the four pulse points.

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Please answer the seven questions in the following question set.

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Respiration

Respiration refers to a person's breathing and the movement of air into and out of the lungs (OER #2). The respiratory system provides oxygen to body tissues for cellular respiration, removes the waste product carbon dioxide, and helps maintain acid–base balance (OER #2). Inspiration is the process that causes air to enter the lungs, and expiration is the process that causes air to leave the lungs (OER #2). A respiratory cycle (or one breath while you are measuring respiratory rate) is one sequence of inspiration and expiration (OER #2).

Respiration is assessed for **quality**, **rhythm**, and **rate**.

The **quality** of a person's breathing is normally relaxed and silent. Healthcare providers assess use of accessory muscles in the neck and chest and indrawing of intercostal spaces (also referred to as intercostal tugging), which can indicate respiratory distress. Respiratory distress can also cause nasal flaring, and the person often moves into a tripod position. The tripod position involves leaning forward and placing arms/hands and/or upper body on one's knees or on the bedside table.

Respiration normally has a regular **rhythm**. A regular rhythm means that the frequency of the respiration follows an even tempo with equal intervals between each respiration. If you compare this to music, it involves a constant beat that does not speed up or slow down, but stays at the same tempo.

Respiratory **rates** vary based on age. The normal resting respiratory rate for adults is 10–20 breaths per minute (OER #1). Children younger than one year normally have a respiratory rate of 30–60 breaths per minute, but by the age of ten, the normal rate is usually 18–30 (OER #2). By adolescence, the respiratory rate is usually similar to that of adults, 12–18 breaths per minute (OER #2). The normal respiratory rate for children decreases from birth to adolescence (OER #2). Respiratory rates often increase slightly over the age of sixty-five.

Estimated respiratory **rates** vary based on the source. **Table 2** lists a generous range of normal respiratory rates based on age. It is important to consider the client and the situation to determine whether the respiratory rate is normal. Always check with the institution where you work about their normal respiratory rate ranges. Healthcare providers take into consideration the client's health and illness state and determinants such as rest/sleep, awake/active, presence of pain, and crying when assessing the respiratory rate.

Table 2: Respiratory Rate Ranges

Age	Rate (breaths per minute)
Newborn to 1 year	30–60
One to six years	22–40
7–11 years	18-30
12-17 years	12-22
Adults and older adults	10–20

_____

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Respiration Technique

Technique

The respiratory rate is counted after taking the pulse rate so that the client is not aware that you are taking it (OER #1). Once you have finished counting the pulse, leave your fingers in place and then begin assessing respiration. Best to assess with the client in an upright position (sitting or high Fowlers) so that the lungs can fully inflate. Observe the chest or abdomen rise and fall. One respiration includes a full respiratory cycle (including both inspiration and expiration). Thus, the rise and the fall of the abdomen or chest is counted as one full breath. Count for 30 seconds if the rhythm is regular or for a full minute if irregular (OER #1). Report the respiration as breaths per minute, as well as whether breathing is relaxed, silent, and has a regular rhythm. Report whether chest movement is symmetrical.

What should the healthcare provider consider?

Assess the movement of the chest with adults, and the movement of the abdomen with newborns and infants. Adults are normally thoracic breathers (the chest moves) while infants are normally diaphragmatic breathers (the abdomen moves). Some adults are abdominal breathers. Breathing rates are counted for one minute with infants because the respiratory rhythm (tempo) can vary significantly. For example, the breathing rates of infants can speed up and slow down with some short periods of apnea (pauses in breathing).

When assessing respiration, ensure that thick and bulky clothing is removed so you can clearly see the rise and fall of the chest or abdomen. Although respiratory rates are best counted at rest, sometimes this is not possible (e.g., in an emergency situation and with a child who is crying). In this case, document the situation. While assessing respirations, it is important to note signs of respiratory distress, which can include loud breathing, nasal flaring, and intercostal retractions. See **Figure 8** for signs of respiratory distress. These signs require further assessment and intervention.

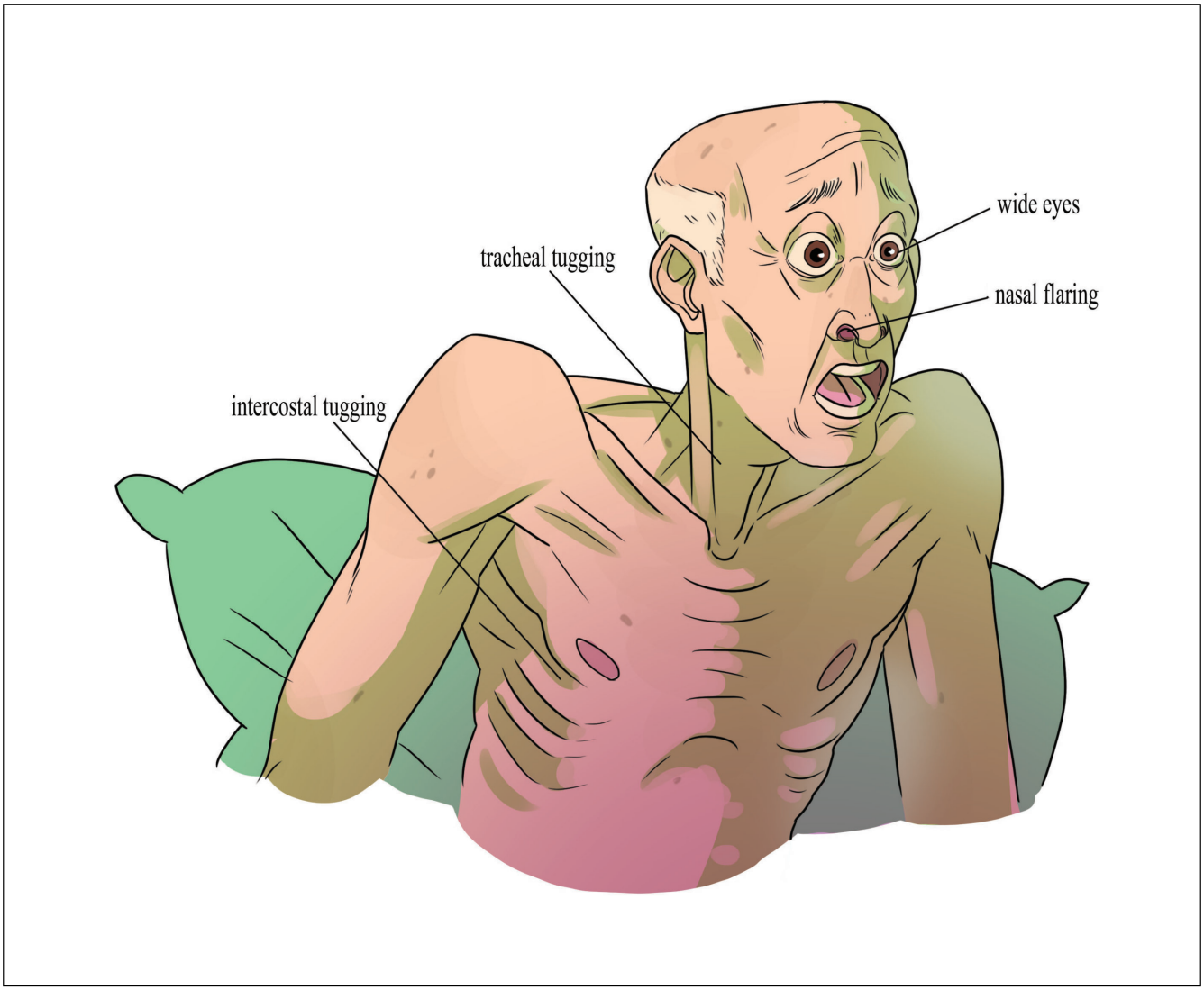

Figure 8: Signs of respiratory distress (Illustration credit: Paige Jones)

Test Your Knowledge

Now, you try it!

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Please answer the three questions in the following question set.

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Pulse and Respirations Summary and Activities

Measurement of pulse and respiration is important because these vital signs provide current data about the client's health and illness state. Changes in pulse and respiration act as cues for healthcare providers' diagnostic reasoning.

Pulse can be measured in many locations. When determining the best location, healthcare providers consider the client's age and health and illness state, as well as the reason for taking the pulse.

When determining the relevance of pulse and respiration data, healthcare providers consider the client's baseline data and the situation. Diagnostic reasoning about pulse and respiration always considers additional information, including other vital sign measurements and subjective and objective client data.

Activity: Check your Understanding

Which is the correct technique for measuring the radial pulse?

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Which image shows the correct method for measuring the apical pulse on a toddler?

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Which image shows the correct method for measuring the apical pulse on an adult?

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Watch this next short **film clip** and see how to measure radial pulse and respiration correctly. After watching the clip, try the technique yourself. You can watch the clip and practice as many times as you like.

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Film clip: Pulse and respiration measurement

Watch this next short **film clip** and see how to measure an apical pulse correctly. After watching the clip, try the technique yourself. You can watch the clip and practice as many times as you like.

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Film clip: Correct measurement of apical pulse

What is the apical pulse rate?

Listen to the audio clip of the apical pulse. Count the pulse for 30 seconds and report the rate as beats per minute (NOTE: although this clip only allows you to count for 30 seconds, remember, **it is best to count the apical pulse for one minute**).

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Audio clip: Apical pulse

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What is the apical pulse rate?

Listen to the audio clip of the apical pulse. Count the pulse for 30 seconds and report the rate as beats per minute (NOTE: although this clip only allows you to count for 30 seconds, remember, **it is best to count the apical pulse for one minute**).

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Audio clip: Apical pulse

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Count the respirations. Please note: there is **no** sound in this video.

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Put the steps in the correct order for each of the pulses and respiration.

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Oxygen Saturation

What is Oxygen Saturation?

Oxygen saturation refers to the percentage of hemoglobin molecules saturated with oxygen. Hemoglobin molecules can each carry four oxygen molecules; the oxygen binds or attaches to hemoglobin molecules. Oxygen saturation provides information about how much hemoglobin is carrying oxygen, compared to how much hemoglobin is not carrying oxygen.

Why is Oxygen Saturation Measured?

Healthcare providers measure oxygen saturation because it provides information about a client's state of health. The body's tissues and organs require oxygen for metabolism, and oxygen saturation can reveal whether there is sufficient oxygen in the blood or whether the client is in a state called hypoxemia (insufficient oxygen in the blood).

Oxygen saturation levels can influence clinical decisions about whether the client is receiving sufficient oxygen and/or requires supplemental oxygen. Oxygen saturation levels are also monitored during and after surgeries and treatments and to assess a client's capacity for increased activity.

How is Oxygen Saturation Measured?

Oxygen saturation can be measured using a pulse oximetry device. See **Figure 9** for a pulse oximeter. It is a non-invasive method that gives an instant estimate of arterial oxygen saturation levels. In critically ill clients, a more accurate, but invasive approach is drawing arterial blood or using a continuous monitoring system to measure arterial blood gases through an arterial line. An arterial line is a catheter that is inserted into an artery, usually the radial artery. It provides a way to access blood gases including arterial oxygen saturation (SaO2). Here, we focus on pulse oximetry because it is identified as a vital sign.

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Figure 9: A pulse oximeter

A pulse oximetry device includes a sensor that measures light absorption of hemoglobin and represents arterial SpO2 (OER #1). Oxyhemoglobin and unoxygenated hemoglobin absorb light differently. The sensor measures "the relative amount of light absorbed by oxyhemoglobin and unoxygenated (reduced) hemoglobin" and compares the amount of "light emitted to light absorbed" (Jarvis, 2014, p. 164). This comparison is then converted to a ratio and is expressed as a percentage of Sp02.

Points to Consider

A pulse oximeter reading reflects arterial oxygen saturation levels, as opposed to venous oxygen saturation levels, because the device only measures light absorption of pulsatile flow: the **'p' in Sp02 refers to pulse or pulsatile flow**. If pulsatile flow is limited or obstructed, an oxygen saturation level will not be accurate. For example, the compression of a blood pressure cuff will obliterate the pulsatile flow so blood pressure and pulse oximetry should not be taken simultaneously on the same limb.

The sensor is attached using various devices. One is a spring-loaded clip attached to a finger or toe as shown previously in **Figure 9**. It is used when an intermittent measurement is required. However, this clip is too large for newborns and young children, so for this population, the sensor is taped to a finger or toe. See **Figure 10**. This technique is also used for clients who require continuous monitoring.

Figure 10: Pulse oximeter with sensor taped around finger

An earlobe clip is another useful device for clients who cannot tolerate the finger or toe clip or have a condition that could affect the results, such as vasoconstriction and poor peripheral perfusion. Another type of device is taped across the forehead and left in place for continuous monitoring. See **Figure 11**.

Figure 11: Pulse oximeter with device across forehead

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Oxygen Saturation Levels

Normal oxygen saturation ranges from **97–100%** (OER #1) in a healthy individual. However, there are reasons why a lower range occurs and in some cases, why it is sometimes acceptable.

Older adults typically have lower oxygen saturation levels than younger adults. For example, someone older than 70 years of age may have an oxygen saturation level of about 95%, which is an acceptable level.

It is important to note that the oxygen saturation level **varies** considerably based on a person's state of health. Thus, it is important to understand both **baseline readings** and **underlying physiology** associated with certain conditions to interpret oxygen saturation levels and changes in these levels.

- People who are obese and/or have conditions such as lung and cardiovascular diseases, emphysema, chronic obstructive pulmonary disease, congenital heart disease and sleep apnea tend to have lower oxygen saturation levels.
- Smoking can influence the accuracy of pulse oximetry in which the the SpO2 is low or falsely high depending on whether hypercapnia is present. With hypercapnia, it is difficult for the pulse oximeter to differentiate oxygen in the blood from carbon monoxide (caused by smoking).
- Oxygen saturation levels may decrease slightly when a person is talking.
- Oxygen saturation may remain normal (e.g., 97% and higher) for people with anemia. However, this may not indicate adequate oxygenation because there are less hemoglobin to carry an adequate supply of oxygen for people who have anemia. The inadequate supply of oxygen may be more prominent during activity for people with anemia.
- Falsely low oxygen saturation levels may be associated with hypothermia, decreased peripheral perfusion, and cold extremities. In these cases, an ear lobe pulse oximeter device or arterial blood gases would provide a more accurate oxygen saturation level. However, arterial blood gases are usually only taken in critical care or emergency settings.

Points to Consider

In practice, such as a hospital setting, the SpO2 range of 92–100% is generally acceptable for most clients. Some experts have suggested that a SpO2 level of at least 90% will prevent hypoxic tissue injury and ensure client safety (Beasley, et al., 2016). However, with children, a saturation that drops below the normal of 97%-100% is always something that you should investigate further. If a client's oxygen saturation levels are low, you should have them sit upright so their lungs can fully expand and then perform a focused respiratory assessment.

Contextualizing Inclusivity – Pulse Oximetry Biases

There are biases ingrained in the technology of pulse oximetry, which results in racial disparities in care. Despite decades of research showing the inherent and systematic racism that is part of pulse oximetry (Hidalgo et al., 2021), practices have been slow to change. This is a serious issue considering that treatment decisions are influenced by pulse oximetry, and hypoxemia can lead to complications including higher mortality rates and organ dysfunction (Wong et al., 2021)

In the context of hypoxemia, pulse oximeters have been found to generally overestimate oxygen saturations (Feiner et al., 2007) particularly as the SpO2 lowers to 88%. This overestimation is sometimes described as hidden hypoxemia (Wong et al., 2021) in which the oxygen saturation on a pulse oximeter is higher than an oxygen saturation measured via arterial blood draw. For several years, this overestimation has been particularly greatest in people with darker skin tones (Bickler et al., 2005; Feiner et al., 2007). For example, it has been noted that hypoxemia is detected (via pulse oximetry) less in Black patients than white patients (Sjoding et al., 2020). In a large, multi-site study with over 79,000 patients, it was found that hidden hypoxemia was found more in Black patients followed by Hispanic and then similar rates for Asian and white patients (Wong et al., 2021). In another study in the context of COVID-19, hidden hypoxemia was found more in Asian, Black and Hispanic patients than white patients and significantly affected treatment in Black and Hispanic patients (Fawzy et al., 2022).

As you go into practice, keep in mind that you should critically reflect on your pulse oximetry findings. For example, if the client's SpO2 finding is normal, but they are presenting with difficulty breathing or signs of respiratory distress (e.g., shortness of breath, audible breathing, **tripod position**, **intercostal tugging/ pulling/retractions**), consider your priorities of care. First, always believe the patient and then, consider the findings in the context of your subjective assessment and other physical findings. It may be appropriate to advocate for arterial blood gases to be drawn to verify oxygen saturation levels if the patient is having breathing problems and their pulse oximetry findings are normal.

Please answer the four questions in the following question set.

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Oxygen Saturation Technique

Technique

The pulse oximeter probe is clipped onto or taped around a client's finger, as shown in **Figure 12**. If doing automatic blood pressures, put the oximeter probe on a finger on the opposite arm. The device displays an oxygen saturation level and a pulse within a few seconds. Palpate the client's radial pulse (taken for 30 seconds if regular and one minute if irregular) while the oximeter is attached to the finger. The healthcare provider can have confidence in the accuracy of the measurement of the oxygen saturation level if the pulse displayed on the oximeter coincides with the radial pulse.

Figure 12: Measuring oxygen saturation

Points to Consider

Nail polish or artificial nails can interact with the absorption of light waves and influence the accuracy of the SpO2 measurement when using a probe clipped on the finger. Remove nail polish or use an alternative method.

It is best to measure oxygen saturation on the opposite hand if you are performing automatic blood pressure on one of the arms.

What should the healthcare provider consider?

Many factors can influence accuracy when measuring oxygen saturation levels via pulse oximetry. Certain conditions, including poor circulation and peripheral vasoconstriction, can lead to inaccurate oxygen saturation measurements when the device is attached to a finger or toe. Vasoconstriction involves narrowing of the vessels, so blood flow is reduced to the peripheries. This can reduce the accuracy of the reading and reduce the oximeter's capacity to detect a signal. Readings may also be inaccurate (low) if a client's hands or feet are cold or they have poor circulation. In cases like these, use an alternate method of measurement, like clipping a device to the earlobe or taping it to the forehead.

The healthcare provider cannot have confidence in measurement accuracy when the radial pulse does not coincide with the pulse displayed on the oximeter. It is also important to note that the pulse oximeter device cannot provide an accurate reading when oxygen saturation is below 75% (Shah & Shelley, 2013). Oxygen saturation levels in the 70s indicate that a client is decompensating and immediate intervention is required. Thus, it is important to confirm accuracy via additional assessments, such as assessing for respiratory distress, drawing arterial blood gases and/or checking for machine error.

The significance of the oxygen saturation level is interpreted in the context of the client's baseline measurements, other data including vital signs and other objective and subjective findings, and the client's overall health and wellness state.

Next, you have an opportunity to watch the next short film clip on accurate measurement techniques – **film clip 2**.

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Film clip 2: Oxygen saturation taken correctly

Test Your Knowledge

Please answer the three questions in the following question set.

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Oxygen Saturation Summary and Activities

Measuring oxygen saturation via pulse oximetry is a non-invasive way to quickly assess a client's oxygen level. The results reflect a person's oxygenation status and provide data for healthcare providers' diagnostic reasoning.

The sensor can be attached in many ways, including clipping and taping probes to the finger, toe, earlobe, and forehead. The type and location of the apparatus is selected based on the client's age, the presence of vasoconstriction, the adequacy of peripheral perfusion, whether intermittent or continuous monitoring is required, and the client's health and illness state.

When determining the relevance of the oxygen saturation reading, healthcare providers consider the client's health and wellness state. Specifically, they consider other data related to oxygenation including respiratory quality, rate, and rhythm; pulse; skin colour and temperature; and the client's subjective description of ease or difficulty breathing. Decreases in oxygen saturation readings are potentially life-threatening and require immediate intervention.

Activity: Check your Understanding

Now you have an opportunity to find errors in measurement techniques. The first activity involves watching a short film clip. Check it out!

What error in technique is this healthcare provider making while measuring oxygen saturation in Film clip 3?

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Film clip 3 Oxygen saturation taken incorrectly

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Now you have an opportunity to find errors in measurement techniques by looking at an image.

Which image shows the correct technique while measuring oxygen saturation?

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Now that you have completed the O2 saturation content, it's time to test your knowledge. Try to answer the following questions.

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Blood Pressure

What is Blood Pressure?

Blood pressure is the force of blood exerted against the arterial walls, and is reported in millimetres of mercury (mm Hg). Try turning your kitchen tap on just a little bit, and then full blast. Compare the varying forces of water pressure as you adjust the tap. This comparison will give you a better sense of blood pressure.

The pressure against the arterial walls (the blood pressure) changes depending on whether the heart is contracting and pushing blood out into the arteries or whether the heart is in a resting phase and filling with blood. There is always force against the arterial walls, even when the heart is in a resting phase. The **systolic pressure** is the maximum pressure on the arteries during left ventricular contraction (systole) (OER #1). The left ventricle is a lower chamber of the heart responsible for pumping blood out to the body. The **diastolic pressure** is the resting pressure on the arteries between each cardiac contraction (OER #1) when the heart's chambers are filling with blood (diastole).

Stroke volume is the amount of blood ejected from the left ventricle in a single contraction. Stroke volume provides information about the functioning of the heart. Stroke volume is influenced by age and typically ranges from 5–80 mL. Newborns have a stroke volume of about 5 mL per contraction while adults have a stroke volume of about 30–70 mL per contraction; the stroke volume increases as individuals grow and their hearts become stronger and can pump more volume per contraction. Direct measurement of stroke volume involves an invasive approach in which a catheter is passed into the pulmonary artery via a large neck vein; this monitoring device is only used during critical care situations.

Indirect measurement of stroke volume involves assessing the **pulse pressure**, which is the difference between the systolic and diastolic values and signifies the force required by the heart each time it contracts. For example, if someone's blood pressure is 120/80 mm Hg, the pulse pressure is 40 mm Hg. A higher pulse pressure can indicate arterial stiffness, which often happens as a result of aging or cardiovascular disease. A higher pulse pressure can also be indicative of aortic valvular insufficiency where the diastolic pressure is unusually low and the systolic pressure is mildly elevated or unchanged. A lower pulse pressure can be a marker of poor heart function, where cardiac output is decreased.

Why is Blood Pressured Measured?

- A person's blood pressure provides insight into the functioning of the body
- Healthy body functioning is influenced by healthy blood pressure
- The findings can provide information about the integrity of arteries and heart functioning, which can lead the healthcare provider to conduct additional assessments
- High blood pressure can cause the arteries to become weak and damaged and cause the heart to become weak and enlarged
- Low blood pressure can decrease perfusion of nutrients and oxygen to the body's cells, influencing ability to function and potentially cellular death
- Chronic high blood pressure can contribute to conditions such as vascular disease, myocardial infarction, cerebral stroke, kidney disease, and dementia

Test Your Knowledge

Please answer the four questions in the following question set.

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Factors That Influence Blood Pressure

Five factors influence blood pressure:

1. Cardiac output
2. Peripheral vascular resistance
3. Volume of circulating blood
4. Viscosity of blood
5. Elasticity of vessels walls

Blood pressure increases with increased cardiac output, peripheral vascular resistance, volume of blood, viscosity of blood and rigidity of vessel walls.

Blood pressure decreases with decreased cardiac output, peripheral vascular resistance, volume of blood, and viscosity of blood. Blood pressure will also decrease when the vessel walls are more elastic.

Cardiac Output

Cardiac output is the volume of blood flow from the heart through the ventricles, and is usually measured in litres per minute (L/min). Cardiac output can be calculated by the stroke volume multiplied by the heart rate. Any factor that causes cardiac output to increase, by elevating heart rate or stroke volume or both, will elevate blood pressure and promote blood flow. These factors include sympathetic stimulation, the catecholamines epinephrine and norepinephrine, thyroid hormones, and increased calcium ion levels. Conversely, any factor that decreases cardiac output, by decreasing heart rate or stroke volume or both, will decrease arterial pressure and blood flow. These factors include parasympathetic stimulation, elevated or decreased potassium ion levels, decreased calcium levels, anoxia, and acidosis.

Peripheral Vascular Resistance

Peripheral vascular resistance refers to compliance, which is the ability of any compartment to expand to accommodate increased content. A metal pipe, for example, is not compliant, whereas a balloon is. The greater the compliance of an artery, the more effectively it is able to expand to accommodate surges in blood flow without increased resistance or blood pressure. Veins are more compliant than arteries and can expand to hold more blood. When vascular disease causes stiffening of arteries (e.g., atherosclerosis or arteriosclerosis), compliance is reduced and resistance to blood flow is increased. The result is more turbulence, higher pressure within the vessel, and reduced blood flow. This increases the work of the heart.

Volume of Circulating Blood

Volume of circulating blood is the amount of blood moving through the body. Increased venous return stretches the walls of the atria where specialized baroreceptors are located. Baroreceptors are pressure-sensing receptors. As the

atrial baroreceptors increase their rate of firing and as they stretch due to the increased blood pressure, the cardiac centre responds by reducing sympathetic stimulation and increasing parasympathetic stimulation to decrease HR. The opposite is also true.

Viscosity of Blood

Viscosity of blood is a measure of the blood's thickness and is influenced by the presence of plasma proteins and formed elements in the blood. Blood is viscous and somewhat sticky to the touch. It has a viscosity approximately five times greater than water. Viscosity is a measure of a fluid's thickness or resistance to flow, and is influenced by the presence of the plasma proteins and formed elements within the blood. The viscosity of blood has a dramatic effect on blood pressure and flow. Consider the difference in flow between water and honey. The more viscous honey would demonstrate a greater resistance to flow than the less viscous water. The same principle applies to blood.

Elasticity of Vessel Walls

Elasticity of vessel walls refers to the capacity to resume its normal shape after stretching and compressing. Vessels larger than 10 mm in diameter are typically elastic. Their abundant elastic fibres allow them to expand as blood pumped from the ventricles passes through them, and then to recoil after the surge has passed. If artery walls were rigid and unable to expand and recoil, their resistance to blood flow would greatly increase and blood pressure would rise to even higher levels, which would in turn require the heart to pump harder to increase the volume of blood expelled by each pump (the stroke volume) and maintain adequate pressure and flow. Artery walls would have to become even thicker in response to this increased pressure.

Test Your Knowledge

Please answer the two questions in the following question set.

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Blood Pressure Ranges

Blood pressure is reported in mm Hg (pronounced millimetres of mercury), in which the systolic is the numerator and diastolic is the denominator. In adults (18 years and older), **normal blood pressure** typically ranges from **90 to less than 130 mm Hg** (systolic) and **60 to less than 80 mm Hg** (diastolic). Blood pressure typically rises with age because of the stiffening of arteries and plaque build-up.

The focus of this chapter is adult clients, but it is important to note that like BMI, normative blood pressure ranges in children are based on **percentile readings** as related to age, sex, and height (Dionne et al., 2017). Generally BP readings greater than the 90th percentile are considered elevated and greater than the 95th percentile are considered hypertension. Here is an example of BP percentiles for:

- female children: link (https://papers.ucalgary.ca/paediatrics//assets/bp-levels—2017-aap-table—girls.pdf).
- male children link (https://papers.ucalgary.ca/paediatrics/assets/bp-levels—2017-aap-table—boys.pdf).

However, a simplified rule of thumb is that a BP of greater than 120/80 mm Hg in those six to 11 years of age and a BP of greater than 130/85 mm Hg in those 12 to 17 years of age should be of concern (Rabi et al., 2020).

Points to Consider

In evaluating whether a client's BP is normal, it is also important to consider the client's baseline blood pressure and the client's current health state in conjunction with subjective data and other objective data. For example, a blood pressure of 88/50 mm Hg may be normal for a healthy, asymptomatic 20-year-old adult.

Factors that influence blood pressure include age, sex, ethnicity, weight, exercise, emotions/stress, pregnancy, and diurnal rhythm as well as medication use and disease processes.

- The general pattern is that blood pressure rises with age, so normal variations tend to be higher for older adults.
- Blood pressure is similar in childhood for males and females. After puberty, females have lower blood pressure than males, whereas after menopause females have higher blood pressure than males.
- Research has revealed that ethnicity may be a predictor of blood pressure, but this causation is not necessarily biological, but rather sociocultural. When determining risk for high blood pressure, it is important to consider ethnicity as a contributing factor.
- The diurnal cycle influences blood pressure to be lower in the morning and increase throughout the day until early evening. Try it out: take your blood pressure when you wake up in the morning and then again in late afternoon, and note the difference. This is one reason why healthcare providers document the time a client's blood pressure is taken.
- Blood pressure can be higher in people who are obese because the heart has to work harder to perfuse the body's tissues.
- The sympathetic nervous system is stimulated by exercise, stress, anxiety, pain, anger, and fear, which increases blood pressure. Blood pressure returns to baseline within five minutes of rest following activity. Try it out. Have a peer take your blood pressure. Then, run on the spot or do some other cardiac activity for five minutes. Have the peer take your blood pressure again, and then lie down and rest for five minutes. Take the blood pressure again. Note the changes.
- Blood pressure varies throughout the duration of pregnancy. It decreases about halfway through the first trimester

until mid-pregnancy due to progesterone effects that relax the walls of blood vessels, causing decreased peripheral vascular resistance. It returns to pre-pregnancy values toward the end of pregnancy.

Points to Consider

White coat syndrome refers to elevated blood pressure due to nervousness or anxiety when clients have their blood pressure taken by a healthcare provider. This occurs in approximately 20% of clients. Key message: have the client take their blood pressure at home with an automatic home blood pressure cuff and compare the findings. Alternatively, you can ask the client to sit quietly and leave the room while an automatic cuff takes a client's blood pressure. The automatic cuff can be programmed to take three measurements and the blood pressure documented is an average of the three readings.

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Test Your Knowledge

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How is Blood Pressure Measured?

Blood pressure is measured in many ways including manual/auscultatory, automatic/electronic, cellular phone applications, and arterial catheters. Whatever method is used, blood pressure must be measured using **validated equipment**. It has been found that blood pressure is often not measured accurately in clinical practice, particularly when using the auscultatory/manual method. It is important to ensure correct technique to obtain an accurate measurement. Hypertension Canada (Goupil et al., 2025) recommends automatic/electronic blood pressure measurement as the preferred method in clinical practice particularly when diagnosing hypertension; however if a validated automatic machine is not available or arrhythmias are present, then manual BP is recommended.

Points to Consider

If a BP is high, it is often best to check it again for accuracy. Then, take blood pressure in both arms when you measure a client's blood pressure for the first time. A small difference in blood pressure between the arms is often normal. Differences of greater than 10 mm Hg systolic between the arms are investigated further because this finding has been associated with vascular disease and mortality outcomes. Measure subsequent blood pressures in the arm with the higher blood pressure.

Client Positioning

Blood pressure is generally taken in a sitting or supine position with the bare arm at heart level (OER #1). Certain health states prevent some clients from sitting, such as clients who are critically ill, unstable, or postoperative. Thus, healthcare providers document the client's positioning (e.g., sitting, supine, standing). **If sitting**, the feet are placed flat on the floor with the back resting comfortably against a chair. The healthcare provider checks to ensure that the client's legs are not crossed, because this can increase blood pressure. The client sits resting for five minutes before you take the blood pressure. **This waiting period is not feasible when the client's condition is deteriorating or a STAT blood pressure is required**. Because the client should be resting, you should ask them not to talk or move. Additionally, you should not ask them to hold any of your equipment during the blood pressure measurement.

Cuff Types and Sizes

Manual and automatic blood pressure measurement involves using a blood pressure cuff with a sphygmomanometer. Many cuff sizes are available to fit newborns, children, adults, people with small and larger arms, and people with cone-shaped arms. The cuff is typically wrapped around the upper arm. However, there is also a cuff that can be placed on the thigh when the arm is not feasible. See **Figure 13** of varying blood pressure cuff sizes. Wrist devices can be used for blood pressure estimation when clients have a large upper arm circumference (Rabi et al., 2020). When taking the measurement, make sure that the arm and wrist are supported at heart level (Rabi et al., 2020).

Figure 13: Varying blood pressure cuff sizes

It is important to choose a cuff size that matches the client's arm size, rather than their age. See **Table 4** about cuff sizing. See **Film Clip 4** of a demonstration of accurate cuff sizing.

Table 4: Cuff Sizing

Cuff Sizing
The width of the cuff is 40% of the person's arm circumference
The length of the cuff's bladder is 80–100% of the person's arm circumference

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Film clip 4: Accurate cuff sizing

Before placing the blood pressure cuff on the client's arm, **palpate the brachial artery** using three fingers (not your thumb) just above the antecubital fossa medially (OER #1). To do this, palpate the bicep tendon at the antecubital fossa. Move 2 cm medially from the tendon and 3 cm above the antecubital fossa. Press firmly to feel the brachial pulse. Wrap

the blood pressure cuff securely and evenly around the client's upper, bare arm (not over clothing) with the **cuff's artery marker aligned** with the **brachial artery** and **3cm above the antecubital fossa**. Hypertension Canada (Goupil et al., 2025) recommends that the **middle of the cuff should be at the level of the heart**.

Technique Tips

Thigh blood pressure is indicated when blood pressure cannot be taken on the arm, such as when clients have bilateral amputation or burns. Thigh blood pressure is also done on children and adolescents with unusually high blood pressure in the arm and to compare differences between upper and lower extremities. In such cases, coarctation of the aorta (a congenital narrowing of the aorta) is possible. The thigh systolic blood pressure is 10–40 mm Hg higher than the arm systolic blood pressure, while the thigh diastolic blood pressure is approximately the same as the arm. To obtain thigh blood pressure, the client must be in prone position. Place the cuff around the bottom third of the client's thigh. The cuff's artery line is aligned with the popliteal artery. The popliteal artery can be located in the popliteal fossa. Palpate the medial tendon and move the pads of your three fingers lateral to the tendon. Press your fingers into the femur or tibia bone. Continue with the same process as noted above in terms of taking blood pressure.

Blood Pressure Methods

Manual blood pressure measurement is taken using a blood pressure cuff with a sphygmomanometer and a stethoscope. **See Figure 14**. This technique is detailed on next page.

Figure 14: Blood pressure cuff with a sphygmomanometer and a stethoscope

Automatic blood pressure cuffs are a digital way to measure blood pressure. See **Figure 15**. After positioning the client and the blood pressure cuff on the arm, press the start button on the monitor. The cuff is automatically inflated and then deflates at a rate of 2 mm Hg per second. The monitor has a digital display that shows the blood pressure reading when done. Automatic cuffs can be programmed to take a series of blood pressure readings in a row. If the healthcare provider is concerned about an **initial high blood pressure** reading on a client, the accuracy of the blood pressure is verified with the following actions:

- have the client sit in a room by themselves
- quiet the room
- dim the lights
- allow the client to sit quietly, without talking for five minutes.
- then take three measurements, one minute apart, with the automatic cuff. The blood pressure displayed is an average of the three readings.

There are cues that may prompt you to do a manual BP after an automatic BP such as when the findings are outside of the client's baseline, the findings are abnormal, a diastolic does not register on the machine, or with a client who struggles to keep their arm still and straight.

Figure 15: Automatic blood pressure cuff

Clients can monitor their own blood pressure at home with an automatic digital blood pressure monitoring device. Clients are advised to use a device that meets the standards of the Association for the Advancement of Medical Instrumentation, the requirements of the British Hypertension Society protocol, or the International Protocol for Validation of Automated Blood Pressure Measuring Devices. The cuff is applied around the client's upper arm or wrist. Similar to the automatic cuff noted above, the client presses the start button and the cuff inflates and deflates based on programmed levels displaying a digital reading. Clients are encouraged to document their blood pressure or use a device with data-recording capabilities to increase the reliability of their reported home blood pressure monitoring. These data can be shared with the client's primary care provider.

Arterial catheters are an invasive way to measure blood pressure and are only used in critical care situations when continuous blood pressure monitoring and arterial blood gas draws are required. This involves insertion of a catheter (similar to an intravenous) into the artery. The catheter is connected to a pressure transducer and monitor that provide a digital blood pressure reading.

Cellular phone applications have been developed to measure blood pressure, but the accuracy of this technology is still being investigated.

Points to Consider

Avoid using an automatic blood pressure cuff if the systolic pressure is less than 90 mm Hg in an adult, the pulse is rapid or the rhythm is irregular such as with an arrhythmia, and/or the client is experiencing shivers or tremors. It is best to also complete a manual blood pressure measurement to validate the accuracy of the automatic blood pressure measurement.

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Manual Blood Pressure Measurement

A healthcare provider uses a stethoscope and a blood pressure cuff with a sphygmomanometer to measure blood pressure manually. The stethoscope is used to listen to the blood pressure sounds, which are called Korotkoff sounds.

Stethoscope Usage and Korotkoff Sounds

The stethoscope is used on **bare skin** so that a client's clothing does not affect the sounds. The stethoscope does not make sounds louder; it simply blocks out extraneous noises so you can better hear the Korotkoff sounds. These sounds are heard through a stethoscope applied over the brachial artery when the blood pressure cuff is deflating. You will not hear anything when you first place the stethoscope over the brachial artery because unobstructed blood flow is silent. The Korotkoff sounds appear after you inflate the cuff (which compresses the artery/blood flow) and then begin to deflate the cuff. The Korotkoff sounds are the result of the turbulent blood caused by the inflated cuff compressing the artery and oscillations of the arterial wall when the heart beats during cuff deflation.

Here are a few tips:

- Use a high quality stethoscope with durable, thick tubing. Avoid stethoscopes with long tubing because this can distort sounds.
- Ensure quiet surroundings so that you can better hear the Korotkoff sounds.
- Make sure that the slope of the stethoscope earpieces point forward or toward your nose.
- Use a stethoscope that has both bell and diaphragm capacity. See **Figure 16** for bell and diaphragm.

Figure 16: Stethoscope with bell and diaphragm (Illustration credit: Hilary Tang).

- Cleanse the stethoscope prior to use including the ear pieces and the bell and diaphragm.
- The bell of the stethoscope is suggested because it is used for low-pitched sounds like blood pressure. However, some healthcare providers use the diaphragm for several reasons: that is how they learned to take blood pressure; they believe this helps them hear the Korotkoff sounds better; and the diaphragm covers a larger surface area than the bell.
- Hold the bell lightly against the skin with a complete seal or hold the diaphragm firmly against the skin with a complete seal.
- You must ensure that the bell or diaphragm is open before using. See **Film Clip 5** on how to open and close the bell and diaphragm.

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Film Clip 5: Opening and closing the bell and diaphragm.

Determining Maximum Inflation Pressure

Healthcare providers determine the maximum inflation pressure before they take blood pressure. The maximum inflation pressure is the number on the sphygmomanometer that the cuff is inflated to when measuring blood pressure. If you do not determine the maximum pressure inflation, an auscultatory gap could go unrecognized, and as a result the blood pressure could be underestimated (lower than the actual value).

An **auscultatory gap** is a silent interval when the Korotkoff sounds go absent and then reappear while you are deflating the cuff during blood pressure measurement. This gap is an abnormal finding and can occur due to arterial stiffness and arteriosclerotic disease. It is typically observed in people with a history of hypertension who have been treated with prolonged antihypertensive medication.

To determine the maximum inflation pressure, start by palpating the brachial or radial pulse while inflating the cuff. Inflate the cuff 30 mm Hg quickly past the point when you obliterate the pulse (ie., you no longer feel the pulse). If you still cannot feel the pulse, use that value to start auscultating – that value is the maximum inflation pressure number.

When taking blood pressure, if an auscultatory gap is observed, document the first systolic sound and diastolic sound only. Report the presence of an auscultatory gap in narrative notes.

Points to Consider

Generally, auscultatory gaps do not interfere with automatic blood pressure measurements (Fech, et al., 2012). However, if a client's blood pressure reading is suspiciously high or low, the healthcare provider takes blood pressure manually.

Blood Pressure Measurement Techniques

For novices, it is a good idea to start with the two-step technique and then move onto the one-step technique as you develop your skills.

Two-step technique

First step: Determining maximum pressure inflation

Palpate the radial or brachial artery, inflate the blood pressure cuff until the pulse is obliterated, and then continue to inflate 30 mm Hg more (OER #1). Note this number – it is considered the maximum pressure inflation. Next, deflate the cuff quickly by fully opening the valve.

Second step: Measure blood pressure

Now, you can start to measure blood pressure. Place the bell of the cleansed stethoscope over the brachial artery (OER #1) using a light touch and complete seal. Inflate the cuff to the maximum pressure inflation number (OER #1). Open the valve slightly. Deflate the cuff slowly and evenly (OER #1) at about 2 mm Hg per second. See **Film Clip 6** which focuses on the speed of the needle when deflating the blood pressure cuff.

Note the points at which you hear the **first appearance of Korotkoff sounds** (**systolic** blood pressure) (OER #1) and the point at which the **Korotkoff sounds go silent** (**diastolic** blood pressure) (Hypertension Canada, 2020). These sounds are called Korotkoff sounds and vary in quality from tapping, swooshing, muffled sounds, and silence. The pressure at which the first Korotkoff sound is noted signifies the systolic pressure, while the pressure at which the Korotkoff sounds are no longer heard marks the diastolic pressure. See **Audio Clip 2** to listen to Korotkoff sounds and noting systolic and diastolic blood pressure.

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Film Clip 6: Deflation rate of sphygmomanometer.

Next, you have the opportunity to observe the two-step blood pressure approach and then try it out yourself – see **Film Clip 7**. This approach is best used when you are first learning how to take blood pressure.

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Film Clip 7: Two-step blood pressure approach (NOTE: The **diastolic** is the point at which the **Korotkoff sounds go silent** [Hypertension Canada, 2025]. Please note, this video was taken prior to the release of these new guidelines. In addition, place cuff 3cm above the antecubital fossa).

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Audio Clip 2: Korotkoff sounds with blood pressure.

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One-step technique: Determining maximum pressure inflation and taking blood pressure

Palpate the radial or brachial artery, inflate the blood pressure cuff until the pulse is obliterated (OER #1), and then continue to quickly inflate 30 mm Hg more (Hypertension Canada, 2020). Place the bell of the cleansed stethoscope over the brachial artery (OER #1) using a light touch with a complete seal. Open the valve slightly. Deflate the cuff slowly and evenly (OER #1) at about 2 mm Hg per second. Note the points at which you hear the first Korotkoff sound (systolic blood pressure) (OER #1) and the point in which the Korotkoff sounds go silent (diastolic blood pressure) (Hypertension Canada, 2020). These sounds are called Korotkoff sounds and vary in quality from tapping, swooshing, muffled sounds, and silence. The first Korotkoff sound is the systolic pressure, and the diastolic pressure is when the Korokoff sounds go silent.

Watch this teaching video of a film clip that shows the **one-step blood pressure approach** – see **Film Clip 8**. After you become proficient in the two-step approach, you can move on to the one-step blood pressure approach.

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Film Clip 8: One-step blood pressure approach. (note, the Hypertension Canada 2025 guidelines now indicate that the cuff should be placed 3cm above the antecubital fossa).

Points to Consider

Korotkoff sounds are the sounds of blood flow through the artery as you are listening to blood pressure. Korotkoff sounds are not the same thing as the heart beat or the pulse. They disappear as the cuff is inflated and reappear as the cuff is deflated. They also cannot be heard when the cuff is fully deflated because unobstructed and healthy blood flow is silent. When deflating the cuff, the first Korotkoff sound is systolic and the point in which the Korotkoff sounds are no longer heard is diastolic (Hypertension Canada, 2020). In rare cases, the Korotkoff sounds continue to 0 mm Hg. In this case, the diastolic pressure should be measured when the Korotkoff sounds become muffled (Hypertension Canada, 2020).

Test Your Knowledge

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What Should the Healthcare Provider Consider?

Manual blood pressure is reported in even numbers. Healthcare providers **always measure blood pressure with pulse** because these vital signs are closely related and data from both are needed to make accurate and informed clinical decisions.

What Should You Do if You Cannot Feel the Brachial Pulse?

- To locate the brachial pulse, palpate the bicep tendon, move medially about 2 cm, and move up about 2–3 cm
- Use three fingers including your index and middle finger to feel for the pulse
- You will usually need to press fairly firmly to palpate the brachial pulse and may need to modify the pressure. If you press too hard, you will obliterate the pulse (make it disappear) and if you press too lightly, you will not be able to feel the pulse
- You may need to reposition your fingers to find the best place to feel the pulse along the brachial artery
- Place the client's arm with the palm up and elbow extended. You can flex the elbow in varying degrees to relax the muscle and accentuate the pulse
- Cup your opposite hand under the client's elbow

What Should You Do if You Cannot Hear the Korotkoff Sounds?

- Use your bell and make full contact with skin
- Make sure the bell is positioned over the brachial artery
- Ensure the room is quiet
- Concentrate on expected sounds (swooshing, tapping, muffled sounds)
- Try different earbuds (hard or soft) on your stethoscope

Common Errors When Taking Blood Pressure

Many errors must be avoided when measuring blood pressure.

- Failure to determine maximum pressure inflation can produce a falsely low systolic reading.
- Deflating the cuff too slowly can produce a falsely high diastolic, and deflating the cuff too quickly can produce a falsely low systolic or falsely high diastolic reading.
- Inaccurate cuff sizes for the client's arm size and shape can result in measurement error: a cuff that is too narrow can produce a falsely high blood pressure whereas a cuff that is too loose can produce a falsely low blood pressure.
- A falsely low blood pressure can result from the arm being positioned above the level of the heart and a falsely high blood pressure can result from the arm being positioned below the level of the heart.

Hypotension

A number of factors can cause hypotension (low blood pressure). **Hypotension is considered less than 90/60 mm Hg in a normotensive adult**. However, low blood pressure measurements are always interpreted in the context of a client's baseline and past blood pressure readings as well as their current health state. Common symptoms associated with hypotension are lightheadedness, loss of consciousness, blurry vision, nausea, and fatigue.

Orthostatic Hypotension

Orthostatic hypotension is a specific type of hypotension that involves a drop in blood pressure associated with postural changes. Specifically, there is a **drop in blood pressure when the client moves from lying to standing position** (and sometimes from sitting to standing).

Have you ever stood up quickly and felt dizzy for a moment? This is because, blood is not getting to your brain so it is briefly deprived of oxygen. It can appropriate to assess for the presence of orthostatic hypotension when a client reports feeling dizzy, light-headed, or **syncope** when they sit up or stand up, or with a client who has been experiencing falls with no specific cause.

When a person moves from supine to standing, there is a gravitational pull in which a significant amount of blood moves from the core of the body to the periphery (e.g., the legs). Normally, there is a hemodynamic response which maintains venous return and cardiac output; this response involves a slight increase in the heart rate, constriction of the vasculature, and the maintenance of the blood pressure or a slight decrease. This hemodynamic response keeps the brain oxygenated so that cognitive and other neural processes are not interrupted. However, sometimes this response does not work properly.

If the sympathetic system cannot increase cardiac output, then blood pressure decreases, and a neurological loss can be felt. This can be brief, such as a slight dizziness when standing up too quickly, or could lead to a loss of balance, a fall, and neurological impairment for a period of time. The name for this is **orthostatic hypotension**, which means that blood pressure falls with postural changes from supine to standing. It can be the result of standing up faster than the reflex can occur, which may cause a benign 'head rush,' or it may be the result of an underlying cause.

There are several reasons why orthostatic hypotension occurs that can be **cardiac** or **neurogenic** related. For example, the blood volume may be too low and the sympathetic reflex is not effective. This hypovolemia may be the result of dehydration (related to factors such as severe diarrhea or vomiting) or medications that affect fluid balance, such as **diuretics** or **vasodilators**. The second underlying cause of orthostatic hypotension is **autonomic failure**. Several disorders can result in compromised sympathetic functions, ranging from diabetes to multiple system atrophy (a loss of control over many systems in the body), and addressing the underlying condition can improve the hypotension. Orthostatic hypotension is more common with advancing age and can be aggravated by antihypertensive medications.

How to Assess Orthostatic Hypotension

Orthostatic hypotension is assessed by measuring orthostatic or postural blood pressure and pulse changes. This procedure is done by assessing when the client moves from supine to sitting to standing and sometimes from supine to standing. There are variations in how this procedure is done in terms of position changes as well as timing (Arnold & Raj, 2017; Fedorowski et al., 2022; Kim & Farrell, 2022; Wieling et al., 2022). For example, blood pressure and pulse can be assessed immediately following position change to assess for initial orthostatic hypotension or at 3 minutes to assess for

delayed orthostatic hypotension (Fedorowski et al., 2022). Because of the variations of assessment, you should document the approach (position changes) and the timing used. Here is a common way to proceed:

1. The client rests supine for five minutes.
2. Take blood pressure and pulse in supine position.
3. The client stands up.
4. Take blood pressure and pulse immediately (within 30 seconds) and then again at 3 minutes.

NOTE: if the client is severely symptomatic, you may add a sitting position between supine and standing. Alternatively, some practitioners use only sitting to standing due to convenience in primary care. In addition, some clients may be referred for a **title table test**.

How to Evaluate the Findings

Normal variation is a 10 mm Hg decrease in blood pressure (systolic) from lying to standing and an increase in pulse of 10–15 bpm.

A decrease in blood pressure from lying to standing of systolic ≥ 20 mm Hg or diastolic ≥ 10 mm Hg is identified as orthostatic hypotension. An increase in pulse from lying to standing of ≥ 20 bpm is identified as orthostatic tachycardia.

Technique Tips

The healthcare provider determines the maximum inflation pressure in the supine position and then uses this same number throughout all readings. Leave the blood pressure cuff on the whole time. If a client is unable to stand during the orthostatic blood pressure assessment, have them sit and dangle their legs. To ensure safety, have a safe place for the client to land/sit if dizzy.

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Hypertension

Chronically elevated blood pressure (BP) is known clinically as hypertension. **Hypertension** is typically diagnosed as **BP that is greater than or equal to 130/80 mm Hg** in adults; it is important to note that this is a lower threshold than previously noted by Hypertension Canada (Goupil et al., 2025). Typically, hypertension treatment is focused on the systolic and keeping it below 130 mm Hg (Goupil et al., 2025). Achieving this target is usually sufficient because it results in low cardiovascular risk "even when diastolic BP is 70-90 mm Hg" (Beddhu et al., 2018 as cited in Goupil et al., 2025 , p. E6).

Hypertension is typically a silent disorder, so hypertensive clients may not recognize the seriousness of their condition and not adhere to their treatment plan. The result is often a heart attack or stroke. Hypertension may also lead to an aneurysm (ballooning of a blood vessel caused by a weakening of the wall), peripheral arterial disease (obstruction of vessels in peripheral regions of the body), chronic kidney disease, or heart failure (OER#2).

Common errors in measurement and natural fluctuations in blood pressure can result in readings that erroneously suggest hypertension. Some of the errors are due to the operator (i.e., the healthcare provider) and others are due to client anxiety and situational determinants. As a healthcare provider, it is important to review your technique to assess possible measurement errors and assess the client for factors that could elevate blood pressure. If the client's blood pressure is elevated, repeat the measurement for accuracy, and then, take the blood pressure in the opposite arm.

Because hypertension is a silent disorder, healthcare providers measure blood pressure at regular intervals. The intervals depend on the client's health status and risk factors. Before a diagnosis of hypertension is made, blood pressure is monitored over days, weeks, or months either in the office using an automatic blood pressure machine, or at home using an ambulatory blood pressure machine.

Points to Consider

It is important to note the distinction between elevated blood pressure and a diagnosis of hypertension. Elevated blood pressure refers to an isolated reading, whereby the client has an elevated finding. Hypertension refers to a clinical diagnosis whereby the client has met the criteria for chronic elevated blood pressure. Hypertension will precipitate a treatment protocol, whereas an elevated finding may just require monitoring.

Guidelines to Determine Hypertension in Adults

In this section, guidelines to determine hypertension in **primary care** are discussed since this is the setting where hypertension is most often diagnosed. Guidelines to determine hypertension are updated regularly so it is important to check them regularly. In Canada, you can check out the Hypertension Canada website. It is best to assess and evaluate BP with a "**validated** automated device and using a **standardized** method" as described below (Goupil et al., 2025, pg. E2). However, validated devices are not always available, and in this case, manual BP is taken.

Hypertension Canada (Goupil et al., 2025) recommends that the client should not participate in exercise and consume caffeine and tobacco in at least 30 minutes prior to having their blood pressure taken. Since the client should be relaxed, they should empty their bladder and bowel (if needed). Additionally, it is preferable that they are not in any acute anxiety, stress, and pain.

As per Hypertension Canada, the following **techniques** should be adhered to when assessing BP in a primary care setting:

- The client should be placed in a quiet room with no noises/disturbances and they should be asked to sit quietly – not moving or talking throughout the procedure.
- They should be seated in a chair with legs uncrossed, feet flat on floor, relaxed with their back against the back of the chair.
- Arm should be bare and rested on a table with their hand facing upwards.
- It is best that they are at rest for 5 minutes prior to the measurements.
- And then, BP should be measured with an automatic cuff three times "at 1-minute intervals" – all values should be recorded and the values should be averaged.
  (Goupil et al., 2025).

Technique Tips

If one of the above conditions is not met, the blood pressure is still taken, but the healthcare provider must take it into consideration. If the blood pressure is elevated, it needs to be repeated to assess the possibility of hypertension. In addition, you should assess and document all medications (prescribed and over-the-counter), supplements, and legal and illegal substances that the client takes as these can influence BP.

When hypertension is diagnosed in a primary setting, it is recommended (when feasible to do so) to conduct out-of-office (home BP monitoring) to confirm the diagnosis and rule-out white-coat hypertension (a situation when BP is elevated in clinical settings) (Goupil et al., 2025). However when out-of-office monitoring is not feasible, then repeated office measurements are recommended (Goupil et al., 2025).

Treatment approaches (lifestyle or pharmacotherapy) are tailored so that systolic BP is lowered to less than 130 mm Hg; although this target can vary for each client based on adverse effects (Goupil et al., 2025). Hypertension Canada (Goupil et al., 2025) recommends the following treatment approaches.

BP greater than or equal to 130/80, but less than 140/90:

- Lifestyle modification recommended.
- Reassessment of BP in 3 to 6 months; if the BP remains in this range at the next assessment, then continue to reassess every 6 to 12 months.
- Series of tests are recommended to assess cardiovascular disease risk such as blood tests (e.g., fasting **lipid panel**, **Hemoglobin A1c**, fasting blood glucose, creatinine) and **12-lead electrocardiography**.

BP greater than or equal to 140/90 (or 130-139 and at high cardiovascular disease risk such as coronary artery disease, heart failure, kidney disease, diabetes, greater than or equal to 75 years of age):

- Lifestyle modification recommended.
- Pharmacotherapy (medications) initiation.
- Reassess every 1 to 3 months "until BP at target" and then every 6 to 12 months.

However, it is important to recognize cues related to a **hypertensive crisis**, which is when a client's **BP is greater**

than 180/120 mm Hg (Sibley et al., 2020). A hypertensive crisis is a priority of care as it can result in cardiovascular events such as a myocardial infarction (heart attack) or a cerebrovascular accident (stroke). Associated cues may include angina (chest pain), shortness of breath, dizziness, confusion, and loss of consciousness. When a hypertensive crisis is suspected, the client should be referred to the hospital emergency for immediate assessment and treatment.

Modifiable and Non-Modifiable Risk Factors

As part of the assessment, you should assess a client's cardiovascular risk factors for atherosclerosis and hypertension. These risk factors are categorized as modifiable and non-modifiable. See **Table 5** for an overview of risk factors adapted based on Hypertension Canada guidelines (Leung, et al., for Hypertension Canada, 2017)

Table 5: Modifiable and Non-Modifiable Risk Factors

Non-modifiable	Modifiable
• Age 55 years or older • Male sex and postmenopausal female • Family history of cardiovascular disease that began in males younger than 55 years and in females younger than 65 years	• Smoking • Stress • Sedentary lifestyle (little or no physical activity) • Poor dietary habits (high sugar, high sodium, high fat, high cholesterol) • Abdominal obesity/overweight • Dysglycemia and dyslipidemia • Non-adherence to treatment plans (e.g., medication, diet, exercise regimen)

Test Your Knowledge

Please answer the three questions in the following question set.

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Healthy Behaviours

As part of your role, it is important to discuss healthy behaviours to prevent hypertension and reduce high blood pressure. As per Hypertension Canada (Goupil et al., 2025), the following **healthy behaviours** are recommended:

- Moderate-intensity of exercise such as walking, biking, jogging, swimming for about 30 to 60 minutes per day for at least five days per week.
- If relevant, weight reduction aiming for a BMI range of 18.5 to 24.9 and a waist circumference of less than 88 cm for females and less than 102 cm for males.
- Diet with low sodium intake, high potassium intake, rich in vegetables, fruits, plant-source proteins (reducing saturated fat and cholesterol), whole grains, and low-fat dairy products.
- Abstaining from or reducing alcohol intake and abstaining from smoking.
- Stress management interventions.

These behaviours are important to maintaining an overall healthy lifestyle and maintaining healthy blood pressure levels. It is also important to consider health promotion as it relates to blood pressure from a relational and structural perspective. A **relational health promotion** approach emphasizes social change at the relational level, meaning the relationships between people, places, environments, spaces, beliefs, meanings, and events. A **structural health promotion** approach focuses on structural aspects of health and wellbeing. In other words, it addresses policies and practices that affect health at a broader community level, such as systemic discrimination. This approach to health promotion recognizes that **broader social structures** play an important role in health, and that one's participation and access within a community are shaped by one's social location. The goal is to dismantle the (often hidden) social processes that contribute to the maintenance of social exclusion and to actively promote health equity.

As such, you will want to discuss these healthy behaviours in the context of the client's daily life and when needed, advocate on their behalf.

BP Summary and Activities

Blood pressure measurement is important because it provides objective data about the client's health and illness state. Changes in blood pressure act as a cue for healthcare providers' diagnostic reasoning. Blood pressure fluctuates with internal and external factors. Therefore, it is important to take more than one measurement before making clinical decisions.

It is always important to ensure **correct techniques** when taking blood pressure.

In determining the relevance of the blood pressure reading, the healthcare provider considers the client's baseline blood pressure, previous readings, and health status. The blood pressure reading is always taken in conjunction with a pulse. Diagnostic reasoning takes into account blood pressure, pulse, and subjective and objective client data.

Activity: Check Your Understanding

Now you have an opportunity to find the errors in measurement techniques. The first activity involves watching a short film clip. Check it out!

What errors in technique is this healthcare provider making while taking blood pressure?

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Film clip: Errors in blood pressure measurement

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Now that you have completed the BP content, it's time to test your knowledge. Try to answer the following questions (you may want to review parts of the chapter before answering).

Watch and listen to the Korotkoff sounds while blood pressure is taken in the audio clip. What is the systolic and diastolic blood pressure?

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Audio clip: Korotkoff sounds

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Watch and listen to the Korotkoff sounds while blood pressure is taken in the next audio clip. What is the systolic and diastolic blood pressure?

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Audio clip: Korotkoff sounds

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Which one of the two images below (Image A or Image B) demonstrates the correct way of putting the ear pieces of the stethoscope in your ears?

Image A

Image B

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Temperature

What is Temperature?

Temperature refers to the degree of heat or cold in an object or a human body. In humans, the brain's **hypothalamus** acts as the body's thermostat and is responsible for regulating its temperature (OER #2). See **Figure 17** of the hypothalamus.

The human body is constantly adapting to internal health states and environmental conditions, and the hypothalamus is programmed to tell the body to generate heat if the body temperature is low. For example, the hypothalamus can activate peripheral vasoconstriction and shivering (contraction of skeletal muscles) to prevent a decrease in body temperature. The hypothalamus can also reduce heat if the body temperature is too high. For example, it can activate peripheral vasodilation to increase heat loss and cause a person to perspire, which cools the body.

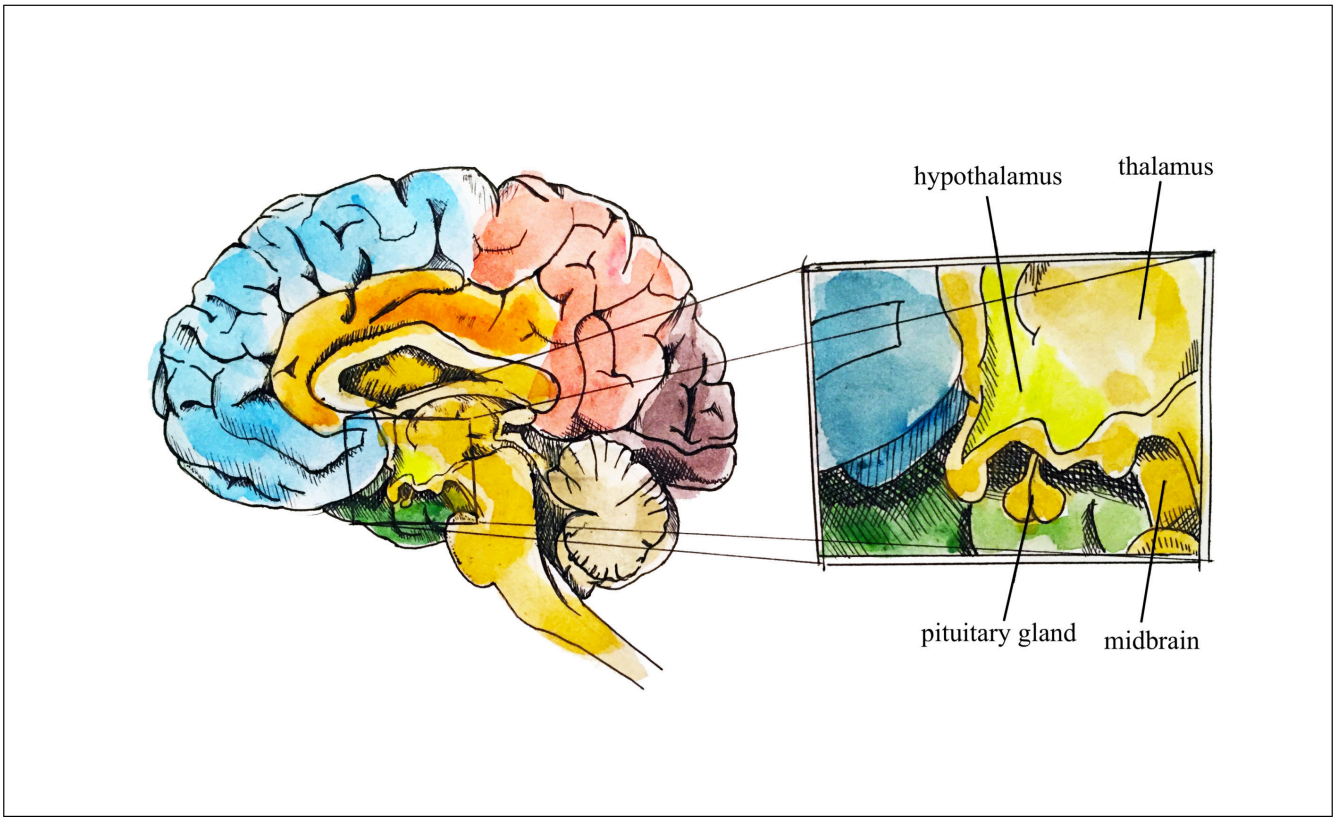

Figure 17: Hypothalamus (Illustration credit: Hilary Tang)

Why is Temperature Measured?

Healthcare providers measure a client's temperature because it can give information about their state of health and influence clinical decisions. Accurate measurements and interpretation are vital so that **hyperthermia** and **hypothermia** can be identified and appropriate interventions determined.

Hyperthermia refers to an elevated body temperature. It can be related to an internal or external source. External sources that increase body temperature could include exposure to excessive heat on a hot day or being in a sauna or hot tub. Internal sources that may increase body temperature include fever caused by an infection or tissue breakdown associated with physical trauma (e.g., surgery, myocardial infarction) or some neurological conditions (e.g., cerebral vascular accident, cerebral edema, brain tumour). Hyperthermia that is associated with an infectious agent, such as a bacteria or virus (e.g., the flu) is referred to as **febrile**. Unresolved hyperthermic body states can lead to cell damage.

Hypothermia refers to a lowered body temperature. It is usually related to an external source such as being exposed to the cold for an extended period of time. Hypothermia is sometimes purposefully induced during surgery, or for certain medical conditions, to reduce the body's need for oxygen. Unresolved hypothermic body states can slow cellular processes and lead to loss of consciousness.

Test Your Knowledge

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Methods of Temperature Measurement

Methods of measuring a client's body temperature vary based on developmental age, cognitive functioning, level of consciousness, state of health, safety, and agency/unit policy. The healthcare provider **chooses the best method** after considering client safety, accuracy, and least invasiveness, all contingent on the client's health and illness state. The most accurate way to measure core body temperature is an invasive method through a pulmonary artery catheter. This is only performed in a critical care area when constant measurements are required along with other life-saving interventions.

Methods of measurement include **oral**, **axillary**, **tympanic**, **rectal**, and **dermal routes**. It is best to engage in a discussion with the institution and the unit that you work in about what methods they use and why.

Tympanic routes are common in the adult population both in primary settings and acute settings. This route should be avoided in a client who cannot hold their head still due to risk of injury of the tympanic membrane.

Oral temperature can be taken with clients who can follow instructions, so this kind of measurement is common for clients over the age of four, or even younger children if they are cooperative. Usually with a child who is stable or in a routine situation (and the client is able to follow instructions – about age four), then, most likely you would do oral temperature. However, you would avoid an oral route with a confused client as you need to assess whether they have recently consumed hot or cold fluids. In these cases, you may take a tympanic or axillary; these routes are also preferable when a client is on oxygen delivered via a face mask (as mask that covers the nose and mouth) because this can alter the temperature.

Also, for children younger than four who are stable and in a routine situation, **axillary temperature** is commonly measured unless a more accurate reading is required. If you have a concern about the temperature, a rectal temperature is preferred in children.

Rectal temperature is an accurate way to measure body temperature (Mazerolle, Ganio, Casa, Vingren, & Klau, 2011) and particularly used in the pediatric population for accuracy and in acute situations. The rectal route is recommended by the Canadian Pediatric Society for children under two years of age (Leduc & Woods, 2017). However, rectal temperatures are commonly taken with children under three in several situations such as when in hospital, when in an isolette, and when the client is not stable or in acute situations. However, this method is not used on infants younger than thirty days or premature infants because of the risk of rectal tearing. If the rectal method is required, the procedure is generally only used by nurses and physicians.

Dermal routes are alternative methods of measurement that may be used in some agencies and practice areas. This method can involve holding the device and sliding it over the skin of the forehead and then down over the temporal artery in one motion. Dermal strips can also be placed on the forehead to measure skin temperature, but are not yet widely used, and the accuracy of this method has not yet been verified. More recently, there has been an increase in **non-contact infrared thermometers** particularly in the era of COVID-19 and other highly transmissible diseases. Depending on the type, these thermometers can be held at a short distance from the forehead or temporal area to measure temperature. Alternatively, some handheld thermal scanners that use an infrared camera can be held at a greater distance to screen large masses of people. Please refer to the manufacturer's suggested reference range for non-contact infrared thermometers and thermal scanners.

Test Yourself!

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Points to Consider

The accuracy of measurements is most often influenced by the healthcare provider's adherence to the correct technique.

Temperature Ranges

The human body's core temperature (internal body temperature) is measured in degrees Celsius (°C) or Fahrenheit (°F). In Canada, degrees Celsius is most commonly used.

In adults, the **normal core body temperature** (referred to as normothermia or afebrile) is 36.5–37.5°C or 97.7–99.5°F (OER #2).

A wider temperature range is acceptable in **infants and young children**, and can range from 35.5–37.7°C or 95.9–99.8°F. Infants and children have a wider temperature range because their heat control mechanisms are less effective. They are at risk for heat loss for many reasons including having less subcutaneous fat than adults, a larger body surface area in comparison to weight (and larger head size in proportion to the rest of the body), immature metabolic mechanisms (e.g., they may be unable to shiver), and limited ability to produce heat through activity. They are also at risk of excessive heat production due to crying and restlessness as well as external factors such as being wrapped in too many blankets.

Older adults tend to have lower body temperatures and are at risk for hypothermic states; reasons for this may include having less subcutaneous tissue acting as insulation, loss of peripheral vasoconstriction capacity, decreased cardiac output with resultant lowered blood flow to the extremities, decreased muscle mass resulting in reduced heat production capacity, and decreased metabolic responses.

Points to Consider

It is important to monitor and regulate temperature in newborns and infants because of the temperature fluctuations that place them at higher risk for hypothermia and hyperthermia, whereas temperature changes in older adults are often minimal.

See **Table 7** for **normal temperature ranges** based on **method**. The normal ranges vary slightly for each of the methods. It is important to consider a client's baseline temperature as some individuals present with a temperature slightly above or below these ranges. To make an informed clinical judgement, examine the client's records to determine a trend in temperature. A pattern of high or low temperature findings may reveal a baseline for your client. As a healthcare provider, it is important to determine the significance of the temperature by also considering influencing factors and the client's overall state of health.

Table 7: Normal Temperature Ranges

Method	Range
Oral	35.8–37.3°C
Axillary	34.8–36.3°C
Tympanic	36.1–37.9°C
Rectal	36.8–38.2°C

Other factors that influence temperature include diurnal rhythm, exercise, stress, menstrual cycle, and pregnancy. The diurnal cycle causes a fluctuation of 1°C, with temperatures lowest in the early morning and highest in the late afternoon. During exercise, body temperature rises because the body is using energy to power the muscles. Temperature can rise as a result of stress and anxiety, due to stimulation of the sympathetic nervous system and increased secretion of epinephrine and norepinephrine. Body temperature varies throughout a woman's menstrual cycle due to hormonal fluctuations, rising after ovulation until menstruation by about 0.5–1°C. Body temperature is slightly elevated during pregnancy as a result of increased metabolism and hormone production such as progesterone.

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Oral Temperature

The normal oral temperature is 35.8–37.3°C (OER #1) or 96.4–99.1°F. Oral temperature measurement is common and reliable because it is close to the sublingual artery. An oral thermometer is shown in **Figure 18**. The device has **blue colouring**, indicating that it is an oral or axillary thermometer as opposed to a rectal thermometer, which has red colouring.

Figure 18: Oral thermometer

Technique

Remove the probe from the device and place a probe cover (from the box) on the oral thermometer without touching the probe cover with your hands. Place the thermometer in the client's mouth under the tongue and instruct client to keep mouth closed and not to bite on the thermometer (OER #1). Ensure the thermometer probe is in the posterior sublingual pocket under the tongue, slightly off-centre. Leave the thermometer in place for as long as is indicated by the device manufacturer (OER #1). The thermometer will beep within a few seconds when the temperature has been taken: most oral thermometers are electronic and provide a digital display of the reading. Discard the probe cover in

the garbage (without touching the cover) and place the probe back into the device. See **Figure 19** of an oral temperature being taken.

Figure 19: Oral temperature being taken

Technique Tips

Putting the probe cover on takes practice. You need to ensure that it snaps onto the probe. Sometimes the device will turn off after you take the probe out of the device if you take too long to put the probe cover on or insert it in the client's mouth. If so, discard the probe cover and re-insert the probe into the device to reset it. Then try again.

What should the healthcare provider consider?

Healthcare providers often measure the oral temperature, particularly when the client is conscious and can follow directions. Measurement of the oral temperature is not recommended for individuals who are unconscious, unresponsive, confused, have an endotracheal tube secured in the mouth, and cannot follow instructions.

Certain factors render the oral route less accurate with the potential for falsely high or falsely low findings. If the client has recently consumed hot or cold food or beverage, chewing gum, or has smoked prior to measurement, the healthcare provider should use another route such as tympanic or axillary. Selecting an alternate route under the aforementioned circumstances is most conducive to a fast-paced clinical environment and most respectful of the client's time. If another route is not available, healthcare providers should wait 15 to 25 minutes to take the oral temperature following consumption of a hot or cold beverage/food. The temperature of the beverage/food also factors into the wait period, as extreme heat or cold will require longer wait times for oral temperature assessment. Healthcare providers should wait about 5 minutes if the client is chewing gum or has just smoked since both of these activities can increase temperature.

Watch this next short **film clip 9** and see how oral temperature is taken correctly. After watching the clip, try the technique yourself.

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Film Clip 9: Oral temperature.

Test Your Knowledge

Please answer the three questions in the following question set.

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Tympanic Temperature

The normal tympanic temperature is usually 0.3–0.6°C higher than an oral temperature (OER #1). It is accurate because the tympanic membrane shares the same vascular artery that perfuses the hypothalamus (OER #1). A tympanic thermometer is shown in **Figure 20**.

Figure 20: Tympanic thermometer

Technique

Remove the tympanic thermometer from the casing and place a probe cover (from the box) on the thermometer tip without touching the probe cover with your hands. Only touch the edge of the probe cover (if needed), to maintain clean technique. Turn the device on. Ask the client to keep head still. For an adult or older child, gently pull the helix up and back to visualize the ear canal. For an infant or younger child (under 3), gently pull the lobe down. The probe is inserted just inside the opening of the ear. Never force the thermometer into the ear and do not occlude the ear canal (OER #1). Only the tip of the probe is inserted in the opening – this is important to prevent damage to the ear canal. Activate the device; it will beep within a few seconds to signal it is done. Discard the probe cover in the garbage (without touching the cover) and place the device back into the holder. See **Figure 21** of a tympanic temperature being taken.

Figure 21: Tympanic temperature being taken

Technique Tips

The technique of pulling the helix up and back (adult) or the lobe down (child under 3) is used to straighten the ear canal so the light can reflect on the tympanic membrane. If this is not correctly done, the reading may not be accurate. The probe tip is gently inserted into the opening to prevent damage to the ear canal. The ear canal is a sensitive and a highly innervated part of the body, so it is important not to force the tympanic probe into the ear.

What should the healthcare provider consider?

The tympanic temperature method is a quick and minimally invasive way to take temperature. Although research has proven the accuracy of this method, some pediatric institutions prefer the accuracy of the rectal temperature. The

Canadian Pediatric Society found equal evidence for and against the use of tympanic temperature route (Leduc & Woods, 2017). It concluded that tympanic temperature is one option for use with children, but suggested using rectal temperature for children younger than two, particularly when accuracy is vital. The tympanic temperature is not measured when a client has a suspected ear infection. It is important to check your agency policy regarding tympanic temperature.

Watch this next short **film clip 10** and see how tympanic temperature is taken correctly. After watching the clip, try the technique yourself. You can watch the clip and practice as many times as you like.

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Film Clip 10: Tympanic temperature.

Test Your Knowledge

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Axillary Temperature

The normal axillary temperature may be as much as 1ºC lower than the oral temperature (OER #1). An axillary thermometer is the same electronic device as an oral thermometer, and both have a **blue end**.

Technique

Remove the probe from the device and place a probe cover (from the box) on the thermometer without touching the cover with your hands. Ask the client to raise the arm away from their body. Place the thermometer in the client's armpit (OER #1), on bare skin, as high up into the axilla as possible, with the point facing behind the client. Ask the client to lower their arm and leave the device in place for as long as is indicated by the device manufacturer (OER #1). Usually the device beeps in 10–20 seconds. Discard the probe cover in the garbage (without touching the cover) and place the probe back into the device. See **Figure 22** of an axillary temperature being taken.

Figure 22: Axillary temperature being taken.

What should the healthcare provider consider?

The axillary route is a minimally invasive way to measure temperature. It is commonly used in children. It is important to ensure that the thermometer is as high up in the axilla as possible with full skin contact and that the client's arm is then lowered down.

Watch this next short **film clip 11** and see how axilla temperature is taken correctly. After watching the clip, try the technique yourself. You can watch the clip and practice as many times as you like.

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Film Clip 11: Axilla temperature.

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Rectal Temperature

The normal rectal temperature is usually 1ºC higher than oral temperature (OER #1). A rectal thermometer has a **red end** to distinguish it from an oral/axillary thermometer. A rectal thermometer is shown in **Figure 23**.

Figure 23: Rectal thermometer

Technique

First, ensure the client's privacy. Wash your hands and put on gloves. For infants, lie them down in a supine position and raise their legs up toward the chest. You can encourage a parent to hold the infant to decrease movement and provide a sense of safety. With older children and adults, assist them into a side lying position. Remove the probe from the device and place a probe cover (from the box) on the thermometer. Lubricate the cover with a water-based lubricant, and then **gently insert the probe 2–3 cm inside the rectal opening of an adult, or less depending on the size of the client**. In pediatrics, devices usually have a mark on the probe which indicates how deep to insert the probe. The device beeps when it is done.

What should the healthcare provider consider?

Measuring rectal temperature is an invasive method. Some suggest its use only when other methods are not available (OER #1), while others suggest that the rectal route is a gold standard in the infant population because of its accuracy particularly in acute situations when the client is unstable. The Canadian Pediatric Society (Leduc & Woods, 2017) has referred to research indicating that rectal temperatures may remain elevated after a client's core temperature has started to return to normal, but after reviewing all available evidence, still recommends measuring rectal temperature for children under the age of two, particularly when accuracy is vital.

Rectal temperature is not measured in infants under one month of age or premature newborns. Other contraindications include: a client with a bleeding disorder or with a rectal abnormality or post rectal surgery.

Test Your Knowledge

Please answer the four questions in the following question set.

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Temperature Summary and Activities

Temperature is an important vital sign because it provides current data about the client's health and illness state. Changes in body temperature act as a cue for healthcare providers' diagnostic reasoning.

There are many ways to measure temperature. In determining the best method, the healthcare provider considers agency policy, the client's age and health and illness state, and the reason for taking the temperature. Healthcare providers must **use the correct technique** when measuring temperature, because this can influence client data.

When determining the relevance of the temperature, the healthcare provider considers the client's baseline data and the situation. Diagnostic reasoning about temperature always involves considering additional data including other vital sign measurements and subjective and objective client data.

Which is the correct technique for measuring the tympanic temperature?

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List the steps below in the correct order for each of the following techniques.

Oral Temperature Technique

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Tympanic Temperature Technique

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Axillary Temperature Technique

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Rectal Temperature Technique

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Conclusion

As you become more proficient in measuring vital signs and interpreting the findings, you should remember a few key points.

There are many methods to take vitals signs. **The correct technique is essential to obtaining an accurate measurement.**

Vital sign measurements have very little meaning on their own. Healthcare providers engage in critical thinking and correlate these measurements with subjective and other objective data. Thinking critically about these measurements will best inform clinical decision-making. Healthcare providers look holistically at the person and their health and wellness state to determine whether vital sign measurements are within normal limits for this individual person.

It is also essential to acknowledge that clients may have additional information that can provide insight into their body, which may influence the technique and location for measuring vital signs and the significance of the findings. Sharing findings with clients is also a good opportunity for health promotion teaching.

Points to Consider

It is important to document vital signs in a timely manner. The healthcare provider reports any abnormal and unexpected findings to the most responsible provider. For example, students should share the findings with their preceptor or clinical instructor in a timely manner.

Figure 7.1: Cells (Illustration credit: Hilary Tang)

Artist Statement – Cells

The human body is a messy phenomenon. From the organ to the cell, the brain to the neurotransmitter, like clockwork, everything is constantly happening. Down to our very core, the tiniest components are working in conjunction, harmoniously, to let us eat, breathe, and move. Without our constant consciousness, we are living. What an organized chaos our bodies are.

Complete Set of Adult Vital Signs

Watch the Complete Set of Adult Vital Signs video on measuring vital signs with an automated vital signs monitor, noting important considerations as you follow along.

Please note: there is **no** sound in this video.

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Knowledge Integration

In healthcare, knowledge integration involves drawing upon and synthesizing client data to inform diagnostic reasoning and clinical decision-making. Healthcare providers are continually evaluating whether vital sign measurements are normal or abnormal. The analysis takes into consideration the client's baseline vital sign measurements as well as the client's age and health and illness state. Additionally, healthcare providers pay attention to trending, which involves looking at vital signs across time to detect changes. If abnormalities are identified, healthcare providers consider the client context including other subjective and objective data to differentiate relevant from irrelevant data. The analysis of client data influences evidence-informed clinical decision-making in which healthcare providers identify priority actions and treatment options.

This chapter presents a series of case studies based on what you learned in this chapter. The case studies are intended to provide an opportunity for you to critically think about client data in the context of a client situation. You will integrate your knowledge about normal and abnormal vital signs and engage in diagnostic reasoning to determine priority actions and next steps based on the client data.

Case Study: Pediatric Client

Initial Assessment Data

- **Biographical data:** 18-month-old child
- **Reason for seeking care:** Febrile
- **History of presenting illness:** Fever x 2 days, today rash appeared consisting of red spots over the client's body
- **Past history:** No medications, no illnesses

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Use the slider to uncover the correct way to document the following assessment data.
At 1700 hrs on June 20, 20xx

- **Temperature:** 39°C axilla
- **Pulse:** 170 bpm (apical) cyclical increases with inspiration, force 2+, regular rhythm
- **RR** 30 bpm, regular rhythm
- **SpO2** saturation 98%

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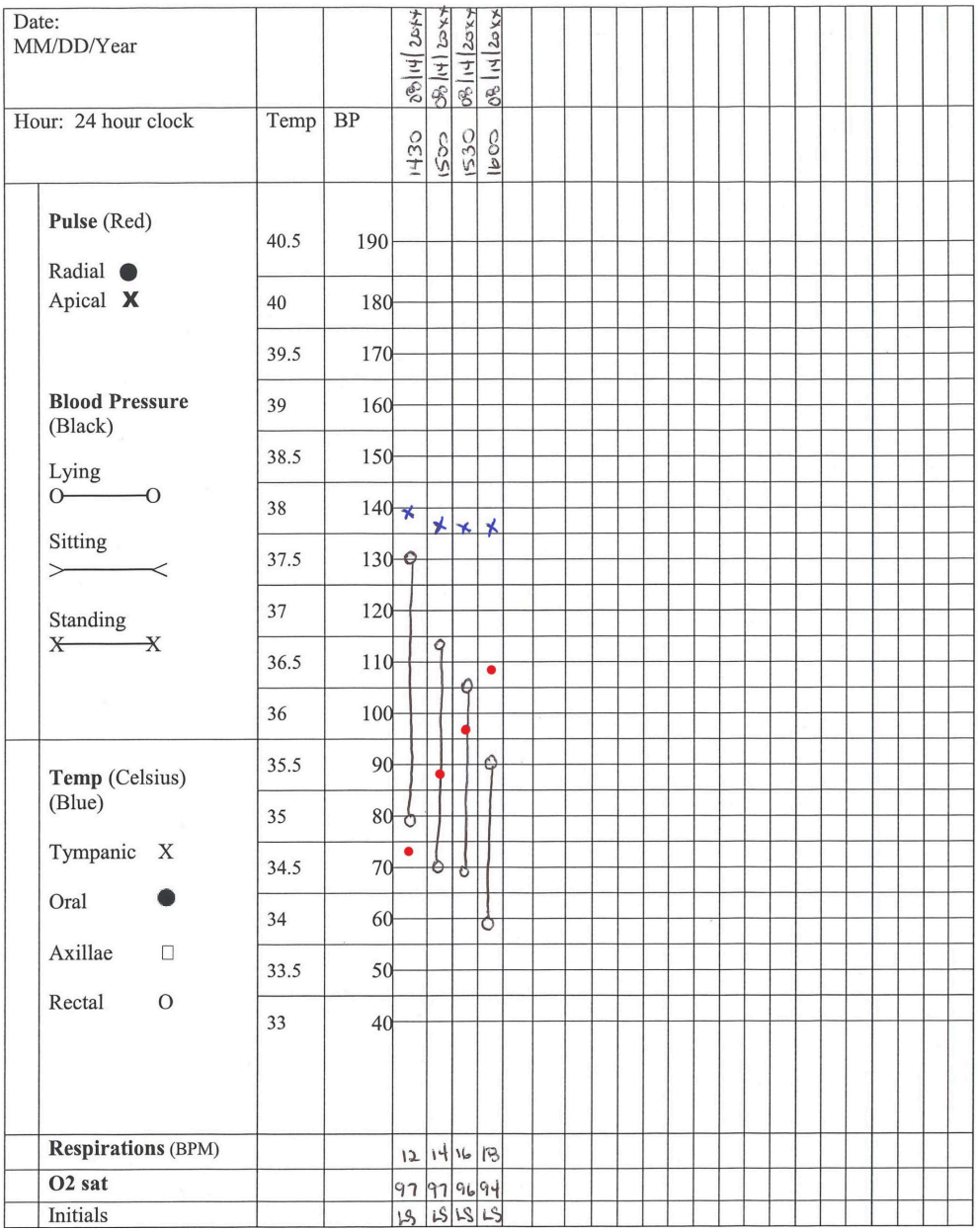
Case Study: Adolescent Client

Initial Assessment Data

- **Biographical data:** Adolescent client (age 14)
- **Reason for seeking care:** Post-op surgery
- **History of health/illness:** Healthy
- **Past history:** No medications, no illnesses
- Client had abdominal surgery and was transferred from the recovery room to the surgical floor. Lethargic and oriented x 4 (person, place, self and time). Awakens when name is called and responds to questions appropriately. Client rates pain 2/10. The healthcare provider assesses client's vital signs every 30 minutes x 2 hours.

Vital Sign Record



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Case Study: Pregnant Adult Client

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Please note: The following documentation exercise has extended columns for interactivity. A vital signs documentation record would have narrow columns and rows as you have seen in previous case studies.

1430 hrs, August 14, 20xx

- T 37.1°C axilla
- RR 14 (shallow breathing)
- P 92 (radial), regular rhythm, 2+ force, Sp02 97%
- BP 134/90 mm Hg (right arm, sitting position)

1435 hrs, August 14, 20xx

- BP 132/90 mm Hg right arm in sitting position
- BP 128/88 mm Hg left arm in sitting position, P 88 (radial)

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Case Study: Adult Client

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Case Study: Older Adult Client

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Now review the documentation for Mr. Turner's blood pressure. Examine the following examples of documentation. Vitals sign taken on November 7, 20xx in the sitting position. The results were:

- 1050 hrs: BP 160/94, P 72 (right arm)
- 1058 hrs: BP 156/92, P70 (right arm)
- 1100 hrs: BP 148/90, P70 (left arm)
- 1105 hrs: BP 150/86, P66 (right arm)
- 1107 hrs: BP 144/84, P68 (right arm)
- 1109 hrs: BP 156/82, P62 (right arm)

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Printable Flashcards

TEMPERATURE

Oral Temperature Technique

1. Remove the probe from the device and place a probe cover (from the box) on the oral thermometer without touching the cover with your hands
2. Place the thermometer in the mouth under the tongue in the posterior sublingual pocket (slightly off-centre) and instruct the client to keep mouth closed and not to bite on the thermometer
3. Remove the thermometer when the device beeps
4. Note the temperature on the digital display of the device
5. Discard the probe cover in the garbage (without touching the cover)
6. Place the probe back into the device

Tympanic Temperature Technique

1. Remove the tympanic thermometer from the casing and place a probe cover (from the box) on the thermometer tip without touching the cover with your hands
2. Turn the device on
3. For an adult or older child, gently pull the helix up and back to visualize the ear canal. For an infant or younger child (under 3), gently pull the lobe down
4. Gently insert the probe into the opening of the ear
5. Activate the device
6. Note the temperature on the digital display of the device
7. Discard the probe cover in the garbage (without touching the cover) and place the device back into the holder

Axillary Temperature Technique

1. Remove the probe from the device and place a probe cover (from the box) on the thermometer without touching the cover with your hands
2. Ask the client to raise the arm away from his/her body
3. Place the thermometer in the client's armpit as high up as possible into the axillae on bare skin, with the point facing behind the client, and ask the client to lower arm
4. Note the temperature on the digital display of the device
5. Discard the probe cover in the garbage (without touching the cover) and place the probe back into the device

Rectal Temperature Technique

1. Ensure the client's privacy and wash your hands and put on gloves
2. Position the client appropriately
3. Remove the probe from the device and place a probe cover on it
4. Lubricate the cover with a water-based lubricant
5. Gently insert the probe 2–3 cm inside the rectal opening of an adult, or less depending on the size of the client
6. Note the temperature on the digital display of the device when it beeps
7. Discard the probe cover in the garbage (without touching the cover) and place the probe back into the device
8. Remove your gloves and wash your hands

Radial Pulse Technique

1. Use the pads of your first three fingers to gently palpate the radial pulse along the radius bone close to the flexor aspect of the wrist
2. Press down with your fingers until you can best feel the pulsation
3. Note the rate, rhythm, force, and equality when measuring the radial pulse

Carotid Pulse Technique

1. Ask the client to sit upright
2. Locate the carotid artery medial to the sternomastoid muscle in the middle third of the neck
3. Gently palpate the carotid artery one at a time
4. Note the rate, rhythm, force, and equality when measuring the carotid pulse

Apical Pulse Technique

1. Ask the client to lay flat in a supine position
2. Physically palpate the intercostal spaces to locate the landmark of the apical pulse
3. Auscultate the apical pulse
4. Note the rate and rhythm

Brachial Pulse Technique

1. Palpate the bicep tendon in the area of the antecubital fossa
2. Move your fingers medial from the tendon and about one inch above the antecubital fossa to locate the pulse
3. Note the rate and rhythm

Respiration Technique

1. Leave your fingers in place when you are done counting the pulse, and then begin assessing respiration
2. Observe the rise and fall of the chest or abdomen
3. Count for 30 seconds if the rhythm is regular or for a full minute if it is irregular
4. Report respiration as breaths per minute, as well as whether breathing is relaxed, silent, and has a regular rhythm

OXYGEN SATURATION

Pulse Oximeter

1. Remove client nail polish
2. Clean oximeter probe with alcohol swab
3. Clip or tape probe onto a client's finger
4. Turn oximeter on
5. Take radial pulse (30 seconds if regular and one minute if irregular)
6. Ensure radial pulse is aligned with pulse displayed on the oximeter
7. Document or report findings

BLOOD PRESSURE

Two-step Blood Pressure Technique

1. Palpate the radial or brachial artery, inflate the blood pressure cuff until the pulse is no longer felt, and then continue to inflate 20–30 mm Hg more: this is the maximum pressure inflation.
2. Deflate the cuff quickly.
3. Now, you can start blood pressure so place the bell of the cleansed stethoscope over the brachial artery using a light touch and complete seal.
4. Inflate the cuff to the maximum pressure inflation number.
5. Open the valve slightly.
6. Deflate the cuff slowly and evenly at about 2 mm Hg per second.
7. Note the points at which you hear the first appearance of Korotkoff sound (systolic blood pressure), and the point in which the sounds go silent (diastolic blood pressure).

One-step Blood Pressure Technique

1. Palpate the radial or brachial artery, inflate the blood pressure cuff until the pulse is no longer felt, and then continue to inflate 20–30 mm Hg more.
2. Place the bell of the cleansed stethoscope over the brachial artery using a light touch, but with an airtight seal.
3. Open the valve slightly.
4. Deflate the cuff slowly and evenly at about 2 mm Hg per second.
5. Note the points at which you hear the first appearance of Korotkoff sound (systolic blood pressure), and the point at which the sounds go silent (diastolic blood pressure).

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CHAPTER 8 - INTEGUMENTARY SYSTEM ASSESSMENT

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Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgement.
4. Integrate health promotion interventions into actions.
5. Integrate an inclusive approach to integumentary assessment.

Introduction to Integumentary System

The integumentary system includes the skin, hair, nails, and **sebaceous** and sweat glands. It has important functions including thermoregulation, sensory functioning, ensuring fluid balance, serving as a protective barrier to external substances, and providing immune defense against foreign bodies.

The integument can be an indicator of the client's general health status. For example, the integumentary system can signal other systemic functions of the body like **diaphoresis** during cardiac events, **cyanosis** related to respiratory insufficiency and other conditions, and **pallor** during times of stress and other conditions. As a nurse, it is important to hone your assessment skills and pay close attention to potential cues that may signal underlying concerns that require your intervention. See **Figure 1** for an anatomical overview of the integumentary system.

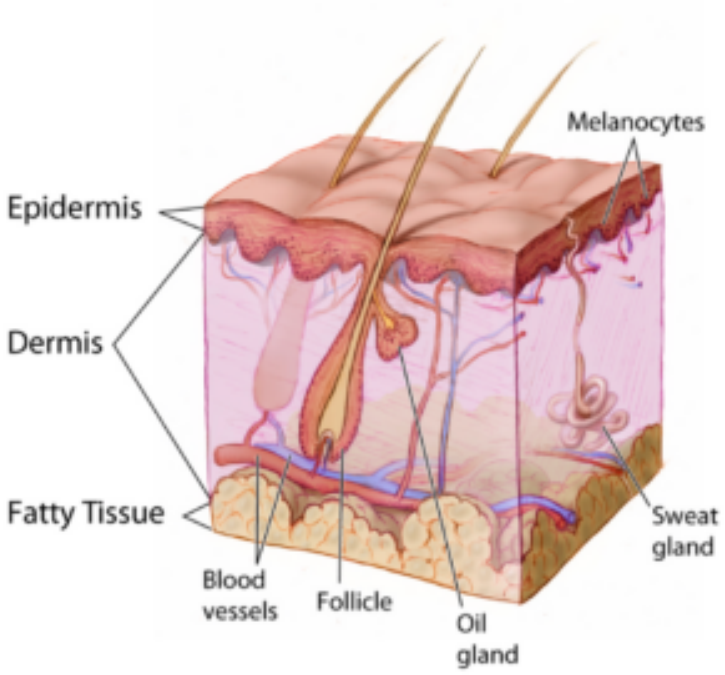


Figure 1: Integumentary system anatomy.

(Image in public domain and adapted from the National Cancer Institute: https://commons.wikimedia.org/wiki/File:Anatomy_The_Skin_-_NCI_Visuals_Online.jpg)

You have already learned about the anatomy and physiology of the integumentary system: for a quick overview see https://youtu.be/OxPlCkTKhzY

You need a basic understanding of disease-specific presentations to effectively interpret findings from your assessment. Be alert to signs and symptoms of greater systemic issues that may require further assessment and possibly immediate intervention. For example, Cullen's sign (**Figure 2**) is a serious concern: it appears as bruising and edema of the subcutaneous fatty tissue around the navel and can be an indication of acute pancreatic trauma and/or internal bleeding. Certain skin symptoms can also prompt the use of personal protective equipment (PPE); for example, small flat red spots that appear on the face and spread down the body may be an indication of **measles** (**Figure 3**), necessitating airborne precautions.

Figure 2: Cullen's sign.

(Attribution: Photo by Herbert L. Fred, MD and Hendrik A. van Dijk – http://cnx.org/content/m14904/latest/, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=5038484)

Figure 3: Measles.

(Attribution: This photo is in the public domain in the United States because it is a work prepared by an officer or employee of the United States Government as part of that person's official duties under the terms of Title 17, Chapter 1, Section 105 of the US Code. https://commons.wikimedia.org/wiki/File:Measles_child_Philippines.jpg)

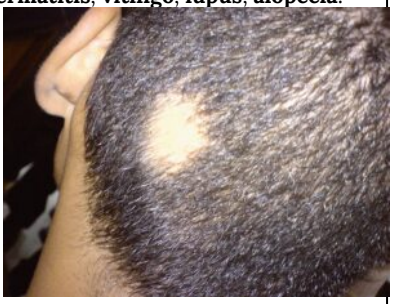
Contextualization of integumentary issues in relation to other symptomatology like fever, cough, and inflammation can provide insight into underlying conditions. **Table 1** provides some general descriptions related to the integument

and underlying pathophysiology. With experience, you will learn to identify patterns, recognize cues, and begin to discriminate between **benign** skin conditions and skin conditions that require further investigation.

Table 1: General descriptions of integument pathophysiology.

Integumentary grouping	Examples	Common presentation
Skin trauma Trauma can affect a single or multiple layers of the skin as a result of injury or illness.	Burns, scars, cuts, tears of the skin, keloids (thick, raised scars). Keloid. (Attribution: Photo by Htirgan – Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=32782658	Swelling, erythema, inflammation, bleeding, pain, blisters, peeling of skin, and sometimes darkened or lightened areas of skin with scars.

Infections Bacterial, viral, fungal, and parasitic skin infections are caused by various pathogens and can range from mild to severe. Many skin infections require treatment. **Shingles**. (Attribution: Photo by James Heilman, MD – Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=14082247)	Viral: Human papillomavirus (HPV), herpes zoster virus, warts, COVID-19, shingles. Bacterial: Staphylococcus-aureus, Methicillin-resistant Staphylococcus aureus (MRSA), impetigo, cellulitis, boils, and abscesses. Fungal (typically skin and mucosal surfaces): Tinea corporis (ringworm), tinea pedis (athlete's foot), candidosis (yeast infection), nail fungus. Parasitic: Lice, bedbugs. Other stings and bites that can cause infection: Spider bites, ticks, animal bites. Tick bite with bull's-eye rash (an early sign of Lyme disease). (Attribution: CDC / James Gathany – https://phil.cdc.gov/Details.aspx?pid=9874, Public Domain, https://commons.wikimedia.org/w/index.php?curid=91609710)	Viral: Some rashes can follow a **dermatome** (e.g., shingles, varicella, herpes simplex) with lesions, papules, or pain. They can appear in cluster/closely grouped or as a single lesion, and can be generalized, regional, or asymmetrical presentation (i.e., rash on one side of the body). Bacterial: Odour, exudate, small red bumps increasing in size, fever, yellowish-brown crusts, redness, heat, swelling, tenderness, pain. Fungal: Deep erythema, swelling, itchiness, scaly, flaky patches, or loss of normal pigmentation of the skin causing discolouration. Parasitic: Itchiness, rash, regional lymphadenopathy (diseases of the lymph nodes resulting in enlarged lymph nodes).

Auto-immune and/or inflammatory disorders causing lesions/eruptions (acute and chronic) Regional or generalized, may involve inflammation of the skin.	**Psoriasis**, **eczema**, **seborrheic dermatitis**, **vitiligo**, **lupus**, **alopecia**.  Alopecia. (Attribution: Photo by Abbassyma at English Wikipedia – Transferred from en.wikipedia to Commons, Public Domain, https://commons.wikimedia.org/w/index.php?curid=3121007)	Eczema (scaling, itching, ill-defined), psoriasis (**well-demarcated**, scaly plaques), vitiligo (depigmentation, patchy loss of skin colour, premature whitening of hair), alopecia (hair loss).
Metabolic and nutritional disorders Poor nutrition or absorption issues can lead to vitamin deficiencies. Excess vitamins can also lead to cutaneous abnormalities.	Vitamin A, C, D, E, K, B1, B2, B3, B6, B9, B12, iron, zinc, and selenium deficiencies. Vitamin A, E, and selenium excess.	Varies depending on metabolic/nutritional disorders, e.g., dermatitis, flushing, hyperpigmentation, white spots.

Vascular disorders Cutaneous vascular disorders commonly involve arteries, veins, and/or lymphatic vessels.	Ulcers, **cherry angiomas**, venous insufficiency. Venous insufficiency. (Attribution: Photo by Ashashyou – Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=122884459) Cherry angioma.	Varies depending on venous insufficiency (flooding of fluid to the skin due to inadequate venous return) or arterial deprivation (deprivation of nutrients to the skin due to poor arterial perfusion). Variations such as cherry angiomas are not harmful. They can begin small and then grow in size, become slightly raised, and multiply over time.
Psychological and neurological disorders Involve interactions between the mind and skin.	Persistent **pruritus** and **prurigo**, neuropathic pain (often related to shingles), trichotillomania (a psychiatric condition resulting in compulsive hair pulling).	Irresistible itching and scratching, urge to scratch exacerbated by anxiety, skin picking, recurrent pulling out of hair.

Systemic disorders The integumentary system can be involved in clinical manifestation of some systemic disorders.	Gout, arthritis, Addison disease, Cushing syndrome, thyroid disease, chronic liver disease, hepatitis, diabetic ulcers.	Varies depending on the underlying systemic disorder. Gout. (Attribution: Photo by Gonzos ft – Own work, CC BY 3.0 de, https://commons.wikimedia.org/w/index.php?curid=10868917)
Neoplastics (abnormal growths) and cancer Benign **cutaneous neoplasms** are very common. Some abnormal growths are benign (non-cancerous). However, some neoplasms become **malignant** and require intervention.	Benign: Freckles, **lentigo**, **café-au-lait spots**, **nevi**, **seborrheic keratosis**, wart, **cutaneous cysts**. Malignant: **Atypical nevi**, **basal cell carcinoma**, **squamous cell carcinoma**, **melanoma**. Seborrheic keratosis (the large brown raised lesion).	Varies depending on the underlying cause, e.g., spots on the skin, palpable mass, depression of the skin. Basal cell carcinoma. (Attribution: Photo by James Heilman, MD – Own work, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=6827823)

Skin disorders caused by external agents Cutaneous adverse reactions can occur because of reactions to drugs or other external agents. Adverse reactions can also occur from heat and cold exposures.	Steven-Johnson syndrome and toxic epidermal necrolysis are rare life-threatening skin disorders where the skin peels and blisters often caused by a medications and infections. Toxic erythema from chemotherapy is a skin reaction including eruptions of red/purple rash and plaques. Photosensitivity is a skin sensitivity when exposed to the sun caused by medications like chemotherapy drugs, HIV medications and antibiotics, frostbite.	Skin reactions like rashes that start after exposure to external agents like medications.

*genetic disorders not listed

Clinical Tip

Did you know that some dermatological conditions are emergencies? For example, necrotizing fasciitis (a rare bacterial infection also known as flesh-eating disease) can spread very quickly throughout the body, at a rate of 1 inch per hour. Symptoms include erythema, warmth to the touch, swelling, severe pain, and fever. If not treated immediately, it can lead to **sepsis**, **shock**, organ failure, and even death. As a nurse, you must report these findings to the physician or nurse practitioner so immediate treatment can be started.

Knowledge Bites: Pathophysiology

How do you distinguish between common viral and bacterial infections? Common characteristics of a bacterial infection are inflammation, **exudate** (such as pus), erythema, swelling, pain, odour. Common characteristics of a viral infection are a grouping/cluster of lesions, generally asymmetrical (one side of body), and specific regions on the body (e.g., mouth, nose, feet, hands).

Activity: Check Your Understanding

Name the integument pathophysiology images:

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1090#h5p-76

Starting Your Assessment

The integumentary system has fundamental characteristics that you will notice immediately. With more experience, you will learn what to consider during your subjective and objective assessment. See **Table 2** for descriptions of clinical manifestations related to integumentary issues.

Table 2: Clinical manifestations of integumentary issues.

Manifestation	Considerations	Examples
Pattern/ distribution Is there a pattern to what you are seeing?	Integumentary issues are rarely random or evenly distributed across the body. Consider the pattern or distribution of the integumental variation.	Rashes that are ring-shaped, linear, or clustered around a blood vessel.
Morphology What is the structure/ constitution of what you are seeing?	Consider whether it is presented discretely (singular; e.g., a lesion, growth, tumour), as a grouping/cluster (e.g., infestation, rash), or confluent (small lesions **coalescing** into a larger lesion).	Pus-filled blisters, movable, squishy lumps, **vesicular**.
Location Where is the variation located on the body?	Consider nearby anatomical landmarks and other considerations such as moisture, heat, and other exposure (e.g., urine, stool, saliva) in the region.	Rashes around the mouth, around genitalia, limited to the trunk, or on the bottom of feet and palms of hands. Skin breakdown over bony prominences or under compression stockings.
Texture What is the texture of the variation?	Consider whether the variation is dry or wet, scaling or crusted.	Lesions that have crusts, rashes that are scaly in appearance or flaking.
Symmetry Is the integumentary variation distributed symmetrically?	Examine the symmetry of the variation. Is it distributed evenly on the body? Is there an asymmetrical distribution? Is there a generalized variation or is it localized to a specific region?	Rashes that only appear on one side of the body. Skin eruption that is generalized all over the body. Itchiness that is localized to one region of the body.
Colour What colour is the variation?	The colour of the variation (whether generalized or localized to a specific variation) is meaningful. Note the colour and any changes in colour.	Centralized cyanosis. Erythemic rash.
Sensation Is the client experiencing any loss of sensation or **dysesthesia**?	Numbness or tingling could be the result of innervation of the integument.	Numbness in extremities. Tingling at the site of a vesicle. Burning sensation associated with a rash.
Other Is the skin weeping? Is blood involved? Consider any odour, size, and changes.	Consider other issues related to the integument, e.g., is the client experiencing fever, nausea, vomiting, anorexia, fatigue? (these types of issues can sometimes suggest a systemic cause).	Weeping: Crusting, hyperkeratosis, or scale. Blood vessels: Visible blood vessels, increased superficial vasculature (telangiectasia). Odour: Foul-smelling ulcers may be infected. Time: What did it look like when it started? Did it change? Size: Petechiae (< 2 mm), purpura (>2 mm), and ecchymosis (1–2 cm).

Priorities of Care

Always assess levels of acuity related to the integument. Certain conditions require immediate attention, while others may require prompt or gradual interventions. **Necrosis** (black tissue) is a form of tissue death that is typically associated with a pathological process and requires immediate intervention. Factors that can lead to necrosis include prolonged compression, bacterial infection, injury, disease, and environmental conditions. Necrotic tissue cannot be revived and normally requires debridement (removal).

Depending on the severity, clients with **acute trauma to the integument, burns, or frost exposure** may require urgent intervention. Lacerations and burns can rid the body of fluids and may require immediate fluid replacement (with intravenous). Any **infections that spread quickly** also require immediate intervention. Understanding the cues that prompt critical interventions is an important nursing skill.

Contextualizing Inclusivity

Persons experiencing homelessness have a higher prevalence of skin infections and non-melanoma skin cancers compared to the general population (Adly et al., 2021). They may find it difficult to access clean water, sanitation, and hygiene facilities. Use a person-centred and non-judgmental approach to help clients manage integumentary conditions. For example, you could link clients to organizations that provide clean clothing, water, and sanitation if needed. As a nurse, you should use a critical lens to identify health inequities, and this includes advocating for systemic changes to improve health conditions for all.

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Subjective Assessment

Assessments of the integumentary system may be uncomfortable, embarrassing, or evoke anxiety for the client. It is possible that the client has been avoiding consultation with a healthcare provider for some time and the condition has advanced. The client may be fearful of the outcome of the assessment, for example, with concerns of malignancy.

During your assessment, try to:

- Attend to their concerns and ensure open communication with the client while commending them for seeking care. Ignoring their stress or delayed consultation may reinforce that they should be fearful of their integumentary concern and this could affect their follow-up care.
- Show unconditional positive regard for the client and empathy for their situation; this will help you collaborate with the client.
- Be clear about next steps and what the client can anticipate during their consultation; this is imperative to a positive therapeutic approach.

Start the conversation with "what brings you here today" and pay attention to their response. The client may identify a particular symptom such as itchiness, swelling, or a lump. Their responses should prompt further questions to help you better understand the underlying issue. A systematic way to approach this line of questioning is to use the PQRSTU mnemonic, which can help ensure you have covered the important basics.

As a critical thinker, you should also consider what else may warrant further inquiry beyond the PQRSTU mnemonic. For example, you might ask about previous environmental exposures, medications (including name, dose, frequency, reason it was prescribed, how long they have been taking the medication), herbal remedies, supplements, allergies, non-prescribed substance use, and exposure to **contagions**.

You can motivate the client to make lifestyle changes by ending the conversation with collaborative dialogue around health promotion strategies such as appropriate sunscreen application, regularly cleaning nail tools, and education about vitamins. Depending on the context, you might engage in this kind of discussion during the subjective assessment or after the objective assessment. A section on "Health Promotion Considerations and Interventions" is provided later in this chapter.

Contextualizing Inclusivity

Western health assessment textbooks have been criticized for reinforcing a Euro-centric view of disease by largely focusing on ailments of white skin, and overlooking variations of black and brown skin. This kind of **systemic racism** can narrow the scope of knowledge of healthcare providers and can result in conditions being missed, further marginalizing racialized populations. Inclusive care requires more attention to black and brown skin variations, and this textbook is a first step. You can also access supplementary tools such as Mind the Gap to help you recognize clinical signs in black and brown skin.

Depending on the reason for seeking care, the healthcare context, and the nature of the client's visit, you may choose to start with screening questions about general health or enter immediately into a focused examination of the integument. Use your clinical judgement about the appropriateness of your questions and try to use a balanced approach between

your own workload, the timing of visit, the urgency of the issue, and the nature of the healthcare setting. **Table 3** provides some examples of symptoms, questions, and clinical tips.

Table 3: Common symptoms, questions, and clinical tips.

Symptoms	Questions	Clinical Tips
Pruritus refers to itching. It is sometimes associated with a rash.	You might start by asking: Do you currently or have you recently had any itching on your skin? If the client's response is affirmative, ask: Do you have the itching now? Additional **probes** may include: Region: Where is it? Radiation: Has it spread anywhere else? Understanding: Do you know what has caused it? Timing: When did it start? What were you doing when it started? Is it constant or intermittent? How long does it last? Provocative: What makes the itchiness worse? Palliative: What relieves it? Quality: How would you describe the itchiness? Quantity: How bad is it? Severity: How would you rate the itchiness on a scale of 1 to 10? 0 being no itchiness and 10 being the most itchy you have ever experienced. Treatment: Have you treated it with anything? Did it help?	Assess whether the itching is localized or generalized. **Localized pruritus** is limited to one area/region and is commonly the result of a reaction like an allergy or insect bites, scabies, parasites or fungal infestations. It can also be associated with dry skin (xerosis), as with eczema and psoriasis. **Generalized pruritus** is widespread itching that is not specific to one area/region. It can be an indication of systemic disease (kidney, liver, thyroid, rheumatic disease) or be caused by a medication reaction (e.g., opioids). Also assess for secondary infections, which can occur when there is breakdown of the skin from repeated scratching.
Skin rashes can vary in qualities such as colour, texture, and pattern.	You might start by asking: Do you currently or have you recently had any rashes on your skin? If the client's response is affirmative, ask: Do you have any rashes now? Additional **probes** may include: Region: Where is it? Radiation: Has it spread? Understand: Do you know what is causing it? Timing: When did it start? What were you doing when it started? Provocative: What brings on the rash? Palliative: What makes it better? Quality: How would you describe the rash? Quantity: How bad is it? Treatment: Have you treated it with anything? Did it help?	Identifying skin rashes involves many considerations. With experience, you will begin to recognize common rashes and their morphology. Consider whether the rash is **acute** (new onset) or **chronic** (lasting more than 6 weeks) as this will give you important information about the timeline and possible exposures or underlying conditions. Many environmental exposures can cause skin rashes like contact dermatitis, a skin condition characterized by swelling, pain, redness, and sometimes lesions. Plants, insects, chemicals, plastics, detergents, pesticides are all possible causes. Thus, it is important to ask the client questions surrounding these factors such as have you had a recent change in the soap/body wash, lotions or laundry detergent that you use or have you been gardening or walking in the woods or long grass? Infections like scabies, lice, fleas, and bed bugs can also cause rash and pruritus.

Nevi are moles.	You might start by asking: Have you noticed any abnormal looking moles, new moles, or changes in your moles? If the answer is affirmative, ask the client to describe the change. Additional **probes** if the response is affirmative: Region: Where is it located? Quality: What does it look like? Has it changed in colour? Have you observed it growing in size? Other questions: Is it itchy? Has it had any discharge like blood? Is there pain associated with the mole? Do you have any moles that do not look like your other moles?	Most moles are **benign** (harmless). However, new moles and moles that are painful or bleed warrant further questioning. Consider the location of the mole and whether it is a region that is exposed to ultraviolet radiation from the sun. If a mole bleeds, investigate whether it is due to scratching or whether it bleeds on its own. It is important to ask whether the client has any moles that do not look like their other moles. This is a telling finding and can inform your objective assessment. There is a mnemonic to assess moles (**to be discussed in the Objective assessment section**).

Skin discolouration and **skin temperature changes**.	You might start by asking: Have you noticed any changes in skin colour or skin temperature on any areas of your body? If the answer is affirmative, ask the client to describe the change. Additional **probes** if the response is affirmative: Region/radiation: Where is it located? Have you noticed it anywhere else? Quality/quantity: Can you describe what it looks like or feels like? How bad is it? Provocative/palliative: What makes it better? What makes it worse? Timing/treatment: When did you notice it? Is it constant or intermittent? If intermittent, how long does it last for? Have you tried treating it with anything? Have you sought treatment for it? Is it affected by position change (e.g., standing all day or elevating your feet? Is it worse at the end of the day? Understanding: Do you know what is causing it?	Hormonal changes during pregnancy can cause patchy regions of dark skin pigmentation (melasma). Other skin variations associated with pregnancy include linea nigra (a darkened vertical line that runs down the abdomen) and striae (also known as stretch marks), which are indented streaks that appear on the abdomen and breasts during pregnancy – linea nigra and striae are normal findings that are part of pregancy. Some of these variations resolve after pregnancy (e.g., linea nigra) or lighten in colour (e.g., striae) and are not of concern. Linea nigra. (Attribution: Photo by Warinhari – Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=47136053) Striae. (Attribution: Photo by Emilymiller123 – Otto J. Placik, M.D., CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=6972012, cropped for OER)

Ulcers are open sores on the skin.	You might start by asking: Have you noticed any sores anywhere on your body, such as on your legs or feet, that are slow to heal? Additional **probes** if the response is affirmative: Region/radiation: Where are they located? Have you noticed them anywhere else? Quality: What do they look like? Are the sores open? Are they wet or dry? Do you notice a discharge? If so, what colour is it? Timing: When did the sore begin? Do you know how it developed Treatment: Have you treated it with anything Understanding: Do you know what is causing it?	These sores are often caused by an injury to the skin, even a minor injury. Because ulcers are open to the air, they can act as an entry point for bacteria and can become infected and increase in size. They can be associated with a variety of conditions. For example, they may begin as a pressure injury over a bony prominence with clients who have mobility issues. They can also be associated with peripheral vascular diseases including arterial and venous issues (more will be discussed on these conditions in a later chapter).
Nail changes can include changes in consistency, texture, and colour.	You might start by asking: Have you noticed any changes in your nails on your hands or feet? If the client's response is affirmative, ask: Tell me about the changes? Additional **probes** may include: Region: What nails are involved? Radiation: Have you noticed it spreading? Quality: How would you describe it? Quantity: How bad is it? Provocative: Is there anything that makes it worse Palliative: Is there anything that makes it better? Timing: When did you notice the change beginning? Is it constant or intermittent? If intermittent, how long does it last? Understanding: Do you know what is causing the change?	Changes to the nails may be the result of a trauma to the nail or could be a sign of disease. A detailed subjective assessment will inform how to proceed with care. **Colour changes** can include white lines, darkening of the nail, or cyanosis. **Texture changes** to the nail can include a thickening of the nail, as with fungal infections. A thickening and overgrowth that looks like a ram's horn is called onychogryphosis. Pitted nails can be a sign of psoriasis, atopic dermatitis, or alopecia. A ridge or deep groove in the nail is often referred to as Beau's line; it is typically a sign that the nail has stopped or slowed in growth. Changes to the **shape of the nail** are also noteworthy. Clubbed nails refers to nails that start to curve, and the nails can become spongy; clubbing can be a sign of cardiopulmonary disease. Spoon-shaped nails often have a tip in the centre of the nail that runs downward. This can be a sign of malnourishment, as with iron and vitamin deficiency. **Lifting of the nail** can be the result of a fungal infection or trauma from cleaning or manicuring the nails. **Onycholysis** refers to a nail separating from the underlying tissue. **Ingrown toenail** refers to a nail growing into tissue; this causes pain, inflammation, and swelling, and can lead to infection.

Alopecia refers to hair loss, which can include thinning of the hair or complete loss of the hair on any part of the body.	You might start by asking: Have you noticed any hair loss on your body or head? If the client's response is affirmative, ask: Tell me about it? Additional **probes** may include: Region: Where have you noticed it? Region: Has it spread anywhere? Timing: When did it start? What was going on in your life when it began? Was it abrupt or did it come on slowly Understanding: Do you know what might be causing it Provocative: What brings on the hair loss? Palliative: Does anything make it better? Quality: How would you describe the hair loss? Quantity: How bad is it? Severity: How would you rate the hair loss on a scale of 0 to 10, with 0 being no loss at all and 10 being very bad hair loss? Treatment: Have you treated it with anything? Has it worked?	Consider whether the hair loss was sudden or gradual. Sudden onset of hair loss can be related to alopecia areata, an auto-immune response in which the body mistakenly attacks the hair follicles. Telogen effluvium is excessive diffuse hair loss. When abrupt, it can be brought on by a triggering life event (stress, traumatic event) or by drugs, thyroid disease, or labour/birth. It is often temporary but can continue for 3–6 months after the event. Hair loss can be damaging to the client's self-concept so it is important to treat them with empathy.
Other integumentary-related symptoms can include xerosis (dry skin), seborrhea (oily skin), bruising, fatigue and fever.	Always ask one question at a time. You might start by asking: Have you experienced any body fatigue? (Or fever, bruising, dry or oily skin?) Use variations of the PQRSTU mnemonic to assess symptoms further if the client's response is affirmative.	Symptoms of fatigue and fever can be related to other body systems and non-integumentary issues. To determine whether they are integumentary-related, explore these symptoms along with any other associated symptoms.

Personal and **family history** of integumentary conditions and diseases. Some common issues associated with the integumentary system include eczema and psoriasis.	You might start by asking: Do you have any chronic conditions or diseases that affect your skin, hair, and nails? Do you have a familial history of conditions or diseases that affect the skin, hair, and nails? Do you have a family member with skin cancer? If the client's response is affirmative, begin with an open-ended probe: Tell me about the condition/disorder/disease? If the client has a personal history, **probing questions** might include: Timing: When did you begin experiencing symptoms related to this condition? When were you diagnosed? Are the symptoms constant or intermittent? Quality/quantity: How does it affect you? What symptoms do you have? How bad are the symptoms Treatment: How is it treated? Have you had any surgeries? Do you take medication? Provocative/palliative: Does anything make it worse? Does anything make it better? Understanding: What personal or family history do you think is important for me to understand?	A previous history of illness (including current illness) can be an important finding that warrants further assessment. Immune deficiencies (sometimes referred to as being immuno-compromised) can decrease the body's defences against harmful matter, rendering persons more susceptible to integumentary conditions. With auto-immune disorders, the body mistakes its own cells for foreign cells and activates an immune response. Many auto-immune disorders involve the integumental system, including lupus, scleroderma, Grave's disease, psoriasis, and rheumatoid arthritis. Common symptoms related to auto-immune disease include fatigue, joint pain and inflammation, digestive issues, and swollen lymph nodes. A first-degree relative (parent, sibling) with a history of skin cancer is an important finding in your subjective assessment. Family history is important because of genetic susceptibility, but also because of shared lifestyle including environmental and behavioural factors. Always take a detailed history including age of onset, type of skin cancer, and treatment outcomes. Family history can provide some insights into predisposition to other conditions related to the integumental system, such as **rosacea**.

Priorities of Care

Personal protective equipment (PPE) like gloves may be necessary for skin variations that expel bodily fluids like blood or pus. Some lesions can expel with pressure when punctured and a face shield may be necessary.

Urticaria (hives) are itchy patches and bumps that are sometime raised and look swollen. They may look lighter or darker than one's normal skin colour on clients with darker tones and they look red and dark pink on clients with lighter skin tones and sometimes with white centres. They are sometimes caused by an allergic reaction to food, medications, or a bug bite. Although they often disappear with no treatment or an antihistamine, in rare cases they could be associated with a severe allergic reaction (anaphylaxis) including

symptoms of dyspnea (difficulty breathing), wheezing, tightness or swelling of the throat. Anaphylaxis is a life-threatening condition and needs to be reported and treated immediately; administration of epinephrine is a priority if anaphylaxis is suspected.

Urticaria: Image free to use for non-commercial purposes, from: https://www.atlasdermatologico.com.br/index.jsf

Knowledge Bites

Certain medications can cause photoreactions, which are skin reactions caused by exposure to sunlight. Consumption of certain medications can lead to photosensitivity (sensitivity to sun exposure), photo-allergy (inflammation/allergic reaction after exposure to sun), and phototoxicity (hazardous sensitivity to sunlight that causes damage to tissue). Medications with these possible side effects include antibiotics, antihistamines, psychiatric agents, and cardiovascular drugs, as well as some topical medications.

Vitamins and some herbal remedies can also cause photoreactions and other integumentary responses. For example, niacin (vitamin B3) toxicity can cause flushing (reddened skin, itching, tingling). Excess vitamin A can cause itching, scaling, cheilitis (dry chapped lips), and even hair loss. Excess vitamin B6 can cause skin eruptions, typically after sun exposure. **St. John's wort** can cause hives and/or other skin reactions. Other screening questions pertinent to a subjective assessment relate to personal care routines, sun exposure, and exposure to other irritants.

Contextualizing Inclusivity

Malnutrition is associated with social determinants of health such as socioeconomic status, as well as many conditions. For example, it can be associated with alcoholism, either because of inadequate dietary intake accompanied by overconsumption of alcohol that does not contain nutrients or due to malabsorption from gastrointestinal conditions secondary to alcoholism. Persons living with alcoholism often have deficiencies in vitamin A, B1, B2, B6, C, E, and niacin, as well as other nutrient depletions like magnesium, potassium, and zinc. Chronic alcoholism can lead to skin changes related to liver disease, such as jaundice (yellowing of skin and sclera) due to bilirubin build up, hyperpigmentation, and generalized pruritus. Recognizing the signs of alcoholism is an important first step in seeking treatment. Family members are often the first to identify a problem. Always build a therapeutic relationship with the client, including unconditional positive regard; this will help establish trust and connect the client with appropriate supports.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1096#h5p-77

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1096#h5p-78

Objective Assessment

Your subjective assessment should segue into your objective assessment. Typically, you will identify priority areas to examine based on your discussion with your client. For example, you may do a focused assessment of a rash, lesion, or itchy patch of skin. Depending on the healthcare context and purpose of your assessment, you may also do a general scan of the integumental system as a baseline comparison to gauge any abnormalities, or as an overview to assess any further abnormalities not identified in the subjective assessment.

Prepare before conducting your objective assessment. For example:

- Tell the client what the objective assessment will entail: how long it will take, how much touching will be involved and where, whether they will need to remove clothing, will they be in a comfortable position. (Tip: Think about things you would like to know going into an assessment).
- Prepare the environment: ensure the temperature is comfortable and the room is bright. Always ensure privacy by drawing the curtains and/or closing the door. If the room temperature is not modifiable, do your best to minimize exposing the client and keep them covered as much as possible. This keeps the client comfortable and preserves their dignity. Prepare your equipment in advance so you are not distracted with locating items while conducting your assessment. Objective assessments of the integumental system usually require pen light, gloves, pen, measuring tape, magnifying glass, and swabs and/or cotton pads. Draping may also be required depending on the region being exposed.

Objective assessment of the integumentary system includes inspection and palpation of the skin, nails, and hair.

Contextualizing Inclusivity

A person-centred approach and cultural humility is imperative when providing care considering that an objective assessment of the integumentary system may involve asking the client to expose different body parts and/or hair. For example, some Muslim women wear head coverings as a part of their Islamic faith, and head coverings can vary greatly: some women may choose to cover their hair and neck only, whereas others may choose to cover every part of their body except for their eyes. Some Muslim women also choose to limit their encounters with the opposite gender, including healthcare professionals. Do not assume a Muslim women's level of comfort: some Muslim women may find it acceptable to reveal parts of their body in front of males if it serves a medical purpose. You should assess their needs at the beginning of a healthcare encounter. If a Muslim woman expresses discomfort with revealing parts of their body and/or hair, you might offer accommodations including a healthcare provider of the same gender, having a female colleague in the room, asking if the client would like a chaperone (friend or family member) to be present in the exam room, or allowing the patient to drape themselves so only a portion of their skin and/or hair is exposed. Ultimately, you should use an individualized approach: assess what each client is comfortable with and conduct the assessment accordingly.

Skin: Inspection

Inspection of the skin can be performed with the client sitting upright on the exam table or lying in a supine position. If you are doing a focused assessment, position the client so that you have the best visibility of the affected area. Use a bright light or a pen light if needed. Shadows and dark lighting may alter your visualization of the affected area and provide information about the elevation of a lump.

If you are doing a complete assessment, use a systematic approach and proceed **cephalocaudally** to ensure comprehensiveness. If the client has identified a specific concern, inspect that area first. If you are doing a complete assessment when the client has no specific concerns, inspect the face, arms/hands, back, abdomen, chest, and legs/feet. Always inspect the **anterior** and **posterior side**; for example, for the arms, ask the client to raise their hands/arms in front of them with their palms facing down and then turn palms up so that you can inspect both sides. Similarly, for the legs, inspect the anterior and then have the client roll over so that you can inspect the posterior. You may need to seek assistance to reposition a client that is immobile or has difficulty moving.

Keep in mind that the best control for comparison is the client's own body, so **always compare bilaterally**.

Clinical Tip

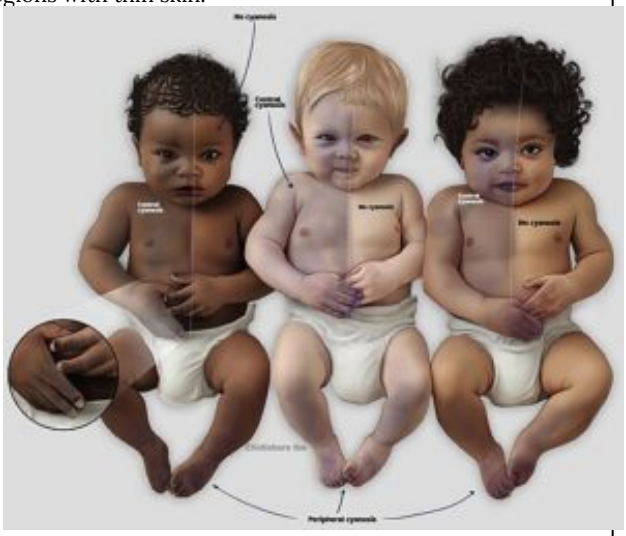
Commonly overlooked areas for skin inspection include behind the knees, in **skin folds**, and between digits (fingers and toes). Other important areas to check are bony prominences (e.g., hips, spine, ankles), especially if the client has mobility issues. If the client is unable to reach these areas, encouraging family members to assist with checks can be helpful.

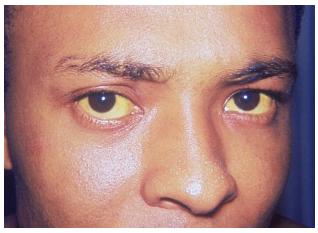
Skin inspection involves the following steps:

1. **Inspect the skin for colour** using both a generalized and localized approach. To visualize general colour, step back and take note of their general appearance; for a localized approach, inspect specific regions. Mucous membranes, palms, sclera, and regions around the mouth can all be telltale signs for centralized colour variations. Always examine distal extremities for discolouration. **Table 4** lists common colour variations. Skin colour varies widely from dark to light shades including black, brown, yellow, and white shades. These colours are affected by many factors. The biggest factor is how much **melanin** is produced by the body's melanocytes; this also affects hair and eye colour. Additionally, the circulating hemoglobin affects skin colour and the underlying connective tissue.

    - Normally, skin colour is evenly distributed with no variations; clients with darker skin tones will have lighter coloured palms and soles of feet. You may observe birthmarks, which are visible upon birth and include a wide array of sizes and colours (brown, black, blue, red, pink and purple). Most are flat and some fade over time. You should document them describing their location and description particularly since some can look like bruising.
    - If you notice variation in skin colour, note the location, colour, and other characteristics of the discolouration.

Table 4: Colour variations.

Colour Variation	Skin Tone Variations and Clinical Tip
Pallor is a lightening of the skin compared to the client's typical complexion. It is commonly due to a lack of oxygen-rich blood near the surface of the skin.	Among clients with darker skin tones, pallor may present as ashen (grey) colouring. Pallor may also present as a yellowish colour among persons with browner skin tones. Among clients with lighter skin tones, the skin appears paler and less pink. To check for pallor, look at mucus membranes, nail beds, conjunctiva, and/or palms of hands. These are all highly vascularized regions that tend to be a pink colour. With pallor, they look pale.
Cyanosis is a bluish/whitish/greyish discolouration of the skin, usually due to a lack of oxygen in the blood. Peripheral cyanosis occurs in the distal extremities, while central cyanosis is generalized in the trunk and head of the body.	With darker skin tones, cyanosis may present as a whitish/greyish colour. For clients with yellow undertones to their skin, cyanosis may be a greenish/greyish colour. For persons with lighter skin tones, cyanosis is generally a bluish/purple hue. Centralized cyanosis is generally most pronounced around the mouth (tongue, lips, oral cavity) and mucous membranes. Cheeks, nose and ears are also good landmarks to check for centralized cyanosis as these are highly vascular regions with thin skin.  (Attribution: photo by Chidiebere Ibe, This file is licensed under the Creative Commons Attribution-Share Alike 4.0 International license, from: https://commons.wikimedia.org/wiki/File:Cynosis_Illustration.jpg).
Erythema is a reddening/darkening of the skin, typically due to increased blood flow to the capillaries.	With darker skin tones, erythema may appear reddish/purple in colour. With very dark skin tones, it may be difficult to visualize. With lighter skin tones, erythema is typically dark pink to red. As you check for erythema, look for other signs like inflammation and warmth.

Brawny is a brown-reddish discolouration, typically associated with venous insufficiency. Red blood cells accumulate in the interstitial spaces and can cause **hemosiderin staining** from the blood leaking out of capillaries.	With darker skin tones, brawny may appear even darker than the rest of the skin, with a brown-reddish hue. With lighter skin tones, the skin is a dark brown-reddish colour. Brawny generally appears in lower extremities and regions of the body that have pooling due to venous insufficiency.
Jaundice is a yellowing discolouration of skin, sclera, and mucous membranes. It is typically brought on by a buildup of **bilirubin** and breakdown of red blood cells in the body. (Attribution: Photo by By James Heilman, MD – Own work, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=9389660)	In persons with darker skin tones, discolouration may be subtle or go unnoticed but visible in the sclera as shown in image below. In persons with lighter skin tones, jaundice can appear yellow or even orange in colour. Jaundice is typically confirmed by blood test or urinalysis.  (Attribution: Photo by Unknown author – CDC / Dr. Thomas F. Sellers / Emory University, Public Domain, https://commons.wikimedia.org/w/index.php?curid=4394119)

Vitiligo is a condition where the skin loses pigmentation in certain regions (patchy). Image is free to use for non-commercial purposes from:https://www.atlasdermatologico.com.br/index.jsf	Vitiligo can affect persons with all skin tones, but it is more visible among persons with darker skin tones due to contrast. Common regions for vitiligo are near the mouth and eyes or on the fingers, wrists, armpits, or groin.

2. **Inspect the skin for nevi (moles)**. If the client has expressed concern about specific moles, check them first. Otherwise, inspect the face, arms/hands, back, chest, abdomen, and legs/feet for the presence of nevi. If you observe any, use the ABCDE mole screening mnemonic (**Table 5** and **Figure 4**); this is vital to screen for melanoma, a life-threatening skin cancer in which early detection is essential (Rigel et al., 2005). Most moles are benign, but they can become malignant: people with more than 50 moles, light-coloured skin, regular sun exposure without sunscreen, and/or a family history of melanoma are at increased risk for melanoma.

    - Normally, nevi are smaller than 6 mm in diameter, round, smooth surfaced, with distinct/round edges. They can be elevated or not, pink, tan, brown, or dark brown. Generally, persons with darker skin tones have darker moles and persons with lighter skin tone have lighter moles. See **Figure 5** for examples of what is considered normal nevi.
    - Abnormal moles are often larger than 6 mm with variation in colours and asymmetrical with irregular borders. Note any atypical moles including the location and description.

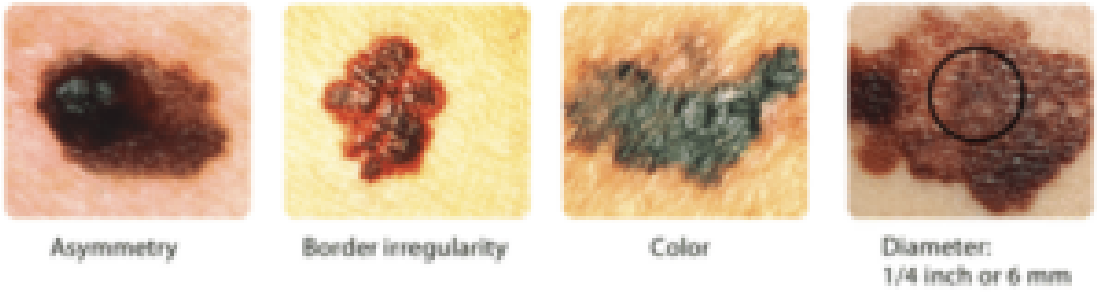


Figure 4: Abnormal nevi/moles. (**Credit**: Courtesy of Skin Cancer Foundation/National Cancer Institute **License**: Public domain. **Source**: Left to right: http://visualsonline.cancer.gov/details.cfm?imageid=2362; http://visualsonline.cancer.gov/details.cfm?imageid=2363; http://visualsonline.cancer.gov/details.cfm?imageid=2364; http://visualsonline.cancer.gov/details.cfm?imageid=2184).

Figure 5: Examples of normal nevi/moles.

Table 5: ABCDE mole screening. (Adapted from Rigel et al., 2005. See the American Academy of Dermatology Association about the history of the mnemonic: https://www.aad.org/public/diseases/skin-cancer/find/at-risk/abcdes)

Screening Characteristic	Warning Sign
A – Asymmetry	Moles that are asymmetrical/irregular in shape (one side does not match the other).
B – Border irregularity	Mole borders that are irregular or jagged in appearance.
C – Colour	Moles that have more than one colour within the mole (mixture of colours like tan, brown, black, red/pink) or changes colour (white, red, or blue) or a dark mole that does not match other moles on the client's body (dark black).
D – Diameter greater than 6 mm	Moles that are larger than 6 mm (pea-size) or moles that start small and grow larger than 6 mm.
E – Evolving	Moles that have changed/evolved in terms of bleeding, pain, size, colour, shape, texture (crusting), elevation, or itching.

Clinical Tip

ABCDE is a useful mnemonic for screening moles and is easily teachable to most clients. Teach-back is an effective technique: this involves presenting the ABCDE mnemonic to the client and then having them "teach" it back to you. This method helps with memory retention; fill in any gaps you may have overlooked as you taught them. Ask them to screen one of their moles based on the mnemonic; it may be appropriate to take a picture for comparison purposes.

3. **Inspect for skin integrity** including whether the skin is intact. Look for the presence of **ulcerations**, **erosions**, **contusions**, or other damage that can disrupt the normal pattern of the skin. You will learn to recognize the signs of skin breakdown and who is at risk for impaired skin integrity. An important tool to assess skin integrity is the Braden Scale, which is commonly used in many healthcare settings and is especially useful for hospitalized clients and those with restricted mobility.

    - Skin is normally intact with no lesions, ulcerations, erosions, and contusions.
    - If you observe any areas where the skin is not intact, note the location and describe the area. Pressure injuries are classified into stages, as shown in **Table 6**. **Figure 6** presents an example of staging.

Braden Scale

The **Braden Scale** is an established tool used to screen and assess for risk of developing pressure sores (Bergstrom et al., 1987; Braden, 2012). Clients at risk are screened weekly. Many factors can increase the risk of developing pressure injuries, including altered sensory perception, increased moisture, decreased activity, impaired mobility, inadequate nutrition, and issues with friction and shear (Open Resources for Nursing, n.d.). As Bergstrom and colleagues note, the Braden Scale is used to screen clients in six areas:

- Sensory perception.
- Skin moisture.
- Activity.
- Mobility.
- Friction and shear.
- Nutritional status.

Friction and shear is rated on a scale from 1–3; all other areas are rated on a scale of 1–4 (Open Resources for Nursing, n.d.). The scores for all six areas are totalled to indicate the client's risk for developing a pressure injury based on the following ranges:
Mild risk: 15–18
Moderate risk: 13–14
High risk: 10–12
Severe risk: less than 9
(Bergstrom et al., 1998; Open Resources for Nursing, n.d.).
Check out the Braden Scale at this link and assess your own risk, and then try using it with a client in your clinical setting:
https://www.clwk.ca/modules/Braden/Slide-1-14.html

Pressure Injury Staging

Classify a pressure injury according to Stages 1–4 or note it is unstageable as per the descriptions below and the example provided in **Figure 6**.

Table 6: Pressure injury staging. (Attribution: Adapted and modified from https://wtcs.pressbooks.pub/nursingfundamentals/)

Stage	Description
Stage 1 pressure injury.	Intact skin with localized area of nonblanchable erythema where prolonged pressure has occurred. Nonblanchable erythema is a medical term used to describe a reddened skin area that does not turn white when pressed.
Stage 2 pressure injury.	Partial-thickness loss of skin with exposed dermis. The wound bed is viable and may appear as an intact or ruptured blister.
Stage 3 pressure injury.	Full-thickness tissue loss in which subcutaneous tissue is visible, but cartilage, tendon, ligament, muscle, and bone are not. Depth of tissue damage varies by anatomical location. Undermining and tunneling may occur in Stage 3 and 4 pressure injuries. Undermining occurs when the tissue under the wound edge becomes eroded, resulting in a pocket beneath the skin. Tunneling refers to passageways underneath the skin surface that extend from a wound and can involve twists and turns. Slough and eschar may also be present in Stage 3 and 4 pressure injuries. Slough is an inflammatory exudate that is usually light yellow, soft, and moist. Eschar is dark brown/black, dry, thick, and leathery dead tissue. If slough or eschar obscures the wound so that tissue loss cannot be assessed, the pressure injury is referred to as unstageable. In most wounds, slough and eschar must be removed by debridement for healing to occur.
Stage 4 pressure injury.	Full-thickness tissue loss with visible cartilage, tendon, ligament, muscle, or bone. Osteomyelitis (bone infection) may also be present.
Unstageable (**Stage X**) pressure injury.	Full-thickness tissue loss in which the presence of slough or eschar are making it difficult to evaluate the extent of damage. If slough or eschar were to be removed, a Stage 3 or Stage 4 pressure injury would likely be revealed.

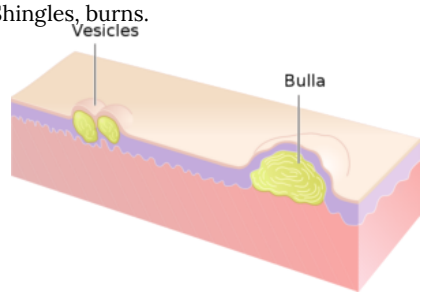
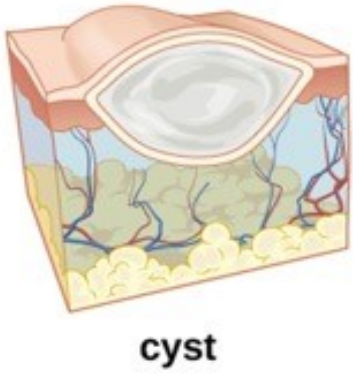
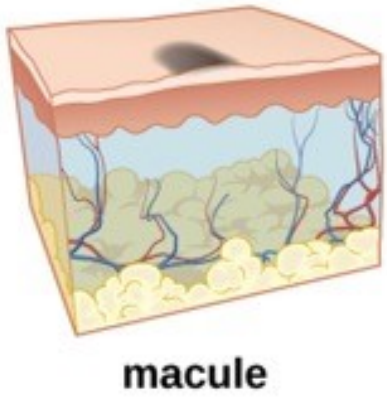
Figure 6: Example of pressure injury staging. (Attribution: Author Babagolzadeh, December 30, 2021, taken from https://commons.wikimedia.org/wiki/File:Wound_stage.jpg
This file is licensed under the Creative Commons Attribution-Share Alike 3.0 Unported license.)

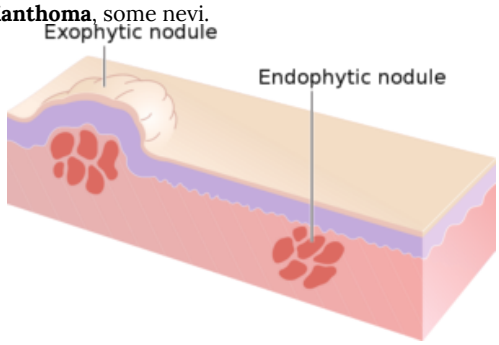
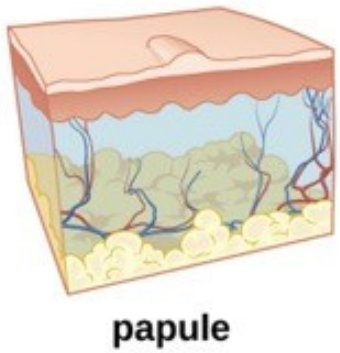
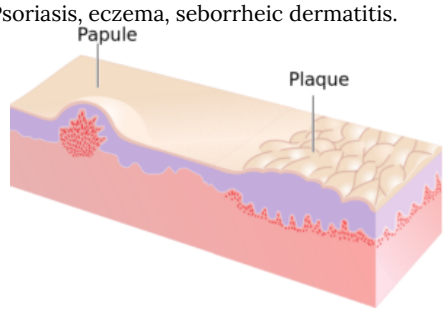
4. **Inspect skin for other lesions** such as cysts, blisters, macules, and wheals. Typically, lesions are associated with

pain because they generally involve the epidermis and/or dermis which are both innervated (supplied by nerves). However, nerve damage may limit sensation and therefore pain to the region. Clients with nerve damage are at increased risk for secondary infections and lesions because they are not restricted by pain at the site. Lesions are usually categorized as primary (develop as a result of a pathological process and not modified by scratching or infection) or secondary (evolve from a primary lesion as a natural development or as a result of scratching or infection). **Tables 7** and **8** provide more additional information about primary and secondary lesions.

- Normally, there are no lesions.
- If lesions are present, describe the location and characteristics in detail, including size, colour, movability, borders, elevation, drainage, and pain levels.

Table 7: Primary lesions. (Attribution: unless otherwise noted, lesion images adapted from https://commons.wikimedia.org/wiki/File:OSC_Microbio_21_01_LesionLine.jpg This file is licensed under the Creative Commons Attribution 4.0 International license).

Type	Example	Clinical consideration
Abscess: Localized lump filled with pus.	Tooth abscess, peritonsillar abscess.	Pain is typically present.
Bulla: Fluid-filled blister.	Shingles, burns.  (Attribution: Adapted photo by Madhero88 – Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=14546567)	Less than 5 mm in diameter.
Cyst: Encapsulated sac filled with fluid, semi-solid matter (such as dead skin cells), or gas; typically located in the upper layer of skin.	Dermoid, cutaneous, ganglion, sebaceous cysts. 	Firm masses can be cysts.
Macule: Flat (non-palpable) spot typically discoloured (hyperpigmented or erythematous).	Freckle, café au lait spot. 	Less than 1 cm.

Nodule: Solid, elevated, palpable growth.	**Xanthoma**, some nevi.  (Attribution: Photo by Madhero88 – Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=14546471)	1–2 cm in size.
Papule: Elevated, solid, palpable, circumscribed (with limits/bounded).	Elevated mole, mosquito bite.  	Elevated less than 1 cm in diameter.
Plaque: Circumscribed, elevated, solid deposit.	Psoriasis, eczema, seborrheic dermatitis.  (Attribution: Adapted photo by Madhero88 – Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=14546485)	Typically larger than 1 cm.

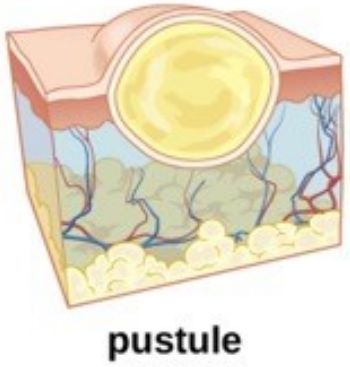
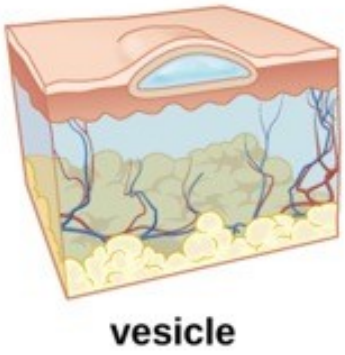
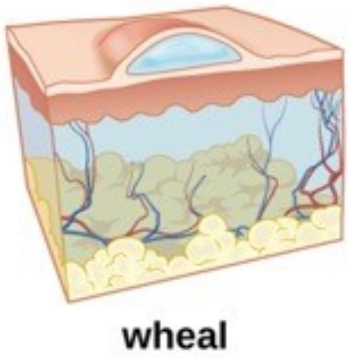
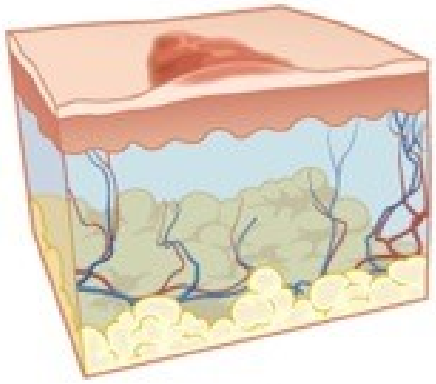
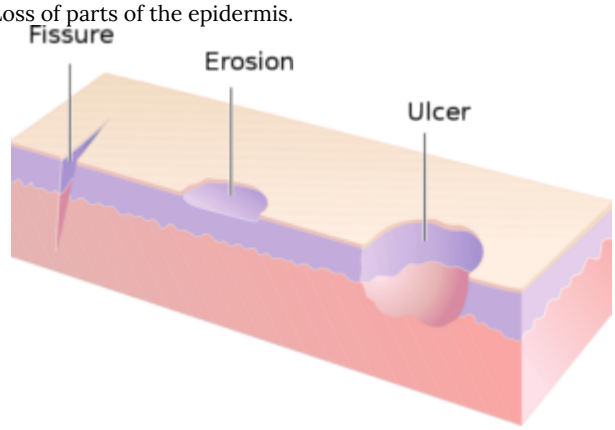
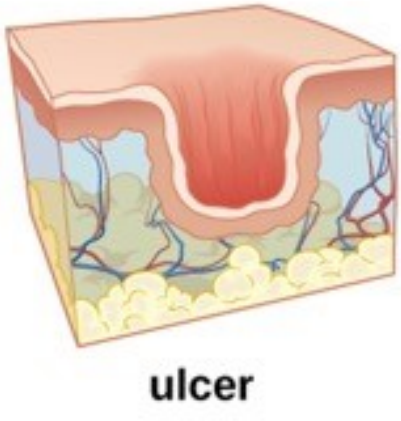
Pustule: Pus-filled, circumscribed, elevated.	Pimple.  	May have redness/swelling at the site of the p
Tumour: Abnormal growth, palpable.	Lipoma, skin cancer.	Typically larger than nodules (> 2 cm).
Vesicle: Small, fluid-filled sacs, thin-walled.	Herpes simplex blister.  	Usually appear in groups.
Wheal: Swollen, inflamed skin patch that itches or burns.	Hives.  	Generally 3 mm or larger.

Table 8: Secondary lesions. (Attribution: unless otherwise noted, lesion images adapted from

https://commons.wikimedia.org/wiki/File:OSC_Microbio_21_01_LesionLine.jpg This file is licensed under the Creative Commons Attribution 4.0 International license).

Type	Description
Atrophy	Thinning of the skin (sometimes shiny appearance), translucent, increased fragility.
Crust	Accumulation of dried exudate and skin cells on the outer layer of the affected area (scab). 
Erosion	Loss of parts of the epidermis.  (Attribution: Photo by Madhero88 – Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=14546561)
Excoriation	Skin breakdown caused by repetitive scratching.
Fissure	Crack or split of the outer layer of the skin.

Keloid	Thick, raised patch of skin (scar tissue). (Attribution: Photo by Htirgan – Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=32782658)
Lichenification	Hyperpigmentation and thickening of the skin.
Scar	Fibrous, thick tissue, shiny appearance once lesion has healed.
Ulcer	Loss of parts of the tissue (crater-like), exposed with some healing formation. 

5. Note the **findings**.
    - Normal findings might be documented as: “Skin integrity intact. Skin colour consistent throughout with no variations. No lesions or rashes noted. Nevus on back examined. Located 2 inches distal to the scapula, left side. Symmetrical with even borders, tan coloured, 3 mm in size and no changes noted by the client. No pain or sensation reported. Image taken and included in the chart.”
    - Abnormal findings might be documented as: “Stage 1 pressure injury on thoracic spine 4 inches in length and 2 inches wide”

Priorities of Care

All abnormal findings should be documented and reported, but some findings are more urgent than others. For example, signs of cyanosis and pallor suggest possible issues with oxygenation, so you should conduct a primary survey, assess vital signs, and conduct a focused assessment on related systems including respiratory, cardiovascular, and peripheral vascular. A similar approach should be used when you observe mottled skin. This is a blotching and netlike discolouration that can appear as bluish, red, purple blotches, sometimes referred to as marbled. It is often associated with conditions that involved reduced blood flow and can be associated with peripheral vascular diseases, shock, and end-of-life, and sometimes cold environments. Always report signs of clinical deterioration immediately. For clients with a Stage 1 pressure injury, it is important to ensure good skin care and repositioning so that the client is not lying on a particular area for long periods of time. Medical intervention may be required for ulcers classified as Stage 2 and higher. Report any moles with warning signs to the physician or nurse practitioner, as the client may need a referral to a dermatologist and/or oncologist.

Knowledge Bite

Burns are caused when the skin is damaged by intense heat, radiation, electricity, friction, or chemicals. This damage results in the death of skin cells. Loss of the skin's protective layers can lead to massive loss of fluid, and makes burned skin extremely susceptible to infection.

Burns are classified by the **degree of their severity**.

First-degree burn:

- Superficial burn affecting the epidermis.
- Mild sunburn is one example.

Second-degree burn (see **Figure 7**)**:**

- Partial-thickness burn affecting the epidermis and a portion of the dermis.
- Results in swelling and a painful blistering of the skin.

Third-degree burn:

- Full-thickness burn extends fully into the epidermis and dermis, destroying the tissue and affecting the nerve endings and sensory function.

Fourth-degree burn:

- Deep full-thickness burn affecting the skin and underlying muscle, tendon, and bone.

Third- and fourth-degree burns require immediate intervention. They are usually not as painful as second-degree burns because the nerve endings are damaged. Full-thickness burns require debridement (removal of dead skin) followed by grafting of the skin from an unaffected part of the body or from skin grown in tissue culture.

Figure 7: Second-degree burn.

(Attribution: Photo by Kronoman at English Wikipedia, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=26501619)

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1119#h5p-79

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Skin: Palpation

Palpation of the skin can be performed with the client sitting upright on the exam table or lying in a supine position. You may need to ask or assist the client to reposition as needed. Palpate the arms from **shoulder to fingertips** and the leg from the **upper legs to toes**.

Steps for palpating the skin include:

1. **Palpate the skin temperature** using the dorsa of your hands: start at the upper arms and move down to the fingertips. Repeat on the legs from upper legs to the tips of the toes (see **Video 1** for an example).

    - Normally, the temperature is warm to touch and equal bilaterally. The hands and feet are sometimes slightly cooler than the upper arms and legs, but they should be equal bilaterally.
    - Note any asymmetry in skin temperature or extreme skin temperatures. Inflammation is typically accompanied by warmth. Describe the characteristics (e.g., warm, cool) and location of asymmetry in skin temperature or extreme skin temperatures.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1123#oembed-1*

Video 1: Palpating for temperature [0:17]

2. **Palpate for skin texture, thickness, and moisture** using your fingertips: start at the upper arms and move down to the fingertips. Repeat on the legs from upper legs to the tips of the toes.

    - Normally, the skin is smooth and dry with uniform thickness.
    - If the skin feels excessively sweaty and clammy, this is referred to as diaphoresis. The skin should feel smooth, free from cracks, peeling, or flaking. Describe the quality and location of dry (xerosis) and flaky skin if present. Darker skin tones may have an ashy appearance, which is a result of dry skin and can appear as white/grey and can range from mild to severe. Describe and note the location of thickened areas of the skin or areas of the skin that are thin. Thickened areas of the skin may be the result of calluses. There are several factors that cause thin skin (e.g., aging, medications).

3. **Palpate the skin for turgor** to assess for skin elasticity (see **Video 2** and **Video 3** for examples). Use your fingertips and thumb to grasp a fold of skin in the midclavicular region under the clavicle (collarbone) or on the forearm or hand. Pull upward gently and then release. The skin's ability to recoil or return to normal may be affected by the client's hydration status.

    - Skin that returns immediately to its normal position is considered normal/resilient and described as good skin turgor (associated with adequate hydration).
    - Skin that remains tented or takes time to return to its normal position is considered abnormal and is described as lacking skin turgor (associated with dehydration).

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Video 2: Assess for skin turgor on forearm [0:19].

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Video 3: Assess for skin turgor below clavicle [0:17].

4. **Palpate lesions and masses if present.** Wear gloves for open lesions. Use your index finger and thumb to size the lesion and get a sense of the depth. Note innervation by asking the client if they can feel you palpating it. Press down on the lesion to see if it blanches. This provides contrast to get a better visual of the lesion, providing information about the skin variation. Petechiae generally does not blanch, while other skin lesions will momentarily blanch. Assess consistency (soft or hard) and shape (e.g., round, irregular).

    - Normally, no lesions or masses are present.
    - If you observe lesions or masses, describe the location and characteristics: what they look like, whether they are intact or open, consistency, and shape.

5. **Palpate for size and edema.** Compare limb circumference of one arm to the other arm and from one leg to the other leg. Generally, you will visually observe the upper and lower part of each limb.

    - Normally, limb circumference is equal bilaterally at each site.
    - If you suspect a size difference, use a tape measure to accurately assess the size on both limbs on the lower and upper limb. If you observe edema, assess for pitting edema: an indentation that remains after applying pressure over the location (see **Figure 8**). Apply pressure with the pad of your finger on a distal location (feet and medial malleolus) for about 3-5 seconds and then release. If you observe an indentation (a “pit”), note the location and how long the indentation remains. If you observe it in a distal location, assess a proximal location such as over the tibia. Check with the unit you work on about the scale used to evaluate pitting edema. It is usually classified using a scale from Grade 1–4 based on pit depth and rebound time (time for the indentation to disappear), with 1 indicating mild, 2 moderate, 3 severe, and 4 very severe (see **Figure 9** for scale).

Figure 8: Pitting edema.

Grade 1	0–2 mm indentation; rebounds immediately.
Grade 2	3–4 mm indentation; rebounds in < 15 seconds.
Grade 3	5–6 mm indentation; up to 30 seconds to rebound.
Grade 4	8 mm indentation; > 20 seconds to rebound.

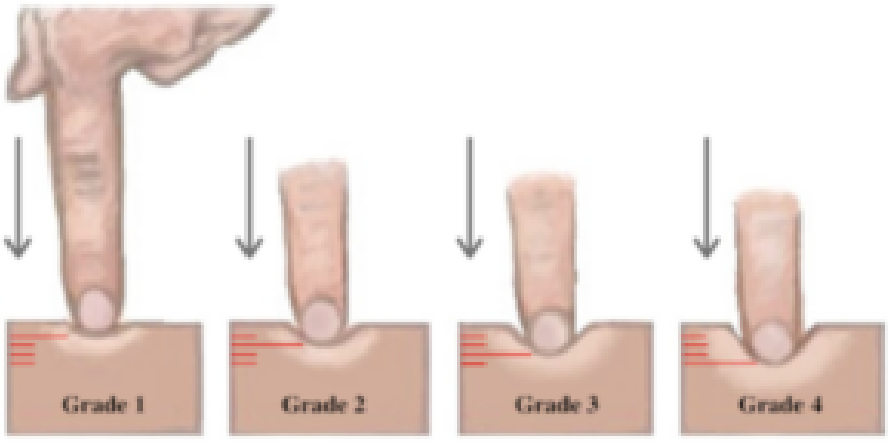

Figure 9: Pitting edema scale. (Attribution, taken from https://wtcs.pressbooks.pub/nursingskills/ CC-BY 4.0)

6. Note the **findings**:

- Normal findings might be documented as: “Skin temperature is warm and equal bilaterally on arms and legs. Skin is smooth with no perspiration and no lesions. Good skin turgor. Limb circumference is equal bilaterally with no edema.
- Abnormal findings might be documented as: “Right foot is cold in comparison to left foot. Poor skin turgor and dry skin.”

Priorities of Care

All abnormal findings should be investigated further and reported to the physician or nurse practitioner. For example, poor skin turgor suggests possible dehydration and the client may have other signs such as dry mouth/mucous membranes, cracked lips, decreased urine output/dark urine, and light-headedness. With severe dehydration, client’s can experience tachypnea, tachycardia, and hypotension. Dehydration can also be associated with clients who have a fever, nausea, vomiting, diarrhea or reduced fluid intake. Ask whether they have experienced recent vomiting, diarrhea, or reduced fluid intake. If the client is an infant, ask the caregiver/parent if they have observed a decrease in the number of wet diapers. If the dehydration is mild, encourage the client to increase their fluid intake. More severe dehydration may require fluid replacement with intravenous to replace fluid loss.

Contextualizing Inclusivity

Use a trauma-informed approach to touch by creating a trusting, safe environment. Clients might have experienced trauma resulted to experiencing or observing physical, sexual and/or emotional abuse, childhood neglect, a family member with mental illness or substance use disorder, violence, and poverty and systemic discrimination (Menschner & Maul, 2016). This can affect how they perceive touch (including palpation). Discuss with the client what they can expect from the objective assessment in terms of touch and explain what you are doing and why.

References

Menschner, C., & Maul, A. (2016). Key ingredients for successful trauma-informed care implementation. Centre for Health Care Strategies Inc, Robert Wood Johnson Foundation. https://www.samhsa.gov/sites/default/files/programs_campaigns/childrens_mental_health/atc-whitepaper-040616.pdf

Nails: Inspection and Palpation

Inspection and palpation of nails can be accomplished with the client in a sitting upright position or lying supine. Nail polish or artificial nails must be removed to fully assess the nails. You will need to decide if a full nail assessment is warranted depending on the nature of the visit, the reason for seeking care and the client's status. If appropriate, remind the client to arrive without nail polish or artificial nails before their appointment.

Steps for nail inspection and palpation include:

1. **Inspect the nail condition** and **nail colour** by asking the client to hold their hands out in front of them (**Figure 10**).

Figure 10: Inspection of nails.

(Licensed under a Creative Commons Attribution-Non-commercial 4.0 License. Arthur Labatt Family School of Nursing, "Nail Colour Assessment" (2021). Respiratory Exams. https://ir.lib.uwo.ca/clinicalskills_respexam/15)

- Normally, the ends of the nails are smooth and nails are clean. A client's job may influence nail cleanliness. Nails are translucent in colour and have a slight pinkish tone.
- Abnormal findings may include ridges, pitting, brittleness, indentations, and discolourations. If you note any abnormal nail condition or discolouration, describe the appearance and location, e.g., white markings at the base of the nail on the left index finger. **Table 9** lists some nail variations that you may observe. Yellowing or darkening of the nails is a common discolouration associated with nail fungus (see **Figure 11**)

Clinical Tip

Landmark digits (fingers and toes) appropriately. Many institutions have a body diagram to landmark anatomy. Check with your institution for specific nomenclature, which can vary in terms of how digits are referenced. Sometimes the thumb as referred to as Digit 1, index finger as Digit 2, middle finger as Digit 3, ring finger as Digit 4, and little finger as Digit 5. If you are uncertain about how to reference a specific digit, landmark as descriptively as possible (e.g., middle finger left hand, 2nd medial toe right foot).

Table 9: Nail colour changes.

Colour Variation	**Description**
White	Loss of pigmentation (pinkness) and whitening of the nail bed can be the result of lack of perfusion related to illnesses like diabetes and liver disease.
Blue	Blue hue of the nail bed can be an indication of hypoxia.
Yellow	Yellowing of the nails can be a sign of chronic lung disease or lymphedema: over time, the nails thicken and become yellow due to lack of drainage of lymph fluid under the nail bed. Yellowing can also be a sign of rheumatoid arthritis or fungal infection. Smoking can also discolour the nail and leave yellow nicotine stains.
Red/brown half-moons	Red half-moons may be a sign of auto-immune disorder.
Blue half-moon	A blue-half moon is a sign of poisoning (e.g., silver).
Black stripe	A black stripe that runs down the nail bed can be a sign of melanoma, but also can be benign.
Greenish black	Bacterial infection under the nail can cause a greenish black appearance (see **Figure 11**).

Figure 11: Nail fungus.

2. **Assess for the presence of clubbing** (see **Figure 12** and **Video 4** and **5**). Clubbing is related to conditions that lead to chronic hypoxia (e.g., chronic lung diseases, cystic fibrosis, congenital heart disease). Chronic hypoxia can cause the nail angle to flatten to 180 degrees or more, the nail bed to soften and become spongy, and the fingertips distal to the distal interphalangeal joint to become enlarged. Clubbing typically first develops in the thumb and then the forefingers. It is often assessed on the index finger, but in cases of early clubbing it may not have advanced to that digit, so it is best to assess the thumb first. To assess for the presence of clubbing, ask the client to point their thumb out so that it is parallel to the ground and view it at your eye level (this is considered the profile sign). Inspect the nail angle at the intersection of where the nail base meets the skin.

    - Normally, the nail angle base is about 160 degrees with normal-sized fingertips and nail beds that are firm to touch.
    - Clubbing is evident when the angle of the nail base is greater than 180 degrees (flattening of the nail base); fingertips are usually enlarged and bulb-like, and the nail base is spongy/soft upon palpation.

Figure 12: Clubbing.
(Photo by Sidsandyy, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=40100295)

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1129#oembed-1

Video 4: Inspection for clubbing on the index finger [0:19]

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1129#oembed-3

Video 5: Inspection for clubbing on the thumb [0:18]

3. **Palpate the nails for texture and consistency** using a grasping motion: place the pad of your index finger on the client's nail and your thumb on the underside of the client's finger. Palpate the whole nail including the nail bed.
    - Normally, nails are smooth and firm.
    - Describe the appearance and location of thick nails and spongy/soft nails.

4. **Palpate the nails for capillary refill** on two or three fingernails of each hand, at heart level (see **Video 6**). Start by applying pressure with your own finger to the client's nail; this causes the nail to blanch (become paler in colour). Apply the pressure for 5 seconds and then release and observe the return in colour.

- A normal finding when assessing capillary refill is colour return within 3 seconds or less.
- Colour return taking longer than 3 seconds is considered sluggish return for capillary refill (or slow capillary refill time), and this finding suggests possible issues with **oxygenated blood perfusion** (this may be related to peripheral vascular and/or cardiac and/or respiratory issues). Note that capillary refill time can be slower if the client's hands are cold from being outside or from washing in cold water; ask them to warm their hands to ensure an accurate reading.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1129#oembed-2*

Video 6: Capillary refill [0:45]

5. Note the **findings**:
    - Normal findings might be documented as: "Nails are smooth, firm, clean with translucent colour, and no presence of clubbing. Capillary refill within 2 seconds."
    - Abnormal findings might be documented as: "Nail angle on thumbs is slightly greater than 180 degrees, capillary refill time is 5 seconds."

Priorities of Care

Nail concerns do not usually require immediate intervention. However, a client with sluggish capillary refill combined with other cues suggesting severely reduced blood flow to the limbs requires additional interventions to re-establish blood flow. For example, if associated with absent or diminished pulses, cool limbs, numbness, cyanosis, or pallor, report these findings to the physician or nurse practitioner.

Some other nail concerns also may need to be addressed promptly. For example, nail **laceration**, **avulsion**, and **subungual hematoma** may require treatment. Bleeding under the nail can cause pressure and pain, and drilling a small hole in the nail can alleviate the pain associated with pressure by allowing the blood to escape the nail bed. With some cases of laceration and avulsion, healthcare providers may need to remove or glue the nail or the surrounding skin may need to be stitched in place.

Hair: Inspection and Palpation

You might begin with a brief inspection of the hair, but this is typically done in combination with palpation. Always ask permission to touch. Move the hair around while observing the scalp and strands of hair; when looking for lice or nits, it is helpful to use a comb.

Steps for inspecting and palpating hair include:

1. **Inspect and palpate for hair colour and texture**.
    - Keep in mind that hair can vary greatly in terms of colour and texture. Note any variations in hair colour not attributable to hair dye, any colour patches or other inconsistencies, hair texture, and the integrity of the scalp. If you have a concern, it can be helpful to first ask the client what their normal or baseline hair colour and texture is.
    - Note any excessive dryness or oiliness of the hair and scalp or any areas of the scalp that are not intact.

2. **Inspect and palpate for hair distribution**.
    - Hair patterns should be consistent without patches of hair or hair loss. However, keep in mind that as a person ages, it is natural for hair to thin and for some people to experience bald areas on the scalp particularly when it is associated with male-pattern baldness.
    - Abnormal findings may include unexplained hair loss on the scalp and the body. Hair loss can be the result of certain conditions and medications. Any hair tufts on the body that are inconsistent with the rest of the hair distribution, such as patches of hair on the scapula, are considered abnormal findings. Hirsutism refers to excessive hair growth on the body. Alopecia refers to patches of baldness or total absence of hair on the scalp. Hair loss on the legs, particularly the toes, can be affected by peripheral vascular disease (you will learn more about this in another chapter).

3. **Inspect and palpate for lesions and other issues**. Use a systematic approach generally starting from the midline of the hairline on the forehead and making your way one side at a time to the base of the skull. Then return to the midline of the hairline of the forehead and repeat on the other side. Be sure to examine behind the ears for lesions and examine strands of hair.
    - Normally, no lesions are present.
    - Describe any abnormal findings. For example, dandruff (seborrhea) is a common condition involving a dry flaking that can be seen on the scalp or hair. Because it flakes (or falls), it can sometimes be seen on the client's clothing (e.g., on the shoulders). Lice may be found on the scalp at the neckline and behind the ears, while the nits (eggs) stick to strands of hair. Pilar cysts are often observed on the head. These are benign growths stemming from the hair follicle, but they can be painful and even disrupt rest.

4. Note the **findings**:
    - Normal findings might be documented as: "Hair colour and distribution consistent with no dryness or oiliness and no lesions present."
    - Abnormal findings might be documented as: "Several nits located on hair strands on the posterior and left side of the head with lice behind the left ear and at the base of the neck."

Contextualizing Inclusivity

The beauty industry and commercialism has shaped ideals and standards of what constitutes beauty, particularly for women. Facial hair removal is a pervasive cultural practice for many women, but remember that some facial hair growth is normal regardless of gender. Hair growth along the upper lip, cheeks, and chin can be a normal finding for many women.

Consider an inclusive, anti-racist, and trauma-informed approach when assessing the hair on a client's head. Always ask permission to touch and explain what you are doing and why. Only perform assessments when necessary, and engage the client in the process.

Clients may have alopecia due to a medical diagnosis or treatment that has caused hair loss; hair loss can be distressing and make them feel vulnerable. There is also a cultural component to hair and headwear, which can be connected to identity, culture, and body image (e.g., Jewish men may wear a kippa, married Jewish women may wear a wig or headscarf, Sikh men and women may wear a turban, transgender individuals may wear wigs or extensions). It is important to be aware of the structural racism that continues to pervade ideals of beauty, for example affecting Black women in particular (Johnson & Bankhead, 2014). Black women may wear their hair naturally, in locs, braids, wigs, or extensions such as clip-ins and weaves, and some may use coconut oil or other oil-based products in their hair. Black women continue to be affected by structural and interpersonal racism with accompanying discrimination, judgement, and marginalization (Brown, 2018). Additionally, some Indigenous people have a spiritual connection with their hair and for that reason, along with the effects of forced cutting of hair in residential schools, and intergenerational trauma more broadly, some may consider it offensive to have their hair touched.

References

Brown, S. (2018). "Don't touch my hair": Problematizing representations of Black women in Canada. Africology: The Journal of Pan African Studies, 12(8), 64-85.

Johnson, T., & Bankhead, T. (2014). Hair it is: Examining the experiences of Black women with natural hair. Open Journal of Social Sciences, 2, 86-100. https://doi.org/10.4236/jss.2014.21010

Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion is an important component of any visit with clients. An assessment of the integumentary system is an opportunity to determine appropriate interventions, if required. Carefully consider all of the collected data, both subjective and objective. During your subjective data collection, you will have asked about risk factors, social determinants, and other considerations. Based on your critical reflection of all data, you might formulate additional questions. Together, your findings will inform your clinical judgement and help you determine the health promotion needed for a specific client.

Healthy Eating

A well-balanced diet is an important part of maintaining healthy skin, hair, and nails. Persons with substance use disorder, mental illness, and other conditions that affect nutrient absorption are at particular risk for developing vitamin deficiencies, which can lead to integumentary manifestations (see **Table 10**). Always use a non-judgemental approach when assessing healthy eating with all clients, including those with these conditions.

Probing questions related to diet may include:

- Tell me about your usual diet?
- How much fluids do you typically drink in a day? What fluids do you drink (e.g., water, caffeinated beverages, alcohol)?
- Have you had any recent changes in your life that have affected your diet?
- Do you have any issues accessing healthy food?
- Do you have enough money to buy healthy food?

Table 10: Vitamin deficiencies.

Vitamin deficiency	Integumentary manifestation
Vitamin A	"Toad skin" appearance (phrynoderma), generalized dry skin, lesions on the face, skull, and extremities.
Vitamin B2	Facial dermatitis (nasolabial folds, forehead, cheeks, and **postauricular skin**).
Vitamin B3 (niacin)	Dermatitis, photosensitivity with eruptions, perineal lesions, thickened pigmented skin.
Vitamin B6	Dermatitis, intertriginous rash, skin ulcerations.
Vitamin B12	Hyperpigmentation on face, palmar creases and flexures, sores in mouth, and red, swollen tongue.
Vitamin C	Follicular hyperkeratosis with fragmented corkscrew hair, perifollicular hemorrhages, diffuse **petechia** in pressure sites (e.g., buttocks), edema, red swollen gums.

Skin, Nail, and Hair Care

Tools used on the skin, hair, and nails should be cleaned regularly to prevent the spread of microorganisms. Families that share nail clippers and hair brushes should replace these tools after an infection or infestation (e.g., lice), and it is never advisable to share razors with others. Inquire about the client's skin, nail, and hair care routine.

Probing questions related to skin, nail, and hair care may include:

- Tell me about your usual skin care routine? Your hair routine? Your nail routine?
- What products do you use?
- Have you recently changed the products you use?

Environmental Health

Environmental exposures to irritants such as poison ivy, poison oak, poison sumac, stinging nettle, and wood nettle can cause contact dermatitis (inflammation of skin with burning/itching) and other rashes. Other irritants that may cause skin reactions can include soaps/detergents, perfumes, solvents, and disinfectants. Some clients may have occupations involving exposure to potent chemicals, for example those working at dry cleaners or nail salons. Others may have occupational exposure to pesticides, plastics, and other materials/chemicals that can cause skin reactions. Ask about all of these issues during your subjective assessment.

Another important issue is skin cancer, which can be related to environmental conditions, especially sun exposure. Mole mapping and monitoring are important strategies to prevent skin cancer or identify it in early stages. Skin cancers can vary in shape, size, and presentation. A new growth or change in skin is the most common sign: a new growth that does not heal, bleeds, is painful – or a mole that evolves – are important warning signs that should prompt

further assessment. Teach clients about sun protection to prevent skin cancers, including daily application of sunscreen and use of protective clothing.

Probing questions related to environmental health might include:

- Do you have any allergies?
- Do you spend time outside in the sun?
- How do you protect yourself from the sun? (e.g., sunscreen with SPF 30 or above, limiting time in sun, wearing a hat, wearing long sleeves/pants). What is the SPF?
- Do you have a history of abnormal moles? If so, do you monitor your moles? How?
- Do you spend time outside in long grass or treed areas? Have you noticed any ticks? How do you protect yourself from ticks? (e.g., long, cuffed pants, closed shoes).
- Are you exposed to chemicals at your workplace? If so, what precautions do you take?

Knowledge Bites

Eruptive skin rashes caused by viruses can occur year-round in children and adults, but winter months tend to be correlated with higher rates of spread because more time is spent indoors.

Virus	Integumentary manifestation	Associated symptoms
Hand-foot-and-mouth disease	Painful blister-like lesions on the tongue, gums, and inside the cheeks. Rash on palms of hands, soles of feet, and occasionally on the buttocks.	Fever, loss of appetite, sore throat, general malaise.
Roseola infantum	Pink rash with flat or raised lesions, begins on trunk and spreads to face and extremities	High fever (3–4 days), irritability, swelling of the eyelids.
Measles	Deep red, flat rash on face and spreads down toward the trunk and extremities. Typically starts as a small, distinct lesion (red with white centre) and then coalesces into a larger lesion. After several days, the rash turns to discolouration and peeling.	Cough, redness and irritation of the eyes, fever.
Rubella	Pink/light red rash that starts on the face and spreads to the neck, trunk and extremities with spots 2–3 mm in size. May or may not be itchy. Rash lasts about 5 days.	Low-grade fever, sore throat, runny nose, malaise, tender/swollen glands.
Erythema infectiosum (fifth disease)	Bright red rash that starts on cheeks (slapped cheeks appearance), spreads to the trunk and extremities, and lasts for 2–4 days. Rash may return when exposed to sunlight, heat or cold, or injury to the skin.	Low-grade fever, headache, runny nose, sore throat, itching, nausea, vomiting, diarrhea.
Varicella (chickenpox)	Itchy rash on trunk, face, armpits, extremities, inside mouth.	Typically accompanied by a fever, runny nose, cough, fatigue, joint pain.

Clinical Judgement: Case Study

A 64-year-old client attends a primary healthcare clinic reporting a burning and tingling sensation with pain and rash under their breast on the left side of the trunk. The client indicates difficulty sleeping due to pain and irritation and rates the pain as 6/10. The client reports that the burning and tingling pain started 8 days ago and the rash started 5 days ago and has progressively worsened and spread slightly. Upon assessment, you note a linear red rash with vesicles spanning from the midline of the trunk to the posterior scapula on the left side (following dermatome). Several vesicles appear to have erupted and are crusted over. Client's vital signs are: blood pressure: 135/89 mm Hg, pulse 89 beats per minute, respirations 18 breaths per minute, O2 saturation: 98%, temperature: 38.6°C tympanic. Client has not received immunizations in 20 years.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1135#h5p-80

Key Takeaways

- Common symptoms to assess related to the integumentary system include skin lesions, skin breakdown, hair loss and nail discoloration.
- The objective assessment of the integumentary system involves inspecting and palpating the skin, hair and nails.
- Health promotion interventions should be developed with the client to address what is important to them. Considerations include dietary adjustments to prevent vitamin deficiencies and preventing the spread of infection.

CHAPTER 9 - MUSCULOSKELETAL SYSTEM ASSESSMENT

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Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgement.
4. Integrate health promotion interventions into actions.
5. Integrate an inclusive approach to musculoskeletal assessment.

Introduction to the Musculoskeletal System

The musculoskeletal system (MSK) is important to assess as it is considered the body's framework and supportive structure. It has additional roles such as **hemopoiesis**, and mineral and fat storage. See **Figures 1 and 2** for an anatomical overview of the MSK system.

Your assessment provides information about the functioning of this system and potential cues that require your action.

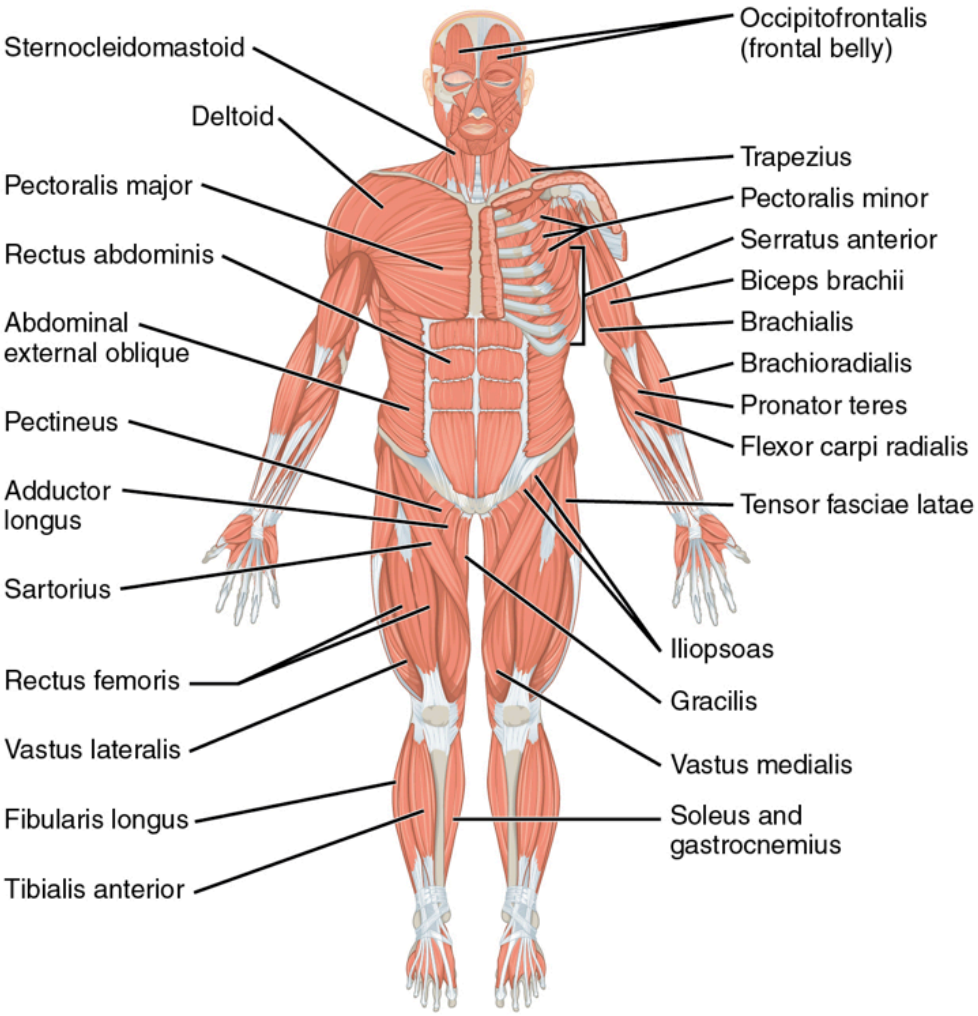
Musculoskeletal System Components

The main components of the MSK system include the skeleton:

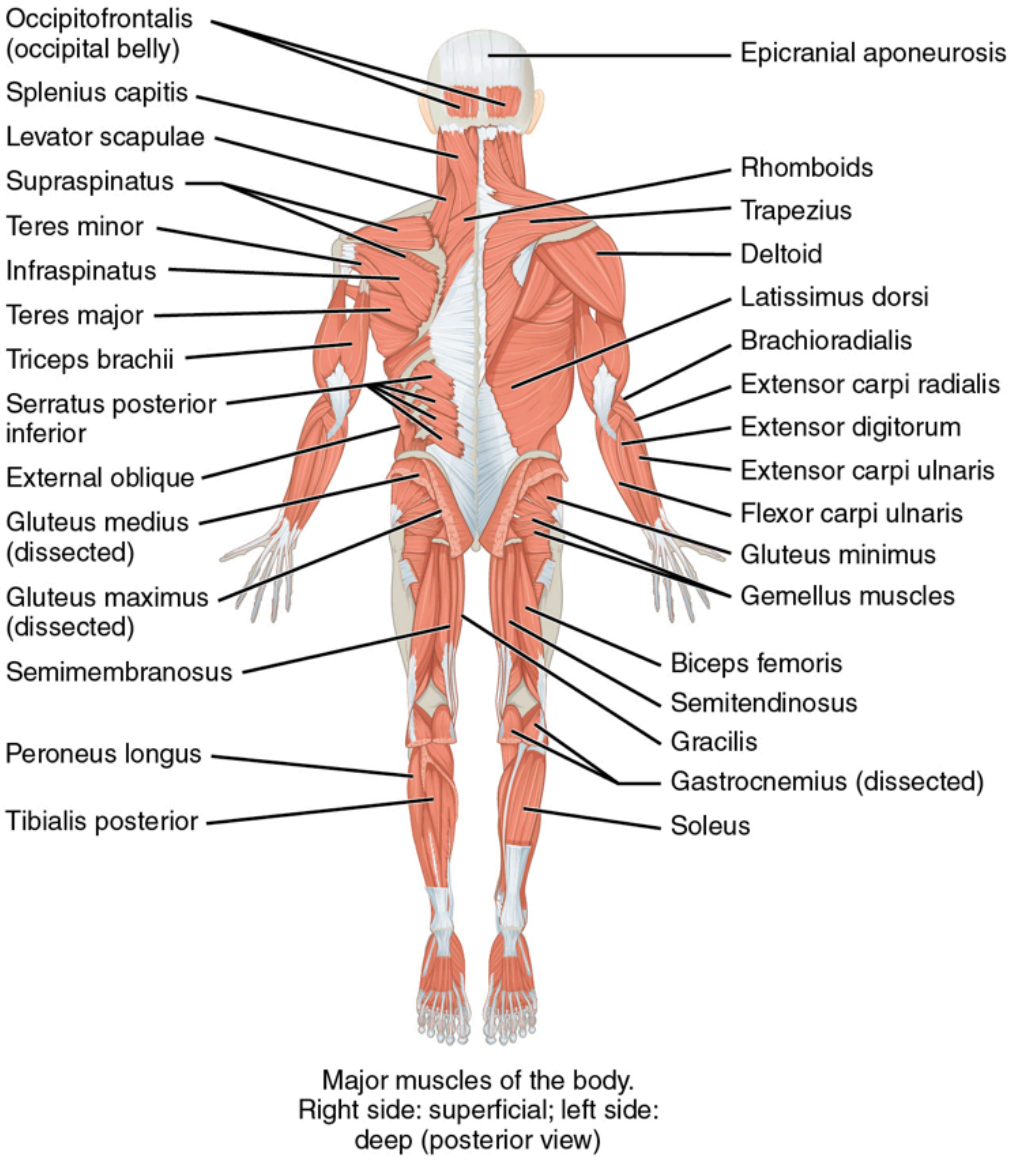
- Skull, including the cranial and facial bones.
- Vertebral column with intervertebral discs.
- Thoracic cage with sternum and ribs.
- Clavicle and scapula.
- Upper and lower limb bones.
- Hip/pelvis bones.

The skeleton also includes cartilage in particular areas of the body such as the nose, ears, **costal cartilage**, and **articular cartilage** in joints (e.g., shoulder, hips, knees, elbows, wrists/hands, and ankles/feet). See **Figure 3** for an anatomical overview of the articular cartilage and synovial joint.

The skeleton is supported by muscles. Skeletal muscles specifically attach to the bones of the skeleton and provide support. The MSK system is connected and supported by joints. These joints include articular cartilage, ligaments, and tendons to connect the MSK system together. Many joints have a cavity with synovial fluid between the articulating joints that permits mobility, including the shoulders, elbows, wrists/fingers, hips, knees, and ankles/toes. Other joints do not have a cavity with synovial fluid including cranial sutures (which are not moveable) and the vertebral column (which is slightly moveable). Bones are connected by ligaments, and tendons connect muscle to bone.



Major muscles of the body. Right side: superficial; left side: deep (anterior view)



Major muscles of the body. Right side: superficial; left side: deep (posterior view)

Figure 1: Muscular system (anterior view on top image, posterior view on bottom image)

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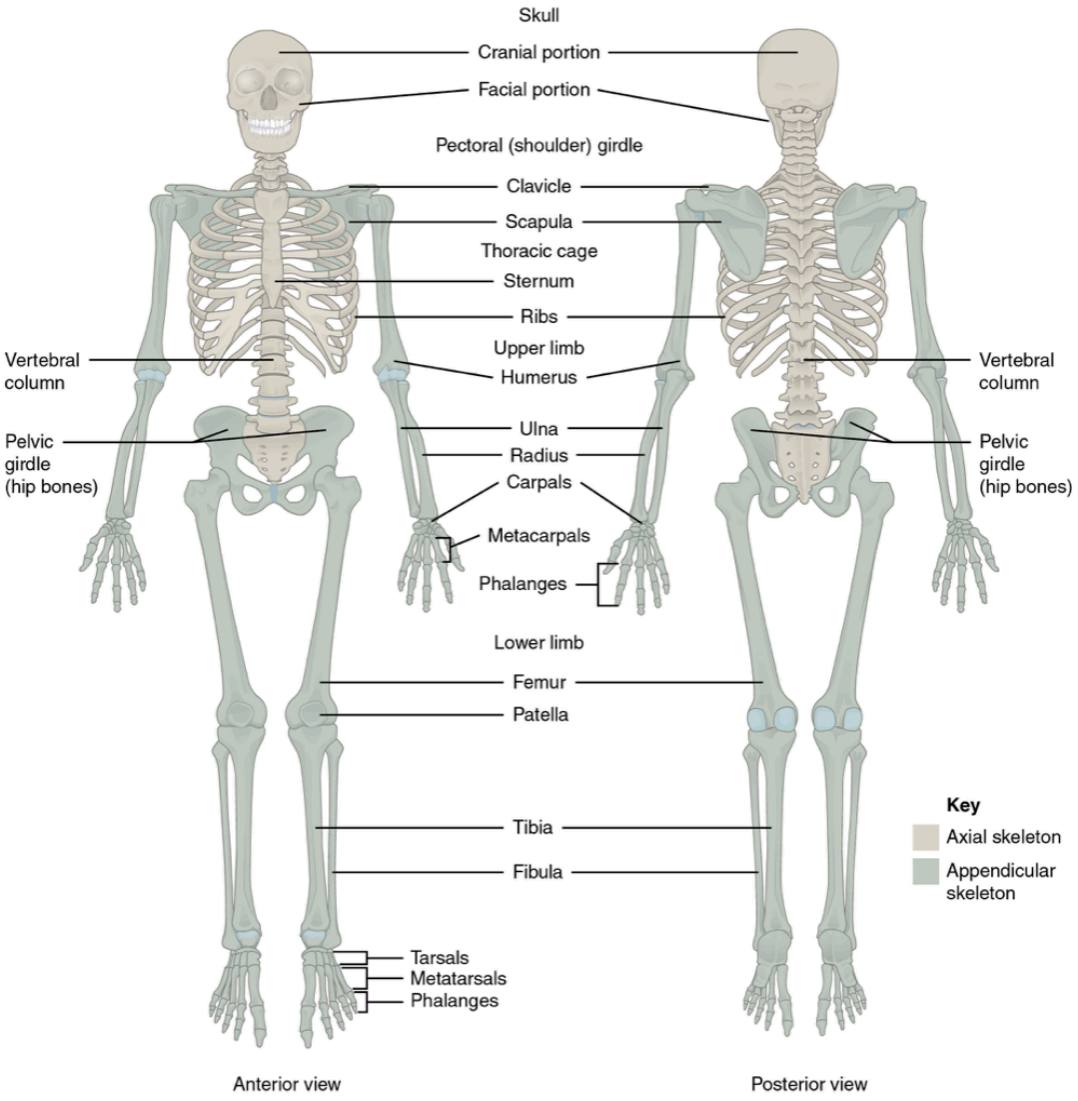
Skull
Cranial portion
Facial portion
Pectoral (shoulder) girdle
Clavicle
Scapula
Thoracic cage
Sternum
Ribs
Upper limb
Humerus
Vertebral column
Pelvic girdle (hip bones)
Ulna
Radius
Carpals
Metacarpals
Phalanges
Lower limb
Femur
Patella
Tibia
Fibula
Tarsals
Metatarsals
Phalanges
Vertebral column
Pelvic girdle (hip bones)
Key
Axial skeleton
Appendicular skeleton
Anterior view
Posterior view

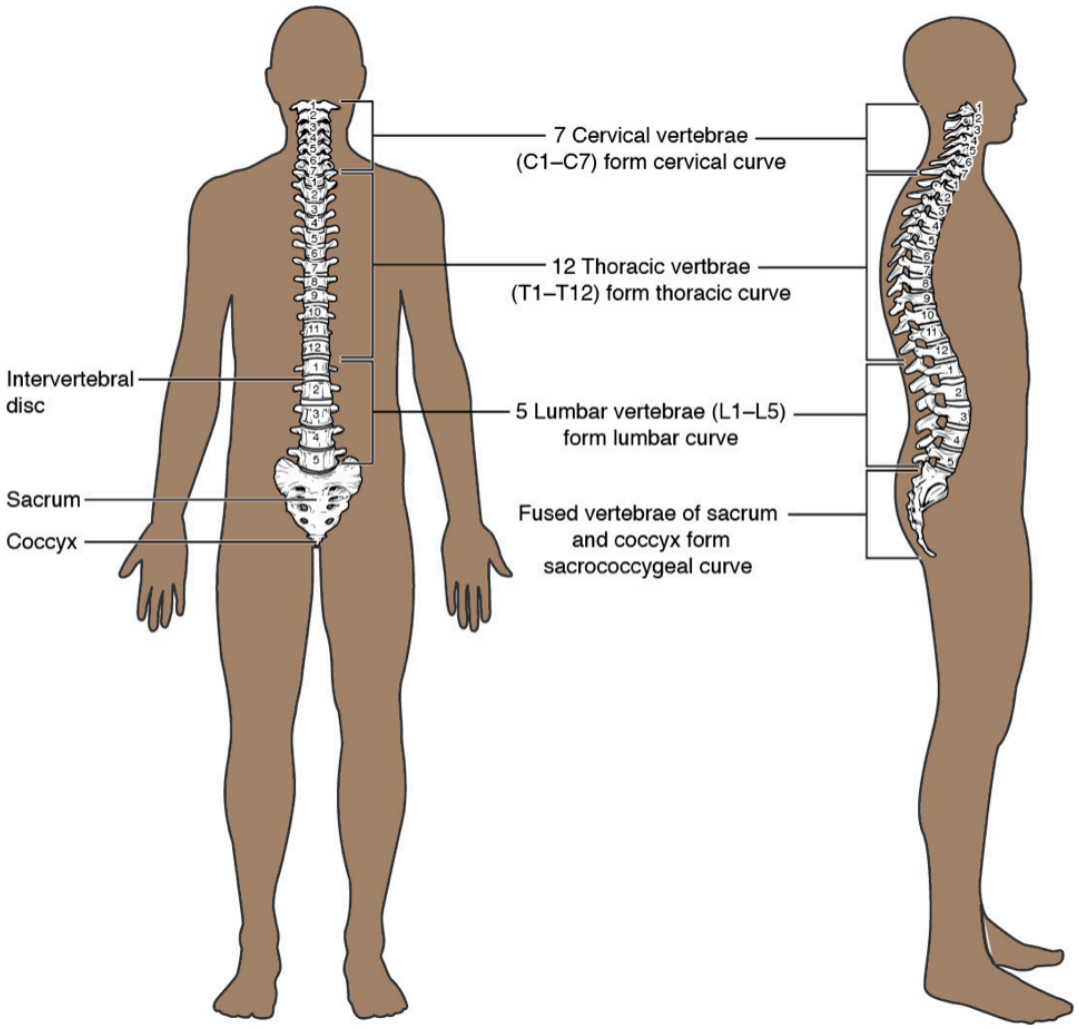

Figure 2: Skeletal system

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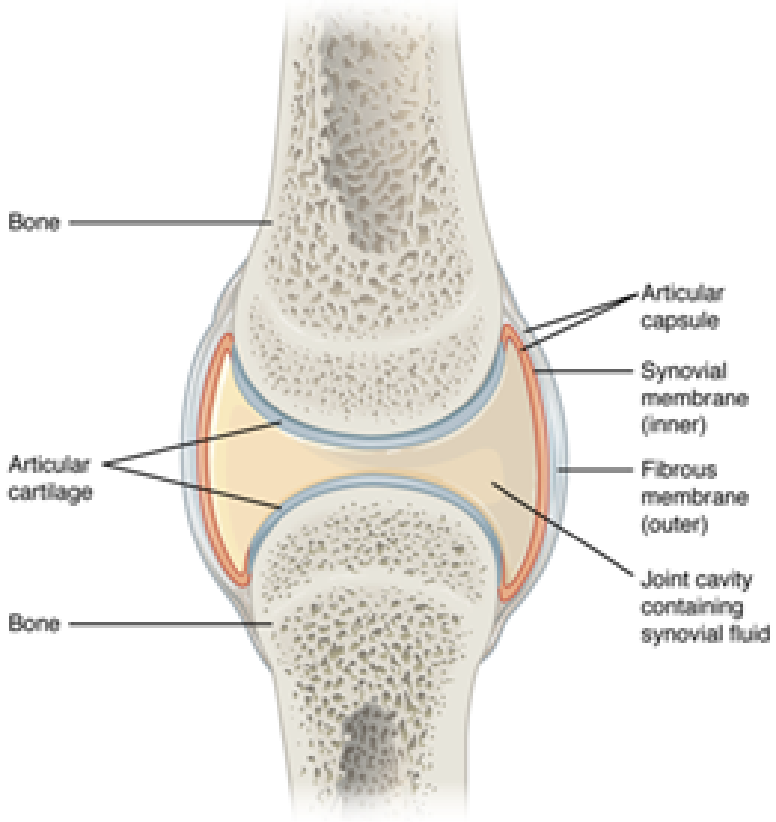

Figure 3: Articular cartilage and synovial joint.

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You have already learned about the anatomy and physiology of the MSK system, but check out these helpful videos on the muscular system explained in six minutes and the skeletal system explained in seven minutes.

Clinical Tip

Your MSK assessment will begin when you first meet the client. Remember to incorporate the concept of functional health by assessing the client's physical capacity to participate in daily activities. For example, a functional assessment includes assessing day-to-day activities such as walking into the room, moving from standing to sitting, signing a consent form, or changing into a hospital gown. Always compare bilaterally during the assessment. Ask clients if they have noticed any changes in their movement and if they have any questions

or concerns. Your findings will help to guide your assessment throughout the examination, as well as provide opportunities to incorporate health promotion and prevention education.

Knowledge Bites

The MSK system is influenced by the neurological system. For example, muscle functioning (e.g., movement and strength) is innervated by the cranial nerves (12 pairs of nerves that send electrical signals from the brain to the body) and the spinal nerves.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1148#h5p-81

Subjective Assessment

Subjective assessment of the **MSK system** involves asking questions about the health of the client and symptoms that may occur because of pathologies that affect the muscles, bones, and joints. A full exploration of these pathologies is beyond the scope of this chapter, but common problems associated with the MSK system include back pain, repetitive strain injury (RSI) such as carpal tunnel syndrome or tendinitis, osteoarthritis, rheumatoid arthritis, sprains, and bone fractures.

Common symptoms that can be related to the MSK system include pain, headache, stiffness, muscle tightness, numbness, weakness, muscle twitches, fatigue, mobility issues, redness, swelling, local temperature change, deformities, and psychological distress. See **Table 1** for guidance on subjective health assessment. Many of the questions in this table align with the PQRSTU mnemonic; for a reminder, check out this resource: PQRSTU. Probing of these symptoms should occur in the order of relevance, as opposed to being sequentially aligned with the PQRSTU mnemonic.

You should also ask about any medications (prescribed, over the counter, and herbal and natural products) the client is taking: the name, dose, frequency, reason it was prescribed or rationale for taking over-the-counter medications, how long they have been taking it, and the effectiveness.

The subjective assessment is performed prior to the objective assessment so that it can inform the objective assessment. Remember to always ask questions related to health promotion. Depending on the context of the assessment, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on "Health Promotion Considerations and Interventions" is included later in this chapter after the discussion of objective assessment.

Knowledge Bites: Pathophysiology

Many MSK-related pathophysiology disorders are related to physical work (e.g., working at a computer, lifting boxes) and workplace injuries, which can be prevented or decreased by implementing health promotion strategies. MSK injuries can occur in the muscles, nerves, tendons, joints, cartilage, and bones. Certain work environments can increase the risk or worsen an MSK injury. For example, work that involves routine lifting, performing repetitive tasks, or work that challenges the ergonomics of your body (e.g., working at a computer for lengthy periods of time). Common workplace musculoskeletal disorders include sprains, back pain, tendonitis, and carpal tunnel syndrome. Proper body alignment and ergonomics can help decrease the risk of a MSK workplace injury.

Table 1: Common symptoms, questions, and clinical tips.

Symptoms	Questions	Clinical tips

Pain associated with the MSK system can be described in many ways such as aching, sharp, cramping, stiffness, or burning sensation. Myalgia is a term that refers to muscle aches and pains. Clients may tell you about pain in their muscles, joints and bone. Sometimes they might not be able to specify, but instead just show the location. Thus, your assessment is important to figuring out the issue.	You might start by asking: Do you currently or have you recently had any pain or other sensations in your joints, muscles, or bones? If the client's response is affirmative, ask: Do you have the pain now? Additional **probes** may include: Region: Where do you feel the pain/ sensation? Radiation: Does the pain radiate to another part of your body Quality/quantity: Tell me about it. What does it feel like? How bad is it? Severity: Can you rate your pain on a scale of 0 to 10 with 0 being no pain and 10 being the most pain you have ever had? Timing: When did it begin? What were you doing when it began? Is it constant or intermittent? Do you wake up with the pain and if so, how long does it last? Provocative/palliative: Is there anything that makes it worse? (If you suspect a fracture, it may be appropriate to ask if movement increases the pain because fractures can cause sharp, intense pain with movement). Is there anything that makes it better? Treatment: Have you treated it with anything? Do you take any medications for it? Does it work? Have you sought treatment regarding this pain? If the pain is in the lower extremities, does walking relieve or aggravate it? Understanding: Do you know what is causing it or what it is related to? Did you have a recent injury? Other questions: How does the pain affect your life? Does it affect your activities of daily living? What type of work do you do? Does it involve physical activity or heavy lifting? Does it involve sitting/standing for long periods of time?	If the client has had an injury or a fall, you may suspect a fracture if they describe a sharp and intense pain on movement or when they attempt to bear weight. If you suspect a fracture, assess for potential deformities, swelling, and decreased circulation distal to the location. Immediate help may be required to decrease the risk of further injury to the MSK, peripheral vascular, and nervous systems, as well as respiratory system (e.g., a fractured rib). When caring for clients with impaired cognition or with clients who are preverbal or non-verbal, refer to the pain assessment chapter, particularly pain tools related to children, cognitive impairment, and critical care. When possible, clients should monitor their pain level and treatment strategies with chronic pain. You might ask them to document their pain in a journal and discuss further strategies for pain management. Types of pain management strategies for some MSK conditions may include non-opioid medications, e.g., acetaminophen or ibuprofen. Non-medicinal pain strategies could include deep breathing exercises, massage, physiotherapy, stretching, ice and heat, and some rest (but you should tell the client it is important to maintain light activity).

Headache is a specific type of pain that can be felt in one certain location or all over the head. It can be described in many ways including sharp, achy, throbbing, full, or squeezing with a viselike quality. You should inquire about the presence of severe and frequent headaches. Headaches can be related to the MSK (e.g., tension or cervicogenic headaches) or neurological system (e.g., **migraine**). Assessment will help you start thinking about which system could be causing the headache. A headache can be the primary cause (e.g., migraine, tension headache) or secondary cause (e.g., cervicogenic or sinus headaches). For example, migraines are primarily related to the neurological system, but head/neck pain and stiffness can occur due to tension that can affect the MSK system; this would be considered a secondary cause.	Do you currently have a headache? Have you recently experienced any headaches that you are concerned about? Do you have frequent, severe, and/or reoccurring headaches that disrupt your day-to-day functioning? Remember to incorporate the language that the client uses into your probing questions.' Additional **probes** if the client's responses are affirmative may include: Quality/quantity: What does your headache feel like? How bad is your headache? Severity: Can you rate your headache on a scale of 0 to 10 with 0 being no pain and 10 being the most pain you have ever had? Region/radiation: Where do you feel your headache? Does it radiate anywhere? Provocative/palliative: Is there anything that makes your headache worse? Is there anything that makes your headache better? Timing/treatment: When did the headache begin? Was it sudden or gradual? What were you doing when it began? Is it constant or intermittent? Have you taken anything to treat your headache? Have you taken any medications Understanding: Do you know what is causing the headache? Do other members in your family experience similar headaches? Other: How does it affect your daily life?	Almost everyone has had a headache. Common causes include stress, dehydration, changes in sleep, poor posture/body alignment, and certain foods (e.g., **nitrates**). Frequent and severe headaches are more concerning. It is important to determine if the headache is primary (e.g., migraine, tension) or secondary and related to another medical condition (e.g., head injury, trauma, tumor, stroke). A sudden onset of a severe headache may require immediate intervention. You should call for emergency help if it is accompanied by confusion, trouble seeing, speaking, or walking, fainting, or numbness/weakness. This kind of headache could be related to a stroke, brain aneurysm, or other serious medical condition.

Joint stiffness refers to when joint movement is limited or difficult (medical term is ankylosis). The joint may feel achy or sore. Joint stiffness can be caused by degeneration of cartilage and/or decreased synovial fluid being produced with age. It can also be caused by other MSK conditions such as arthritis, gout, or bursitis.	Do you currently have any stiffness in your joints? Have you had any recent stiffness in your joints? Additional **probes** if the client's responses are affirmative may include: Quality/quantity: What does it feel like? How bad is it? Region: Which joints feel stiff? Timing: When did it begin? Is there a time of day when the stiffness is worst? Is it constant or intermittent? If intermittent, how long does it last for? Provocative/palliative: Is there anything that makes it better (e.g., position)? Is there anything that makes it worse (e.g., exercise or sitting for long periods of time)? Is it aggravated or associated with any specific movements? Treatment: Have you treated it with anything (e.g., ice, heat, exercise)? Do you take any medications or supplements for it? Do you use any mobility aids? Understanding: Do you know what causes your joint stiffness? Do you have any related symptoms (e.g., pain, swollen glands or lymph nodes, increased saliva production)? Other: How does it affect your ability to move around? How does it affect your sleep?	Joint stiffness is a common MSK concern. Understanding the pathophysiology of the cause of the stiffness will help you determine effective interventions. You should assess the location of the joint stiffness to help determine the cause and whether and how it is affecting the client's activities of daily living. Preventive strategies that can ease joint stiffness include gentle range of motion movements, exercise (e.g., walking), hot and cold compresses, good body alignment/posture, managing weight, and balancing rest and activity.

Muscle spasms are involuntary muscle contractions. The cause of muscle spasms is often unknown, but they can be related to inactivity, fatigue, stress, lack of stretching, dehydration, overuse of the muscle, or pain. Muscle spasms can feel like a twitch or cramping and can create pain.	Do you experience muscle spasms? If the client's response is affirmative, additional **probes** might include: Quality/quantity: Tell me about the muscle spasm. What does it feel like? How bad is it? Region: Which muscle(s) has the spasm? Timing: How often do you have them? When did it begin? When do you feel the muscle spasm (e.g., at night, after exercise)? Is it constant or intermittent? Provocative/palliative: Is there anything that makes it better? Is there anything that makes it worse? Is it aggravated or associated with any other symptoms? Treatment: Have you treated it with anything (e.g., stretching, hot or cold compresses)? Do you take any medications or supplements for it? Understanding: Do you know what caused the muscle spasm or what it is related to?	Assess the cause of the muscle spasm and associated signs and symptoms. If it is related to a neurological system concern, symptoms will vary (e.g., numbness, paralysis, tremor) and other interventions will be required. Adequate water intake, especially during exercise or warm weather, will assist with dehydration-related muscle spasms. Some clients will describe intense muscle spasms in the night, particularly in the calf muscle. Stretching and massaging the spasm can relieve the symptoms. Stretching before and after activities, as well as after being stationary for long periods, will help decrease the risk of muscle spasms.

Mobility, **lack of balance**, and **weakness**. A person's mobility can be affected and limited by their joints, muscles, or bones, as can lack of balance and weakness.	Tell me about your mobility? Tell me about your daily activities and exercise? Do you have any limitations when walking, standing, sitting, or any other body movements? Do you have mobility limitations? For example, do you have any concerns with your balance or any weakness while moving? Do you use any mobility aids (e.g., walker, cane, crutch, bar handles, wheelchair, prosthetics)? If the client's response is affirmative, additional **probes** might include: Quality/quantity: Tell me about your mobility concerns. What does it feel like? How bad is it? Region/radiation: Which part of your body experiences limitations or weakness related to your mobility/ movement? Does the limitation/ weakness remain in the one location or does it move to another location (e.g., hip to knee)? Does this happen when you walk for longer periods of time? Timing: When do you feel a lack of balance or weakness when you are mobile? When did the mobility concerns begin? How long have you been experiencing the limitation or weakness? Is it constant or intermittent? Provocative/palliative: Is there anything that makes it better? Is there anything that makes it worse? Does a certain movement or activity aggravate it or make it feel better? Is it associated with any other symptoms (e.g., pain or numbness)? Treatment: Have you treated it with anything (e.g., stretching, hot or cold compresses, mobility aids)? Do you take any medications or supplements for it (e.g., ibuprofen, fish oil)? Do you regularly use any mobility aids? Understanding: Do you know what caused the mobility issue or what it is related to? How does it affect your daily life?	Mobility will depend on the client's developmental age, current health, and morbidity status. It can also be affected by certain medications that can affect balance or cause fatigue. Help the client take precautions against falling. Think about the SAFE mnemonic: • Safe environment (e.g., well-lit environment, tripping hazards removed). • Assist with mobility (e.g., if relevant, ensure mobility aids and glasses are in reach, document and assist with mobility). • Fall risk reduction (e.g., non-slip footwear, bed in lowered position, call bell in reach). • Engage the client and family (e.g., having conversations about risk factors and prevention). (Canadian Institute of Patient Safety, 2015). You should identify any risk for falls: fall-related injuries are the number one cause of death in seniors (Canadian Fall Prevention Curriculum, 2017). A careful assessment is needed for any client at risk of falling. Various assessment tools are available to systematically assess risk factors related to falls, which include history of falls/near falls, acute condition, ability to move around, mobility aids, or hearing, vision, or cognitive impairment. If the client has already been assessed, you should follow recommendations, as well as all institutional policies to prevent falls. If the client has mobility limitations, assess how this affects their overall daily life (e.g., physically, psychosocially, financially).

Redness, **swelling**, **temperature changes**, and **deformities** may be related to the joints, muscles, or bones.	Always ask one question at a time. Questions might include: Have you experienced any redness (or swelling or temperature changes or deformities) in any joints (or muscles or bones)? Use variations of the PQRSTU mnemonic to assess these symptoms further if the client's response is affirmative.	These symptoms can be related to the MSK system or another body system. You should assess each symptom individually to determine the systematic cause.
Injury and **trauma** can cause a range of musculoskeletal symptoms and/or exacerbate existing issues. It is important to explore the **mechanism of injury**.	Have you had any recent injuries/trauma? If the client's response is affirmative, additional **probes** might include: Quality/quantity: Tell me about the injury/trauma? What does it feel like? How bad is it? Region/radiation: Which part of your body experienced the injury/trauma? Have the effects of the injury/trauma remained in one location or is another location affected? Timing: When did the injury/trauma occur? How long have you been experiencing it? Provocative/palliative: Is there anything that makes it better? Is there anything that makes it worse? Treatment: Have you treated it with anything?	Understanding the mechanism of injury and how the injury occurred will inform your objective assessment and interventions.
Other MSK symptoms can include fatigue, numbness, dizziness, or flu-like symptoms.	Always ask one question at a time. Questions might include: Have you experienced any body fatigue? (or numbness or dizziness or flu-like symptoms?) Use variations of the PQRSTU mnemonic to assess these symptoms further if the client's response is affirmative.	These symptoms can be related to other body systems and non-MSK issues. To determine whether they are MSK related, you will need to explore these symptoms along with any other associated symptoms.

Personal and **family history of MSK** conditions and diseases. Some of the common issues associated with the MSK system, including back pain, repetitive strain injury (RSI) such as carpal tunnel syndrome or tendinitis, osteoarthritis (OA), rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), gout, and fibromyalgia, can have a familial connection.	Do you have any chronic conditions or diseases that affect your muscles, bones, and joints? Do you have a familial history of conditions or diseases that affect the muscles, bones, and joints (e.g., arthritis, lupus, gout, and fibromyalgia)? If the client's response is affirmative, begin with an open-ended probe: Tell me about the condition/disorder/disease? If the client has a personal history, **probing questions** might include: Timing: When did you begin experiencing symptoms related to this condition? When were you diagnosed? Are the symptoms constant or intermittent? Quality/quantity: How does it affect you? What symptoms do you have? How bad are the symptoms? Treatment: How is it treated? Have you had any surgeries? Do you take medication? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better?	The biological and non-biological nature of family may be important to consider when asking questions: risk factors may be influenced by genetics and/or culture and/or environmental factors. Some musculoskeletal disorders are related to genetics (e.g., (e.g., **achondroplasia**, **Duchenne muscular dystrophy**, **osteogenesis imperfecta**), but it is more common that a combination of environment and cultural factors play a larger role (e.g., **osteoarthritis**, **degenerative disc disease**).

Priorities of Care

All abnormal findings require a focused assessment on the MSK system and possibly other systems. However, certain MSK symptoms are cues that require immediate action.

A sudden very severe headache that is worse than the client has ever experienced before requires urgent assessment. It could be a sign of a life-threatening condition such as an aneurysm or a ruptured aneurysm. Other associated symptoms include reduced consciousness, disorientation, eye pain, light sensitivity, blurred vision. If your client has this sort of headache, you should immediately report it to the physician or nurse practitioner, monitor the client's vital signs, and conduct focused assessments (on the MSK, neurological system, and the eye).

Additionally, if you suspect a potential fracture, you should perform a focused assessment. A bone fracture is highly probable if the client experiences a sharp and intense pain upon movement particularly when they have experienced some sort of trauma (e.g., a fall). Take immediate action to decrease the risk of further internal trauma to the peripheral vascular systems (e.g., circulation), nervous system, or other organ damage (e.g., punctured lung or perforated bowels). For example, with a clavicle fracture, the sharp edge of a broken bone

could damage the underlying vessels (e.g., internal jugular vein), nerves (e.g., brachial plexus) or puncture the apex region of the lung (e.g., pneumothorax). When a fracture is suspected:

- Assess pain level.
- Immobilize the area and do not attempt to realign the bones.
- Monitor vital signs frequently (particularly respiration, pulse, and blood pressure) and perform a primary survey.
- Assess circulation and sensation distal to the injury including skin temperature, sensations, and pulses: cool temperature, numbness/tingling, and decreased or absent pulses.
- Report findings to the physician or nurse practitioner.

Contextualizing Inclusivity

Recognize that some clients may have extensive MSK histories, particularly older clients, and ensure you allow sufficient time for assessment. Children may experience what is often called growing pains; this type of pain is an achy muscle pain typically in the legs.

Also, you may have certain values surrounding activity and exercise and/or concerns about your own body image. Try to reflect on your own unconscious biases: this will help you support each client's agency and their own mobility goals while connecting them with supportive resources within their communities.

Some clients with MSK limitations may feel hesitant to participate in sports or activities. For example, they may feel uncomfortable because of self-concept or body image issues associated with their limitations, mobility aids, or physical deformities. It is important that you create an inclusive environment, and be aware of the client's potential discomfort. For example, you may begin the assessment with a non-judgemental question such as: "What type of activities (or sports) do you enjoy?" This can open a discussion about participating in sports or group activities, which can provide many benefits to the client's concept of self. Interacting and socializing with others in a shared activity can create a sense of inclusion, as well as have positive health benefits, both physical and emotional.

Listen to Justin Gallegos' story about being part of his high school cross-country and track team: No Such Thing As A Disability: The story of a runner with cerebral palsy [insert link: https://youtu.be/Hv3liaDDtSY]

Activity: Check Your Understanding

A 28-year-old client is admitted to the emergency department after being involved in a motor vehicle accident (MVA). Their vital signs are RR 28 bpm and shallow, HR 110, BP 100/60, T 36.4°C, and client-rated pain 6 out of 10 in left shoulder and clavicle, 7 out of 10 in right pelvis and hip area, and 4/10 in right thigh and across chest where seatbelt was. The client has a fractured left clavicle and dislocated shoulder with numbness along the distal arm, and a

fractured right pelvis. Bruising noted anteriorly across the upper chest wall/thoracic cage area and medial-lateral from the right hip to upper thigh. Right peripheral IV with normal saline infusing at 50 ml/hr. Client states their head is throbbing, feels stiff and sore all over their body, tired, and scared.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1150#h5p-82

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Canadian Patient Safety Institute (2015). Reducing falls and injuries from falls. https://www.patientsafetyinstitute.ca/en/toolsResources/Pages/Falls-resources-Getting-Started-Kit.aspx

Brief Scan: MSK System

A brief scan provides a **quick overview** of the MSK system. It can be performed when the client enters the room. Your observations provide insight into how the client may need to be supported during the assessment, ways you may need to modify the assessment, and cues that require further investigation.

Steps involved in the brief scan are:

1. Assess the type of **footwear** and the presence of **prosthetics** and **mobility aids** such as canes, walkers, braces, splints, or wheelchairs.

    - If aids are present, you should ask further questions. You need to understand the need for the aid and should assess whether it is being used properly.

2. Assess the client's **posture** and **balance** when they enter the room and their ability to sit or stand upright and maintain this position.

    - Normal findings may include an upright posture and no issues with balance.
    - Abnormal findings may include hunched over, unequal weight bearing, and lateral lean.

3. Assess for the presence of **tremors or obvious deformities**.

    - Normal findings include no tremors or deformities.
    - Abnormal findings may include deformities, which could include fractures, or unilateral or bilateral tremors in head/neck region, upper or lower limbs.

4. Assess the client's **symmetry of limbs** in terms of length and **gait**. This can be done informally when the client walks in the room from the waiting room. Otherwise, you can ask them to walk about 10 feet. This may not be required if a client is in a wheelchair, particularly if they are unable to stand up.

    - Normally, limbs are symmetrical, and gait is balanced.
    - Abnormal findings include asymmetrical limbs and difficulties with balance. Cues of asymmetry and a gait that is not balanced should be probed further.

5. Note the **findings**.

    - Normal findings might be documented as: "Client's body is symmetrical, no deformities, posture straight, steady gait and balance. No mobility aids used."
    - Abnormal findings might be documented as: "Client has a slow and unsteady gait. Left arm hangs lower than the right arm."

Contextualizing Inclusivity

Use a **person-centred** and **systematic approach** to assessment. The initial MSK brief scan will help guide your questioning and facilitate a **non-discriminatory**, **anti-ableist** assessment. For example, if a client uses a mobility aid, always ask for permission/consent to touch or handle the equipment.

Priorities of Care

During the brief scan, any **fractures** or **suspected fractures** should take priority. The fracture may have caused internal damage that is not visible upon inspection, such as a punctured lung, severed cranial nerve, perforated organ, bone fragments, or vascular or peripheral nerve damage.

A **primary survey** approach should be performed before beginning a focused MSK assessment. If there are no life-threatening injuries, you can begin the MSK assessment. **Safety** should be prioritized, including prevention of falls when assessing a client's movement, balance, strength, and gait.

Objective Assessment

An objective MSK assessment is generally completed after the subjective assessment. If the client shows signs of clinical deterioration, such as respiratory distress, you should focus the interview portion on pertinent questions and proceed directly to the objective assessment and associated interventions. For example, a fractured rib or vertebral fracture or a fracture that has severed circulation requires urgent intervention.

Be aware of the environmental temperature in the room and the temperature of your hands. Room temperatures are not easily modified, so try to limit exposing the client's body parts and keep them covered with their clothes or sheet/blanket until you need to assess that body part. This also follows a **trauma-informed approach** and maintains the client's dignity and limits exposing them unnecessarily. If a stethoscope is needed, warm your hands and stethoscope before placing them on the client's body.

The objective assessment of the MSK system involves a brief scan and a focus on **inspection**, **palpation**, **range of motion (ROM)**, and **manual muscle testing (MMT)**, and sometimes **auscultation**, depending on the affected area (see **Table 2**). Compare the body bilaterally throughout the assessment. Assess the unaffected side first for comparison with the affected side, and when a joint is affected, at the minimum, assess above (proximal) and below (distal) the joint. However, it is important to note that some causes of joint pain can go beyond the joint above and joint below.

The **sequential order of the objective assessment** is typically based on minimizing position changes and using a cephalocaudal (head to toe) or proximal to distal approach. Although certain positions are suggested, you may need to adapt the position if a client is not able to stand or sit up. **Do not conduct ROM or muscle testing** if the subjective assessment and/or inspection and palpation suggest **trauma to the neck or back, or a bone fracture**.

Table 2: Brief overview of a MSK assessment.

MSK Assessment	Clinical Tips
Inspection involves systematic observation with a focus on muscles, bones, and joints. Depending on the areas inspected, this may include colour, swelling, masses, deformities, and asymmetry. Observed deformities may include subluxation (when a bone is partially dislocated within a joint) or a complete dislocation in which the articular surface of two bones are no longer aligned or connected. You also need to assess the surrounding skin condition and presence of bleeding with **open fractures** and whether you observe any involuntary muscle contractions (e.g., twitching, spasms).	Remember to **compare findings bilaterally** and further assess discrepancies, asking additional subjective questions when required. Any **abnormal findings** noted upon inspection should be further assessed with palpation. You should assess for the presence of muscle atrophy/wasting (loss of muscle mass and tone) in clients who have suspected musculoskeletal conditions and mobility issues. It is best evaluated by comparing the client's muscle mass and tone to their baseline (i.e., their normal composition).
Palpation involves applying your hands to assess temperature, pain, masses, swelling, deformities, palpable fluid, and size and contour of muscles. You can palpate the affected area if the client notes or you observe any involuntary muscle contractions (e.g., twitching, spasms).	Assess the **unaffected side first** to compare it to the affected side. Use the **dorsal aspect** of your hands to assess for temperature, because it is most sensitive to temperature changes. For palpation, use your **finger pads** as they are densely innervated. Your thumb will often be used along with your fingertips when assessing joints. A synovial joint does not normally have palpable fluid. To learn more details about palpation techniques, review the Physical Examination Techniques: A Nurse's Guide open educational resource.
Range of motion (ROM) refers to a joint's mobility: can it stretch to its fullest extent? You should become familiar with the normal ROM of each joint. A client's baseline also is important so that you can evaluate their progress over time. When assessing, make note of: • **Range of motion** of the joint (full ROM or limited ROM with the specific range, and the presence of any **contractures**). • **Quality of the movement** (movements of joints should be smooth and symmetrical with no obvious misalignments). • Presence of **pain** (ask the client if they have any pain). • Presence of **crepitus** (crepitus is an abnormal grating or crunching sound or sensation felt and heard over joints at the location where bones meet. It occurs when the articular surface of bones grind together. It is different from the sounds that are made when a person cracks their fingers or joints, which are caused by the slipping of tendons/ligaments over bony surfaces. Ask the client to move their joints through a range of motion and listen. If the client has pain or a limited range of motion, you may cup your hand over the joint or grasp the joint with your fingers and thumb.). When performing ROM exercises, encourage the client to try to perform **active ROM** first, meaning that they move without assistance. If they are unable, help the client perform assisted active ROM, and then move to passive ROM as needed. • Assisted active ROM is when you are providing some assistance to help the client with ROM. • Passive ROM is when a healthcare provider or equipment/machine moves the client's joints through ROM positions for a specific joint. With all ROM, ensure the **joint is still** and **stabilized**. When performing assisted active or passive ROM, always support the client's joint and maintain proper body alignment throughout the movement. It is appropriate to provide light pressure to fully test the full ROM of the joint, but you should **never force a joint beyond its capacity**, as this could cause damage.	It is helpful to **demonstrate the movement** so that the client can mirror the motions you make. Before beginning, ensure the client's **body is aligned**. As the client moves through the motions, ensure stability of the body part proximal to the joints. Ideally, the client would perform ROM bilaterally at the same time in order to make comparisons. However, this is not possible with all joints such as the hips. Additionally, it may not be possible with clients who have mobility limitations and pain. The guidelines for ROM angles vary across the literature. We recommend using the ROM guidelines set out by the American Academy of Orthopaedic Surgeons (1965) and Luttgens and Hamilton (1997), as they are most commonly used in practice. Typically, you will visually observe the angle of the joint. Note that this will be an estimate, which is an appropriate approach when doing a **functional assessment of ROM**. If a more accurate joint angle is needed (e.g., fitting for a wheelchair), you may require a goniometer, which is a tool that measures the angle of a joint. ROM can be affected by several factors including the person's typical use of the joint and their age. New onset of limited ROM is a concern and is a cue that requires further investigation.

Manual muscle testing (MMT) evaluates the body's capacity to **innervate muscle strength**. This can reveal neurologic deficits and help you evaluate their response to treatment of neuromuscular conditions. Essentially, you are evaluating the muscle strength resistance against the force of the assessor (i.e., the nurse). The Medical Research Council (MRC) Manual Muscle Testing scale (1943) is a common tool used and accepted by healthcare providers (James, 2007). It uses a **grading scale of 0–5** to measure upper and lower extremities resistance against applied pressure by the healthcare provider in various ROM exercise movements (see **Table 3**). An alternative method to test muscle strength is to use a dynamometry, which is a kind of mechanical equipment. The tool can record a more precise measurement of the muscle strength. However, not all healthcare facilities have access to this equipment. Another method to assess a client's muscle strength is a functional test. This kind of test assesses performance during activities of daily living; examples include the 30 Seconds Sit to Stand test or the Timed Up, Go (TUG) test.	MMT can be evaluated in several ways. Check with the unit policy to see if there is a preferred approach. The MRC tool is somewhat controversial in terms of grade breakdown, as the subjective nature of skill when performing MMT (Naqvi, 2019). You can minimize subjectivity by being consistent in how you perform these techniques. Keep these tips in mind when performing MMT: • Before beginning, assess the environment. Are there any situational factors that might affect the client's MMT performance (e.g., pain, fatigue from medications, lack of sleep, stress)? • Ensure the joint is stabilized/still. • Maintain proper body alignment of you and the client (i.e., the muscle being tested) to ensure stability and that only the selected muscles are being tested. • When making comparisons bilaterally, ensure your hand is positioned on the client at the same location. • Test one joint at a time. This will ensure consistency and stability of the specific muscle and joint being tested. • Use both hands when performing MMT. • When applying force, be aware of your own strength and your dominant side so that you apply the same force on each side. Be aware that clients have varying muscle strength and use force accordingly. When uncertain, apply force gradually to ensure safety and minimize potential injury. • Compare bilaterally and report findings. For example, normal findings are full resistance equal bilaterally. Alternatively, note any asymmetry in strength and decrease in resistance. • Note whether the client has pain. MMT puts the tissue under a higher threshold of stress and may elicit pain.

Table 3: MMT Scale (based on Medical Research Council (MRC) Manual Muscle Testing scale, 1943).

Grade	Muscle State	Description
0	No contraction.	There is no contraction or movement of the body part being tested. Thus, MMT cannot be performed.
1	Flicker or trace of contraction.	There is a trace of contraction or flicker of movement of the body part being tested with no gravity and no applied force. No gravity means that the body part is supported by a bed or table.
2	Active movement, with gravity eliminated.	The body part being tested is able to actively move through a ROM when supported on a flat surface (i.e., supported by the table or bed) with gravity eliminated and no applied force.
3	Active movement, against gravity.	The body part being tested is able to actively move through a ROM against gravity without support and no applied force. Note: If client is able to perform full active ROM, then you can assume the client is already at ⅗ on the MMT as a baseline.
4	Active movement, against gravity and resistance	The body part being tested is able to actively move through a ROM against gravity while you apply force and they try to resist your force, and they demonstrate partial resistance.
5	Normal power	The body part being tested is able to actively move through a ROM against gravity while you apply force and they try to resist your force, and they demonstrate full resistance.
Note: For each MMT movement, document the movement and whether the movement is equal bilaterally in strength (except spine flexion and extension, where bilateral comparison is not possible) as well as if the client experiences pain. For example, a normal finding may be reported as "**full resistance equal bilaterally on all upper limb ROM with no pain**."		

Contextualizing Inclusivity

When assessing the MSK, you will need to assist the client into various body positions. Try to reduce the

number of changes in body position, particularly for older clients and clients with physical disabilities who may have difficulty and possibly reduced strength to change positions. If you are assessing a newborn or young child, you can ask someone (e.g., care partner, healthcare provider, parent) to help hold and reposition the client on the exam table or in their lap while you conduct the assessment.

Knowledge Bites

Synovial joints have a small amount of fluid in the cavity between the articulating joints, but this fluid should not be palpable. Palpable fluid is a joint effusion, which refers to an accumulation of excess fluid. When palpating, it feels soft and moveable, and is sometimes associated with warmth, redness, and pain. The cause of effusions varies, but can be associated with infection, inflammation, and injury. Effusions are considered in the context of other cues, the severity, and potential causes. Treatment may be as simple as rest, ice or heat, and non-steroidal anti-inflammatory medications. Depending on the cause and severity, other treatments may include antibiotics, **arthrocentesis**, and surgery.

Activity: Check your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1154#h5p-83

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Face, Neck, and Cranium

Assessment of the face, neck, and cranium involves inspection, palpation, ROM, and MMT. This assessment is best performed with the client sitting upright on the exam table. However, depending on the client's situation, it can be performed when they are sitting in a chair/wheelchair or lying in bed.

Inspection

Steps for **inspecting** the **face, neck** and **cranium** include:

1. **Inspect** the **face for colour, symmetry, swelling, masses,** and **deformities** with a focus on the muscles, bones, and joints.

    - Normally, the face has no discolourations such as erythema and is symmetrical with no swelling, masses, or deformities. Describe the appearance and location of any discolouration, swelling, masses, and deformities.

2. **Inspect** the **anterior, lateral,** and **posterior sides** of the neck and cranium (as well as the superior side of the cranium). Depending on the reason for assessment, it may be appropriate to request permission to move the client's hair so that you can directly observe the cranium.

    - Normally, the head is upright and centred and the cranium and the neck are symmetrical with no masses, swelling, deformities, or discolourations. Describe the appearance and location of any asymmetry, masses, swelling, deformities, and discolourations (these will be further assessed with palpation).

3. Note the **findings**.

    - Normal findings might be documented as: "Client's head is upright and centred. No masses, swelling, deformities or discolouration on the head, face and neck."
    - Abnormal findings might be documented as: "Client's face has swelling over the right zygomatic (cheekbone) area with bluish-purple discolouration."

Contextualizing Inclusivity

Consider an inclusive, anti-racist, and trauma-informed approach when assessing the cranium, which may involve touching the hair. Clients may have alopecia due to a medical diagnosis or treatment that has caused hair loss; hair loss can be distressing and make them feel vulnerable. There is also a cultural component to hair and headwear, which can be connected to identity, culture, and body image – this can apply to many people. Be aware that structural racism continues to pervade ideals of beauty and affects

Black women in particular (Johnson & Bankhead, 2014). Black women may wear their hair naturally, in locs, braids, wigs, or extensions such as clip-ins and weaves. Black women continue to be affected by structural and interpersonal racism with accompanying discrimination, judgement, and marginalization (Brown, 2018). Additionally, some Indigenous people have a spiritual connection with their hair and for that reason, along with the effects of forced cutting of hair in residential schools, and intergenerational trauma more broadly, some may consider it offensive to have their hair touched. As a healthcare provider, you should be aware of these issues and use an anti-racist and trauma-informed approach. Always ask permission to touch and explain what you are doing and why. Only perform assessments when necessary and engage the client in the process.

Palpation

Steps for **palpating** the **cranium, face,** and **neck** include:

1. Palpate the **temporomandibular joint** (where the maxilla and mandible meet anterior to the tragus). Do both sides at the same time and place two to three finger pads on each side and move in a circular motion in two to three areas. Then, use dorsa of hands and palpate the **posterior side of neck** for **temperature**. The rest of the facial structures are normally not palpated unless the client has indicated a concern or has experienced a physical injury.

    - Normally, the temperature is equal bilaterally, muscles are firm to touch, and no pain is felt on palpation.

2. Palpate down the **cervical spine** and the **paravertebral muscles** on the posterior side of the neck from inferior to the occipital bone (C1) down to C7 (see **Video 1**). Then, palpate down the **trapezius muscles** followed by the **sternomastoid muscles**. Ask the client if they have any pain/tenderness.

    - Normally, the cervical spine and muscles are symmetrical with no pain, masses, swelling, deformities, or paravertebral muscle spasms. The description and location of abnormal findings should be noted. Description of masses and swelling may include size and consistency (soft or hard).

3. Note the **findings**:

    - Normal findings might be documented as: “Temperature warm to touch and equal bilaterally with no pain on temporomandibular joint. Cervical spine and muscles are symmetrical with no pain, masses, swelling, or deformities noted on palpation.”
    - Abnormal findings might be documented as: “Client noted pain as a 6/10 upon palpation of the cervical spine. Swelling palpable from C6–7.”

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Video 1: Palpation of spinous processes and paravertebral muscles from C1 to C7 [0:43]

Range of Motion (ROM)

ROM related to the face is focused on the temporomandibular joint and includes vertical and lateral motions and protraction and retraction. ROM of the neck involves flexion, extension, lateral bending, and rotation (see **Table 4** for normal ranges). For cervical spine ROM, you will assess the gross ROM, which is the cumulative ROM of all of the spinal segments together.

While performing the assessment, observe the ROM, quality of the movement, listen for crepitus, and ask the client about the presence of pain.

While demonstrating the movements yourself, the steps in assessing ROM of the temporomandibular joint and the neck are:

1. Ask the client to open and close their mouth (**vertical motion**). Then, place your index and middle fingers on the temporomandibular joints on both sides of the face and ask them to repeat the movement
    - Normally, there should be no pain and the temporomandibular joint should open and close smoothly. Sometimes, you may hear and/or feel a click (clunk) of the jaw. This is usually not of concern unless associated with pain and affecting the ability to chew food.
2. Ask the client to perform **neck flexion** by attempting to touch their chin to their chest and bring it back to neutral position.
3. Ask the client to perform **neck extension** by gently tilting their head back and bring it back to neutral position.
4. Ask the client to perform **neck lateral bending** by tilting their head to the right, back to neutral position, and then to the left (e.g., "attempting to touch their ear to their shoulder").
5. Ask the client to perform **neck rotation** by turning their head to the right, back to neutral position, and then to the left.
6. Note the **findings**:
    - Normal findings might be documented as: "Client's temporomandibular joint and neck has full ROM, movements of joints are smooth and symmetrical with no obvious misalignments, no crepitus or pain noted."
    - Abnormal findings might be documented as: "Client's neck has limited ROM in flexion with no crepitus. Pain noted as a 3/10 while flexing."

NOTE: See **Video 2** for ROM of the neck.

Table 4: Normal ROM of temporomandibular joint and neck (adapted from Luttgens & Hamilton, 1997).

Joint	Range of motion
Temporomandibular joint	ROM for the temporomandibular joint is not commonly performed unless there is a concern regarding pain or functionality.
Neck: Flexion	60 degrees
Neck: Extension	75 degrees
Neck: Lateral flexion	45 degrees
Neck: Rotation	80 degrees

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Video 2: ROM of neck [0:58]

Manual Muscle Testing (MMT)

Assess MMT after ROM. Explain the procedure before applying force. Perform MMT on each joint bilaterally. Grade the resistance according to the institution's grading scale (e.g., MRC) or just describe it and note whether it is equal bilaterally. Keep in mind that MMT of the neck also provides information about the functioning of cranial nerve XI (spinal accessory nerve) and whether it is innervating the muscles.

MMT of the face, neck, and cranium is focused only on the neck and is typically performed with the client in sitting position. The steps involve:

1. Begin with the client's head in a neutral position looking straight ahead. To perform **cervical/neck flexion**, stand slightly lateral to the client, place one hand on the thoracic spine for stability and the other on the client's forehead, ask them to bend their neck bringing their chin to their chest while you apply force with your hand on their forehead. Ask them to resist your force. Release the force and ask them to return their head to neutral. Note if the client tries to move their shoulders or thoracic body during the procedure.
2. Next, place one hand on the posterior occipital bone and the other on the client's shoulder for stability. To perform **neck extension**, ask the client to look up to the ceiling to extend the cervical spine, while applying force with the hand on the occipital bone. Ask them to resist your force. Release the force and ask them to return their head to neutral. Note if the client tries to use their back during the procedure.
3. Move in front of the client. For stability, place one hand on their right shoulder and the other on the client's head above the left ear over the temporal bone structures. To perform **lateral bending**, ask the client to touch their left ear to their left shoulder, while you apply force to the movement. Ask them to resist your force. Release the force and ask them to return their head to neutral. Repeat the procedure on the opposite side. Note if the client tries to flex the lateral thoracic spine during the procedure.
4. To perform **rotation**, place one hand on the right shoulder for stability and the other on the lateral side of the client's face with fingers pointing toward the temporal bone structures. Ask the client to look left to rotate the cervical spine while you apply force. Ask them to resist your force. Release the force and ask them to return their head to neutral. Repeat the procedure on the opposite side. Note if the client tries to rotate the thoracic spine during the procedure.
5. Note the findings:
    - Normal findings might be documented as: ""full resistance equal bilaterally on all neck ROM with no pain."
    - Abnormal findings might be documented as: "partial resistance equal bilaterally on all neck ROM with mild pain."

NOTE: See **Video 3** for MMT of the neck.

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Video 3: MMT of the neck [1:34]

Priorities of Care

If a fracture or internal trauma is suspected when inspecting the head, face, or neck, call for immediate assistance and stabilize the head and neck. Your initial suspicions will usually be based on the client's reason for seeking care. Monitor vital signs for any internal damages caused by bone fragments, such as changes in respiration due to damage of the larynx or nasal bone/cartilage. Monitor for reduced consciousness, disorientation, or dilated pupils due to swelling in the brain. Monitor for loss of sensation or paralysis due to a severed cranial nerve. Do not perform palpation, ROM and MMT as this manipulation can increase the risk of permanent damage or life-threatening conditions. You will also do a neurological assessment, which will be introduced in another chapter; neurological involvement may be suspected if the client has limited ability to blink their eyes, stick out their tongue, raise their eyebrows, or smile.

Activity: Check your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1156#h5p-84

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Arms, Hands, and Related Joints

Assessment of the arms and hands progresses from the shoulders to the fingertips. Related joints include the shoulders, elbows, wrists, and fingers. This assessment involves inspection, palpation, range of motion, and manual muscle testing, and is generally completed with the client sitting upright on the exam table. ROM and muscle testing of the shoulders requires the client to stand, so it is usually reserved until the end of the MSK assessment to minimize position changes. You may also need to modify the approach if a client is unable to stand.

Inspection

Steps for inspecting the arms and hands include:

1. **Inspect for colour**, **symmetry**, **swelling**, **masses**, **deformities**, and **length of limbs** with a focus on the muscles, bones, and joints on the whole arm and hand. This involves asking the client to stretch arms and hands out in front of them (pronation) and then turn them over (supination) so that you can inspect the anterior and posterior sides. You may need to ask the client to spread their fingers apart while they are moving their outstretched arms from pronation to supination. Next, ask the client to rest their hands on their lap while you inspect the shoulders and elbows as these cannot be fully visualized when pronating and supinating.

    - Normally, there is no discolouration, swelling, masses, and deformities, and the arms and hands and joints are symmetrical.
    - Describe the appearance and location of any discolouration, swelling, masses, and deformities.

2. Note the **findings**:

    - Normal findings might be documented as: “Client’s shoulders, arms, wrists and hands are symmetrical with no redness, swelling, masses, or deformities.”
    - Abnormal findings might be documented as: “Client’s right wrist is red and swollen on the dorsal side of wrist, 5 cm x 3 cm area.”

NOTE: See **Video 4** for inspection of arms and hands.

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Video 4: Inspection of arms and hands [0:50]

Palpation

Steps for palpating the arms and hands:

1. **Palpate for temperature** from shoulders to fingertips bilaterally. Palpate over the shoulder, elbow, wrist, and finger joints as you move down the client's arm.

    - Temperature is normally warm to touch and equal bilaterally. Temperature may get slightly cooler toward the fingertips.
    - Abnormal findings include increased temperature over a joint and sometimes a muscle.

2. **Palpate for pain, masses, swelling, deformities, palpable fluid,** and **muscle twitching** from shoulders to fingertips. Palpate the whole arm and hand including the full joint. If the client reports pain prior to assessment, assess that area last.

    - Normally, there is no pain, masses, swelling, deformities or palpable fluid.
    - If pain is present, note the location and ask client to rate the severity and describe the quality. Describe the location and characteristics of any masses, swell, deformities, or palpable fluid.

3. Note the **findings**:

    - Normal findings might be documented as: "Client's shoulders, arms, wrists and hands are warm to touch to fingertips, equal bilaterally. No pain, swelling, masses, deformities, or palpable fluid noted."
    - Abnormal findings might be documented as: "Client's right elbow is warmer to touch in comparison to left elbow. Swelling over the olecranon area. Client reported pain as a 6/10 upon palpation."

NOTE: See **Video 5** for palpation of arms and hands.

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Video 5: Palpation of arms and hands [2:03]

Range of Motion

ROM of the arms and hands is focused on the shoulders, elbows, wrists, and finger joints (see **Table 5** for normal ranges). Much of this assessment can be performed in sitting position except the shoulder ROM, which is best performed in standing position (it can be performed toward the end of the MSK assessment when the client is positioned into standing). In saying this, ROM of shoulders, elbows, wrists and finger joints can all be performed in standing position if the client has no issues with mobility and balance or a supine and lying lateral position if the client is unable to stand. Begin with the unaffected arm first, then move to the affected arm for comparison.

While performing the assessment, observe the ROM, quality of the movement, listen for crepitus, and ask the client about the presence of pain. You can demonstrate the movements yourself.

Steps for assessing ROM of the arms and hands:

1. To perform **shoulder flexion**, ask the client to stand with their arms hanging straight at their sides (neutral position/extension), then lift their arms in front of them above their head (keeping their arms straight) until their fingertips point toward the ceiling, and finally bring them back to a neutral position.
2. To perform **shoulder extension**, start with the client in a neutral position and ask them to move their arms/hands back as far as possible (keeping their arms straight with an upright posture and not leaning forward), and then return to a neutral position.
3. To perform **shoulder abduction**, start with the client in a neutral position and ask them to move their arms out from their body (laterally) and up over their head until the hands meet, and then back to a neutral position. Assess movement anteriorly and posteriorly.
4. To perform **shoulder adduction**, start with the client in a neutral position and ask them to move their arm across the midline of their body to the opposite side, keeping the arm straight, and then repeat with the other arm.
5. To perform **shoulder external rotation** (also called lateral rotation), ask the client to bend their arm at the elbow to a 90-degree angle keeping their elbow tightly close to their side, then ask them to move their hands out to the side while keeping their elbows tight to the side of their body until their palms face forward (this externally rotates the shoulder).
6. To perform **shoulder internal rotation** (also called medial rotation), ask the client to have their arms hanging straight down at side with thumbs pointing inward/medial to the body, and then move their thumbs/arms up their back as high as they can, and then back to a neutral position.
7. To perform **elbow flexion**, start with the client in a neutral position, and then ask them to lift their forearm/hand arms up by bending at the elbow, moving their hands toward their shoulders while keeping the elbow joint still, and finally return to a neutral position (which is **elbow extension**).
8. To perform elbow **supination** and **pronation**, start with the client in a neutral position, and ask them to bend their elbow at a 90-degree angle with thumbs facing up. Next, rotate the thumbs/forearms internally for pronation (palms of the hands should be facing down to the floor), and then externally for supination (palms of the hands should be facing up to the ceiling).
9. To perform **wrist flexion** and **extension**, ask the client to rest their forearms and hands on a table.
    - For **wrist flexion**, the client's forearms should be resting on the table in supination position (palms of the hands facing up). Ask the client to bend at the wrist joint with fingers pointing to the ceiling while keeping the forearms/wrists on the table.
    - For **wrist extension**, the client's forearm should be resting on the table in a prone position (palms of the hands facing down). Ask the client to bend their wrist joint back with fingers pointing to the ceiling by keeping the forearm and wrists on the table.
10. To perform **wrist radial** and **ulnar deviation** ask the client to rest their forearm on the table in a prone position (palms of the hands facing down).
    - For **radial deviation**, ask the client to flex their wrists inward/medially keeping the forearm/hands/fingers on the table as the fingers deviate midline and point toward each other, and then return to a neutral position.
    - For **ulnar deviation**, ask the client to flex wrists outward/laterally keeping the forearms/hands/fingers on the table as the fingers deviate away from midline and point away from each other, and then return to a neutral position.
11. To perform **finger flexion and extension/abduction,** first ask the client to make a fist (flexion) by bending the

fingers and then stretch and spread their fingers out straight (extension). This is also considered abduction as the fingers are spread out from one another. Ask the client to put their forearm/hands/fingers flat in a prone position on a table and lift their fingers off the table in extension, while keeping their palms flat.

12. To perform **thumb flexion, extension, abduction, and opposition**, ask the client to rest their forearms on the table in a prone position (palms of the hands facing down), then ask the client to externally rotate their forearms so the palms are facing each other.

    - For thumb **flexion and extension**, ask the client to bend their thumbs into the base of the palm, and then up, pointing the tip toward the ceiling for extension.
    - For thumb **abduction and adduction**, ask the client to abduct their thumbs internally pointing toward each other, and then adduction moving back beside the first digit.
    - For thumb **opposition**, ask the client to touch their thumb tips to the tip of the 5th digit.

13. Note the **findings**:

    - Normal findings might be documented as: "Full ROM of shoulders, elbows, wrists and hands, movements of joints are smooth and symmetrical with no obvious misalignments, crepitation, or pain bilaterally."
    - Abnormal findings might be documented as: "Client shoulder abduction 100 degrees, no crepitation, reported tenderness 3/10."

NOTE: See **Video 6** for ROM of shoulders, see **Video 7** for ROM of elbows, see **Video 8** for ROM of wrists, and **Video 9** for ROM of fingers.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1158#oembed-3

Video 6: ROM of shoulders [2:23]

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Video 7: ROM of elbows [1:05]

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1158#oembed-4

Video 8: ROM of wrists [1:20]

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1158#oembed-5*

Video 9: ROM of fingers [1:19]

Table 5: Normal ROM of shoulders, elbows, wrists, and fingers (adapted from American Academy of Orthopaedic Surgeons, 1965; Luttgens & Hamilton, 1997).

Joint	Range of motion
Shoulders: Flexion and extension	Flexion: 180 degrees Extension: 50–60 degrees
Shoulders: Abduction and adduction	Abduction: 180 degrees Adduction: 50 degrees
Shoulders: External/lateral and internal/medial rotation	External/lateral rotation: 90 degrees Internal/medial rotation: 70–90 degrees
Elbows: Flexion and extension	Flexion: 140–150 degrees Extension: 0 degrees
Elbows: Pronation and supination	Pronation: 80 degrees Supination: 80 degrees
Wrists: Flexion and extension	Flexion/palmar flexion: 60–80 degrees Extension/dorsiflexion: 60–70 degrees
Wrists: Ulnar and radial deviation	Ulnar deviation: 30 degrees Radial deviation: 20 degrees
Fingers: Flexion, extension, abduction, and adduction	Flexion: 90 degrees Extension: 10 degrees Abduction/adduction: Varies in degrees; ask the client to spread their fingers apart, then back together in adduction.

Thumbs: Flexion, extension, abduction, and opposition	Flexion: 15-80 degrees Extension: 20 degrees Abduction: 70 degrees Opposition: Varies in degrees; ask the client to touch the tip of their thumb to the tip of their 5th digit or the base of their palm

Manual Muscle Testing (MMT)

Perform MMT after you assess ROM. Explain the procedure before applying force and perform MMT on each joint, one at a time. Grade the resistance according to the institution's grading scale (e.g., MRC) or just describe it and note whether it is equal bilaterally.

Steps for MMT of shoulders, elbows, wrists, and fingers:

1. To perform MMT for **shoulder flexion** and then **extension**, ask the client to stand with their arms hanging straight down at the side (neutral position). With their shoulder joints still and arms straight, place your hands on the client's forearm and apply force while you ask the client to raise their arm straight up in front of them and resist your force. Release the force and ask them to return their arm to a neutral position. Repeat on the other arm. Then, have the client raise one arm straight out in front of them and above their head. Place your hands on their elbow/forearm, apply pressure and ask them to resist your force while pushing their arm down back to a neutral position. Release the force and ask them to return their arm to a neutral position. Repeat on the other arm.
2. To perform MMT for **shoulder abduction** and then **adduction**, ask the client to stand in a neutral position. Place your hands over the elbow/top of the forearm. Ask the client to try to raise their straight arm out to the sides while you apply force and they try to resist it. Release the force and ask them to return their arm to a neutral position. Repeat on the other arm. For adduction, assess one arm at a time: place your hand on their inner forearm and ask them to move their straight arm across the midline while you apply force and they resist it. Release the force and ask them to return their arm to a neutral position. Repeat on the other arm.
3. To perform MMT for **elbow flexion** and then **extension**, ask the client to stand in a neutral position. Place your hands in the middle of one forearm and ask the client to flex/bend their arm (at the elbow) in front of them while you apply force and they resist it. Release the force. Repeat on the other arm. Next, ask the client to bend their arm about 100 degrees (at the elbow) in front of them; place your hands on the middle area of the forearm and ask them to attempt to straighten their arm while you apply force and they resist it. Repeat on the other arm.
4. To perform MMT for **wrist flexion** and then **extension**, ask the client to rest their forearms/hands on a table in a supination position. Place one of your hands on their forearm and the other touching the palm of their hand. Ask the client to bend their wrists by pushing their palm up into your palm while you apply force and they resist it. Repeat on the opposite side. Next, ask the client to rest their forearm/hands on the table in a pronation position. Place one hand on their forearm to stabilize the arm; place the other on the dorsal side of their hand. Apply force to the dorsal side of the hand and ask the client to bend their wrist back by pushing their hand up into yours while resisting your force. Repeat the procedure on the opposite side.
5. To perform MMT for **finger flexion**, ask the client to grasp your two fingers with their hands (or with a handshake) to assess their strength bilaterally.
6. Note the **findings**:
    - Normal findings might be documented as: "full resistance equal bilaterally on all upper limb ROM with no pain."
    - Abnormal findings might be documented as: "partial resistance on left wrist ROM with mild pain."

NOTE: See **Video 10** for MMT of shoulders, see **Video 11** for MMT of elbows, and see **Video 12** for MMT of wrists.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1158#oembed-6*

Video 10 for MMT of shoulders [1:19]

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1158#oembed-9

Video 11 for MMT of elbows [0:51]

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1158#oembed-7

Video 12: MMT of fingers [0:58]

Priorities of Care

A priority of care related to the upper limbs is a functional assessment, which helps determine whether the client can complete activities of daily living such as personal hygiene, getting dressed, picking up a fork or cup, and opening doors. Clients with a limited ROM caused by pain, inflammation, or contractures can experience difficulties completing these activities, and an interprofessional team approach can help promote autonomy, independence, and comfort among these clients. For example, a nurse can identify these healthcare issues when performing assessments and help relieve or reduce the client's pain level using pharmaceutical or non-pharmaceutical strategies. Nurses can also advocate for additional referrals, such as interprofessional assessments and treatments: for example, an occupational therapist can provide clients with therapeutic devices such as large-handled utensils, or safety hand bars or shower chairs for their bathrooms; a physiotherapist can help adapt an appropriate exercise program; and a psychologist can help clients cope with their new health status. An interprofessional healthcare team can help clients to maintain their independence, overcome any potential barriers, and help them find supportive resources to address their specific needs.

Activity: Check your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1158#h5p-85

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Thoracic Cage and Spine

Ask the client to reposition into a sitting position on the exam table with their legs and feet hanging off the side. Parts of the assessment can be performed in a sitting position and then reposition into standing. If the client cannot sit or stand, you will need to modify the assessment approach.

As always, use a trauma-informed approach. You will need to expose the thoracic cage and back, so you should explain what you are doing and why and provide a drape as needed. The thoracic cage is part of both MSK and respiratory systems, so these assessments are often combined.

Inspection and Palpation

Steps for inspection and palpation include:

1. **Inspect** the **thoracic cage** for deformities that may be related to injury/trauma or congenital anomalies.
    - The thoracic cage is normally symmetrical.
    - Abnormal findings may be related to fractured ribs that can appear as a deformity or a sunken chest such as with **pectus excavatum**. If you note these abnormal findings, auscultate the lungs because both conditions can affect breathing. For example, a broken rib can be associated with a risk of **pneumothorax**.

2. Use your four finger pads to **palpate** the **thoracic cage** for masses, swelling, and deformities. You may also palpate for **subcutaneous emphysema**, which can result from a rib fracture. Ask the client if they have pain.
    - Normally, no pain, masses, swelling, and deformities are present.
    - Describe the characteristics and location of any pain, masses, swelling and deformities.

3. To **palpate for temperature**, use the dorsa of your hands to palpate down the spine from T1 to the lower back (about L4 at the superior iliac crest).
    - Temperature is normally warm to touch.
    - Be attentive to areas that are excessively warm and possibly associated with redness, swelling, and deformities.

4. Using two or three finger pads, including the index and middle finger, **palpate down spinous processes to feel for deformities** and **pain** from T1 to L4. A moderate pressure with a circular motion is best. Use the same technique, with both hands, to palpate down the paravertebral muscles on either side of the vertebra for pain and spasms.
    - Normally, there are no deformities or pain along the spinous process and no pain and spasms on the paravertebral muscles.
    - Describe the location and characteristics of pain, deformities, or spasms.

For the next steps, ask the client to stand.

5. From a posterior view, **inspect** the **spinal alignment** from C1 to L4. At this point, you have already inspected the neck, but it can be helpful to look at the whole spine to assess alignment as well as head position. Also inspect the

back for **symmetry**: compare the level of the shoulders, scapula, iliac crest, gluteal folds, and arm hang bilaterally. Ask the client to keep their legs straight and bend down toward their toes; this can accentuate any asymmetry if present.

- Normally, the spine is straight with no curvature from a posterior view and the back is symmetrical and arms hang at an equal length.
- Any curvature and asymmetry should be described including the location. One type of curvature is a spinal condition called **scoliosis (Figure 4)**. It appears as an S or a C curve affecting either or both thoracic and lumbar sections of the spine. This curvature also affects the head position and asymmetry of the arm hang.

6. From a lateral view, **inspect the spinal curvature**.

- Note the normal thoracic convex (outward) curve and the cervical and lumbar concave (inward) curve.
- Note any variations in curvature such as kyphosis and lordosis **(Figure 4)**. **Kyphosis** is increased curvature of the thoracic section of the spine (the upper back). A person can be born with it (congenital) or it can develop as a result of poor posture (postural kyphosis) or MSK-related conditions such as **osteoporosis. Lordosis** is an inward curve of the lumbar section of the spine. It can occur for pathological reasons in various age groups, but especially during pregnancy as a way to realign the centre of gravity as the fetus grows.

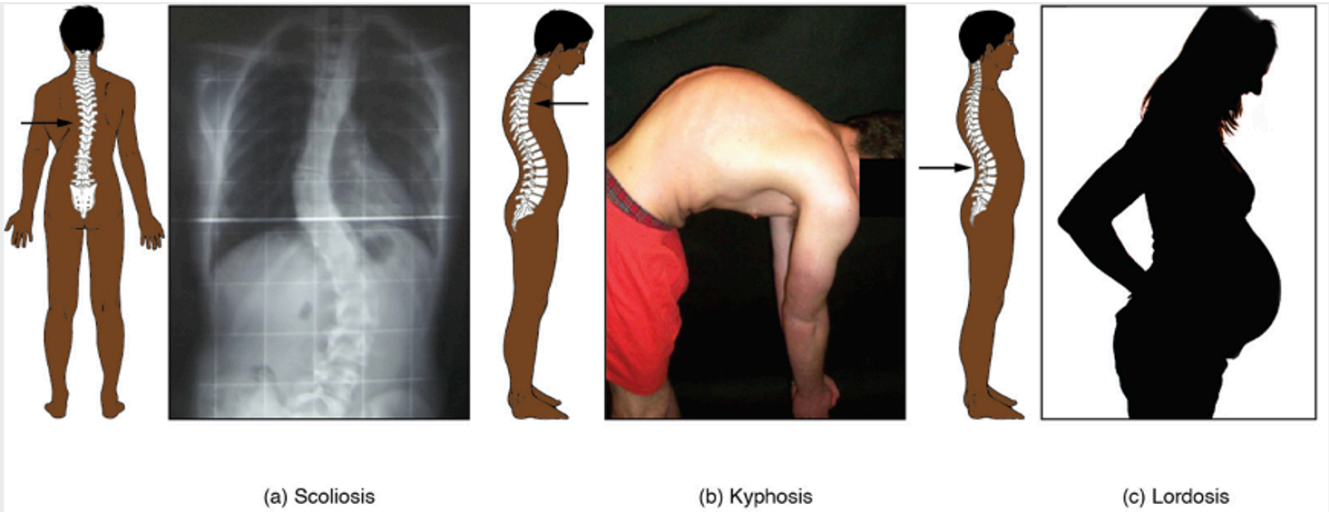

Figure 4: Scoliosis, kyphosis, and lordosis.
Attribution: Gordon Betts, J., Young, K.A., Wise, J.A., Johnson, E., Poe, B., Kruse, D.H., Korol, O., Johnson, J.E., Womble, M., & DeSaix, P. (2013). The Autonomic Nervous System. In Anatomy and Physiology. OpenStax. Creative Commons Attribution License v4.0. Book URL: https://openstax.org/books/anatomy-and-physiology/pages/1-introduction. Section URL: https://openstax.org/books/anatomy-and-physiology/pages/7-3-the-vertebral-column

7. Note the **findings**:

- Normal findings might be documented as: "Client's thoracic cage is symmetrical with no reported pain, and no swelling, masses, or deformities, temperature warm to touch and equal bilaterally. Spinal column is straight with no abnormal curvatures. No deformities and pain along the spinous process and no pain and spasms on the paravertebral muscles."
- Abnormal findings might be documented as: "Swelling at L4-5, tender to touch, with tingling and radiating

pain to the right buttock and upper thigh area. Client reported tenderness as 4/10 upon palpation."

NOTE: See **Video 13** for inspection and palpation of thoracic cage and spine.

> *One or more interactive elements has been excluded from this version of the text. You can view them online here:* https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1161#oembed-1

Video 13: Inspection and palpation of thoracic cage and spine (note, you can also inspect the spinal curvature from the lateral view) [3:17]

Contextualizing Inclusivity

An inclusive approach to health assessment is vital because clients need to feel accepted for who they are. For example, some non-binary and transmasculine clients may wear a chest binder because they feel uncomfortable or distressed about having breast tissue. Binders are garments designed to flatten the appearance of the chest wall. They come in different forms and can extend from the chest down to the diaphragm or to the hips: they may look like a sports bra or tank top, and some clients may use compression bandages.

The binder needs to be removed to adequately assess inspect and palpate the spine. First, decide whether the assessment is necessary. Also, you may or may not be aware of whether the client you are assessing wears a chest binder, so you can apply an inclusive approach by acknowledging the vulnerability that clients may feel. Provide step-by-step instructions so that they are prepared, and ask non-judgmental questions like "Assessing your spine requires me to assess on the bare skin of your back. Is there anything that would impede me from doing so?" You can also ask if they have any questions before beginning.

You should also assess the binder for proper fit: a good fit allows for normal movement and chest expansion.

For a client with breast tissue, you may need to have them reposition their breast so that you can palpate the thoracic cage. It may feel awkward for the client to perform this action, so some nurses demonstrate on themselves over their own uniform to show the client what they would like them to do. If the client is unable to do so, you may ask permission to reposition their breast. In this case, do so with the ulnar aspect of your hand. Avoid grasping or cupping the breast with your hand as this can be misinterpreted as a sexual motion. Always ask permission and inform the client what you will be doing in order to apply a trauma-informed approach and support the therapeutic nurse-client relationship.

Range of Motion (ROM)

When possible, ROM of the spine is best performed in a standing position to ensure full movement. Start with the client standing straight, looking forward with the face and body, and arms/hands hanging at the side (neutral position). When assessing cervical spine ROM, you will assess the gross ROM, which is the cumulative ROM of all of the spinal segments together. See **Table 6** for normal ROM for each movement.

Steps for assessing ROM:

1. To perform **lumbar spine flexion** and **extension**, ask the client to bend forward at the waist, keeping their legs straight and bending down toward their toes, and then return to a neutral position. Next, ask the client to bend back at the waist, keeping their pelvis and hips still, and then return to a neutral position.
2. To perform **lumbar spine lateral flexion**, ask the client to bend to the right side with arms/hands reaching toward their toes while looking forward and keeping pelvis/hips still and facing forward. Return to a neutral position and then repeat on the opposite side.
3. To perform **lumbar spinal rotation**, ask the client to twist to the right while keeping arms/hands at the side and legs/pelvis/hips facing forward. Return to a neutral position and then repeat on the opposite side.
4. Note the **findings**:
    - Normal findings might be documented as: "Full ROM of lumbar spine with symmetrical and smooth movements, no crepitation and pain noted."
    - Abnormal findings might be documented as: "Client has limited ROM of lumbar spine flexion of 30 degree, no crepitation. Rates pain 3/10 during movement."

Note: See **Video 14** for ROM of the spine.

Table 6: ROM of spine (adapted from Luttgens & Hamilton, 1997).

Joint	Range of motion
Lumbar spine: Flexion	65–90 degrees (see Figure X showing where to measure, angles are based on Šavlovskis & Raits, 2021; Washington State, 2014)
Lumbar spine: Extension	25 degrees
Lumbar spine: Lateral flexion	25 degrees
Lumbar spine: Rotation	30 degrees

NOTE: There are many variations of what is described as “normal” spine flexion; we have based these numbers on “lumbar” spine flexion specifically. Always ensure that the client does not engage/move the hips when assessing spine flexion.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1161#oembed-2

Video 14: ROM of spine [1:07]

Manual Muscle Testing (MMT)

You should assess MMT after completing your assessment of ROM. Demonstrate the procedure before applying resistance, and then perform MMT on each joint bilaterally. Ask the client if they experience any pain and where. Grade the resistance according to the institution’s grading scale (e.g., MRC or Oxford testing scale).

MMT of the spine begins with the client in a standing position with feet placed under hips (slightly apart) for stability and arms hanging down at the side (neutral position).

Steps for MMT of the spine:

1. To perform MMT of **spinal flexion**, stand in front of the client with each hand on the anterior aspect of the shoulder applying force, and ask the client to flex the spine by bending (at the waist) forward toward their toes while resisting your force. Apply resistance once the client begins to bend (about 10 degrees). This technique can also be performed in a supine position if needed. Note any engagement of surrounding muscles to compensate for the movement.
2. To perform MMT of **spinal extension**, stand behind the client with each hand on the posterior aspect of the shoulders and scapula applying force, and ask the client to extend the spine by bending back at the waist while resisting your force. Apply resistance once the client begins to extend (about 10 degrees). This technique can also be performed in a prone position if needed. Note any engagement of surrounding muscles to compensate for the movement.
3. Note the **findings**:
    - Normal findings might be documented as: ““full resistance on spine ROM with no pain.”
    - Abnormal findings might be documented as: “partial resistance equal bilaterally on spine ROM with mild pain.”

Priorities of Care

The thoracic cage is part of the MSK and respiratory systems. When performing a MSK assessment of the

thoracic cage and spine, remember to assess the client's respiration efforts. If skeletal trauma or injury has occurred, it could puncture the lungs and cause subcutaneous emphysema. In this case, assessment and support of the airway, breathing, and circulation always take priority (Edgecombe et al., 2022). A primary survey should be conducted to assess for signs of clinical deterioration. External trauma is not always evident, so you should use subjective questioning and objective assessment to identify any potential internal trauma. Cues that are life-threatening require immediate action: these may include an airway that is not patent, increased work during breathing, tachypnea, bradypnea, and decreasing oxygen saturation levels.

Activity: Check Your Understanding

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Legs, Feet, and Related Joints

Assessment of the legs and feet progresses from the upper leg to the toes; related joints include the hips, knees, ankles, and toes. This assessment involves inspection, palpation, range of motion, and muscle testing. Most of it is completed with the client in a supine position with their head on the pillow and their arms relaxed at their side.

Use a trauma-informed approach: tell the client you need to inspect their legs, including their hips, and provide them with a drape. Only expose the areas that you are assessing, particularly the hips, because clients may feel a sense of discomfort exposing this area.

Inspection

Steps for inspecting the legs and feet:

1. **Inspect** for **colour, swelling, masses,** and **deformities** with a focus on the muscles, bones, and joints. This involves inspecting from the hips/upper leg to the toes on the anterior, lateral, and posterior sides of the legs. To inspect the posterior side, you can either ask the client to lift their leg into the air or to reposition on their lateral side. Then, you should expose the full area of the hip ensuring the client is draped. Inspect all of the joints (hip, knee, ankles, and toes).

    - Normally, there will be no discolouration, swelling, masses, or deformities.
    - Describe the appearance and location of any discolouration, swelling, masses, and deformities.

2. **Inspect for symmetry in terms of leg size** and **length**. This can be done by just looking at the legs: compare the thigh size and the calf size from one limb to the other and from the hips to the feet. You can evaluate with a tape measure for accuracy if upon inspection you notice a potential discrepancy, or the client has indicated a concern. For circumference, measure at the largest point around the thigh and the calf. For leg length, place the tape measure at the anterior-superior point of the iliac crest to the inferior point of the bony prominence of the medial malleolus and repeat again. Some begin at the umbilicus as opposed to the iliac crest. Because many factors can affect accuracy, it is best to measure twice and take an average of the two measurements (Applebaum et al., 2021).

    - The legs are usually of equal length and circumference.
    - Describe any asymmetry that is greater than 10 mm (1 cm).

3. Note the **findings**:

    - Normal findings might be documented as: “Thigh and calf circumference and leg length are equal bilaterally. No discolouration, swelling, masses, and deformities noted on hips, legs, knees, ankles, or toes.”
    - Abnormal findings might be documented as: “Swelling and purple-blue discolouration over lateral side of left knee. No deformities noted. Client reported they were ‘side tackled’ during rugby.”

Palpation

Steps for palpating the legs and feet:

1. **Palpate for temperature** from the hips/upper legs to the toes bilaterally. Palpate around each of the joints as you move down the client's legs.

    - Temperature is normally warm to touch and equal bilaterally. Temperature may get slightly cooler toward the feet.
    - Abnormal findings include increased temperature over a joint and sometimes a muscle. Describe the characteristics and the location.

2. **Palpate for pain, masses, swelling, deformities,** and **palpable fluid** from hips to toes. Palpate the whole leg and foot including the full joint. If the client reports pain prior to assessment, assess that area last.

    - Normally, there will be no pain, masses, swelling deformities or palpable fluid.
    - If present, describe the characteristics and the location.

3. Note the **findings**:

    - Normal findings might be documented as: "Client's hips, legs, knees, ankles, and toes are warm to touch and cooler at toes, equal bilaterally with no swelling, masses, deformities, pain, or palpable fluid noted."
    - Abnormal findings might be documented as: "Client's left ankle to toes are cool to touch in comparison to right ankle. Swelling around the base of the ankle. Client reported discomfort as a 4/10 upon palpation. Client reported 'twisting ankle' stepping off a ladder."

Range of Motion

ROM of the legs and feet is focused on the hips, knees, ankles, and toes (see **Table 7** for normal ranges). While performing this assessment, observe the ROM and also listen for crepitus and ask the client about the presence of pain. Start with the unaffected leg first, and then move to the affected leg for comparisons.

The assessment begins with the client in a supine position with the legs straight – this is considered: neutral position. All assessments are completed in supine position except hip extension.

Steps for assessing ROM of the legs and feet:

1. To perform **hip flexion with straight leg** and **hip flexion with knee flexion**, ask the client to lie with their hips/pelvis still. Ask the client to lift one leg up (with leg straight) while bending it at the hip and moving it as close to the upper body as they can, then return to a neutral position (this is hip flexion with straight leg). Next, ask the client to lift the leg up as high as they can while bending it at the hip and the knee (hip flexion with knee flexion). Perform on the other leg.
2. To perform **hip extension**, ask the client to stand and move one straight leg back while keeping their body facing forward and upright. This is normally done at the end of the exam when the client stands up for you to assess their spine. If the client cannot stand, you may assess in the prone position. NOTE: this ROM can be performed toward the end of the assessment when asking the client to stand to assess the spine.
3. To perform **hip abduction** and **adduction**, ask the client to lie in a neutral position. For hip abduction, ask the client to move their leg out (keeping leg straight) toward the side (moving off the bed) and back to neutral. Repeat on the opposite leg. Next, for hip adduction, place one hand proximal to the ankle and one proximal to the knee on the underside of the leg and lift the client's legs up enough so that the client can slide their other leg underneath. Next, ask the client to slide the opposite leg underneath the leg that you are holding up. Return to a neutral position and repeat on the opposite leg.
4. To perform **hip internal rotation** (also called medial rotation) and **external rotation** (also called lateral rotation),

first ensure the client does not engage the spine with any sort of spinal rotation. For hip internal rotation, ask the client to bend one leg up at the knee, keeping their foot flat on the table with the knee pointing to the ceiling, then tip their knee inward (medially) and keeping their heel fixed to the table and their hips still (flat on table). Then, return the leg so that the knee is pointing to the ceiling. For external rotation, ask the client to tip their knee outward (laterally) while keeping the heel fixed to the surface and keeping their hips still (flat on table). Then, return to the leg to a neutral position with both legs straight. Repeat on the opposite leg. Note, both of these ROM can also be done in sitting position, which is commonly seen in practice.

5. To perform **knee flexion** and **extension**, ask the client to bend their leg at the knee by sliding their foot/heel toward their buttocks (knee flexion), and then back to a neutral position (extension). Repeat on the opposite leg.
6. To perform **dorsiflexion** and **plantar flexion**, ask the client to point and move their toes on both feet toward their shin or head (dorsiflexion), and then back to a neutral position. Next, ask the client to point and move their toes away from the body with the soles of the feet facing down (plantar flexion), and then return to a neutral position.
7. To perform **ankle inversion** and **eversion**, place one hand on the client's lower leg to stabilize their tibia and ask the client to tilt/move the sole/bottom of the feet inward (medially) facing each other (inversion), and then back to a neutral position. Next, for ankle eversion, ask the client to move the sole/bottom of the feet outward (away from each other), and then return to a neutral position.
8. To perform **toe flexion** and **extension**, ask the client to curl their toes toward the bottom of the foot, and then ask the client to uncurl their toes and point the tips of their toes up as much as possible, and then back to a neutral position.
9. Note the **findings**:

    - Normal findings might be documented as: "Full range of motion, no crepitation, and pain of hip, knees, ankles, and toes bilaterally, smooth and symmetrical movements of joints with no obvious misalignments."
    - Abnormal findings might be documented as: "Right knee flexion is 110 degrees and extension 10 degrees, no crepitation. Reported muscle tightness on movement."

NOTE: See **Video 15** for ROM of hips, **Video 16** for ROM of the knees, **Video 17** for ROM of the ankles, and **Video 18** for ROM of the toes.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1163#oembed-1

Video 16: ROM of the hips [1:59]

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Video 17: ROM of the knees [0:29]

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Video 18: ROM of the ankles [0:37]

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Video 19: ROM of toes [0:21]

Table 7: Normal ROM of hips, knees, ankles, and toes (adapted from American Academy of Orthopaedic Surgeons, 1965; Luttgens & Hamilton, 1997)

Joint	Range of motion
Hips: Flexion with straight leg and bent leg	100 and 120 degrees
Hips: Extension	30 degrees
Hips: Abduction and adduction	Abduction: 40-45 degrees Adduction: 20-30 degrees
Hips: External/lateral and internal/medial rotation	External/lateral rotation: 45–50 degrees Internal/medial rotation: 40–45 degrees
Knee: Flexion	150 degrees
Ankle: Dorsiflexion and plantarflexion	Dorsiflexion: 20–30 degrees Plantarflexion: 20–50 degrees
Ankle: Inversion and eversion	Inversion: 35 degrees Eversion: 15 degrees

Manual Muscle Testing (MMT)

Perform MMT after you assess ROM. Explain the procedure before applying force. Perform MMT on each joint bilaterally. Grade the resistance according to the institution's grading scale (e.g., MRC) or just describe it and note whether it is equal bilaterally.

This testing generally begins with the client in a supine position with the legs straight (neutral position).

Steps for MMT:

1. To perform **hip flexion with straight leg**, place one hand proximal to the ankle and the other proximal to the knee. Ask the client to bend/flex their leg at the hip as if they were going to lift their leg up (keeping leg straight) while you apply force and they resist it. Return to a neutral position and then repeat the procedure on the opposite side.
2. To perform **hip extension**, ask the client to raise their straight leg up (hip flexion with leg straight), place one hand proximal to the ankle and the other proximal to the knee (both on the underside of the leg), and then ask the client to move their leg back down to the table while you apply force and they resist it. Return to a neutral position and repeat on the opposite leg.
3. To perform **hip abduction and adduction**, place one hand proximal to the knee and the other proximal to the ankle on the lateral side of the leg. Ask the client to move their leg out toward the side (moving off the bed) while you apply force and they resist it. Return to a neutral position and repeat on the opposite leg. Next, ask the client to move their leg out/abduct toward the edge of the bed (about 15 degrees). Place one hand proximal to the knee and the other proximal to the ankle on the medial side of leg. Ask the client to move their leg in toward the centre (moving their leg toward the other leg) while you apply force and they resist it.
4. To perform **knee extension and flexion**, ask the client to bend their leg/knee keeping their foot flat on the table (about 90 degrees) with the other leg remaining straight in neutral position. Place one hand proximal to the knee for support and the other proximal to the ankle so that you can apply force. Ask the client to extend their leg by moving their foot off the bed (like a kicking action) while you apply force and they resist it. Return to the 90-degree position with the foot flat on the table. Next, for flexion, place one hand proximal to the knee for support and the other proximal to the ankle to apply force on the posterior side of the leg. Ask the client to move their foot off the table so that their lower leg is parallel to the table and knee at about 90 degrees, and then bend their knee and bring the heel of their foot back down to the table while you apply force and they resist it. Repeat on the opposite leg.
5. To perform **ankle dorsiflexion and plantarflexion**, place your hand on the top (dorsal) side of one foot. Ask the client to point and move their toes toward their shin or head while you apply force and they resist it. Repeat on the other foot. For plantar flexion, place your hand on the bottom (plantar) side of the foot. Ask the client to point and move their toes away from the body, with the sole of the foot facing down, while you apply force and they resist it. Repeat on the other foot.
6. Note the findings:
    - Normal findings might be documented as: ""full resistance equal bilaterally on all lower limb ROM with no pain."
    - Abnormal findings might be documented as: "partial resistance with left hip ROM with mild pain."

NOTE: see **Video 20** for MMT of hips, **Video 21** for MMT of knees, **Video 22** for MMT of ankles.

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Video 20: MMT of hips [3:08]

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Video 21: MMT of knees [1:47]

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Video 22: MMT of ankles [1:11]

Contextualizing Inclusivity

Clients may require a leg or arm amputation and may choose to wear a prosthetic to replace the amputated limb. Prosthetics can be expensive and require replacing from use or damage; the cost and resources available vary by province or territory. Aesthetics and functionality of prosthetics have evolved over time (Franzino, 2020) from uncomfortable wooden limbs to functional life-like or artistic structures. Clients often choose a prosthetic that is closest to their skin tone (Hussain, 2011) or may choose an alternative style for sports or fashion (Burton, & Melkumova-Reynolds, 2019). As a nurse, you should advocate for clients' needs and preferences as they may encounter unconscious bias and barriers during the process. Another issue is that while the prosthetic assists with mobility and function, it also becomes a part of their body, or an extension of their body, and part of their self-identity. Always ask permission to touch when assessing the client's prosthetic. A trauma-informed approach will help foster a safe environment for the client to share their thoughts and feelings about the amputation and their prosthetic limb. Focusing on the client's needs fosters collaboration and a client-centred decision-making process.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1163#h5p-87

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Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion and disease prevention strategies for a healthy musculoskeletal system need to be appropriate for each specific individual, so you should carefully consider all collected data, both objective and subjective. Subjective data collection involves asking the client about risk factors, social determinants, and other considerations. This kind of inquiry should be integrated throughout the entire assessment. You will ask many probing questions during the subjective assessment, but you should also formulate questions based on critical reflection of the data you have collected during the subjective and objective assessment. Together, the findings will inform your clinical judgement for each specific patient and the health promotion needed.

Activity/Exercise

A **sedentary lifestyle** with limited activity/exercise is a risk factor that contributes to MSK conditions. Many clients will sit for long periods at work, and then sit at home to relax. Oftentimes, **activity** is described as one's general activity in the day (such as the activity they do around the house or at work). **Exercise** is a form of activity, but is considered intentional and planned physical activity often referred to as "working out."

Listen to Murat Dalkilinç TED-Ed on Why sitting is bad for you [4:50].

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Exercise, including aerobic and strength-training exercise, strengthens the muscles, bones, and joints of the MSK system. Guidelines vary based on age and health, but in general individuals should engage in about **30–60 minutes of aerobic activity**, 5–7 times a week. **Stretching** is also an important element of activity in the workplace or during exercising. It is advised to stretch before and after any strenuous or physical work and activity/exercise. Watch the video by Physiopedia called Musculoskeletal Disorders (MSD) & Work Place to learn more about MSD and how stretching can help decrease the risk. **Strength training** is also important throughout life, and can include weight lifting, resistance bands, and using one's own body weight for resistance, e.g., squats and push-ups.

Exercise is an important part of life for many clients, and can be part of their self-concept. However, individuals with MSK conditions may not be able to perform activities as they once did. You should assess what an active lifestyle means to the client, learn about their past experiences, and collaboratively design a new exercise program that fits their specific needs and interests.

Probing questions related to activity may include:

- Do you have any concerns about your level of activity or exercise?
- Tell me about your daily pattern of activity? What activities are you involved in?
- What exercise do you engage in? How long do you engage in this type of exercise? How many days of the week do you participate in exercise? (If the client plays sports, ask about their use of protective equipment.)
- What does an active lifestyle mean to you?

Collaborate with the client to create an activity/exercise care plan/program that is specific to their needs and personal goals. For example, low-impact activities such as walking, cycling, and water exercises involve less stress on the joints and muscles, and yoga and tai chi can help release endorphins, control breathing, strengthen balance and posture, and increase flexibility while strengthening muscles. Start at a **realistic and attainable level**, depending on the client's physical capabilities and energy level, and slowly start to increase the time and duration of the physical activity. Clients should keep active but maintain pain-free activities and avoid over-strenuous activities when joints and muscles become inflamed or tired. For example, a client with an injury to the back muscles could engage in light activity (such as walking and stretching), but should avoid heavy lifting. Strength training can be resumed when the acuity of the injury subsides.

Many interventions are available to support clients to achieve their activity goals: community walking groups, fitness apps, and joining a local gym or group activity. The participACTION website is a helpful resource related to activity guidelines: https://www.participaction.com/en-ca. Consider activity interventions from a structural health promotion approach, considering the financial costs associated with many of these resources.

Ergonomics and Back Health

Ergonomics is essential to **back health** and the overall health of the MSK system. Many injuries and chronic health issues are related to inattention to ergonomics science.

Broadly speaking, ergonomics refers to **designing a space for the body to move** and **function** based on the needs of the human body. For example, consider body positioning when sitting at a desk, during repetitive actions, or picking up and moving heavy objects. Teach the client about how to maintain proper body alignment by using large muscle groups, keeping the objects close to their centre of gravity, avoiding twisting motions, and instead using pivoting motions or asking for assistance. For example, when picking an object up from the ground, a client should stand directly in front of the object, place their feet hip distance apart to create a supportive centre of gravity, bend down using the knees to engage the large quadricep muscles, keep the object close to the body's centre of gravity during lifting and standing, engaging their quadriceps and glutes. Maintaining proper body alignment by stabilizing the centre of gravity and core can decrease the risk of injuries. The ultimate aim is to increase comfort and decrease injuries and pain. The workspace is often a focus when considering ergonomics, but it is also important to also consider common spaces in the home.

Listen to Murat Dalkilinç TED-Ed on The benefits of good posture [4:11].

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Probing questions related to ergonomics and health may include:

- Tell me about any concerns you have related to ergonomics and your back health at work or at home?
- What physical position are you typically in at work (e.g., sitting, standing)?
- Are you engaged in any repetitive motions at home or at work (e.g., typing at a computer, lifting heavy objects, or other activities such as dishes/sewing)?
- Additional probing questions may be required based on the client's answers:
    - Tell me more?
    - How does it affect your back or body?
    - Do you experience any pain?

When considering interventions for a client, think about activities the client is concerned about, for example those that cause pain or other issues. Always consider health promotion from a preventative perspective, based on cues that are suggestive of potential issues.

Use relational and structural health promotion perspectives to further assess a client's ergonomics and back health. Health is affected by relationships with others in the workplace and at home, and broader structural influences may require discussions and advocacy, especially with regard to the work space.

Diet

A **healthy diet** is important for musculoskeletal health because nutrients and hydration are important for the bones, joints, and muscles to grow and function. A healthy diet is also essential to help maintain an ideal body weight: when a person is overweight, the MSK system has to work harder to move the body because of the excess weight on the joints.

A well-balanced diet includes protein, calcium, vitamins D and K, magnesium, and zinc, which help with muscle and bone growth, repair, and maintenance, and adequate water intake helps with hydration and joint fluid. Inadequate nutrition can increase the risk of injury and negatively affects muscle, bone, and joint repair. Clients should avoid foods that cause inflammation such as refined carbohydrates (e.g., white bread), fried foods, processed meats, sugar, and trans and saturated fats.

Probing questions related to diet may include:

- Tell me about your usual diet?
- What have you eaten in the last 24 hours? Is that your usual diet?
- How much fluids do you typically drink in a day? What fluids do you drink (e.g., water, caffeinated beverages, alcohol)?
- Have you had any recent changes in your life that have affected your diet?
- With rising food costs, purchasing food can be difficult. Do you have enough money to buy healthy food?

Assess the client's familiarity with **Health Canada's Food Guide** (Government of Canada 2021) and discuss how they might use it to guide their food choices: https://food-guide.canada.ca/en/. Be aware that this new guide still has a Eurocentric element to it, so you should collaborate with the client about its relevance in the context of their cultural food practices. A snapshot of the guide is now available in dozens of languages: https://www.canada.ca/en/health-canada/services/canada-food-guide/resources/snapshot/languages.html. Many resources have also been developed related to healthy eating and food safety for Indigenous individuals: https://www.sac-isc.gc.ca/eng/1581522106156/1581522147811

Based on the food guide, some key elements to consider are:

- **Water** should be the drink of choice: hydration can help keep muscles and joints lubricated.
- A meal/dinner plate should have **half vegetables/fruit**, **one-quarter protein**, and **one-quarter whole grains**.
- **Cook whenever possible**, as opposed to eating processed meals and purchasing fast foods.

Assess each client's situational environment to understand how it affects their diet. For example, people with arthritis may have difficulty opening certain food items; you can help the client find adaptive tools that help with their grip. Nurses can collaborate with occupational therapists and physiotherapists to help clients create an accessible living environment that meets their specific needs.

From a structural health promotion approach, consider a client's geographical access and financial ability to purchase healthy food. These are elements of food security, and the rising cost of food globally has made it difficult to ensure everyone is food secure. This is especially true in many remote regions of Canada's North, where access to nutritious

food is limited in terms of availability, and even when available, the costs are excessive. There may be times when you should refer the client to a dietician with certain and more severe musculoskeletal conditions.

Stress

Stress is a risk factor for MSK-related conditions as it can have physical, social, mental and emotional effects. Talking about stress factors can be triggering, so always use a trauma-informed approach to support the client during this type of conversation.

Stress can:

- Change and disrupt sleep patterns.
- Cause tooth-grinding, which can affect the temporomandibular joint.
- Lead to feelings of self-consciousness and subsequent self-isolation.
- Increase muscular tension in the trapezius muscles, causing neck or lower back pain.
- Affect breathing, thereby decreasing oxygen to muscles.
- Release hormones that increase inflammation in the body.
- Lead to injury due to distractions caused by a trigger.

Stress is usually a combination of multiple stressors. You should pay attention to how clients perceive or talk about themselves, their life, and their current situation, as these can indicate potential concerns and areas that need further assessment.

Probing questions related to stress may include:

- Tell me about stressors in your life?
- Have you experienced stress recently? Physically? Socially? Emotionally?
- Have you had any recent changes in your life? Tell me more?
- How does stress affect you?
- How often do you experience stress?
- How do you handle this stress?
- Tell me about the coping strategies you use?

When considering interventions for a client, consider their daily patterns of living and potential stressors that may be disrupting these patterns.

Stress management and **coping strategies** may include:

- Engaging in regular physical activity.
- Spending time with family and friends.
- Practicing relaxation techniques such as yoga, deep breathing exercises, and tai chi.
- Taking time for oneself and personal interests.
- Getting adequate sleep (usually 7–9 hours). (Wang et al., 2022).

Use a relational and structural health promotion approach to further assess the client's situation in relation to stress and potential strategies/resources. Once you understand how the client experiences, perceives, and manages stress in relation to themself and their relationships, you can start to create a collaborative plan of action.

All clients experience stress at some point in their lives, but structural factors influence whether they are more at risk for stress or are better able to manage stress. For example, ableism is a determinant that can lead to highly stressful experiences, such as not being able to access community services due to lack of wheelchair/walker accessibility. In

this case, use a trauma-informed approach to stress and stress management to understand how the client is being influenced by ableism and how best to support them. Socioeconomic status can also influence a person's access to resources to cope with stress; when collaborating with clients to develop stress management techniques, you must be aware of these structural influences.

Contextualizing Inclusivity

Arthritis is a common condition affecting many older people. However, about 25,000 Canadians under the age of 18 live with arthritis (Arthritis Society, 2022); a pediatric client can be diagnosed with arthritis as early as 12 months. A client-centred approach is essential for these cases, as the disease affects each individual differently. Arthritis affects the joints in fingers, hands, hips, knees, ankles and toes, which affect daily activities such as writing school assignments, participating in school activities, playing sports, and eating lunch with friends. Inflamed joints can cause pain, stiffness, and limitations in mobility, which can affect the physical, emotional, and social health of a young person, who may feel embarrassed or self-conscious or isolated because of their limitations. You can help the client adapt by using open supportive dialogue for them to share their feelings (verbally and nonverbally), and discuss strategies on how to adapt to specific situations so they can still participate. Use an interprofessional team approach, which can include nurses, doctors, occupational therapists, pharmacists, physiotherapist, school counsellors, teachers, care partners, and sometimes peers. A strong community network can help the client build meaningful relationships and decrease their risk of isolation.

Gillian Taylor, a Clinical Nurse Specialist in Rheumatology, from Montreal Children's Hospital, highlights experiences of individuals living with juvenile arthritis in the video Juvenile Arthritis – Kids Get it Too What Educators Need to Know About Juvenile Arthritis [9:01].

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1165#oembed-3

To learn more about arthritis go to www.arthritis.ca

Priorities of Care

Falls are a common cause of injury at any age, but they are the leading cause of injury among older adults in Canada, affecting 30% of the population each year (Public Health Agency of Canada, 2014). Falls can result in hospitalization due to head injuries or hip fractures, and can have a psychological impact on an individual's self-concept. Completing a fall assessment and implementing prevention strategies can help decrease the risk.

One preventative strategy is wearing proper footwear. Shoes that do not properly fit or support the foot during an activity (e.g., walking or running) can lead to knee, hip, and lower back pain, as well as skin integrity and foot issues (e.g., nail damage). Outdoor and indoor shoes should have an intact non-slip sole, laces or Velcro to increase ankle support and maintain a snug fit around the foot, and an appropriate length with no extra space for the foot to slide. Walking in socks or bare feet can increase the risk of falling.

Other strategies to help prevent falls include regular medical checkups (e.g., eye and hearing exams), creating a safe home environment (e.g., grab bars, lighting, non-slip carpets, mobility aids), eating nutritious meals (e.g., protein, calcium, water), exercising (e.g., walking, yoga, swimming), monitoring alcohol intake, and managing medications (e.g., side effects). Clients begin to lose muscle mass after about age 30, so it is important to engage in exercise as a preventative strategy.

Activity: Check Your Understanding

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1165#h5p-88

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Clinical Judgement: Case Study

A 48-year-old client comes to the clinic with back pain. They report feeling pain in their back after moving some boxes. Yesterday their back spasmed as they tried to get out of bed, and now they're unable to bend over to tie their shoes without feeling pain. The client has a history of back pain for the past 10 years. They play rugby and go to cross-fit exercises 2x/week. Due to the spasms, they are unable to do anything or go out and are feeling useless. Vital signs: blood pressure 124/78 mm Hg, pulse 98 beats per minute, respirations 20 breaths per minute and shallow, oxygen saturation 98%, oral temperature 36.9 degrees Celsius, BMI: 26. Upon a brief inspection, the client's trapezius muscles are elevated and tense, and their posture is leaning slightly forward to the left while walking slowly. Client slowly sat down in the chair with their face grimacing and using pursed lip breathing.

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1167#h5p-89

The client has been diagnosed with strained lower back muscles and inflammation along the L4-5. The client is being discharged and requires health teaching. Identify which health teaching strategies are required by dragging and dropping each strategy in the Indicated or Not Indicated columns.

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Key Takeaways

- Common symptoms related to the MSK system can include headache, pain, stiffness, muscle tightness, numbness, weakness, muscle twitches, fatigue, mobility, redness, swelling, temperature change, deformities, and psychological distress.
- The objective assessment of the MSK system involves a brief scan, as well as inspection, palpation, range of motion, manual muscle testing, and sometimes auscultation, depending on the affected area.
- The objective assessment is performed in sequential order to minimize position changes.
- Health promotion interventions should be developed with the client to address what is important to them.

CHAPTER 10 - RESPIRATORY SYSTEM ASSESSMENT

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Learning Outcomes

- Apply subjective assessment skills.
- Apply objective assessment skills.
- Use clinical judgement.
- Integrate health promotion interventions into actions.
- Integrate an inclusive approach to respiratory assessment.

Introduction to the Respiratory System

The respiratory system is important to assess because it is responsible for gas exchange, specifically facilitating oxygenation and ridding the body of carbon dioxide. If this system is not functioning properly, **hypoxemia**, **hypoxia**, and **hypercapnia** can occur. These pathophysiological processes can affect all body systems. As a nurse, your assessment of the respiratory system provides information about the functioning of this system and potential cues that require your action.

Respiratory System Components

The main components of the respiratory system include the upper and lower respiratory tract (see **Figure 1**).

The upper respiratory tract includes:

- The nasal cavity and paranasal sinuses.
- The pharynx and larynx.

The lower respiratory tract includes:

- The trachea, bronchi, and respiratory units.
- The lungs (three right lobes and two left lobes).
- The pleural membranes (visceral and parietal) and the pleural cavity.
- The pulmonary artery and pulmonary vein.
- The diaphragm.

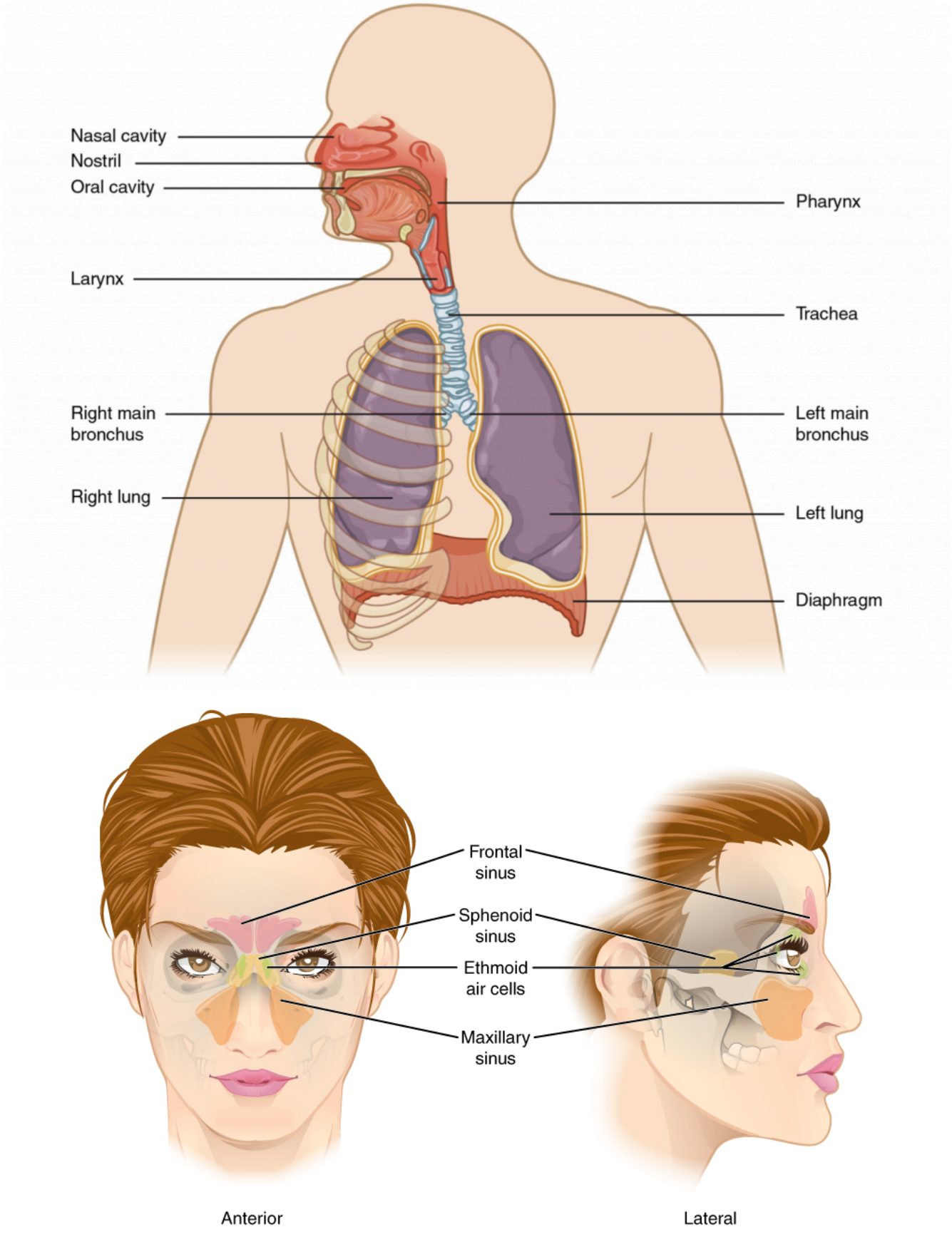
Nasal cavity
Nostril
Oral cavity
Pharynx
Larynx
Trachea
Right main bronchus
Left main bronchus
Right lung
Left lung
Diaphragm
Frontal sinus
Sphenoid sinus
Ethmoid air cells
Maxillary sinus
Anterior
Lateral

Figure 1: Anatomy of the respiratory system

(Attribution: Gordon Betts, Kelly A. Young, James A. Wise, Eddie Johnson, Brandon Poe, Dean H. Kruse, Oksana Korol, Jody E. Johnson, Mark Womble, Peter DeSaix. OpenStax, Anatomy & Physiology. 2013. Used under a CC BY 3.0 license. Download for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction)

You have already learned about the anatomy and physiology of the respiratory system: see **Video 1** and **Video 2** for a quick overview.

Video 1: Respiratory system physiology.

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https://www.khanacademy.org/science/high-school-biology/hs-human-body-systems/hs-the-circulatory-and-respiratory-systems/v/meet-the-lungs

Video 2: How the lungs work.

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Clinical Tip

The respiratory system is interconnected and influences many other body systems, so it is rarely assessed in isolation. When attempting to make sense of concerning respiratory cues, nurses commonly assess other body systems: cardiovascular, skin, and musculoskeletal.

Subjective Assessment

Subjective assessment of the **respiratory system** involves asking questions about the health of the client and symptoms that occur because of pathologies that affect the upper and lower respiratory tract. A full exploration of these pathologies is beyond the scope of this chapter, but common problems associated with the respiratory system include **sinusitis**, **nasal polyps**, **asthma**, **pneumonia**, **cancer**, **cystic fibrosis**, **bronchitis**, **emphysema**, **chronic obstructive pulmonary disease**, and respiratory viruses like coronaviruses and **RSV**.

Common symptoms that can be related to the respiratory system include nasal congestion/discharge, sinus pain/pressure, dyspnea, coughing, wheezing, and pain. See **Table 1** for guidance on subjective health assessment. Many of the questions in this table align with the PQRSTU mnemonic. You should consider asking questions in order of importance, thus, you do not follow the sequential order of PQRSTU.

You should also ask about any medications (prescribed or over the counter) the client is taking: the name, dose, frequency, reason it was prescribed, and how long they have been taking it.

Remember to always ask questions related to health promotion. Depending on the context of the assessment, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on "Health Promotion Considerations and Interventions" is included later in this chapter after the discussion of objective assessment.

Knowledge Bites – Pathophysiology

Many respiratory-related pathologies are related to inflammatory processes, narrowed airways, and mucous production. These processes cause a variety of symptoms including difficulty breathing, coughing, and noisy breathing. They can also influence the body's oxygenation and affect a person's capacity to engage in activities of daily living.

The SARS-CoV-2 virus (commonly referred to as COVID-19 disease) is a highly infectious virus (emerged in 2019) that affects the lungs and breathing as well as other body systems. It became a pandemic in 2020 because it was highly transmissible and affected people across the globe. It is transmitted through airborne participles and droplets from the mouth and nose when you breathe, talk/sing/yell, cough, or sneeze. **Video 3** that will help you understand how the virus affects the lungs in terms of inflammation, fluid accumulation, and lung damage.

Video 3: How COVID-19 affects the lungs

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Table 1: Common symptoms, questions, and clinical tips

Symptoms	Questions	Clinical tips
Dyspnea refers to difficulty breathing and can be described as shortness of breath, a feeling of breathlessness, not being able to get sufficient air, or being unable to catch your breath. The feeling of not being able to catch one's breath is particularly upsetting because it feels like suffocation. When a client is having difficulty breathing, they often also have rapid breathing: **tachypnea.** Older adults sometimes experience mild shortness of breath upon exertion because of the anatomical lung changes including decreased muscle mass, lung elasticity, and increased lung rigidity. This makes it more difficult to breathe and causes the stiffening of lung expansion and recoil, decreased **vital capacity**, and increased **residual volume**.	Do you currently have any difficulty breathing or shortness of breath? Have you recently experienced any difficulty breathing or shortness of breath? Remember to incorporate the language that the client uses into your probing. Additional **probes** if the client's responses are affirmative: Quality: What does your difficulty in breathing feel like? Provocative/palliative: Is there anything that makes your breathing worse? Is it worse when you are lying down? Is there anything that makes your breathing better? Does it feel better when you are sitting up? Severity: Can you rate your difficulty in breathing on a scale of 0 to 10 with 0 being no difficulty and 10 being the most difficult breathing you have ever had? Timing/treatment: When did the difficulty in breathing begin? What were you doing when it began? Is it constant or intermittent? Do you get short of breath with activity/exertion? If so, what type of activity? Have you taken anything to treat your difficulty in breathing? Understanding: Do you know what is causing the difficulty in breathing?	As you are assessing the client, consider raising the head of the bed so that it is easier for them to breathe. However, this decision may be influenced by whether the client's condition is stable. For example, if the client is showing signs of clinical deterioration and their blood pressure is low, you should lower the head of the bed to increase the amount of blood returning to the heart. Use a primary survey approach to determine cues that may indicate clinical deterioration. Assess the client's respiration rate, work of breathing, oxygen saturation, and then pulse, blood pressure, and temperature, followed by auscultation of lungs.

Coughing, also known as "tussis," is a common respiratory symptom. It is usually an involuntary reflex involving expulsion of air from lungs or an attempt to clear one's throat/breathing passages from foreign bodies, irritants, fluids, and mucus. Coughing can be associated with acute or chronic infections or diseases. Coughs can be dry or wet, and wet coughs often produce expectorate (mucus). Mucus can be thin or thick and can be clear, yellow, green, pink-tinged, or bloody. Bloody expectorate is called hemoptysis.	Do you currently have a cough or have you recently had a cough? If the client's response is affirmative, begin with an open-ended probe: Tell me about the cough. You will probably need to **probe** further. Additional questions might include: Quality: Can you describe the cough? Can you describe what the cough sounds like?(Clients may describe the quality in various ways such as dry, wet, bubbling, barking, or hacking. You can provide examples if they are struggling to find the words). Do you cough anything up? (sputum or phlegm/mucus). If so, can you describe it? Is it thick or thin? What colour is it? Timing/treatment: When did the coughing begin? Is it constant or intermittent? Have you treated it with anything? Provocative/palliative: Is there anything that makes the coughing worse? Is it worse at a particular time of day? Is there anything that makes it better? Does it feel better when you are sitting up? Region: Do you feel the cough is worse in a particular area? (e.g., throat, lungs) Severity: Can you rate your coughing on a scale of 0 to 10 with 0 being no coughing and 10 being the worst coughing you have had? Understanding: Do you know what is causing the coughing?	Until the origin is ruled out, consider it transmissible. Wear eye protection, and you and the client should both wear face masks. You should consider raising the head of the bed. A client who is coughing with expectorate might be more comfortable sitting upright. Assess the client's respiration rate, work of breathing, oxygen saturation, and then pulse, blood pressure, and temperature, followed by auscultation of lungs.
Chest and **nasal congestion** is accumulation of mucus in the chest/lungs and/or in the nasal cavity/nose. This congestion may be associated with coughing, runny nose (such as nasal discharge), and sneezing.	Do you have any chest or nasal congestion? If the client's response is affirmative, additional **probes** might include: Quality/quantity: Tell me about it. How bad is it? If there is discharge, what colour is it? Timing: When did it begin? Is it constant or intermittent? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Region: Where do you feel the congestion? Treatment: Have you treated it with anything? Do you take any medications for it? Understanding: Do you know what is causing it or what it is related to?	Assess the client's respiration rate, work of breathing, oxygen saturation, and then pulse, blood pressure, and temperature followed by auscultation of lungs.

Sinus pain/pressure is a sensation felt in the sinuses. It is commonly associated with inflammation, infection, and/or blockage of the sinuses.	Do you have any pain or pressure in your sinuses? If the client's response is affirmative, additional **probes** might include: Quality/quantity: Tell me about it. How bad is it? Timing: When did it begin? Is it constant or intermittent? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Region: Where do you feel the pressure/pain? Treatment: Have you treated it with anything? Do you take any medications for it? Understanding: Do you know what is causing it or what it is related to?	Sinus pain can be associated with several other symptoms such as nasal congestion, nasal discharge, headaches, earaches, and pain around the ear and down the neck. It is important to assess the client for any associated symptoms. The location of the sinus pain is important to assess to potentially help determine the cause and the sinuses affected.
Wheezing is a whistling sound or noisy breathing associated with inspiration and/or expiration. It is commonly associated with narrowing of the airways, inflammation, and **bronchospasm**.	Do you hear any wheezing when you breathe? If the client's response is affirmative, begin with an open-ended probe: Tell me about the wheezing. You can **probe** further with questions related to the PQRSTU mnemonic such as: How often does it happen? How bad is it? Is there anything that triggers the wheezing? Do you know what causes it? Is there anything that makes it better? Do you treat it with anything? (e.g., medications, puffers).	Wheezing can be associated with an acute or a chronic condition. Some clients can hear it themselves and report it; you might also hear it when you auscultate the lungs. If a client is currently wheezing, it is essential to rule out **anaphylaxis**, because this is a life-threatening condition. Assess whether the client has allergies and if so, whether they may have been exposed to the allergen. Common allergens related to anaphylaxis are insects (e.g., bees), food, and medications. Related anaphylaxis symptoms might include **pruritus**, rash/hives, difficulty swallowing, swelling of face or lips, and nausea. Administration of **epinephrine** is a priority if anaphylaxis is suspected.

Chest pain associated with the respiratory system can be described in many ways: a sensation in the chest, discomfort, tenderness, tightness, and sharp pain. Depending on the etiology, the pain can worsen when breathing and coughing.	Do you currently or have you recently had any chest pain or sensations in your chest? If the client's response is affirmative, first ask: Do you have the pain now? Additional **probes** may include: Quality/quantity: Tell me about it. What does it feel like? How bad is it? Timing: When did it begin? What were you doing when it began? Is it constant or intermittent? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Region: Where do you feel the pain/ sensation? Treatment: Have you treated it with anything? Do you take any medications for it? Understanding: Do you know what is causing it or what it is related to?	It is important to address any current pain, particularly if it could be of cardiac origin. Pain that is associated with the respiratory system can sometimes be relieved by position change. If the client is stable, try sitting them upright. However, if the client is showing signs of clinical deterioration, it is best to position them in supine position and lower the head of the bed in case prompt intervention is needed. Assess the client's respiration rate, work of breathing, oxygen saturation, and then pulse, blood pressure, and temperature, followed by auscultation of lungs.
Other respiratory symptoms can include fatigue, perspiration, confusion, light-headedness, sneezing, sore throat, headache/body aches, fever/chills, colour changes in skin/lips/nails (such as cyanosis, lymph node swelling, and decreased appetite.	Always ask one question at a time. Questions might include: Have you experienced fatigue? (Or perspiration, confusion, light-headedness, sneezing, sore throat, headache/body aches, fever/chills, colour changes of your skin/lips/nails such as cyanosis, lymph node swelling, decreased appetite?) Use variations of the PQRSTU mnemonic to assess these symptoms further if the client's response is affirmative.	These symptoms can be related to other body systems and non-respiratory issues. It is important to explore these symptoms specifically if the client answers affirmatively to other respiratory-related symptoms.
Personal and **family history of respiratory** conditions and diseases. As noted earlier, common issues associated with the respiratory system include asthma, allergies, pneumonia, bronchitis, emphysema, chronic obstructive pulmonary disease, cancer, cystic fibrosis, and respiratory viruses like coronaviruses.	Do you have any chronic respiratory conditions or diseases? Do you have a familial history of respiratory conditions or diseases? (e.g., asthma, allergies, emphysema). If the client's response is affirmative, begin with an open-ended probe: Tell me about the condition/disease? If the client has a personal history **probing** questions might include: Timing: When did it occur? When were you diagnosed? Quality/quantity: How does it affect you? What symptoms do you have? Treatment: How is it treated? Do you take medication? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better?	The biological and non-biological nature of family may be important to consider when asking questions: risk factors may be influenced by genetics and/or culture. Although there may be a genetic role to some respiratory-associated diseases (e.g., asthma, cystic fibrosis), it is more likely that environment and cultural factors like family traditions and practices play a larger role (e.g., lung cancer, emphysema). One example might be living with a smoker.

Priorities of Care

It is important to understand which respiratory symptoms are cues that require action. Urgent intervention is required with the following cues: cyanosis/pallor, new onset confusion, severe shortness of breath or wheezing, or chest pain. All of these can be related to clinical deterioration and hypoxia.

If cues suggest clinical deterioration, you should ask a colleague to call the physician/nurse practitioner while you perform a primary survey and a focused objective assessment on the respiratory system. Assess respiration rate, work of breathing, oxygen saturation, and then pulse, blood pressure, and temperature, followed by auscultation of lungs.

If the client is wheezing, and you think it may be related to a foreign object, quickly inspect the nose and mouth and dislodge it if you can do so simply. For example, young children often put small toys/objects up their nose; it can become lodged and affect breathing.

Note that chest pain could be respiratory or cardiovascular related depending on the underlying pathophysiology.

Activity: Check Your Understanding

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Objective Assessment

An objective assessment of the respiratory system includes:

- **Brief scan** of the respiratory system.
- **Inspection** and **palpation** of the **nose** and **sinuses**.
- **Inspection**, **auscultation**, **palpation**, and **percussion** of the **posterior** and **lateral thorax** followed by the **anterior thorax**.

An objective assessment is usually completed after the subjective assessment, but if the client shows signs of respiratory distress, you may proceed directly to the objective assessment and associated interventions. In this case, it is important to prioritize care after a brief scan that involves components of the primary survey. The physical techniques of inspection and auscultation are usually prioritized.

It is important to be aware of the landmarks of the anterior and posterior chest. This knowledge helps you accurately landmark and also informs the documentation of the findings. See **Figure 2** for anatomical locations and **Figure 3** for reference lines.

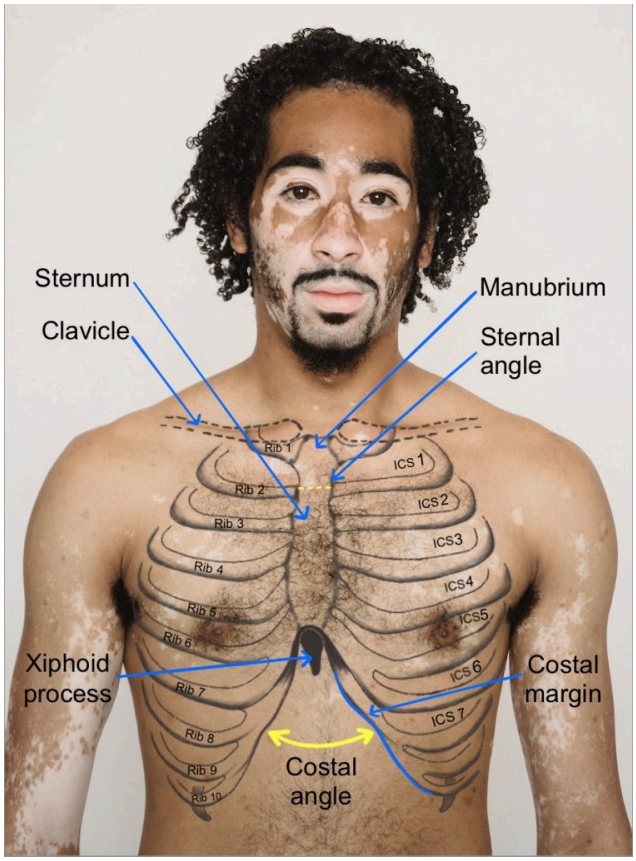

Figure 2: Anatomical landmarks.
Photo by Armin Rimoldi from Pexels (image was cropped and illustrated upon for the purposes of this chapter)

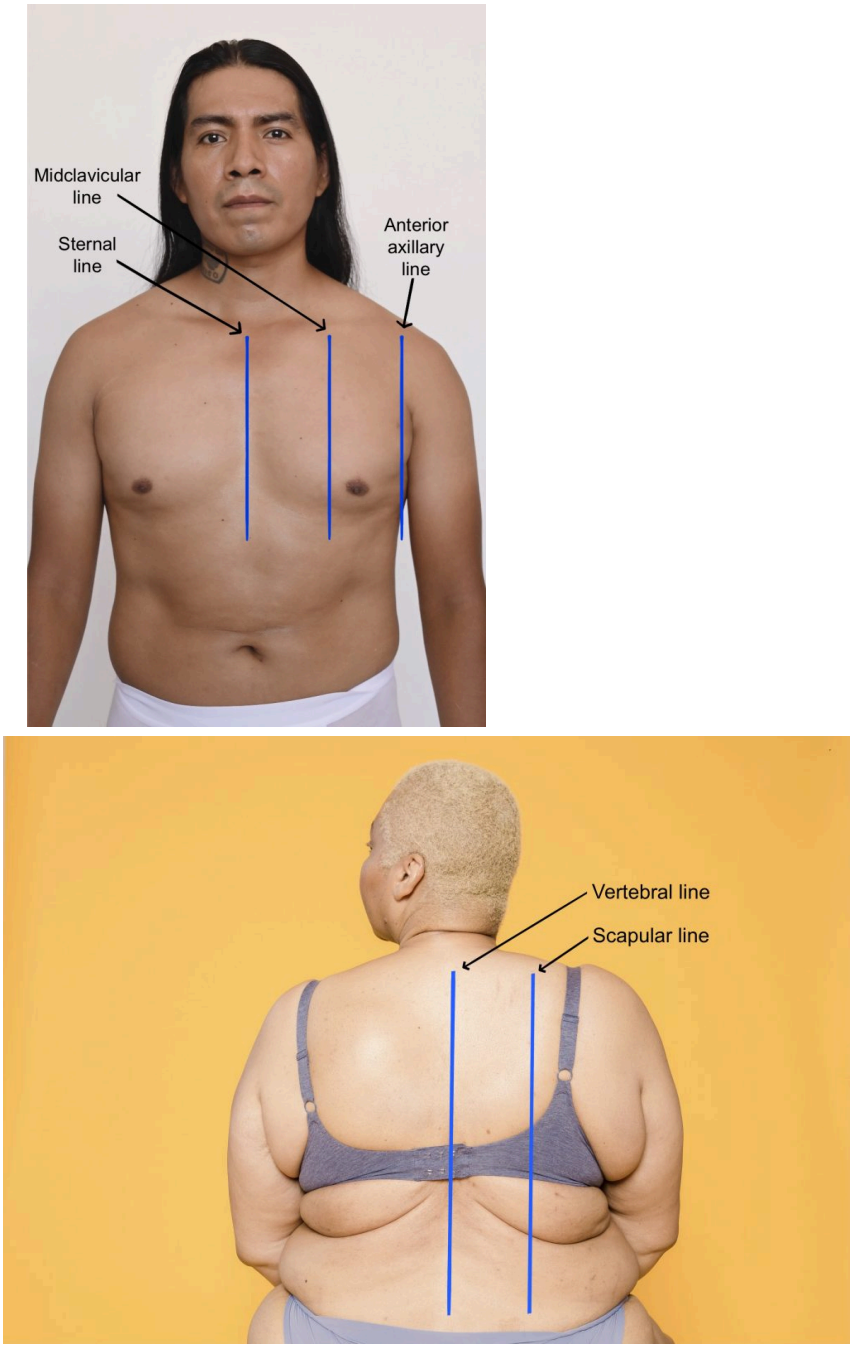

Figure 3: Reference lines.

Image on left: Photo by Armin Rimoldi from Pexels (image was cropped and illustrated upon for the purposes of this chapter)

Image on right: Photo by Laura Tancredi from Pexels (image was cropped and illustrated upon for the purposes of this chapter)

Be aware of the **environmental temperature** in the room and the temperature of your hands. Room temperatures are not easily modified, so you should attempt to limit exposing the client and keep them covered. You should also try to warm your hands and stethoscope before placing them on the client's body.

Ensure the client is **positioned** in the best way to assess the lungs: usually **seated** or in the **high-fowlers position** with the client looking straight ahead so that the lungs can fully expand. If you are assessing a young child or newborn,

you could ask someone (e.g., care partner, healthcare provider, parent) to help hold the client upright on the exam table or sit the client in their lap while assessing the respiratory system.

You should help the client into the side-lying position if they are in a supine position and cannot sit upright. This repositioning may require the help of another healthcare provider if the client is unable to roll over themselves.

Assessment of the **posterior** and **lateral thorax** involves assessing from the shoulders and the axillary area down to the bottom of the rib cage. Assessment of the **anterior thorax** involves assessing from the lung apices (just above the clavicles) down to the bases (at bottom of the rib cage). To help visualize, see **Figure 4** for the location of the lobes on the anterior and posterior thorax and **Figure 5** for the location of the lobes on the lateral thorax (shown upon inspiration).

Keep in mind, you should do the entire assessment on the **bare skin**.

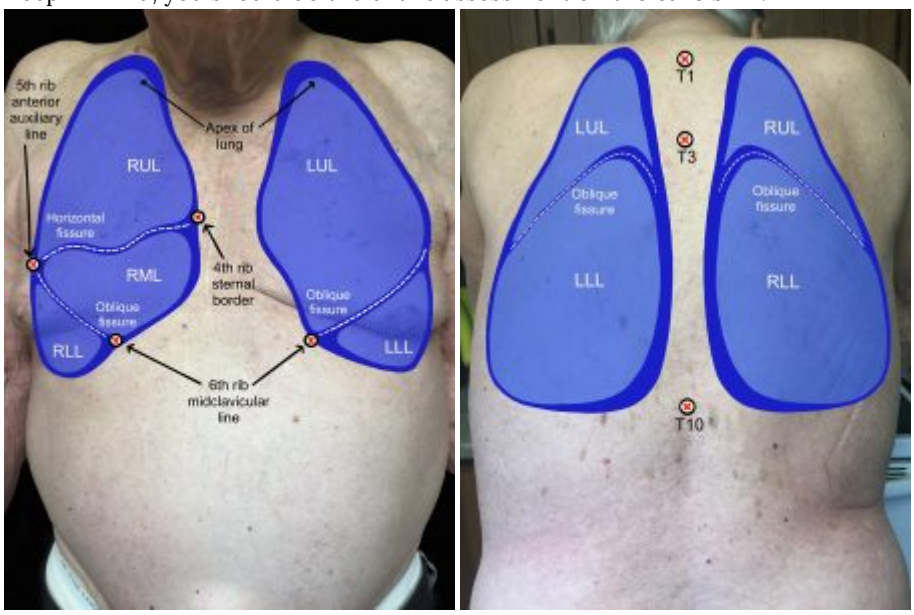

Figure 4: Location of lobes on anterior and posterior thorax.

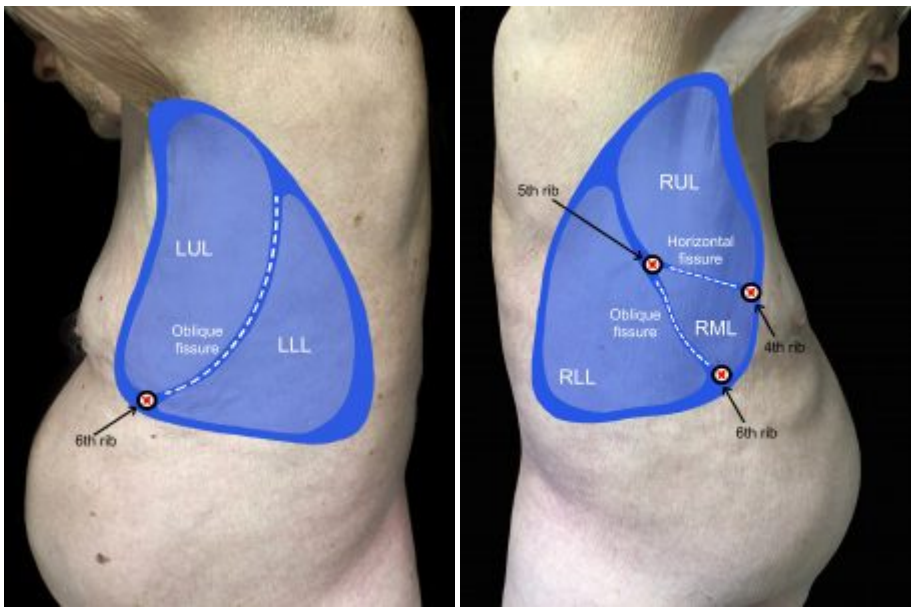

Figure 5: Location of lobes on lateral thorax.

Clinical Tip

Always use a **trauma-informed approach** to inform your respiratory assessment. This is particularly important considering that areas of the chest will be exposed. Do not assume who may have experienced trauma: it can happen to anyone, regardless of gender, age, or socioeconomic/educational level.

You could start by asking the client if they would like a family member or friend present or another healthcare provider. You should explain what you are doing throughout the assessment and explain why these actions are important to perform. Sometimes it is helpful to show on your own chest (over your uniform) where you will be palpating and placing your hands or the stethoscope.

Maintain privacy by closing the door and/or curtains. Use draping and only expose the necessary areas of the chest. Clients may feel awkward or embarrassed having their thorax exposed, particularly the anterior side. This feeling can be felt by people of all genders and ages. While you have the gown open at the back, use the drape to cover the lower half of the thorax. When you need to assess the anterior thorax, use the drape to cover any area not being assessed; the drape can be secured around the abdomen. With the anterior thorax, you can ask the client to lower the patient gown at the top so that you can assess the upper thorax and then, you can have them pull the gown up at the bottom to assess the lower thorax. Another alternative method is to have gown open at the front instead of the back.

You should always be professional, confident, and efficient. Try to be responsive to the client's verbal and non-verbal cues. If they seem uncomfortable, you could acknowledge this by saying, "Many clients feel uncomfortable having their lungs assessed because it involves exposing their chest. I will only ask you to expose the areas that I need to assess and then you can cover back up again. Is there anything I can do to make this easier for you?"

Contextualizing Inclusivity – Chest Binding

An inclusive approach to health assessment is vital because clients need to feel accepted for who they are. Some non-binary and transmasculine clients may wear a chest binder because they feel uncomfortable or distressed about having breast tissue. Binders are garments designed to flatten the appearance of the chest wall. They come in different forms and can extend from the chest down to the diaphragm or to the hips: they may look like a sports bra or tank top, and some clients may use compression bandage.

The binder needs to be removed to adequately listen to the lungs, as these sounds may be diminished through the binder. You may or may not be aware of whether the client you are assessing wears a chest

binder, so you can apply an inclusive approach by acknowledging the vulnerability that clients may feel. Provide step-by-step instructions so that they are prepared, and ask non-judgmental questions like "Assessing your lungs requires me to assess on the bare skin on the front and back of your chest. Is there anything that would impede me from doing so?" You can also ask if they have any questions before beginning such as "Do you have any questions before we begin?"

You should also assess the binder for proper fit: a good fit allows for normal chest expansion and deep breathing.

Brief Scan – Respiratory System

A **brief scan** (see **Figure 6**) involves **inspection of the client's breathing** and includes elements of the primary survey. This assessment helps you quickly recognize cues of clinical deterioration, specifically signs of respiratory distress, and may influence your decision on whether immediate action is required. The steps of a brief scan are prioritized in order of importance. For example, you need to assess whether an airway is patent (i.e., not obstructed) before you assess presence of breathing and respiratory rate.

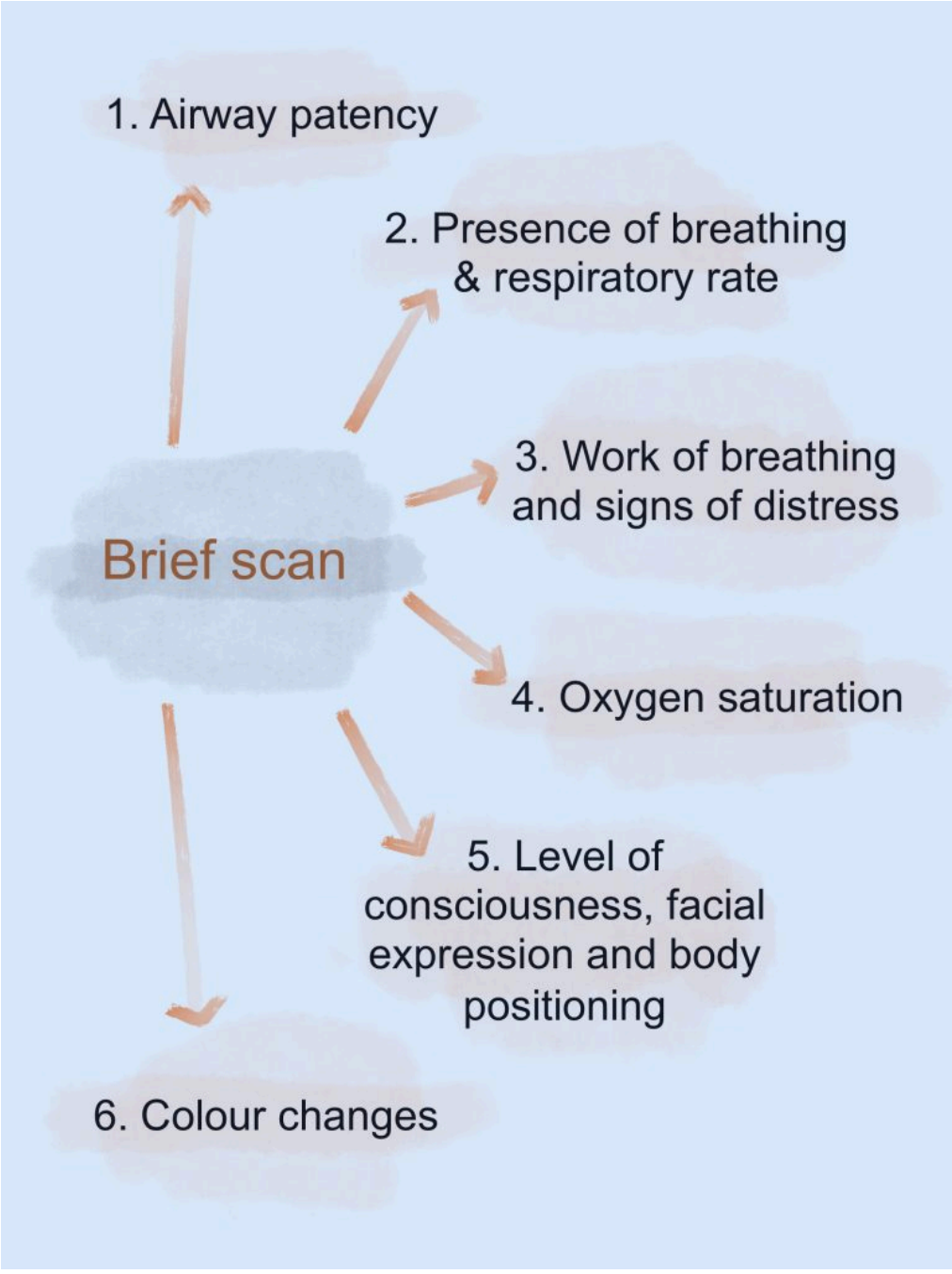

Figure 6: A brief scan.

Guided by the primary survey, steps of the brief scan of the respiratory system include assessing respiratory effort and signs of respiratory distress:

1. Assess **airway patency**

- Determine whether there is an open airway or the presence of obstructive airway symptoms (e.g., secretions [mucus, blood, vomit], snoring, **stridor**, difficulty breathing, coughing, drooling, wet sounding voice, unable to speak). Partial or complete obstruction of airways are commonly associated with foreign objects, inflammation, and direct injury/trauma to the airway. An obstructed airway is a first level priority of care because it affects oxygenation and can lead to clinical deterioration.

2. Assess **presence of breathing** and **respiration rate**

- First, assess the presence of breathing and eupnea, which is normal automatic breathing with a regular rhythm. Apnea is the cessation of breathing and can be permanent or intermittent. It can result in severe hypoxia, and can be associated with respiratory depression from certain medications, and can also involve sleep apnea when breathing stops intermittently.
- If breathing is present, count the rate for 30 seconds if the rhythm is regular and one minute if it is irregular. Are there signs of bradypnea or tachypnea? See **Table 2** for normal respiratory rates.

Table 2: Respiratory rate ranges.

Age	Rate (breaths per minute)
Newborn to 1 year	30–60
1 to six years	22–40
7 to 11 years	18-30
12 to 17 years	12-22
Adults and older adults	10–20

3. Assess **work of breathing** and **signs of respiratory distress**.

- Is the breathing silent or noisy? Do you hear wheezing or stridor? Normal breathing is silent. Noisy breathing with wheezing or stridor is a sign of distress.
- Do you observe nasal flaring? (This is a common symptom of respiratory distress particularly in infants and young children. However, keep in mind that newborns are nose breathers. Additionally, air does not enter the lungs until birth so the newborn may be congested and you may observe nasal flaring).
- Do you observe use of the accessory muscles (i.e., sternomastoid and trapezius) and intercostal tugging/pulling/retractions? Unobstructed breathing with no respiratory distress should be quiet with no observable use of

accessory muscles or intercostal tugging. Observable use of accessory muscles and intercostal tugging are signs of distress.
- Do you observe any abnormal patterns of breathing? One example of an abnormal pattern of breathing is **agonal breathing**; it involves an irregular rhythm with gasping and is a sign that a person is near death.

4. Assess **oxygen saturation**.

- Is the oxygen saturation level below 95 to 97%? Although 97 to 100% is the normal range for oxygen saturation levels, older individuals may have a slightly lower saturation (also, see Knowledge Bites for information about when lower oxygen saturations are acceptable in certain populations). Keep in mind that a saturation below 97% with children should always be further investigated.
    - Nail polish should be removed before assessing oxygen saturation with a pulse oximeter on the finger.
    - The accuracy of pulse oximetry can be affected by low perfusion states (e.g., vasoconstriction or low cardiac output). If you suspect low perfusion or you are getting a weak signal on the finger, use a pulse oximeter that snaps on the ear or can be taped to the forehead. These approaches to measuring oxygen saturation are best when a client has artificial nails.

Contextualizing Inclusivity – Pulse Oximetry

Oxygen saturation measured with pulse oximetry is sometimes overestimated in a client with dark skin: oxygen saturation may appear higher than it really is. If a client indicates that they are short of breath, but this is not reflected on the pulse oximeter, believe the client and assess further. It is always best to assess further when the client's signs and symptoms do not align with the pulse oximetry.

5. Assess **level of consciousness**, **facial expression**, and **body position** for signs of respiratory distress.

- Does the client have an altered level of consciousness and confusion? Normally, clients should be alert and oriented.
- Does the client show signs of agitation such as wide eyes and grimacing? Normally, a client should have a relaxed facial expression.
- Is the client showing signs of distress including hunched over/tripod position or unable to sit up? A client should normally be in a relaxed posture, while those in respiratory distress often shift into a tripod position: leaning forward with hands and/or forearms resting on their legs or another surface such as a table.

6. Assess **colour changes** (and fingernails for clubbing and testing capillary refill)

- Are there signs of cyanosis or pallor in the lips, mucous membranes, fingernails, or conjunctiva? Cyanosis and pallor result from hypoxemia, and can have many causes.

Contextualizing Inclusivity – Assessing Colour Change

Cyanosis: This is best seen in areas with rich vasculature and thin overlying dermis: mucous membranes/lips, conjunctiva, and extremities (fingernails). In people with darker skin, cyanosis can appear as a grey/white shade around the lips and the conjunctiva can appear as a grey/bluish shade while people with yellowish tones to their skin can have a greyish/green shade (Lewis, 2020; Sommers, 2011). In people with lighter skin, cyanosis appears as a dusky bluish/purple shade (Lewis, 2020).

Pallor: In people with darker skin, this can appear as a grey shade to the mucous membranes/lips, nail beds, and skin, and a yellowish shade in people with lighter brown skin; it can be helpful to look at the palms of people with dark skin when assessing for pallor as they tend to be paler (Lewis, 2020). In people with lighter skin, pallor can appear as a generalized pale discolouration to the skin, nail beds, and mucous membranes/lips. In people of all skin colours, the conjunctiva is normally a healthy pink due to the vascularity, but with pallor it will appear white or very pale pink (Mukwende et al., n.d.).

- While assessing fingernails, also assess for presence of clubbing. Clubbing is related to conditions that lead to chronic hypoxia and cause the nail angle to flatten to 180 degrees or more, the nail bed to soften and become spongy, and the fingertips distal to the distal interphalangeal joint to become enlarged. Normally, the nail angle is about 160 degrees with firm nailbeds, and no enlarged fingertips. It is often assessed on the index finger, but in cases of early clubbing it may not have advanced to that digit, so it is best to assess the thumb first. To assess for the presence of clubbing:
  - Ask the client to stick their thumb (or index finger) out so that it is parallel to the ground and view it at eye level (this is considered the profile sign).
  - Inspect the nail angle at the intersection of where the nail base meets the skin (the angle should be about 160 degrees).
  - Inspect for enlarged fingertips that look "bulb-like" (see **Figure 7**).
  - Palpate the nail bed (it should be firm to touch).

Figure 7: Clubbing of fingernails on a person's hands. Taken from Acopaquia.jpg by Desherinka is licensed under CC BY-SA 4.0.

- Test capillary refill on two or three fingernails of each hand. Start by applying pressure with your own finger to the client's nail; this causes the nail to blanch (become pale in colour). Apply the pressure for about 5 seconds and then release and observe the return in colour. It should return within 3 seconds or less; a more sluggish return (more than 3 seconds) suggests that there may be issues with oxygenated blood perfusion, which might be caused by respiratory, cardiac, and/or peripheral vascular system issues.

7. Note the **findings**

- Normal findings might be documented as: "Patent airway, quiet breathing with no signs of respiratory distress. Alert. Oxygen saturations 98%. No colour changes with translucent nails and pinkish undertone. No signs of clubbing. Capillary refill returns within 1–2 seconds."
- Abnormal findings might be documented as: "Stridor present, nasal flaring and intercostal tugging, pallor noted around lips. Oxygen saturations 91%. Slow capillary refill at 4–5 seconds."

Priorities of Care

A client who is in respiratory distress requires immediate intervention, especially if signs indicate an obstructed airway, increased work of breathing, an altered level of consciousness, and an oxygen saturation dropping below 92%. Stay with client and call for help (a senior nurse, physician, or nurse practitioner) if a client is in respiratory distress.

- If an airway is not patent, try to open the airway with a head-tilt-chin-lift and inspect the mouth and nose for obstructions.
- If oxygen saturations are low, try to wake the client if they are sleeping, sit them upright, and ask them to take a few deep breaths. Supplemental oxygen can be applied if there are **standing orders** on your unit.

You may need to keep the client in a supine position if you suspect that they are deteriorating quickly and may go into respiratory or cardiac arrest. Notify the **critical care response team (CCRT)** or call a code in this case. **Bag-mask-ventilation** may be needed if the client is in respiratory arrest.

If you suspect the client is choking, stay with the client and call for help while you place them in a high fowlers position. If they are able to, encourage them to cough and clear their airway. You may need to suction the oral cavity and airway, if possible. If you suspect a complete obstruction, use a combination of "back blows, abdominal thrusts, and chest thrusts" (Canadian Red Cross – https://www.redcross.ca/blog/2021/9/what-to-do-if-an-adult-is-choking)

Knowledge Bites

Lower oxygen saturation levels (between 88 to 92%) are acceptable for those with Chronic Obstructive Pulmonary Disease (**COPD**).

In a healthy person without COPD, the strongest stimulus for the normal respiratory drive is hypercapnia (increased carbon dioxide, CO2, in the blood). This means that a person is stimulated to breathe when there are high CO2 levels in their blood.

In contrast, a person with COPD has a reduced capacity to exhale carbon dioxide, leading to hypercapnia (increased CO2 in the blood). As a result, there is a shift in the normal respiratory drive: the respiratory drive becomes a hypoxic drive, meaning that low oxygen is the primary stimulus to breathe. This means that low oxygen levels stimulate respirations as opposed to hypercapnia because a person with COPD is a CO2 retainer (i.e., they retain CO2 in their lungs). Therefore, when performing a brief scan, consider oxygen saturation levels in the context of existing conditions and be cautious about applying oxygen when a client's oxygen saturation is lower than normal, particularly if the client has COPD.

Activity: Check Your Understanding

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Nose and Sinuses

Inspection and palpation of the nose should be performed standing directly in front of the client while they are sitting upright on the examination table or a chair. It is important to don gloves as you may be in contact with bodily fluids such as nasal discharge.

Inspection

Steps to **inspect** the **nose** include:

1. Inspect the **external surface** of **the nose** for **colour**.
    - Normally, the nose is the same colour as the rest of the face with no discolourations such as redness. Describe the appearance and location of any discolourations noted.
2. Inspect the **contour** and **external surface of the nose** for **symmetry**, **swelling**, and **malformations** such as **masses** and **lesions**.
    - Normally, the nose is symmetrical with no swelling or malformations. Describe the appearance and location of any abnormalities.
3. Inspect the **nasal cavity** and **mucosa** of the nose for **colour**, **discharge/bleeding**, **swelling**, **foreign bodies**, and **malformations**. See **Figure 8** and **Video 4**.
    - Ask the client to tilt their head gently backwards while you use your finger to elevate the tip of their nose.
    - Use a penlight or the light source from a otoscope to illuminate the nasal cavity. Use a large/wide cover for the otoscope probe and ensure that you do not touch any part of the nose with it as the mucosa is sensitive and highly vascular. Discard the probe cover in the garbage when done.
    - The nasal mucosa is normally pinkish red in colour with no discharge or bleeding. Describe any discolouration of the mucosa or the colour and amount of any discharge/bleeding.
    - Normally, there is no swelling or foreign bodies. If present, describe the appearance and location of swelling and foreign bodies. In children, common foreign bodies include little toys and beads.
    - Common malformations may include lesions, masses, polyps, and deviated or perforated septum. If any are present, describe the appearance and location. Polyps appear as a tear-drop formation. A deviated septum is when the septum is off centre and bulges laterally. A perforated septum is when there is a hole/opening in the septum; it is typically observed when you illuminate one side of the nasal cavity and you observe the light on the other side.

Figure 8: Inspecting the nasal cavity and mucosa

4. Note **findings**:

    - Normal findings might be documented as: “External nose is symmetrical with no discolouration, swelling or malformations. Nasal mucosa is pinkish red with no discharge/bleeding, swelling, malformations or foreign bodies.”
    - Abnormal findings might be documented as: “Bright red nasal mucosa with purulent discharge.”

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Video 4: Inspecting the nasal cavity and mucosa

Palpation

Steps to **palpate** the nose and **sinuses** include:

1. With your thumb, gently palpate one sinus at a time.

    - Use a circular motion to palpate.
    - Begin with the frontal sinuses inferior to the eye brows over the bony ridge. Avoid the eye socket.
    - Then, palpate the maxillary sinuses inferior to the zygomatic bone slightly lateral to the nose.

- Inquire if the client had any pain/tenderness upon palpation. A slight pressure is normal. If pain/tenderness is present, assess further subjectively.

2. Palpate the nose for **airflow/patency**.

   - Occlude one naris at a time while placing your index finger over the outside of the nose/nasal wing.
   - Ask the client to take a deep and quick inhalation in through the nose (like a sniff in which they draw air inwards as if trying to smell something).
   - Note the client's capacity to breathe inwards. The client should be able to breathe inwards with no obstructions.

3. Gently **palpate** the **external nose** if trauma/injury or lesions are present.

   - Use the thumb and the index finger to palpate the contour.
   - Lesions can be palpated with the index finger and note the consistency of lesions (e.g., are they soft or firm?).

4. Note the **findings**:

   - Normal findings might be documented as: "No sinus pain noted. Nose is patent with good air flow."
   - Abnormal findings might be documented as: "Left frontal sinus pain 6/10."

Priorities of Care

You should call for assistance while monitoring breathing and vital signs and performing a focused assessment if the client is experiencing signs of respiratory distress associated with any malformations, trauma/injury to the nose, or nasal obstructions. It can be helpful to sit the client upright to assist with breathing.

Deviated septum is quite common. Unless it affects a client's breathing, typically no action is required. Similarly, if a client has a nasal obstruction or an absence of sniff, you should attempt to determine the cause. Is it mucous or a foreign body (like a toy)? Does it just affect one side? If an obstruction is noted, assess for the presence of any findings of respiratory distress. Usually absence of sniff in one naris isn't an urgent finding as a person can breathe through the other side and the mouth, but you should evaluate the cause.

Other abnormal findings that require action are lesions and sinus pain. A focused assessment should be performed and findings reported to the physician/nurse practitioner. Depending on the cause, sinus pain may require treatment such as decongestants, antibiotics, or antihistamines. Cutaneous lesions on the nose should be closely examined. There are many causes of lesions such as herpes simplex virus or a melanoma. For example, the lesion in **Figure 9** is a carcinoma, which is a serious finding. These sorts of lesions are often brought to the attention of healthcare providers when clients share that they have noticed an open sore that has developed with no physical trauma and has not healed. In addition to no physical trauma, a sore that

doesn't heal should be of concern; although it really depends on the type and severity of a sore, the typical timeframe to heal is 4 to 6 weeks. These lesions are not a critical finding, but they are life-threatening; they require prompt intervention because they are curable if diagnosed and treated early.

Figure 9: Squamous cell carcinoma lesion

(Image from the National Cancer Institute: https://visualsonline.cancer.gov/details.cfm?imageid=2165)

Activity: Check Your Understanding

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Posterior and Lateral Thorax - Inspection

1. Inspect for **symmetry of thorax** and **chest expansion**.

- Compare the left and right sides of the thorax. Are the shoulders, scapula, and ribs on symmetrical upon observation?
- When the client breathes, does the left and right sides of the thorax expand and recoil symmetrically? Also, test for symmetrical chest expansion by placing your thumbs (on either side of vertebra) just below the inferior border of the scapula (about T9/T10) with fingers stretched out to the lateral sides of the thorax. Pinch a piece of skin in between your thumbs and ask the client to take a big breath in and out. If the thumbs move equally apart and back together at the same time upon inspiration and expiration, this indicates symmetrical expansion. Make a note if the expansion is asymmetrical (one side has limited expansion, lags in expansion, or does not expand). This can happen when one lung cannot expand due to conditions that involve inflammation and air between the lungs and chest wall (i.e., pneumothorax) or partial or complete collapse of the alveoli (i.e., atelectasis). You may also notice that in pregnant women, the thorax shortens while the costal angle widens to accommodate the enlarging uterus: this is normal.

2. Inspect the **spinous process**, **ribs**, **deformities**, **masses**, and **swelling**.

- Do the spinous processes appear in a straight line down the vertebral line of the posterior thorax?
- Are the ribs sloping downwards?
- Do you observe any deformities, masses or swelling?

3. Inspect **skin colour** and **skin integrity**

- Is the skin colour consistent across the posterior and lateral thorax?
- Do you notice any skin discolouration?
- Do you notice any scars? If so, ask the client the cause. For example, a client may have a scar from lung surgery such as a **lobectomy**, and this surgery can lead to no air entry when you auscultate the lungs.

4. Inspect the **anteroposterior to transverse diameter** of the thorax. See **Figure 10**. The transverse diameter is shown in the first image across the chest. The anteroposterior diameter is show in the second image from front to back. In most adults, the anteroposterior to transverse diameter ratio is about 1:2.

- The ratio will be closer to equal (1:1) when a client has conditions that give rise to hyperinflated lungs (e.g., emphysema). Also, a 1:1 ratio is usually present in children younger than two years of age.

Figure 10: Anteroposterior to transverse diameter

5. Note the **findings**

- Normal findings might be documented as: "Symmetrical posterior thorax with symmetrical chest expansion, no thorax deformities or masses, spinous process in a straight line, no skin discolouration, anteroposterior to transverse diameter 1:2."
- Abnormal findings might be documented as: "Horizontal ribs with a 1:1 anteroposterior to transverse diameter."

Priorities of Care

None of the abnormal findings on their own are considered critical findings. However, if you notice asymmetrical lung expansion, be aware that this is associated with decreased ventilation. You should investigate whether there is decreased or absent air entry in the affected lung, which may be lagging behind or not expanding at all. Examples of underlying pathologies can include **pneumothorax**, **atelectasis**, **pleural effusion**, or partial or complete obstruction of the airway on the **ipsilateral** side.

Activity: Check Your Understanding

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Posterior and Lateral Thorax – Auscultation

Auscultating the posterior and lateral thorax involves the following steps (see **Video 5**):

Step 1: Perform hand hygiene and cleanse the stethoscope.

Step 2: Ensure the client is in an **upright position** and ask them to take a big breath in and out through the mouth each time they feel the stethoscope on their posterior thorax.

- Instruct the client to breathe through the mouth because this makes it easier for you to listen to lung sounds, particularly if there is any nasal congestion or obstructions.
- Keep in mind that breathing a bit more deeply may trigger shortness of breath or dizziness for some clients. You should notify them that they can take a break and breathe normally if they need to. Also be aware that older adults may have difficulty taking a big breath.

Step 3: Place the **stethoscope's diaphragm** on the chest in about four to eight locations on each side of the posterior thorax and then at three locations on the right lateral thorax and at two locations on the left lateral thorax so that you listen to all lung lobes. Make sure you have a complete seal. See **Figure 11** for the placement pattern. The number of locations depends on the size of the thorax. For example, less locations are needed on a client with a smaller thorax (e.g., infants). Note that the posterior thorax is primarily lower lobes.

- On the posterior thorax, begin at the shoulders at the scapular line, moving from one side to the other side, then move down, and repeat. As you move down the thorax, place your stethoscope close to the vertebral line so that you avoid listening over the scapula. Toward the bottom, listen close to the vertebral line and also move laterally.

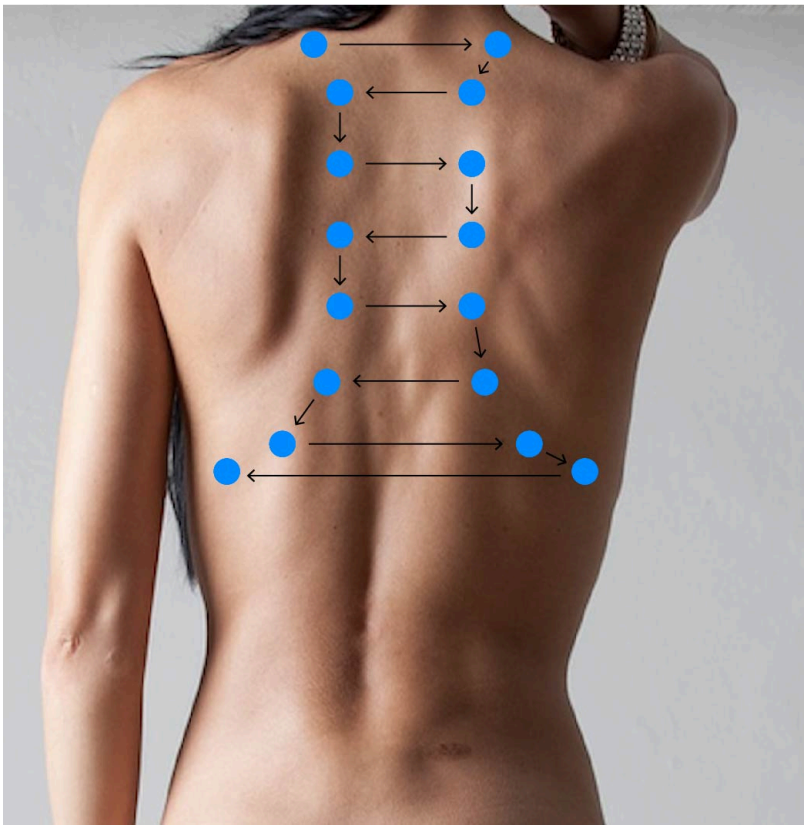

Figure 11: Placement pattern for auscultation of posterior thorax
Image by Claudio_Scott from Pixabay (image was cropped and illustrated upon for the purposes of this chapter)

- On the lateral thorax, place the stethoscope at three locations on the right side so that you listen to the right upper, middle, and lower lobes, and then two locations to listen to the left upper and lower lobe. See **Figure 12** below.

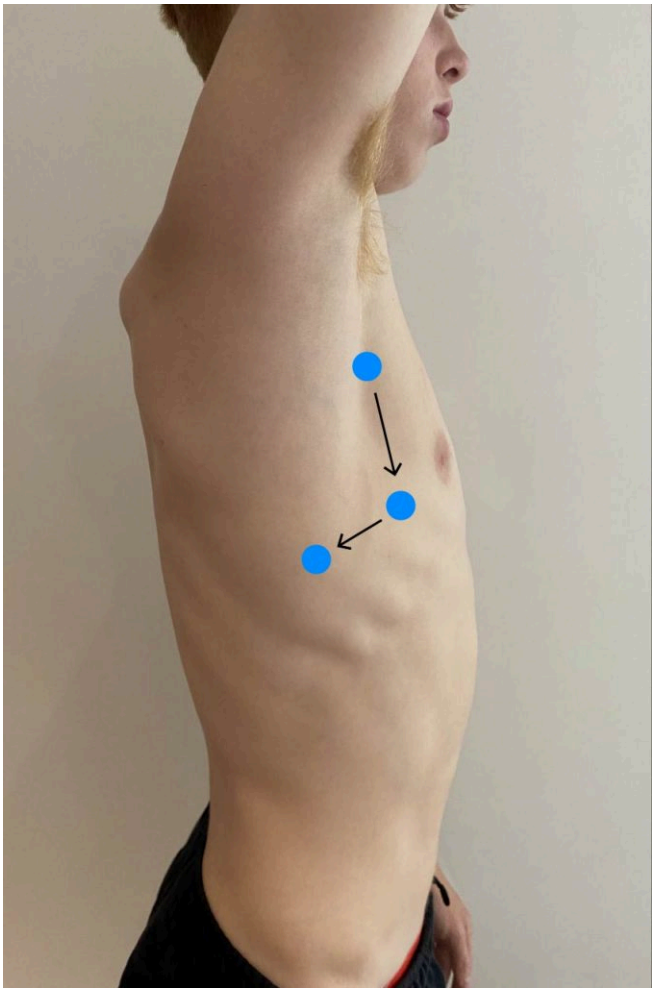

Figure 12: Placement pattern for auscultation of lateral thorax

Step 4: In each location, **listen to one full respiration** (inspiration and expiration) and **compare air entry bilaterally**.

Step 5: Listen for the following:

- **Air entry quality** and **equality**.
  - Quality: Note whether it is good, decreased, or absent.
  - Equality: Note whether air entry is equal bilaterally.

- **Normal breath sounds** include clear air entry (**Audio 1**) and the location of bronchovesicular and vesicular.
  - **Air entry** is normally **clear** with no abnormal sounds (e.g., adventitious breath sounds – see below).
  - **Bronchovesicular** breath sounds are moderate in loudness; inspiration is equal to the expiration phase, and heard on the upper thorax close to the vertebrae and near the bronchi.
  - **Vesicular** breath sounds are quiet and low-pitched; inspiration is longer than the expiration phase, and heard in the periphery of the lung fields and near the smaller airways in an older child and adult. (Note: in young children particularly under two and three years of age, vesicular sounds are not heard because of their small thoraxes. Rather, you hear bronchovesicular over the whole thorax).

NOTE: When a person takes a breath in, it takes time for the air to get to the periphery of the lung fields resulting in a long inspiration phase. When a person breathes out, the expiration phase is short with vesicular sounds because the breath leaves the periphery of the lung fields quickly.

NOTE: Another type of normal breath sounds are bronchial sounds, which are heard over the tracheal

area. These sounds are described as hollow sounds and harsh sounds, particularly upon expiration; the expiration phase is longer than the inspiration phase. These are heard over the trachea area, and are not heard on the posterior thorax except in the case of an underlying pathology.

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=240#h5p-243

Audio 1: Normal breath sounds

- **Adventitious sounds** are abnormal lung sounds with several causes. You will become familiar with the quality of these sounds after listening to the thorax of many clients and listening with an expert nurse. When you hear these sounds, you should note the quality and the location. For example, what lobes do you hear these sounds in?
  - Wheezes (**Audio 2**) are an adventitious sound heard in the lungs when there is bronchoconstriction (i.e., narrowing of the airways) that can happen with inflammation and **bronchospasm** with conditions such as asthma, emphysema, or an allergic reaction. Wheezes are a continuous musical-like sound that can be heard on inspiration or expiration and can be low- or high-pitched. Higher pitch = increased bronchoconstriction. Lower pitch = decreased bronchoconstriction. Wheezes are often described as mild, moderate, or severe.

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Audio 2: Adventitious sounds: Wheezes

  - Stridor (**Audio 3**) is a more extreme form of wheezing when the upper airways are partially obstructed, and have congenital (i.e., problem present at birth), infectious (e.g., croup, bronchitis), or trauma-related (e.g., foreign body, neck fracture) causes. The sound is continuous and high-pitched. Although commonly heard on inspiration, it can be heard on expiration too. It is usually associated with other signs of respiratory distress and requires immediate response.

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=240#h5p-245

Audio 3: Adventitious sounds: Stridor

  - Crackles (**Audio 4**) are an adventitious sound heard in the lungs when there is an accumulation of fluid (e.g., mucus), such as with pneumonia. They sound like an interrupted popping and even a bubbling noise that can be described as fine, moderate, or coarse crackles depending on the severity.

Mild crackles are typically heard in the bases because fluid accumulation in the lungs is affected by gravity. Crackles are typically heard upon inspiration, but they may be heard upon expiration and heard throughout the thorax, particularly when the crackles are coarse. Coarse crackles are associated with increased severity in terms of fluid accumulation in the lungs.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Audio 4: Adventitious sounds: Crackles

Step 6: Note the **findings:**

- Normal findings might be documented as: "Good air entry, equal bilaterally, no adventitious sounds audible throughout all lobes. Bronchovesicular sounds heard in upper lobes close to vertebrae. Vesicular sounds heard throughout periphery and lateral lobes."
- Abnormal findings might be documented as: "Decreased air entry heard in left lower lobe with moderate crackles."

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=240#oembed-1

Video 5: Auscultation of posterior and lateral thorax.

Clinical Tip

If a newborn or young child is sleeping, begin with auscultation. It is difficult to accurately listen to lungs when a client is crying. If a client is crying, consider ways to reduce this. For example, a newborn/young child will feel safer if the parent/care partner is engaged. You could have a young child play with your stethoscope so that it is familiar, or ask them to take a big breath and pretend they are blowing out birthday candles.

Priorities of Care

Absence of air entry and stridor are considered urgent situations. You should notify another provider like a physician or nurse practitioner. If you think the stridor is caused by a foreign body that you can quickly remove, do so. Otherwise, follow the steps of the primary survey (check airway patency, measure respiratory rate, work of breathing, and oxygen saturation, assess pulse rate/rhythm, blood pressure, assess level of consciousness). If the oxygen saturations are low, apply oxygen if you are permitted to do so.

With the presence of crackles and wheezes or decreased air entry, you should rely on the primary survey to determine whether there is a risk of clinical deterioration. You should also consider whether the wheezing is new onset and could be caused by a severe allergic reaction (i.e., anaphylaxis) and requires immediate intervention. If not, and the client is stable, you can move the head of the bed up to assist with breathing and continue the focused assessment on the respiratory system. Abnormal findings should be reported.

Posterior and Lateral Thorax - Palpation

The steps in palpating the posterior and lateral thorax are as follows (see **Video 6**):

1. Begin by using the dorsa of your hands to compare **temperature** bilaterally from the apex to the bases. Temperature should be equal bilaterally and typically warm to touch.

2. While comparing bilaterally, use the finger pads of your dominant hand, palpate the posterior and lateral thorax from the shoulders and axillary area to the bottom of the thoracic cage for **pain, moisture, deformities, masses, swelling**, and **crepitus.**

While doing so:

- Ask the client if they have any pain. Remember to use other words that may resonate with them, such as tenderness. Pain can be associated with many different underlying pathologies, so you should further assess the pain and other related cues that provide information about the pathology and the required intervention.
- Note any moisture.
- Note the location, size, and description (hard, soft) of any deformities, masses, or swelling.
- Note the location of any crepitus. Crepitus feels like a crackling under the skin similar to popping bubble wrap. It is an acute condition related to subcutaneous emphysema in which air shifts out of the lungs and into the subcutaneous tissues as a result of traumatic, surgical, or infectious causes. It usually resolves when the acute condition is treated. However, it is important to monitor the client for any signs of respiratory distress and **desaturation** and if the crepitus worsens (expands in size across the chest). New onset crepitus should be examined further, and any additional respiratory changes should be assessed. The physician/nurse practitioner should be notified of the findings.

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Video 6: Palpation of posterior and lateral thorax.

3. Assess for **tactile vocal fremitus,** which is a vibration felt on the chest wall produced by the sounds of vocalization (speech) transmitting through lung tissue. See **Video 7**. This assessment is not commonly performed, but it can provide information about pathological conditions that cause **consolidation** in the lung tissue (e.g., tumour, pneumonia) or increased amounts of air (e.g., pneumothorax, emphysema). Combined with other potential cues, the findings from this assessment will point to whether further diagnostic testing is required.

- Place the ulnar or palmar surface of your fingers on about three to five locations on each side of the posterior thorax and about three locations on the right lateral thorax and two locations on the left lateral thorax (again, the number of locations depends on the size of the thorax). See **Figure 13** for the pattern. The ulnar and palmar surface of fingers are used because they are most sensitive to vibrations.
- Begin at the apex of the lungs (near the shoulders) or just under the axilla and continue down to the base of the lungs (at the bottom of the thorax cage).
- Ask the client to say a word that produces a low-frequency sound (e.g., “foodie” or “coin”) each time you place your hands on the thorax. You may need to ask them to speak a bit louder than normal. The best words to have them say are ones that have two vowels within a single syllable because this produces a low frequency. If you are

interested, a history of the words used can be found at: https://onepagericu.com/blog/tactile-fremitus-lost-in-translation

- Note the equality of fremitus in comparison from the left to the right side. The vibrations should be equal. The vibrations will be more difficult to feel as you get closer to the bases because you are further away from the larynx.

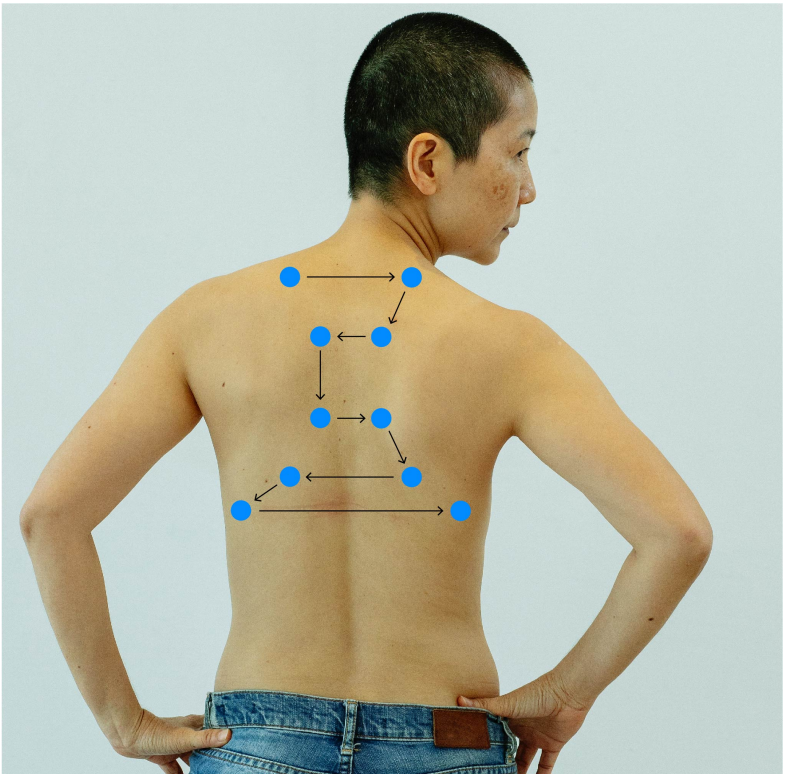

Figure 13: Pattern for palpation of tactile vocal fremitus
Photo by Michelle Leman from Pexels (image was cropped and illustrated upon for the purposes of this chapter)

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Video 7: Palpation for tactile vocal fremitus.

4. Note the **findings**

- Normal findings might be documented as: "Upon palpation of posterior chest wall, client reports no pain, temperature warm to touch, equal bilaterally, no moisture, masses, swelling, or deformities, equal tactile fremitus.
- Abnormal findings might be documented as: "Upon palpation of posterior chest wall, client reports pain inferior to scapula at scapula line, a small protrusion noted at same location, temperature warm to touch, equal bilaterally, perspiration noted, equal tactile fremitus."

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=242#h5p-206

Posterior and Lateral Thorax – Percussion

The steps in percussing the posterior and lateral thorax are as follows (see **Video 8**):

1. Ensure the client is in an **upright position**, and perform **indirect percussion** to evaluate the elicited sounds.

- The lung is an air-filled organ, so the normal percussion note over the lungs of older children, adolescents, and adults is resonance, which is a low-pitched and hollow sound. With very young children under the age of about 5, you will hear a lower-pitch and booming sound (this is described as hyperresonance).
- Listen for any abnormal percussion notes such as dull notes that can occur when the lung tissue is filled with fluid or solid matter (e.g., a tumour close to the chest wall, pneumonia, pleural effusion, atelectasis) or hyperresonance with lung conditions that lead to hyperinflation of part or all of a lung (e.g., emphysema, pneumothorax). Percussion does not elicit reliable data when a client is overweight or obese because the adipose tissue modifies the normal resonance to a dull note. However, the notes typically don't change with a client who is underweight. Keep in mind that you should not percuss over ribs or the heart. If you do, the sound elicited over the heart (a dense organ) will be a dull high-pitched sound that quickly stops and over the ribs (composed of bone and cartilage will be a flat high-pitched sound that stops promptly with a very short duration). If abnormal percussion sounds are noted, describe the sound and identify the location. Then, perform a complete focused assessment on the respiratory system and check for other related cues.

2. Percuss in about four to eight locations on each side of the posterior thorax and then at three locations on the right lateral thorax and at two locations on the left lateral thorax. See **Figure 14** for the **percussion pattern**. Remember that the number of locations depends on the size of the thorax; less locations are needed on a client with a smaller thorax (e.g., infants). Also remember that the posterior thorax is primarily lower lobes.
3. On the **posterior thorax**, begin at the shoulders at the scapular line. As you move down the thorax, place your finger close to the vertebral line to avoid percussing over the bone of the scapula. Toward the bottom, percuss close to the vertebral line and then move laterally.

- Avoid percussing over ribs because this will elicit a flat note and does not provide you with any important information. You can rock your finger back and forth to ensure you are in an intercostal space. Typically, you will skip the percussion step when the client has a muscular chest or a lot of adipose tissue as this will modify the normal resonant sound to a flat sound. However, a client who is underweight will typically still have a resonant sound.

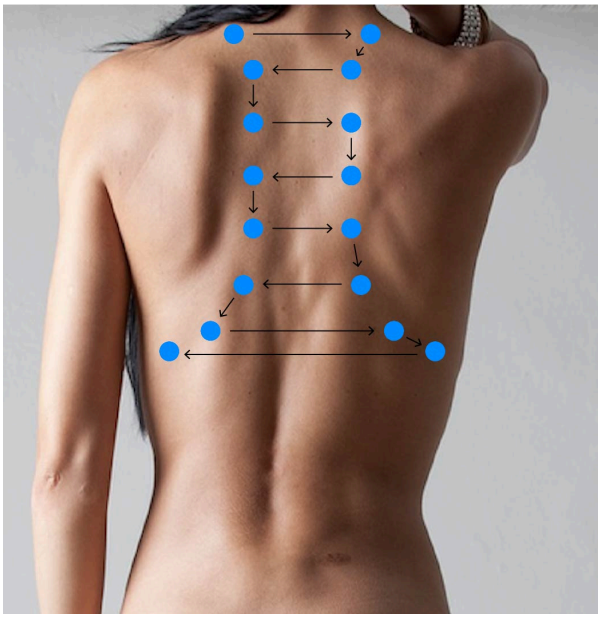

Figure 14: Percussion pattern for posterior thorax.
Image by Claudio_Scott from Pixabay (image was cropped and illustrated upon for the purposes of this chapter)

4. On the **lateral thorax**, begin percussing inferior to the axilla and percuss in about three locations on the right side and then two locations on the left side (see **Figure 15**).

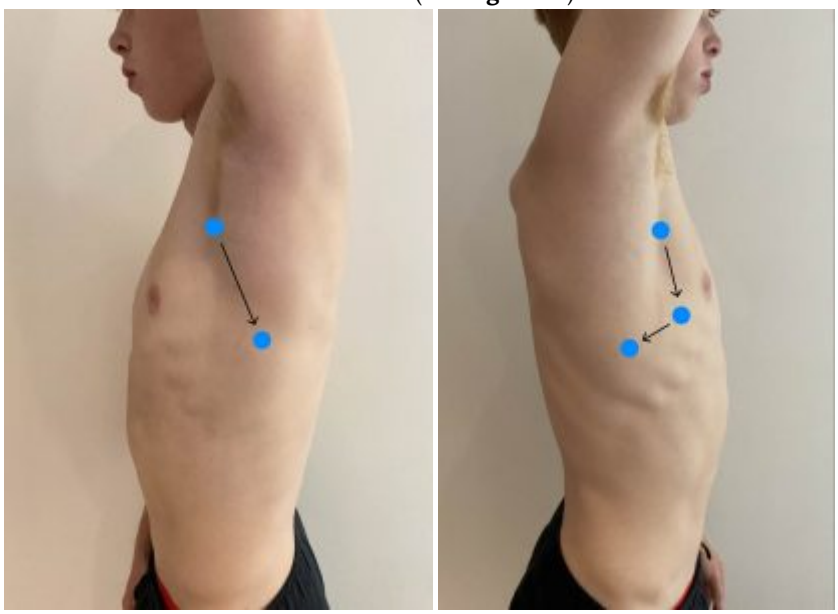

Figure 15: Percussion pattern for lateral thorax.

5. Note the **findings**

- Normal findings might be documented as: "Resonance heard through lungs on posterior and lateral thorax."
- Abnormal findings might be documented as: "Resonance heard throughout except hyperresonance heard in left lower lobe on posterior and lateral thorax."

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Video 8: Percussion of posterior and lateral thorax (NOTE: percuss down to just below the bottom of the thorax).

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=244#h5p-208

Anterior Thorax - Inspection

Inspection of the anterior thorax involves the following steps:

1. Inspect for **symmetry, observable deformities, masses, swelling**, and **shape of the thorax** (see **Figure 16** as a reminder for landmarks).

- Compare the left side of the thorax to the right side of the thorax. Are the clavicles and ribs on each side symmetrical upon observation? Are the ribs sloping downwards? Is the trachea and sternum midline? (note which side, if trachea is deviated [i.e., pulled to one side]).
- Do you notice any deformities, masses, or swelling? (note location and describe)
- Observe the costal angle which is the angle between the costal margins inferior to the xiphoid process. Normally, it is about 90 degrees.
    - An abnormal finding is when the angle flattens out. This happens with chronic lung conditions associated with hyperinflation of the lungs (e.g., emphysema). This abnormal finding is often associated with ribs that flatten out and an anteroposterior to transverse diameter that is no longer 1:2, but rather is closer to 1:1 resembling a barrel chest.

2. Inspect for **skin colour**.

- Is the skin colour consistent across the anterior thorax?
- Do you notice any skin discolouration?

3. Note the **findings**

- Normal findings might be documented as: “Symmetrical anterior thorax, downward sloping ribs, trachea and sternum midline, no thorax deformities, masses, or swelling, costal angle 90 degrees. Consistent skin colour across anterior thorax, no discolouration”
- Abnormal findings might be documented as: “Tracheal deviation to the right side. Costal angle 170 degrees, horizontal ribs with a 1:1 anteroposterior to transverse diameter.”

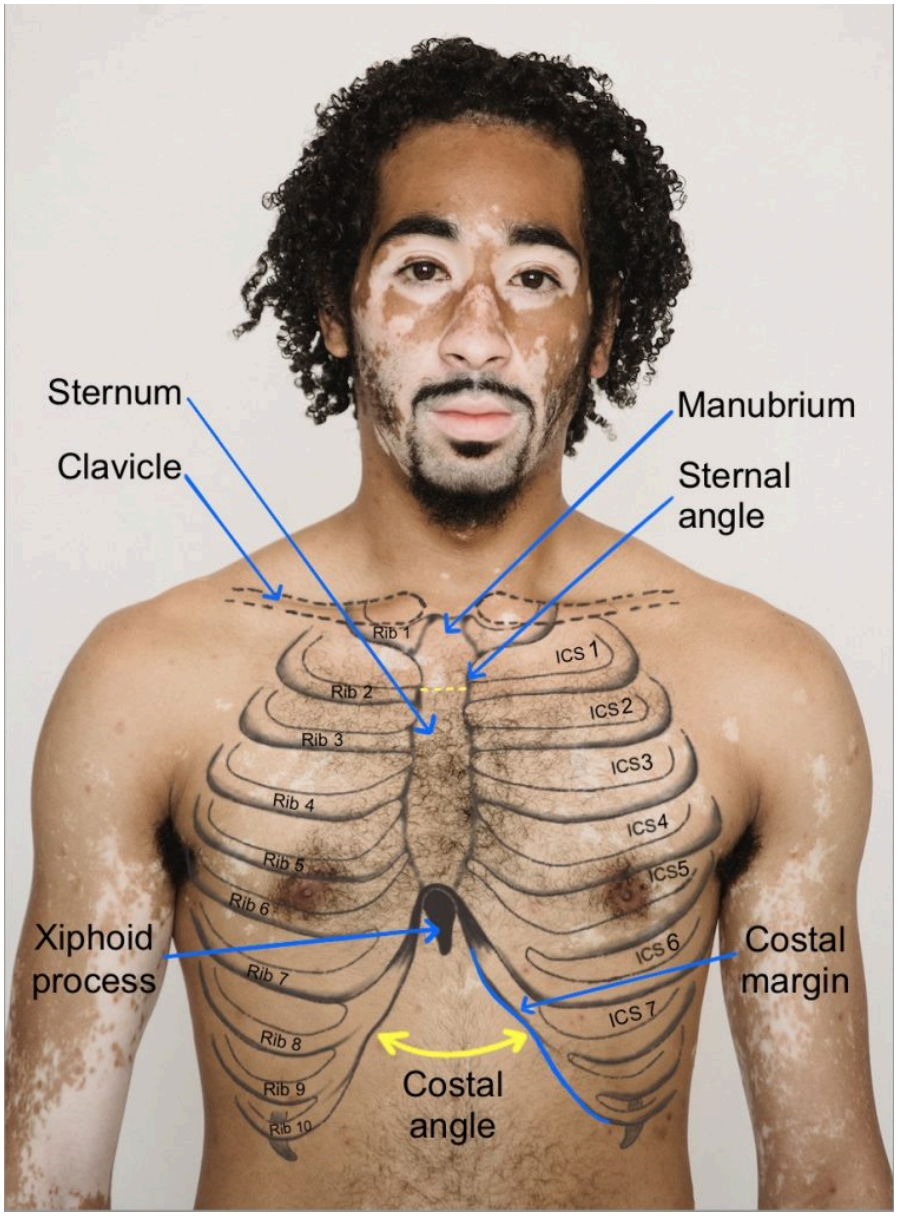

Figure 16: Anatomical landmarks of thorax
Photo by Armin Rimoldi from Pexels (image was cropped and illustrated upon for the purposes of this chapter)

Priorities of Care

Upon inspection, the findings of most concern are usually a new onset of tracheal deviation or asymmetrical lung expansion. These cues are suggestive of decreased ventilation to one side of the lungs possibly caused by pneumothorax, atelectasis, or pleural effusion. If the client is showing other signs of respiratory distress, notify

the physician/nurse practitioner immediately. Otherwise, complete a primary survey followed by a focused assessment of the respiratory system so that you can provide a complete report of the relevant cues to the physician/nurse practitioner.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Anterior Thorax - Auscultation

Auscultating the anterior thorax involves the following steps (see **Video 9**):

1. Perform hand hygiene and **cleanse the stethoscope**.
2. Ensure the client is in an **upright position** and ask them to take a **big breath in and out through the mouth** each time they feel the stethoscope on their chest.
3. Place the stethoscope's diaphragm on the chest in about three to six locations on each side of the anterior thorax so that you listen to all lung lobes. Ensure you have a complete seal. See **Figure 17** for **stethoscope placement pattern**. Remember the number of locations depends on the size of the thorax; fewer locations are needed on a client with a smaller thorax (e.g., infants). Also remember that the anterior thorax has more upper lobes and that the right lung has three lobes while the left lung has two lobes.

- On the anterior thorax, begin at the lung apices, which are supraclavicular, moving from one side to the other side. As you move down the thorax, place your stethoscope close to the sternal line to avoid listening over the breast tissue. You may need to ask the client to reposition their breasts to place the stethoscope flat against the thorax. Toward the bottom, listen close to the sternal line and also move laterally.

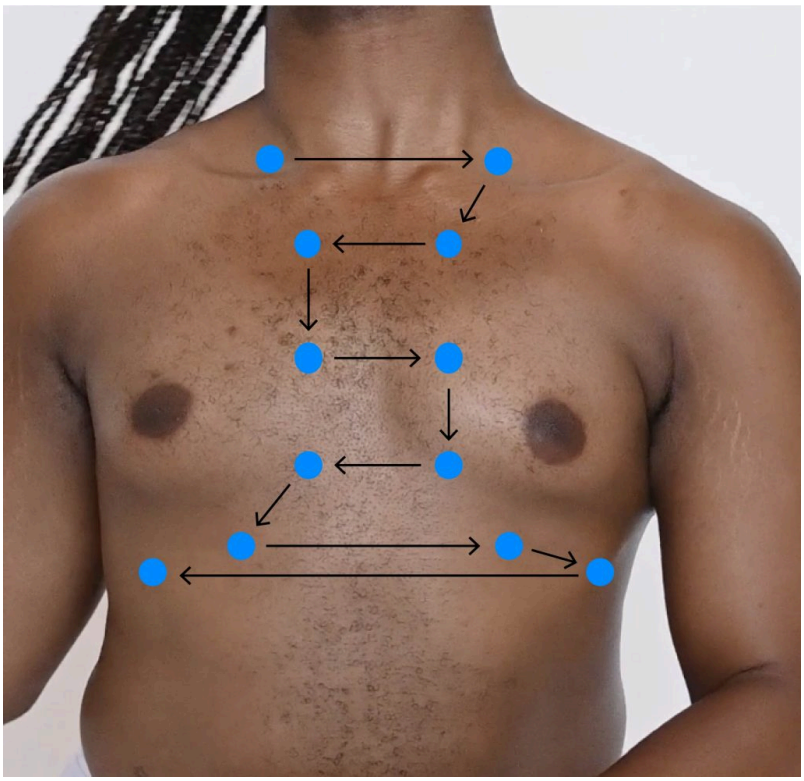

Figure 17: Stethoscope placement pattern when auscultating anterior thorax
Photo by Armin Rimoldi from Pexels (image was cropped and illustrated upon for the purposes of this chapter)

4. In each location, **listen to one full respiration** (inspiration and expiration) and compare air entry bilaterally.
5. Listen for the following:

- Air entry **quality** and **equality**.
  - Quality: Note whether it is good, decreased, or absent.

    - Equality: Note whether air entry is equal bilaterally.
- Identify the location of **normal breath sounds** including bronchial, bronchovesicular, and vesicular.
    - If you place your stethoscope over the tracheal region, you should hear bronchial sounds (loud harsh sounds).
    - **Bronchovesicular** breath sounds are moderate in loudness; inspiration is equal to the expiration phase, and heard on the upper thorax close to the sternum and near the bronchi.
    - **Vesicular** breath sounds are quiet and low-pitched; inspiration is longer than the expiration phase, and heard in the periphery of the lung fields and near the smaller airways in an older child and adult. (Note: in young children particularly under two and threes of age, vesicular sounds are typically not heard because of their small thoraxes. Rather, you hear bronchovesicular).
- Identify clear air entry or the **presence**, **quality**, and **location of any adventitious sounds**.

6. Note the **findings**

- Normal findings might be documented as: "Good air entry, equal bilaterally, no adventitious sounds throughout all lobes on anterior thorax. Bronchovesicular sounds heard in upper lobes close to sternum. Vesicular sounds heard throughout peripheral lung field."
- Abnormal findings might be documented as: "Absent air entry in right lower lobe anteriorly with mild wheezing heard upon expiration in the upper lobes bilaterally."

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=248#oembed-1

Video 9: Auscultation of anterior thorax.

Clinical Tips

For a client with breast tissue, you may need to have them reposition their breast so that you can place the stethoscope flat on their chest. This repositioning is also important when you palpate and percuss. It may feel awkward for the client to perform this action, so some nurses demonstrate on themselves over their own uniform to show the client what they would like them to do. Depending on where the breasts are positioned on the thorax, you may need to ask the client to reposition their breasts laterally and up or down. If the client is unable to do so, you may ask permission to reposition their breast. In this case, do so with the ulnar aspect of your hand. Avoid grasping or cupping the breast with your hand as this can be misinterpreted as a sexual motion. Always ask permission and inform the client what you will be doing in order to apply a trauma-informed approach and support the therapeutic nurse-client relationship.

Priorities of Care

The priorities of care related to auscultation of the anterior thorax are the same as those for the posterior thorax. Absence of air entry and presence of stridor are considered urgent situations: you should call for assistance and notify the physician or nurse practitioner. If you think the stridor is caused by a foreign body that you can quickly remove, do so. Otherwise, follow the steps of the primary survey (check airway patency, measure respiratory rate, work of breathing, and oxygen saturation, assess pulse rate/rhythm, blood pressure, assess level of consciousness). If the oxygen saturations are low, apply oxygen if you are permitted to do so. With the presence of crackles and wheezes, use the primary survey to determine whether there is a risk of clinical deterioration. Also consider whether the wheezing is new onset and could be caused by a severe allergic reaction (i.e., anaphylaxis) and requires immediate intervention. If not, and the client is stable, you can move the head of the bed up to assist with breathing and continue the focused assessment of the respiratory system.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Anterior Thorax - Palpation

Palpation of the anterior thorax involves the following steps (see **Video 10**):

1. Begin by using the dorsa of your hands to compare **temperature** bilaterally from the apex to the bases.
2. While comparing bilaterally, use the finger pads of your dominant hand to palpate the anterior thorax from the apices to the base for **pain, moisture, deformities, masses, or crepitus**. Avoid palpating over breast tissue. You may need to ask the client to reposition their breasts so that you can palpate the thorax.

While doing so:

- Ask the client if they have any pain.
- Note any moisture or the location, size, and description of any deformities, masses, and swelling.
- Note the location and extent of any crepitus.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=250#oembed-1*

Video 10: Palpation of anterior thorax

3. Next, assess for **tactile vocal fremitus** (see **Video 11**).

- Place the ulnar surface of your hands or the base of the palmar aspect of your fingers on about three to five locations on the anterior thorax on each side (see Figure 18). Begin at the apex and move down to the base of the lungs.
- Ask the client to say “foodie” or “coin” each time you place your hands on the thorax.
- Note the equality of fremitus in comparison from the left to the right side. Remember that the vibrations will be more difficult to feel as you get closer to the bases because you are further away from the larynx.

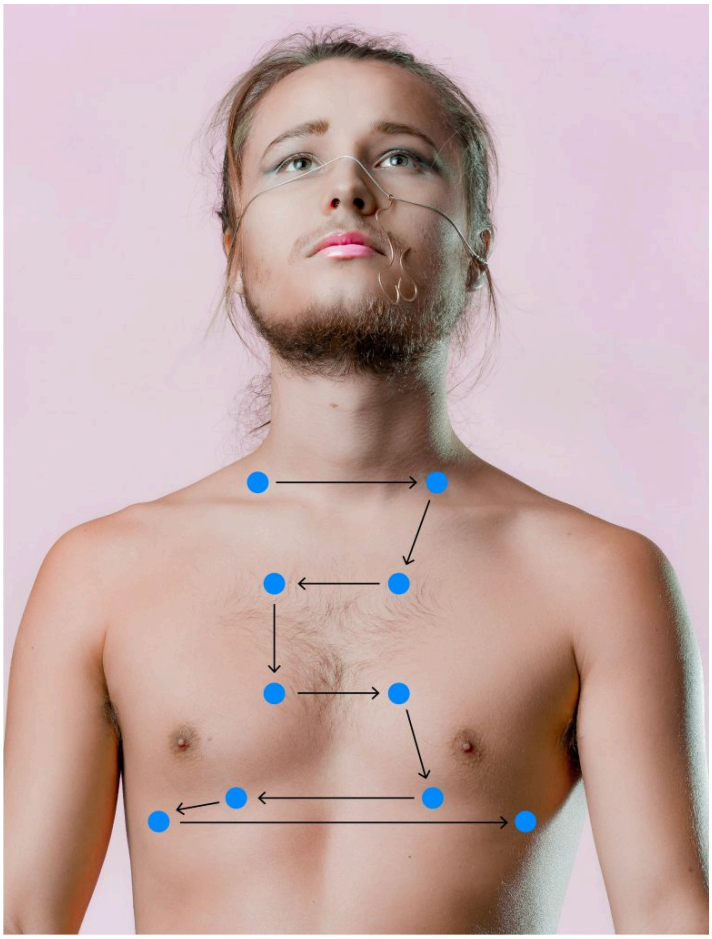

Figure 18: Pattern for palpation of tactile vocal fremitus on anterior thorax
Photo by Cottonbro from Pexels (image was cropped and illustrated upon for the purposes of this chapter)

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=250#oembed-2

Video 11: Palpation for tactile vocal fremitus of anterior thorax.

4. Note the **findings**

- Normal findings might be documented as: "Upon palpation of anterior chest wall, client reports no pain, temperature warm to touch, equal bilaterally, no moisture, swelling, masses or deformities, equal tactile fremitus."
- Abnormal findings might be documented as: "Upon palpation of anterior chest wall, crepitus felt in neck and upper lobe area, perspiration noted."

Anterior Thorax - Percussion

Percussion of the anterior thorax involves the following steps (see **Video 12**):

1. Ensure the client is in an **upright position**, and then perform **indirect percussion** to evaluate the elicited sounds.
2. Percuss in about four to eight locations on each side of the anterior thorax. See **Figure 19** for the **percussion pattern**.
3. On the **anterior thorax**, begin at the apices and move down to the bases, comparing side to side. In the supraclavicular region, start at the midclavicular line. As you move inferior to the clavicle, you should shift medially slightly, and then stay close to the sternum to avoid the breast tissue. Toward the bases, percuss close to the sternal line and move laterally.

    - Keep in mind that the elicited sound will become dull as you percuss over the heart (second to fifth intercostal space on left side). Also, avoid percussing over breast tissue as this will elicit a dull sound, and avoid percussing over clavicles and ribs because this will elicit a flat note. To avoid the ribs, rock your finger back and forth to ensure you are in an intercostal space. Typically, you will skip the percussion step when the client has a muscular chest or a lot of adipose tissue as this will modify the normal resonant sound to a flat sound.

4. Note the **findings**

    - Normal findings might be documented as: “Resonance heard throughout lungs on anterior thorax.”
    - Abnormal findings might be documented as: “Dominant sound of resonance heard throughout lungs on anterior side except an area of 3 cm^2 on left sternal border between clavicle and second rib.”

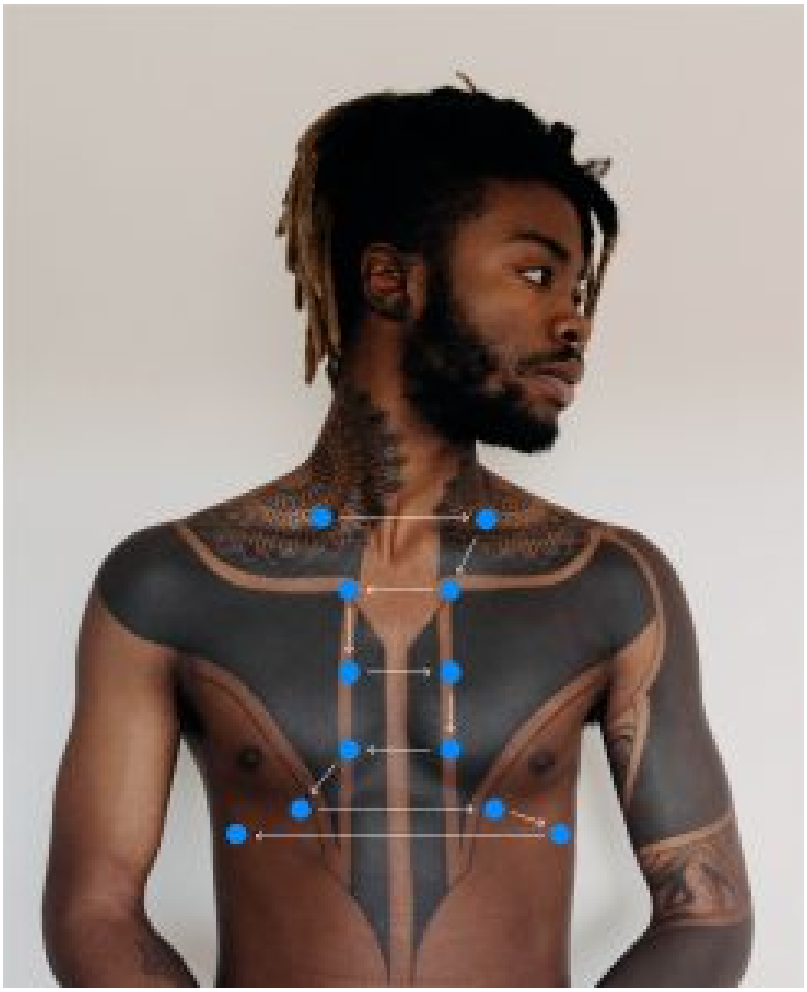

Figure 19: Percussion pattern for anterior thorax
Photo by Seyi Ariyo on Unsplash (image was cropped and illustrated upon for the purposes of this chapter)

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=252#oembed-1

Video 12: Percussion of anterior thorax

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=252#h5p-211

Attribution Statement: The description of percussion and the technique is taken and modified from chapter 5.

Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion and disease prevention are important components of a healthy respiratory system. To determine appropriate interventions, you should carefully consider all of the collected data, both subjective and objective. As part of subjective data collection, you should inquire about risk factors, social determinants, and other considerations.

The inquiry part is integrated throughout the assessment. Many of the probing questions may be asked when doing the subjective assessment. However, some of the questions will be formulated based on your critical reflection of data collected during the subjective and objective assessment. It is this data that will inform your clinical judgment and the health promotion needed for a specific patient.

Handwashing and Immunization: Self-Care Behaviours

Handwashing and immunization are two important factors that affect respiratory health. Regular handwashing is important in healthcare and work settings, when returning home, prior to making and eating food, and before and after elimination.

Probing questions related to handwashing and immunization include:

- Tell me about when you wash your hands?
- What is involved in washing your hands? (You may need to probe further: What are the steps involved? How long do you do it for?)
- Are you up to date on your vaccines?
- When was your last vaccine? What was it for? (You may need to probe about specific vaccines such as influenza [flu], pneumonia, and COVID-19.)
- Have you had tuberculosis testing and when was your last chest x-ray? (You should ask about the results, if relevant). Asking these questions is important part of screening.

You may need to provide education about proper handwashing practices: when and how. Tell the client that it is important to wash hands frequently, but always when leaving a building, returning home, before and after meals, and before and after using the washroom. Tell them to wet their hands with water, lather with soap for 20 seconds, rinse and dry their hands, and then turn off the tap with their elbow or a paper towel. Consider how to make it fun with children: you could tell them to sing a song that lasts 20 seconds (e.g., Happy Birthday).

With regard to vaccines, consider the recommended schedule based on age and region. In Canada, vaccine schedules are determined by provinces and territories. More information can be found at: immunization schedules

If a client is not up-to-date on their vaccines, you should inquire about the reasons why. If a client is **vaccine hesitant**, explore further in a non-judgmental manner. Respond to their specific concerns with objective facts and refer to vaccines in a positive way. Vaccine hesitancy can be the result of misinformation, so it is important to assess the client's knowledge and intervene as necessary. Vaccine hesitancy may also be associated with cultural beliefs, and can also be influenced by the client's relationships with others. Check out this link for more information about vaccine hesitancy.

Smoking and Vaping

First-hand, second-hand, and **third-hand smoke** are major risk factors that negatively affect the respiratory system. The chemicals in smoke cause inflammation of the blood vessels, and contribute to plaque buildup and narrowing of the blood vessels. Prenatal exposure and exposure to smoke as a child has particularly harmful effects. In addition to the risks of respiratory diseases (e.g., asthma), these children are also predisposed to hypoxia and conditioning the brain to nicotine.

More recently, **vaping** has become common among adolescents and young adults as well as people trying to quit smoking cigarettes. Vaping involves the inhalation of heated aerosols from a vaping device (e.g., electronic cigarettes, vape pens); the aerosols frequently contain nicotine (Miech et al., 2019). Although vaping aerosols may contain less chemicals than cigarettes, there are still many toxins in vaping that can cause lung damage among other health problems (Park et al., 2021).

Probing questions related to smoking and vaping include:

- Do you smoke cigarettes or any tobacco-related products? Do you vape? If the answer is affirmative, ask probing questions: how much do you smoke (how many packs a day)? How many years? Can you tell me about the reasons that you began smoking? (if they vape, you can ask the same questions, but refer to the word they use).
- If you do not currently smoke, have you ever smoked? If the answer is affirmative, ask similar probing questions, including why the client quit.
- If relevant: Have you ever tried quitting? If the answer is affirmative, ask probing questions: What made you want to quit? How long did you quit for? Did you use any strategies to help you quit?
- If relevant: Have you ever thought of quitting? If the answer is negative, respond in a non-judgmental way: "If you ever want to discuss quitting let me know; there are many resources to help you."

Client interest in quitting smoking/vaping and collaborative intervention are both important for a successful outcome. The intervention must be tailored to the client. Many options are available: counselling, cognitive-behavioural therapy, support groups, pharmacology treatments (e.g., nicotine replacement therapy), smartphone applications, and short text message services. Sometimes even a brief discussion about the risks and a recommendation to quit smoking or vaping is sufficient.

You should consider both relational and structural health promotion approaches related to smoking and vaping. For example, a client's success in cessation can be affected by their intimate and physically close relationships with family, friends, and work colleagues. Another issue to consider is that access to smoking or vaping cessation resources can be costly and are not necessarily covered by provinces and territories. Many primary care clinics offer group support and counselling at no charge, so it can be helpful to encourage clients to access these resources. You may also advocate for healthy social policy around smoking and vaping cessation and support and participate in the development of educational campaigns and resources about how smoking affects health.

Indoor and Outdoor Pollution

Indoor and **outdoor air pollution** can affect respiratory health and exacerbate respiratory conditions. They may include motor vehicle emissions, living close to a highway, radon or asbestos in the home, chemicals such as glue, paint, asbestos, and other household or workplace products, and air quality/smog/ozone.

Probing questions related to pollution include:

- Tell me about any indoor and outdoor air pollution you are exposed to?
- Do you have any concerns about how indoor or outdoor pollution is affecting your health?

- Have you noticed that your breathing is affected in any specific indoor or outdoor spaces or on hot days? (Air pollutants and humidity associated with hot weather can aggravate breathing problems).
- Do you wear a mask when using chemicals?

Any client concerns about exposure to pollutants should be addressed. Some clients need education about safe storage and use of chemicals such as household cleaning products, and keeping windows closed and avoiding exercise on days when the outdoor air quality is low. You might recommend hard-surfaced floors or rugs, because carpets can trap pollutants.

Nurses play an important role in the underlying structures that influence healthy environments and pollution. Because the environment has such important effects on health and wellbeing, the Canadian Nurses Association (2017) has developed a position statement about Nurses and Environmental Health. In addition to intervening with actions focused on individual behaviours, nurses can be involved in larger structural approaches involving education campaigns, healthy social policy, and scientific research related to the environment.

Diet

A healthy diet is important for respiratory health because nutrients and hydration are the fuel the lungs need to breathe and function. Water is a main component of the lungs, and water is essential for the delivery of oxygen throughout the body. Normal fluid losses occur with respiration, and **hyperpnea** increases this fluid loss, so adequate hydration is essential to effective respiratory functioning. A healthy diet is also important to help maintain an ideal body weight. When a person is obese, the lungs work harder to breathe deep because of the excess weight pushing against the thorax.

Probing questions related to diet include:

- Tell me about your usual diet?
- What have you eaten in the last 24 hours? Is that your usual diet?
- How much fluids do you typically drink in a day? What fluids do you drink (e.g., water, caffeinated beverages, alcohol)?
- Do you live in an area where fresh food and drinking water is difficult to access?
- Do you have enough money to buy healthy food?

You may assess a client's familiarity with Health Canada's Food Guide (Government of Canada 2021) and discuss how they might draw upon it to guide their food choices: food guide. Be aware that this new guide still has a Eurocentric element to it; you should collaborate with the client about its relevance in the context of their cultural food practices. Check out this link for snapshot of the guide available in dozens of languages: link. Many resources have also been developed related to healthy eating and food safety for Indigenous People.

Some key elements to consider are:

- Water should be the drink of choice: hydration can help keep mucus thin.
- High intake of fruit and vegetable.
- Canada's Food Guide recommends a dinner plate with half vegetables/fruit, one-quarter protein, and one-quarter whole grains.

Some respiratory-related conditions require specific diets. For example, clients with cystic fibrosis often require increased caloric intake to maintain a healthy weight and enzymes to support the pancreas. In clients with COPD, it is important to also maintain a healthy weight and ensure nutrients such as Vitamin D, C, and E (Berthon & Wood, 2015).

From a structural health promotion approach, consider a client's access and financial ability to purchase healthy food. These are elements of food security, and the rising cost of food globally has made it difficult to ensure everyone is food secure. In many remote regions of Canada's North, access to nutritious food is limited in terms of availability, and even when available, the costs are excessive.

Activity

A sedentary lifestyle that involves limited activity/exercise is a risk factor that contributes to respiratory conditions and the overall health of the lungs. Exercise, including aerobic and strength-training, strengthens the lungs and the respiratory muscles, making the lungs more efficient at transporting oxygen.

Guidelines vary based on age and health, but individuals should generally participate in about 30 to 60 minutes of aerobic activity five to seven times per week.

Probing questions related to activity include:

- Do you have any concerns about your level of activity or exercise?
- Tell me about your daily pattern of activity? What activities are you involved in?
- What exercise do you engage in? How long do you engage in this type of exercise? How many days of the week do you participate in exercise? If the client plays sports, ask about their use of protective equipment, if relevant.

Collaborate with the client to create an activity/exercise care plan that is specific to their needs and goals. Start at a realistic and attainable level, depending on the client's physical capabilities and energy level, and then begin to increase the time and duration of the physical activity. Many interventions are available to support clients to achieve their activity goals: community walking groups, fitness apps, and joining a local gym or group activity. The participACTION website is a helpful resource related to activity guidelines. Consider activity interventions from a structural health promotion approach, considering the financial costs associated with many of these resources.

Stress and Distressing Emotions

Stress and **distressing emotions** are subjective and can affect a person physically, mentally, socially, and financially.

Stress and other negative emotions affect the respiratory system. Stressful states such as anxiety and anger stimulate the sympathetic nervous system and stimulate the body to breathe faster. This can exacerbate existing respiratory conditions such as asthma.

Probing questions related to stress and negative emotions include:

- Tell me about any stress that affects your breathing? Have you had anxiety or panic attacks affect your breathing? If the client's answer is affirmative to either question, probe further with questions such as:
- Tell me more?
- How does it affect your breathing?
- How often do you experience this?
- What do you do when you experience this?

When considering interventions for a client, consider their daily patterns of living and any disruptions to these patterns, which can be stressful.

Various strategies can help reduce stress, including:

- Engaging in regular physical activity.
- Getting adequate sleep.
- Spending time with family and friends.
- Taking time for personal interests and hobbies.
- Practicing relaxation techniques such as meditation, deep breathing exercises, and tai chi.
- Using pursed lip breathing techniques: this involves taking a slow deep breath in through the nose for two counts and then pursing the lips while breathing out for four counts. It helps with stress and also increases oxygenation and reduces carbon dioxide.

Use relational and structural health promotion perspectives to further assess a client's stress and how best to act. Stress does not exist in a vacuum: how it is experienced, perceived, and managed is affected by relationships with others. All clients occasionally experience stress, but structural aspects influence how a client may be more at risk for stress. For example, racism is a major determinant that leads to highly stressful experiences, so use of an anti-racist approach to stress and stress management will help you understand how the client is influenced and how best to support them. Other determinants of health related to socioeconomic status can influence access to resources to cope with stress. When collaborating with clients to develop stress management techniques, you must be aware of these broader structural influences.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=254#h5p-212

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Clinical Judgement: Case Study

A 13-year-old client comes to the emergency department with breathing difficulties. The client is accompanied by their father, and has a history of asthma, diagnosed four years ago. On arrival, the client's symptoms include increased work of breathing, shortness of breath, coughing and wheezing. Vital signs: respiration rate: 30 breaths per minute, heart rate: 118 beats per minute, O2 saturations: 91%, blood pressure: 110/60 mm Hg, and tympanic temperature: 38.1°C. The client reports the symptoms are not related to usual triggers (e.g., overexercising, playing in cold air, scented products). The father says the child was up all night coughing and is therefore very fatigued this morning. Upon auscultation, decreased air entry bilaterally to bases, wheezing in the upper quadrants. No accessory muscle tugging. The client states their chest feels tight when coughing and that they started to feel nauseous this morning. Diaphoresis noted on face and neck areas. Slight grey discolouration around lips.

Watch the following 5-minute video to learn more about asthma and the respiratory system.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=256#h5p-214

Key Takeaways

- Common symptoms to assess related to the respiratory system include dyspnea, coughing, wheezing, congestion, and chest pain.
- The objective assessment of the thorax is best performed on the client in an upright position on the bare skin.
- A trauma-informed approach to the objective assessment is necessary considering that areas of the chest are being exposed.
- The objective assessment should begin with a brief scan combined with components of the primary survey so that potential signs of clinical deterioration are recognized and acted upon.
- Following the brief scan, the objective assessment includes inspection, auscultation, palpation, and percussion.
- Health promotion interventions should be developed with the client to address what is important to them.

CHAPTER 11 - CARDIOVASCULAR SYSTEM ASSESSMENT

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Learning Outcomes

- Apply subjective assessment skills.
- Apply objective assessment skills.
- Use clinical judgement.
- Integrate health promotion interventions into actions.
- Integrate an inclusive approach to cardiovascular assessment.

Introduction to the Cardiovascular System

The cardiovascular system is important because it is responsible for the provision of **blood**, **oxygen**, and **nutrients** to the body's tissues and organs. If this system is not working properly, it provides sub-optimal perfusion of these elements to body tissues. Lack of perfusion can affect all body systems and tissues as a result of pathophysiological processes related to **hypoxemia**, **hypoxia**, and **electrolyte imbalances**. As a nurse, your assessment of the cardiovascular system provides information about the functioning of this system and potential cues that require your action.

Cardiovascular System Components

The main components of the cardiovascular system include:

- The heart (two atriums, two ventricles, and four valves).
- The main vessels (aorta, pulmonary artery, pulmonary vein, and superior and inferior vena cava).
- The coronary arteries.
- The carotid arteries and jugular veins (typically considered part of the peripheral vascular system but also included in this chapter). See **Figure 1**.

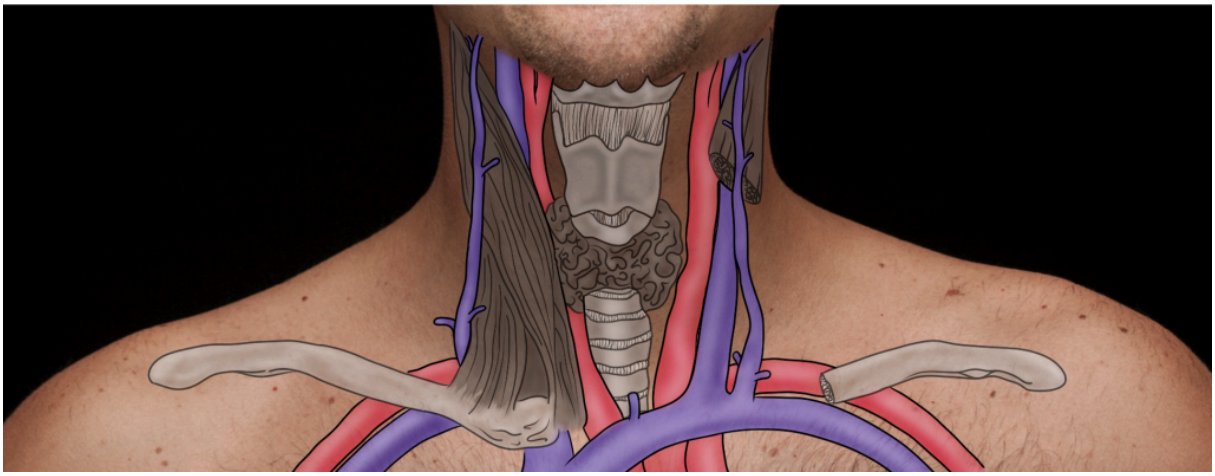

Figure 1: Carotid arteries and jugular veins.
Photo by engin akyurt on Unsplash (image was cropped and illustrated upon for the purposes of this chapter)

You have probably already learned about the anatomy and physiology of the heart; see **Video 1** for is a quick overview of how the heart works:

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=264#oembed-1

Video 1: Overview of how the heart works.

Clinical Tip

The cardiovascular system is interconnected and influences many other body systems, so it is rarely assessed in isolation. When nurses are attempting to make sense of the cues that are relevant and of concern, they commonly assess other body systems: respiratory, peripheral vascular, and skin.

Activity: Check Your Understanding

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Subjective Assessment

Subjective assessment of the **cardiovascular system** involves asking the client about their health and symptoms that might be related to pathologies that affect the heart. A full exploration of these pathologies is beyond the scope of this chapter, but common cardiovascular diseases and conditions include hypertension, coronary artery and valvular diseases, heart rhythm disorders, heart failure, and congenital or acquired structural diseases of the heart.

Common symptoms or **cues** that may be related to the cardiovascular system include pain, dyspnea, arrhythmias, coughing/wheezing, and edema. See **Table 1** for guidance on the subjective health assessment. Many of the questions in this table align with the PQRSTU mnemonic. Probing of these symptoms is done in the order of relevance, as opposed to being sequentially aligned with the PQRSTU mnemonic.

You should also ask about any medications the client is taking: name, dose, frequency, reason it was prescribed, and how long they have been taking it.

You should also include questions focused on health promotion. Depending on the context, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on "Health Promotion Considerations and Interventions" is included later in this chapter after the discussion of objective assessment.

Knowledge Bites – Pathophysiology

Many common cardiovascular symptoms are related and are caused by the same issue. For example, pain associated with the heart is often related to **cardiac ischemia**, which is commonly caused by **atherosclerosis** of coronary arteries as well as other conditions such as cardiac valve disease, heart failure, and **pericarditis**. When tissue such as the cardiac muscle does not receive sufficient oxygen-rich blood, this can lead to chest pain, dyspnea, and fatigue. Other common cardiac symptoms, such as fatigue, shortness of breath, and chest pain, can sometimes be related to **valve stenosis/prolapse**.

Table 1: Guidance on the subjective assessment.

Symptoms	Questions	Clinical Tips
Cardiac pain refers to pain associated with the heart and can be described in many ways such as crushing, pressure, squeezing, tightness, and heaviness in the chest. It is often referred to as chest pain. It can sometimes be confused with **heartburn**, but the etiology and treatment of both are different. Therefore, subjective questions are needed to differentiate between these. **Cardiac pain** may be felt in the chest, but also in other locations such as the jaw, neck, arms particularly the left arm, upper back, and abdomen. This type of **referred pain** occurs because of the sharing of neural pathways.	Do you have pain in your chest? Have you ever experienced pain in your chest? Additional **probes** if the response is affirmative: Region/radiation: Where is the pain located? Does it move around or do you feel it anywhere else? Quality/quantity: Can you describe what it feels like? How bad is it? Severity: Can you rate it on a scale of 0 to 10, with 0 being no pain and 10 being the worst pain you have had? Timing/treatment: When did it begin? What were you doing when it began? Is it constant or intermittent? Have you tried treating it with anything? Provocative/palliative: What makes it worse? Is it worse when you are breathing deeply? Does it occur after eating? What makes it better? Understanding: Do you know what is causing the pain?	Apply a cultural humility approach when you consider the meaning of "pain." Some people may reserve the word to describe severe sensations, so if their symptom is mild they may not refer to it as pain. Others may associate pain with vulnerability and use alternative words to describe it. Therefore, if the response is initially "no," try rephrasing the question using words such as discomfort, tenderness (e.g., Do you have any sensations in your chest?). Pain of cardiac origin is a critical finding and requires immediate action. It is considered a first-level priority of care. You should ask a colleague to notify the physician while you keep the client at rest, assess pulse, blood pressure, and oxygen saturations. Depending on the setting and if appropriate, adhere to existing directives such as order an electrocardiogram and blood work, administer oxygen, initiate intravenous, and give **nitroglycerin** and **morphine**. If you are in a home setting and/or do not have access to these treatments, the client can chew and swallow acetylsalicylic acid (usually low-dose ASA, 81 mg); this can be helpful to prevent the enlarging of the **blood clot**.

Dyspnea refers to difficulty breathing and can be described as shortness of breath, a feeling of breathlessness, not being able to get sufficient air or catch your breath.	Do you have any difficulty breathing? Have you experienced any difficulty breathing? Additional **probes** if the response is affirmative: Quality/quantity: What does the difficulty in breathing feel like? How bad is it? Provocative/palliative: Is there anything that makes your breathing worse? Is it worse when you are lying down? Is there anything that makes your breathing better? Does it feel better when you are sitting up? Severity: Can you rate your difficulty breathing on a scale of 0 to 10, with 0 being no difficulty breathing and 10 being the most difficulty breathing you have had? Timing/treatment: When did the difficulty in breathing begin? Have you treated it with anything? Understanding: Do you know what is causing it?	People find the sensation of not being able to catch their breath particularly disturbing because it feels like they are suffocating. As you are assessing the client, consider raising the head of the bed to make it easier for them to expand their lungs and breathe more easily. However, this decision may be influenced by whether the client's condition is stable. If they are showing signs of clinical deterioration and their blood pressure is low, lower the head of the bed to increase the amount of blood returning to the heart. Assess the client's respiration rate, breathing effort, oxygen saturation, and then assess pulse, blood pressure, and temperature, followed by auscultation of lungs.
Arrhythmias refer to irregular heart rhythms (e.g., atrial fibrillation) or irregular heart rates (e.g., tachycardia, bradycardia). Some of these arrhythmias can feel like the heart skipping a beat, a palpitation, or a fluttering of the heart.	Do you have any fluttering of your heart or palpitations? Have you ever experienced any fluttering of your heart or palpitations? Additional **probes** if the response is affirmative: Timing: What were you doing when it started? Is it constant or intermittent? Provocative: Is it worse when you are feeling stressed or anxious? Other: Do you have any other associated symptoms (dizziness, difficulty breathing, sweating, pain, blurred vision)?	Perform a primary survey if you are concerned about clinical deterioration. Assess apical pulse rate and rhythm and blood pressure.

Coughing or **wheezing** are common symptoms of heart disease particularly when it affects the lungs. In individuals with **heart failure**, the blood can back up into the lungs, affecting breathing. Fluid can leak into the lungs causing congestion. Depending on the cause, the client may have expectorate (sputum production from coughing) or hemoptysis (sputum that has blood in it).	Do you have any coughing or wheezing? Have you experienced any persistent coughing or wheezing recently? Additional **probes** if the response is affirmative: Timing: When did the coughing and/or wheezing begin? How often are you coughing and/or wheezing? Quantity: How bad is the coughing and/or wheezing? Other: Do you have any mucus production when coughing? If so, what colour is it? Provocative/palliative: Is there anything that makes the coughing and/or wheezing better or worse?	Until the origin is ruled out, consider it transmissible. You and the client should both wear a mask. Additionally, you should consider putting on a face shield. Follow a process similar to one you would use for a client with dyspnea.
Peripheral edema is swelling that occurs from excess fluid in the tissues. When it is cardiac-related, it is usually caused by the heart not pumping adequately and blood backing up causing swelling. It is most easily noticed in peripheral locations such as the feet and legs because gravity pulls the fluid downward into these dependent position, but it may also be observed in the sacrum, abdomen, hands, and arms.	Have you noticed any swelling or puffiness in your feet or ankles (or any other areas)? Have you noticed that your shoes fit tight on your feet? Additional **probes** if the response is affirmative: Region: Where is the swelling? Timing: When did the swelling begin? Is the swelling worse at a particular time of day? Provocative/palliative: Does anything make the swelling worse or better? Other: Have you noticed any associated colour changes to the skin? Do you have difficulty walking? Have you noticed any skin ulcers on your feet or legs? Do you have increased urination at night? Have you noticed a recent and rapid weight gain in the last week?	Assess whether the edema is acute or chronic and unilateral or bilateral. This will help you focus your questioning. If it is acute and unilateral, it may be a localized issue such as **deep vein thrombosis** (DVT) or an injury. If it is chronic and bilateral, it is more likely to be a systematic issue such as heart failure. **Nocturia** and edema are often related symptoms. At night when a person lies down, gravity no longer retains the fluid in the peripheries. As a result, the fluid returns to the veins and some is filtered by the kidneys, producing an increase in urine. Since blood is returning to the veins and being pumped to the heart, the edema can also lessen. Edema and **rapid weight gain** are also sometimes related. Rapid weight gain can be suggestive of increased fluid retention (leading to edema) and is often associated with heart failure. A 2–3 lb (.9 to 1.3 kg) weight increase in 24 hours is a cue that requires immediate action. Complete a focused assessment on respiratory, cardiovascular, peripheral vascular, and skin.

Other cardiovascular related symptoms can include fatigue, light-headedness, **diaphoresis**, nausea, decreased appetite, and colour changes such as cyanosis.	Always ask one question at a time. Have you experienced fatigue (light-headedness, sweating, nausea, decreased appetite, skin colour changes)? Use variations of the PQRSTU mnemonic to assess these symptoms further if the client's response is affirmative.	These symptoms can be related to other body systems and non-cardiac issues. Therefore, it is important that these symptoms be explored specifically if there were affirmative responses to the other common cardiac-related symptoms.
Personal and **family history of cardiovascular issues**. These may include risk factors, conditions, and diseases.	Do you or your family members have high blood pressure or high cholesterol? Have you or your family members ever had a heart attack? Do you or your family members have heart failure? Do you or your family members have any issues associated with the valves of the heart? Are you aware of any other personal or family history of cardiac issues that I may have not mentioned? Additional **probes** if the response is affirmative include further exploration using the PQRSTU mnemonic. Also ask about age of diagnosis, and if relevant, age of death of family members.	The biological and non-biological nature of family may be important to explicate when asking questions, considering that the risk factors may be influenced by genetics and/or culture. Although there is a genetic role to some cardiac conditions and diseases, it is also important to consider culture in terms of family traditions and practices have a large role to play (e.g., eating habits, activity/exercise, smoking). With some clients who have high cholesterol, there can be a genetic component leading to **familial hypercholesterolemia**. This is an inherited condition (the gene is present at birth) that leads to hypercholesterolemia (high levels of cholesterol in the blood). Thus, the age that a person or their family member develops hypercholesterolemia as well as hypertension is important to assess. It is important to inquire about high blood pressure in current or past pregnancies. High blood pressure can be associated with complications for the women and the fetus. Thus, it is measured at each prenatal care visit.

Priorities of Care

Many cardiovascular symptoms are cues for action. Chest pain could signify **angina**, which requires immediate action: failure to do so could result in a myocardial infarction (heart attack). Acting quickly when a client has angina can reduce cardiac muscle damage and prevent death. In this case, all of the following actions are important:

- Notify the physician/nurse practitioner.
- Take the client's vital signs: pulse, respirations, blood pressure, and oxygen saturation.
- Keep the client at rest, preferably lying in bed in case they deteriorate.
- If you have standing orders in your healthcare setting, you may also apply oxygen, order an **electrocardiogram** (ECG) and bloodwork, give morphine intravenously, and provide the prescribed/protocol dose nitroglycerin spray.

Angina and other symptoms (shortness of breath, arm numbness, change in vision) may be associated with a condition called hypertensive crisis, in which the blood pressure is extremely high (greater than 180/110 mm Hg). This requires immediate intervention because it can lead to severe consequences (myocardial infarction or stroke). Therefore, you should notify the physician/nurse practitioner and continue to monitor vital signs and additional cues. In addition, it is vital to monitor blood pressure and pulse with any cardiac-related symptoms. See further information about high blood pressure and hypertension in the vital signs chapter.

Currently, there is a gender bias related to recognizing and acting on this angina promptly; as a result, women's health outcomes are negatively affected. Some of the reasons underlying this issue are systematic, particularly in terms of the perception that heart disease is a man's issue, as well as physiological and cultural differences in how pain presents in women and limited clinical trials and research focused on women.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Objective Assessment

Objective assessment of the cardiac system includes a **brief scan** and then, assessing the **carotid arteries**, the **jugular veins**, and the **heart**.

Typically, you will complete an objective assessment after the subjective assessment, but in urgent situations, objective assessment and associated interventions may become the priority of care.

Remember to do all assessments on bare skin.

Clinical Tips

A trauma-informed approach to cardiac assessment is important because areas of the chest will need to be assessed and exposed. Maintain privacy by closing the door and/or curtains. Ask the client if they would like a family member or friend present or another healthcare provider. Provide a drape to the client and only expose the necessary areas of the chest. Always ask permission to touch. And last, explain what you are doing throughout the assessment. Sometimes it is helpful to show on your own chest (over your uniform) where you will be palpating and placing the stethoscope.

Contextualizing Inclusivity – Chest Binding

An inclusive approach to health assessment is vital because clients need to feel accepted for who they are. Some non-binary and transmasculine clients may wear a chest binder because they feel uncomfortable or distressed about having breast tissue. Binders are garments designed to flatten the appearance of the chest wall. They come in different forms and can extend from the chest down to the diaphragm or to the hips: they may look like a sports bra or tank top, and some clients may use compression bandages.

The binder needs to be removed to adequately assess the heart. You may or may not be aware of whether the client you are assessing wears a chest binder, so you can apply an inclusive approach by acknowledging the vulnerability that clients may feel. Provide step-by-step instructions so that they are prepared, and ask non-judgmental questions like “Assessing your heart requires me to assess on the bare skin of your chest. Is there anything that would impede me from doing so?” You can also ask if they have any questions before beginning.

You should also assess the binder for proper fit: a good fit allows for normal chest expansion and deep breathing.

Brief Scan - Cardiovascular System

A **brief scan** involves involves assessment of level of consciousness, colour changes, and sometimes pulse and blood pressure. This assessment helps you quickly recognize cues of clinical deterioration and may influence your decision on whether immediate action is required.

Steps of the brief scan include:

1. Assess **level of consciousness**.

- Does the client have an altered level of consciousness and confusion? Normally, clients should be alert and oriented.

2. Assess **colour changes**.

- Are there signs of cyanosis or pallor in the lips, mucous membranes, fingernails, or conjunctiva? Cyanosis and pallor result from hypoxemia, and can have many causes including cardiovascular.

3. Assess **pulse** and **blood pressure**.

- Is the client's pulse and blood pressure within the normal range? Is the pulse rhythm regular?
- How does the client's pulse and blood pressure compare to their baseline?

Contextualizing Inclusivity – Assessing Colour Change

Cyanosis: This is best seen in areas with rich vasculature and thin overlying dermis: mucous membranes/lips, conjunctiva, and extremities (fingernails). In people with darker skin, cyanosis can appear as a grey/white shade around the lips and the conjunctiva can appear as a grey/bluish shade while people with yellowish tones to their skin can have a greyish/green shade (Lewis, 2020; Sommers, 2011). In people with lighter skin, cyanosis appears as a dusky bluish/purple shade (Lewis, 2020).

Pallor: In people with darker skin, this can appear as a grey shade to the mucous membranes/lips, nail beds, and skin, and a yellowish shade in people with lighter brown skin; it can be helpful to look at the palms of people with dark skin when assessing for pallor as they tend to be paler (Lewis, 2020). In people with lighter skin, pallor can appear as a generalized pale discolouration to the skin, nail beds, and mucous membranes/lips. In people of all skin colours, the conjunctiva is normally a healthy pink due to the vascularity, but with pallor it will appear white or very pale pink (Mukwende et al., n.d.).

Priorities of Care

A client who with new onset of altered level of consciousness requires immediate intervention. Although altered level of consciousness can be related to many body systems, it may have a cardiovascular component. For example, the client may be experiencing reduced cardiac output (insufficient blood being pumped by the heart per minute) and a disruption in the normal heart rhythm. It is best to conduct a primary survey to evaluate any signs of clinical deterioration and notify the physician or nurse practitioner of any abnormal findings.

Carotid Arteries

Assessment of the carotid arteries involves **auscultation** followed by **palpation**. This assessment provides information about cardiac function and the quality of blood flow through the artery.

Unobstructed blood flow is silent, whereas partial obstruction of blood flow (due to **carotid stenosis**) creates turbulent blood flow, leading to vascular sounds. These sounds are called bruits: blowing/swooshing noises. Following auscultation, if you do not hear bruits, proceed to palpating the carotid pulses. Be aware that complete obstruction of blood flow will also be silent, as there is no blood flowing through the artery.

This assessment is done in the seated position or in the high-fowlers position with the client looking straight ahead. Make sure they do not flex or extend their neck.

Auscultation of Carotid Arteries

1. **Cleanse** the stethoscope. See **Video 2**.
2. Ask the client to breathe in, breathe out, and then **hold their breath**.

- This is important because normal tracheal breath sounds can resemble a bruit and limit the nurse's ability to hear the bruit. Note that some clients are unable to hold their breath for long: tell them to breathe if they feel they need to or if they become lightheaded.

3. With light pressure, place the **stethoscope's bell** over the right carotid artery in the middle third of the neck, just medial to the sternomastoid muscle, but closer to the muscle than the trachea. This location is anatomically determined, see **Figure 2**.

- The bell should be used because vascular sounds are low-pitched.
- Usually, listening at one location on each side of the neck is sufficient. Some practitioners listen to three locations on the neck, but this is usually not needed because sound radiates. If you have concerns, you can listen to three locations on each side of the neck: at the base of the neck closer to the origin of the carotid artery; in the middle third of the neck just medial to the sternomastoid muscle, but closer to the muscle than the trachea; and inferior to the angle of the mandible.

4. Repeat the steps two and three on the left carotid artery.
5. Note the **findings**

- Normal findings might be documented as: "No carotid bruit present, bilaterally."
  - NOTE: You may hear the beating of the heart because sound travels.
- Abnormal findings might be documented as: "Carotid artery bruit present" (on left or right side or bilaterally).

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Video 2: Auscultation of the carotid arteries.

Priorities of Care

Do NOT palpate the carotid artery if you hear a bruit when auscultating the carotid arteries. A bruit can be a critical finding and is suggestive of carotid stenosis and partial obstruction of the artery. It is therefore important to not palpate (compress the artery) when the blood flow is already compromised. You should measure the client's vital signs (specifically pulse, blood pressure, oxygen saturation, respiration) and continue the cardiac assessment. Then, report your findings to the physician/nurse practitioner.

Palpation of Carotid Arteries

1. First, if you hear a bruit when auscultating the carotid arteries, do not palpate the carotid artery. **Only proceed with palpation if you do not hear a bruit.** See **Video 3**.

2. Place the pads of your three fingers gently over ONE carotid artery (right or left) in the middle third of the neck, just medial to the sternomastoid muscle. Then, repeat on the opposite artery.

- Do NOT palpate the left and right carotid arteries at the same time, because this can compromise blood flow superior to the location you are palpating (the brain).
- Do NOT place the pads of your finger high on the neck, because this area is the location of the baroreceptors of the carotid sinus. These receptors are medial to the sternomastoid muscle, inferior to the angle of the jaw, and just superior to the thyroid cartilage. They play a role in mediating heart rate and blood pressure, and increased pressure on this area can lead to bradycardia and a drop in blood pressure.

3. Palpate for the following:

- Force (strength of pulsation). Pulse force is recorded using a four-point scale:
    - 3+ Full, bounding
    - 2+ Normal/strong
    - 1+ Weak, diminished, thready
    - 0 Absent/non-palpable

  (Adapted from: Vital Sign Measurement Across the Lifespan, 2nd Canadian edition)

- Symmetry (compare force between left and right side).
- Quality (describe the pulsation) in terms of the wave form. The carotid pulsation is described as a quick upstroke (one cursory/brisk outward movement felt against your fingers) and a slow downstroke (a more gradual inward

movement away from your fingers).

4. Note the **findings**

- Normal findings may be documented as: "2+ carotid pulsation equal bilaterally, smooth contour with a quick upstroke and gradual downstroke."
- Abnormal findings may be documented as (example): "1+ carotid pulsation bilateral with **dicrotic upstroke** and gradual downstroke" (reduced amplitudes can be common in conditions with low stroke volume, while dicrotic upstrokes can be common with increased peripheral vascular resistance, for example in situations of heart failure).

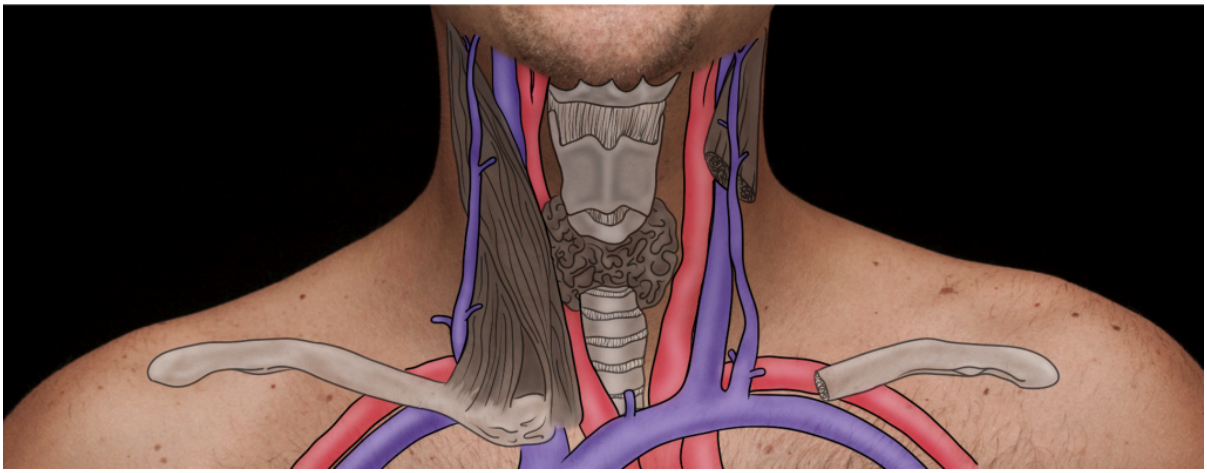

Figure 2: Carotid artery anatomy.
Photo by engin akyurt on Unsplash (image was cropped and illustrated upon for the purposes of this chapter)

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=270#oembed-2

Video 3: Palpation of carotid arteries.

Activity: Check Your Understanding

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Jugular Veins

Assessment of the jugular veins involves **inspection of the pulsation**. This assessment is performed because it provides information about the central venous pressure (CVP), which is the pressure in the vena cava near the right atrium and is an estimation of the right atrial pressure. Assessment of the CVP provides information about fluid status and functioning of the right ventricle.

When inspecting the jugular veins, you are noting whether there is elevated CVP as reflected by distention of the veins in the neck. Elevated CVP can be indicative of fluid retention, right ventricle contractile dysfunction that can be associated with heart failure, **pericarditis, pulmonary hypertension**, and tricuspid stenosis. Low CVP can be indicative of volume depletion (e.g., hemorrhage, dehydration).

You can assess CVP and other heart pressures with an invasive procedure called pulmonary artery catheterization. However, this would only be done in intensive care when the client is critically ill. A non-invasive way to assess the CVP is by inspecting the jugular veins

Inspection of Jugular Veins

1. Assist the client into a supine position with the head of bed in a position **at least 30 degrees** and **no higher than 45 degrees**. See **Video 4**.

- With normal CVP (not elevated), the jugular pulsation will not be visible if you raise the head of the bed to 90 degrees. With severely elevated CVP, you can raise the head of the bed to 90 degrees and still see the jugular pulsation.

2. Remove the client's pillow so their head is laying flat against the bed in a **neutral position**. You may leave the pillow if it is flat (not fluffy). The important point is that the head, neck, and thorax are on the same plane and the neck is not flexed.

3. Stand on the **right side of the bed** and ask the client to gently turn their **head to the left**.

- It is assessed from the right side because the right jugular vein is more directly attached to the superior vena cava leading to the right atrium.

4. Use **tangential lighting** to highlight pulsations.

5. Begin by **inspecting the right external jugular pulsation**, as it is most visible. The vein should be flat or not visible; a bulging vein can suggest high CVP.

- The vein is superficial to the sternomastoid muscle and runs from anterior to the mastoid process to the medial portion of the clavicle. As it moves down to the clavicle, it becomes lateral to the sternomastoid muscle and then turns 90 degrees to join the superior vena cava. See **Figure 3** as a reminder of the anatomy.

6. Next, inspect the **right internal jugular pulsation** at the sternal notch, the base of neck supraclavicular area, and up the neck as needed. The right internal jugular pulsation provides the most accurate assessment of the CVP because it attaches more directly to the superior vena cava. Note the location and the wave quality.

- A normal jugular pulsation is visualized around the sternal notch or the supraclavicular area. (The right internal jugular vein is underneath the sternomastoid muscle and runs from anterior to the mastoid process to the medial

portion of the clavicle. It begins medial to the muscle at the mastoid process and then runs underneath the muscle as it moves down to the clavicle)
- The wave quality of a normal jugular pulsation is a double wave that is diffuse (diffuse means that it is spread out as opposed to in a pinpointed areas).
  NOTE: Do not confuse the carotid artery pulsation with jugular venous pulsation. **See Figure 3**.

7. Note the **findings**

- Normal findings may be documented as: "Right external jugular vein is flat with no distension. Double diffuse pulsation of right internal jugular vein at sternal notch."
- Abnormal findings may be documented as: "Bulging right external jugular vein. Accentuated double pulsation of right internal jugular vein just inferior to the ear lobe."

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Video 4: Inspection of the jugular pulsation.

Clinical Tips

It is important to ensure your assessment is focused on the jugular pulsation and not the carotid pulsation. Unlike the carotid pulsation, the jugular pulsation varies with a person's breathing, it is not palpable, and is not visible when the client is sitting upright unless they are experiencing severe distention. Additionally, the carotid pulsation is visualized as one quick wave in a specific area as opposed to a double diffuse wave.

Priorities of Care

A distended/bulging jugular vein (see **Figure 4**) is a critical finding in which blood is backing up from the right side of the heart/superior vena cava into the jugular veins; there are many causes such as **heart failure**,

pulmonary hypertension, and **tricuspid valve stenosis / prolapse**. It is typically associated with other cues such as heart palpitations, chest pain, tachycardia, perspiration, and dyspnea, and other signs of respiratory distress. The priority of care related to this cue is determining the cause and keeping the client stabilized. In addition to notifying the physician/nurse practitioner, you should continue monitoring the client's vital signs (specifically: pulse, respiration, blood pressure, oxygen saturation) and continue the assessment with a focus on cardiac inspection, palpation, and auscultation. It is important to auscultate the valves to determine the quality of blood flow and presence of murmurs.

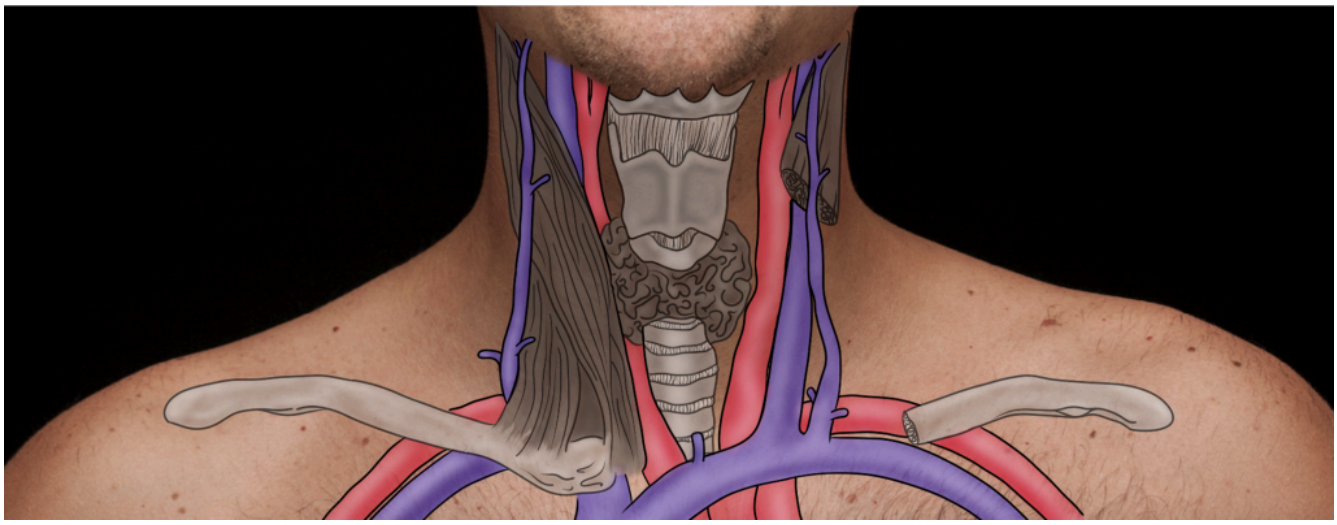

Figure 3: Jugular vein anatomy.
Photo by engin akyurt on Unsplash (image was cropped and illustrated upon for the purposes of this chapter)

Figure 4: JVD by Ferencga is used under a Creative Commons Attribution-Share Alike 3.0 Unported license. (taken

from: https://pressbooks.bccampus.ca/clinicalproceduresforsaferpatientcaretrubscn/chapter/2-8-head-to-toe-assessment-cardiovascular-assessment/).

Knowledge Bites – Pathophysiology

Jugular venous pulsation is influenced by blood volume, cardiac function of the right ventricle, and venous compliance. Any condition that causes an increase in right atrial pressure can lead to elevated CVP such as fluid overload, heart failure, pulmonary hypertension, and valve abnormalities (e.g., pulmonic stenosis).

Activity: Check Your Understanding

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The Heart

Assessment of the heart involves **inspection, palpation,** and **auscultation.** Always **begin with inspection,** unless there is an immediate concern to move to auscultation or you suspect clinical deterioration.

The assessment must be **performed on skin** and never over clothing. You may ask the client if they would like someone present for the exam; some clients may not feel comfortable exposing their chest area and may prefer the presence of a friend, family member, or another healthcare provider.

You should always explain what you are doing and ask permission to touch. Always ensure the client's **privacy.** Close the door and curtains and provide **appropriate draping,** considering that some of the assessment involves exposing parts of the chest. Draping should be provided to clients of all genders and ages.

The assessment is typically performed in a **supine position** with the client's head on a pillow. This positioning also facilitates draping and easier landmarking, particularly with a client who has larger breasts that will need to be repositioned to expose assessment areas. For example, repositioning will be easier as larger breasts typically shift laterally in a supine position. You can ask the client to shift their breast tissue laterally and up or down as needed; if the client is unable to do so, you can ask permission to reposition their breast. In this case, always use the ulnar (outside) surface of your hand, as opposed to a grasping or cupping movement.

Clinical Tips – Landmarking the Heart

When performing an objective assessment, you will need to **physically landmark** several locations on the chest to inspect and palpate the precordium, palpate the apical impulse, and auscultate the apical pulse and cardiac valves. See **Figure 5** and **Video 5**. The physical location where you assess is not always aligned with the anatomical location. For example, auscultation of cardiac valves corresponds with the **direction of blood flowing** out of the valve as opposed to where the valve is anatomically located.

2nd Intercostal space at right sternal border: Location of where the aortic valve is best heard because the flow of blood out of the valve is directed toward this area. This is also the location of the base of the heart.

2nd Intercostal space at left sternal border: Location of where the pulmonic valve is best heard because the flow of blood out of this valve is directed toward this area. This is also the location of the base of the heart.

5th Intercostal space at left sternal border (or 4th intercostal space in a child): Location of where tricuspid valve is best heard because the flow of blood out of this valve is directed toward this area. Note that in a child, this is located at the fourth intercostal space. Some practitioners assess the 4th intercostal space even in adults. Keep in mind that sound travels.

5th Intercostal space, left midclavicular line or **just medial to the midclavicular line** (or 4th intercostal space in a child): Location of where the **mitral valve** is best assessed because the flow of blood out of this valve is directed towards this area (the mitral valve is also called the bicuspid valve). This location is also considered the **apex** of the heart because it is where maximum impulse against the chest wall occurs as a result of systolic contraction of the left ventricle. Additionally, it is where the apical impulse and apical pulse are assessed.

Left sternal border: Location between the 2nd and 5th intercostal space close to the left sternal border.

NOTE: Certain pathophysiological processes will modify these locations. For example, an enlarged heart or congenital disorders may affect the anatomy of the heart and/or the location of the heart.

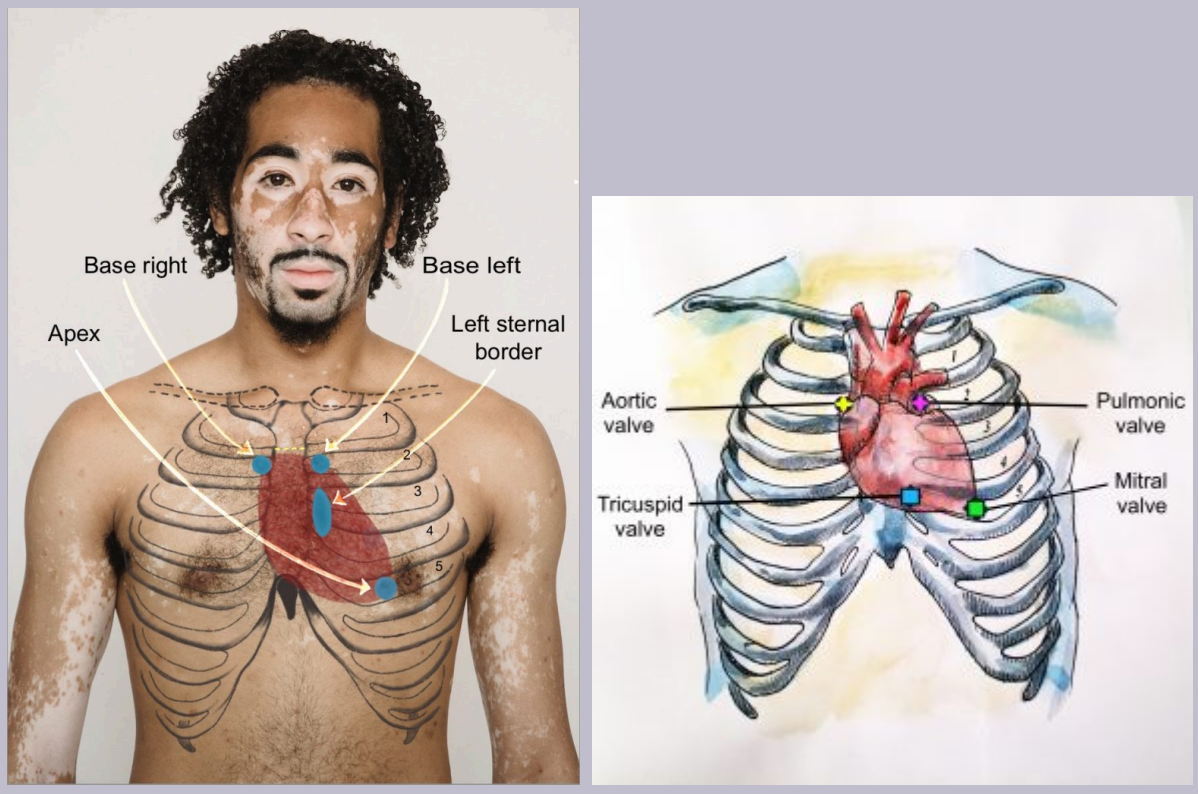

Figure 5: Landmarks

Image on left side: Photo by Armin Rimoldi from Pexels (image was cropped and illustrated upon for the purposes of this chapter)

Image on right side: Illustration by Hillary Tang from vital signs chapter (image was cropped and illustrated upon for the purposes of this chapter)

Techniques for landmarking on adults:

1. There are approaches that you can begin with. The **first approach** is: Place your fingertips on the manubrium and slide your fingers down to the sternal angle. You will have reached the sternal angle when you feel a small ridge. The sternal angle is attached to the second rib. Slide your fingers over to the rib on the right sternal border and slide your fingers down into the space below the second rib – this is the 2nd intercostal space. This location is considered the base of the heart and where the aortic valve is best assessed. The **alternative approach** is: On the right side, place your index and middle fingers on the clavicle, slide down until you feel the first rib. Then, slide them into the 1st intercostal space and down over the second rib. Then, slide fingers down into the 2nd intercostal space at the right sternal border. This location is considered the base of the heart and where the aortic valve is best assessed.
2. Follow this same space across the sternum into the 2nd intercostal space of the left sternal border. This location is considered the base of the heart and where the pulmonic valve is best heard.
3. Now slide your fingers down the chest wall feeling for each rib and each intercostal space below the rib until you reach the 5th intercostal space at the left sternal border. This is the location of where the

tricuspid valve is best heard. Stay close to the sternum because the ribs are easier to feel.

4. Follow the 5th intercostal space out to the left midclavicular line or just slightly medial. This is the location of the apex of the heart, the location where you palpate the apical impulse, and the location where you auscultate the apical pulse and the mitral valve.

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Video 5: Landmarking the heart.

Activity: Check Your Understanding

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Inspection of the Precordium

The precordium is the region on the chest wall that overlays the heart area. The base of the heart is located in the region of the second intercostal space and the apex is located in the region of the fifth intercostal space on the left side. As you inspect the chest wall, you will collect data that provides information about cardiac function.

Inspection of Precordium

1. Place the client in supine position with their head on a pillow.
2. Provide draping.
3. Use tangential lighting with a penlight across the heart area.
4. Inspect the base of the heart, left sternal border, and apex of heart. You may do this in sequence so that you are only exposing the area that you are assessing and then move on to the next area. See **Figure 6** and **Video 6**.
5. Observe for the presence or absence of **impulses** against the chest wall and note the location.

- Pulsations: These are gentle flickers observed on the skin of the chest wall. They can be considered normal when observed on clients with thin chest walls. Otherwise, these are cues that require further assessment because they may be suggestive of increased cardiac workload associated with conditions such as an enlarged heart.
- Heaves: These are a more forceful movement (a thrust) observed on the skin over the chest wall. These cues require further assessment because they also may be suggestive of increased cardiac workload such as an enlarged heart.

6. Note the **finding**

- Normal findings might be documented as: “No cardiac impulses observed against chest wall.”
- Abnormal findings might be documented as (example): “Gentle pulsation observed at apex.” or “Heave observed at apex.”

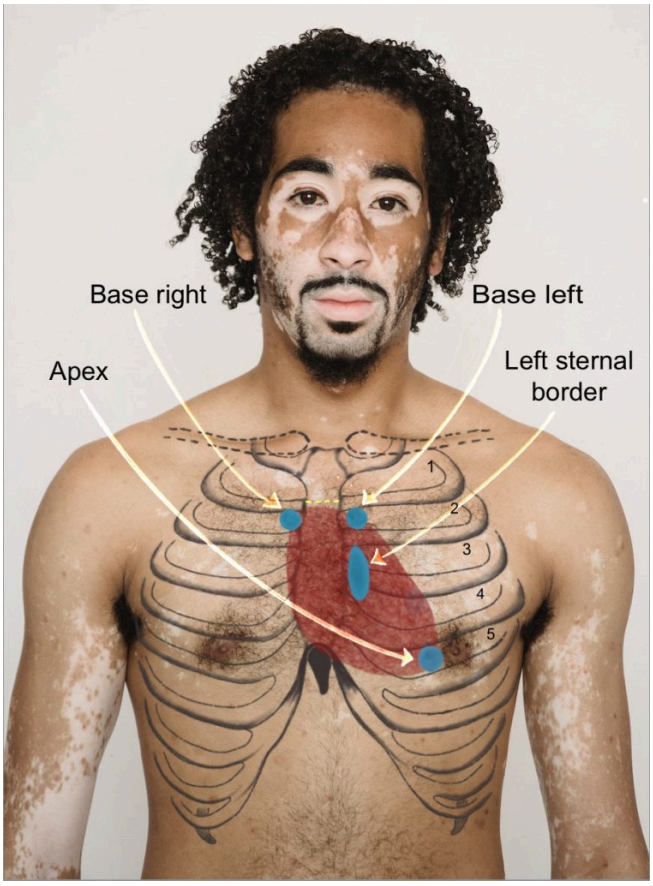

Figure 6: Location of the base of the heart, left sternal border, and apex of heart.
Photo by Armin Rimoldi from Pexels (image was cropped and illustrated upon for the purposes of this chapter)

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Video 6: Inspection of precordium.

Knowledge Bites – Pathophysiology

Impulses observed on the chest wall should always be assessed further because they are suggestive of some sort of increased workload of the heart and/or vasculature (such as the aorta). A heave can be associated with

cardiac hypertrophy (enlargement of the heart muscle) or a dissecting aorta (a tear in the inner arterial wall that can lead to a rupturing of the aorta). These can be caused by many conditions such as hypertension, valvular disease, septal defects, and infarction. Your assessment can contribute to the database about whether the impulse is benign, such as may appear with a client who has a thin chest wall, or whether the impulse may have a pathophysiological cause.

Activity: Check Your Understanding

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Palpation of the Precordium

Palpation of the precordium involves palpating the chest wall and palpating the apical impulse.

Palpation of Chest Wall for Pulsations

Palpation of the chest wall provides information about the quality of cardiac blood flow.

Palpation for pulsations involves the following steps (see **Video 7**):

1. Maintain the client in a supine position and continue to use draping as needed.
2. Palpate the base of the heart, the left sternal border, and the apex.
3. Use one of two techniques to palpate:

- Use the metacarpophalangeal surface of your fingers starting at the base of the heart. Leave them in place as long as you need to, but usually about two to three seconds and then move onto the sternal border and then the apex. (This is the most common technique).

OR

- Use the ulnar surface of your hands starting at the base of the heart. Place your ulnar surface in several locations because its surface is smaller than your metacarpophalangeal surface. Leave them in place as long as you need to, but usually about two to three seconds and then move onto the sternal border and then the apex

4. Identify presence of any pulsations that feel like a vibratory sensation.

Tip: Place your fingertips over your trachea and stick your tongue out and say "ahhh." The vibrations that you feel on your fingertips are similar to what a thrill feels like on the chest wall.

- Healthy blood flow does not produce a vibratory sensation.
- The presence of any vibratory sensations are abnormal; turbulent blood flow can create a vibratory sensation (typically referred to as a thrill) felt on the chest wall. If you feel a thrill, you should auscultate for a murmur and expect other subjective findings associated with an incompetent valve (not opening and closing correctly). You should conduct a full cardiac and vital sign assessment and notify the physician/nurse practitioner.

5. Note the **findings**

- Normal findings might be documented as: "Absence of vibratory sensations."
- Abnormal findings might be documented (example): "Thrill palpated at second intercostal space left sternal border."

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Video 7: Palpation of precordium.

Palpation of Apical Impulse

Palpation of the apical pulse provides information about the location and the workload of the heart. You are specifically palpating for a physical pulsation over the apex of the heart. This involves the following steps (**Video 8**):

1. Maintain the client in a supine position and continue to drape.
2. Physically landmark the expected location of the apex. In adults, this is the fifth intercostal space at the left midclavicular line or just midline to the midclavicular line; in children, it is the fourth intercostal space at the left midclavicular line.
3. Place the finger pad of your index finger at this location in the intercostal space. Use the finger pad (not the fingertip) because it is more sensitive to pulsations. Thus, you will need to keep your hand/wrist/forearm low so that your hand/wrist/forearm are parallel to the client's chest.
4. Ask the client to hold their breath after taking a large breath in and out. You should feel the pulsation quite quickly if it is palpable.
5. If you do not feel a pulsation, help the client into a left lateral position. This positioning rotates the apex of the heart and accentuates the impulse against the chest wall. Usually, you can leave your finger in place when re-positioning the client.
6. Note the **findings**
    - Normal findings might be documented as: "Gentle tap of apical impulse, short duration, one smooth pulsation, 1–2 cm^2 at apex." Also note that it is normal not to feel an apical impulse in many clients as well. In this case, note "No apical impulse felt after re-positioning client in left lateral position."
    - Abnormal findings might be documented as: "Double systolic impulse lateral to left midclavicular line with sustained forceful thrust lasting throughout systole." (This is just one example of an abnormal finding.

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Video 8: Palpation of apical impulse (NOTE: Not clearly seen in the video, ensure that you place your index finger at the left mid-clavicular line).

Knowledge Bites – Pathophysiology

You might feel what is perceived as an abnormal apical impulse for many reasons. The heart might be displaced and/or have an accentuated impulse and extended duration with conditions such as left ventricular hypertrophy (enlargement of the left ventricle muscle), volume overload, and heart failure. The apical impulse

can be accentuated with exercise, anxiety, fever, and other conditions when higher cardiac outputs are needed. Also, the apical impulse can shift laterally and up with pregnancy to accommodate the growing uterus.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=278#h5p-225

Auscultation of the Heart

Auscultation of the heart involves auscultating the apical pulse followed by auscultating the valves of the heart. You must always cleanse the stethoscope prior to auscultating. After you have cleansed it, do not set it down on the table or wrap it around your neck because this will contaminate it.

Extraneous noises can be heard when in a noisy environment or with a client who has a hairy chest. Thus, it is important to reduce environmental noise if possible and keep your stethoscope still when you press it against the chest.

Auscultation of the Apical Pulse

Auscultation of the apical pulse involves assessing the **rate** and the **rhythm**. This is best done at the apex, which is landmarked at the 5th intercostal space (for adults) and the 4th intercostal space (for children) at the left midclavicular line. See **Figure 7**.

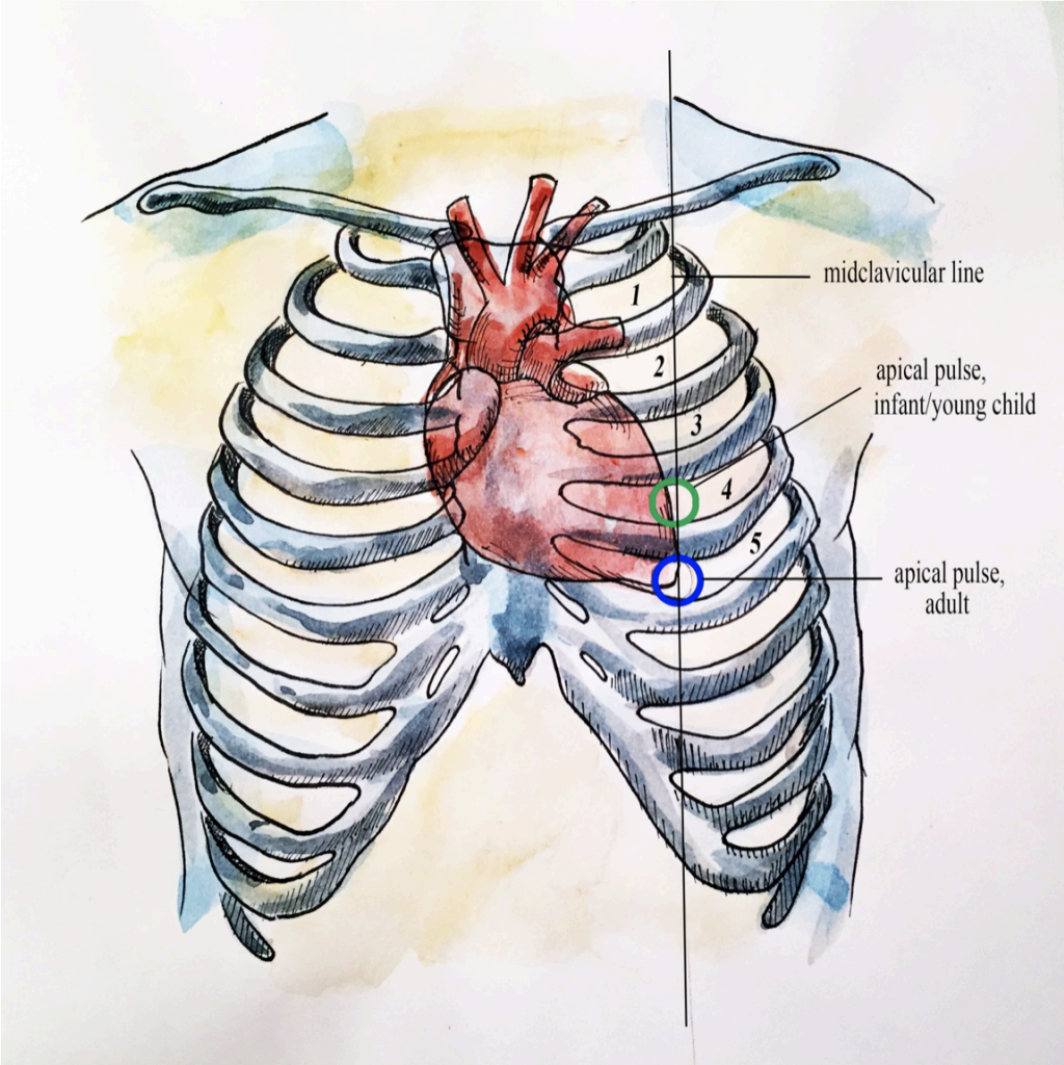

Figure 7: Location of apical pulse
Illustration by Hillary Tang from the vital signs chapter (image was cropped and illustrated upon for the purposes of this chapter).

Auscultation of the apical pulse involves the following steps (see **Video 9**):

1. Keep the client in a supine position and continue to drape.

- This procedure can also be completed in a sitting position.

2. Cleanse the stethoscope.
3. **Physically landmark** the location of the apical pulse.
4. Place the diaphragm of the stethoscope at the correct location with a complete seal.
5. Count the **rate** for one minute and **report beats per minute**.

- One beat is considered one cardiac cycle (systole and diastole) and it sounds like "lub dub." Lub correlates with the closure of the AV valves and is referred to as S1; it signals the beginning of ventricular contraction (systole). Dub correlates with the closure of the SL valves and is referred to as S2; it signals the beginning of ventricular relaxation (diastole).
- Apical pulses are typically counted for a full minute to assess for any irregularities.

6. Note the **rhythm** (e.g., regular or irregular rhythm).

- Normally, the rhythm is **regular** which means there is an even tempo with equal intervals between beats.
- If the rhythm is **irregular**, note whether it is a regularly irregular rhythm or an irregularly irregular rhythm.
    - **Regularly irregular rhythm**: a regularity to the irregular rhythm, for example three regular beats and one missed beat and then this pattern is continually repeated.

OR

    - **Irregularly irregular rhythm**: an irregularity to the irregular rhythm, for example there is no pattern to the irregular rhythm. For example, you might hear two beats in a row, 1 missed beat, three beats in a row, 1 missed beat, 1 beat etc… This irregular rhythm is more concerning. When it is irregularly irregular, it is an erratic rhythm in which the heart is not always fully contracting at systole and filling with blood at diastole. This type of rhythm is highly specific to atrial fibrillation, in which the atria quiver. This can result in blood clots and decreased stroke volume and cardiac output. As a result, it can also lead to the heart not optimally perfusing blood to the periphery.

- If the rhythm is irregular, check for a **pulse deficit**. A pulse deficit is when the radial pulse is less than the apical pulse, meaning that you will feel less palpable pulses at the radial site compared to the number of beats heard when auscultating the apical pulse. Normally there is no pulse deficit when a heart is perfusing the periphery. Experts suggest that a pulse deficit of more than 10 should be investigated further particularly when associated with other symptoms. To assess for a pulse deficit, use the following steps:
    - While auscultating the apical pulse, also palpate the radial pulse. You can usually do this at the same time and note whether they are equal.
    - If they are unequal, count the apical pulse for one minute, and then count the radial pulse for one minute. Next, subtract the radial pulse from the apical pulse to obtain the client's pulse deficit. For example, if the apical pulse is 90 beats per minute and the radial pulse is 72 beats per minute, you would calculate the pulse deficit as 18 beats per minute (90 – 72 = 18), meaning that those 18 times that the heart contracts, the blood is not being perfused to the periphery.

7. Note the **findings**

- Normal findings might be documented as (example): "Apical pulse 82 beats per minute with a regular rhythm."
- Abnormal findings may be documented as (example): "Apical pulse 134 beats per minute with an irregularly irregular rhythm."

See **Audio 1** to listen to a normal apical pulse. Listen for the "lub dub." And then listen again, and count the pulse and report the beats per minute. (Find the answer at the bottom of this page)

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Audio 1: Normal apical pulse
(Attribution statement: taken from https://wtcs.pressbooks.pub/nursingskills/chapter/9-3-cardiovascular-assessment/)

One or more interactive elements has been excluded from this version of the text. You can view them online here:
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Video 9: Auscultation of apical pulse.
ANSWER: The apical pulse rate in **Audio 1** is 64 beats per minute.

Priorities of Care

Notify the physician/nurse practitioner if a client has an irregularly irregular rhythm and is showing signs of bradycardia or tachycardia. Additionally, a pulse deficit is of concern because it is suggesting that the heart is not perfusing the periphery. Thus, you should perform a full cardiac assessment. Unless the client is showing signs of clinical deterioration and requires prompt intervention, you should first complete a full cardiac assessment so that you can provide a full report of the relevant cues and share recommendations for actions.

Activity: Check Your Understanding

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Auscultation of the Cardiac Valves

Auscultation provides information about the **functioning of the cardiac valves**, for example whether they are opening and closing appropriately and the **quality of blood flow** through the valves. Cardiac valves include the **atrioventricular valves (AV)** (tricuspid and mitral) and the **semilunar valves (SL)** (aortic and pulmonic). Remember, auscultate them at the location that corresponds with the flow of blood out of the valve, not at their anatomic location.

Biological background of heart sounds

You need to know what you are listening for when auscultating the valves. First, you are listening for **heart sounds ("lub dub")**. As described above, these sounds are related to the **closing of the heart valves** and referred to as S1 (lub) and S2 (dub). In a healthy heart with no valvular pathology, the opening of these valves is silent.

- **S1** is the **closing** of the **AV valves** including the tricuspid valve and the mitral valve. Although the mitral valve closure occurs immediately prior to the tricuspid valve closure because of the route of electrical charges in the heart (i.e., myocardial depolarization), the closing of these valves are generally heard at the same time in the healthy heart – **lub.**
- **S2** is the **closing** of the **SL valves** including the aortic valve and pulmonic valve. Although the aortic valve closure occurs immediately prior to the pulmonic valve closure because of the route of electrical charges in the heart, the closing of these valves are generally heard at the same time in the healthy heart – **dub.**

Recall what you learned in biology:

- S1 involves the closing of the AV valves, so it is considered the beginning of systole (contraction of the ventricles ejecting blood into the pulmonary artery and the aorta).
    - When the AV valves close, all four cardiac valves remain closed momentarily (it's called isovolumetric contraction) and then the semilunar valves (aortic and pulmonic) open while the ventricles contract.
- Then, the semilunar valves close (S2); this is considered the end of systole and the beginning of diastole (relaxation of the ventricles filling with blood)
    - When the semilunar valves close, all four cardiac valves are closed momentarily (this is called isovolumetric relaxation) and then the AV valves open and the ventricles fill with blood (i.e., diastole).

Auscultating cardiac valves

The steps involved in auscultation of the cardiac valves are (see **Video 10**):

1. Keep the client in a supine position and use draping.

- You can do this assessment with the client in a sitting position, but it is generally easier to do in a supine position because you can drape the client without struggling to hold the drape in place. Also, you might have to ask a client who is sitting to reposition their breasts to auscultate the valves; this is easier in a supine position as larger breasts will typically shift laterally in a supine position.
- NOTE: if you have specific cardiac concerns, you should also listen for murmurs in the left lateral position and in

the sitting position with the client leaning forward slightly. This positioning can help you hear any murmurs that might be present.

2. Cleanse the stethoscope.
3. Follow the pattern in **Figure 8** to auscultate the cardiac valves.

- Particularly when you have concerns, some practitioners will move their stethoscope around several locations at each site.
- Remember, it is important to physically landmark the location of the valves immediately before you auscultate them.
    - Landmarking for these valves is important. For a reminder about landmarking, go back to The Heart page to watch the video.

4. Auscultate all four valves with the bell, and then begin again and auscultate all four valves with the diaphragm.

- Heart sounds are typically classified as low-pitched, but you should use both the bell and diaphragm to distinguish sounds because some may be better heard with the diaphragm versus the bell. For example, S1 is lower in pitch than S2 and some abnormal heart sounds are higher in pitch.
- At each location, listen as long as you need to complete the assessment, but for at least two to three full cardiac cycles (including systole and diastole). You may need to listen longer if you hear abnormal sounds.
    - S1 and S2 – (lub dub) Are they clear and distinct sounds? Or do you hear split sounds associated with S1 and S2? This can occur when the tricuspid and mitral valve do not close at the same time or the aortic and pulmonic do not close at the same time.
    - Murmurs are a whooshing sound associated with turbulent blood flow that can occur when a valve is not opening and closing appropriately. See **Audio 4.2** to hear what a murmur sounds like. When a valve is not working properly, this can lead to **regurgitation** of blood. Sometimes a murmur is caused by heightened blood flow such as during pregnancy or exercise. Assess whether murmurs are present or absent; if you hear a murmur, the main characteristics to be evaluated are:
        - Timing with the cardiac phase. Is it associated with S1 or S2?
        - Grading of the loudness of the sound (see **Table 2**). Murmurs that are grade 4 and above are associated with a palpable thrill.

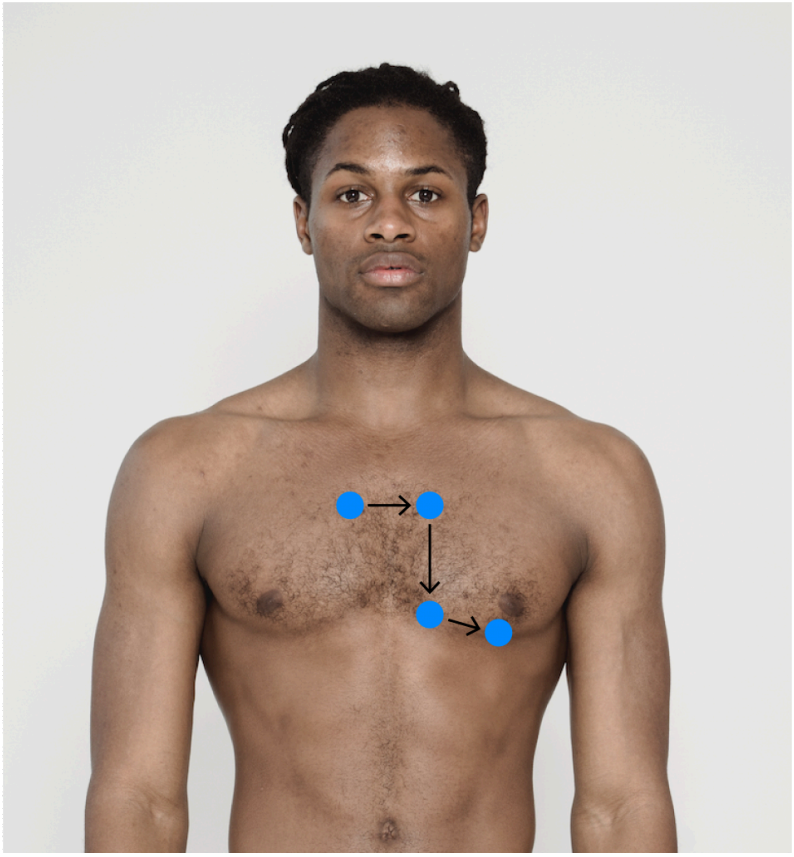

Figure 8: Pattern for auscultation of cardiac valves
Photo by Mike Jones from Pexels (image was cropped and illustrated upon for the purposes of this chapter).

5. Note the findings

- Normal findings might be documented as: "Clear S1 and S2, no split sounds, no murmurs."
- Abnormal findings might be documented as: "Clear S2, no split sounds, grade II murmur heard best on S1, at the apex." (This is just one example of an abnormal finding that could be associated with **mitral regurgitation**.)

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Audio 2: Normal S1/S2 sounds.

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Audio 3: Murmur.

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Table 2: Levine's murmur scaled (adapted from Silverman & Wooley, 2008).

Grade 1	Faint/difficult to hear (not heard right away)
Grade 2	A faint murmur heard immediately
Grade 3	Moderately loud murmur
Grade 4	Loud murmur
Grade 5	Very loud murmur. Can be heard if only the edge of the stethoscope is in contact with the skin.
Grade 6	Loudest possible murmur. The murmur can be heard with the stethoscope just removed from the chest and not touching the skin.

See **Video 11** for an in-depth understanding of heart sounds: the main point is that heart sounds can change based on cardiac pathologies. Heart Sounds | Complete Cardiac Sounds with Audio | Heart Sounds Made Easy.

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Video 10: Auscultation of cardiac valves.

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Video 11: Heart sounds.

Knowledge Bites – Pathophysiology

The cardiac valves may be associated with many issues, most commonly regurgitation/prolapse and stenosis. Regurgitation is leaking or backflow of blood through the valve; this is sometimes caused by prolapse in which

the valve does not close completely. Stenosis involves narrowing of the valve, which limits/restricts blood flow through the valve.

Activity: Check Your Understanding

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Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion and disease prevention are important components of a healthy cardiovascular system. To determine appropriate interventions, you must carefully consider all available subjective and objective data. Part of your subjective data collection will include inquiring about risk factors, social determinants, and other considerations.

The inquiry part is integrated throughout the assessment. Many of the probing questions may be asked when doing the subjective assessment. However, some of the questions will be formulated based on your critical reflection of data collected during the subjective and objective assessment. It is this data that will inform your clinical judgment and the health promotion needed for a specific patient.

Smoking

First-hand, second-hand, and **third-hand smoke** are major risk factors that negatively affect the cardiovascular system. The chemicals in smoke cause inflammation of the blood vessels and contribute to plaque buildup and narrowing of the blood vessels.

Probing questions related to smoking include:

- Do you smoke cigarettes or any tobacco-related products? If the client's answer is affirmative, ask probing questions: How much do you smoke? How many packages of cigarettes do you smoke a day? How many years have you smoked? Can you tell me about the reasons that you started smoking?
- If you do not currently smoke, have you ever smoked? If the client's answer is affirmative, ask similar probing questions as above, including the reason that they quit.
- Have you ever tried quitting? If the client's answer is affirmative, ask probing questions: Tell me about what made you want to quit? How long did you quit? Did you use any strategies to help you quit?
- Have you ever thought of quitting? If the client's answer is negative, make a non-judgemental comment like: "If you ever want to discuss quitting, let me know, there are many resources to help you."

The effectiveness of **health promotion** is influenced by client interest and collaborative intervention because these factors are important in producing a successful outcome in smoking cessation. Each intervention must be tailored to the client, and could include counselling, cognitive-behavioural therapy, pharmacology treatments (e.g., nicotine replacement therapy), smart-phone applications, and short text message services. Sometimes a brief discussion about risks and a recommendation to quit smoking is sufficient. You might also choose to be involved in developing public health educational campaigns and resources about how smoking affects health as a population-based prevention strategy.

Contextualizing health promotion related to smoking from a **sociocultural perspective** will help you understand who might be more vulnerable or at risk. For example, the prevalence of smoking is higher among individuals with lower socio-economic status and lower education attainment, and those experiencing racial and ethnic discrimination (Wang & Wu, 2020). These populations are less likely to have access to resources pertaining to smoking cessation, so it is important to consider interventions as they relate to the social determinants of health, rather than using a one-size-fits all approach (Brady, 2020).

Contextualizing Inclusivity – Tobacco

Tobacco plays an important part in traditional and spiritual practices in many Indigenous communities (CAN-ADAPTT, 2010). Many, but not all, Indigenous peoples use it for ceremonial and medicinal purposes (CAN-ADAPTT, 2010). Nurses should recognize and distinguish between tobacco use for traditional purposes and misuse, and questions to the client should be culturally sensitive and respectful of these differences (CAN-ADAPTT, 2010).

Diet

An unhealthy diet is a risk factor that contributes to cardiovascular disease, such as a diet high in saturated and trans fats, cholesterol, sodium, and alcohol. It is best for clients to choose water and reduce caffeine and alcohol intake. Clients with **heart failure** are sometimes recommended to limit all types of fluids.

Probing questions related to diet include:

- Tell me about your usual diet?
- What have you eaten in the last 24 hours? Is that your usual diet?
- Have you had any recent changes in your life that have affected your diet?
- Do you add sugar and salt to your food?
- How much fluid do you typically drink in a day? What fluids (e.g., water, caffeinated beverages, alcohol)?

You may want to assess a client's familiarity with, and discuss with them how to use: Health Canada's (2019) Food Guide. This new food guide still has a Eurocentric bias, so you should collaborate with the client about its relevance in the context of their cultural food practices. It is now offered in dozens of languages that you can refer clients to: snap shot in multiple languages and many resources are available about food safety for Indigenous People.

Some **key elements** of Canada's Food Guide are:

- Be mindful of eating patterns.
- Choose water as the drink of choice.
- A dinner plate should be one-half vegetables/fruit, one-quarter protein, and one-quarter whole grains.
- Make time to enjoy eating meals with others.
- Cook when possible, as opposed to eating processed meals and purchasing fast foods.
- Reduce sodium, saturated and trans fats, and sugar, and monitor portion sizes.

Canada's guidelines now suggest that there are health risks associated with any level of alcohol consumption, although negligible with two drinks or less weekly (Paradis et al., 2022). Although some previous research had suggested some positive benefits to alcohol, this is now being disputed indicating that drinking alcohol of any kind does not decrease risks of heart disease, and high levels of consumption increase risk for coronary artery disease, myocardial infarction, heart failure, hypertension, and stroke (Paradis et al., 2022).

Many types of diets can be heart healthy, but some research points especially to the benefits of the **Mediterranean** diet and **DASH** diet. The American Heart Association (2020) recommends the Mediterranean diet as heart healthy: it includes plenty of fruits and vegetables, grains, potatoes, legumes, nuts, and seeds, olive oil, along with small amounts of dairy, eggs, fish, and poultry. The Heart and Stroke Foundation of Canada (n.d.) recommends the DASH (Dietary Approaches to Stopping Hypertension) diet as heart healthy and helpful to lower blood pressure: it is rich in vegetables, fruit and low-fat dairy foods and lower in saturated fat, total fat and cholesterol. The two diets are very similar and may be used in combination; the Mediterranean diet typically emphasizes more fish and less dairy products than the DASH diet.

Healthy eating involves behavioural actions but also **relational and structural actions**. First, an individual needs access to healthy food and the financial capacity to purchase it; this is referred to as food security. The rising cost of food globally has made this a challenge, and in many remote regions of Canada's North, access to nutritious food is limited in terms of availability; even when available, the costs are excessive.

Socioeconomic status is known to affect food purchasing: individuals from socioeconomically disadvantaged communities – those with lower household income and lower levels of education – purchase fewer healthy foods like fruits and vegetables (Turrell et al., 2002). Therefore, health promotion efforts should focus on narrowing socioeconomic differences in food purchasing. Nurses can work in partnership with disadvantaged individuals and tailor a health promotion approach to their particular needs and attend to structural and economic barriers (Turrell et al., 2002). For example, you could direct clients to organizations that partner with vulnerable communities to support access to healthy foods, skill development, and capacity-building in terms of community-led initiatives (Turrell et al., 2002). You could also advocate on behalf of these communities for more effective social policy to address food insecurity (Turrell et al., 2002).

Activity

A sedentary lifestyle with limited activity/exercise is another risk factor that contributes to cardiovascular disease. Guidelines vary based on age and health, but individuals should generally participate in about 30 to 60 minutes of aerobic activity five to seven times per week.

Probing questions related to activity are:

- Do you have any concerns about your level of activity or exercise?
- Tell me about your daily pattern of activity? What activity are you involved in?
- What exercise do you engage in? How long do you do this type of exercise? How many days a week do you exercise? If a client plays sports, ask about their use of protective equipment.

You can collaborate with clients to create an activity/exercise care plan that is specific to their needs and goals. Start at a realistic and attainable level, depending on physical capability and energy level, then slowly increase the timing and level of activity. Many interventions are also available to support clients to achieve their activity goals: community walking groups, fitness apps, local gyms, and group activities. The participACTION website is a helpful resource for activity guidelines.

Nurses should use a **relational health promotion** approach when addressing activity. A community of support can promote activity, so you should assess the client's access to support (e.g., friends, family, acquaintances) who may have similar activity interests or goals. A **structural approach to health promotion** can also help address and eliminate inequities. For example, some clients may not be able to afford gym memberships or sports registration fees. Additionally, those in urban areas may have more access to specific activities or rehabilitation programs than those living in rural or remote regions, including in the North. You will need to consider these factors and tailor activity programming to each client. You could also advocate for policies to address these inequities.

Sleep

Adequate sleep is important for restoration of the body and mind: 6–8 hours is usually considered adequate sleep. Pulse and blood pressure lower during deep sleep, known as non-rapid eye movement, which is important for cardiovascular health. Lack of sleep quality and quantity has been linked to cardiovascular-related illnesses such as hypertension, obesity, myocardial infarction, and stroke.

Probing questions related to sleep include:

- How much sleep do you get each day/night? How many hours? Do you rest during the day?
- Do you have any concerns about your sleep?
- Tell me about your sleep routine? What do you do before you go to bed? Do you take any medications to help you sleep?
- Do you wake up during the night? If so, why? Are you able to fall back to sleep?
- Do you feel rested when you wake up?

One behavioural intervention is a sleep journal. Ask the client to record how much sleep they get. If less than recommended, address potential triggers that may be disrupting the client's sleep, such as stress or pain. Limiting screen time two hours prior to bedtime can also be helpful. Additionally, you may want to discuss with the client the potential for naps.

The physical and social environment affects sleep. Siengsukon (2020) describes that sleep may be affected by the following:

- Living in an unsafe or noisy neighbourhood.
- Not having access to private transportation and needing to get up early to commute via public transportation.
- Living in congregate or multigenerational housing might mean that clients share bedrooms or beds.
- Being a caregiver for a spouse or parent can also interfere with sleep, as does living with someone who works long hours or shift work.

It is important to note that many of these physical and social factors influencing sleep are associated with race, ethnicity, and socioeconomic status (Siengsukon, 2020).

Stress

Stress is subjective and can have emotional, physical, mental, social, and financial effects; it is a risk factor for cardiovascular-related illnesses. Stress is usually caused by a combination of multiple stressors. How a person may talk about themselves, their life and their situation can indicate potential concerns and areas that need further assessment.

Probing questions related to stress could include:

- Tell me about the stress in your life?
- Have you experienced stress recently? Physically? Emotionally?
- Have you had any recent changes in your life? (tell me more).
- How does stress affect you?
- How do you handle this stress?
- Tell me about the coping strategies you use?

Stress management and coping strategies may include:

- Regular physical activity.
- Getting adequate sleep.
- Spending time with family and friends.
- Taking time for personal interests and hobbies.
- Practicing relaxation techniques such as meditation, deep breathing exercises, and tai chi.

From a relational and structural health promotion perspective, it is important to be aware that stress does not exist in a vacuum: how it is experienced, perceived, and managed is affected by relationships with others. All clients experience stress sometimes, but structural factors influence whether a client is more at risk for stress or able to manage stress. For example, racism is a major determinant that can lead to highly stressful experiences. You can use an anti-racist approach to stress and stress management to understand how the client is being influenced by racism and how best to support them. Socioeconomic status can also influence a person's access to resources to cope with stress. When collaborating with clients to develop stress management techniques, you must be aware of these larger structural influences.

Weight and blood pressure

Obesity and high blood pressure are linked to cardiovascular-related illnesses, so clients should monitor their weight and blood pressure.

Probing questions may include:

- Are there any recent changes in your life that may have affected your weight or blood pressure?
- Have you had any recent changes in your weight?
- Do you have any concerns about your weight?
- When was the last time you had your blood pressure taken?
- Do you know what your blood pressure normally is?

In collaboration with the client, discuss any disruptions in daily patterns and explore possible ways to address these – and facilitate weight loss and lowering of blood pressure if relevant. Many interventions related to diet, activity/exercise, and stress will help with weight and blood pressure. Nurses can also advocate on behalf of clients and take actions to develop and advance equitable healthy public policies.

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Clinical Judgement: Case Study

A 34-year-old male client arrives in the emergency department with his partner. The partner is crying, stating the client tried to stand after dinner, and then fell to the floor holding his chest. Upon assessment, the client was experiencing shortness of breath, had a racing heartbeat, voiced slight chest discomfort and said he felt a fluttering sensation in his chest. He also said he has lower back pain. RR: 28 bpm, HR: regular irregular rhythm 146 bpm, BP: 132/86 mmHg, O2: 97%. The client is diaphoretic and states he feels lightheaded, dizzy, and is afraid he's going to faint.

After reading the following scenario, perform a primary survey of the client. Remember your ABCDEs! The goal is to determine whether urgent interventions are needed and act on signs of clinical deterioration.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=288#h5p-233

Key Takeaways

- Common symptoms to assess related to the cardiovascular system include chest pain, dyspnea, arrhythmias, coughing/wheezing, and edema.
- The objective assessment of the cardiovascular system is always performed on bare skin and involves a combination of positions including sitting upright, head of bed at 45 degrees, and supine.
- A trauma-informed approach to the objective assessment is necessary considering that areas of the chest are being exposed.
- The objective assessment includes auscultation and palpation of the carotid arteries, inspection of the jugular pulsation, and inspection, palpation, and auscultation of the heart.
- Health promotion interventions should be developed in collaboration with the client to address what is important to them.

CHAPTER 12 - PERIPHERAL VASCULAR SYSTEM ASSESSMENT

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[3] Canadian Black Nurses Alliance
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[5] Trillium Health Partners

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Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgement.
4. Integrate health promotion interventions into actions.
5. Integrate an inclusive approach to peripheral vascular assessment.

Introduction to the Peripheral Vascular System

The peripheral vascular system (PVS) is a continuous network of blood vessels that carry oxygenated blood away from the heart to the periphery and carry deoxygenated blood back to the heart and to the lungs for reoxygenation. This system is important in the perfusion and oxygenation of tissues in the periphery. If this system is not functioning properly, perfusion issues can arise including **hypoxia** and tissue damage.

Assessment of the PVS provides information about the functioning of this system and cues that may require action.

Peripheral Vascular System Components

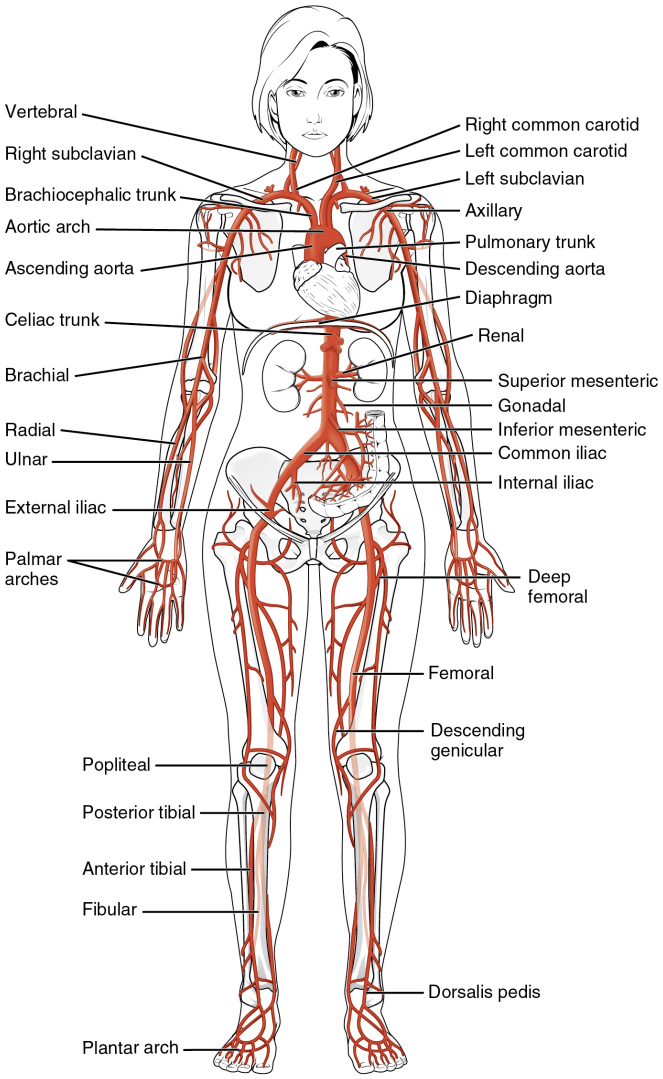
The main components of the PVS (see **Table 1** and **Figures 1** and **2**) include:

- **Arteries**: vessels that carry blood away from the heart to the periphery. Blood in the arteries is referred to as arterial blood. The multiple layers of the arteries are strong and elastic and can dilate (expand in circumference) and recoil (decrease or return to normal size) in relation with cardiac **systole** and **diastole**. These high-pressure vessels dilate when the heart contracts and pumps blood out into them and then recoil to push blood through the arteries, creating a wave of blood through the vessels (felt as a pulse).
- **Veins**: vessels that carry blood back to the heart from the periphery. Blood in the veins is referred to as venous blood. The walls of these vessels are thin in comparison to arteries but have good stretching capacity, so they can acclimate to larger volumes of fluid (blood) when needed. Veins are low-pressure vessels because they are further away from the heart than arteries. Cardiac systole (contraction of the heart) does not assist with the forward movement of venous blood the way it does with arterial blood. Rather, forward movement of venous blood is mainly achieved through contraction of the skeletal muscles surrounding these veins and **intraluminal valves** in the veins that maintain unidirectional blood flow and prevent backward flow of blood.
- **Capillaries**: small blood vessels that connect the arteries to the veins. Their main function is to facilitate the exchange of materials between blood and body tissues (e.g., muscles, kidneys, liver). They deliver blood and its components (nutrients and oxygen) to tissues throughout the body and transport waste products.

You have already learned about the anatomy and physiology of the PVS assessment: see this video for a quick overview: https://youtu.be/v43ej5lCeBo

Table 1: Comparison of arteries and veins. (Image from Anatomy and Physiology [on OpenStax] by Betts et al., used under a CC BY 4.0 international license. Download and access this book for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction)

CHARACTERISTIC	ARTERIES	VEINS
Direction of blood flow	Conducts blood away from the heart	Conducts blood toward the heart
General appearance	Rounded	Irregular, often collapsed
Pressure	High	Low
Wall thickness	Thick	Thin
Relative oxygen concentration	Higher in systemic arteries Lower in pulmonary arteries	Lower in systemic veins Higher in pulmonary veins
Valves	Not present	Present most commonly in limbs and in veins inferior to the heart


Vertebral
Right subclavian
Brachiocephalic trunk
Aortic arch
Ascending aorta
Celiac trunk
Brachial
Radial
Ulnar
External iliac
Palmar arches
Popliteal
Posterior tibial
Anterior tibial
Fibular
Plantar arch
Right common carotid
Left common carotid
Left subclavian
Axillary
Pulmonary trunk
Descending aorta
Diaphragm
Renal
Superior mesenteric
Gonadal
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Common iliac
Internal iliac
Deep femoral
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Descending genicular
Dorsalis pedis

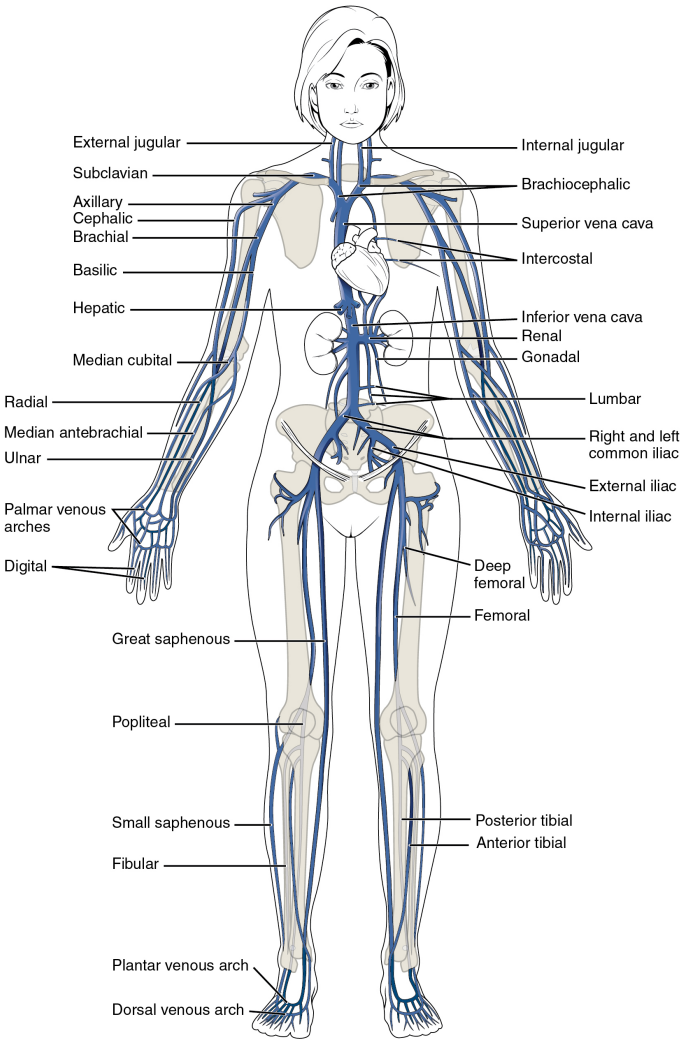

Figure 1: Peripheral vascular system anatomy. (Image from Anatomy and Physiology [on OpenStax] by Betts et al., used under a CC BY 4.0 international license. Download and access this book for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction)

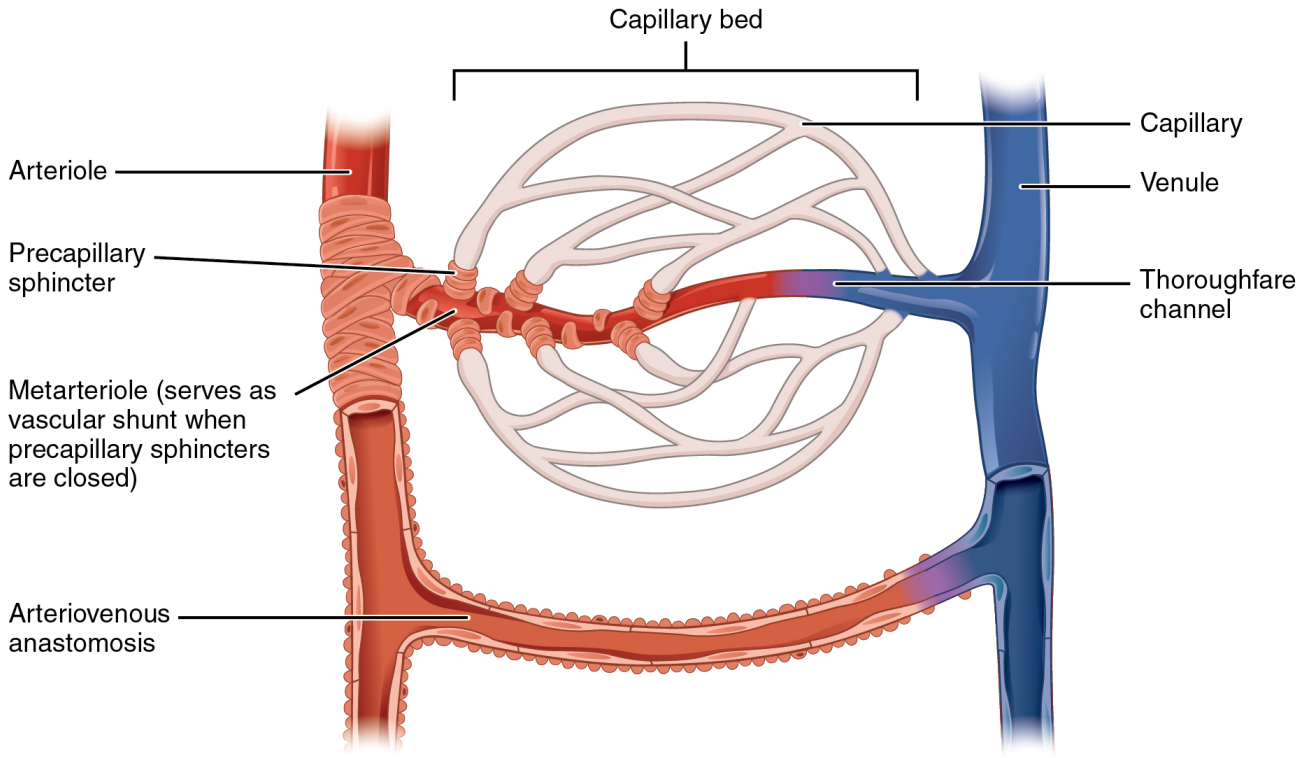

Figure 2: Capillaries. (Image from Anatomy and Physiology [on OpenStax] by Betts et al., used under a CC BY 4.0 international license. Download and access this book for free at https://openstax.org/books/anatomy-and-physiology/pages/1-introduction)

Clinical Tip

The PVS is interconnected with many other body systems, so it is rarely assessed in isolation. When attempting to make sense of cues, nurses commonly assess other body systems including cardiovascular, integumentary, lymphatic, and musculoskeletal. See **Figure 3** for related systems. For example, the PVS might be assessed along with a cardiovascular assessment to assess perfusion and also with the musculoskeletal system to assess potential blood flow interruptions. The PVS is also closely related to the lymphatic system and connected via the capillaries. In addition, many PVS conditions affect the skin, thus the integumentary system is often assessed.

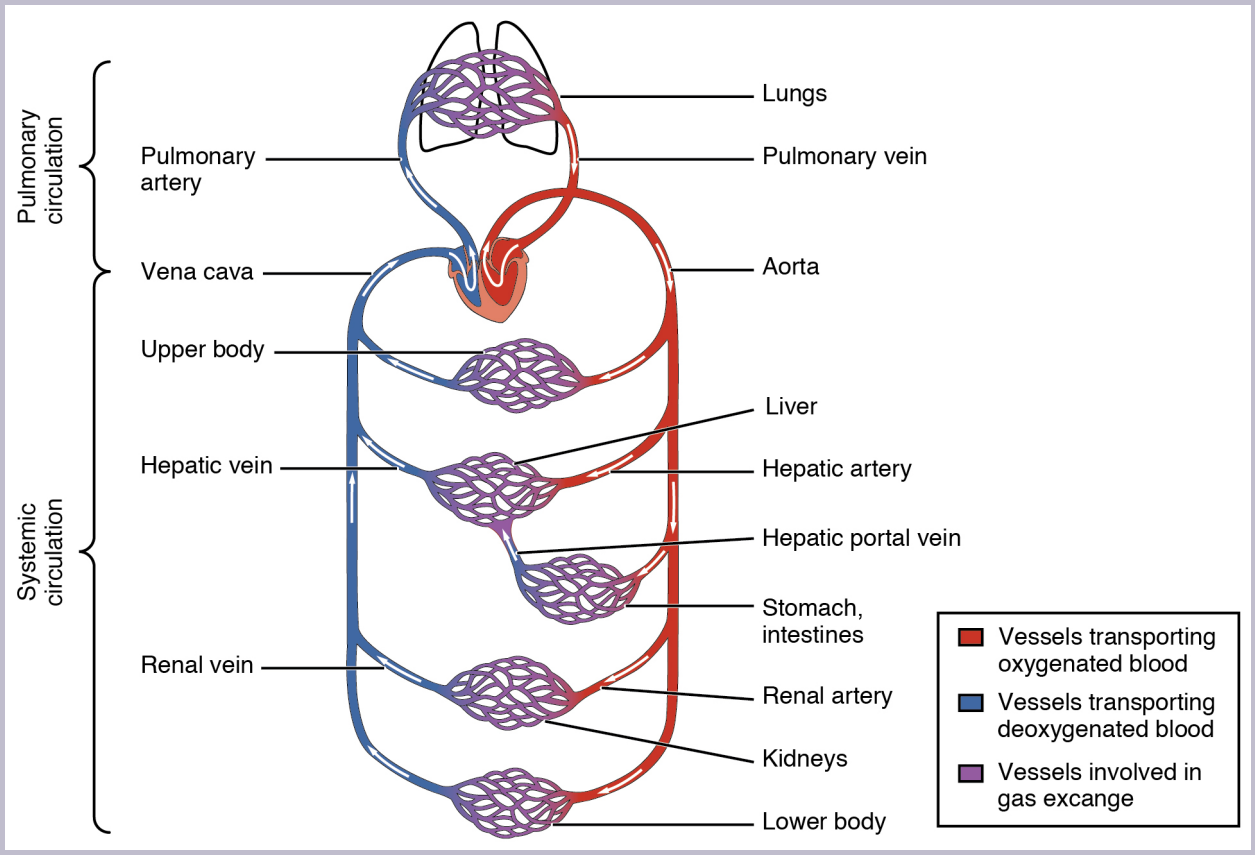

Figure 3: Pulmonary and systemic circulation.

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Activity: Check your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1180#h5p-91

Subjective Assessment

Subjective assessment of the peripheral vascular system (PVS) involves asking questions about the health of the client and symptoms that occur because of pathologies that affect the vasculature of the body. A full exploration of these pathologies is beyond the scope of this chapter, but common problems associated with this system include **peripheral vascular disease** (PVD), **atherosclerosis**, **arteriosclerosis**, **venous stasis**, **varicose veins**, and **ulcers**.

Knowledge Bites

Many peripheral vascular symptoms are related and are caused by the same issue. See **Table 2** for the signs and symptoms of arterial and venous issues and watch **Video 1**:

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1187#oembed-1

Video 1: Arterial and venous issues [5:00]

Peripheral arterial issues occur when there is a problem with perfusion (blood flow is restricted or blocked) in the arteries due to a blockage. This can be caused by **atherosclerosis** (narrowing of the arteries caused by plaque build up on the arterial walls) and **arteriosclerosis** (hardening, stiffening and loss of elasticity of the arterial walls); these are both forms of peripheral arterial disease. When blood flow is restricted, oxygen and nutrients are not efficiently delivered to body tissues. When tissues in the periphery do not get sufficient oxygen-rich blood, hypoxia can develop, leading to pain, numbness, ulcers, fatigue, and other symptoms and signs. However, it's important to note that many clients with arterial disease don't have symptoms, so your assessment of risk factors is important.

Peripheral venous issues are related to venous insufficiency: veins in the periphery (typically the legs) restrict the return of blood to the heart, causing **venous stasis** (collection or pooling of blood) in the peripheral limbs (typically the feet and lower legs). This is often caused when the one-way venous valves are not working properly and allow backflow of blood, as opposed to the forward movement of blood. It can also be caused by blood clots. **Venous hypertension** and varicose veins can arise secondary to venous insufficiency and venous stasis (Anwar et al., 2021). **Varicose veins** (see **Figure 4**) are dilated, bulging, and twisted veins that can be superficial (observed on the skin's surface) or deep within the leg and not visible upon inspection. You may hear the term tortuous veins, which refers to twisted veins. Varicose veins can have a genetic component and can also have primary causes that are relatively unknown (Anwar et al., 2021). Some varicose veins are painful and depending on the associated cause may result in blood clots. Another venous issue is **spider veins** (**Figure 5**),

which appear as small flat dark red, blue, or purple venous patterns close to the surface. Spider veins can cause body image issues, but they are not painful and are not related to serious problems such as blood clots.

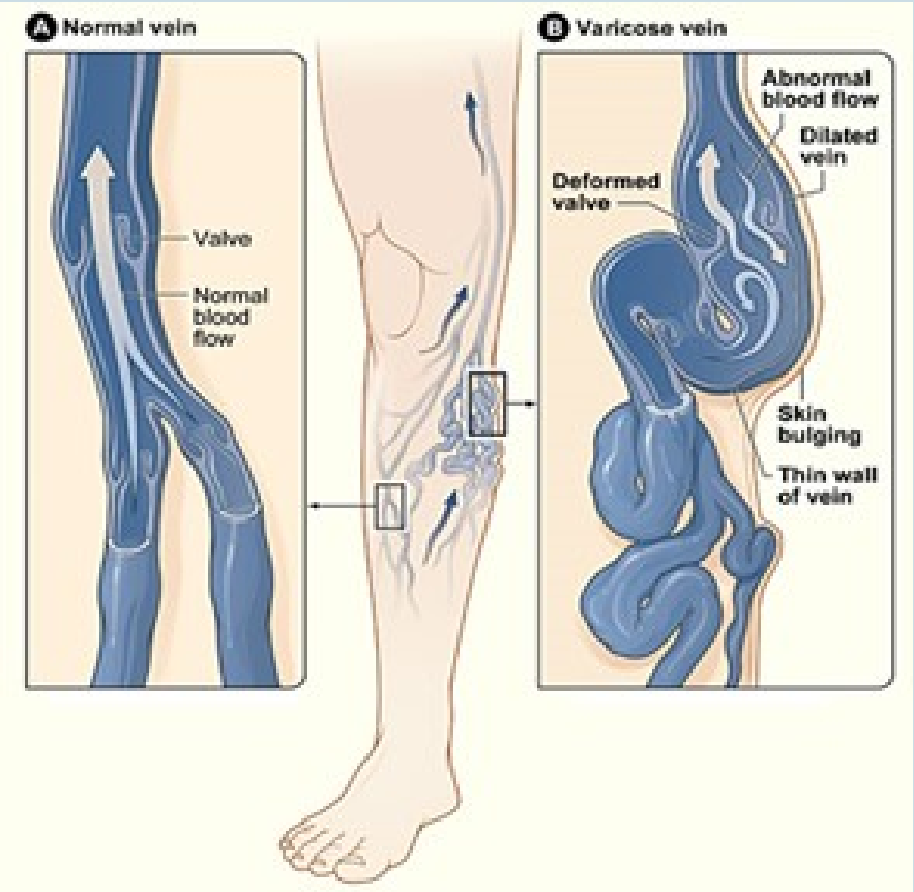

Figure 4: Comparison of a normal and varicose vein.

(Attribution: Photo by National Heart Lung and Blood Institute. – Varicose veins., Public Domain, https://commons.wikimedia.org/w/index.php?curid=6885995)

Figure 5: Spider veins.

Table 2: Venous and arterial issues signs and symptoms.

Venous issues

- Dull achy pain, tiredness, and a heavy and full feeling in the legs (typically worse toward end of day and when standing).
- **Edematous** feet and legs including **pitting edema**.
- Warm skin temperatures in feet and legs.
- Coarse and thickened texture with flaky skin.
- Erythema, hyperpigmentation, and brownish/yellowish skin discolouration. The discolouration is sometimes referred to as brawny (brown-reddish discolouration). Red blood cells accumulate in the interstitial space and cause hemosiderin staining from the blood leaking out of capillaries.
- Pulses present, but may need to use a Doppler ultrasound device due to the quantity of edema.
- Irregularly shaped ulcers. Although they are often found anywhere on the lower limbs, they are typically on the medial (inside) **malleoli** and medial side of the leg with an exudative base and a shallow depth (London & Donnelly, 2000; Vivas et al., 2016). See **Figure 6**.

Arterial issues

- Sharp leg pain that often increases with activity and is relieved with rest, and leg pain that can get worse when lying down.
- Numbness, tingling, burning, or inability to move or feel the toes and feet.
- Muscle **atrophy**.
- Hair loss in the periphery (legs) particularly related to toes.
- Smooth and shiny skin.
- Cool skin temperatures in feet and legs.
- Pallor and/or cyanosis of skin and nail beds, and **gangrene**.
- Absent pulses or decreased force (weak and thready) of distal pulses in the periphery.
- Ulcers with well-demarcated borders (smooth and round) and typically located on the toes, dorsal side of foot, and shin in which the ulcer is deep and dry (London & Donnelly, 2000; Vivas et al., 2016). See **Figure 7**.

NOTE: Another type of ulcer is a **diabetic ulcer** typically found on the plantar side of the foot. Although they resemble arterial ulcers, their underlying pathophysiology is related to the effects of diabetes (damage to nerve endings and vasculature and decreased sensation in feet).

Figure 6: Chronic venous insufficiency and venous ulcer.

(Attribution: Photo by Ashashyou – Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=122884459)

Figure 7: Arterial ulcer PVD.

(Attribution: Photo by Jonathan Moore – Creating the Ideal Microcosm for Rapid Incorporation of Bioengineered Alternative Tissues Using An Advanced Hydrogel Impregnated Gauze Dressing: A Case Series. The Foot and Ankle Online Journal 1 (9): 2., CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=6886430)

Common symptoms that can be related to the PVS include pain-related sensations, numbness, **skin discolouration** changes, skin temperature changes, edema, and ulcers. See **Table 3** for guidance on the subjective health assessment. Many of the questions in the table align with the PQRSTU mnemonic, but you should probe symptoms in the order of relevance, as opposed to sequentially with the PQRSTU mnemonic.

Ask about any medications the client is taking: name, dose, frequency, reason it was prescribed, and how long they have been taking it.

Also ask questions focused on health promotion. Depending on the context, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on "Health Promotion Considerations and Interventions" is included later in this chapter after the discussion of objective assessment.

Table 3: Guidance on subjective assessment.

Symptoms	Questions	Clinical tips
Pain-related sensations such as sharp pain, sensitivity, cramping, achiness, and numbness in the legs/feet and/or arms/hands. These types of sensations are common with perfusion issues and more often affect the lower limbs. These sensations worsen as circulation is reduced. **Arterial perfusion** issues usually lead to sharp pain and cramping in the lower legs and feet, as well as numbness and sensitivity in the feet and toes. Pain-related sensations with **venous issues** often include achiness and a heavy feeling.	Do you currently have or have you recently had any pain, discomfort, tenderness, numbness, sensitivity, and cramping in your feet or legs? Additional **probes** if the response is affirmative: Region/radiation: Where is the pain located? Does it move around, or do you feel it anywhere else Quality/quantity: Can you describe what it feels like? How bad is it? Severity: Can you rate it on a scale of 0 to 10, with 0 being no pain and 10 being the worst pain you have had Provocative/palliative: What makes it better? What makes it worse? Is it brought on by activities such as walking? If so, how long can you walk before the pain begins? Have you noticed a reduction in the amount of activity that you can do before the pain begins? Timing/treatment: When did the pain begin? Does it begin suddenly or gradually? Is it constant or intermittent? If intermittent, how long does it last for? Does it occur at night when you are in bed? Have you tried treating it with anything? Understanding: Do you know what is causing it? What do you think is causing it?	Use the client's words when probing. For example, they may refer to sensations as "tenderness" or "pain." **Claudication** is a type of pain that happens with activity and is caused by lack of oxygen to the tissues. It is typically related to arterial insufficiency and can be felt in the feet, buttocks, calves, and thighs. This type of pain is often relieved with rest. For example, it may be an intermittent pain that subsides within ten minutes when the client rests. It is important to assess how much activity it takes to produce the pain and whether the amount of activity that exacerbates the pain has changed recently. Pain-related sensations may have a peripheral vascular or musculoskeletal or neurological cause. If you suspect peripheral vascular issues, you should assess impact on circulation: skin temperature and distal pulses (more information is provided later in the objective assessment section). Numbness and tingling sensations can be neurological-related as a result of damage to or pressure on the peripheral nerves.

Skin discolouration and **skin temperature changes** in the distal portions of the limbs. PVD can cause changes in skin colour (cyanosis, erythema, pallor) and skin temperature (coolness, warmness).	Have you noticed any changes in skin colour or skin temperature in your legs or arms? If the answer is affirmative, ask the client to describe the change. Additional **probes** if the response is affirmative: Region/radiation: Where is it located? Is it anywhere else? Quality/quantity: Can you describe what it looks like or feels like? How bad is it? Provocative/palliative: What makes it better? What makes it worse? Timing/treatment: When did you notice it? Is it constant or intermittent? If intermittent, how long does it last for? Have you tried treating it with anything? Have you sought treatment for it? Is it affected by position change (e.g., standing all day or elevating your feet? Is it worse at the end of the day? Understanding: Do you know what is causing it?	The type of change in skin colour and temperature change can help you determine whether this is an arterial or venous issue. As a reminder, see **Table 3** above for skin changes associated with arterial and venous issues. **Gangrene** is the death of tissue. It can occur when tissue does not receive oxygen supply as a result of occlusion in the arterial vasculature. It can happen in any part of the body but when associated with peripheral arterial disease, it is usually first observed in the toes, feet and lower limbs. The skin becomes darker in colour and can have shades of dark green and black. Gangrene requires immediate treatment to prevent further tissue damage. Sometimes amputation is required with advanced gangrene.

Edema is swelling that occurs from excess fluid in the interstitial space. It is sometimes described as a heavy feeling by clients. It is most easily noticed in peripheral locations such as the feet and legs because gravity pulls the fluid downward into these dependent positions, but it may also be observed in the sacrum, abdomen, hands, and arms. **Dependent edema** is a type of edema that is worse while standing or when the legs/feet are below the heart level and improves when legs/feet are elevated (i.e., when lying down with legs/feet above the heart level). A common cause of peripheral edema in the older population is venous insufficiency, which is associated with dependent edema.	Have you noticed any swelling or puffiness in your feet or ankles (or any other areas)? Have you noticed that your shoes fit more tightly? Additional **probes** if the response is affirmative: Region/radiation: Where is the swelling? Have you noticed it anywhere else? Timing: When did the swelling begin? Is it worse at a particular time of day? Provocative/palliative: Does anything make the swelling worse? Does anything make it better? Is it affected by position change (e.g., when standing or when legs are elevated)? Is it worse when you have been standing for a long period? Other: Have you noticed any associated colour changes to the skin? Do you have difficulty walking? Have you noticed any skin ulcers on your feet or legs? Have you noticed any recent and rapid weight gain (e.g., in the last week)?	Assess the timing of the edema: is it acute or chronic and is it unilateral or bilateral? This will help you focus your questioning. If it is acute and unilateral, it may be a localized issue such as **deep vein thrombosis** (DVT) or an injury. If it is chronic, it is more likely to be a systematic issue. Bilateral edema can also be associated with venous insufficiency. **Diabetes** that is not well controlled can also cause bilateral edema due to vascular damage caused by high blood glucose levels, resulting in reduced blood circulation. Edema and **rapid weight gain** are sometimes related. Rapid weight gain can be suggestive of increased fluid retention (leading to edema) and is often associated with heart failure. A 2–3 lb (0.9– 1.3 kg) weight increase in 24 hours is a cue that requires immediate action. Compression stockings are often prescribed for leg edema. These are fitted elastic stockings that apply a certain amount of pressure to the leg. When leg edema is associated with venous insufficiency, it is often recommended to elevate legs and feet. These therapeutic treatments help improve blood flow and prevent pooling of blood in the legs.
Ulcers are open sores on the skin. Initially, these sores are often caused by an injury to the skin, even a minor injury. They are slow to heal. Because ulcers are open to the air, they can act as an entry point for bacteria and can become infected and increase in size.	Have you noticed any sores on your legs or feet that are slow to heal? Additional **probes** if the response is affirmative: Region/radiation: Where are they located? Have you noticed them anywhere else? Quality: What do they look like? Is the sore open? Are the sores wet or dry? Do you notice a discharge? If so, what colour is it? Timing: When did the sore begin? Do you know how it developed? Treatment: Have you treated it with anything? Understanding: Do you know what is causing it?	When a client reports a leg ulcer, it is important to perform a focused peripheral vascular assessment including an objective assessment. Leg ulcers that are slow to heal are often related to peripheral venous disease. Other causes include peripheral arterial disease and diabetes. Your assessment will help you determine the type of ulcer and assess the risk for infection.

Other peripheral vascular related symptoms can include fatigue, weakness, hair loss on legs, shiny skin, and erectile dysfunction.	Have you experienced fatigue? (Ask about weakness, hair loss on the legs, shiny skin, erectile dysfunction). Use variations of the PQRSTU mnemonic to assess these symptoms further if the client's response is affirmative.	These symptoms can be related to other body systems and non-peripheral vascular issues. If you suspect a PVD, it is important to do a focused assessment.
Personal and **family health history** of PVD, **coronary artery disease**, high blood pressure, hypercholesterolemia, and diabetes. Each of the above conditions are risk factors for PVD. Coronary artery disease and PVD occur as a result of atherosclerosis.	Do you have any chronic conditions or diseases (e.g., personal and/or family health history of PVD, coronary artery disease, high blood pressure, hypercholesterolemia, or diabetes)? Is there a familial history of any of these conditions or diseases? If the client's response is affirmative, begin with an open-ended probe: Tell me about the condition/disease? Other questions might include: Timing: When did you begin experiencing symptoms related to this condition? When were you diagnosed? Are the symptoms constant or intermittent? Quality/quantity: How does it affect you? What symptoms do you have? How bad are the symptoms? Treatment: How is it treated? Has this treatment helped? Have you had any surgeries? Do you take medication? If so, is the medication effective or do you experience any side effects? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Other: Tell me about living with this condition?	The biological and non-biological nature of family may be important to explicate when asking questions, considering that the risk factors may be influenced by genetics and/or culture. These assessment questions will allow you to gain a better understanding of the client and relevant nursing interventions and education. Although there is a genetic role to some PVDs, it is also important to consider culture in terms of family traditions and practices which can have a large role to play (e.g., eating habits, activity/exercise, smoking). Some cases of high cholesterol may involve a genetic component. Familial hypercholesterolemia is an inherited condition (the gene is present at birth) that leads to hypercholesterolemia (high levels of cholesterol in the blood) and increases the risk of atherosclerotic plaque buildup.

Contextualizing Inclusivity

The risk of PVD increases with age, particularly for those over the age of 50. Risk factors include sedentary lifestyle, physical inactivity, obesity, high blood pressure, high cholesterol, diabetes, smoking, and diets high in saturated and trans fat, red meat, sodium, and sugar.

While assessing and responding to these risk factors, always use an inclusive approach in conducting your subjective health assessment. Inclusive health assessments should be grounded in social justice: uphold the humanity of all clients in all aspects of care, regardless of their race, ethnicity, gender, sexuality, age, ability, health decisions, and any other factors that makes them who they are. Treat everyone with dignity and recognize that each client is a human being with unique health experiences. Be aware of your biases and use a non-judgemental approach to interviewing.

Priorities of Care

All abnormal symptoms need to be explored and followed up by an objective assessment.

New onset or worsening pain-related symptoms, changes in skin colour and skin temperature, edema, and ulcers need to be fully assessed and reported to the physician or nurse practitioner. Prompt intervention is required with rapid weight gain in a short period of time (e.g., 2–3 lb or 0.9–1.3 kg in 24 hours). These issues should be reported to the physician or nurse practitioner.

With regard to **arterial issues**, you should be attentive to signs and symptoms that may indicate acute ischemia to the limbs: this is a decrease in peripheral perfusion that could threaten the **viability of the affected limb**. These signs and symptoms should be monitored and reported to the physician or nurse practitioner; they are often referred to as **the 5 Ps** (Obara et al., 2022):

- Pain (this could be acute pain in the affected limb and extremity that gets progressively worse).
- Pallor (extremities that become paler than the client's normal skin colour in the affected limb).
- Pulselessness (absent pulses in the affected limb).
- Paresthesia (decreased sensation in the affected limb or a tingling or a numbness sensation).
- Paralysis (inability to move the affected limb).

Additionally, reports of gangrenous tissue (**Figure 8**) require prompt intervention and should be reported to the physician or nurse practitioner.

Figure 8: Gangrene: By Dr. Andreas Settje – This Picture was copied under GFDL from the german PflegeWiki., CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=168739

Activity: Check your Understanding

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Objective Assessment

An objective assessment is usually completed after the subjective assessment, unless symptoms require urgent interventions.

An objective assessment of the peripheral vascular system (PVS) includes:

- Inspection and palpation of hands and arms.
- Inspection and auscultation of abdominal vasculature areas.
- Inspection and palpation of feet and legs.

All assessments should be performed on bare skin. You will need a penlight and a stethoscope.

Be aware of the environmental temperature in the room and the temperature of your hands. Room temperatures are not easily modified, so you should only expose the body part(s) you are assessing. Try to warm your hands before placing them on the client's body. Don gloves if you observe skin that is not intact.

Ensure the client is positioned in the best way to assess the arms, abdomen, and legs. You will usually begin with the client seated on the side of the exam table with legs or feet dangling or in the high-Fowler's position. If you are assessing a young child or newborn, you could ask someone (e.g., care partner, healthcare provider, parent) to hold them on their lap or on the exam table.

When assessing the PVS, you will usually assess arterial and venous sufficiency. Your findings from the objective assessment, along with those from the subjective assessment, will provide cues about whether any issues are arterial or venous related. Recall **Table 3** from the Subjective Assessment section.

Clinical Tips

Trauma-informed approach: Always use a **trauma-informed approach**. This is particularly important considering that areas of the abdomen and legs will be exposed. Don't assume who may have experienced trauma: it can happen to anyone, regardless of gender, age, or socioeconomic/educational level. Trauma is also subjective and personal to each individual; trauma for one person might not be trauma for another.

You could start by asking the client if they would like a family member or friend or another healthcare provider present. Always maintain privacy by closing the door and/or curtains and using draping. Ask permission to touch and explain what you are going to do so the client knows what to expect. If relevant, ask permission to touch any mobility aids and prosthetics; the client may view these as an extension of their body and part of their self-identity.

What if pulses are not palpable? If a pulse is not palpable in the distal most aspect of the limb, you should assess the next proximal pulse (or medial). For example, if you can't feel a radial pulse, you might assess the brachial or ulnar pulses. It can also be helpful to use a **Doppler ultrasound device** (often just referred to a doppler) when you are struggling to feel a pulse and are concerned about perfusion into the limbs. This is a

handheld device that allows you to hear the whooshing sound of the pulsatile blood flow. See **Figure 8** and **Video 2** for use of a Doppler device.

Figure 8: Doppler ultrasound device. (Photo by Juan Manuel Montejano Lopez on Pexel.)

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Video 2: Use of a Doppler ultrasound device [1:51]

Contextualizing Inclusivity

Objective assessment involves assessing skin discolouration. Two common kinds of skin discolouration related to peripheral vascular assessment are cyanosis and pallor.

- **Cyanosis** involves an increase in **deoxygenated hemoglobin** in the blood (**hypoxemia**). Reduced oxygen makes blood a darker red colour. When this blood is circulated to the limbs, the tissues receive inadequate oxygen (**hypoxia**) and as result the skin becomes dull in colour and the skin and nail beds change in colour. The skin can become a variation of blue/purple and grey/green shades. In people with dark skin, cyanosis appears as a dark purple and sometimes a grey colour, but it is difficult to see with early cyanosis. People with yellowish tones to their skin can have a greyish/green shade (Lewis,

2020; Sommers, 2011), and people with lighter skin tones tend to develop a dusky bluish/purple shade (Lewis, 2020). Acrocyanosis is cyanosis that happens in the extremities (feet and hands). Newborns can be born with acrocyanosis, but it should disappear after a couple of hours and should be monitored.

- **Pallor** occurs when there is **decreased perfusion to the limbs**. In clients with darker skin, it is best assessed on the palms of the hands and the nail bed, as these areas are already paler in colour; with pallor, these areas become paler than the client's normal skin colour (Lewis, 2020). This is also true for clients with lighter skin colour, but with these clients you will also observe paler toes and feet. In people with lighter brown skin, you might observe pallor as a yellowish shade (Lewis, 2020).

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Inspection and Palpation of Hands and Arms

Peripheral vascular issues usually affect the lower limbs (feet and legs) more than the upper limbs, but you should begin a complete peripheral vascular assessment with the hands and arms because most clients feel comfortable exposing these areas. However, you might focus on a particular area such as the legs if the assessment is related to a physical trauma and you are concerned about perfusion to that limb. Assessment of the hands and arms can be done while the client is sitting on the side of the exam table or in a high Fowler's or supine position.

Steps for **inspecting and palpating hands and arms** include:

1. **Inspect the skin** of the hands and arms for colour (including nails), edema, limb circumference discrepancy, lesions, presence of ulcers, and venous patterns. Ask the client to place their hands and arms in front of them with their palms facing downwards, and then turn their palms upwards. Next, **palpate skin temperature** using the dorsa of your hands from the shoulders down the arms to the fingertips (see **Video 3**).
    - Normally, the skin colour is consistent and skin temperature is warm to touch and equal bilaterally from shoulders to fingertips, although the fingertips can be slightly cool to touch. Normally, there are no signs of cyanosis or pallor in the nails or fingertips. Nails are translucent in colour with a slight pinkish tone underneath. Remember that the palms of hands are a lighter skin colour, particularly among people with darker skin tones. Normally, there is no edema, no ulcers, no lesions and circumference is equal bilaterally.
    - Describe the location, size, and quality of any abnormal findings such as skin discolouration, signs of cyanosis, pallor, venous pattern, and presence of ulcers or lesions. With regard to quality, for example, you should note what the discolouration and the ulcers look like. Describe the location and quality of abnormal skin temperatures, particularly if asymmetrical. If you notice any discrepancy in terms of unequal limb circumference, measure with a flexible tape measure at the same location on both limbs to ensure accuracy. Note the location of any edema.

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Video 3: Palpation of skin temperature [0:17]

2. **Test capillary refill** on two or three fingernails of each hand at heart level (see **Video 4**). Start by applying pressure with your own finger to the client's nail; this causes the nail to blanch (become paler in colour). Apply the pressure for 5 seconds and then release and observe the return in colour.
    - A normal finding when assessing capillary refill is colour return that is equal to or less than 3 seconds when assessing capillary refill.
    - Colour return that is greater than 3 seconds is described as sluggish return for capillary refill (or slow capillary refill time), and this finding suggests that there may be issues with oxygenated blood perfusion (this may be related to peripheral vascular and/or cardiac and/or respiratory issues). Capillary refill time can be slower if the client's hands are cold; if the client's hands are cold from being outside or from washing in cold water, ask them to warm their hands to ensure an accurate reading.

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Video 4: Testing capillary refill [0:45]

3. **Palpate the radial pulses** bilaterally and simultaneously, and then palpate the **brachial pulses** (see **Figure 9**). Assessing the pulses simultaneously allows you to compare the strength of pulsation; recall the 4-point scale for force. Assessing pulses for the presence, force, and symmetry of force provides information about perfusion (flow of blood) to the limbs. If these pulses are not palpable, you can use a Doppler ultrasound device to assess pulsatile blood flow.

    - Normally, pulses are present, 2+ force and equal bilaterally.
    - Decreased pulse force or absent pulses can be associated with arterial insufficiency. A decreased pulse force (1+) can be described as "thready," which refers to a weak pulse that is difficult to feel.

Figure 9: Palpation of radial and brachial pulses.

4. Note the **findings**:

    - Normal findings might be documented as: "From shoulders to fingertips: equal limb circumference with no edema or ulcers, and skin colour consistent. Good capillary refill. Radial and brachial pulses 2+ force and equal bilaterally. Skin temperature warm to touch and equal bilaterally from shoulders to fingertips."
    - Abnormal findings might be documented as: "Pallor in fingernails, cool to touch in fingers bilaterally, sluggish

capillary refill 4–5 seconds, 1+ radial pulses equal bilaterally."

Activity: Check your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Inspection and Auscultation of Abdominal Vasculature

Inspection and auscultation of abdominal vasculature is best performed with the client in a supine position with their head on a pillow. You will be assessing the area over the abdominal aorta, renal arteries, iliac arteries, and femoral arteries (**Figure 10**). Draping is important because you will need to expose the abdomen and groin area.

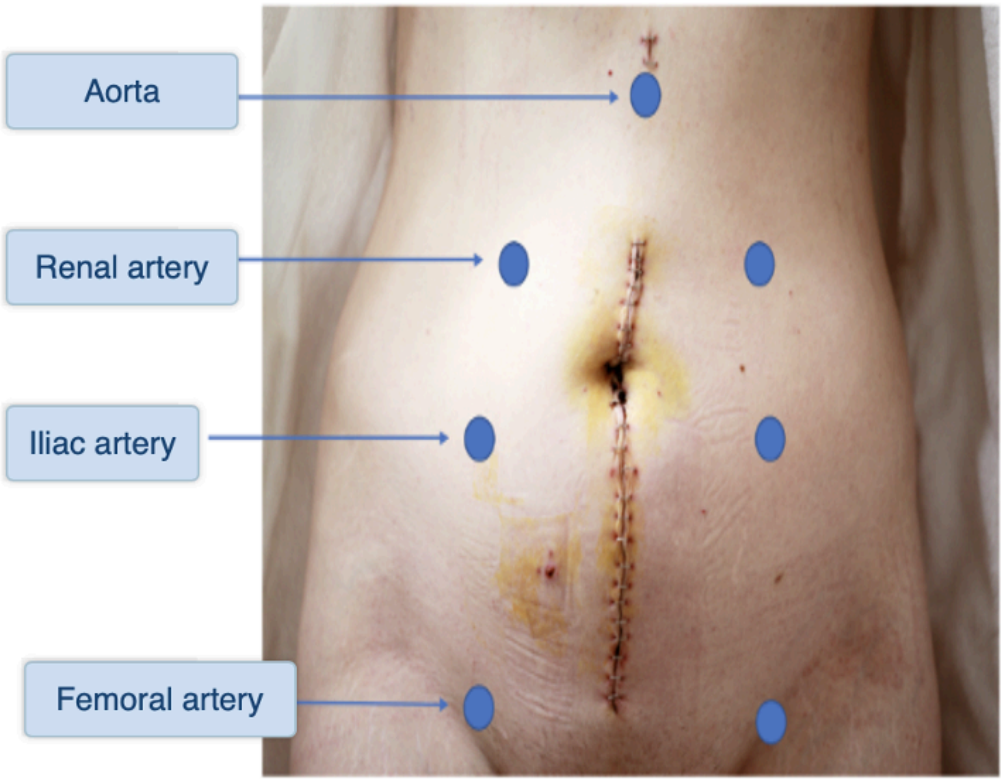

Figure 10: Abdominal vasculature. (Attribution: Adapted photo by Alexander Grey on Unsplash, CC BY-NC 4.0)

Steps for assessing the **abdominal vasculature** include:

1. **Observe for pulsations** over the areas of the abdominal vasculature. Use **tangential lighting** with a penlight; this will help highlight any small imperfections/shadows, which accentuate visible pulsations.
    - Normally, no pulsations are present. Pulsations may be present with a client who has a thin abdominal wall, but these are never considered normal in a client who has increased adipose tissue.
    - Note the location of any pulsations.
2. **Auscultate** over the abdominal vasculature (see **Figure 10** and **Video 4**) using the bell of a cleansed stethoscope. Use slightly firmer pressure than when you use the diaphragm over the lungs or intestines. Listen for vascular sounds related to the flow of the blood through the arteries. Placing your stethoscope in each location for about

2-3 seconds is usually sufficient.

- Normally, you won't hear any vascular sounds because unobstructed blood flow through an artery is silent.
- Note the location of any vascular sounds. Partial obstruction of an artery creates turbulent blood flow, leading to vascular sounds such as a bruit: blowing/swooshing noises. Atherosclerosis can cause stenosis (narrowing of the vessel), leading to a bruit. If you hear a bruit, notify the physician or nurse practitioner while you keep the client still and continue to monitor them. Do not palpate the abdomen if a bruit is present, as this finding suggests that blood flow is already compromised.

3. Note the **findings**:

- Normal findings might be documented as: "No pulsations observed or bruits heard over the abdominal aortic artery and the renal, iliac, and femoral arteries."
- Abnormal findings might be documented as: "Pulsation observed over aortic artery with a bruit noted."

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Video 4: Auscultation of the abdominal vasculature [1:27]

Priorities of Care

If you hear a bruit, do not palpate the area. Ask if the client has experienced any recent pain in their chest, back, abdomen, or groin, and if they have ever been diagnosed with an **aneurysm**. You should also complete a primary survey and measure blood pressure in both arms. Notify the physician and nurse practitioner of the findings. Until an aneurysm is ruled out or assessed, it is best to keep the client in bed, at rest, and under continuous monitoring.

Activity: Check Your Understanding

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1197#h5p-94

(Attribution: Activity Photo by Alexander Grey on Unsplash)

Inspection and Palpation of Feet and Legs

This assessment can be done while the client is supine with their head on a pillow. The client will need to remove their shoes and socks and uncover the legs from the upper legs down to the feet. You should inspect the anterior as well as the posterior side of the legs; ask the client to roll on their side to do so.

Steps of **inspection and palpation of legs and feet** include (see **Video 5** for technique):

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Video 5: Inspection and palpation of feet and legs (showing technique) [1:44]

1. **Inspect the legs and feet for colour** and **hair distribution**. Remember that clients will have different skin tones: assess abnormal findings related to skin discolouration in comparison to the rest of the skin. In addition to inspecting the legs, it is important to assess the toes for hair distribution, because hair loss associated with **peripheral arterial disease** (PAD) often begins at the toes and moves upward.

    - Normally, the skin colour is consistent and hair distribution is equal. Remember that the plantar side of the feet are lighter in colour, particularly among clients with darker skin tones.
    - Describe any abnormal findings such as skin discolouration (e.g., colour and location) and any uneven hair distribution, particularly if asymmetrical. Some clients remove leg hair with hair laser removal, waxing, or shaving; this is not considered an abnormal finding related to hair distribution.

2. **Inspect (and palpate) the legs** and **feet for size** and **edema**.

    - Normally, the upper and lower leg circumference and ankle circumference are equal bilaterally at each site.
    - If you suspect a size difference of the ankle, calf or upper leg circumference, use a tape measure to accurately note the size on both limbs.
    - If you observe edema, assess for pitting edema: an indentation that remains after applying pressure over the location. See **Figure 11** for a picture of pitting edema. Apply pressure with the pad of your finger on a distal location (feet and medial malleolus) for about 3-5 seconds and then release. If you observe an indentation (a "pit"), note the location and how long the indentation remains. If you observe it in a distal location, assess proximal such as over the tibia. Always check with the unit you work on about the scale used to evaluate pitting edema; scales are usually 1 to 4 (see **Figure 12**). Assess the pit depth and the rebound time (the time for the indentation to disappear). Pitting edema is often rated as 1 mild, 2 moderate, 3 severe, and 4 very severe.

Figure 11: Pitting edema.

Grade 1	0–2 mm indentation; rebounds immediately.
Grade 2	3–4 mm indentation; rebounds in < 15 seconds.
Grade 3	5–6 mm indentation; up to 30 seconds to rebound.
Grade 4	8 mm indentation; > 20 seconds to rebound.

Figure 12: Pitting edema scale. (Attribution, taken from https://wtcs.pressbooks.pub/nursingskills/ CC-BY 4.0.)

3. **Inspect the feet and legs** for **lesions** and **ulcers**. Ensure you inspect between the toes and on the plantar side of the feet.

    - Normally, no lesions or ulcers are present.
    - Describe the location and quality of any lesions and ulcers.

4. **Palpate skin temperature** using the dorsa of your hands from the anterior side of the upper legs down to the toes. Use your fingertips to assess skin texture.

    - Normally, the temperature is warm to touch and equal bilaterally. The feet are sometimes slightly cooler than the upper legs, but they should be equal bilaterally. The skin texture is normally smooth.
    - Describe any asymmetry in skin temperature, extreme temperatures, and skin textures such as dry, flaky skin.

5. **Inspect the nails for colour** and **test capillary refill** on two or three toenails of each foot. Start by applying pressure with your own finger to the client's nail; this causes the nail to blanch (become pale in colour). Apply the pressure for 5 seconds and then release and observe the return in colour.

    - Normally, the nails are translucent in colour with a slight pinkish tone underneath. Colour should return within 3 seconds or lesswhen assessing capillary refill.
    - Describe any pallor or cyanosis of the nails. A sluggish return for capillary refill suggests that there may be issues with oxygenated blood perfusion, which might be related to peripheral vascular issues (and/or cardiac and/or respiratory issues).

6. **Gently palpate the dorsalis pedis pulses** bilaterally and simultaneously, and then **palpate the posterior tibial pulses** (see **Figure 13** and **Video 6**). Simultaneous assessment helps you compare the force (strength of pulsation); recall the 4-point scale for pulse force. Assessment of pulses for presence, force, and symmetry of force provides information about perfusion (flow of blood) to the limbs. If you are concerned about blood flow into the extremities (e.g., neither the dorsalis pedis or posterior tibial pulses are palpable on one foot), use a Doppler device to assess blood flow.

    - Normally, pulses are present, 2+ force and equal bilaterally.
    - Decreased pulse force or absent pulses can be associated with arterial insufficiency. A decreased pulse force (1+) can be described as "thready," which is a weak pulse that is difficult to feel.

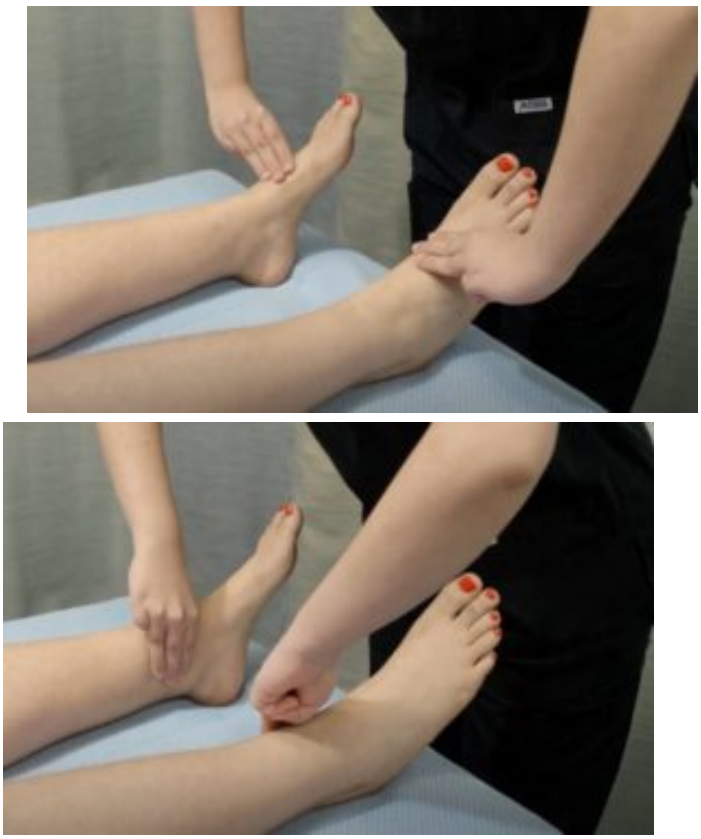

Figure 13: Location of dorsalis pedis and posterior tibial pulses.

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Video 6: Palpating dorsalis pedis and posterior tibial pulses [0:30]

7. Palpate the **popliteal** (**Figure 14**) and **femoral pulses**. For the popliteal pulse, slide your fingers behind the knee just medial to the the middle of the popliteal fossa (typically located slightly lateral to the medial tendon). While palpating, push up with pressure, because this pulse is high up in the fossa and can be difficult to palpate. For the femoral pulse, palpate inferior to the inguinal ligament less than halfway from the pubis bone to the anterior superior iliac spine. While palpating, press firmly up into the bone. If you do not feel a pulse right away, reduce the pressure slightly.

    - Normal and abnormal findings are the same as item 6 above: if you can find a femoral and dorsalis pedis pulse, a non-palpable popliteal pulse is usually not of concern.

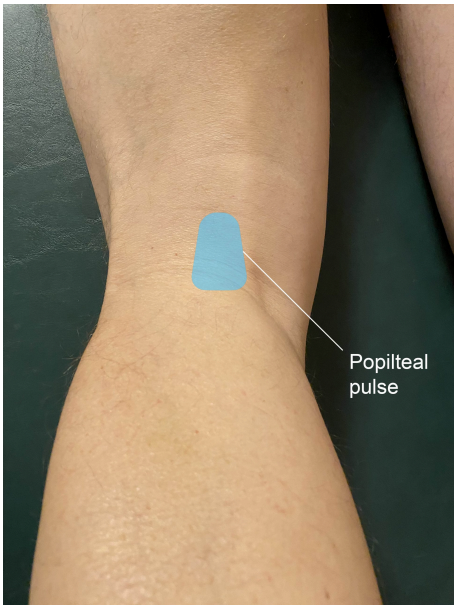

Figure 14: Popliteal pulse.

8. If the findings from the above assessments make you suspect arterial insufficiency, **assess for elevational pallor** and **dependent rubor** (Wennberg, 2013). Elevational pallor is when the extremities become pale when they are raised above the heart level. Dependent rubor is an erythematous discolouration, particularly of the dorsal sides of the toes, when the feet/legs are below the level of the heart (Bahrani & Sladden). **Step 1**: While the client is in a supine position, hold their legs at 45 degrees for about 30 seconds; this action helps push the venous blood back to the heart, and the skin colour is reflective of the sufficiency of arterial blood flow. **Step 2**: Return the client's legs to the table and assist the client into a sitting position with their legs dangling over the edge or into a standing position.

    - During Step 1, the skin colour normally becomes just slightly paler in comparison to the client's normal skin colour (best seen on the sole of the foot), demonstrating good arterial blood flow. During Step 2, the colour of the client's foot normally returns within 10 seconds.
    - Abnormal findings associated with Step 1 include significant pallor in comparison to the client's normal skin colour (best seen on the sole of the foot). Abnormal findings associated with Step 2 are the normal colour of the client's feet taking more than 10–15 seconds to return, as well as dependent rubor. Dependent rubor in combination with other cues (such as claudication) may be associated with PAD.

9. Ask the client to stand so that you can **inspect the legs** and **feet for vascularity**. If the client is unable to stand, you can complete the inspection while they are in a supine position.

    - Normally, you will observe no vascularity or a fine and flat venous pattern. Athletes may have superficial veins.
    - Describe any vascular patterns you observe on the legs and feet, such as varicose veins.

10. Note the **findings**:

    - Normal findings might be documented as: "Skin colour consistent from upper legs to toes, equal limb circumference with no edema or ulcers. No presence of cyanosis or pallor on nails. Good capillary refill. Dorsalis pedis and posterior tibial pulses 2+ force and equal bilaterally. Skin temperature warm to touch and equal bilaterally from upper legs to toes."
    - Abnormal findings might be documented as: "Pallor in nails, cool to touch in feet and toes bilaterally, sluggish

capillary refill 4-5 seconds, 1+ dorsalis pedis pulses equal bilaterally."

Contextualizing Inclusivity

A large majority of pregnant people have edema in their feet and legs due to increased blood volume and pressure on veins from the growing fetus (Smyth et al., 2015). In addition to edema, the increased volume and pressure on veins can lead to venous insufficiency and varicose veins, in which the blood pools in the feet and legs, particularly when in dependent positions (Smyth et al., 2015). Although edema is a normal part of pregnancy, a pregnant person should be referred to their physician or nurse practitioner if they experience a sudden onset of edema associated with other symptoms such as headache, high blood pressure, and vision changes; these symptoms can be associated with **preeclampsia**.

Knowledge Bites

The **ankle-brachial index (ABI) test** is one test used to assess the presence of peripheral arterial disease. The test is sometimes performed by nurses, but it is usually associated with an advanced practice nursing role.

The ABI can be performed in various ways, so you should receive advanced training in the procedure and always be consistent with your practice.

Begin with the client in supine position at rest (US Preventive Services Task Force, 2018). Measure BP using a Doppler ultrasonic device (Fowkes, 2008). Follow this sequence:

1. Measure BP:
    a. right arm (brachial)
    b. right posterior tibial
    c. right dorsalis pedis
    d. left posterior tibial
    e. left dorsalis pedis
    f. left arm
    g. repeat right arm measurement (average both right arm measurements).
2. Next, calculate an ABI for the right side and an ABI for the left side using the following equation:

highest systolic pressure of the posterior tibial or dorsalis pedis is the numerator (some may average the two)

Highest systolic arm pressure is the denominator (some may average the two)

(Aboyans et al., 2012)

Divide the numerator by the denominator to obtain a ratio, which is the ABI. A ratio of less than 0.9 indicates the presence of PAD (Fowkes, 2008; US Preventive Services Task Force, 2018).

For example, if the ankle pressure is 122 and the brachial systolic is 148, the ABI is 0.82, which is suggestive of peripheral arterial disease.

Priorities of Care

An urgent priority of care is signs suggesting **absent or severely reduced arterial blood flow** such as absent or diminished pulses, which are usually accompanied by sluggish capillary refill, cool limbs, pain, numbness, decreased sensation, and pallor or cyanosis. Assess these if you have not already. If you cannot detect dorsalis pedis and/or posterior tibial pulses, use a Doppler device. Report these findings immediately to the physician or nurse practitioner so that additional intervention can be taken to re-establish blood flow.

Any signs related to **deep vein thrombosis (DVT)** should also be reported to the physician or nurse practitioner. A combination of unilateral leg pain, swelling, warmth, and erythema can be an urgent situation: a DVT may be blocking blood flow. A DVT can loosen from the vessel wall and travel to the lungs, causing a pulmonary embolism that blocks blood flow. Risk factors for blood clots and DVT include advancing age, smoking, oral contraceptives, sedentary lifestyle, obesity, and pregnancy. Other conditions related to DVT include prolonged sitting, immobilization of limbs, fractures, damage to veins, varicose veins, and **sickle cell disease.**

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Health Promotion and Disease Prevention: Considerations and Interventions

When developing health promotion and disease prevention strategies for a healthy peripheral vascular system (PVS), always select an appropriate intervention based on careful consideration of all collected data, both subjective and objective. Subjective data collection should include asking about risk factors, social determinants, and other considerations.

This kind of inquiry should be integrated throughout the assessment. You will ask many probing questions during the subjective assessment phase, but you will also come up with some questions based on your critical reflection of all data collected during the subjective and objective assessments. All of these data will inform your clinical judgement and appropriate health promotion strategies for a specific patient.

Activity

Any activity, including **general daily activity**, **aerobic exercise**, and **strength training**, improves blood flow within the body, lowers blood pressure, and supports the transportation of oxygen throughout the PVS. An active lifestyle and regular exercise lower the risk of vascular diseases. Exercise and participating in social activities can also help reduce stress, which in turn can help lower blood pressure and decrease the risk of peripheral vascular disease (PVD); a sedentary lifestyle with limited activity increases the risk factors that contribute to PVD. **Standing** and **sitting for sustained periods of time** can increase venous stasis and risk of deep vein thrombosis (DVT). For example, DVT can be an issue for some people with lengthy air travel due to the sustained period of sitting and lack of activity.

Guidelines for activity vary based on age and health status. Most people should engage in **about 30–60 minutes of aerobic activity**, five to seven times per week.

Probing questions related to activity might include:

- Tell me about your daily exercise? What activities are you involved in? (Probe about the type and amount each day.)
- Do you have any concerns about your level of activity or exercise? Do you have any limitations to your mobility that affect your activity?
- Do you experience leg pain or cramps when walking? Do you experience a lack of sensation to heat or cold in the extremities?

Collaborate with the client to create an activity/exercise plan that is specific to their needs and goals. Be aware of **your own biases** related to activity/exercise with certain populations such as older clients or clients who may currently live sedentary lifestyles or have mobility issues. Also, recognize that some clients may have concerns about starting an exercise plan: these might include exacerbating pain, fear of falling, mobility issues, and/or a history of previous falls. Try to connect with the client and get to know them and their needs and fears. Start at a **realistic and attainable level**, depending on the client's physical capabilities and energy level, and then begin to increase the time and duration of the physical activity. Many interventions are available to help clients achieve their activity goals: community walking groups, fitness apps, or joining a local gym or group activity. When appropriate, encourage clients to ask family and friends to get active with them: a strong support system can help clients stay active and achieve their health goals. The participACTION website is a helpful resource for activity guidelines. Also, consider activity interventions from a structural health promotion approach: for example, consider the financial costs associated with many resources and the client's financial ability to pay for them.

Diet

A **healthy diet** helps maintain healthy blood vessels of the PVS and decreases the risk of plaque buildup in the blood vessels. A heart-healthy diet of leafy greens, vegetable, fruits, whole grains, nuts, fish, lean meats, low-fat dairy, and monounsaturated fats (e.g., olive oil) helps the body function, controls blood pressure, lowers cholesterol and blood glucose levels, and helps maintain an ideal body weight. In contrast, an **unhealthy diet** of refined sugars, carbohydrates, saturated and trans fats, and high levels of cholesterol and salt can lead to buildup of plaque in the arteries, high blood pressure, obesity, and an increased risk of PVD.

Canada's guidelines now suggest that there are health risks associated with any level of alcohol consumption, although negligible with two drinks or less weekly (Paradis et al., 2022). The current literature indicates that drinking alcohol of any kind does not decrease risks of heart disease, and high levels of consumption increase risk for coronary artery disease, myocardial infarction, heart failure, hypertension, and stroke (Paradis et al., 2022).

Probing questions related to diet might include:

- Tell me about your typical diet? What sorts of food do you eat each day?
- What have you eaten in the last 24 hours? Is that your usual diet?
- Do you have enough money to buy healthy food? Do you pack a lunch or purchase your food when out?
- Tell me about your cultural practices related to diet?

Explore the client's familiarity with **Health Canada's Food Guide** (Government of Canada, 2021) and explain that it can help them guide their food choices: link. However, this guide still includes **Eurocentric elements**, so you should collaborate with the client about its relevance in the context of their cultural food practices. A snapshot of the food guide is now offered in dozens of languages: link and many resources have been developed for Indigenous populations.

Assess the client's lifestyle to understand how it affects their diet and how you can help them adapt to include healthier food choices when possible. Use a **relational health promotion approach** to learn what a healthy diet means to the client and how their environment and the people within it can influence their choices. For example, some clients may choose fast food vendors for lunch due to accessibility (e.g., school or work cafeteria options). Try to help the client find accessible food services or learn how to pack healthy lunches. Issues related to **food security**, and the increasing costs of food globally, has made it difficult to ensure everyone can have a healthy diet. As a nurse, you can **advocate** to ensure the particular needs of each client are being met using the available socioeconomic and environmental resources. Advocacy might include identifying and securing access to resources for clients, as well as political advocacy efforts related to food costs and geographical access to food. By working in partnership with clients, you can create effective interventions that help them achieve a healthy diet.

Smoking

Smoking tobacco has negative effects on the PVS because it can damage blood vessels and increase the risk of atherosclerosis and PVD. Smoking can cause the blood vessels to narrow, which reduces blood flow and the transportation of oxygen to the peripheral areas (e.g., limbs). There has been some recent interest in the health effects of **cannabis use**, but the literature remains inconclusive in terms of peripheral vascular and cardiovascular diseases (Page et al., 2020). Some have suggested that smoking cannabis may lead to arteritis and should be considered in adults younger than 50 years of age who are presenting with signs and symptoms associated with PVD (Cottencin et al., 2010 as cited in Page et al., 2020).

Always use a **culturally inclusive** and **non-judgemental approach** when you are asking about consuming tobacco and cannabis or providing health education. For example, be aware that tobacco plays an important part in traditional

and spiritual practices in many communities, such as some Indigenous communities, where individuals may use it for ceremonial and medicinal purposes (CAN-ADAPTT, 2011).

Probing questions related to smoking tobacco and cannabis might include:

- Do you smoke cigarettes or use any tobacco- or cannabis-related products? If affirmative, ask probing questions such as: How much per day? What type of product do you use (e.g., smoking, vaping, chewing)? For how long? Can you tell me the reasons you began smoking? Have you ever considered quitting smoking?
- If you do not currently smoke, have you ever? If affirmative, ask similar probing questions, including the reason that the client quit.
- Are you exposed to second- or third-hand smoke? If affirmative, ask similar probing questions, including whether the client is still exposed and possible interventions to reduce the risk.

Health education should focus on the client's lifestyle, living situation, and reasons for using tobacco. Interventions related to using safely or quitting should be tailored to each client and could include counselling, cognitive-behavioural therapy, and support groups. You should also consider a relational approach. For example, a client's smoking or second- and third-hand exposure can be influenced by their surrounding environment (e.g., family, friends, workplace).

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Clinical Judgement: Case Study

A 74-year-old white client was admitted to the hospital. The client has a history of heart failure, hypertension, peripheral vascular disease (PVD), and arthritis. The client stated they have a "heavy, dull, achy feeling" in their legs. Skin on the lower legs has a brownish yellow discolouration. No visible veins. Client has +2 pitting edema bilaterally in the lower legs and feet, pulses difficult to palpate due to edema. Legs warm to touch down to toes. Open sore on the lateral malleoli is irregular in shape and shallow, no discharge or smell. Client smokes 3–5 cigarettes a day. Client has been smoking for 40 years and stated they have slowly been decreasing the amount each day for the past year. Client moved to a new community 6 months ago and has not been going out as much because they do not know anyone and has been more sedentary than usual. Client stated their legs usually feel worse at the end of the day and when making dinner if standing too long. Vital signs: R20, P90, BP 140/90, O2 saturation 97%, T 36.1, BMI 34.5.

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Key Takeaways

- The peripheral vascular system (PVS) is a continuous network of vessels that carry oxygenated blood away from the heart to the periphery (arteries) and deoxygenated blood back to the heart and to the lungs for reoxygenation (veins).
- Common symptoms that can be related to the PVS include pain-related sensations, skin discolouration changes, skin temperature changes, edema, and ulcers.
- An objective assessment of the PVS includes inspection and palpation of hands and arms; inspection and auscultation of abdominal vasculature areas; and inspection and palpation of feet and legs.
- Health promotion interventions should be developed in collaboration with the client and focus on what is important to them.

CHAPTER 13 - LYMPHATIC SYSTEM ASSESSMENT

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Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgement.
4. Integrate an inclusive approach to lymphatic system assessment.
5. Integrate health promotion interventions into actions.

Introduction to Lymphatic System

The lymphatic system (see **Figure 1, 2,** and **3** for an anatomical overview) includes lymphatic capillaries, lymphatic vessels, lymph nodes, and other lymphoid tissues. This system plays a valuable role in **fluid balance** and **filtering pathogens** and **waste** such as cellular debris. Assessment of the lymphatic system provides important information about the functioning of this system and potential cues that require further action.

The lymphatic system involves the following processes:

- Fluids and proteins leak from the vascular system into the **interstitial space**. As previously discussed in the peripheral vascular chapter, much of this fluid is reabsorbed back into the venous system.
- Some of the fluid and proteins (including waste and pathogens) in the interstitial space are absorbed by the lymphatic capillaries into the lymphatic system, which becomes lymph (i.e., lymphatic fluid that is rich in proteins).
- The lymph travels along the **lymphatic vessels** so that fluid and proteins can be returned from the lymphatic system into the bloodstream to ensure sufficient blood volume in the cardiovascular system. The lymph is returned to the bloodstream through the right lymphatic duct and the thoracic duct into the subclavian veins. Attached to the lymphatic vessels are hundreds of lymph nodes throughout the body, which filter the lymph and cleanse it.
- Lymph nodes can be found all over the body and are often assessed in the head/neck, axilla, anterior chest, upper arm, and groin areas.

You have already learned about the anatomy and physiology of the lymphatic system, here is a quick overview of how it works: https://www.youtube.com/watch?v=QD9AdNXSQe4

An additional resource is this video: https://www.youtube.com/watchv=I7orwMgTQ5I&list=PL8dPuuaLjXtOAKed_MxxWBNaPno5h3Zs8&index=46

Clinical Tip

The lymphatic system is rarely assessed in isolation because it is closely linked to many other systems including the cardiovascular system, peripheral vascular system, respiratory system, immune system, gastrointestinal system, and musculoskeletal system.

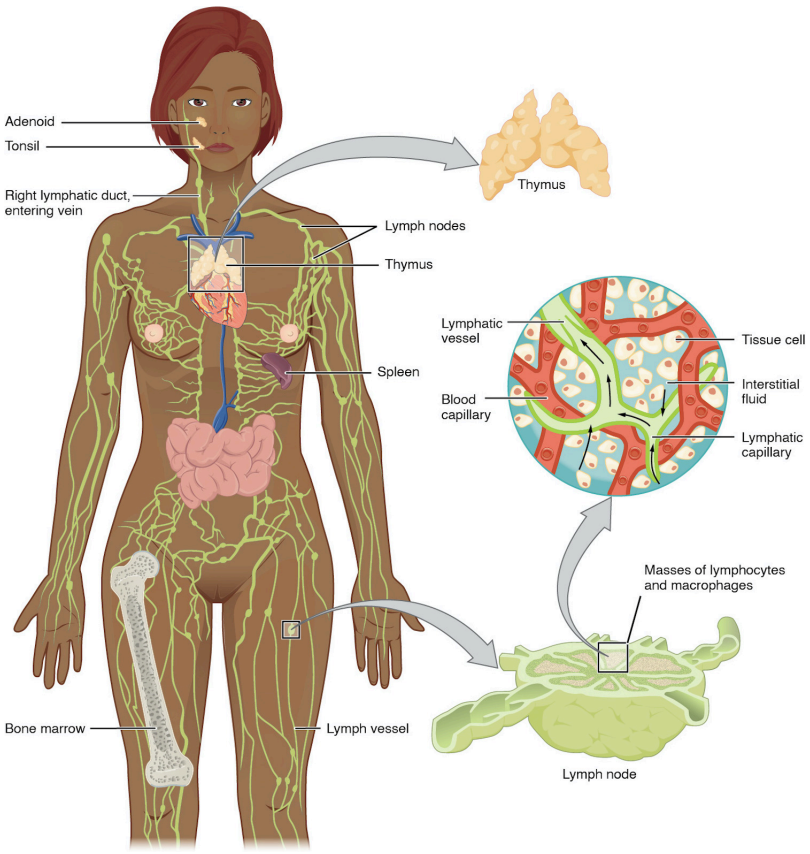

Figure 1: Overview of lymphatic system.

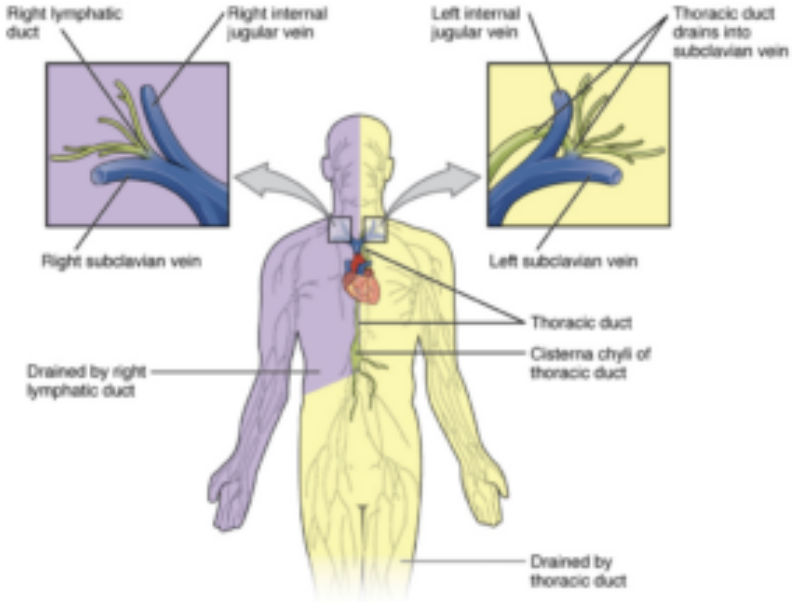

Figure 21.4 Major Trunks and Ducts of the Lymphatic System The thoracic duct drains a much larger portion of the body than does the right lymphatic duct.

Figure 2: Lymphatic ducts.

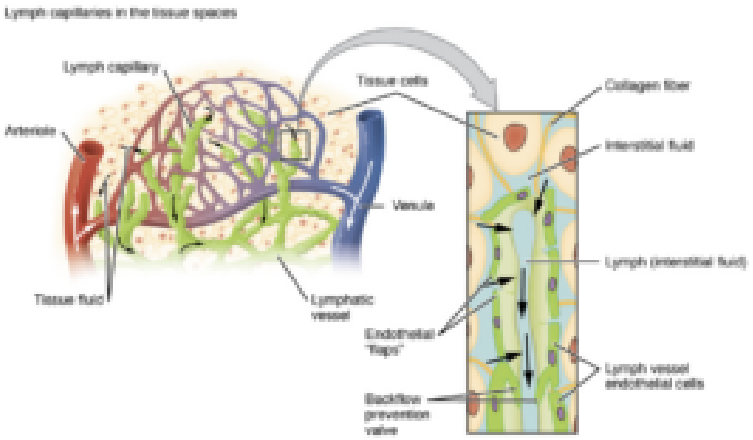

Figure 21.3 Lymphatic Capillaries Lymphatic capillaries are interlaced with the arterioles and venules of the cardiovascular system. Collagen fibers anchor a lymphatic capillary in the tissue (inset). Interstitial fluid slips through spaces between the overlapping endothelial cells that compose the lymphatic capillary.

Figure 3: Lymphatic capillaries.

(Attribution for all three images: Gordon Betts, J., Young, K.A., Wise, J.A., Johnson, E., Poe, B., Kruse, D.H., Korol, O., Johnson, J.E., Womble, M., & DeSaix, P. (2013). The Lymphatic and Immune System. In Anatomy and Physiology. OpenStax. Creative Commons Attribution License v4.0. Book URL: https://openstax.org/books/anatomy-and-physiology/pages/1-introduction

Section URL: https://openstax.org/books/anatomy-and-physiology/pages/21-1-anatomy-of-the-lymphatic-and-immune-systems)

Activity: Check Your Understanding

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Subjective Assessment

Subjective assessment of the **lymphatic system** involves asking questions about the health of the client and symptoms that occur because of pathologies affecting this system. Subjective assessment related to the lymphatic system is typically conducted as part of assessments related to peripheral vascular, gastrointestinal, respiratory, genital, and musculoskeletal systems.

A full exploration of pathologies is beyond the scope of this chapter, but common problems associated with the lymphatic system include **lymphadenopathy**, **lymphedema**, and cancers of the lymphatic system such as **lymphomas**.

Common symptoms that can be related to the lymphatic system include noticeable lymph nodes, skin changes (swelling, tight, hard skin, leaking fluid), headache, general fatigue, and fever. See **Table 1** for guidance on subjective health assessment. Many of the questions in the table align with the PQRSTU mnemonic; you should probe symptoms in the order of relevance, rather than sequentially according to the mnemonic. For a reminder, check out this resource: PQRSTU.

You should also ask about any medications (prescribed or over the counter) the client is taking: name, dose, frequency, reason it was prescribed, how long they have been taking it, and effectiveness. Always ask about herbal and natural products.

Also ask questions related to health promotion. Depending on the context of the assessment, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on "Health Promotion Considerations and Interventions" is included later in this chapter, after the discussion of objective assessment.

Knowledge Bites

Many lymphatic system pathologies result in swelling. For example, clients may report or you may observe **lymph node swelling** (a raised lump under the skin). Lymph node swelling is often the body's way of filtering pathogens possibly related to an upper respiratory infection, flu, or cold; swelling is typically localized (in one area) and usually resolves within 1–2 weeks after the condition resolves. In these cases, lymph nodes are often tender, enlarged, and warm to touch with some localized redness. Abnormal characteristics are discussed below under priorities of care.

Table 1: Common symptoms, questions, and clinical tips.

Symptoms	Questions	Clinical tips
Noticeable lymph nodes associated with the lymphatic system can be described as lumps, swollen, palpable, and/or painful.	Have you noticed any lymph nodes (or lumps) on your head, neck, under your arms, or in your groin area? If the client's response is affirmative, **additional probes** may include: Region: Where do you feel the nodes? Quality/quantity: Tell me about it. What does it feel like (e.g., hard, soft)? Is there pain associated with it? (You might need to use the word "tender"). If so, how bad is the pain/tenderness? Severity: If there is pain, can you rate your pain on a scale of 0–10 with 0 being no pain and 10 being the worst pain you have ever had? Timing: When did you notice the lymph nodes (or pain/tenderness)? Were you sick when you noticed them? Are the nodes constantly swollen? Provocative/palliative: Does anything make it worse? Does anything make it better? Treatment: Have you treated it with anything? Do you take any medications for it? Understanding: Do you know what is causing it or what it is related to?	Many clients refer to **lumps** without being aware that they are lymph nodes. Therefore, you may need to use this terminology in your assessment. Use a **calm demeanor** with clients and help them understand that most lymph node issues are not concerning or malignant. Swollen lymph nodes are often a sign that one's lymphatic system is working effectively and indicating that the body is filtering pathogens when a person is sick. In addition to asking the client about the nodes, inquire about any **associated symptoms** (e.g., pain, fatigue, unexplained weight loss, persistent fever, fainting, breathing issues) and palpate the nodes. Depending on the location of the nodes, you may also ask about symptoms related to respiratory infections (e.g., runny nose, sore throat, cough).

Skin changes can occur with lymphadenopathy and lymphedema. With **lymphadenopathy**, skin changes may include swelling, redness, and warmth over the affected lymph nodes. With **lymphedema**, localized skin changes may include swelling, a feeling of fullness/heaviness, redness, tight and firm skin, dry and thick skin, and leaking fluid and blisters when severe.	Have you noticed any changes in your skin? (You might ask about specific changes like those in the column to the left). If the client's response is affirmative, additional probes may include: Quality/quantity: Tell me about the changes. What does it feel like? What does it look like? How bad is it? Region: Where are these changes? Have you noticed them anywhere else? Timing: When did you notice these changes? Are they constant or intermittent? Provocative/palliative: Does anything make it worse? Does anything make it better? Treatment: Have you treated it with anything? Do you take any medications for it? Understanding: Do you know what is causing it or what it is related to?	Skin changes associated with lymphedema are often associated with **chronic conditions** and can be significant enough to affect body image. Lymphedema can be caused by various conditions and **treatments** (e.g., cancer surgery, radiation) that disrupt the flow of lymphatic fluids returning to the blood. It often affects arms and legs, and can also affect the breasts, chest, abdomen, face, and neck depending on the cause. Some of the first symptoms that clients experience is the feeling that their clothing or jewelry (e.g., rings and bracelets) that they are wearing seems to fit tighter.
Other lymphatic system symptoms may include fatigue, unexplained weight loss, weight gain, persistent fever, headache, dizziness, fainting, difficulty moving a limb or area of the body, breathing issues, coughing, and night sweats. An individual may experience a host of other associated symptoms depending on the lymphatic condition.	It is important to ask about other symptoms, particularly if the client answers in the affirmative about noticeable lymph node changes or skin changes, or if you suspect a lymphatic condition. Use variations of the PQRSTU mnemonic to assess these associated symptoms further.	Explore these symptoms specifically if the client answers affirmatively, but also recognize that these symptoms can be related to many other body systems. Affirmative answers related to fever, anorexia, chills, and fatigue can help you determine if the cause is systemic.

Personal and **family history of lymphatic** conditions and diseases. As noted above, common issues associated with the lymphatic system include lymphadenopathy, lymphedema, lymphatic-related cancers, cancer treatments, or physical traumas.	Do you have any chronic conditions or diseases that affect your lymphatic system? Do you have any family members with conditions or diseases that affect the lymphatic system? If the client responds in the affirmative, begin with an open-ended probe: Tell me about the condition/disease? If the client has a personal history, **probing questions** might include: Timing: When did it occur? When were you diagnosed? Quality/quantity: How does it affect you? What symptoms do you have? Treatment: How is it treated? Is the treatment effective? Have you had any surgeries? (e.g., tonsillectomy or cancer-related surgeries or radiation?) Do you take medication? Provocative/palliative: Does anything make it worse? Does anything make it better?	Although some lymphatic-related cancers involve familial clustering, the genetic causes are not clearly understood. Lymphedema is sometimes genetic (Jones & Mansour, 2017). This cause may be considered with childhood lymphedema, particularly when no cancers are present.

Priorities of Care

In cases of **severe lymphedema**, you should assess for **cellulitis**, which is a bacterial infection resulting in fever and inflammation (heat, erythema, swelling, and pain) over the affected area. With severe infection, you may observe red, purple, or other deeply coloured streaks radiating from the affected site (see **Figure 4** for signs of cellulitis). Keep in mind that these streaks may be less visually obvious in clients with darker skin tones. Severe lymphedema is usually treated with antibiotics and can be life-threatening if untreated. Any signs of cellulitis should be reported to the physician or nurse practitioner. Mark the borders with a skin marker pen and monitor for enlargement. If the client is outpatient, tell them to contact their healthcare provider if it enlarges beyond the original borders.

Figure 4: Signs of cellulitis.

(Image CC-BY-SA, By James Heilman, MD, https://commons.wikimedia.org/wiki/File:CellulitisJmh649.JPG)

Keep in mind that enlarged lymph nodes often simply indicate that the body is fighting an infection such as a cold. However, they are sometimes associated with serious conditions such as cancer, so you should always conduct a focused subjective and objective assessment when lymph nodes are enlarged. Any **lymph node swelling** with the following **abnormal characteristics** requires further investigation and should be reported to the physician or nurse practitioner:

- Nodes that are larger than 1 cm.

- Nodes that have developed for no apparent reason (i.e., no sign of infection) and remain swollen for more than 3 weeks or continue to enlarge.
- Nodes that are fixed/attached to the skin and not easily moveable.
- Nodes that are hard like a stone upon palpation or rubbery as opposed to soft.
- Nodes that are matted (in a group and attached to each other) as opposed to a discrete node (an individual node not attached to other nodes).
- Nodes associated with sustained symptoms such as fatigue, unexplained weight loss, persistent fever, fainting, and breathing issues.

Note whether nodes are non-painful or painful. Be aware that even a non-painful node may be a cause for concern: some non-painful nodes can meet some of the above characteristics and be associated with certain cancers. Nodes can also grow large enough to press on surrounding nerves. A systemic issue may be the cause of generalized swollen nodes found in multiple locations throughout the body, as opposed to localized. A local infected lymph node can also become systemic, so it is important to ask the client about symptoms such as fever, fatigue, chills, and anorexia.

Contextualizing Inclusivity

Children have **active immune systems** and are exposed to many viral and bacterial infections (e.g., cold, flu) at daycare and school. As a result, palpable soft, moveable, and small lymph nodes are common in children. These changes are the body's normal response to fighting infection and indicate that the lymphatic system is working properly. Prompt assessment and intervention is required if the lymph nodes continue to enlarge when an infection has resolved or the swelling is associated with symptoms such as difficulty breathing or swallowing or any of the abnormal characteristics described in the box above.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1221#h5p-98

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Jones, G., & Mansour, S. (2017). An approach to familial lymphoedema. Clinical Medicine, 17(6), 552–557. https://doi.org.10.7861/clinmedicine.17-6-552

Objective Assessment

The objective assessment of the lymphatic system is usually completed after the subjective assessment. Position the client depending on the related area being assessed.

Be aware of the **environmental temperature** in the room and the temperature of your hands. Room temperatures are not easily modified, so try to limit exposing the client and keep them covered, and try to warm your hands before placing them on the client's body.

Objective assessment of the lymphatic system involves the techniques of inspection and palpation. Compare your assessment bilaterally and ask the client if they feel any pain. If you notice leaking fluid or blisters, wear gloves to help prevent and control infection.

Contextualizing Inclusivity

You will be exposing various areas of the body, so it is important to be attentive to the client's needs during the assessment. Always use a **trauma-informed approach**: ask permission to touch and explain what you are doing before you proceed.

A **cultural humility approach** to assessment is also important because you cannot know and fully understand all cultures. This kind of approach requires a life-long process of reflection and self-critique to address power imbalances within systems and develop mutually beneficial partnerships and relationships (Tervalon & Murray-Garcia, 1998). Healthcare professionals should engage in continuous, critical reflection on power and privilege, and find ways to interact with clients of different race, sex, gender, age, and ability.

For example, some of your clients may wear head coverings or coverings over their face or body. Some Muslim women wear hijabs that cover their heads or niqabs that cover their faces; some Sikh individuals wear turbans; and some married Jewish women cover their hair with scarves or wear wigs. These are just some examples. For some clients, touch (i.e., physical assessment) from a person of the opposite gender may not be permissible or encouraged. Some Muslim women may prefer or require a female healthcare provider of the same gender, but others may feel that receiving healthcare from a male practitioner can be medically necessary and is therefore permitted.

Another consideration is that many clients are uncomfortable with assessments of the lymph nodes in the groin area. This kind of assessment may be particularly uncomfortable for clients who have experienced trauma and/or clients who experience **gender incongruence**.

Overall, you should first determine whether the assessment is necessary, if the client feels comfortable with you doing the assessment, and if accommodations can be made for the client. You can find some tips for providing sensitive care to 2SLGBTQ+ clients at https://soginursing.ca/.

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Assessment of Lymphedema

Assessment of the lymphatic system includes inspecting the skin for signs of lymphedema (**Figure 5** shows signs of severe edema). The most common sign is swelling, but other signs may be present when the condition is severe or not well managed.

Figure 5: Lymphedema.

(Attribution: Photo of legs by Medical doctors – https://commons.wikimedia.org/w/index.php?curid=37663127 and photo of arms has been cropped. Photo by DocHealer – https://commons.wikimedia.org/w/index.php?curid=64120555, both own work, CC-BY SA 4.0)

Clients with lymphedema will usually report that they are experiencing swelling or that their clothes or jewelry appear to be fitting tighter. This will help you to determine where to begin your assessment. If you are doing a general assessment, it is appropriate to observe the face, neck, arms and legs in a sitting or supine position. Observe the client's bare skin and compare bilaterally.

Assessment for lymphedema involves the following steps:

1. Inspect for **swelling** and **symmetry** over the face, neck, arms, and legs.
    - Normally, no swelling is present on the face, neck, arms, and legs, and limb circumference is equal bilaterally.
    - If swelling or asymmetry is present, describe the location. If you observe asymmetrical limbs in terms of circumference, measure with a flat/flexible tape measure around the largest area of swelling on the affected limb and measure at the same location on the other limb.

If you note swelling, **assess for pitting edema**: an indentation that remains after applying pressure over the location (see **Figure 6**). Apply pressure with the pad of your finger on a distal location (feet and medial malleolus) for about 3-5

seconds and then release. If you observe an indentation (a "pit"), note the location and how long the indentation remains. Then, assess a proximal location to assess how high the edema goes (e.g., over the tibia). Always check with the unit you work on about the scale used to evaluate pitting edema. Scales are usually 1–4 as shown in **Figure 7** and are used to record the pit depth and rebound time (the time for the indentation to disappear). Often, 1 is classified as mild, 2 as moderate, 3 as severe, and 4 as very severe.

Figure 6: Example of pitting edema

Grade 1	0–2 mm indentation; rebounds immediately.
Grade 2	3–4 mm indentation; rebounds in < 15 seconds.
Grade 3	5–6 mm indentation; up to 30 seconds to rebound.
Grade 4	8 mm indentation; > 20 seconds to rebound.

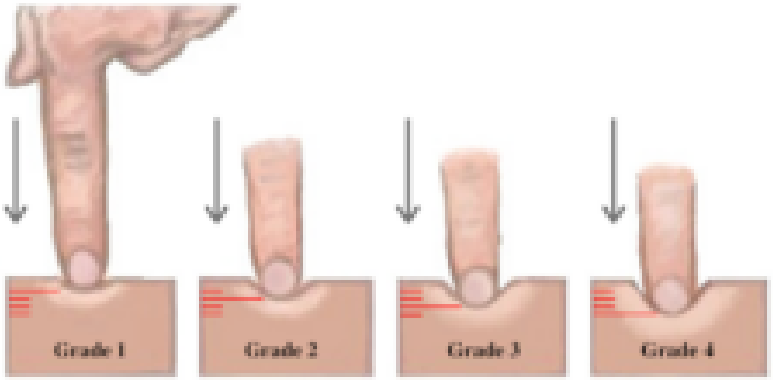

Figure 7: Pitting edema scale. (Attribution: https://wtcs.pressbooks.pub/nursingskills/ CC-BY 4.0).

2. Inspect for **skin discolouration**, **skin breakdown** (cuts, cracks), and **ulcers** over the face, neck, arms, and legs. Inspect anterior and posterior sides, in between skin folds and toes, and on the bottom of the feet.

    - Normally, skin colour is even throughout the body and skin is intact.
    - If you observe any skin discoloration from the client's baseline, identify the location and colour. If skin is not intact or ulcers are present, note the location and record a description. If applicable, describe the colour, odour, **consistency** and colour and quantity of discharge.

3. **Palpate for temperature** using the dorsa of your hands from the top of the client's limb (e.g., shoulder/upper leg) to their extremities (hand/fingers and feet/toes).

    - Normally, the temperature is equal bilaterally. The distal portions of the limbs (hands and feet) may be slightly cooler, but should be equal bilaterally.
    - If you note any asymmetry in temperature or extreme temperatures, identify the location and temperature (i.e., cold or hot).

4. **Palpate skin texture** and **consistency** with your first two or three fingers and thumb over the limbs or any areas where lymphedema is suspected.

    - Normally, the skin texture is smooth and soft with no lumps.
    - Describe the quality and note the location of any dry, moist, dimpled, or firm areas on the skin.

5. If you suspect lymphedema, assess the client's **mobility** of the affected limb and **range of motion**.

    - Normally, clients should have no difficulty moving their arms and legs, with full range of motion and no pain.

- Note any difficulty moving, limited range of motion, or pain.

6. Note the **findings**:

   - Normal findings might be documented as: "No swelling or discolouration present on the face, neck, arms, and legs, and limb circumference is equal bilaterally. Temperature is warm to touch and equal bilaterally, and skin texture is smooth with no lumps on arms and legs."
   - Abnormal findings might be documented as: "Redness and swelling noted on left arm, left upper arm circumference 19 inches and forearm circumference 12 inches. Right upper arm circumference 14 inches and forearm circumference 10 in inches. Full range of motion of both arms. Client describes slowness and difficulty moving arm."

Priorities of Care

A main priority of care is to **prevent and/or treat infection**. Clients with lymphedema are at risk for skin breakdown, ulcers, and infection. Skin should be kept clean, dry, and moisturized. Clients should also be careful to prevent any scratches or cuts that could lead to infection. Assess and monitor any areas of the skin that are not intact and/or show potential infection. It is important to observe if any areas of concern worsen (e.g., get bigger). Report to the physician or nurse practitioner if you observe any ulcers or signs of infection.

Clients with lymphedema may be referred to a physiotherapist and encouraged to perform light exercises to assist with **lymphatic fluid transportation**. For similar reasons, compression stockings are often prescribed: these are fitted elastic stockings that apply a certain amount of pressure to the limb. It is also often recommended to elevate limbs with lymphedema.

Activity: Check Your Understanding

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Inspection and Palpation of the Lymph Nodes

This assessment is often performed with the client sitting **upright on the exam table** to assess the lymph nodes in the head and neck, the upper arm, and the axillae, and then with the client **repositioned into a supine position** to assess the lymph nodes in the groin.

- NOTE: Lymph nodes are located in many areas of the body, some of which are not physically accessible. Although some of the axilla lymph nodes are associated with the breast, other lymph nodes associated with the breast will be explored in another chapter.

Use the following **techniques** to palpate the lymph nodes:

- Prior to palpation, say to the client "let me know if you have any pain or tenderness when I touch you."
- Use the **finger pads** of two to three fingers and move them in a circular motion.
- Use a **light touch** with gentle pressure so that you don't forcefully push the node inwards.
- After you palpate in one spot, **shift your fingers** to a new spot within the same area, because there are strands of lymph nodes in each area. This should be done about two to three times in each area.
- Typically, you palpate bilaterally at the same time and compare the right side to the left side.
- Conclude by asking the client if they had any pain or tenderness.

See **Table 2** for what to note when assessing lymph nodes and abnormal characteristics.

Table 2: Lymph node assessment.

• Presence of observable swelling (is the node swollen and observable upon inspection?) • Skin changes over the node (what is the skin colour and temperature?) • Presence of pain/tenderness (is the node painful or tender?) • Node location (where is the node located?) • Node size (what is the size of the node?) • Node consistency, e.g., rubbery, hard, soft (what is the consistency of the node?) • Node movability (can you move it around when you palpate it?) • Node delimitation (what are the limits or the boundaries of the node in terms of whether it is an individual node or a cluster of nodes matted together?) • Symmetry (is the node the same on both sides of the person's body?)

Lymph Nodes of Head and Neck

Steps for assessing **lymph nodes** of the **head and neck** are as follows:

1. **Inspect the lymph node areas** on the head and neck (see **Figure 8**) for swelling, asymmetry, and erythema.
    - Normally, the lymphatic areas are symmetrical between sides with no discolouration, swelling, or visible nodes.

- Abnormal findings may include asymmetry and visible nodes due to swelling with erythema overlying the skin.

2. **Palpate for lymph nodes** using a systematic approach moving from proximal to distal; thus moving from preauricular to supraclavicular area (see **Figure 8**, **Table 3** and **Video 1**). Consider lymphatic drainage patterns (see **Figure 9**); this approach allows you to reflect on the origins of the cause when there is an abnormality.

    - Recall to palpate nodes bilaterally at the same time: for example, assess the preauricular nodes on the left and right side at same time. However, for the submental lymph nodes, you should use the fingers of your dominant hand to palpate just under the chin behind the bony prominence. When assessing the deep cervical chain on clients with a muscular neck, you may ask the client to tip their head toward the side you are assessing to relax the sternomastoid muscle; thus, you will need to do one side at a time. For the supraclavicular nodes, you can ask the client to gently raise their shoulders.
        - Normally, lymph nodes are not palpable, but remember that normal lymph nodes can sometimes be palpable in young children.
        - If a lymph node is palpable, assess them as per **Table 2** noted above.

3. If lymph nodes are visible or palpable, **palpate the temperature** over the lymph node areas of the head and neck using the dorsa of your hands, comparing bilaterally.
4. Note the **findings**:

    - Normal findings might be documented as: “No lymph nodes palpable in the head and neck, no swelling, no asymmetry, no discolouration or increased temperature over lymph node locations, and no pain.”
    - Abnormal findings might be documented as: “Visible lymph nodes in the neck, hard, matted, and palpable cervical and supraclavicular lymph nodes on the right side, 3 cm. Client indicates they are tender.”

Figure 8: Lymph node areas on head and neck
Table 3: Lymph node locations on the head and neck.

Name	Location
1 Preauricular	Anterior to the tragus of the ear.
2 Posterior auricular	Along the mastoid process.
3 Occipital	Inferior to the occipital bone and on the lateral side of the occipital bone.
4 Submental	Under the chin behind the bony prominence.
5 Submandibular	Halfway between the submental nodes and the angle of the jaw.
6 Tonsillar	Inferior to the angle of the jaw.
7 Superficial cervical chain	Along the sternomastoid muscle at the top, just below the mastoid process.
8 Deep cervical chain	Further down the sternomastoid muscle.
9 Posterior cervical chain	Behind the sternomastoid muscle.
10 Supraclavicular	Superior to the clavicles.

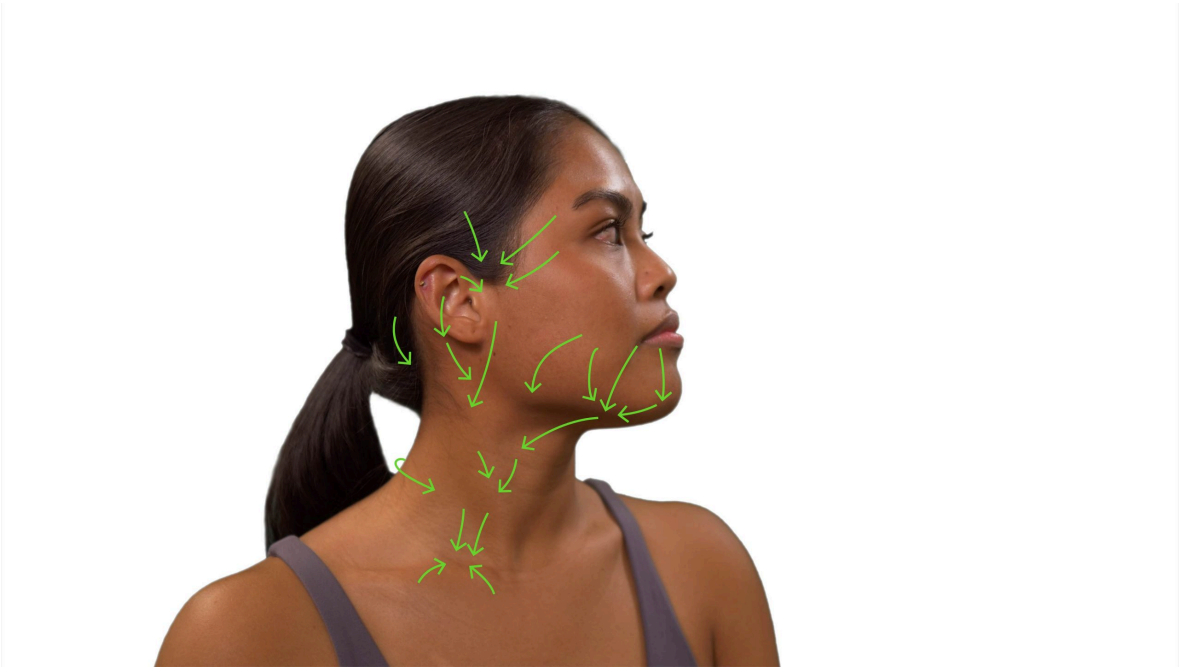

Figure 9: Lymphatic drainage of head and neck lymph nodes.

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> *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=1236#oembed-1*

Video 1: Palpation of head and neck lymph nodes. [0.58 seconds].

Lymph Nodes of Upper Arm and Axillary Area

Steps for assessing **lymph nodes** of the **upper arm and axillary** area:

1. Inspect the area surrounding the upper arm where the epitrochlear lymph nodes are located (see **Figure 10**-the area under the finger tips is where you should inspect which is superior and behind the medial epicondyle of the humerus) and inspect the axillae where the axillary lymph nodes are located (see **Figure 11**).
    - Normally, the lymphatic areas are symmetrical on each side with no discolouration, swelling, or visible nodes.
    - Abnormal findings may include asymmetry and visible nodes due to swelling with erythema overlying the skin. If a lymph node is palpable, assess it for abnormal characteristics (**Table 2**).

Figure 10: Epitrochlear lymph node area.

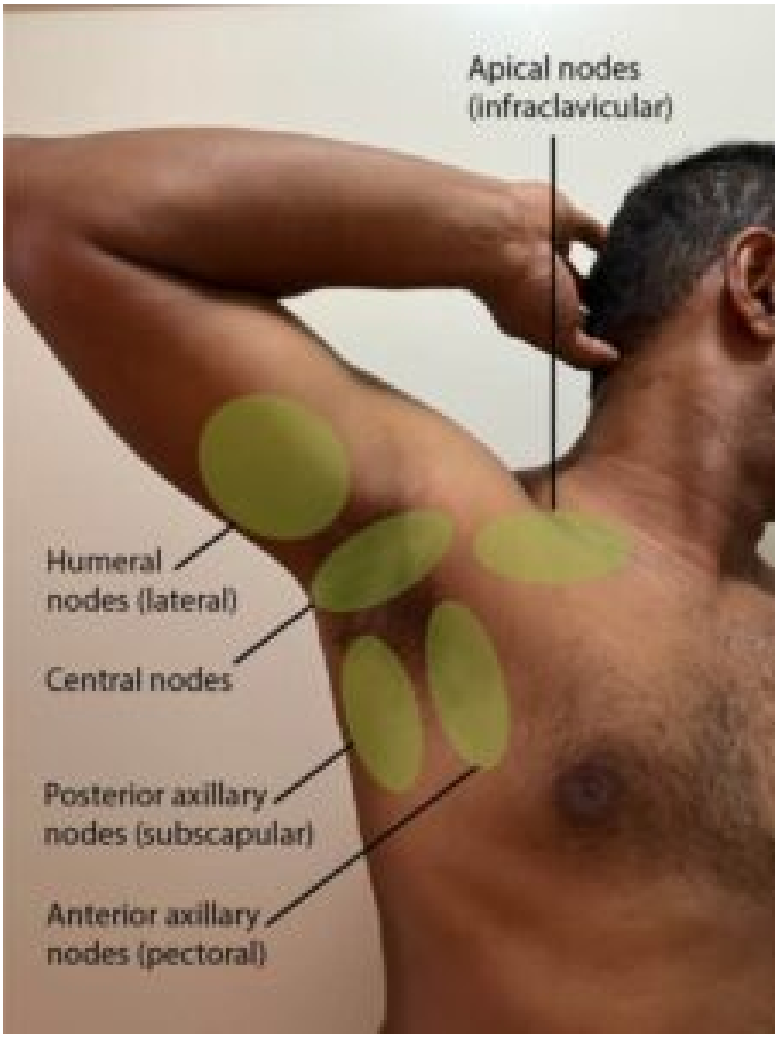

Figure 11: Axillary lymph node area.

2. **Palpate the epitrochlear (Video 2) and axillary lymph nodes** (**Video 3**). Prior to palpation, say to the client "let me know if you have any pain or tenderness when I touch you." For the **epitrochlear lymph nodes**: Ask the client to place their forearm on the bedside table with the palm facing up and palpate in a gentle circular motion in about two to three locations just superior to and behind the medial epicondyle of the humerus (about 1–2 cm). For the **axillary lymph nodes**: Ask the client to raise their arm and rest their hand on the back of their head. Use a gentle circular motion to palpate. Begin in the axilla: palpate in one row high in the axilla, then palpate in three rows away from the axillae along the upper arm, then three rows away from the axillae down the chest wall, and then in one row medially (see **Figure 12** for pattern). For each row, palpate about three to four locations.

    - Normally, there are no palpable lymph nodes.
    - If a lymph node is palpable, assess them as per **Table 2** and pay attention to the drainage patterns noted in **Figure 13**. It is important to recognize that a large amount of the lymph from the breast drains into the anterior axillary nodes, lymph from the back drains into the posterior axillary nodes, and lymph from the arm drains into the lateral nodes. Additionally, this lymph drains into the central nodes to the apical nodes to the supraclavicular and then, often returns to the vascular system through the subclavian vein via the **thoracic duct**.

Figure 12: Axillary lymph node palpation pattern.

Figure 13: Lymphatic drainage of axillary lymph nodes.

3. If lymph nodes are visible or palpable, **palpate the temperature** over the lymph node areas of the axillary and epitrochlear areas using the dorsa of your hands comparing side to side.

    - Normally, there is no increase in temperature.
    - Some abnormal lymph nodes will have increased localized skin temperature overlying the node.

4. Note the **findings**:

    - Normal findings might be documented as: "No lymph nodes palpable in the upper arm or axillae, no swelling, no asymmetry, no discolouration and no increased temperature over lymph node locations, and no pain reported by the client."
    - Abnormal findings might be documented as: "Hard, matted and palpable lymph nodes on the left axillary side. Tenderness reported by the client."

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Video 2: Palpation of the epitrochlear lymph nodes (showing technique on right arm) [0:25]

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Video 3: Palpation of the axillary lymph nodes (showing technique on right side) [1:05]

Lymph Nodes of the Groin

Steps for assessing **lymph nodes** in the **groin** area:

1. **Inspect and palpate the groin area** for the **inguinal lymph nodes**. Assist the client into supine position and provide a drape. Briefly expose one side to inspect and palpate, and then repeat on the other side. Prior to palpation, say to the client "let me know if you have any pain or tenderness when I touch you." Palpate about four to five times in the groin area (**Figure 14**). If nodes are palpable, assess for temperature (comparing bilaterally)
    - Normally, the lymphatic areas are symmetrical on each side with no discolouration, swelling, or visible or palpable nodes.
    - Abnormal findings may include asymmetry and visible nodes due to swelling with erythema overlying the skin. If a lymph node is palpable, assess it for abnormal characteristics (**Table 2**).
2. Note the **findings**:
    - Normal findings might be documented as: "No lymph nodes palpable in the groin, no swelling, asymmetry, discolouration or increased temperature over lymph node locations, and no pain reported."
    - Abnormal findings might be documented as: "Palpable, soft right-sided inguinal lymph node. Tenderness reported by the client."

Figure 14: Inguinal lymph node area.

Priorities of Care

Lymph nodes with abnormal characteristics require further investigation and should be reported to the physician or nurse practitioner. Depending on the client, you may ask about whether they have been recently unwell or have noted any other concerns in the affected area (pain, itching, rashes). You might also ask whether they shave or have had a recent cat scratch or bite. Lymph node swelling can be associated with certain infections such as skin and yeast infections, sexually transmitted infections, and eye, ear, and throat infections. In rare situations, it can also be associated with cancer, particularly when accompanied by other symptoms such as fatigue, unexplained weight loss, persistent fever, fainting, breathing issues, and if the lymph nodes have continued to enlarge with no obvious signs of infection.

Contextualizing Inclusivity

The lymphatic system undergoes changes as a person ages; the lymphatic vessels become thinner and the

lymph nodes atrophy. As a result, older people may have more difficulty fighting infection and are more prone to lymphedema.

Always use a trauma-informed approach, particularly when assessing the inguinal lymph nodes due to their location. Explain what you are doing and why, ask permission to touch, provide a drape, and ask if the client would like someone present (a friend, family member, or another healthcare provider).

Activity: Check Your Understanding

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Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion is an important component of a healthy lymphatic system. To determine appropriate interventions, carefully consider all of the collected data, both subjective and objective. As part of subjective data collection, you should inquire about risk factors, social determinants, and other considerations.

Integrate this kind of inquiry throughout the assessment. You will ask many probing questions during the subjective assessment, but other questions will emerge based on your critical reflection of data collected during the subjective and objective assessment. These findings will inform your clinical judgement and help you develop appropriate health promotion interventions for each specific patient.

Preventing the Spread of Infection

The spread of infections can be prevented with simple techniques such as hand hygiene, staying home when sick, covering the mouth when coughing, wearing a mask, and receiving an annual influenza vaccine. You may need to **assess the knowledge of the client** and provide education about infection control. Also, with young children, you may need to assess the knowledge of parents/caregivers and educate them about infection control so that they can teach their children. **Children** learn about preventing the spread of infection by watching their parents/caregivers/siblings and practicing the techniques they use, so it is important to reinforce proper technique and infection prevention behaviours.

Probing questions might include:

- When do you perform hand hygiene?
- How do you perform hand hygiene?
- What do you do when you are sick?

Activity

Activity is another important part of assisting with effective **lymph fluid transportation**. For example, the pump action associated with muscle contraction helps aid in lymphatic drainage. Activity and exercise also help maintain a healthy body weight and prevent obesity.

It is often recommended that clients with lymphedema engage in gentle movement of limbs to help transport lymph fluid. Activities can include walking, swimming, and bike riding. Depending on the severity of lymphedema, clients may be assisted with range of motion exercises and referred to a physiotherapist or a registered massage therapist specializing in lymphedema.

Probing questions may include:

- Tell me about any activity/exercise you are involved in?
- How many times do you participate in exercise a week?
- How long each time?
- Do you have limitations related to activity/exercise?
- Do you have any concerns related to activity/exercise?

Healthy Eating

Healthy eating promotes healthy cell function, so it is important that clients have an appropriate level of water intake, nutrients, and vitamins. Healthy eating can also help maintain a healthy body weight; extra body weight can interfere with the lymphatic system's ability to transport lymph fluid.

Probing questions may include:

- Tell me about your normal diet?
- What do you eat and drink each day?
- Do you have sufficient access to healthy food?
- Do you have sufficient funds to access healthy food?

Alcohol and Drug Use

Alcohol and drug use can affect the lymphatic system in many ways. For example, these activities can be associated with certain cancers, cause inflammation, and increase the risk for injury and infections. The most recent Canadian guidelines now suggest that there are health risks associated with any level of alcohol consumption, although negligible with two drinks or less weekly (Paradis et al., 2022). Alcohol is considered a carcinogen and linked to several types of cancers and can affect the arteries (Paradis et al., 2022).

Reflect on your own **biases** about alcohol and drugs. Use of these substances can be stigmatized, so self-reflection is crucial to help facilitate a non-judgmental approach to care.

Probing questions may include:

- Tell me about how much alcohol you consume in a day? If the client does not consume alcohol daily, you can assess consumption based on weekly, monthly, or none. If the client's answer is affirmative, ask probing questions such as: How much (e.g., ounces a day)? What type of alcohol (e.g., red wine, beer)? For how long? Can you tell me the reasons?
- If you do not currently consume alcohol, have you ever? If affirmative, ask similar probing questions, including why the client quit.

Ask similar questions related to drug use.

Contextualizing Inclusivity

Consider a client's socio-economic status during your assessment, particularly as it relates to healthy eating. For example, does the client have geographical access and sufficient funds for healthy foods such as fresh fruits and vegetables? If not, discuss alternatives with the client (e.g., frozen vegetables). Another issue is that discussions about weight can be triggering for some clients, especially those with moderate to severe lymphedema, which can affect body image. Always use a compassionate, open, and non-judgmental approach to assessment.

Clinical Judgement: Case Study

A 26-year-old client has not been feeling well for 4 days. The client reports starting a new job at a drop-in centre for adolescents in the community. Enlarged tonsillar lymph nodes, 2 cm bilaterally, tender to touch, and accompanied with a sore throat, cough, ear ache, and fatigue. The client reports feeling excited and stressed with the new job, and has not been eating very much due to an unsettled stomach. Client's vital signs are: blood pressure 100/68 mm Hg, pulse 64 bpm, respiration 12 bpm, O2sat 97%, temperature 38.2°C tympanic.

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Key Takeaways

- Common symptoms to assess related to the lymphatic system include noticeable lymph nodes and pain, skin changes (swelling, tight, hard skin, leaking fluid), headache, general fatigue, and fever.
- Objective assessment of the lymphatic system includes assessment for lymphedema and inspection and palpation of the lymph nodes in the head and neck, axilla, groin, and related area of the body.
- Health promotion interventions should be developed with the client to address what is important to them. Considerations include preventing infection spread, activity, healthy eating, and alcohol and drug use.

CHAPTER 14 - GASTROINTESTINAL SYSTEM ASSESSMENT

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Learning Outcomes

- Apply subjective assessment skills.
- Apply objective assessment skills.
- Use clinical judgement.
- Integrate health promotion interventions into actions.

Introduction to Gastrointestinal System

The **gastrointestinal system** (also called the GI system) is important to assess because it is responsible for nutrition, digestion, absorption, hydration, and **defecation**. You may also have heard it referred to as the digestive system. As a nurse, your assessment of the GI system provides information about how the system is functioning and potential cues that require action.

GI System Components

As per **Figure 1**, the main components of the GI system include:

- The **upper GI tract** (oral cavity, esophagus, stomach, and the first part of the small intestine [i.e., the duodenum]).
- The **lower GI tract** (small and large intestine, rectum, anus).
- The **accessory glands** and **organs** (salivary glands, liver, pancreas, gallbladder) and lymphatic organs and tissue (tonsils, spleen, appendix).

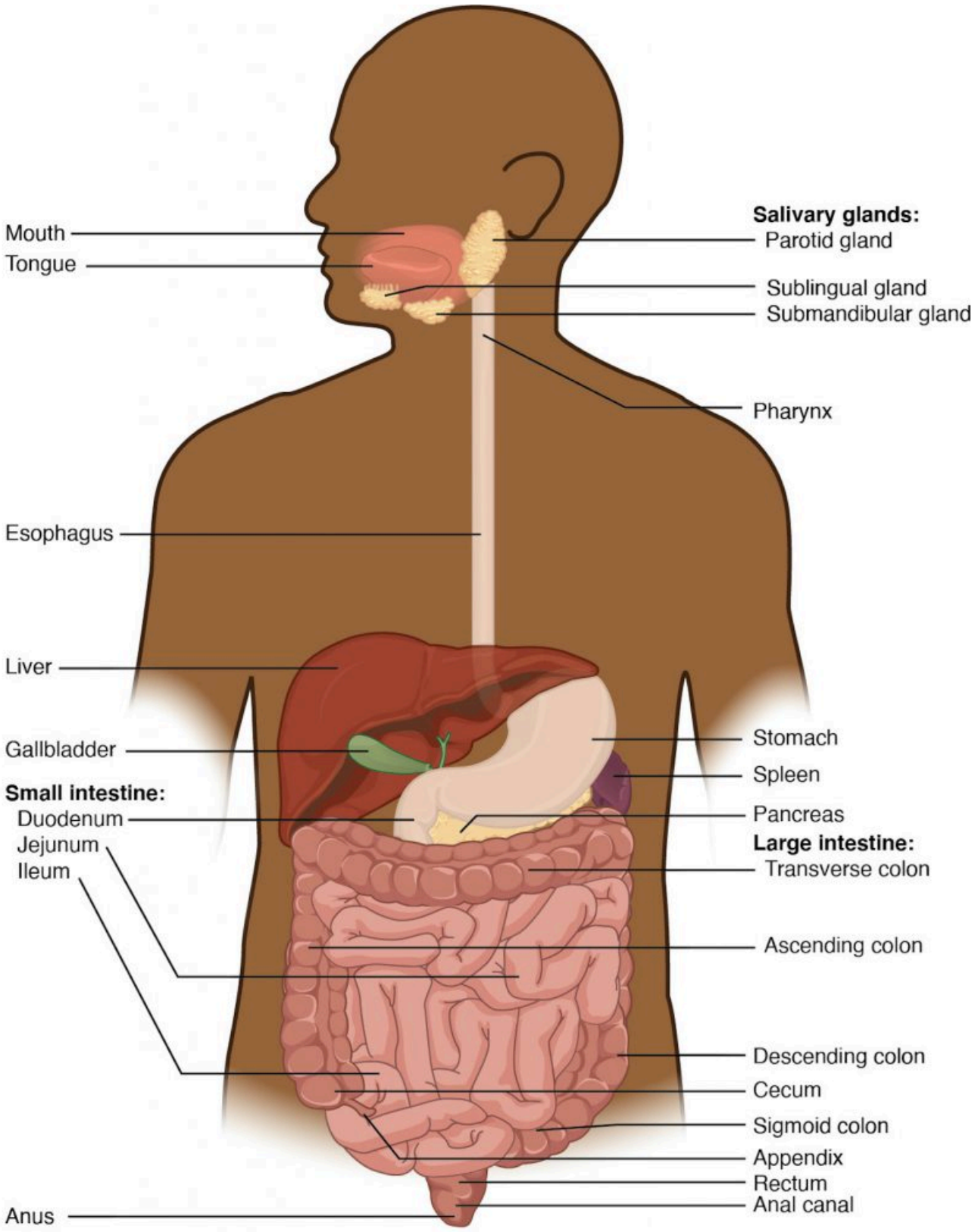

Figure 1: GI tract.
(Attribution statement for image at bottom of page)

You have already learned about the anatomy and physiology of the GI system; See **Video 1** for a quick overview:

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Video 1: Overview of the GI system. (Attribution taken from: https://www.khanacademy.org/science/high-school-biology/hs-human-body-systems/hs-the-digestive-and-excretory-systems/v/meet-the-gastrointestinal-tract)

Activity: Check Your Understanding

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Subjective Assessment

Subjective assessment of the GI system involves asking questions about the health of the client and symptoms related to pathologies of the associated organs and glands. Although a full understanding of these pathologies is beyond the focus of this chapter, common issues associated with the GI system include **dental cavities, gastroesophageal reflux disease (GERD), cancer, ulcers, hepatitis, ascites, ileus, irritable bowel syndrome, constipation, hernias,** and **hemorrhoids.**

Knowledge Bites

Ulcers have emerged over the last century as a common condition. For decades, researchers believed the cause was related to increased acid production, foods, and stress. In the early part of this century, researchers found that Helicobacter pylori (H. pylori) bacteria are a common cause of gastric and duodenal ulcers (Ahmed, 2005; Kusters et al., 2006). Since then, there has been a major shift in both diagnostics and treatment, including testing for H. pylori and use of medications including antibiotics and **proton pump inhibitors**. Correct treatment is important considering that untreated ulcers can lead to perforation of the gastric or intestinal wall (depending on location) followed by peritonitis and possible hemorrhage.

Common symptoms that can be related to the GI system include pain, nausea and vomiting, appetite changes, bowel patterns changes including diarrhea and constipation, bloating, and flatulence. See **Table 1** for guidance on a subjective health assessment related to common symptoms, questions, and clinical tips. Many of the questions in this table align with the PQRSTU mnemonic. You should consider asking questions in order of importance, thus you do not follow the sequential order of PQRSTU.

You should also ask about any medications (prescribed, over the counter, or illicit) the client is taking, including the name, dose, frequency, reason for taking, and how long they have been taking it. Many types of medications can cause GI upset (nausea, vomiting, constipation, diarrhea).

Always use questions focusing on health promotion during an assessment. Depending on the context, you might ask these during the subjective assessment or after an objective assessment. A "Health Promotion Considerations and Interventions" section is provided later in this chapter after the discussion of an objective assessment.

Table 1: Common symptoms, questions, and clinical tips

Symptoms	Questions	Clinical tips
Dysphagia is difficulty related to swallowing and can involve difficulty related to swallowing saliva, food, and/or fluids. It can be caused by a variety of conditions that can be associated with structural issues (inflammation) or neural issues (stroke).	Do you have any current or recent difficulty swallowing? If the client's response is affirmative, additional **probes** may include: Quality/quantity: Tell me about the difficulty. What does if feel like? How bad is it? Region: Where do you feel it (e.g., in the throat area or lower in the upper esophageal area)? Understanding: Do you know what is causing it? Do you have any related symptoms (e.g., pain, swollen glands, excessive saliva, drooling)? Timing: When did it begin? What were you doing when it began? Is it constant or intermittent? Provocative/palliative: Is there anything that makes it worse? Is it aggravated or associated with eating or drinking? Is there anything that makes it better (e.g., position)? Treatment: Have you treated it with anything? Do you take any medications for it?	New onset of dysphagia requires immediate action because it can lead to clinical deterioration and complications such as choking or **aspiration pneumonia**. If a client is experiencing new onset dysphagia, it is important to restrict food or fluids until it has been fully assessed. If possible, have the client sit upright (e.g., high fowler position) or raise the head of the bed.
Oral lesions, discolourations, and **bleeding gums.**	Do you currently have or have you had any chronic issues with sores/ulcers in your mouth, discolouration of your mouth, or bleeding gums? If the client response is affirmative, additional **probes** may include: Region: Where is it located? Quality/quantity: Tell me about it. How bad is it? Timing: When did it begin? What were you doing when it began? Is it constant or intermittent? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Treatment: Have you treated it with anything? Do you take any medications for it? Understand: Do you know what is causing it or what it is related to?	The first action is to inspect the mouth so that you can provide an objective assessment. Interventions will depend on the cause. For example, bleeding gums may be caused by brushing too hard or increased vascularity associated with pregnancy; they can also be caused by gum disease, so you may need to refer the client to a dentist.

Xerostomia is dry mouth; it can be mild and easily treated or severe and affecting a client's quality of life, health, and overall wellbeing. It can be associated with dehydration, certain medications, cancer treatments such as radiation therapy, and alcohol and drug use.	Do you currently have a dry mouth or have you had any chronic issues with dryness in the mouth? If the client's response is affirmative, additional **probes** may include: Quality/quantity: Tell me about your dry mouth. What does it feel like? How bad is it? Timing: When did it begin? Is it constant or intermittent? Understanding: Do you know what is causing it or what it is related to? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Other questions may include: How much fluids do you drink per day? Are you taking any medications or radiation therapy? How much alcohol do you drink per day? Do you take any drugs? Do you smoke? Treatment: Have you treated it with anything? Do you take any medications for it? Tell me about how much fluids you drink per day	Interventions will depend on the cause. Older adults are at risk for xerostomia due to decreased intake of fluids as well as increased usage of medications and certain medical conditions that affect the functioning of the **salivary glands**. It may be as simple as encouraging the client to drink more water, limit sodium, limit alcohol and drug use, and use sugar-free gum or lozenges. You should also ask about smoking, which can further aggravate symptoms related to dry mouth. If a client has chronic dry mouth, inspect their mouth for associated symptoms such as cracked lips, gum disease, tooth decay, and oral lesions. You should also assess whether it is affecting the client's nutrition or other elements of daily life such as wearing dentures, especially when the client is an older adult.
Mouth pain or **sensitivities** can involve a sore throat, tooth pain or sensitivities, and jaw pain.	Do you currently have or have you had any issues with mouth pain or sensitivities such as a sore throat, tooth pain or sensitivities, or jaw pain? If the client response is affirmative, additional **probes** may include: Region: Where is it located? Quality/quantity: Tell me about it. How bad is it? Timing: When did it begin? What were you doing when it began? Is it constant or intermittent? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Treatment: Have you treated it with anything? Do you take any medications for it? Understand: Do you know what is causing it or what it is related to?	These symptoms require an objective assessment to assess further GI signs, or signs related to other systems. First, assess whether the jaw pain might be cardiac-related. Angina is a critical finding that requires immediate intervention and can radiate to the jaw area. In order to determine this, you should assess what brought the pain on. For example, was there a physical injury? If not, are there other related factors and symptoms. Another common cause of jaw pain is **bruxism**, which can be caused by stress. These types of symptoms and tooth pain and sensitivities usually require referral to a dentist.

Upper and **lower GI pain** can be associated with many conditions. This is an unpleasant sensation that is described subjectively in a ways such as tenderness, achy, discomfort, burning, or sharp pain.	Do you have any current or recent pain in the esophageal or abdominal region (or unpleasant sensations such as tenderness)? If the client's response is affirmative, additional **probes** may include: Region: Where do you feel the pain/ sensation? Does it radiate anywhere? Quality/quantity: Tell me about it. What does it feel like? How bad is it? Timing: When did it begin? What were you doing when it began? Is it constant or intermittent? Severity: Can you rate it on a scale of 0 to 10 with 0 being no pain and 10 being the worst pain you have had? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Treatment: Have you treated it with anything? Do you take any medications for it? Understand: Do you know what is causing it or what it is related to?	With children, always tailor questions to their developmental stage. With infants and pre-verbal or non-verbal children, you may need to focus on objective assessment such as behavioural and physiological signs of pain. Remember that GI pain is sometimes cardiac-related (angina). You must rule out this possibility because it can be a critical finding that requires urgent intervention.
Nausea and **vomiting (emesis)** are common symptoms associated with many conditions. Nausea is an uneasiness/ queasy feeling in the stomach associated with the urge to vomit. Vomiting (emesis) is the emptying of the GI tract (usually the contents of the stomach/esophagus) through the mouth. When associated with pregnancy, this is called hyperemesis gravidarum (morning sickness).	Do you have any current or recent nausea and vomiting? If the client's response is affirmative, additional **probes** may include: Timing: When did it begin? When was the last time? What were you doing when it began? Is it constant or intermittent? Is it associated with eating? Quality/quantity: Tell me about it. What does the nausea feel like? How bad is it? If the client indicates vomiting, ask: How much do you vomit? Is it undigested food? What colour is it? Is there blood in it? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Treatment: Have you treated it with anything? Do you take any medications for it? (If so, do they help?) Understand: Do you know what is causing it or what it is related to? Do you have any other related symptoms (e.g., stomach pain, fever)?	Nausea and vomiting are usually not serious, and are often associated with a bacterial or viral infection. However, they may be associated with a more serious condition such as appendicitis, a concussion, or an intestinal blockage. **Hematemesis** is a serious concern that suggests GI bleeding. It is important to assess the colour, as this can help determine where the bleeding is coming from and whether it is active bleeding or old, dried blood. For example, bright red suggests active bleeding from the upper GI system. You might also visualize vomit that has dark brown or black specks in it resembling coffee grounds, which is suggestive of bleeding. It is important to determine the cause and severity of the nausea and vomiting. Antiemetics are a class of drugs used to prevent and treat nausea and vomiting. Many types are available, including dimenhydrinate (Gravol). Assess the client for risk of dehydration, particularly among children or older adults or when vomiting is frequent with large quantities. Common signs of dehydration include dry mouth, cracked lips, decreased skin turgor, tachycardia, increased thirst, decreased urine output, delirium, and in infants, sunken **fontanelles**.

Changes in bowel patterns can include constipation or diarrhea. These changes can be short-term or chronic and can be associated with many health conditions and other factors such as diet. Constipation refers to decreased frequency in bowel movements (BMs) (less than three per week) and difficulty having a BM (having to strain to push stool out, hard stool). Diarrhea refers to soft, loose, watery stools that are not formed and are frequent (three or more a day).	Tell me about your normal bowel patterns? **Probing questions** may include: How often do you have a bowel movement? What is the consistency (soft or hard)? What colour is it? Have you ever noticed mucus or blood in it? Do you have any concerns about your bowel patterns? Do you take any medications to help you have a bowel movement (such as a stool softener or laxative)? Have you had any recent or frequent diarrhea or constipation? If the client has concerns about their bowel patterns or has reported a problem such as diarrhea or constipation, probe further with questions such as: Timing: When did it begin? When was the last time? Is it constant or intermittent? Is it associated with eating? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Treatment: Have you treated it with anything? Do you take any medications for it (if so, do they help)? Understand: Do you know what is causing it or what it is related to? Do you have any other related symptoms (e.g., stomach pain)?	Remember that normal bowel patterns vary from client to client. Some people, particularly older children/adolescents and young adults, may feel embarrassed to talk about bowel patterns. Try to normalize the discussion using statements like "I like to speak with all clients about their bowel patterns because it can provide information about your health." An inclusive approach to assessment involves age- and culturally-appropriate terms. For example, not everyone will know what a BM is, so you may need to use words like "poop" or "number two." Blood in the stool can appear as bright red or black/dark brown. Assessing the colour helps determine the cause, which can be something mild to something as severe as colorectal cancer. A focused assessment is important. If a client has constipation or diarrhea, choose an appropriate action based on the severity. Dietary changes and hydration are often helpful, but in some cases, severe constipation could be related to a bowel obstruction and requires urgent intervention. This may be associated with other symptoms such as abdominal pain and a distended abdomen. Severe diarrhea can lead to dehydration, which is a serious issue and needs to be treated with rehydration with fluids and electrolytes. Chronic and severe diarrhea could be related to digestive disorders (e.g., lactose intolerance, Crohn's disease, ulcerative colitis, celiac) or viral (e.g., norovirus), bacterial (e.g., clostridium difficile [C. diff.]), or parasites (e.g., giardia) Contact isolation is required when a client has or is suspected to have infectious diarrhea.

Appetite changes are common symptoms associated with the GI system. These changes can involve a decrease or increase in appetite (for foods or fluids), and can be physiologically or psychologically related.	Have you had any recent appetite changes (such as decreased or increased appetite)? If the client's response is affirmative, additional **probes** may include: Quality/quantity: Tell me about the changes? How bad have the changes been? Timing: When did these changes begin? Are the changes in appetite constant or intermittent? What was going on in your life when these changes began? Provocative/palliative: Is there anything that makes the appetite changes worse? Is there anything that makes the appetite changes better? Treatment: Have you treated the appetite changes with anything? Do you take any medications for it? Understand: Do you know what is causing the appetite changes or what they are related to?	Changes in appetite can be a sensitive issue for some clients. Use a non-judgmental approach when asking questions, and use words that the client uses when asking additional probes (e.g., when did you begin feeling like not eating?). Prompt intervention is needed if a newborn is not eating, as adequate nutrition is important to growth and development, and they can also dehydrate easily.
Other GI-related symptoms can include fatigue, unintended weight loss, fever, rectal pain/bleeding/pruritus, and lymph node swelling.	Only ask one question at a time. For example: Have you experienced fatigue (appetite changes, unintended weight loss, fever, rectal pain/bleeding, lymph node swelling)? If the client's response is affirmative, use variations of the PQRSTU mnemonic to assess the symptoms further.	Keep in mind that many of these GI-related symptoms can be related to other body systems. Thus, these symptoms require further investigation to determine whether they are related to the GI system. You should assess the severity of rectal bleeding to determine whether prompt intervention is required.

Personal and family history of GI conditions and diseases. As noted earlier, common issues associated with the GI system include dental cavities, acid reflux, ulcers, cancers, hepatitis, ascites, constipation, and hernias.	Do you have any chronic conditions or diseases associated with your GI system? Do you have a familial history of conditions or diseases related to the GI system? If the client's response is affirmative, begin with an open-ended probe: Tell me about the condition/disease? If the client has a personal history, additional **probing questions** might include: Timing: When did it occur? When were you diagnosed? Quality/quantity: How does it affect you? What symptoms do you have? Treatment: How is it treated? Do you take medication? Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better? Understanding: Do you have any concerns about how the condition or disease is affecting you?	Some clients may not be familiar with the word gastrointestinal (GI). If so, use words such as the mouth, esophagus, stomach, liver, bowels/intestines. Some GI-associated diseases have a genetic component, but environmental and cultural factors (family traditions and personal practices) are more likely for many symptoms (e.g., diarrhea, constipation, hepatitis).

Knowledge Bites

Blood can appear in the **stool** for various reasons; this requires a focused and prompt assessment so that you can attempt determine the cause. Start by asking when it began and what the client has noticed (e.g., colour, amount, associated symptoms).

- If the colour is **bright red**, this suggests active bleeding and is usually associated with the lower GI system, possibly related to the rectal area or the lower/distal portion of the colon. The objective assessment should begin by inspecting the perianal region to check for any bleeding around the anus, possibly caused by hemorrhoids.
- Sometimes the bleeding is difficult to notice because it is **darker in colour**. Melena is black sticky stool (often referred to as tar-like) and can be caused from bleeding higher in the GI tract. You might visualize dark brown or black specks in stool resembling coffee grounds.
- If the stool is **red** and resembles a **jelly-like substance**, this could indicate intussusception. It is a serious GI condition in which a part of the intestine folds into itself, causing obstruction of the bowel and

constriction of blood supply. It is rare in adults, but a common cause of intestinal obstruction in infants and toddlers. It is often associated with severe abdominal pain, lethargy, nausea, and vomiting.

Sometimes what looks like blood in the stool is not actually blood. Diet (e.g., beets, black licorice) and certain medications (e.g., iron medications) can change the colour of stool.

Some blood is not visible to the naked eye. This is called "**occult blood**" and can only be determined by testing a stool sample for blood. In Ontario, a fecal immunochemical test (FIT) is routinely recommended when someone is at "average risk" (over age 50 and no first-degree relative diagnosed with colorectal cancer) or at "increased risk" (family history of colorectal cancer) (Cancer Care Ontario, n.d.).

If you identify blood in the stool, your action should be based on its severity and associated symptoms. Act promptly if the amount of blood is concerning or if the client shows signs of clinical deterioration. It's always best to do a primary survey to determine the potential of deterioration.

Priorities of Care

Certain symptoms associated with the GI system are cues that require action. Urgent intervention is required when the cues suggest clinical deterioration or the potential for clinical deterioration. For example, urgent intervention is required with:

- New onset dysphagia (can be associated with stroke and/or can lead to complications).
- Severe diarrhea and/or vomiting (particularly with signs of dehydration or when vomiting indicates hematemesis).
- GI pain (may suggest angina) or right lower quadrant pain (may suggest appendicitis).
- GI pain in infants (may suggest intussusception).

If you encounter a cue that suggests clinical deterioration, ask a colleague to call the physician/nurse practitioner while you perform a primary survey and a focused objective assessment. For example, assess the client's respiration rate, work of breathing, oxygen saturation, and then pulse, blood pressure, and temperature, followed by auscultation of lungs.

Any evidence of bleeding requires intervention. However, the severity (e.g., the amount and whether it is active bleeding) will determine how prompt the intervention needs to be. Additionally, when a care partner or parent indicates that an newborn/infant has had a decreased number of wet diapers, you should conduct further assessment as this could be a sign of dehydration.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=298#h5p-234

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Objective Assessment

Objective assessment of the GI system includes:

- Inspection and palpation related to the **oral cavity**.
- Inspection, auscultation, palpation, and percussion of the **abdomen**.
- Inspection and palpation of the **perianal region**.

Be aware of the **environmental temperature** in the room and the temperature of your hands. Room temperatures are not easily modified, so try to limit exposing the client and keep them covered. Draping is particularly important when assessing the abdomen and perianal region. Before touching the client, warm your hands by rubbing them together and warm the stethoscope before placing it on the client's body.

Oral Cavity - Inspection and Palpation

Usually the client is positioned sitting upright; newborns or young children can be held by their parent/caregiver. Wear gloves because this assessment involves contact with body fluids from the mucus membranes. You will also need a tongue depressor and a penlight.

Inspection of Lips

Inspect the lips for swelling, colour, lesions, or **malformations**. Also inspect the lips for moisture and texture, which are interrelated.

The steps for this are as follows:

1. Identify any **presence** and **location** of **swelling** and **redness**.

- These two findings are often associated. You must respond immediately if you suspect the swelling is associated with anaphylaxis. For example, do they have allergies, such as food or bees, or have they recently had a vaccine? Do they have other signs of anaphylaxis (e.g., hives, pruritus, dyspnea, dysphagia, tachycardia, hypotension)?

2. Note the **colour**.

- Lip colour varies based on the client's skin colour. It can range from pink to brown tones. Note any lip discolouration (e.g., redness, cyanosis, pallor). Cyanosis can appear as a grey/white shade in people with darker skin (Lewis, 2020; Sommers, 2011) or as a dusky bluish/purple shade in people with lighter skin (Lewis, 2020). Pallor can appear as a grey shade in people with darker skin (Lewis, 2020) or as a generalized pale discolouration in people with lighter skin.

3. Identify the **presence, location, size**, and **description** of any **lesions** and **malformations**, including the **colour** and **presence of any discharge**.

- If you identify a lesion, ask the client whether they have noticed it, how long they have had it, whether they know the cause, and if they have treated it with anything.
- A common lesion on the lips is herpes simplex virus (cold sore) which appear as small, fluid-filled blisters, see **Figure 2**. Another common malformation of the lip is a **cleft lip** (which is sometimes associated with a **cleft palate**). These are important to assess and act upon because they can affect a client's breathing, speaking, and sucking and swallowing associated with eating. They are often surgically repaired at a young age. Further information and images for cleft lip and palate can be found at: https://www.cdc.gov/ncbddd/birthdefects/cleftlip.html

4. Note the **moisture** and **texture**.

- Are the lips moist or dry? Moist lips are smooth with no cracking. Dry lips are chapped and/or may have fissures. Chapped lips are flaky and sometimes red, with "flakes" or "scales" of skin peeling away from the lips. Fissures are usually called "cracked lips."

5. Note the **findings**.

- Normal findings: "Lips are moist with no cracking, lesions, or swelling, pink in colour with generalized brown

tones, no discolouration."

- Abnormal findings: "Lips are dry with cracking, a red lesion on upper lip left of midline 3mm x 3 mm with a slight serous discharge."

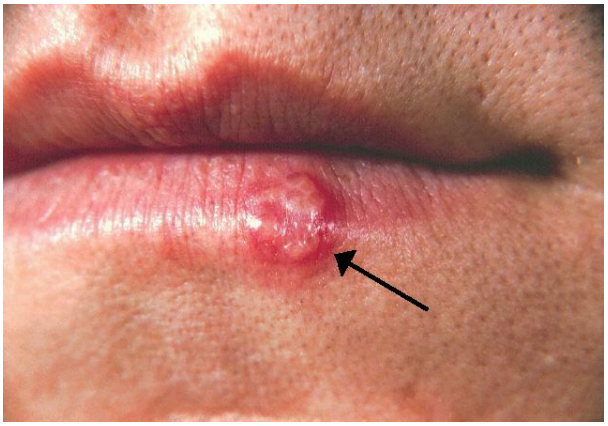

Figure 2: Herpes simplex virus (cold sore) on the lower lip.
(Attribution: Photo Public Domain, https://commons.wikimedia.org/w/index.php?curid=8011415)

Inspection of Oral Mucosa

Systematically inspect all parts of the mucosa. Shine a penlight in the mouth to illuminate the area. You can ask the client to pull their top lip up and then their bottom lip down, or use a gloved hand or tongue depressor to perform this action so you can inspect the mucosa on the inside of the lips.

Most clients can open their mouth wide and tip their head back so that you can observe the palate and also put the tip of their tongue behind their front teeth so that you can observe the floor of the mouth and under the tongue. You can use a tongue depressor to expose the buccal mucosa. To expose the pharynx, ask the client to stick their tongue out and say "ahhh" or pretend to yawn. You may need to use the tongue depressor to press the tongue down. If so, avoid using it in the middle of the tongue as this may elicit a gag reflex.

Inspection of the mucosa of the oral cavity includes observing the insides of the lips and the buccal mucosa (inside of checks), the tongue, the floor of mouth (under the tongue) and the hard and soft palate, the pharynx, and salivary glands. See **Figure 3** for anatomical locations of the oral cavity.

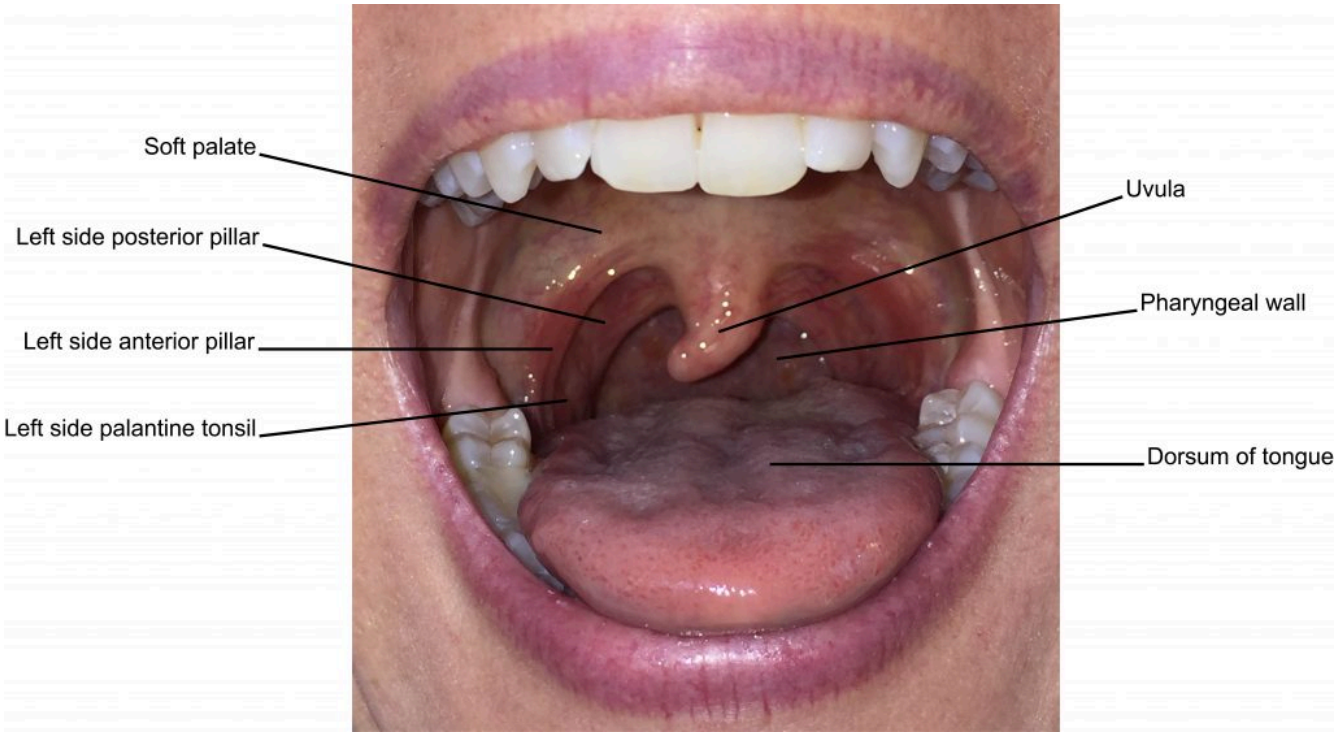

Figure 3: Anatomical locations of oral cavity.

Use the following steps:
1. Note **moisture** or **dryness**.

- The whole oral cavity should be moist. Dry mucous membranes are often a sign of dehydration. However, you should also assess if the client may be a person who breathes through their mouth and not their nose. You will notice tiny ductal openings (about 1 mm in size) of the salivary glands. These glands produce saliva for the mouth and include the parotid (ductal opening on the buccal mucosa near the upper second molar), the submandibular (ductal opening at the base of the ventral surface of the tongue on both sides of the frenulum), and the sublingual (several ductal openings on both side of the floor of the mouth).

2. Inspect the **mucosa of the lips** and **buccal mucosa** for **colour, lesions, swelling**, and **nodules**.

- The mucous membranes, including the mucosa of the lips and buccal mucosa, are pink in colour. Any discolourations (e.g., cyanosis or pallor) should be described and the location noted. Cyanosis can appear as a grey/white shade in people with darker skin (Lewis, 2020; Sommers, 2011) or as a dusky bluish/purple shade in people with lighter skin (Lewis, 2020). Pallor appears as a grey shade in people with darker skin or as a generalized pale discolouration in people with lighter skin.
- The mucosa of the lips and buccal mucosa are intact with a smooth surface. Note the description and location of any lesions, swelling, or nodules. Palpate any lesions, swelling, or nodules and identify the consistency (e.g., soft or hard).

3. Inspect the **tongue, floor of the mouth**, and **hard** and **soft palate** for **colour, lesions, swelling, nodules**, and **malformations**.

- Note the colour and any discolourations along with the location. The tongue is normally pink with a dotted surface that is most readily seen on the dorsal and posterior side. The small and hard palate are a lighter pink in which the hard palate (directly behind the upper front teeth) has a slight white shading. The ventral surface of the tongue is

highly vascular, and you will observe veins under the tongue.

- The mucosa is normally intact with a smooth texture except the hard palate, which has a ridged surface. Note the description and location of any lesions, swelling, nodules, or malformations. Palpate any lesions, swelling, or nodules and identify the consistency (e.g., soft or hard). One of the most common malformations at birth is a cleft palate.
- While doing so, observe for halitosis, which refers to a bad odour. It is important to recognize that "stale" smelling breath is not necessarily a concern and also to understand that this can be embarrassing for clients. Therefore, it is important to approach the situation in a sensitive manner. There are many causes of halitosis that should be assessed. For example, common causes are dehydration, bacteria associated with poor oral care, diabetes, tobacco, and recent ingestion of foods such as garlic, onion and coffee.

4. Inspect the **pharynx** for **colour, swelling, lesions**, and **nodules**, and describe the **tonsils**.

- Note the colour and any discolourations (such as redness or white patches) along with the location.
- Identify the presence, location, and description of any swelling, lesions, or nodules.
- Note the size of both the left and the right tonsil. Sometimes tonsils have been surgically removed so they may not be present. But, usually tonsils are just visible to view. Many "scales" are used to grade tonsil size, but there is no one standardized scale. Therefore, it is better to describe the size such as:
    - Tonsils are not present.
    - Tonsil(s) is visible between the anterior and posterior pillar, but not enlarged.
    - Tonsil(s) is enlarged at halfway between the anterior pillar and the uvula.
    - Tonsil(s) is enlarged and touching the midline of the mouth or the uvula. (If both tonsils are enlarged, you may describe them as touching each other).

5. Note the **findings**.

- Normal findings might be documented as: "Moist oral cavity. Pink mucosa with no discolouration, lesions, nodules, or swelling. Tonsils are visible but not enlarged."
- Abnormal findings might be documented as: "Dry mucous membranes of oral cavity. White, raised patches on the tongue, buccal mucosa, soft palate, and pharynx."

Teeth and Gums

Assessment of the teeth and gums includes inspection and palpation. Use a penlight to illuminate the back of the mouth. Begin by asking the client to smile to expose the teeth, and use a tongue depressor or your gloved finger to expose the gums and the back teeth. Remember: your assessment of the teeth and gums does not replace a routine dental assessment.

Assessment of the teeth and gums involves the following steps:

1. Inspect the **colour of the teeth**.

- Tooth **enamel** is white, so you should note any discoloration. When enamel begins to erode, teeth may have a yellowish colour, which reflects the underlying layer, and even a brown colour. Enamel erosion and tooth discolouration can be caused by many things including smoking, diet (e.g., red wine, coffee/tea), bruxism, decay, and acids introduced into the mouth as a result of bulimia. Some mild erosion is associated with aging due to exposure to cultural factors such as diet.

2. Inspect for **missing**, **chipped**, or **broken teeth**.

- Note the presence and location.

3. Inspect for missing or loose **fillings**.

- Note the presence and location.

4. Inspect the **gums** for **colour**, **swelling**, and **bleeding**.

- Identify the presence and location of any discolouration such as redness, swelling, or bleeding. Healthy gums have a pink colour similar to the buccal mucosa, with no swelling or bleeding.

5. Palpate for **loose teeth** and palpate the **gums** for **pain**.

- Use your gloved finger to palpate for the presence of any loose teeth, and note the location.
- Next, use your gloved finger to palpate the gums for pain while using the tongue depressor to pull the buccal mucosa out. Ask the client if they feel any pain or tenderness and note the location.

6. Note the **findings**.

- Normal findings might be documented as: "White teeth with no loose, missing, chipped or broken teeth. Gums are pink in colour with no swelling, bleeding, or pain."
- Abnormal findings might be documented as: "Slight yellow discolouration of the teeth. Second molar on upper right side loose with swelling of the gum and mild bleeding."

Priorities of Care

Respond immediately if a client has swollen lips consistent with other signs of anaphylaxis (e.g., hives, pruritus, dyspnea, dysphagia, tachycardia, hypotension). If so, did they just receive a vaccine or were they exposed to an allergen (e.g., a food or bee sting) that they are allergic to? If so, call for help and notify the physician/nurse practitioner immediately. If you are permitted to do so, administer epinephrine. Continue to monitor the client because anaphylaxis is life-threatening.

If the client shows signs of cyanosis or pallor, perform a primary survey to assess for clinical deterioration. Usually a client with discolourations in lips or mucous membranes will have other respiratory- or cardiovascular-related cues such as dyspnea, low oxygen saturation, tachypnea, and/or angina.

If the client has dry and cracked lips and dry mucous membranes with no other signs of dehydration, increasing fluid intake will usually resolve the issue. This could involve administering a rehydration solution that contains electrolytes; other forms of fluid intake can include ice chips (or popsicles for children), especially if the client is nauseated.

Further assessment and intervention may be needed if signs of more advanced dehydration are observed:

poor skin turgor, **oliguria**, dark urine, altered level of consciousness, tachycardia, and hypotension. With newborns and infants, you should assess for sunken fontanelles, decreased wet diapers, and drowsiness. An infant may also show reduced or absent tears when crying. For a hospitalized client with signs of advanced dehydration, perform a primary survey to assess for signs of clinical deterioration, increase intravenous fluids to rehydrate, and treat any other related symptoms such as diarrhea, vomiting, and fever. Report any cues that suggest clinical deterioration to the physician/nurse practitioner.

Lesions, nodules, discolourations, and enlarged tonsils are not usually urgent priorities for treatment, but you should complete a focused assessment (subjective and objective) to document them and report your findings to the physician/nurse practitioner. If tonsils are enlarged, you should assess the colour and the presence of exudate. If tonsils are touching the uvula or each other, you should assess for any breathing or swallowing issues. These associated symptoms require prompt intervention. Any issues associated with teeth (particularly loose, broken, or chipped teeth or missing or loose fillings) and gums usually require referral to a dentist. You should be concerned when the client indicates they have a lesion in their mouth that will not heal or a lump. These can sometimes be associated with oral cancers, which are commonly found on the floor of the mouth, inferior side of tongue, the buccal mucosa or the soft palate. A common cause of oral cancers is tobacco use.

Knowledge Bite

This image shows a throat infection called tonsillitis. Evidence of the infection is shown through swelling, redness and white patches (pus) on the tonsils. This pus consists of dead bacteria, white blood cells, and cellular debris

Image from: This work has been released into the public domain by its author, Michaelbladon at English

Wikipedia. This applies worldwide. Michaelbladon grants anyone the right to use this work for any purpose, without any conditions, unless such conditions are required by law.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=304#h5p-133

Abdominal Assessment

Abdominal assessment involves inspection, auscultation, palpation, and percussion. This **order of physical assessment** is important to preserve normal bowel sounds when auscultating. For example, pressing on the abdomen can modify bowel sounds by increasing peristalsis (wave-like contractions of the intestines).

Before beginning, ask the client to empty their bladder and bowel so that fullness will not influence the findings.

This assessment is best accomplished in the **supine position** because this allows any air in the abdominal region to rise to the surface area. The client should lie flat with their head on a pillow. Some clients may find it difficult to lie completely flat; if so, you can slightly elevate the head of the bed (about 10 degrees). To ensure the abdominal musculature is relaxed, ask the client to have their **arms resting beside their body** and their **knees bent** with either their feet placed flat on the bed or a pillow placed under their knees. For a newborn or young child, you can ask someone (care partner, parent, healthcare provider) to hold them on their lap.

Always do the assessment on **bare skin**.

Contextualizing Inclusivity – Discomfort in Exposing Abdomen

Some clients are uncomfortable exposing their abdomen. For example, they may feel uncomfortable because of body image issues associated with weight, modesty related to cultural or religious beliefs, or a new ostomy such as a colostomy or an ileostomy. Ostomies are surgically created openings onto the abdomen that allow stool to bypass a damaged/diseased part of the intestine and leave the body.

It is important that you create an inclusive environment that is judgment free and recognizes the client's potential discomfort. For example, you may begin the assessment with the following: "I need to assess your abdomen on the bare skin. Is that okay?" (wait for the client to give consent).

Abdomen - Inspection

Inspection of the abdomen provides information about the client's GI system, particularly the intestines, as well as the liver and the abdominal cavity overall. Refer to **Figure 4** for the quadrants and regions: a horizontal and a vertical imaginary line bisects the umbilicus to help you visualize the four quadrants. Note any abnormalities of the abdomen using these quadrants and regions.

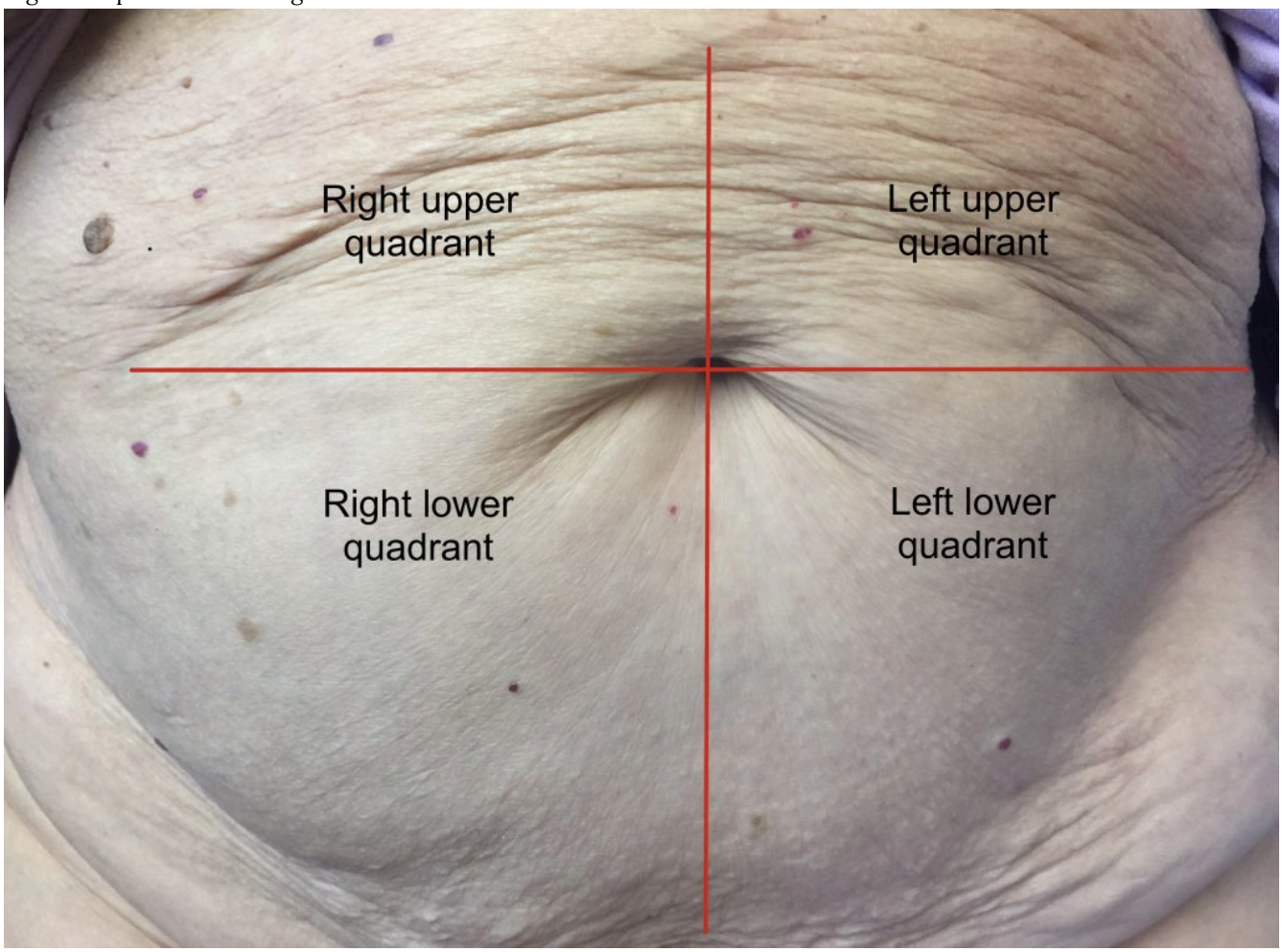

Figure 4: Abdominal quadrants.

Inspecting the abdomen involves the following steps:

1. Before inspecting the abdomen, note the client's **level of consciousness, facial expression**, and assess for the **presence of jaundice**.

- Clients are usually alert with a relaxed expression, although some may be nervous/anxious. Be attentive to any non-verbal signs of pain such as grimacing or **guarding**, and continue to observe the client's expression throughout the assessment. In addition to providing information about non-verbal signs of pain, this can also sometimes help you assess whether further support or guidance is needed.
- Jaundice is associated with high levels of bilirubin in the blood. It is included in the abdominal assessment because it can be associated with diseases of the liver, pancreas, gallbladder, and bile duct. Clients with jaundice have a yellowish discolouration of the **sclera** and sometimes the skin. An inclusive approach to evaluating jaundice is to inspect the sclera of the eyes, because the melanin in skin influences how jaundice appears. Clients with lighter

skin may have yellow discolouration of the skin beginning in the face and transmitting to the rest of the body, but relying on assessment of the skin alone is an example of how health assessment practices can be non-inclusive or racist.

2. Ask the client to **expose their abdomen** so you can observe from the epigastric (inferior to xiphoid process) down to the hypogastric region (superior to the pubic bone).
3. Ask the client to bend their knees.
4. Note any **stoma bags, tubes, drains, incisions, scarring, dressings**, or **medical equipment** (e.g., monitors). NOTE: If you observe discharge/bleeding on a dressing, outline it with a marker/pen and observe whether it increases in size. However, if there is a significant quantity, you should investigate the cause and perform a primary survey.
5. Use **tangential lighting** and **observe all four quadrants**.

- Observe the profile view (side view) while standing on the client's right side. Standing on this side will help you visualize any peristaltic movement, which will move away from you. These movements are the waves caused by the gastrointestinal tract (e.g., large intestine contractions). Peristalsis movement is usually not observable on the abdomen. You may see it in a client who is thin; otherwise, visible peristalsis is a cue that should act as a concern and can suggest an intestinal blockage. In a newborn, observable peristalsis may be associated with pyloric stenosis (narrowing of the opening between the stomach and the intestines), but this condition is associated with other symptoms such as projectile vomiting.
- Next, position yourself so that your eyes are at about the level of the abdomen at the side, and also view the abdomen from the end of the bed. This will allow a full view of the abdomen so you can compare the left and right sides of the full abdomen (including the umbilicus) and assess symmetry. Tangential lighting will highlight any protrusions like a lump/mass.

6. Note any potential signs of **observable pain**. (Remember: if you suspect pain, always ask the client.)

- Observe for signs of pain may include facial expressions, behavioural changes (e.g., complete stillness or restlessness or guarding) or physiological changes (e.g., holding their breath, shallow breathing).
- In pre-verbal children (or other non-verbal clients), signs of pain may include groaning, grimacing, shallow breathing, irregular rhythm of breathing, and tachypnea. Newborns and infants may flex their hips and knees, moving their legs up to their chest.
- Note that a client may be experiencing pain even if you do not observe signs of it. Clients with chronic pain often do not exhibit behavioural signs of pain.

7. Note the **abdominal shape**.

- Identify the presence of symmetry or asymmetry and any bulging.
    - The abdomen should be symmetrical and the umbilicus should be midline. Note the location of any asymmetry. If you suspect asymmetry, you can ask the client to take a deep breath in and out; this can accentuate any asymmetry or potential bulges. If the client is able to, you can also ask them to hold their head and upper shoulder area off the bed (like a little sit-up) or onto their elbows as this maneuver can accentuate any asymmetry or bulges. You could also ask them to cough; this can increase the intra-abdominal pressure and accentuate a hernia if present.
    - If you observe any bulging, further assess the area and note the location. Inspect the umbilicus for bulging, which can sometimes appear as an everted umbilicus. Normally, an umbilicus is inverted. Although an everted umbilicus can be normal, so always inquire if it is new. If you observe bulging, ask the client if they have noticed it, when it began, whether they know what it is, and ask about any associated pain. At the end of the overall inspection, you can gently palpate it to assess its consistency (soft or hard) and the presence of pain.

- Identify the contour (i.e., the abdominal curve).
    - The normal contour of the abdomen is typically flat or rounded.
    - A concave contour (inward curve of the abdomen that looks sunken in) is concerning because it can be associated with dehydration and malnutrition, and sometimes with anorexia nervosa and cancer. In newborns, it can also suggest a congenital anomaly in which the abdominal contents have shifted elsewhere, such as up into the thorax.
    - A distended abdomen is an enhanced outward contour, which can have many causes. See **Figure 5**.
        - The outward contour of the abdomen is typically enhanced when a client has increased air, fluid, and/or content inside the intestines, or outside the intestines within the **peritoneal cavity**. Distension may be associated with constipation, bowel obstruction, or irritable bowel syndrome. Severe malnutrition associated with protein deficiency and water retention can also distend the abdomen so it looks bloated. Another cause is ascites, which is the accumulation of fluid in the peritoneal cavity. Ascites has many causes, but most commonly **liver cirrhosis** associated with hepatitis or chronic alcohol use. In rare cases, a tumor might cause distension. Keep in mind that an infant normally has a protuberant abdomen that sticks out because of muscles that are not developed – don't confuse this with distension. A distended abdomen is firm to touch.

8. Note **skin colour, discolouration, integrity**, and **swelling**.

- Skin colour varies based on a client's racial background and should be consistent across the abdomen and the umbilicus. If you observe a discolouration (e.g., redness), describe it and the location. No swelling should be present and the skin should be intact; describe and note the location of any swelling or damaged skin (e.g., an open ulcer). Examine the umbilicus, which may become infected from a piercing. Note any scars, which may indicate past surgeries.

9. Note the **presence of peristaltic movement**.
10. Note the **findings**.

- Normal findings might be documented as: "Abdomen flat, symmetrical with no bulging, swelling, discolouration. Skin intact."
- Abnormal findings might be documented as: "Client grimacing with shallow irregular breathing. Abdomen distended."

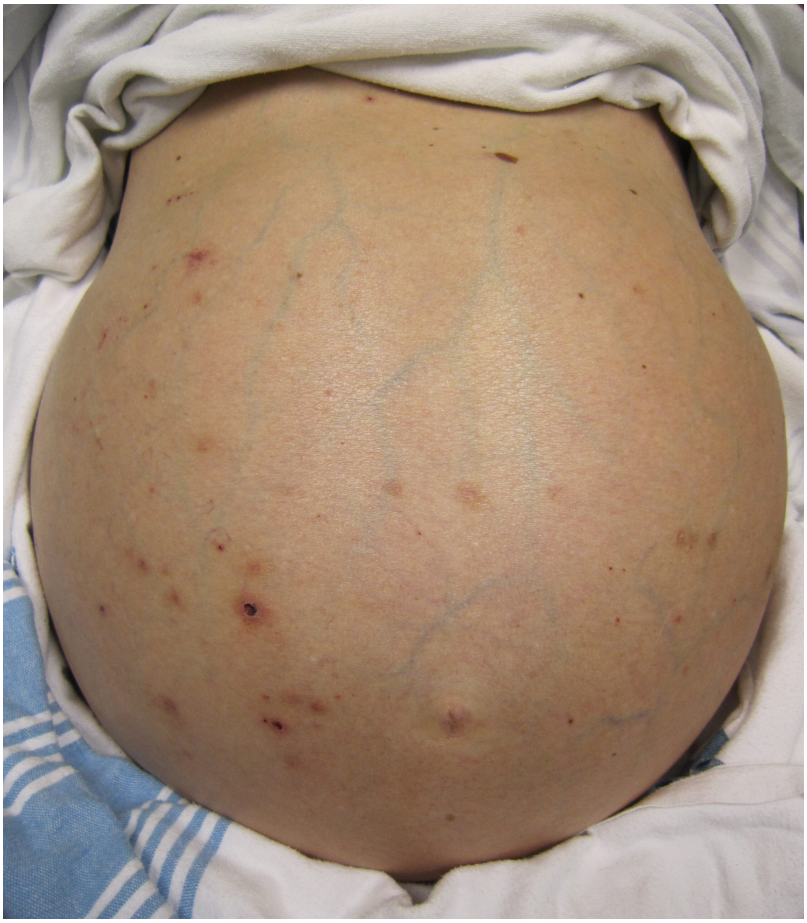

Figure 5: Abdominal distention (By James Heilman, MD – Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=15335623)

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Video 2: Inspection of the Abdomen

Priorities of Care

Signs associated with an intestinal blockage is a priority of care because it may indicate the need for surgical intervention. Pain, constipation, vomiting, and abdominal distention are possible signs of a blockage. If any are

present, notify the physician/nurse practitioner after performing a primary survey with a complete set of vital signs and a full abdominal assessment. It is especially important to auscultate and palpate the abdomen, because absent bowel sounds or a distended/firm and painful abdomen are associated with blockages.

All abnormal signs observed upon inspection require a full abdominal assessment. If you observe signs of pain, begin with a subjective assessment. Any asymmetry, bulging, abnormal contour, swelling, and lesions should be reported to the physician/nurse practitioner.

Activity: Check Your Understanding

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Abdomen - Auscultation

Auscultation of the abdomen as it relates to the GI system is performed to assess for intestinal function, specifically bowel sounds. **Bowel sounds** are produced by the movement of fluid, gas, and contents through the intestines.

As a nurse, auscultating for bowel sounds with the **stethoscope's diaphragm** is a common part of health assessment. The diaphragm is best for detecting **high-pitched sounds** such as bowel sounds. Bowel sounds are sometimes loud enough to hear without a stethoscope.

Auscultation of the abdomen follows inspection, so the abdomen is already exposed. When conducting auscultation, begin in the right lower quadrant and progress clockwise to the right upper quadrant, left upper quadrant, and the left lower quadrant. **Figure 6** presents the pattern of auscultation. Always begin in the right lower quadrant because this is the location of the ileocecal valve, which is a muscular sphincter that allows contents to move from the ileum of the small intestine to the cecum of the large intestine.

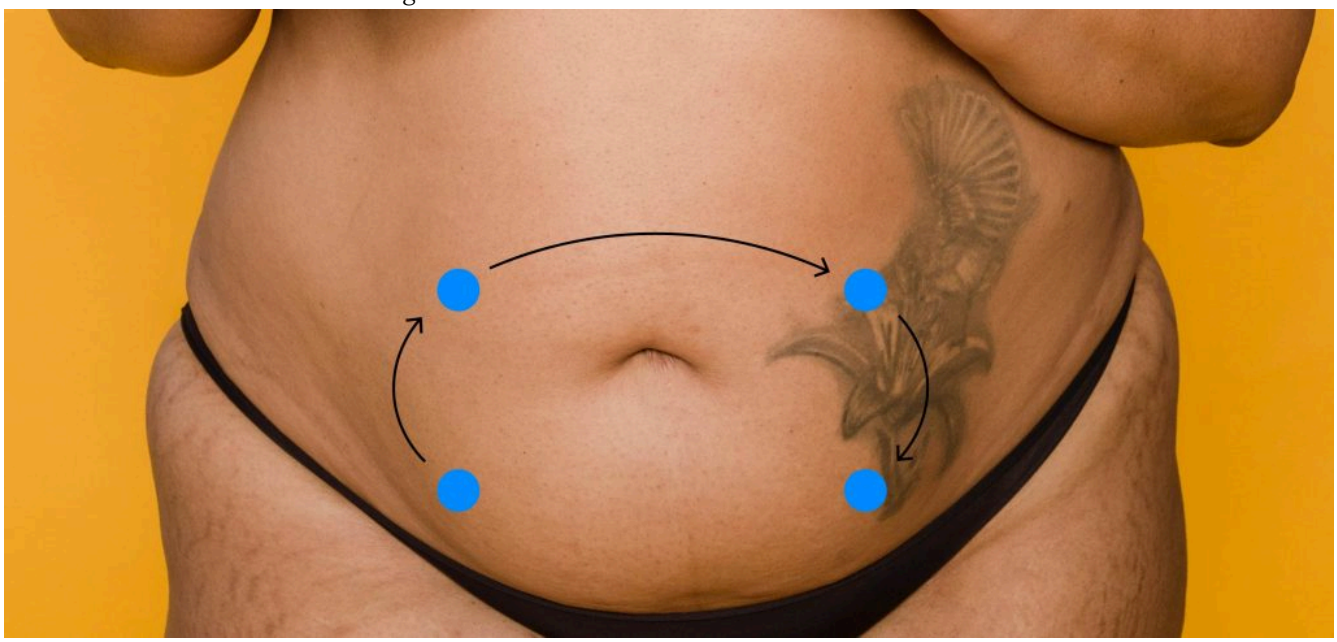

Figure 6: Pattern of auscultation.
Photo by Laura Tancredi from Pexels (image was cropped and illustrated upon for the purposes of this chapter)

Assess the presence, frequency, and quality of bowel sounds.

- **Presence**. Normally, bowel sounds are present in all four quadrants. This means that peristalsis is occurring and contents are moving through the intestines. Only document the absence of bowel sounds after listening in each quadrant for five minutes. Absent bowel sounds are a cue that suggest there may be a problem with the movement of contents through the intestines: common causes include **peritonitis**, a complete bowel obstruction, or perforation of the small or large intestine. However, keep in mind that movements of contents and contraction of the intestines do not always create sound.
- **Frequency**. If you hear bowel sounds, describe the frequency (i.e., the rate of occurrence, how often do you hear them). You do not need to count the number of bowel sounds; instead, estimate whether they are considered normoactive, hypoactive, or hyperactive.
    - Normoactive: 5–30 bowel sounds per minute (about 2 sounds every 5 seconds). Generally, you will only need to listen for a few seconds to estimate this frequency.
    - Hypoactive: less than 5 bowel sounds per minute. Because the frequency of hypoactive sounds is less frequent,

you will need to listen a bit longer in order to assess them. These sounds indicate that intestinal activity has slowed, which is normal when a person is sleeping. Hypoactive bowel sounds should act as a cue in other situations, which should always be assessed further. For example, bowel sounds may become hypoactive post-surgery due to anesthetic use and with certain medications (e.g., narcotics). Constipation is also a common cause of hypoactive bowel sounds.
    - Hyperactive: more than 30 bowel sounds per minute. Again, you will only need to listen for a couple seconds in order to estimate this frequency. These sounds indicate that intestinal activity is quicker than normal. You will often hear hyperactive bowel sounds after a client has just eaten; these sounds may also be associated with diarrhea and early/partial intestinal obstruction.
- **Quality**. Describe the quality of the bowel sounds (e.g., the description, how they sound). You might describe the quality as high-pitched with a series or mixture of sounds (e.g., gurgling, rumbling, bubbling, and even clicking). You might describe the quality of sounds as irregular (i.e., no specific/constant rhythm). The quality of bowel sounds is typically less important than the presence and frequency, but an extremely high-pitched bowel sound can be a cue suggestive of an early bowel obstruction.

Auscultating the abdomen for bowel sounds involves the following steps (see **Video 3**):

1. **Cleanse** the stethoscope.
2. With a complete seal and light touch, place the **diaphragm** of the stethoscope on the abdomen in the right lower quadrant and listen. Moving clockwise, lift the diaphragm and place it in the next quadrant. You should listen once in each quadrant.
3. Identify the **presence** and **location of bowel sounds**.

- Normally, bowel sounds should be present and heard in all four quadrants.

4. Identify the approximate **frequency of bowel sounds**. You do not need to count them.
5. Identify the **quality of bowel sounds**.
6. Note the **findings**.

- Normal findings might be documented as: "Normoactive bowel sounds heard in all four quadrants. High-pitched, gurgling sounds."
- Abnormal findings might be documented as: "Hypoactive bowels sounds in all four quadrants."

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Video 3: Auscultating the abdomen.

Priorities of Care

Any abnormal bowel sounds should be investigated. They should not be evaluated in isolation: an abnormal sound should always be considered in the context of other symptoms such as abdominal distention, flatus, pain, nausea, vomiting, diarrhea, and constipation. If a client has absent bowel sounds, consider whether this could be associated with a complete bowel obstruction, a perforation of the small or large intestine, or **peritonitis**. All of these issues require urgent intervention and are often associated with pain, abdominal distention, nausea, and vomiting. If you suspect one of these conditions, monitor the client closely while conducting a primary survey and complete set of vital signs. Then, notify the physician or nurse practitioner.

Normal bowel sounds are usually the same throughout all four quadrants, but abnormal bowel sounds can vary from quadrant to quadrant. For example, hyperactive bowel sounds can be present prior to the location of a partial bowel obstruction, and hypoactive or absent after the location of a partial bowel obstruction. Trends in bowel sound are important to consider; for example, a sudden shift from hyperactive to absent may indicate a crisis situation such as a bowel perforation.

Activity: Check Your Understanding

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Abdomen - Palpation

Palpation of the abdomen provides information about the organs associated with the GI system. The palpation technique follows auscultation, so the abdomen is already exposed. Additionally, **you should NOT palpate** the abdomen if vascular bruits are present (e.g., aortic, renal, iliac, and femoral). If the client has experienced a physical injury or trauma to the abdomen, you also might not palpate the abdomen.

Remember, always **palpate on bare skin**.

Palpation of the abdomen involves the following steps (see **Video 4**):

1. If not already, ask the client to bend their knees up and ensure they are draped.
2. Use the **pads of your four fingers** to gently palpate the abdomen, keeping your fingers together and your wrist and forearm at about the same plane as the client's body.

- Avoid a more angled position: this will create a feeling that you are poking the client in the abdominal region, which can be uncomfortable and also does not permit you to assess the area as well.
- Only the pads of your fingers should be touching the client during light palpation.

3. Begin in the **right lower quadrant** and proceed clockwise. If the client indicates they have pain in the right lower quadrant, begin in the right upper quadrant instead and palpate the area with pain last.
4. Press down about **one to two centimeters** (light palpation) and move your fingers together in a circular motion.

- Sometimes, you will notice **voluntary guarding** (tense abdominal muscles) as a result of nervousness, pain, cold room temperature or hands of the nurse, or ticklishness. The tenseness of the muscles usually covers the whole abdomen (i.e., bilateral). It can help to ask the client to take a deep breath when you palpate to help them relax the muscles. Remember to use light palpation and do the painful area last. Only expose the abdomen as long as needed so the client stays warm, and warm your hands by rubbing them together. If the client is ticklish, use a sandwich technique: put their hand on top of your palpating hand, and place your other hand over top of both to control the pressure.

5. Lift fingers up together and move on to the next location, ensuring that you **palpate every square centimeter** of the abdomen in all four quadrants.
6. Assess the following:

- **Overall consistency** (soft or firm) and associated pain/tenderness. The abdomen is usually soft upon palpation. Note the location of any firmness and any associated pain/tenderness. The consistency of the abdomen is influenced by the amount of adipose tissue or muscle, but these are symmetrical across the abdomen.
- **Presence of masses**. Describe any masses in terms of location, size (dimensions), shape, consistency (soft or firm), and associated pain/tenderness.
- **Presence of swelling**. Note the location of any swelling.
- **Presence of pain**. If the client feels pain/tenderness upon palpation, note the location and ask them to rate the severity on a scale of 0 to 10.
- **Presence of rigidity and spasms**. Rigidity is involuntary firmness/hardness of the abdominal muscles associated with peritoneal inflammation. This rigidity is felt over the inflamed area; it is not bilaterally symmetrical and not voluntary like guarding. You may also feel spasms which are muscle contractions that are often painful.

7. Note the **findings**.

- Normal findings might be documented as: "Abdomen soft to touch with no masses, swelling, pain, and rigidity."

- Abnormal findings might be documented as: "Client noted generalized pain all over abdomen upon palpation, rating it 5/10. Abdomen firm to touch in all quadrants. Left lower quadrant mass, circular in shape, 5 x 5 cm."

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Video 4: Palpation of the abdomen.

Clinical Tip

If a client has indicated pain/tenderness, palpate that area last. Palpating a painful area of the abdomen first will aggravate the pain and may affect the accuracy of your assessment. Additionally, observe the client's facial expression as it can be a cue about how the client is doing and possibly whether they are having any pain.

Priorities of Care

Urgent surgical intervention is required when a client has appendicitis (inflammation of the appendix that is at risk of perforating). In these cases, the client usually presents with an increasing level of pain in the right lower quadrant, often beginning in the periumbilical region. This can also be associated with lack of appetite, nausea, vomiting, fever, chills, and muscle rigidity. If you suspect appendicitis, notify the physician immediately. Continue to monitor the client, measure vital signs, do not allow the client to take anything by mouth, and begin an intravenous if there are standing orders. A physician or nurse practitioner may assess for rebound tenderness, which involves palpating in the right lower quadrant and quickly removing one's hand. Positive rebound tenderness (pain when the assessor removes their hand) is often indicative of appendicitis.

All abnormal findings (e.g., masses, swelling, pain, rigidity) should be further investigated with a focused abdominal assessment. Report any new, worsening, or unexpected findings to the physician or nurse practitioner.

Activity: Check Your Understanding

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Abdomen - Percussion

Percussion of the abdomen involves **tapping the body to elicit sounds** and determining whether the sounds are appropriate for the underlying structure of the quadrant. This provides information about the **overall consistency of the abdomen** as well as the size and borders of some of the underlying structures. For example, percussion sounds of the abdomen can tell you whether the underlying structures are:

- Fluid filled with a mixture of air and contents (e.g., intestines, bladder, stomach).
  - Fluid results in a tympanic sound (like a drum, usually high pitched with a long duration). General tympany with scattered dullness is the dominant sound heard over the abdomen because of the intestines.
- Dense (e.g., liver, an abnormal mass close to the surface, intestines filled with stool).
  - Density results in a dull sound (like a quiet thud, usually high pitched with a short duration).

Clinical Tip

Expected percussion notes may be influenced by each body's unique size and shape. For example, some bodies are more muscular and some have more adipose tissue. The expected percussion sounds are influenced by muscle and adipose tissue, which tends to elicit a more dull sound. You may decide to not percuss an abdomen that is extremely muscular or has a lot of adipose tissue, but percussion may still be of clinical utility in certain situations. For example, when the abdomen is distended and filled with air, the percussion note might resemble hyper-resonance; when the abdomen is filled with fluid such as with **ascites** the percussion note might have more tympanic noise that is not scattered with dullness, depending on the severity of the ascites.

Percussing the abdomen involves the following steps:

1. Use an **indirect percussion technique** to percuss the abdomen. As shown in **Figure 7**, this technique involves the application of a mediated force using parts of both hands.

Figure 7: Indirect percussion.

2. Perform **indirect percussion** using a zig-zag pattern (see **Figure 8**) beginning in the right lower quadrant and progressing clockwise. Percuss about three times per quadrant. For indirect percussion (see **Video 5**):

- Non-dominant hand: With your hand parallel to the client's body, place the distal interphalangeal joint of the pleximeter (middle) finger of your non-dominant hand firmly on the body region to percuss. Because the abdomen is often soft, you must push down relatively firmly with the distal interphalangeal joint. Ensure that only your interphalangeal joint is touching the body (and not the rest of the hand) and that the finger is fully extended.
- Dominant hand: Flex (bend) the pleximeter finger of your dominant hand and with the tip of your finger, tap twice on the distal interphalangeal joint of your non dominant hand. The pleximeter finger of your dominant hand should be at a 90-degree angle to the surface of the client's body. The motion should be firm and quick with a very short duration. To optimize this motion, the wrist of your non-dominant hand should be relaxed and loose with your forearm parallel to the client's body.

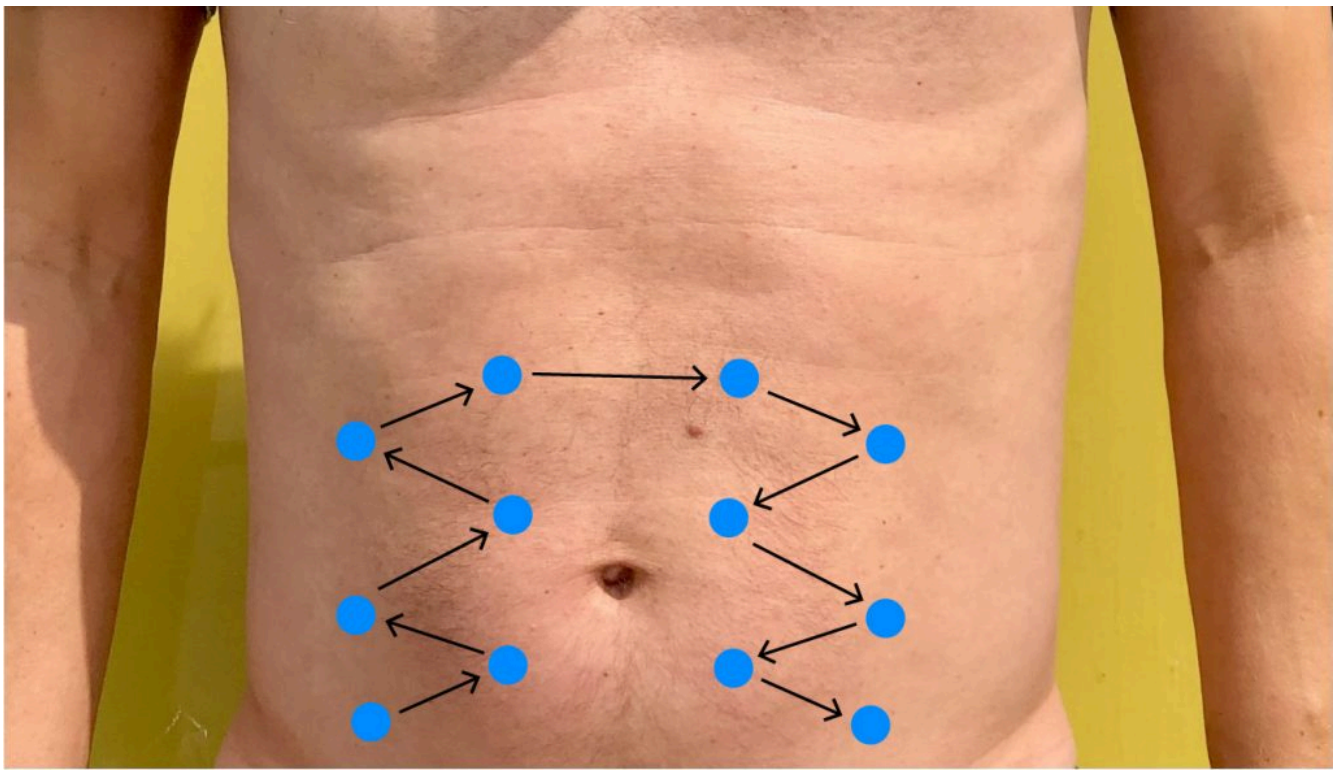

Figure 8: Pattern to percuss the abdomen.

3. Listen to the **quality of the sound** and identify the **location**.
4. Note the **findings**.

- Normal findings might be documented as: "General tympany with scattered dullness heard in all quadrants. Dullness heard in upper right quadrant over the liver."
- Abnormal findings might be documented as: "Dullness heard in left lower quadrant with general tympany and scattered dullness in all other quadrants."

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Video 5: Percussing the abdomen.

Activity: Check Your Understanding

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Perianal Region - Inspection and Palpation

The perianal region extends around the anal opening by about five centimetres. Assessment of the perianal region can create feelings of discomfort and nervousness in clients, so you should always employ a **trauma-informed approach**.

- Explain each step.
- Ask permission to touch.
- Use a drape, and only expose the client as long as needed.
- Avoid words that may be triggering, such as "bed" and "spread your legs." Instead, use "exam table" and make requests like "move this leg out."
- Ask the client if they would like to have another person present such as a family member/friend or another healthcare provider.

Positioning for this assessment depends on several factors including age, what is most comfortable for the client, and other parts of the assessment. It is best to use an **inclusive approach** to assessment: provide the client with options on how to proceed with positioning. Where appropriate, you can provide choices by saying, for example, "I need to exam your anal region. I usually have clients in position XX or XX, do you have a preference or another option?" Specific considerations for positioning include:

- To ensure **infants** and **toddlers** are comfortable and safe, involve their caregiver/parent when possible. They are often best positioned in supine position on the exam table or the caregiver's lap and then the legs (hips and knees) are flexed towards the chest.
- With **older children, adolescents**, and **adults**, use a position that is comfortable and familiar for the client. For example, if you are only doing an examination of the perianal region and/or the client is restricted to the bed, you can help the client into a left lateral position. If clients have difficulty maintaining this position, place a pillow between their legs with the right leg flexed.
- A rectal exam is often performed at the same time as genitourinary or prostate exam, so you should use the position required for that to minimize position changes. More importantly, it is important to use a position that is **most comfortable** for the client and usually **gender-affirming**. For example, for a **cisgender** woman, you may use a lithotomy position in which they are in supine position with their legs flexed and abducted, and their feet in stirrups. With a cisgender man, you may use a standing position in which they lean over on a table with toes pointing inward. With **transgender** and **non-binary** clients, use a position that is most comfortable for them at that moment: this is usually a position that is gender-affirming. For example, for a transman, you may use a standing position and for a transwoman, you may use a lithotomy position. Be aware that the preferred position may change over time for a non-binary or a trans client, so always ask.

Perianal assessment involves the following steps:

1. Prepare **supplies** needed (e.g., cover sheet/drape, gloves).
2. Don **gloves**.
3. Provide options for **positioning**.
4. Assist the client into position and ensure they are comfortable.
5. Expose the **rectal area**. If the client is in a left lateral position, place your dominant hand on the right buttock and gently pull it up. If the client is standing, you may need to gently spread the buttocks apart with both of your hands; you may also need to do this if the client is in supine or lithotomy position.
6. Inspect the area for **colour**. The peri-anal area is slightly darker than the rest of the client's skin, but the colour in the region should be consistent with no discoloration (e.g., redness, dark brown/purple) or rashes.
7. Inspect the area for **lesions** or **lumps** (e.g., a wart).

- If any are noted, palpate them for consistency (soft or hard) and pain.
- If any are noted, identify the location, colour, size, shape, elevation, and whether the area is intact.

8. Inspect the area for **discharge**. If any is noted, identify the quantity, colour, and consistency.

9. Inspect the area for **malformations**. (e.g., hemorrhoids). See **Figure 9** for an image of a hemorrhoid. If any malformations are noted, describe the appearance, location, colour, and size.

- If any are noted, palpate them for consistency (soft or hard) and pain.

Figure 9: Hemorrhoids.

Photo by Pachacamac33, Public Domain, from Wikimedia Commons (image was cropped and illustrated upon for the purposes of this chapter)

10. Assess for **anal tone** by asking the client to try to contract or "draw in" their anus. This can also be achieved by gently touching a cotton ball just lateral from the anus. Observe the external anal sphincter. Normally, a client has "good" anal tone as demonstrated by contraction or puckering of the anus.

- This is important to assess particularly in older clients or clients who may have indicated problems with **fecal incontinence**. Anal tone can be affected by nerve or muscle damage. There are many causes of this damage, but it is sometimes related to individuals who strain when trying to have a bowel movement. Straining can be associated with constipation and can be treated by health promotion related to diet, sufficient water intake, and routine bowel training.

11. Note the **findings**.

- Normal findings might be documented as: "Perianal area is consistent in colour with no discolouration, lesions, discharge, or malformations. Good anal tone."
- Abnormal findings might be documented as: "Perianal area has swollen veins at the anal opening with slight bleeding."

Activity: Check Your Understanding

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Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion and disease prevention are important components of any assessment, including a GI system assessment. Consider all available subjective and objective data when determining appropriate interventions. As part of subjective data collection, ask the client about risk factors, social determinants, and other considerations.

The inquiry part is integrated throughout the assessment. Many of the probing questions may be asked when doing the subjective assessment. However, some of the questions will be formulated based on your critical reflection of data collected during the subjective and objective assessment. It is this data that will inform your clinical judgement and the health promotion needed for a specific client.

Hand Hygiene

Hand hygiene is necessary to maintain a healthy GI system and prevent unhealthy microorganisms from entering the body. Hand hygiene can decrease the risk of various mouth and other GI-related viruses, such as herpes simplex virus type 1 (e.g., cold sores, fever blisters) and viral gastroenteritis (e.g., stomach flu), parasites on the surfaces of soil, food, and water (e.g., giardia), and bacteria found in the mouth that cause decay (e.g., Streptococcus mutans) or in contaminated food that can cause diarrhea and stomach cramps/pain (e.g., Salmonella).

Probing questions related to hand hygiene include:

- Tell me about when you wash your hands?
- How often do you wash your hands?
- What is involved in washing your hands? (Further probes might include: What are the steps involved? How long do you do it for?)

You may need to educate the client about effective hand hygiene practices such as when to perform it and how to do it. This education should be dependent on the client's age. For example, you could teach a child to wash their hands along with their favorite song or a fun educational video; with older adults, you could introduce various assistive devices (e.g., nail brush) for clients with limited fine dexterity. Teach clients to perform hand hygiene frequently in healthcare and in work settings, as well as when they arrive at and leave a building, come home, before meal preparation, before and after meals, and before and after using the washroom.

Hand hygiene generally refers to either hand washing with soap and water or hand sanitizing with an alcohol-based hand rub. The mechanical actions of rubbing and creating friction helps to break down and remove various microorganisms from hands, preventing them from entering the mouth and the rest of the GI tract. Clients may require education about specific techniques.

Hand washing technique:

- Rinse hands with warm water, lather with soap for 20 seconds.
- Rinse hands with water.
- Dry hands with a paper towel.
- Turn off the tap with your elbow or the paper towel.

NOTE: Consider how to make it fun with children, for example by singing a song that lasts 20 seconds.

Hand sanitizing technique with alcohol-based hand rub:

- Ensure hands have no soil on them and are visibly clean.
    - If there is visible soil, perform hand washing instead.
- Dispense a sufficient amount of gel in hand.
- Rub hands together so that all areas of the hands are covered.
- Rub hands together for about 15 seconds until they are dry.
    - If hands dry before 15 seconds, use more hand gel.

Mouth Care and Dental Care

Mouth and dental care is an important part of maintaining the health of the oral cavity of the GI system, particularly the teeth and gums.

Probing questions related to mouth care and dental care include:

- Tell me about any personal mouth and dental care you perform. Probing questions could include:
    - How often do you brush your teeth?
    - How often do you floss?
    - Can you tell me about your brushing technique (e.g., brushing away from gums, type of toothbrush)?
- When was the last time you saw a dentist for a check-up or a hygienist for a dental cleaning? How often do you typically have your teeth cleaned?
- Do you have any concerns about your mouth and dental care?

Begin by addressing any of the client's concerns about their mouth and dental care. Remember to consider relational and structural approaches to health promotion. For example, children learn how to brush their teeth and maintain a schedule based on support from their parent/caregiver. Thus, it is important that you assess social and familial support related to dental care. Based on your assessment and the client's needs, you may need to provide health promotion education about mouth and dental care.

The Canadian Dental Association (2021) recommends brushing teeth at least twice a day, flossing once a day, and having a cleaning about every six months. However, there are many inequities associated with dental care, for example geographical access to a dentist when living in rural, remote, and Northern communities. Some communities lack access to clean water, and some water systems are not fluoridated. Almost 30% of the water systems in Ontario are not fluoridated, and this has a significant effect on dental decay. The lack of fluoridated water systems has been identified as a problem for many Indigenous communities (Public Health Agency of Canada, 2017).

Another consideration is the financial costs associated with dental cleanings and dentist appointments. These are not always covered under provincial and territorial health insurance plans in Canada. Ask the client if they are covered under a private insurance plan related to their work or under a family member's plan or through their post-secondary educational institution. Ontario has a dental care program for children under the age of 17 from low-income families (Ontario dental care – children). Also check out the new Canada Dental Care Plan that was developed to help ease financial barriers in accessing oral health care for eligible Canadian residents. Also, check out information about flossing). Some dental schools also provide dental care at minimal cost.

Diet

Diet affects the functioning of the GI system. A healthy diet helps maintain the health of the GI system, fuels the body

to function, and maintains an ideal body mass index; a diet high in fibre with adequate hydration helps keep the intestines moving and bowel movements regular. In contrast, an unhealthy diet can lead to malnutrition, obesity, dental decay, altered bowel patterns such as constipation and diarrhea, and can affect other body systems and lead to various health problems such as diabetes, some cancers, cirrhosis, and heart disease.

Malnutrition is when when the body does not have sufficient vitamins, minerals and other nutrients to maintain a healthy GI system as well as healthy tissues and organs. Malnutrition can be related to **undernutrition** or **overnutrition**.

Check out this video about how the food you eat affects your gut. It was created by Dr. Shilpa Ravella, a gastroenterologist.

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https://youtu.be/1sISguPDlhY

Probing questions related to diet could include:

- Tell me about your usual diet?
- What have you eaten in the last 24 hours? Is that your usual diet?
- How often do you eat X or drink X? (X refers to a specific food or fluid and getting an understanding of the frequency of consuming certain foods can provide information related to malnutrition disorders)
- Do you have any food allergies or intolerances? (Further probes could include: What type of allergies? What is the reaction? (e.g., anaphylaxis, rash) When did the allergy start? How do you treat it?)
- Do you have enough money to buy healthy food?
- Tell me about your cultural practices related to diet?

In addition to assessing what they ate in the last 24 hours, it can sometimes be helpful to elicit a more comprehensive understanding of their diet particularly when there are health problems associated with the GI system (e.g., chronic diarrhea or constipation). In this case, you may ask the client to keep a **food diary** for a set period of time such as a week. The client can identify anything they consume with the date/time and also keep track of any symptoms. In clients who are hospitalized, observation is often employed to monitor the client's food and fluid intake and help tailor diets to the client's likes and nutritional needs.

You could assess the client's familiarity with Health Canada's Food Guide (Government of Canada, 2021) and discuss how they might draw upon it to guide their food choices. Remember that the food guide still includes Eurocentric elements, so you should collaborate with the client about its relevance in the context of their cultural food practices. A food guide snap shot available in multiple languages and many resources have been developed for Indigenous populations.

Informed by Canada's Food Guide, some key elements to discuss with a client when promoting a healthy diet include:

- Eating patterns and cultural practices.
- Making water the drink of choice.
- Making time to enjoy the meal, eating mindfully, allowing the food to digest.
- How to incorporate fibre, probiotics, fermented foods (e.g., kimchi), polyphenols (e.g., almonds), and a variety of food options to promote gut healthy nutrients.

Assess each client's lifestyle to understand how it affects their diet and how you can help them adapt to include

healthier food choices when possible. Use the relational health promotion approach to learn what food and diet means to the client and how their environment and the people within it can influence their choices. For example, young adults attending college or university may have limited access to healthy food choices due to a prevalence of fast food vendors at their institution. In this sort of situation, when a client lacks access to healthy food resources, nurses can source out and advocate for access to food resources within the client's community (e.g., food banks, breakfast programs), help the client find accessible food services (e.g., student nutrition program), or help the client find resources for grocery delivery. Nurses need to advocate to ensure the particular needs of each client are being met, using the available socioeconomic and environmental resources. By working in partnership with each client, you can create effective interventions that support the client in achieving a healthy diet.

Smoking, Alcohol, and Cannabis

Smoking or chewing tobacco has negative effects due to the risk of cancer in the mouth, tongue, esophageal, stomach, pancreas, and liver. Alcohol and cannabis can have positive and negative effects on the GI system.

For example, red wine contains polyphenols from the skins of the red grapes. Polyphenols are plant-based compounds that are healthy for intestinal bacteria; evidence suggests that polyphenols have a probiotic effect on intestinal bacteria (Moorthy et al., 2020). However, this is not a good reason to start drinking wine, because many plant-based foods such as fruits contain polyphenols. Moreover, alcohol can have negative effects on your GI tract: it can cause diarrhea in some due to increased acid production in the intestines, and constipation in others due to its diuretic effect. Some people are also intolerant to the additives in alcohol (e.g., gluten in beer). The liver is the main organ that processes alcohol, and heavy drinking over a long period can damage the liver and lead to cirrhosis. Additionally, because the liver processes many medications, a damaged liver can affect how medications are absorbed and their effects. The most recent Canadian guidelines now suggest that there are health risks associated with any level of alcohol consumption, although negligible with two drinks or less weekly (Paradis et al., 2022). From a GI perspective, alcohol is a carcinogen that is linked to colon cancer as well as rectum, mouth, liver, and esophageal cancer (Paradis et al., 2022). Overall, the key is to consume limited amounts of alcohol.

The Canadian Society of Intestinal Research has reported that cannabis can be used effectively to treat loss of appetite and nausea and vomiting related to GI conditions such as irritable bowel diseases (IBD) and multiple sclerosis (MS) (medical Cannabis). However, negative GI-related effects of consuming cannabis have also been reported: some individuals are allergic, and long-term use can cause cannabinoid hyperemesis syndrome, which causes nausea, vomiting, and abdominal pain. Overall, clients should discuss cannabis use with their primary healthcare provider prior to consuming.

Probing questions related to alcohol, cannabis, and smoking could include:

- Tell me about how much alcohol you consume in a day? If the client does not consume alcohol daily, you can assess consumption based on weekly, monthly, or none. If the client's answer is affirmative, ask probing questions such as: How much (e.g., ounces a day)? What type of alcohol (e.g., red wine, beer)? For how long? Can you tell me the reasons?
- Do you smoke or ingest cannabis? If affirmative, ask similar probing questions as above. Also ask if it is medically prescribed or recreational.
- Do you smoke cigarettes or use any tobacco-related products? If affirmative, ask similar probing questions as above examples. Also ask if the client inhales or chews tobacco.
- If you do not currently consume alcohol/cannabis/smoking, have you ever? If affirmative, you can ask similar probing questions as above, including the reason that the client quit.
- Have you had an allergic reaction to alcohol or cannabis? If affirmative, ask probing questions such as: What is the reaction (e.g., anaphylaxis, irritable bowel)? When did it start? How do you treat it?

Health promotion education should focus on each client's lifestyle and reasons for consuming alcohol, cannabis, or tobacco. Interventions related to using safely or quitting the consumption should be tailored to each client and could include counselling, cognitive-behavioural therapy, and support groups. You should also consider the relational promotion approach: for example, a client's consumption can be influenced by their surrounding environment (e.g., family, friends, workplace).

If the client is interested in using medical cannabis, your role as a nurse is to understand their interest and help them find appropriate resources specific to their needs. You can also advocate for educational resources about medical cannabis if a client's healthcare setting or community lacks resources or support.

Activity

Activity and exercise promote peristalsis of the intestines ensuring that content moves along the digestive tract and helps to maintain a healthy body mass index. It is important for individuals to eat healthy and drink an adequate amount of fluids (primarily water) based on their age, genetics, and activity level. Guidelines vary, but it is suggested that individuals participate in about 30 to 60 minutes of aerobic activity five to seven times per week.

Check out this video about improving digestion with movement. It was created by Dr. Jaclyn Tolentino, a family medicine physician.

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Probing questions related to activity could include:

- Tell me about your activity or exercise routine?
- What is your exercise routine? What type of exercise? How long do you do this type of exercise for? How many days of the week do you participate in exercise? If the client engages in sports, ask about protective equipment.
- Do you have any mobility limitations?
- Do you have any concerns about your level of activity or exercise?
- Do you have any goals you would like to achieve related to your activity or exercise level?

Assess and collaborate with each client to create an activity/exercise care plan that is based on their goals and needs. The care plan should be realistic and attainable for the client according to their physical capabilities, environment, and availability. You can also assess the client's access to support systems for additional support, such as community walking groups, fitness apps, and local gym memberships. The participACTION website is a helpful website

Remember to assess the client's broader community structures. For example, does the client's community have accessible, safe sidewalks or streetlights. This kind of structural approach to health promotion can help address potential inequities. Access to services can vary and can be a barrier to the client's exercise/activity goals. Other barriers might include finances (e.g., gym memberships, sports registration fees) or geographical location (e.g., different resources available in urban, rural or remote regions). As a nurse, you will need to tailor activity programming to each client. You can also advocate for structures to address inequities.

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Clinical Judgement: Case Study

A 67-year-old client, pronouns she/her, came to the health clinic concerned about being constipated for the last 2 ½ weeks and has been experiencing cramping and pain in her left lower quadrant (LLQ) for the past 4 days. She reported feeling like she has to have a bowel movement (BM) but nothing comes out and she is worried she might have hemorrhoids. Today she began to feel nauseous. The client explained she was diagnosed with multiple sclerosis (MS) 5 years ago and that when she is stressed, her MS flares up and she gets constipated. Her daily life routine has been altered recently because she has been taking care of a friend who had heart surgery. Her vital signs are: blood pressure (BP) 138/88 mm Hg, pulse (P) 92 beats per minute, respirations (RR) 18 breaths per minute, oxygen saturation (O2 sats) 98% and oral temperature (T) 37.9 degrees Celsius.

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The nurse learns the client experiences these symptoms a couple of times per year when her MS flares-up. When not having a flare-up, the client normally has a bowel movement 5–6 times per week. The client reported that her diet and exercise has been interrupted due to helping a friend. She said that she usually eats a healthy diet, walks 30–60 minutes 5 times per week, and does yoga 3 times per week. During the last 2 weeks, she has not exercised and has been ordering take-out. Other symptoms include straining when having a bowel movement, passing small hard stool, and a bit of bleeding during the last bowel movement. The client's constipation usually resolves after a week, but she believes it has lasted longer due to the added stress in her life.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Key Takeaways

- Common symptoms to assess related to the GI system include pain, nausea and vomiting, appetite changes, food intolerances and allergies, changes to bowel patterns including diarrhea and constipation, bloating, and flatulence.
- An objective assessment of the GI system is first performed with the client sitting upright to assess the oral cavity and then lying supine to assess the abdomen. Collaborate with the client to determine the position to best assess the perianal region.
- A trauma-informed approach to the objective assessment is necessary considering that areas of the abdomen and the perianal region are being exposed.
- The objective assessment should begin with inspection and palpation related to the oral cavity; inspection, auscultation, palpation, and percussion of the abdomen; and inspection and palpation of the perianal region.
- Health promotion interventions should be developed with the client to address what is important to them.

CHAPTER 15 - NEUROLOGICAL SYSTEM ASSESSMENT

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Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgement.
4. Integrate an inclusive approach to neurological system assessment.
5. Integrate health promotion interventions into actions.

Introduction to the Neurological System

The **neurological system** is important to assess because it is responsible for relaying messages from all body systems to the brain and spinal cord, and from the brain and spinal cord back out to all body systems. It is involved in regulating:

- **Senses** (e.g., seeing, hearing, tasting, smelling, touching).
- **Motor function** (e.g., walking, balance, coordination).
- **Cognition** (e.g., level of consciousness, thinking).

As a nurse, your assessment of the neurological system provides information about the functioning of this system and potential cues that may require your action. This chapter focuses on the adult and adolescent (older child) population; neurological assessment of the newborn/infant/young child is beyond the scope of this chapter.

Neurological System Components

See **Figures 1**, **2**, and **3** for the anatomy of the main components of the neurological system. The main components of the neurological system include:

The **central** nervous system:

- Brain.
- Spinal cord.

The **peripheral** nervous system:

- 12 paired cranial nerves.
- 31 paired spinal nerves.

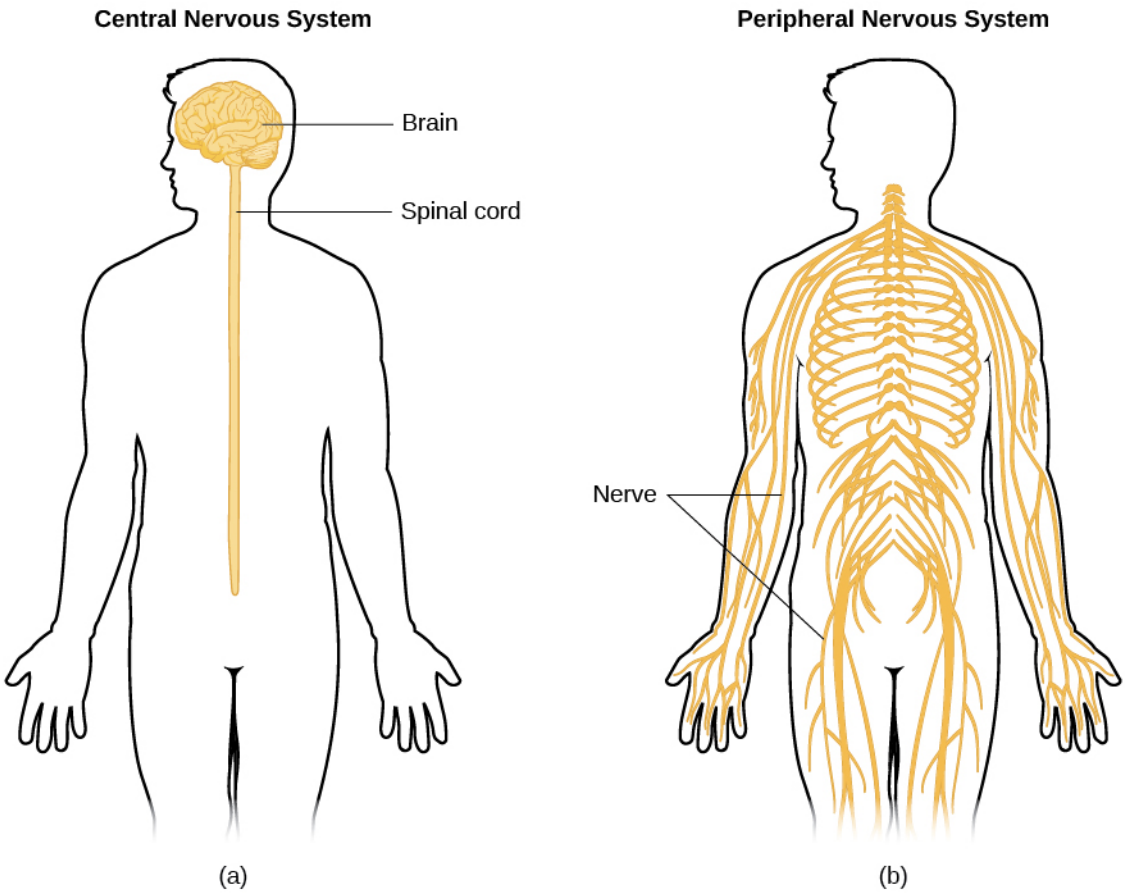

Figure 1: Central nervous system and peripheral nervous system. (https://oercommons.org/courseware/lesson/71166/overview)

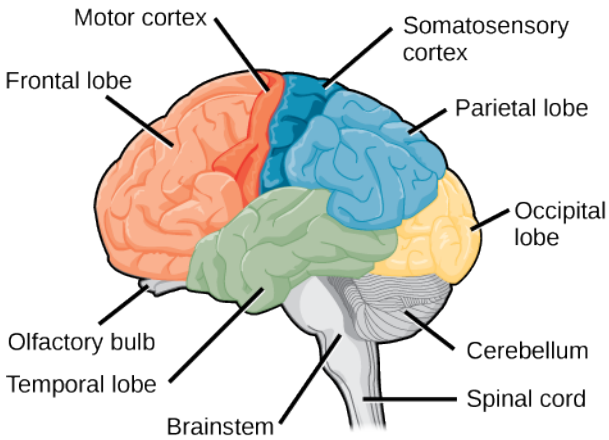

Figure 2: Central nervous system. (https://oercommons.org/courseware/lesson/15117/overview)

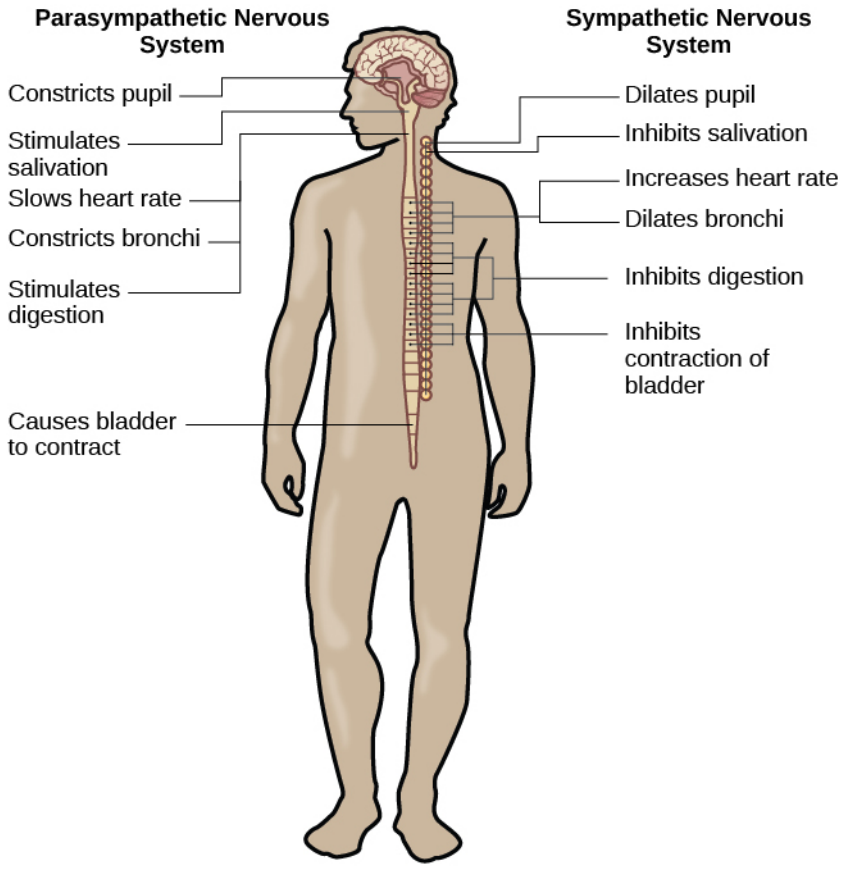

Figure 3: Autonomic nervous system. (https://oercommons.org/courseware/lesson/71166/overview)

If you want to refresh your knowledge of anatomy and physiology of the nervous system, watch these videos:
The nervous system
Central nervous system
Peripheral nervous system

Clinical Tip

The neurological system is closely interconnected with and influences all body systems, so it is rarely assessed in isolation. When attempting to make sense of neurological cues, nurses commonly assess related body systems. For example, hypertension (and the pathophysiological processes of atherosclerosis) is a major risk factor for stroke.

Subjective Assessment

Subjective assessment of the neurological system involves asking questions about the health of the client and symptoms that might be caused by pathologies affecting the central and peripheral nervous system. A full exploration of these pathologies is beyond the scope of this chapter, but common problems associated with the neurological system include **cerebrovascular accidents (stroke)**, **cerebral aneurysms**, **traumatic brain injury**, **neurodegenerative disorders** (dementias, Parkinson's disease), **movement disorders**, **seizures**, **diabetes-related neuropathy**, **spinal cord injuries**, **brain tumours**, **delirium**, **migraines**, and **neurodiverse conditions**.

Common **symptoms** that may be related to the neurological system include headache, **paresis**, **paralysis**, **paraesthesia**, **dysphagia**, **dysarthria**, visual changes/impairment, dizziness, balance issues, incoordination, seizures, tremors, confusion, fatigue, and nausea and vomiting. See **Table 1** for guidance on subjective health assessment: many of the questions in the table align with the PQRSTU mnemonic (or variations of it). Try to ask questions in order of importance – you will not necessarily follow the sequential order of PQRSTU.

Always ask about any **medications** (prescribed or over the counter) or supplements the client is taking: name, dose, frequency, reason it was prescribed, and how long they have been taking it.

To help determine the **validity of your findings**, ask about other factors that may affect the neurological assessment such as alcohol or substance use. Try to evaluate the condition of the client in relation to their ability to comprehend questions and provide subjective data. On initial contact you will assess neurological status based on client responses: Are they awake? Are they paying attention to you?

Remember to ask questions related to health promotion. Depending on the context of the assessment, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on "Health Promotion Considerations and Interventions" is included later in this chapter after the discussion of objective assessment.

Knowledge Bites

One common neurological condition is **stroke**, which is caused by a blocked or leaking cerebral artery (hemorrhage) causing damage in the brain. Its pathology is related to **atherosclerosis** and **blood clots**. If it is a temporary disruption of blood flow, it can result in a **transient ischemic attack** (TIA), commonly known as a mini-stroke. See **Figure 4**, which presents one type of stroke.

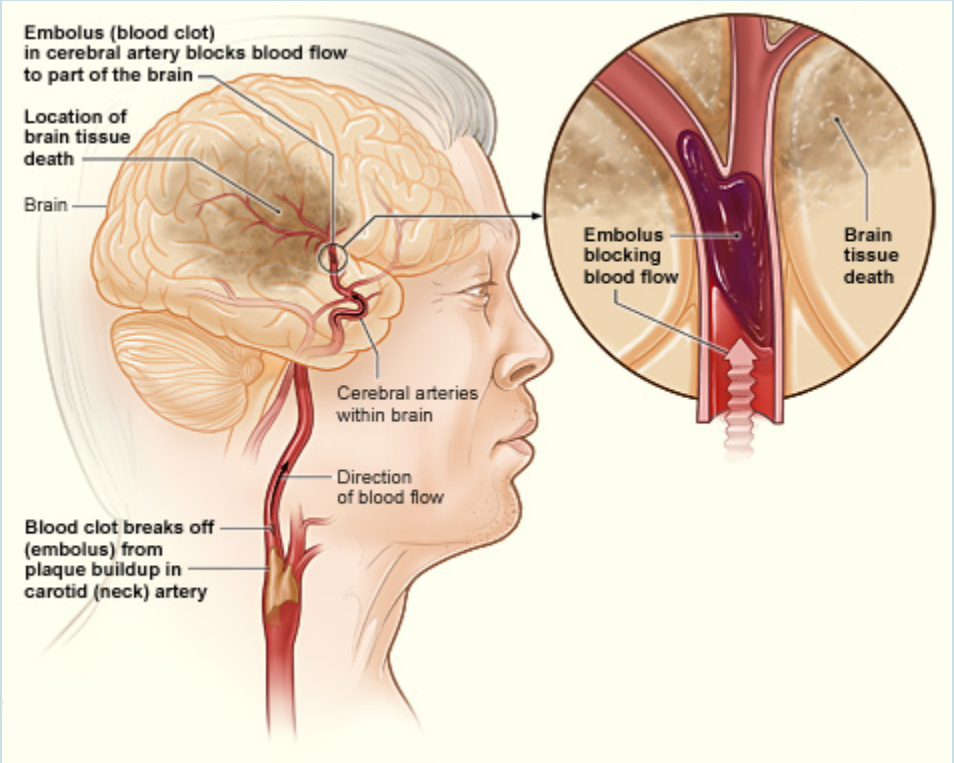

Figure 4: Ischemic stroke.

(from National Heart Lung and Blood Institute (NIH), Public domain, via Wikimedia Commons

https://commons.wikimedia.org/wiki/File:Stroke_ischemic.jpg)

Another common condition is **traumatic brain injury** (TBI). Always monitor clients closely when they have experienced an injury to the head and brain, which might be caused by a fall or a physical bump or jolt to the body/head. **Concussion** is one possible serious consequence of this kind of injury, and it can disrupt normal brain function and lead to an altered level of consciousness. Symptoms of concussion include confusion, headaches, problems with memory and judgment, sensitivity to light, disruptions in sleep, and nausea and vomiting. Another serious risk associated with traumatic brain injury is increased intracranial pressure (pressure inside the skull), which can be related to swelling and bleeding in the brain. Symptoms of increased intracranial pressure include headaches, vision impairment, vomiting, and weakness.

Table 1: Common symptoms, questions, and clinical tips.

Symptoms	Questions	Clinical tips
Headache is a specific type of pain that can be felt in one certain location or all over the head. It can be described in many ways including sharp, achy, throbbing, full, or squeezing with a viselike quality (a tight, strong, constricting feeling). Headaches occur when **nociceptors** react to certain triggers. There are many causes. Although some headaches are related to musculoskeletal injuries, most are neurologically-related and can be related to inflamed or damaged nerves and triggers such as stress, alcohol, lack of sleep, and certain food and medications. Other influences can include muscular tension, dental or jaw problems, infections, and eye problems.	Do you currently have a headache? Have you recently experienced any headaches that you are concerned about? Do you have frequent, severe, and/or recurring headaches that disrupt your day-to-day functioning? Additional **probes** if the client's responses are affirmative may include: **Quality/quantity**: What does your headache feel like? How bad is your headache? **Severity**: Can you rate your headache on a scale of 0 to 10 with 0 being no pain and 10 being the most pain you have ever had? **Region/radiation**: Where do you feel your headache? Does it radiate anywhere? **Provocative/palliative**: Is there anything that makes your headache worse? Is there anything that makes your headache better? **Timing/treatment**: When did the headache begin? Was it sudden or gradual? What were you doing when it began? Is it constant or intermittent? How often do you get headaches? Have you taken anything to treat your headache? Have you taken any medications? **Understanding**: Do you know what is causing the headache? Do other members in your family experience similar headaches? **Other**: How does it affect your daily life?	A severe headache with a quick onset is a cue for concern. This kind of headache can be related to conditions such as stroke. Patients may describe these types of severe headaches as the worst headache they have ever had or say they have never experienced pain like this before. **Chronic headaches** can be debilitating for people and affect day-to-day life. Migraines are a neurological condition. They are often described as throbbing, pulsating, and pounding intense headaches with associated symptoms such as nausea and vomiting, sensitivity to light, noise and smell, and **auras**. The causes of migraines are not yet clear, but they appear to be linked with genetic, environmental, and hormonal factors.

Paresis, **paralysis**, and **paraesthesia** are common symptoms associated with neurological conditions such as stroke or nerve damage.

Paresis is decreased muscle strength of the voluntary muscle groups (often referred to as muscle weakness) whereas **paralysis** is the inability to move a muscle such as a limb.

Paraesthesia is abnormal sensory sensations such as numbness (loss of feeling), tingling (sometimes described as pins and needles), or other characteristics such as burning and prickling.

Have you experienced any decrease in muscle strength? (Or inability to move a muscle/limb or abnormal sensations such as numbness or tingling in your face, arm or leg?)

Remember to incorporate the language that the client uses into your probing questions (below, "XX" is used to represent the client's language).

Additional **probes** if the client's responses are affirmative may include:

Timing: Are you currently experiencing XX now? When did it begin? Did it come on suddenly or gradually? Is it constant or intermittent? What were you doing when it began? How often do you get it?

Quality/quantity: What does it feel like? How bad is it?

Severity: Can you rate it on a scale of 0 to 10 with 0 being no XX and 10 being the most XX you have ever had?

Region/radiation: Where do you feel it most? Does it radiate anywhere?

Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better?

Treatment: Have you taken anything to treat it? Have you taken any medications?

Understanding: Do you know what is causing it?

Other: How does it affect your daily life?

Falls are a safety concern with paresis, paralysis, and paraesthesia. Fall risk assessment and prevention strategies are essential for client safety. If the client is mobile, strategies may include non-skid shoes or socks, use of prescribed mobility and assistive devices, and removal of hazards in the room. Nurses should consult with occupational therapists and physiotherapists to decrease the client's risk of falls.

Skin ulcers are another risk factor. Areas of the body that have lost or limited sensation or strength/movement should be assessed daily to decrease further damage to the area. Therefore, it may be important to assess clients using the **Braden Scale** for risk of pressure sores (see: Skin inspection via Braden Scale).

Paresis, paralysis, and paraesthesia decrease client mobility and therefore increase the risk of blood clots, **urinary stasis**, decreased peristalsis, and pneumonia. Passive range of motion (ROM) exercises should be performed to encourage continuous movement of the joints and muscles.

Bell's palsy is a facial nerve (CN VII) disorder causing temporary paralysis of the face in which it droops downwards (e.g., eye, cheek, mouth). However, similar symptoms can occur with Botox and other facial fillers/injections. A thorough assessment can help determine the origin of the cause.

Dysphagia and **dysarthria** are common symptoms associated with various neurological conditions such as stroke, brain tumour, and neurodegenerative diseases (e.g., Alzheimer's, multiple sclerosis, Parkinson).

Dysphagia is impairment in swallowing. Clients often refer to it as difficulty or trouble swallowing and it is sometimes associated with pain.

Dysarthria is a neuromotor impairment in speaking: clients may have difficulty saying or forming a word and may have reduced strength and speed when speaking. This can result in slow or slurred speech.

Have you experienced any difficulty swallowing? Have you experienced any difficulty speaking?

Remember to incorporate the language that the client uses into your probing questions (remember that below, "XX" refers to the client's language).

Additional **probes** if the client's responses are affirmative may include:

Timing: Are you currently experiencing XX now? When did it begin? Did it come on sudden or gradual? Is it constant or intermittent? What were you doing when it began? How often do you get it?

Quality/quantity: What does it feel like? How bad is it?

Severity: Can you rate it on a scale of 0 to 10 with 0 being no XX and 10 being the most XX you have ever had?

Region/radiation: Where do you feel it most? Does it radiate anywhere?

Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better?

Treatment: Have you taken anything to treat it? Have you taken any medications?

Understanding: Do you know what is causing it?

Other: How does it affect your daily life?

New onset of dysphagia requires immediate action because it can be associated with conditions such as stroke and can lead to clinical deterioration as well as other complications such as choking or **aspiration pneumonia**. Always notify the physician or nurse practitioner. Additionally, if the client is experiencing new onset dysphagia, it is important to restrict food or fluids until this has been fully assessed. If possible, have the client sit upright (e.g., High Fowler's position) or raise the head of the bed.

After any acute symptoms have been managed, consult with a speech language pathologist and dietician to discuss safety measures required during meal assistance to decrease risk of choking and aspiration pneumonia. Dysphagia management tips may include a special dysphagia diet, having the client sit upright, placing food on the noneffective side of the mouth, use of thickening fluids, and taking small bites.

Dysarthria can cause slowed, slurred speech, which may be misdiagnosed as intoxication. A thorough assessment is required to determine the cause of dysarthria to ensure proper interventions are performed. Evaluating a client's speech, including changes in speech, is part of the primary survey assessment. Consult with a speech-language therapist on exercises to strengthen speech-related muscles and use of other communication aids.

Visual impairment is a disturbance in the client's ability to see. Symptoms may include blurred vision, double vision, or partial or complete vision loss (central or peripheral) in one eye or both, dark area in the visual field, shadowed vision, and/or light sensitivity.

Have you experienced any difficulty seeing or new changes to your sight? (You may choose to provide some examples.)

Remember to incorporate the language that the client uses into your probing questions (remember that below, "XX" refers to the client's language).

Additional **probes** if the client's responses are affirmative may include:

Timing: Are you currently experiencing XX now? When did it begin? Did it come on sudden or gradual? Is it constant or intermittent? How often do you get it?

Quality/quantity: What does it feel like? How bad is it?

Severity: Can you rate it on a scale of 0 to 10 with 0 being no XX and 10 being the most XX you have ever had?

Region/radiation: Where in your eye do you experience it?

Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better?

Treatment: Have you taken anything to treat it? Have you taken any medications?

Understanding: Do you know what is causing it?

Other: How does it affect your daily life?

A **sudden change in vision** is a priority in care. This cue is considered an emergency and needs immediate action. Sudden vision change could indicate a stroke and blood clot in the retinal artery. Immediate care is required to decrease the risk of permanent vision loss (blindness).

Dizziness, **balance issues**, and **incoordination** are neurological symptoms that are sometimes, but not always, associated with each other.

Dizziness refers to impaired spatial orientation in which clients describe feeling light-headed, woozy, or that they might faint. It may be associated with **nausea** and **syncope**. (Vertigo is often described as dizziness, but vertigo is actually a different neurological symptom in which the client feels like they are spinning or the environment around them is spinning.)

Balance issues are associated with feeling unsteady: the client feels like they may lose their balance or fall down. It can sometimes be associated with dizziness.

Incoordination refers to loss of muscle control and lack of coordination such as the impaired ability to use parts of the body together (e.g., hands, arms, legs). It may result in impaired ability to walk smoothly or to use arms/hands together.

Have you experienced any dizziness or a feeling of light-headedness?

Remember to incorporate the language that the client uses into your probing questions (remember that below, "XX" refers to the client's language).

Additional **probes** if the client's responses are affirmative may include:

Quality/quantity: What does XX feel like? Have you ever passed out or lost consciousness? How bad is it?

Timing: Are you currently experiencing it now? When did it begin? Is it constant or intermittent? What were you doing when it began? Is it associated with position changes such as standing up? How often do you get it?

Severity: Can you rate it on a scale of 0 to 10 with 0 being no XX and 10 being the most XX you have ever had?

Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better?

Treatment: Have you taken anything to treat it? Have you taken any medications?

Understanding: Do you know what is causing it?

Other: How does it affect your daily life?

Fall risk assessment is essential to help the client take precautions against falling. As per the Canadian Institute of Patient Safety (2015), think about the **SAFE** mnemonic:

Safe environment (e.g., well-lit environment, remove tripping hazards).

Assist with mobility, including balance and transfers (e.g., if relevant, ensure mobility aids [cane, walkers], assistive devices [bars, eyeglasses, hearing aid], and assist client as needed).

Fall risk reduction (e.g., non-slip footwear, bed in lowered position, call bell in reach).

Engage the client and family (e.g., having conversations about risk factors and prevention).

Various fall assessment tools are available to help you systematically assess risk factors related to falls. These factors may include a history of falls/near falls, acute condition, ability to move around, mobility aids, or hearing, vision, or cognitive impairment. If the client has already been assessed, you should follow all recommendations, as well as all institutional policies to prevent falls.

Seizures are sudden changes in the brain's electrical function that affect consciousness, muscle tone, movement, and sensations. For example, a client may be unable to move or walk, or may blink repeatedly, stare with no movement of eyes, experience stiffening and spasms of the muscles, loss of muscle tone, or exhibit sudden repetitive movements often described as twitching or jerking.

Tonic-clonic seizures refer to seizures in which a client's muscles stiffen and twitch. In contrast, a client experiencing an **absence seizure** often stares off into space and/or repeatedly blinks.

After the active (ictal) phase, many clients experience a recovery (postictal) phase that typically last minutes to 30 minutes (but for some this period may last for days), with symptoms including sore muscles, fatigue, confusion, and headache.

The cause of a seizure may be unknown, or a result of a head injury, infection, high fever, certain medications, electrolyte imbalance, or other diagnosis/illness. A client who has two or more seizures is often diagnosed with epilepsy.

Have you experienced a seizure?

Remember to incorporate the language that the client uses into your probing questions.

Additional **probes** if the client's responses are affirmative may include:

Quality/quantity: What does it feel like or look like? Have you ever lost consciousness? How bad is it?

Timing: When did you experience one last? How often do you experience them? At what age did you experience your first one?

Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better?

Treatment: Have you ever sought treatment for it? Have you taken anything to treat it? Have you taken any medications?

Understanding: Do you know what is causing it?

Other: How does it affect your daily life? Has anyone ever told you that you have short episodes where you stare off into space or repeatedly blink?

Seizures can last a few seconds to many minutes or longer. In some institutions, seizures are treated when they last longer than 3 minutes or the client has 3 within 30 minutes.

Seizures can place the client in danger and safety precautions need to be considered. The client could be at risk of falling, accidents in the workplace (e.g., machinery), and pregnancy complications due to medications. Encourage clients to wear a medical alert bracelet.

As per the Canadian Epilepsy Alliance (n.d.), when a client has a seizure:

- Stay with them and call for help.
- Roll them onto their side.
- Place a pillow under their head.
- Clear the surrounding area of hazards.
- Do not restrain the client or place anything in their mouth.
- Record the time, duration, and symptoms.

Consider the client's own unique plan to manage their seizures.

Other **neurological symptoms** can include fatigue, **tremors**, **fasciculations**, confusion, hearing impairment, difficulty breathing, and nausea and vomiting. For example, tremors can be related to neurological diseases (e.g., Parkinson's disease) or other factors such as caffeine, certain medications, or overactive thyroid.	Always ask one question at a time. Questions might include: Have you experienced tremors or twitching like movements? (Or confusion, fatigue, hearing impairment, difficulty breathing, or nausea and vomiting?) Use variations of the PQRSTU mnemonic to assess these symptoms further if the client's response is affirmative.	These symptoms can be related to the neurological system as well as other body systems. It is important to explore these symptoms specifically if the client answers affirmatively.
Personal and **family history of neurological conditions** and diseases. As noted earlier, common issues associated with the neurological system include stroke, migraines, seizures, dementia, Parkinson's disease, multiple sclerosis, or other movement disorders.	Do you have any chronic neurological conditions or diseases? Do you have a familial history of neurological conditions or diseases? (Give examples). If the client's response is affirmative, begin with an open-ended probe: Tell me about the condition/disease? Remember to incorporate the language that the client uses into your probing questions. If the client has a personal history, **probing** questions might include: **Timing**: When were you diagnosed? **Quality/quantity**: How does it affect you? What symptoms do you have? **Treatment**: How is it treated? Do you take medication? **Provocative/palliative**: Is there anything that makes it worse? Is there anything that makes it better?	Risk factors may be influenced by genetics and/or culture, so you should ask about the biological and non-biological nature of family. Some neurological-associated diseases (e.g., Parkinson's) are related to genetics, but it is more likely that environmental and cultural factors (such as family traditions and practices) play a larger role. Examples might include diet, sedentary lifestyle, and smoking.

Priorities of Care

Respiratory distress is a first-level priority of care. Signs of respiratory distress and respiratory failure can be related to various neuromuscular disorders (Racca et al., 2019). Always screen for and recognize signs of respiratory distress (e.g., shortness of breath, stridor, **desaturation**, intercostal tugging, nasal flaring, difficulty talking). If any of these signs are present, notify the physician or nurse practitioner while supporting the client's airway.

- If an airway is not patent, try to open the airway with a head-tilt-chin-lift and inspect the mouth and nose for obstructions.
- If oxygen saturations are low, try to wake the client if they are sleeping, sit them upright, and ask them to take a few deep breaths. **Supplemental oxygen** can be applied if there are **standing orders** on your unit.
- You may need to keep the client in a supine position if you suspect that they are deteriorating quickly and may go into respiratory or cardiac arrest. Notify the **critical care response team** (CCRT) or call a

code in this case. **Bag-mask-ventilation** may be needed if the client is in respiratory arrest.

- If you suspect the client is choking, stay with the client and call for help while you place them in a High Fowler's position. If they are able to, encourage them to cough and clear their airway. You may need to suction the oral cavity and airway, if possible. If you suspect a complete obstruction, use a combination of "back blows, abdominal thrusts, and chest thrusts" (Canadian Red Cross – What to do if an adult is choking)

Stroke is one of the most acute neurological pathological conditions. As per the Canadian Stroke Best Practice Recommendations, **acute stroke is a medical emergency**. You should respond immediately by reporting your findings to a physician or nurse practitioner or call 911 in the community (or the emergency telephone number in your area, if not in Canada) (Heart & Stroke Foundation of Canada, 2022).

FAST – or more recently, **BE-FAST** – are common mnemonics used when assessing stroke (Aroor et al., 2017; Heart & Stroke of Canada, n.d.).

Balance: Are they having difficulty with balance, walking, coordination, or lower extremity weakness?

Eyes: Are they having difficulty with vision? (e.g., sudden trouble seeing out of one or both eyes or double vision).

Face: Is their face drooping, does it look asymmetrical, or do they have numbness on one side?

Arms: Do they have difficulty raising both arms or have numbness or weakness on one side?

Speech: Are they having trouble speaking, have slurred speech, or seem confused?

Time: Time is of utmost importance, so assess when the symptoms/signs began.

If you suspect a stroke, complete a brief scan (detailed later) and notify the physician or nurse practitioner. Depending on the hospital, you may notify the Critical Care Response Team or the Stroke Response Team. Assess and monitor vital signs, specifically blood pressure. Monitor for neurological deficits (e.g., decreased consciousness, confusion, dysphagia, dysphasia, ataxia, respiratory dysfunction such as **Cheyne–Stokes respiration pattern**). If you suspect a stroke, stay with the client and ensure their safety: restrict food/fluid intake and keep bed railings raised.

Contextualizing Inclusivity

The **symptoms of neurological conditions** (e.g., confusion, ataxia) and diseases or conditions that affect the neurological system can sometimes **resemble intoxication** from alcohol or substance use. It is important to reflect on your own biases and consider how they influence your perception of neurological symptoms and (in)actions and how this can lead to racist approaches to care. Prime examples of this are the real-life cases of **Brian Sinclair** and **Joyce Echaquan**, two Indigenous people who died from neglect as a result of factors associated with racism and being stereotyped.

Taking part in **cultural safety** and **anti-racism training** is one effective way to develop competence in

working with diverse communities. This kind of training can help you understand the historical and institutional trauma experienced by marginalized communities including Indigenous and Black people, and how and why hospitals and emergency rooms can be considered unsafe places for them. Reflective practice is an important way to explore and understand one's potential biases: education is a key element to help uncover one's unconscious biases and disrupt deeply rooted problematic beliefs.

It is also vital to **listen**, **validate**, and **act on what clients say**. This is particularly important with racialized people because of the racism they have experienced and the serious effects it has on their lives and the healthcare they receive. Racism is consistently recognized as a social determinant of health and as a factor in the high rates of cardiovascular disease among Indigenous and Black communities in Canada (Olanlesi-Aliu et al., 2023; Vervoort et al., 2022). For example, these populations may have inequitable access to healthy food and inequity, which can be linked with cardiovascular diseases including stroke, which has a significant neurological impact.

With regard to sex and gender differences, increased mortality and disability rates have been observed among women (Rexrode, 2022). More research is needed to explore symptom presentation, as well as biases among healthcare providers that may influence how symptoms are interpreted and responded to (Rexrode, 2022).

Knowledge Bites

Choosing Wisely Canada recommends that opioids should **not** be the first line of treatment for neuropathic pain and should **not** be used to treat migraines (Canadian Neurological Society, 2022). Other analgesics have demonstrated better results in treating neuropathic pain (Moulin et al., 2014), and opioids are also associated with increased risk of harm (Canadian Neurological Society, 2022).

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2267#h5p-122

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Objective Assessment

An objective assessment of the neurological system includes:

- Brief scan of the neurological system.
- Glasgow Coma Scale.
- Cranial nerve testing.
- Motor function and cerebellar testing.
- Sensory function testing.
- Reflex testing.

An objective assessment is usually completed after the subjective assessment, but if the client shows signs of clinical deterioration, you may proceed directly to the objective assessment and associated interventions. In this case, it is important to prioritize care after a brief scan that involves components of the primary survey.

The order of the neurological assessment, and choices about whether a **complete neurological assessment** is needed, will depend on the context (primary care setting, hospital setting, long-term care, rehabilitation) and the presence of neurological symptoms and signs or history. A complete neurological assessment includes all components listed above. You should conduct a complete neurological assessment if:

- The client reports neurological symptoms or you observe signs.
- The brief scan reveals abnormal findings.
- You need to track symptoms and signs when following the progression of a neurological disease.

Screening of the neurological system also depends on the context. At a minimum, you should conduct a brief scan of the neurological system and the Glasgow Coma Scale, as detailed in the next section. Always do a screening if you are aware of changes in behaviour and communication. **Table 2** presents medical terminology related to neurological findings.

Contextualizing Inclusivity

Always use a **trauma-informed approach** when conducting an objective assessment, because you may need to expose the body.

- Maintain privacy by closing the door and/or curtains.
- Ask the client if they would like a family member, friend, or another healthcare provider present.
- Provide a drape to the client and only expose areas of the body as needed.
- Always ask permission to touch.
- Explain what you are doing throughout the assessment. Sometimes it is helpful to demonstrate it on yourself so the client knows what to expect.
- Collaborate "with" the client versus "doing to" the client.
- Use a culturally-informed approach and provide choice whenever possible to empower the client.

- Ensure the clients know that they can take a break at any point.

Consider how a trauma-informed approach can be used when a client is unable to speak or advocate for themselves due to their neurological condition or sedation. Sometimes healthcare professionals neglect this approach when the client is unresponsive, but in fact, it is even more important in these situations.

Table 2: Medical terminology related to neurological findings.

Term	Definition
Hyposmia	Partial loss of the sense of smell.
Anosmia	Complete loss of the sense of smell.
Esthesia	Perception of touch sensation.
Hypoesthesia	Decreased sensitivity to touch sensation.
Anesthesia	Loss of sensitivity to touch sensation or inability to feel touch sensation.
Hyperesthesia	Increased sensitivity to touch sensation.
Algesia	Sensation of pain.
Hypoalgesia	Decreased sensitivity to pain sensation.
Analgesia	Loss of pain sensations or inability to feel pain sensation.
Hyperalgesia	Increased sensitivity to pain sensation.
Paresis	Decreased muscle strength of the voluntary muscle groups (often referred to as muscle weakness).
Paralysis	Inability to move a muscle such as a limb.
Paraesthesia	Abnormal sensory sensations such as numbness (loss of feeling) or tingling (sometimes described as pins and needles) or other characteristics such as burning and prickling.
Dysphagia	Impairment in swallowing such as difficulty swallowing or pain while swallowing.
Dysphasia	Impairment in use or comprehension of language.
Dysarthria	Neuromotor impairment in speaking in which clients have difficulty saying or forming a word, or difficulty with the strength and speed of speaking, which can result in slow or slurred speech.

Flaccid	Muscles that have no resistance and no tone (atonic).
Rigid	Increased muscle resistance that is consistent at rest and with movement.
Spasticity	Increased muscle resistance that decreases with continuous movement and worsens at extreme ROM.

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Brief Scan of the Neurological System

A brief scan of the neurological system involves an assessment that allows you to quickly recognize neurological signs, changes in clinical status, and cues of clinical deterioration. This kind of brief scan is sometimes called a neurological recheck and is completed on regular intervals with clients who have had some sort of physical head trauma or cerebrovascular disease (like a stroke). This brief scan will influence your decision on whether immediate action is required and whether a focused assessment is needed.

Steps of a brief scan include:

1. Assess **airway patency**. Are they having any difficulties breathing, talking, swallowing?
2. **Level of consciousness** and **level of orientation**. Are they confused or disoriented about person, place, time, self? Are they unable to respond appropriately to questions such as: Can you tell me who I am? Can you tell me where you are? What year is it? Who are you?
3. Assess **vital signs**. Are the vital signs within the normal ranges or have there been any changes?
4. **Speech**. Is their speech unclear, slurred, delayed, not making sense?
5. **Mobility** and **balance**. Are they having any difficulty with balance (standing, walking, sitting upright), movement of limbs, or exhibiting drooping of the face/eyelids/mouth?
6. **Mental health status**. Are there any concerning cues, e.g., inattentive, **flat affect**, or **labile affect**? Has the client verbalized that they are not feeling quite themselves or provided a vague statement about their mental health?

Pupillary light reflex is often assessed as well. More to come on how to do so later in the chapter.

Knowledge Bites: Cognitive Impairment

Various tools are available to support assessment when cognitive impairment is observed during the brief scan or if the client or family member indicates the client is having some problems with memory. These include:

- The **Mini-Mental State Exam** (MMSE) and the **Standardized Mini-Mental State Exam** (SMMSE), which are used to evaluate cognitive function and detect cognitive impairment (Vertesi et al., 2001). Some nurses prefer the SMMSE because it is timed, meaning that clients are given a limited amount of time to answer a question (e.g., What year is it?).
- **Montreal Cognitive Assessment Test** (MoCA), which is particularly useful for detecting "mild" cognitive impairment (MoCA Cognition, 2023). For example, if the client/family has indicated problems with memory but the MMSE/SMMSE results are normal, you might decide to use the MoCA. Training and certification is encouraged for healthcare professionals to maintain the validity of the test.

Another tool is **The Canadian Neurological Scale**, which was developed to monitor and evaluate neurological functioning during the acute phase of a client with a stroke (Cote et al., 1986). The main components include mentation and motor response. Check it out: The Canadian Neurological Scale

Clinical Tips – Common Tests as Part of the Brief Scan

The following **common tests** are often used **to evaluate mobility** and **innervation of muscles** in **hospitalized clients**:

- **Hand grip**: Stick out the index and middle finger of both of your hands, and ask the client to grasp them and squeeze.
- **Manual muscle testing – arms**: Ask the client to extend their arms out in front of them and then bend their arms toward them (elbow flexion) and resist your force when you apply pressure both in the movement of flexion, and then extension.
- **Pronator drift**: Ask the client to close their eyes and extend their arms out in front of them with palms facing up for 30 seconds.
- **Movement**: Ask the client to wiggle their toes.
- **Manual muscle testing – feet**: While the client is lying supine, place your hands on the balls of the feet and ask the client to resist your pressure when you push.

Note: Clients should have equal muscle strength bilaterally in hands and feet, able to wiggle their toes, and maintain their arms out in front of them (see **Video 1** for a demonstration).

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2271#oembed-1

Video 1: Common tests to evaluate mobility and innervation of muscles in hospitalized clients

Priorities of Care

Any issues with **airway patency** and **respiratory distress** (e.g., stridor, difficulty breathing, difficulty/inability to speak) are significant cues of concern.

- Stay with the client and call for help (an experienced nurse, physician, or nurse practitioner).
- If an airway is not patent, try to open the airway with a head-tilt-chin-lift and inspect the mouth and

nose for obstructions.

- If oxygen saturations are low, try to wake the client if they are sleeping, sit them upright, and ask them to take a few deep breaths. **Supplemental oxygen** can be applied if there are **standing orders** on your unit.
- You may need to keep the client in a supine position if you suspect that they are deteriorating quickly and may go into respiratory or cardiac arrest. Notify the **critical care response team** (CCRT) or call a code in this case. **Bag-mask-ventilation** may be needed if the client is in respiratory arrest.
- If you suspect the client is choking, stay with the client and call for help while you place them in a High Fowler's position. If they are able to, encourage them to cough and clear their airway. You may need to suction the oral cavity and airway, if possible. If you suspect a complete obstruction, use a combination of back blows, abdominal thrusts, and chest thrusts (Canadian Red Cross – What to do if an adult is choking).

All other abnormal cues of the brief scan (particularly if they are new onset) require immediate attention and a focused assessment. Abnormal cues can be associated with many conditions, stroke being of the most concern. For example, a sudden change and decrease in consciousness or aphasia or limb weakness are potential signs of a stroke and are critical findings that require immediate action and must be reported to a physician or nurse practitioner. Complete a primary survey and perform a focused assessment. Be aware that time from first symptom to treatment is a factor in permanent disability and/or death.

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Glasgow Coma Scale

The Glasgow Coma Scale (GCS) is a common neurological tool to assess **level of consciousness** and detect and track clinical changes in consciousness when clients have had a traumatic brain injury or any condition that causes an impairment in consciousness (Teasdale et al., 2014).

GCS is used in the context of head injuries, cerebral hemorrhage or lesions, stroke, and general trauma. It is commonly used in acute and emergency care, critical care, post-operative care, and in neurological settings. It is important to elicit a baseline and then monitor trends, particularly with an altered GCS or during the acute phase of a neurological condition.

Steps in the GCS assessment include:

1. Assess for any factors that could influence your assessment (see Contextualizing Inclusivity textbox below).
2. Observe behaviours as per **Table 3** and apply verbal and physical stimuli as needed (e.g., if spontaneous behaviours are absent).
3. Judge criteria with rating and score.
4. Evaluate the score for each component (eye opening, verbal response, best motor response).
5. Evaluate the total GCS score by adding up scores for the three components of the GCS
    a. If any components are "non-testable," note this and do not provide a total score. For example, verbal responses may not be testable if a client has a breathing tube, and eye opening may not be testable if a client has periorbital edema that prevents eye opening.

See **Video 2** on how to use the Glasgow Coma Scale with a demonstration.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2273#oembed-1*

Table 3: Components of the Glasgow Coma Scale. (copyright Teasdale, 2015, permission to use in this resource).

Eye opening

Criterion	Rating	Score
Open before stimulus	Spontaneous	4
After spoken or shouted request	To sound	3
After fingertip stimulus	To pressure	2
No opening at any time, no interfering factor	None	1
Closed by local factor	Non-testable	NT

Verbal response

Criterion	Rating	Score
Correctly gives name, place, and date	Oriented	5
Not oriented but communicates coherently	Confused	4
Intelligible single words	Words	3
Only moans/groans	Sounds	2
No audible response, no interfering factor	None	1
Factor interfering with communication	Non-testable	NT

Best motor response

Criterion	Rating	Score
Obeys 2-part request	Obeys commands	6
Brings hand above clavicle to stimulus on head neck	Localising	5
Bends arm at elbow rapidly but features not predominantly abnormal	Normal flexion	4
Bends arm at elbow, features clearly predominantly abnormal	Abnormal flexion	3
Extends arm at elbow	Extension	2
No movement in arms/legs, no interfering factor	None	1
Paralysed or other limiting factor	Non-testable	NT

Clinical Tips: Physical Stimuli and Flexion Responses

If no response is elicited when using the GCS, you may need to apply **physical stimuli** (see **Figure 5**), which are usually applied in the following order to:

1. Finger nail bed.
2. Trapezius muscle.
3. Supraorbital notch.

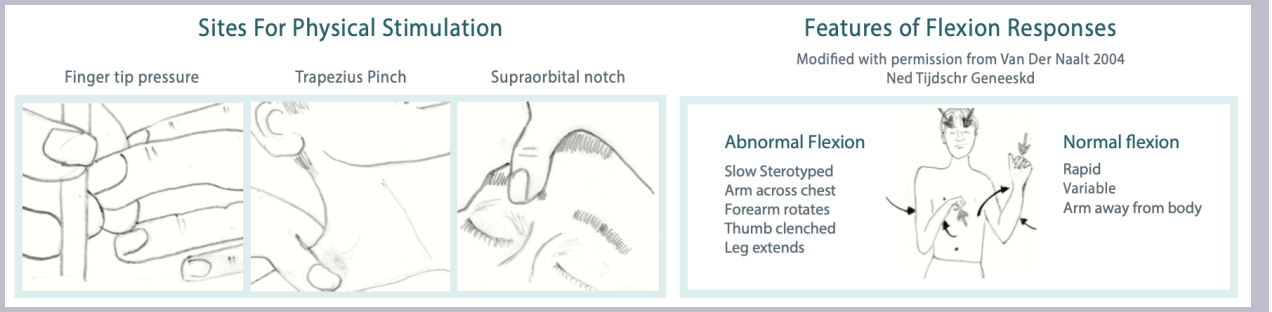

Figure 5: Physical stimulus.

Copyright Teasdale, 2015 (used with permission), https://www.glasgowcomascale.org/downloads/GCS-Assessment-Aid-English.pdf?v=3.

Contextualizing Inclusivity

Before using the GCS, assess for factors that could influence the validity of the tool.

For example, **children** under five may not be able to obey commands and answer questions. The GCS components provided in **Table 3** are considered reliable for those over the age of 5 (Royal College of Physicians and Surgeons of Glasgow, n.d.). When working with children, it is best to check with your institution about whether they use a specific scale, e.g., the Paediatric Glasgow Coma Scale or other tools to evaluate level of consciousness.

Another issue is that a **hearing impairment** can influence a client's ability to respond to verbal stimuli. You may need to employ alternative options such as gently touching the client's arm to observe if their eyes are open, using sign language, or writing on a piece of paper.

Other factors could include **language discordance** or barriers that inhibit clients from speaking, such as a breathing tube. Many **pathologies** and **conditions** can affect the validity of the GCS such as the presence of hypoxemia, intellectual and neurological deficits, and movement disorders, pharmacological agents such as sedation, and use of alcohol, cannabis, or other substances that affect cognition.

Prioritizing Care

GCS scores can range from 3 (unresponsiveness in all three components of the GCS tool) to 15 (no deficits in responsiveness in all three components of the GCS tool) (National Institute for Health and Care Excellence [NICE], 2023). With acute traumatic brain injury, GCS scores are classified as:

- Severe injury: GCS 8 or less (suggestive of coma state).
- Moderate injury: GCS 9 to 12.
- Mild injury: GCS 13 to 15.

(NICE, 2023).

Anyone presenting in a community or emergency setting with decreased consciousness or a score of less than 15 should be assessed immediately. At first, clients with GCS scores below 15 should be monitored regularly. The frequency of GCS assessment varies significantly: it is contingent on timing since the injury/trauma as well as trends in improvement or deterioration. Until a stable pattern is observed, all changes should be reported to the physician/nurse practitioner. NICE (2023) recommends the following **frequency of observation**:

- Every 30 minutes until GCS is 15 or every 30 minutes if there is a decrease in the GCS.
- If GCS is 15: observe every 30 minutes for 2 hours, then hourly for 4 hours, then every 2 hours.

These frequencies may vary depending on the client's situation, the acuity of symptoms, and the institution/unit.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Introduction to Cranial Nerves

In total, **12 paired cranial nerves** originate within the brain and brainstem and extend into multiple branches (see **Figure 6**).

The 12 cranial nerves are related to **sensory** and/or **motor** functions (see **Table 4**). Sensory refers to senses such as seeing, hearing, tasting, smelling, and touching, while motor refers to movement. Innervation and associated responsibilities of the nerves can be affected when the nerve is damaged from a physical trauma (e.g., an accident), a surgical intervention, a **brain lesion** (related to a stroke, cerebral inflammation, tumour, aneurysm), or a condition resulting in **demyelination** (e.g., multiple sclerosis).

The next section explores some of the most common approaches that nurses use to examine the 12 pairs of cranial nerves. Keep in mind that there are many ways to assess cranial nerves, and an abnormal finding may indicate damage to the nerve. These findings should be considered in the context of the complete neurological examination.

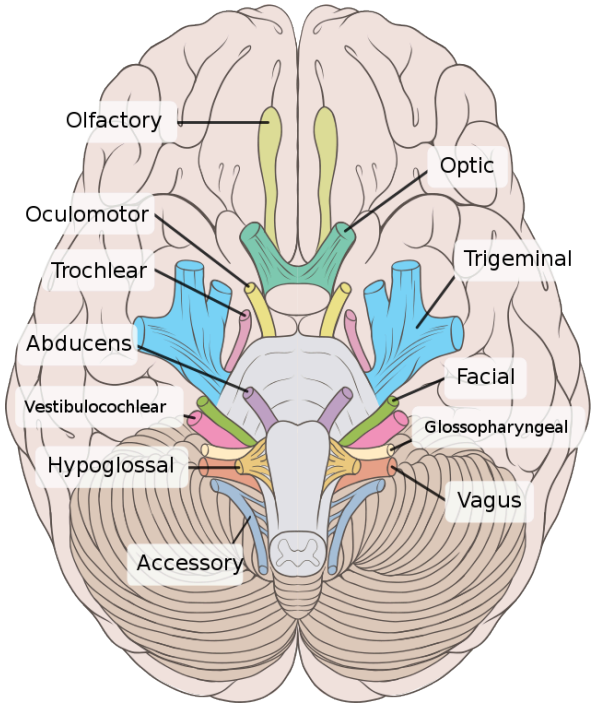

Figure 6: Cranial nerves.

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Table 4: Cranial nerves.

Nerves	Neurological signs and symptoms (when CN is damaged)
CN I (1) Olfactory nerves **Sensory nerves** related to smell.	• Hyposmia (partial loss of the sense of smell) or anosmia (complete loss of the sense of smell).
CN II (2) Optic nerves **Sensory nerves** related to visual acuity (how well a person's eyes can identify shapes and details of an object at a specific distance) and visual fields (periphery of vision). This nerve is also responsible for sending a message to the brain when light is introduced to the eye when assessing pupillary light reflex to evaluate CN III.	• Partial or complete loss of central or peripheral vision.
CN III (3) Oculomotor nerves **Sensory nerves** related to pupil innervation (pupillary constriction) and lens shape. **Motor nerves** related to upper eyelid movement and eye muscle movement specific to four muscles (superior rectus, inferior rectus, medial rectus, and inferior oblique) controlling eye movements: diagonal upward (both inward and outward); diagonal downward-outward; horizontal inward.	• Loss of reactivity to light and pupillary dilation. • Inability to track an object (follow with eyes). • Inability to open eyelid or ptosis (drooping of the eyelid). • Double vision.
CN IV (4) Trochlear nerves **Motor nerves** related to eye muscle movement specific to one set of muscles (superior oblique) controlling the diagonal downward-inward movement of the eye.	• Inability to track an object downward and inward. • Double vision.
CN V (5) Trigeminal nerves **Sensory nerves** related to the sense of touch on facial **dermatomes** (forehead, maxillary, mandible) and the cornea. **Motor nerve** related to the innervation of the temporal and masseter muscles of the face.	• Asymmetrical, decreased, or no sensation/feeling to forehead, cheeks, and jaw region. • Delayed or absent **corneal reflex**. • Asymmetry in jaw clenching movement and decreased strength.
CN VI (6) Abducens nerves **Motor nerves** related to eye muscle movement specific to one set of muscles (lateral rectus) controlling the horizontal outward movement of the eye.	• Inability to track an object outward on a horizontal plane. • Double vision.
CN VII (7) Facial nerves **Sensory nerves** related to taste on the dorsal side of the tongue on the anterior two-thirds (at the front of the tongue). **Motor nerves** related to movement of the facial muscles (i.e., facial expressions).	• Alteration in taste (decreased or absent). • Asymmetry of facial muscles such as flattening of the nasolabial fold or flattening of forehead wrinkles. • Inability to close eyes. • Decreased or inability to smile or show teeth.
CN VIII (8) Vestibulocochlear nerves **Sensory nerves** related to balance (vestibular) and hearing (cochlear). This is a set of two nerves including the vestibular nerves and the cochlear nerves (with some motor function).	• Issues with proprioceptive sensation, balance issues, dizziness, and nausea. • Difficulty or absent ability to hear sounds or voices.

CN IX (9) Glossopharyngeal and CN X (10) Vagus nerves These nerves work together: CN IX carries afferent messages to the brain and CN X carries efferent messages to the affected area. **Sensory nerves** (CN IX) related to taste on the dorsal side of the tongue on the posterior third (toward the back of the tongue) **Motor nerves** related to movement of the soft palate, uvula, and pharynx, and some muscles of the tonsillar pillars, swallowing, and speech.	• Decreased or absent taste (CN IX). • Diminished or absent gag reflex. • Asymmetrical or lack of movement of palate and uvula. • Dysphagia. • Dysphasia. • Hoarseness.
CN XI (11) Spinal accessory nerves **Motor nerves** that innervates and controls the sternocleidomastoid and trapezius muscles.	• Asymmetry and atrophy of neck muscles. • Misaligned levelling of shoulders. • Decreased range of motion of neck or shoulders on one or both sides • Decreased muscle resistance of neck or shoulders on one or both sides.
CN XII (12) Hypoglossal nerves **Motor nerves** related to tongue movement and strength.	• Inability to stick tongue out midline and tremor of tongue. • Decreased or inability to move tongue. • Decreased or no tongue strength.

Prioritizing Care

All abnormal findings related to cranial nerve testing should be documented and reported to the physician or nurse practitioner. These findings should be considered in the context of the full neurological exam. For example, you should refer a client to an eye specialist when their visual acuity is worse than 20/30. However, some abnormal findings require immediate action. For example, a sudden change in vision (e.g., partial or complete loss) and **fixed pupils** are a priority of care and you should immediately notify the physician or nurse practitioner.

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CN I – Olfactory Nerves

The olfactory nerves (CN I) are tested in cases when the client has indicated a problem smelling things.

Steps for evaluating the functioning of the CN I include:

1. Before assessing the nerve, test patency of the nasal passages by having the client occlude one naris at a time while placing their index finger over the outside of the nose/nasal wing and ask them to take a deep and quick inhalation in through the nose (like a sniff in which they draw air inwards as if trying to smell something). Note the client's capacity to breathe inwards demonstrating patent nasal passage. The client should be able to breathe inwards with no obstructions. Note: if the client is unable to occlude their own naris, you can press on the nasal wing to occlude the naris.
2. Then, ask the client to occlude one naris at a time while placing their index finger over the outside of the nose/nasal wing.
3. Ask the client to close their eyes.
4. Place a familiar smelling stimulant under the open naris and ask the client to identify the smell.
5. Then, repeat steps 2 to 4 on the other nostril with a different stimulant.
    a. Normally, the client can identify the smell of the stimulant.
    b. Note unilateral (one side) or bilateral (both sides) loss of smell.
6. Note the **findings**:
    a. Normal findings might be documented as: "CN I exam: smell intact bilaterally."
    b. Abnormal findings might be documented as: "CN I exam: unilateral decrease of smell, left side."

Contextualizing Inclusivity

It is important to use a **familiar smelling stimulant** (e.g., toothpaste, mouthwash, coffee, vanilla extract). What is considered "familiar" is sometimes **culturally dependent**, so be aware of this when choosing stimulants and interpreting findings. Alongside of this, it is more important that the client perceives an odour than being able to identify the actual smell.

CN II – Optic Nerves

The optic nerves (CN II) can be tested in several ways. Nurses often assess for visual acuity using the Snellen eye chart, and peripheral vision using the confrontational visual field exam.

Visual Acuity Testing

Steps for evaluating visual acuity and the functioning of the CN II include:

1. In a well-lit environment, have the client stand 20 feet away from the Snellen eye chart (see **Figure 7**). The chart should be placed on the wall at about 5 to 6 feet from the floor (at eye level). The client should keep their glasses on or their contact lenses in if they are used for distance. Snellen eye charts are also available in 10 feet formats; in this case, the client stands 10 feet away from the chart.
2. Ask the client to cover one eye with the palm of their hand.
3. Ask the client to read as many lines as they can, without squinting, beginning with the top line and reading one line at a time. Typically, you will stand to the side of the chart, and if necessary, you may point to the line.
4. When the client has read as far as they can, ask them to try to read the next line.
5. If they make an error on a line, ask them to repeat the line. They can make a maximum of two errors on a line in order for their visual acuity to be identified on that line. If they make more than two errors, then their visual acuity is noted as the line above.
6. Note the client's visual acuity using a fraction: the numerator (top number) is the distance the client is standing from the chart and the denominator (bottom number) is the distance at which a person with normal vision can read that line, as noted on the Snellen eye chart (Canadian Association of Optometrists, 2023; Porter, 2022). Normal vision is 20/20 on the Snellen eye chart. The denominator should be reported as the last line the client could read, even if they made two errors on the line (e.g., they couldn't read two of the letters or they made an error with two of the letters). Report the eye (i.e., left or right), how many letters they missed, and whether they were wearing glasses or contact lenses (see **Clinical Tip textbox** for more information).
7. Repeat steps 2 to 6 for the other eye.

    - Normal visual acuity is 20/20, which means that the client can read at 20 feet what a person with normal/good vision can read at 20 feet (Porter, 2022).
    - Abnormal visual acuity can involve situations where the denominator is bigger, and sometimes where the numerator is smaller. For example, 20/60 means that the client can read at 20 feet what a person with normal/good vision can read at 60 feet. Sometimes a client cannot read any of the letters at 20 feet. If so, they should move closer to the chart (e.g., 10 feet) and attempt to read the chart. In this case, the numerator would be 10. As an example, you may report vision as 10/80, meaning that the client can read at 10 feet what a person with normal/good vision can read at 80 feet.

8. Note the **findings**:

    - Normal findings might be documented as: "CNII exam: visual acuity 20/20 -1 in both eyes with contact lenses." (NOTE: -1 represents the number of letters they missed with each eye).
    - Abnormal findings might be documented as: "CNII exam: 20/20 -2 in left eye, 20/200 in right eye with no glasses/contact lenses." (This reflects abnormal findings in the right eye).

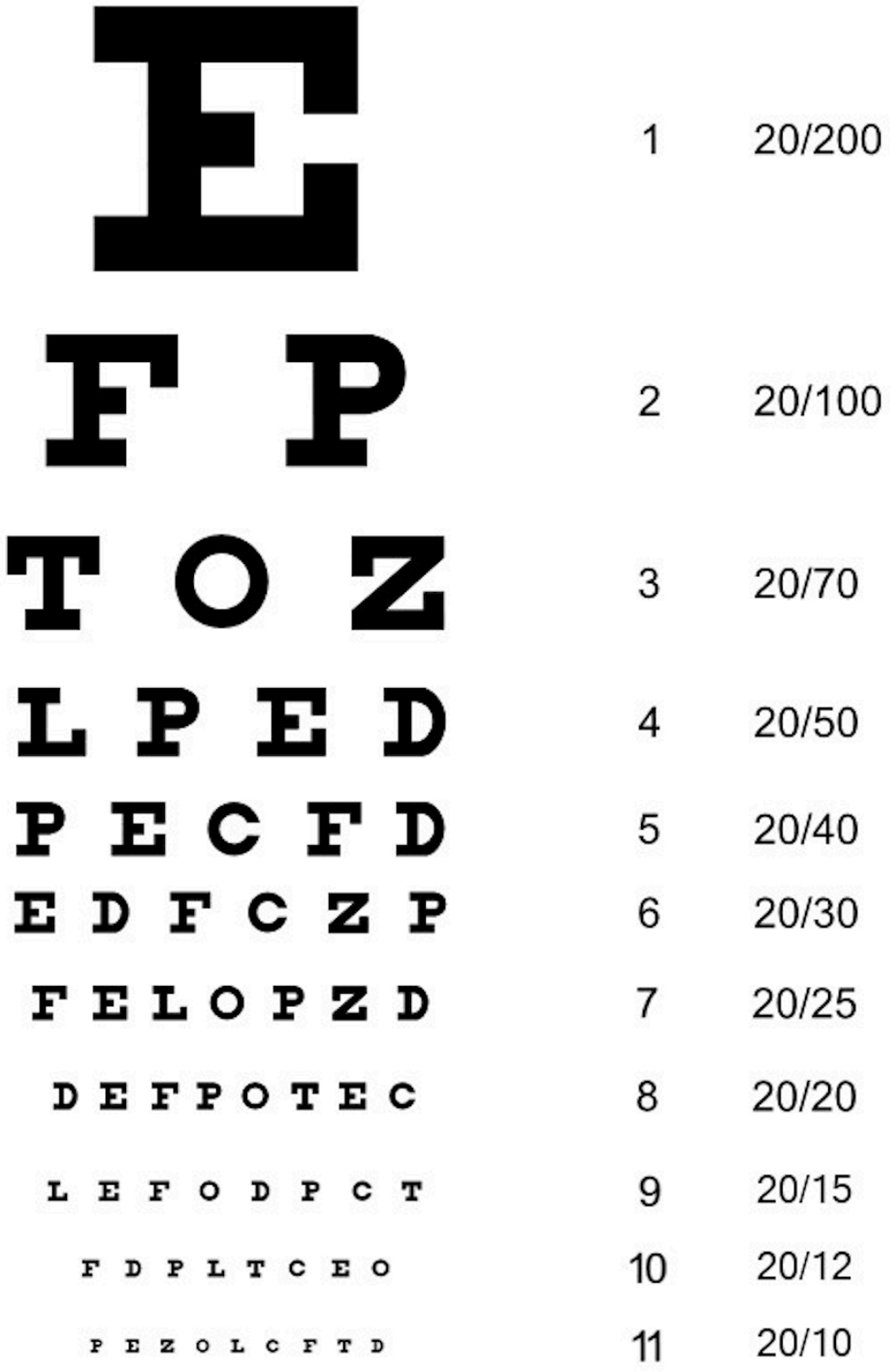
E
1 20/200
F P
2 20/100
T O Z
3 20/70
L P E D
4 20/50
P E C F D
5 20/40
E D F C Z P
6 20/30
F E L O P Z D
7 20/25
D E F P O T E C
8 20/20
L E F O D P C T
9 20/15
F D P L T C E O
10 20/12
P E Z O L C F T D
11 20/10

Figure 7: Snellen eye chart (By Khex14 – Own work, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=31308551)

Clinical Tip

Visual acuity is noted on the line where the client can read all of the letters with a maximum of two errors.

Example 1: If the client incorrectly identifies two of the five letters on the 20/40 line, this means they were unable to correctly read all of the letters on this line except two. Thus, their visual acuity is noted as 20/40 – 2. Recall, they can make a maximum of two errors on a line.

Example 2: If the client can accurately read all of the letters on the 20/30 line and only 3 of the 7 letters on the next line (20/25 line), this means they made more than two errors on the 20/25 line. Thus, their visual acuity is noted as 20/30 +3.

Contextualizing Inclusivity

Some clients may be unable to stand due to muscle weakness, fatigue, balance problems, or being in wheelchair. If so, lower the Snellen eye chart so that it is located on the wall at about their eye level.

Several alternatives are available for young children or individuals who are unable to read letters, including the Tumbling E chart or a chart with pictures.

Confrontational Visual Field Exam

Peripheral vision can be evaluated using the confrontational visual field exam. The exam can be conducted in several ways including client peripheral vision compared to examiner, wiggle finger method, and counting finger method. For each of these tests, you move your arm/hand into three peripheral vision fields as per **Figure 8**: superior, eye level, inferior.

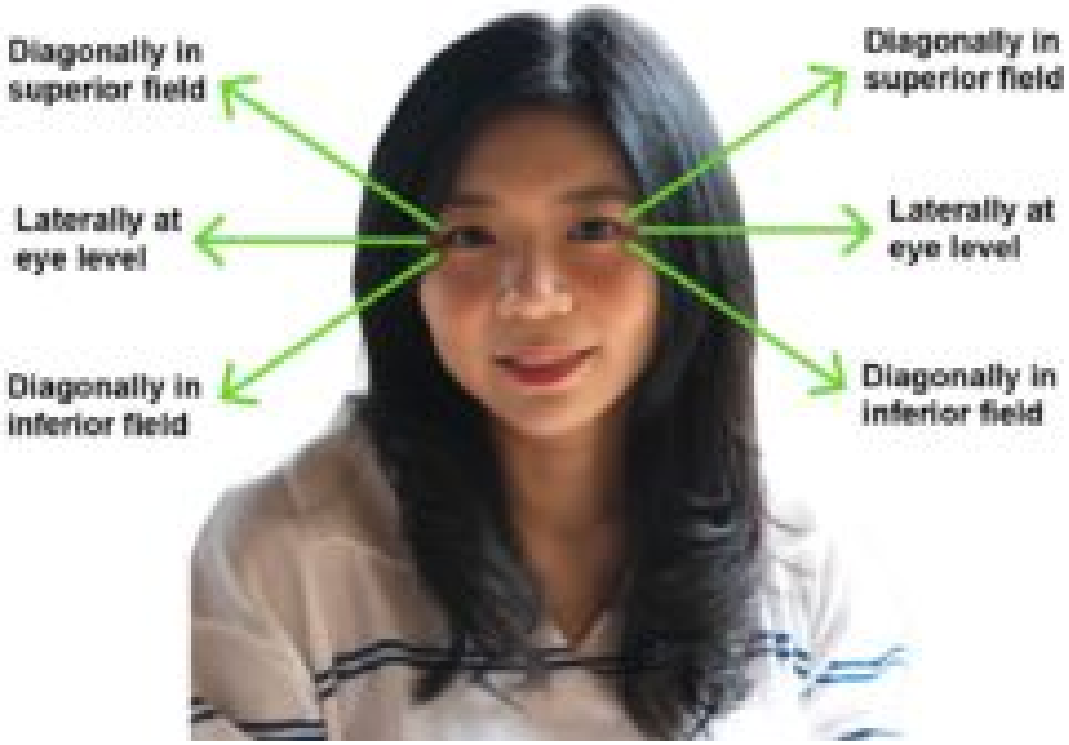

Figure 8: Peripheral vision fields

This exam should take place in a well-lit environment in which the client's eye level is at the same level as your eyes. Both you and the client can stand as long as eye levels match or you can stand and raise or lower the exam table so that the client's eye level matches your eye level. Position yourself about three to four feet away from the client.

Ask the client to remove anything that could interfere with peripheral vision such as a hat with a rim, and then to look at your face: ask if they can clearly see your face with no difficulties and no blurring.

The next set of steps are as follows:

1. **Client peripheral vision compared to examiner**: Stand about one foot away from the client. Cover your own right eye and ask the client to cover their left eye with the palm of their hand and stare directly at your open eye; you will also stare at their open eye. Stretch your left arm/hand out laterally as far as you can in the superior field, at the client's eye level, midway between you and the client. Begin to move your arm/hand inward. Ask the client to state "now" when they first see your hand: they should see it at the same time you see it. Repeat this by stretching your arm/hand into the inferior field and moving your arm/hand inward. Then, repeat a third time with your arm/hand stretched out laterally at the client's eye level, but this time closer to them as opposed to midway between you. Then, repeat the same three steps on the opposite eye. The validity of this exam is based on the assumption that the examiner has normal peripheral vision, which is about 90 degrees.
2. **Wiggle finger method**: Now position yourself about three to four feet away from the client. Ask the client to fixate (focus) on your nose. Stretch both of your arms out to the side, pointed diagonally into the superior quadrants. Wiggle/flex the index finger on one of your hands and ask the client to point to the side that they see your finger moving. Then repeat with your other hand. Repeat the same steps with your arms stretched out to the side laterally at eye level and then out to the side pointed diagonally into the inferior quadrants. The client should be able to identify the correct hand that is moving each time (see **Video 3**).

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Video 3: Wiggle finger method.

3. **Counting finger method**: Remain about three to four feet away from the client. To test the client's right eye: Close or cover your own right eye and ask the client to cover their left eye with the palm of their hand and stare directly at your open eye; you should do the same. Now, stretch your left arm/hand out pointed diagonally into the superior quadrant, then laterally out at the eye level, and then diagonally down into the inferior quadrant. In each of these fields, hold up 1–5 fingers (use a different number each time) and ask the client how many fingers they see. Your hand should be midway (equidistant) between you and the client (i.e., not closer to you, nor closer to them) with the palm of your hand facing the client, so they can tell how many fingers you are holding up. Repeat the same steps to test the client's other eye; this time asking them to cover their right eye, and use your right arm/hand (see **Video 4** as an example of testing the right eye).

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Video 4: Counting finger method for testing the right eye.

4. Note the **findings**:
    - Normal findings might be documented as: "Confrontational visual field exam: client able to identify correct numbers and hand wiggling in all three peripheral positions on left and right sides. Client's peripheral vision intact (equal to the examiner's)."
    - Abnormal findings might be documented as: "Confrontational visual field exam: client unable to see correct numbers displayed by examiner's fingers and examiner's hands wiggling in superior and inferior fields bilaterally. Client's peripheral vision less than the examiner's."

Priorities of Care

Clients who have decreased visual acuity or decreased peripheral vision should be encouraged to see an eye doctor. However, new onset and sudden loss of vision such as blurred vision, a dark spot or shadow, or double vision requires emergency care as these symptoms could be related to a stroke or **retinal detachment**. In these

cases, stay with the client, notify the physician or nurse practitioner STAT, take the client's blood pressure, and perform a primary survey.

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CN III, IV, and VI - Oculomotor, Trochlear, and Abducens Nerves

This section explores three different evaluations: assessment of the eyelids, pupillary light reflex, and extraocular eye movements.

Eyelids (specific to CN III)

1. Ask the client to look straight at you and observe their eyelids.
    - Normally, eyelids are open with equal palpebral fissure, which is the opening between the upper and lower eyelids. The upper eyelid crosses the iris and is positioned between the upper limbus and the pupil (the upper part of the sclera should not be visible).
    - Abnormal findings include unequal palpebral fissures such as drooping of one eyelid or eyelid retraction.
2. Note the **findings**:
    - Normal findings might be documented as: "Equal palpebral fissures bilaterally."
    - Abnormal findings might be documented as: "Drooping of left eyelid" or (as shown in **Figure 9**) "Left eyelid retraction."

File:Congenitalptosis.JPG

Figure 9: Left eyelid retraction.
(By Andrewya – Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=7028920)

Pupillary Light Reflex (specific to CN II and CN III) and Accommodation (CN III)

The pupillary light reflex assesses the eye's response to light and innervation of CN II (optic) and CN III (oculomotor) while testing for accommodation refers to the eye's ability to accommodate for near objects and innervation of CN III (oculomotor). Beginning with pupillary light reflex followed by accommodation, the steps in the assessment include:

1. To test **pupillary light reflex**, have the client look straight ahead at a distant point on the wall behind you (e.g., at the opposite end of the room) to slightly dilate the pupils. If possible, also reduce the lighting in the room to dilate the pupils.
2. First, assess the pupils for shape, equality, and size.
    - Normally, the pupils should be round, equal in size and shape, and sized 2 to 8 mm in diameter. Normal size will depend on the ambient lighting; for example, the diameters of normal pupils are smaller in a well-lit environment (2–4 mm) and bigger in a darker environment (4–8 mm).

- Abnormal findings may include pupils that are not round, are unequal in size and shape, or are smaller or larger than the normal size.

3. Ask the client to continue looking straight ahead at the distant point on the wall. Turn on your penlight. Move the light from the right side of the client to directly in front of their right eye, pause for 1–2 seconds, and then move the light back out to the side: the light should activate CN II to send a message to the brain, and then CN III should send a message to the pupillary muscles causing pupillary constriction.

   When pausing the light on the eye, observe the clients' right eye and left eye for pupillary constriction. If necessary, perform this procedure twice so that you can focus on the right eye (for direct response: meaning the pupil of the eye on the side where the light is introduced constricts), and then focus on the left eye (for consensual response: meaning the pupil of the opposite eye where the light is introduced also constricts). Repeat this step for the left eye and observe direct and consensual responses (see **Video 5**). Additionally, note the size of the pupil afterwards; it should return to the same size before the light was introduced.

   - Normally, you should see a direct response and a consensual response. Normal constriction is often described as prompt or brisk, meaning it happens right away. And when you remove the light, normally, pupils will return to the same size/shape they had before you introduced the light.
   - Abnormal findings include no direct and/or consensual response (the response is absent and pupils do not constrict), or when pupillary constriction is sluggish (slow).

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Video 5: Pupillary light reflex test.

4. To test **accommodation**, first have the client stare straight ahead at a distant point on the far wall and if possible, have the lights dimmed to dilate the pupils. While they are staring straight ahead, explain to the client that you are going to move your index finger (or your penlight turned off) in front of their nose and slowly bring it closer to their nose. Ask them to shift their gaze from looking at the distant point on the wall to your finger and stay focused on your finger. Next, place your index finger in front of their nose (about 20 to 30 cm from the tip of their nose and slowly move it closer so that it is about 8 cm from the tip of their nose).

   - Normally, the client should shift their gaze to your finger (convergence of the eyes inward) accompanied by pupillary constriction.
   - Abnormal findings include inability to shift eyes simultaneously and lack of pupillary constriction.

5. Note the **findings**:

   - Normal findings might be documented as: "Pupils round, 3 millimetres, and equal in size. Brisk, direct and consensual light reflex noted bilaterally. When testing for accommodation: pupillary constriction and convergence of eyes noted." (In some institutions, this is sometimes noted as PERRLA: pupils equal round reactive to light and accommodation).
   - Abnormal findings might be documented as: "No direct or consensual light reflex noted bilaterally."

Clinical Tip

It can sometimes be difficult to evaluate the pupil size and pupillary constriction with clients who have dark irises. If needed, ask them to look up while doing the assessment; this can sometimes help. Alternatively, use a second penlight and shine the light tangentially to highlight the iris without causing an unintentional pupillary reflex.

Extraocular Eye Movement (specific to CN III, IV, and VI)

The **extraocular eye movement** is innervated by CN III, IV, and VI (see **Figure 10**).

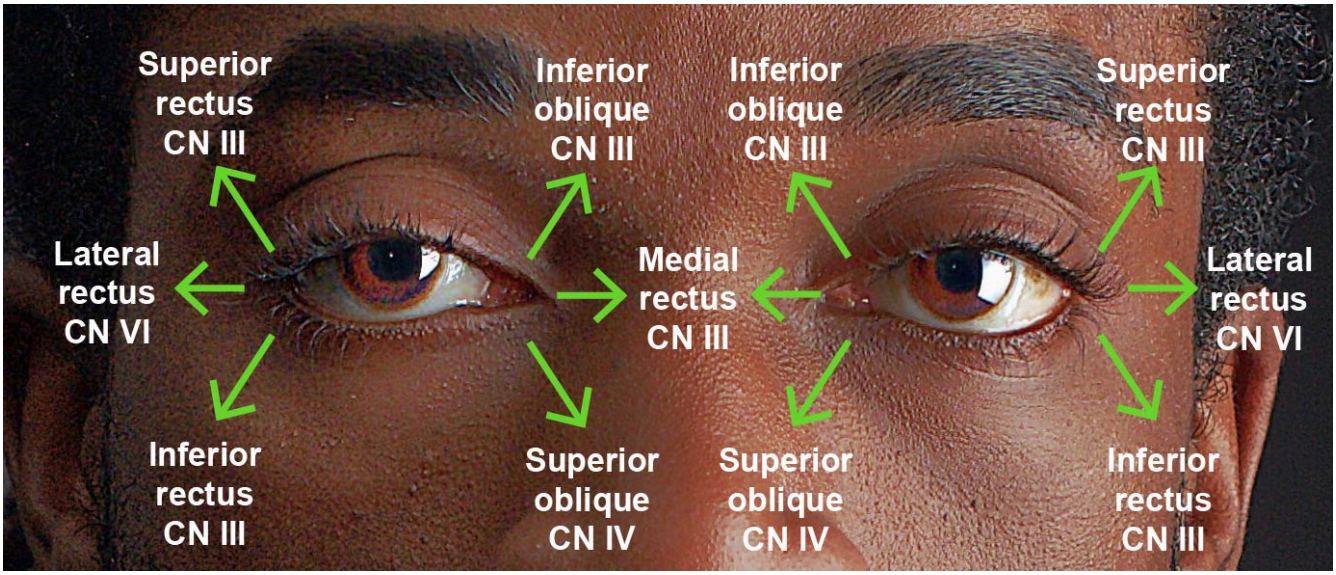

Figure 10: Extraocular movement via cranial nerves. (Illustrator Arina Bogdan)

1. Sit or stand about 3 to 4 feet (or two arms lengths away from the client) at the same level.
2. Ask the client to stare at your nose.
    - Normally, the client's gaze is midline.
    - Abnormal findings include deviation of one of the eyes or both. The deviation may involve the eye moving inward, outward, up, or down.
3. Place your index finger straight out in front of you and ask the client to keep their head still and follow your finger

with their eyes through an "H" or what is also called the six diagnostic positions (see **Figure 11**). Positions include: diagonally in superior field, laterally at eye level, and diagonally in the inferior field. You should move your finger into each of these positions by fully extending your arm. Move back to centre each time you move to one of these positions and complete these movements on both sides. Hold your finger in each of these six positions for about two seconds. If the client moves their head, remind them to keep their head still and only follow your finger with their eyes. Ask the client if they experienced any double vision. See **Video 6**.

- Normally, eye movement is smooth, **conjugate**, with no **nystagmus**, and no double vision.
- Abnormal findings might include disconjugate movement, nystagmus, and double vision.

4. Note the **findings**:

   - Normal findings might be documented as: "Smooth, conjugate movement with no double vision."
   - Abnormal findings might be documented as: "Disconjugate eye movement, nystagmus of left eye with extreme lateral gaze, and double vision noted by client."

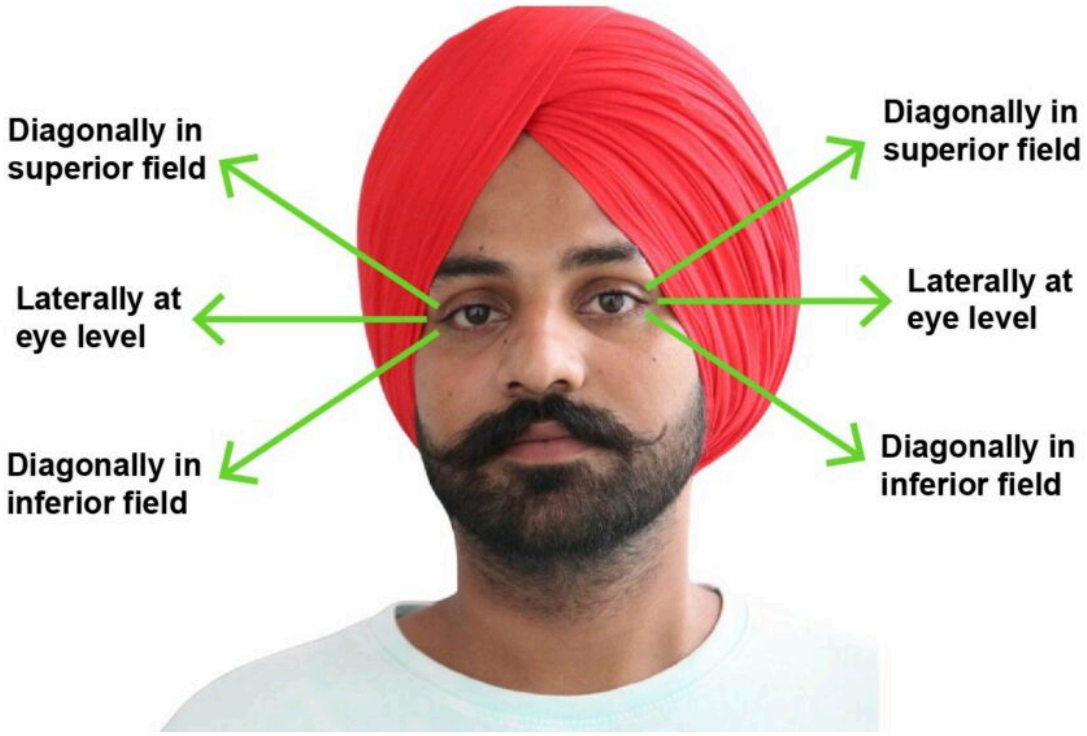

Figure 11: Six diagnostic positions for testing.

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Video 6: Extraocular eye movement test.

Contextualizing Inclusivity

If the client is a sleeping infant, you should generally wait until they awake and spontaneously open their eyes before you assess pupillary light reflex. You can also have the parent or other caregiver hold the infant.

If the client is unconscious, you will need to open their eyes to assess pupillary light reflex. To do so, place the thumb pad of your non-dominant hand over the superior edge of the orbital bone and pull the eyelid up and open (see **Figure 12**).

Figure 12: Opening an unconscious client's eye to assess pupillary light reflex.

Priorities of Care

A serious finding is what is often referred to as a "blown" pupil (the pupil is fixed, unresponsive, and dilated). This condition is often associated with brain herniation, meaning the brain tissue shifts due to increased intracranial pressure. Brain herniation can be related to various pathophysiological process such as brain trauma, stroke, aneurysm, or tumour. Unilateral or bilateral fixed and dilated pupils should be immediately reported to the physician or nurse practitioner, while you stay with the client and complete a primary survey.

Anisocoria (unequal pupil size) does not require treatment unless it is new onset. Many clients have unequal pupil size, but a new onset may be of concern because it can be associated with neurological problems, stroke, infection, or eye trauma. Complete a focused assessment and report findings to the physician or nurse practitioner.

CN V - Trigeminal Nerves

1. **Sensory function testing of CN V – Cotton ball**: Explain to the client that you want them to close their eyes, that you will lightly touch areas on their face with a cotton-tipped applicator or cotton ball, and that they should indicate when they feel you touch their face each time. When their eyes are closed, briefly touch one spot in the ophthalmic area, then wait 2 to 3 seconds, and then touch the other ophthalmic area (see **Figure 13**). After touching these two spots, ask the client if the sensation felt the same. Repeat the same test for the maxillary and mandibular areas. The objective is to evaluate the locations where the trigeminal nerves innervate (see **Figure 14** and **Video 7)**.

    - Normally, a client should be able to indicate when their face is being touched in the ophthalmic, maxillary, and mandibular areas bilaterally and the sensation should feel similar.
    - Abnormal findings include not being able to feel the touch on one or more locations or having decreased sensation on one side. If you observe any abnormal findings or need more information, you may repeat the test using a tongue depressor broken in half. Apply the rounded edge or sharp edge in each location and ask the client to differentiate between "rounded edge" or "sharp edge." You may show them the round edge and sharp edge before beginning and brush both on their forearm so they know what each feels like.

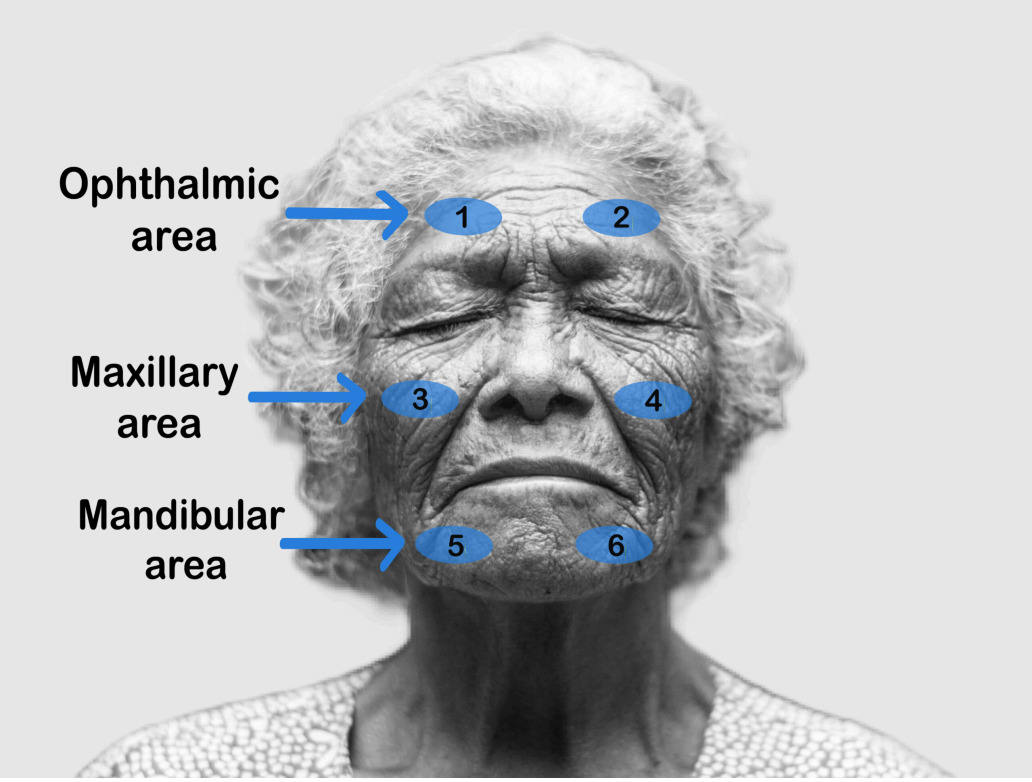

Figure 13: Trigeminal nerve sensation areas. (Illustrated by Tayiba Rahman)

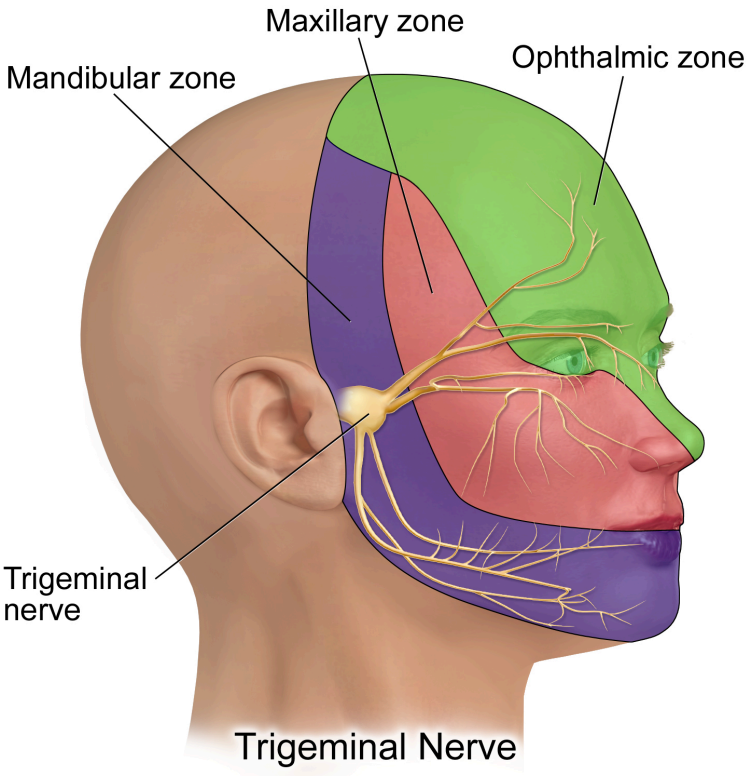

Figure 14: Sites of trigeminal nerve innervation. (CC-BY 4.0 by BruceBlaus: https://commons.wikimedia.org/w/index.php?curid=61465350)

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2291#oembed-1

Video 7: Sensory testing of trigeminal nerve (CN V).

2. **Sensory function testing of CN V – Corneal reflex**: Test the corneal reflex ONLY in specific situations, such as suspected brain stem damage or CN V or CN VII lesions – typically, the corneal reflex should NOT be tested on a person who is healthy. The corneal reflex is facilitated by afferent sensory CN V and efferent motor CN VII. To test the right eye, stand on the client's right side; if they are able to follow commands, ask them to keep their head still to use their eyes only to look up and away from you. Then, with a delicate wisp of a cotton ball, gently touch the edge of the cornea. Repeat this procedure for the left eye. Some healthcare professionals perform the test with a drop of sterile saline instead of a wisp of the cotton ball to avoid possible corneal abrasion. See **Video 8.**

    - Normally, there will be bilateral blinking.
    - Abnormal findings include unilateral or absent blinking.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2291#oembed-2

Video 8: Corneal reflex.

2. **Motor function testing of CN V – Inspect and palpate**: Inspect the temporalis and masseter muscles for symmetry. Next, ask the client to clench their teeth while you palpate the temporalis and masseter muscles on both sides simultaneously along the upper and lower jaw.

    - Normally, the muscles are equal bilaterally in size.
    - Abnormal findings include asymmetrical muscle mass or atrophy.

3. **Motor function testing of CN V – Range of motion**: Ask the client to open and close their mouth a bit slower than usual and then protrude and retract the lower jaw (move outwards and back inwards).

    - Normally, these movements should all be symmetrical.
    - Abnormal findings include asymmetrical movement.

2. **Motor function testing of CN V – Manual muscle testing**: Perform manual muscle testing of the jaw. Ask the client to keep their head still and clench their teeth, and then place your thumbs on their chin with your fingers toward the back of the neck. With your thumbs, attempt to pull down their lower jaw. Then, ask them to open their mouth and resist your force (i.e., not let you push their jaw closed) while you apply upward pressure on their chin; to do so, place your fingers on their chin applying upward pressure and your other hand on the top of their head (see **Video 9**).

    - Normally, the client should be able to resist your force, demonstrating good strength.
    - Abnormal findings include decreased or no resistance in which the client cannot resist jaw opening unilateral or bilateral, or is unable to keep the jaw open, or the jaw deviates to one side.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2291#oembed-3

Video 9: Manual muscle testing of the jaw.

6. Note the **findings**:

    - Normal findings might be documented as: “Trigeminal nerve test: sensations intact on ophthalmic, maxillary, and mandibular areas bilaterally. Temporal and masseter muscles equal in size, symmetrical movement observed with ROM. Client able to resist force on the jaw. Corneal reflex present bilaterally.”
    - Abnormal findings might be documented as: “Trigeminal nerve test: no sensations felt on ophthalmic, maxillary, and mandibular areas bilaterally, temporal and masseter muscles atrophy bilaterally, no muscle strength in jaw, corneal reflex absent bilaterally.”

CN VII - Facial Nerves

1. **Motor function testing – facial asymmetry:** Observe for facial asymmetry such as flattening of nasolabial fold, lack of wrinkles on forehead, drooping of the eyebrow, or decreased or absent blinking.

    - Normally, there is no asymmetry and the client is able to blink.
    - Abnormal findings include decreased blinking and flattening of nasolabial fold, asymmetry of eyebrows with one drooping (see **Figure 15**).

2. **Motor function testing – facial muscle movement:** Explain to the client that you will ask them to move their facial muscles in different positions. It is simplest if you demonstrate the movement and ask them to mimic it. Observe the client for movement and symmetry of movement (see **Video 10**).

    - Move eyebrows upwards and crease the forehead.
    - Smile while showing teeth.
    - Puff out cheeks with air and hold, while you press gently on the cheeks in and out 2 to 3 times.
    - Close eyes and keep them closed, while you try to spread them open with your index fingers on the upper orbital bones and thumbs on the lower orbital bones.
    - Normally, the client should be able to perform all movements symmetrically, should be able to keep cheeks puffed out when you press on them, and should be able to keep their eyes closed while you try to open them.
    - Abnormal findings include lack of movement, asymmetrical movement, inability to keep cheeks puffed out, and inability to keep eyes closed.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2294#oembed-1*

Video 10: Facial movements.

3. **Sensory Sensation**: To test taste related to CN VII, use a familiar substance such as sugar or salt, but do not tell the client what the substance is. Place the substance in a small amount of water and stir it with a cotton swab until it dissolves. Ask the client to open their mouth and you place the swab on the dorsal anterior third of the tongue (not on the tip of the tongue). Ask the client to identify the taste.

    - Normally, the client should be able to identify the taste or substance.
    - Abnormal findings include inability or reduced ability to identify the taste or substance or decreased taste.

4. Note the **findings**:

    - Normal findings might be documented as: "Facial nerves testing: No asymmetry of eyebrows, blinking automatically, symmetrical movement of face. Client able to identify taste with cotton-tipped applicator soaked in sugar."
    - Abnormal findings might be documented as: "Facial nerves testing: Right eyebrow droops, client unable to

wrinkle forehead or raise right eyebrow. Client unable to identify sweet taste of cotton-tipped applicator soaked in sugar."

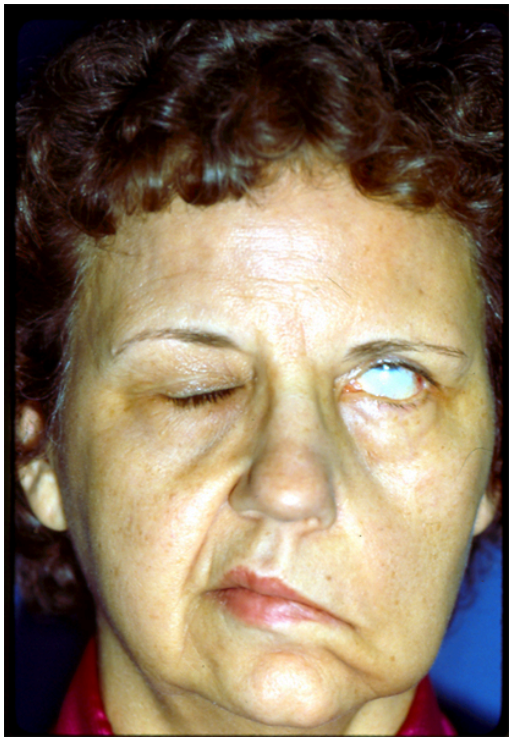

Figure 15: Facial asymmetry.
(By Student30 – This file is licensed under the Creative Commons Attribution-Share Alike 4.0 International license. https://commons.wikimedia.org/w/index.php?curid=61665721)

CN VIII - Vestibulocochlear Nerves

Testing can begin with the client sitting on the exam table. Before testing the vestibulocochlear nerves, ask the client about any history of impaired hearing and use of hearing devices. If the client has a hearing aid, they should keep it on.

1. General ability: Begin by noting the client's general ability to hear you throughout your ongoing assessment process. For example, have you noticed any difficulties in hearing as manifested by leaning forward, lip reading, or consistently asking you to repeat what you say?

2. Finger/thumb rub test: this test helps evaluate the cochlear nerve. Ask the client to look straight forward and place their index finger on the tragus of the right ear and push the tragus in and move in a circular motion until you ask the client to stop. It may be simplest to demonstrate this for them. Ask them to close their eyes so you are specifically testing hearing and not their ability to see your hand moving. Then, place your hand in front of the opposite ear (left ear) and rub your fingers and thumbs together and ask them if they can hear it. Repeat on the other side. See **Video 11**.

- Normally, the client should be able to hear this sound on both ears with a similar intensity.
- Abnormal findings are when the client cannot hear the sounds or they sound different in intensity

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2296#oembed-1

Video 11: Finger/thumb rub test.

3. Whisper voice test: this test also helps evaluate the cochlear nerve. Tell the client that you are going to whisper a mixture of three numbers and letters and you want them to repeat what you say. Ask them to look straight forward and place their index finger on the tragus of the right ear and push the tragus in and move your finger over the tragus in a circular motion until you ask the client to stop. Stand on their left side (slightly behind them and about an arm's length away) to test the left ear. Take a breath in, and as you breathe out, whisper a mixture of three numbers/letters (e.g., 8, E, 4). The client should repeat what you say. If they don't, whisper another set of three numbers/letters (e.g., 2, K, 10). Repeat on the opposite ear with a different set of numbers/letters. See **Video 12**.

- Normal findings are when the client can repeat what you say with both ears. If you need to repeat the set of numbers/letters on one ear (for a total of six), a normal finding is if the client is able to repeat at least half of the numbers/letters.
- Abnormal findings are when the client is unable to repeat the set of numbers/letters on one or both ears or unable to repeat at least half of them if repeated twice.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2296#oembed-2

Video 12: Whisper voice test.

4. Past pointing test: this test specifically focuses on the vestibular portion of the cochlear nerve. It evaluates the client's proprioceptive sensation of the vestibular portion of the nerve, i.e., body's awareness that helps an individual perceive their location and movement. Ask the client to place both arms straight out in front of them with palms down. You will then do the same, but with your palms up: allow the client's hands to rest on yours and then ask them to raise their arms above their head, and then come back to the same position to touch your hands. Next, ask them to close their eyes and again raise their arms above their head, and then come back to the same position to touch your hands (repeating this twice). See **Video 13**.

- Normal findings are when the client can raise their arms and then return to the same position to touch your hands with eyes closed (this is considered a negative past pointing test).
- Abnormal findings are when the client is unable to return their hands to the same position to touch your hands with eyes closed. They might deviate to the side with one or both hands or overshoot your hands (this is considered a positive past pointing test).

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2296#oembed-3*

Video 13: Past pointing test.

- Note the **findings**:
  - Normal findings might be documented as: "Cochlear nerve test: With whispered voice test, client able to hear and repeat numbers and letters in both ears, able to hear examiner rubbing fingers together beside both ears. Past pointing test: client able to raise arms above head and return and touch examiner's hands with eyes closed."
  - Abnormal findings might be documented as: "Client unable to hear and repeat numbers and letters whispered in left ear. Positive past pointing test."

CN IX and X - Glossopharyngeal and Vagus Nerve

1. To test taste related to CN IX, use the same steps as step 3 in the previous section related to CN VII, except introduce the substance to the posterior third of the tongue. This test is only done when there are specific concerns.
2. To test gag reflex as related to CN IX and CN X, use a tongue depressor to tap near the lateral side of the pharynx near the tonsillar pillars or at the lateral posterior side of the soft palate. While doing this, use a penlight to illuminate the inside of the mouth and pharynx. Test on both sides of the mouth. See **Video 14.**
    - Normally the client will gag, meaning that the pharynx will constrict/contract and the uvula and midline of the soft palate will move upward.
    - Abnormal findings include an absent or decreased gag reflex, as well as an overactive gag reflex.
3. Next, ask the client to open their mouth and inspect the soft palate and uvula, and then have the client stick out their tongue and say "ahh."
    - Normally the soft palate is symmetrical and uvula is midline. When they say "ahh," the soft palate should elevate and the uvula should elevate while remaining midline.
    - Abnormal findings include an asymmetrical palate, a deviating uvula, and a palate that does not move upward.
4. You may ask the client to swallow, or to take a sip of water and swallow, to ensure they have no difficulty swallowing.
5. Throughout this assessment, continually listen to the client's speech to ensure there is no hoarseness or difficult speaking.
6. Note the **findings**:
    - Normal findings might be documented as: "Gag reflex present, soft palate and uvula symmetrical and mobile with no dysphagia, dysphasia or hoarseness."
    - Abnormal findings might be documented as: "Gag reflex absent. Client unable to clearly form words."

Gag reflex link (from kaltura)

Video 14: Gag reflex

CN XI - Spinal Accessory Nerves

This section presents a brief description of assessment of the spinal accessory nerves; more information can be found in the musculoskeletal resource. The following tests are usually performed with the client in a sitting or standing position.

1. Inspect the neck and shoulders anteriorly and posteriorly and inspect the head position.

    - Normally the neck and muscles (sternocleidomastoid and trapezius) are symmetrical and shoulders are at the same level. The head is midline and upright.
    - Abnormal findings are asymmetry of neck and muscles with a drooping shoulder or if the head droops forward, backward, or off to one side.

2. Ask the client to perform range of motion (ROM) of the neck (flexion, extension, rotation, lateral flexion) and shoulders (flexion, extension, abduction, adduction) and to shrug their shoulders.

    - Normally, ROM should not be affected and the client should be able to lift up/shrug shoulders.
    - Abnormal findings are limited to no ROM and inability to shrug shoulders.

3. Conduct manual muscle testing (MMT) of the neck (flexion, extension, rotation, lateral flexion) and shoulders (flexion, extension, abduction, adduction, shoulder shrug). All of these elements can be tested, but especially rotation to ensure the sternocleidomastoid muscle is being innervated, and shoulder shrug to ensure the trapezius muscles are being innervated.

    - Normally, the client should have full resistance bilaterally.
    - Abnormal findings are partial or no resistance on one or both sides.

4. Note the **findings**:

    - Normal findings might be documented as: “Spinal accessory nerve testing: Symmetrical neck and muscles with shoulders at same level. Head midline and upright. Full ROM of neck and shoulders and full resistance bilaterally.”
    - Abnormal findings might be documented as: “Right shoulder lower than left. Client unable to abduct right shoulder fully with decreased resistance.”

CN XII - Hypoglossal Nerves

1. Ask the client to open their mouth and stick their tongue out as far as they can. Ask them to move it to one side and then the other side

    - Normally, the tongue should be midline with no tremors and ease of movement.
    - Abnormal findings would be a tongue that deviates to one side, with tremors and/or decreased or absent movement.

2. Next, place your fingertips on one side of the client's cheeks. Ask the client to move the tip of their tongue against the buccal mucosa inside their mouth so that they can feel your fingers. Tell them that you are going to apply pressure with your fingers and they should attempt to resist the pressure. Repeat on the other side.

    - Normally, the client should be able to resist your pressure.
    - Abnormal findings would be a client who is unable to resist your pressure.

See **Video 14**.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2302#oembed-1*

Video 14: Hypoglossal nerve testing (CN XII).

3. Note the **findings**:

    - Normal findings might be documented as: "Hypoglossal testing: Tongue midline, no deviation, able to move tongue from side to side and resist examiner's pressure."
    - Abnormal findings might be documented as: "Hypoglossal testing: Tongue deviates to left side with tremors. Absent muscle resistance of tongue bilaterally."

Contextualizing Inclusivity

- Your findings may be affected by the client's age. As individuals age, they often experience a diminished ability to smell and taste bilaterally, as well as reduced peripheral vision.
- Some clients may feel vulnerable when a nurse is behind them; recall the steps of a trauma-informed

approach.

Motor Function and Cerebellar Testing

To evaluate the central and peripheral nervous systems, you must assess motor functions related to the spinal nerves, spinal column, cerebellar function, and the brain.

Together, the **motor system** and the **cerebellum** have several functions including maintaining muscle tone, muscle strength, movement, coordination, and balance. Specific to motor function, the spinal nerves innervate all portions of the body from the neck down to the toes and transmit sensory information to the cerebellum and brain (via afferent nerves) and to all areas of the body (via efferent nerves). The cerebellum relies on effective functioning of the musculoskeletal system, but is specifically responsible for coordination of movement. Cerebellar dysfunction can result in **ataxia** and is associated with incoordination, tremors, and difficulty with rapid and fine motor movements, as well as walking and balance. An abnormal finding associated with motor function and cerebellar testing could indicate a problem with the spinal nerves, spinal column, cerebellum, or the brain. These findings should be considered in the context of a complete neurological assessment.

The following assessment is completed to evaluate motor function and cerebellar testing.

1. **Inspect** and **palpate skeletal muscles** of limbs for bulk (size), symmetry, and involuntary movements. Note any abnormalities such as atrophy, asymmetry, and twitches. For more information, refer back to the chapter on musculoskeletal assessment.
2. **Assess ROM** and **manual muscle testing.** Note any abnormalities such as asymmetry, decreased ROM, decreased muscle resistance (including **flaccid/atonic**), and increased muscle resistance/hypertonia (including **rigidity** and **spasticity**). Recall the techniques presented in the objective section of the musculoskeletal testing resource.
3. Assess **pronator drift** by asking the client to close their eyes while extending their arms straight out in front of them with palms of hands facing upward (supination) for about 30 seconds. This can be done in a sitting or standing position.

    - Normally, the client should be able to maintain this position.
    - Pronator drift is when one forearm begins to pronate, move downward, and sometimes the elbow begins to flex (this finding may be associated with upper motor neuron diseases of the brain and spinal cord). See **Video 15** demonstrating pronator drift and an abnormal finding: the left arm lowers and shifts from supination to pronation.

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Video 15: Pronator drift.

4. Use the past pointing test as previously described related to CN VIII – Vestibulocochlear Nerves.
5. Similar to pronator drift, you can assess **lower extremity weakness** by having the client lie in a supine position with head on a pillow. Ask them to flex their knees as they keep their feet flat on the exam table for about 30 seconds (**see Video 16**).

    - Normally, the client should be able to maintain this position.
    - An abnormal finding is when one leg begins to extend out.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2305#oembed-2

Video 16: Lower extremity weakness test.

6. To perform the **Romberg test**, ask the client to remove their shoes. Ask them to stand at the bedside in case they get dizzy and need to sit down; you can also stand near them for safety. Next, ask the client to move their feet together with their arms/hands down at their sides or crossed in front of them. Start by asking the client to stand in this position for 20 seconds with their eyes open to ensure balance (and cerebellar functioning). Next, ask the client to maintain this position with their eyes closed for up to one minute (this tests proprioception, i.e., one's location in space). See **Figure 16.**
    - Normally, the client should be able to maintain this position with eyes opened and eyes closed, possibly with mild swaying.
    - An abnormal or positive finding is unusual swaying or moving their feet: this may be associated with the posterior column of the spinal cord. If the swaying happens when eyes are opened, this finding may be associated with the cerebellum.

Figure 16: Romberg test.

7. **Assessment of posture and gait** can be done in several ways. At this point, you have probably already evaluated the client's ability to sit or stand as part of the Brief Scan of the Neurological System. Now, ask the client to walk from point A to point B (usually about 20 feet/6 metres) and then turn around and walk back to point B. To emphasize any balance or coordination issues, ask the client to walk in a heel-to-toe manner for about half the distance (10

feet/3 metres). See **Video 17**

- Normally the client should be able to sit or stand upright with their head up and in a midline position, maintain their balance, and walk smoothly in a coordinated manner with their arms swinging at their sides.
- Abnormal findings include inability to sit upright, drooping of head, lack of balance, wide stance, incoordination of legs and arms when walking, or lack of arm movement.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2305#oembed-3

Video 17: Gait test.

8. To further test coordination and cerebellar function, complete the finger-to-nose and finger-to-finger test; the client may be sitting or standing for these tests. For the **finger-to-nose test**, ask the client to extend both arms out to the sides and then bend one arm slowly to touch their nose with their index finger, alternating with each arm a 3 to 4 times. Next, ask the client to close their eyes and repeat the same movements more quickly, about 3 to 4 times. Then, ask them to open their eyes. For the **finger-to-finger test**, place your finger an arm's length away from them, ask them to touch it with their index finger, then touch their nose, and repeat this activity 3-4 times moving your finger to a new location each time (in a high, middle and low location). Repeat with the other arm. The **heel-to-shin test** is similar to this test but specific to lower extremities: ensure the client is in a supine position and ask them to place their heel on the contralateral shin at the knee level and slide their heel down the shin. Repeat for the other leg. See **Video 18** for the finger-to-nose and finger-to-finger tests and **Video 19** for the heel-to-shin test.

   - Normally, the client's movement should be accurate and steady in motion.
   - Abnormal findings include inaccurate and unsteady movement.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2305#oembed-4

Video 18: Finger-to-nose test and finger-to-finger test.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2305#oembed-5

Video 19: Heel-to-shin test.

9. While the client is seated, perform **rapid alternating movements** of the upper and lower limbs. Start by asking the

client to stick out one hand with the palm facing upward, then place the back of their other hand in this palm, and then turn the top hand over (palm to palm): repeat this process and increase the speed about 3–4 times. Repeat on the other side. See **Video 20**. Next, ask the client to remain seated with feet flat on the floor; ask them to repeatedly tap one of their feet on the floor and repeat this with increased speed (about 3–4 times is sufficient). Repeat for the other foot.

- Normally, the client can repeat the action smoothly, quickly, and symmetrically.
- Abnormal findings include slow and uncoordinated movements.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2305#oembed-6*

Video 30: Rapid alternating movements.

10. Note the **findings**:

- Normal findings might be documented as: "Limb muscles symmetrical bilaterally with no atrophy, no involuntary movements, full range of motion, equal muscle resistance bilaterally. No pronator drift. No lower extremity weakness observed. Client able to maintain standing position with mild swaying with Romberg test. Smooth coordinated gait. Accurate and steady motion with finger-to-nose, finger-to-finger, and heel-to-shin test. Smooth, quick and symmetrical rapid alternating movements of hands and feet."
- Abnormal findings might be documented as: "Pronator drift observed right arm. Ataxia observed with walking and wide stance."

Clinical Tip

Consider safety when completing tests, especially those that require a client to stand or walk. Reflect back on fall safety interventions and strategies in relation to each client's health condition. You may decide not to complete the Romberg test, particularly if a client has symptoms of dizziness or is at risk of a fall.

Contextualizing Inclusivity

Consider the client's age, health condition, and prior limitations. For example, some older people have age-related conditions resulting in loss of muscle mass and strength. Some may have conditions associated with pain or amputations, which can affect movement. In addition to being patient, you may need to provide accommodations for accessibility reasons.

Neurological testing can be time-consuming, and it may be helpful to frame tests as a fun experience, like a game, especially for children.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2305#h5p-125

References

Campbell, W., & Barohn, R. (2020). DeJong's The Neurological Examination. Wolters Kluwer.

Sensory Function Testing

Sensory function testing is another component of the neurological evaluation. This may involve assessing components including:

- Pain sensation.
- Light touch sensation
- Vibration sensation.
- Kinesthetic and position sensation.
- Fine tactile discriminative sensation.
- Temperature sensation (these are rarely assessed by nurses and are therefore not discussed in this chapter).

Testing of pain and light touch sensation is done by applying a stimulus to the body's dermatomes: areas of the skin that are innervated by the nerves (see **Figure 17**). Typically, a **full evaluation** (where all dermatomes are tested) is performed only when the client has reported altered sensations, sensory loss, hyposensitivity, or hypersensitivity. A screening evaluation may be completed for other neurological signs and symptoms; when **screening**, touch the forearm, upper arm, upper chest, thigh, lower leg, and foot.

Knowledge Bites

Sensory function tests help evaluate the neural pathways through the spinothalamic tract (pain, light touch) and the posterior column tract (vibrations, kinesthetic and position, fine tactile discriminative touch) via the spinal cord to the brain (Campbell & Barohn, 2020). If all testing is normal except those associated with tactile discriminative sensations, then the potential of neurological dysfunction of the parietal lobes is suspected (Campbell & Barohn, 2020).

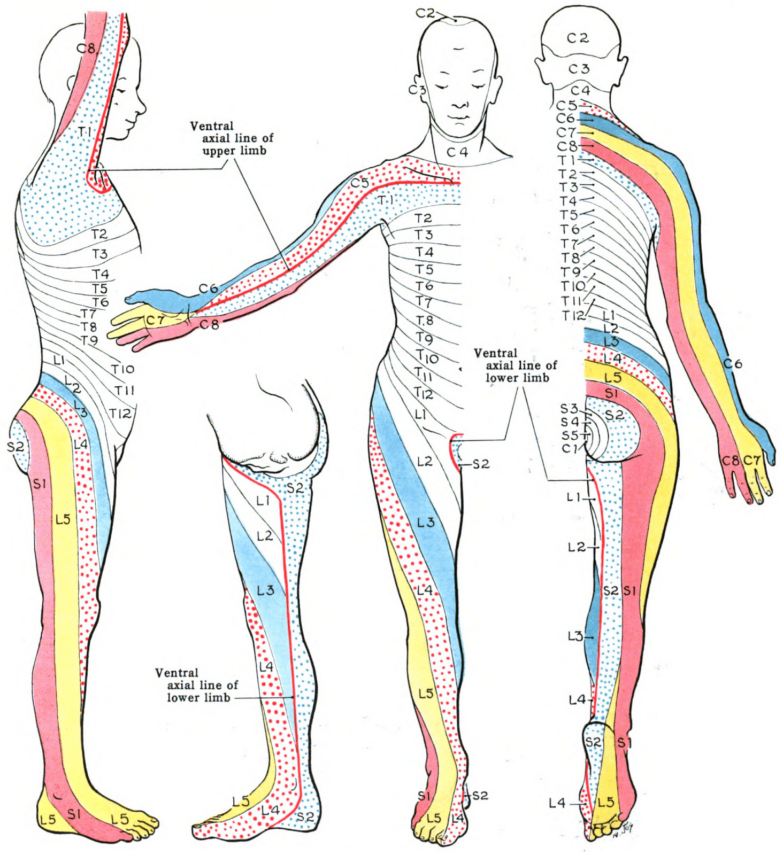

Figure 17: Dermatomes.

(By Grant, John Charles Boileau – An atlas of anatomy, / by regions 1962, Public Domain, https://commons.wikimedia.org/w/index.php?curid=30017222)

This sensory testing is best done with the client in a supine position with a pillow supporting their head. For comfort, the head of the bed may be raised at about 30 degrees. Always follow these important principles:

- To avoid **summation**, each stimulus should be separated by at least 2 seconds.
- The intervals between the stimulus should be varied to avoid the client automatically responding to a constant rhythm.
- Use a random order, but ensure a systematic approach.

Pain Sensation

1. Break a tongue depressor in half down the centre lengthwise so that there is a "sharp" edge and a "smooth" edge. Alternate approaches are to use a safety pin with the smooth clasp and the pin end or a paper clip. With the client's eyes open, demonstrate on their arm what the sharp and smooth edge feels like.
2. Let the client know that you are going to touch several areas on their body including their arms, legs, and chest and that each time they should indicate whether it is "sharp" or "smooth."
3. Then, ask the client to close their eyes and apply the various stimuli. See **Video 21** for screening.
    a. Normal findings include being able to identify when the stimulus is sharp and when it is smooth.
    b. Abnormal findings include unable to discriminate between the sharp and smooth edge or absent sensations.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2312#oembed-1

Video 21: Pain sensation test.

Light Touch Sensation

1. The stimulus can be applied with a cotton ball or a tissue (Kleenex) or even using a light touch with your index finger. If using a cotton ball, stretch it out so that you can apply a wisp to the areas.
2. Let the client know that you are going to touch several areas on their body including their arms, legs, and chest and that each time they feel something they should say "now."
3. Ask the client to close their eyes.
4. Apply the stimuli. This test is a similar way to that shown in **Video 21** for screening, except it is done with a different stimulus and the client is asked to say "now."
    a. Normal findings include being able to identify when they are touched by the stimulus and equal sensation bilaterally.
    b. Abnormal findings include decreased or absent sensation and unequal sensations bilaterally.

Vibration Sensation

1. Use a tuning fork (see **Figure 18**).
2. Place your thumb and index finger as close to the end of the stem as possible and strike the tines of the tuning fork against the ball or heel of your hand to create an oscillation/vibration.
3. First, demonstrate what it should feel like by placing the end of the tuning fork stem on a bony prominence such as the clavicle bone.
4. Notify the client that you are going to apply it to the feet and the hands and they should report when they feel the vibration and when it disappears (with their eyes closed).
5. Ask the client to close their eyes.
6. Apply the end of the tuning fork stem gently to the bony prominence of the distal bony prominence of the thumb and then repeat the process on the other hand. Repeat on the distal bony prominence of the great/big toe and then on the other foot (see **Figure 19**).
    a. Normal findings include being able to feel vibratory sensations equal bilaterally.
    b. Abnormal findings might include unequal sensations bilaterally, unable to feel the vibration or decreased vibratory sensation. If these findings are reported, a full evaluation is needed. For this, you will continue the process moving proximally: for upper limbs, move to the distal bony prominences of the fingers, the radial styloid bone, the olecranon process and so on; for lower limbs, move to the metatarsophalangeal joints, the malleoli, and the knee.

See **Video 22** demonstrating the technique assessing vibration sensation.

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2312#oembed-2

Video 22: Vibration sensation.

Figure 18: Tuning fork.
(By Rahulshedge555 – Own work, CC BY-SA 4.0,
https://commons.wikimedia.org/w/index.php?curid=89721253)

Figure 19: Tuning fork on bony prominence.

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https://commons.wikimedia.org/w/index.php?curid=79382930

Kinesthetic and Position Sensations

Kinesthetic refers to motion along with awareness of moving a body part. Testing typically involves passive movement of digits (fingers and toes) and sometimes a limb: in addition to identifying movement, the client is asked to identify the position/movement type (up or down).

The steps in evaluation include:

1. First demonstrate the expectation by grasping the client's digit on the sides with your thumb and index finger (begin with the fingers) and move it up and down explaining that the client should be able to identify the movement when their eyes are closed. Avoid grasping the anterior and posterior (top and bottom of the finger), as the pressure you apply acts as a sensation to whether you are moving the finger up or down.
2. Ask the client to close their eyes.
3. Individually move one digit at a time up or down (randomizing the movement) and ask the client to identify the movement direction and repeat on all digits on both hands and then, repeat on the toes (see **Video 23** for an example involving hands).
    a. Normal findings are that the client can identify the movement direction in all 10 digits of the hands and all 10 digits of the toes.
    b. Abnormal findings are that the client is unable to identify the movement direction in one or more of the digits of the hands and feet. If this occurs, repeat the process on proximal joints in the upper extremities (wrists, elbows, shoulders) and lower extremities (ankles, knees, hips).

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2312#oembed-3

Video 23: Kinesthetic and position sensation test: an example involving hands.

Fine Tactile Discriminative Sensations

Fine tactile discriminative sensation involves the client's ability to recognize and identify a specific sensation, which requires that they perceive and localize the sensation. These sensations are tested with what is called stereognosis and graphesthesia. **Stereognosis** is the ability to perceive and identify a three-dimensional object by touching it in one's hand, whereas inability to do so is astereognosis. **Graphesthesia** is the ability to perceive and identify a letter or number written on the skin (hands or feet), whereas inability to do so is agraphesthesia.

Steps in evaluating these sensations include:

1. Explain what you are going to do.
2. Ask the client to close their eyes.
3. Place an object that is familiar in one of the client's hands and ask them to feel it and identify it. Repeat on the other hand with a different object. Always use familiar objects such as a key, coin, comb, safety pin, or paper cup (see **Figure 20**).
4. Use your fingertip or narrow end of an instrument such as a pen to draw a letter or number on the palm of the client's hand and have them identify it. Repeat on the other hand with a different letter or number, and repeat on

the dorsum of both feet (see **Figure 21**).

a. Normal findings include being able to identify the object bilaterally and being able to identify the letter/number on hands and feet bilaterally.
b. Abnormal findings include the unilateral inability to identify the object and the unilateral inability to identify the letter/number on hands and feet bilaterally.

Figure 20: Stereognosis test.

Figure 21 : Graphesthesia test.

Contextualizing Inclusivity

Choice of familiar object should be dependent on the client because what is considered "familiar" may vary based on age and other cultural factors and experiences. Additionally, non-English speaking clients may not be familiar with the English alphabet and numbers.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2312#h5p-126

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Reflex Testing

Reflexes are **automatic** and **involuntary responses** to stimuli. They serve a protective function and help maintain balance and coordinate muscle activity. Testing reflexes is an important way to **localize a neurological lesion** to determine the spinal level. Impaired reflex activity is noted as one of the earliest signs of neurological disruption when there is a problem (Campbell & Barohn, 2020). An example of a reflex action is immediate withdrawal of a hand after touching a hot object (such as a cup).

The neural pathway responsible for these responses is called the reflex arc: the stimulus initiates an impulse along the afferent neurons to the spinal cord and transmits the impulse to efferent neurons back to the limb's muscles causing a reflex (here, contracting the muscle and pulling the hand away from the hot object). See **Figure 22**.

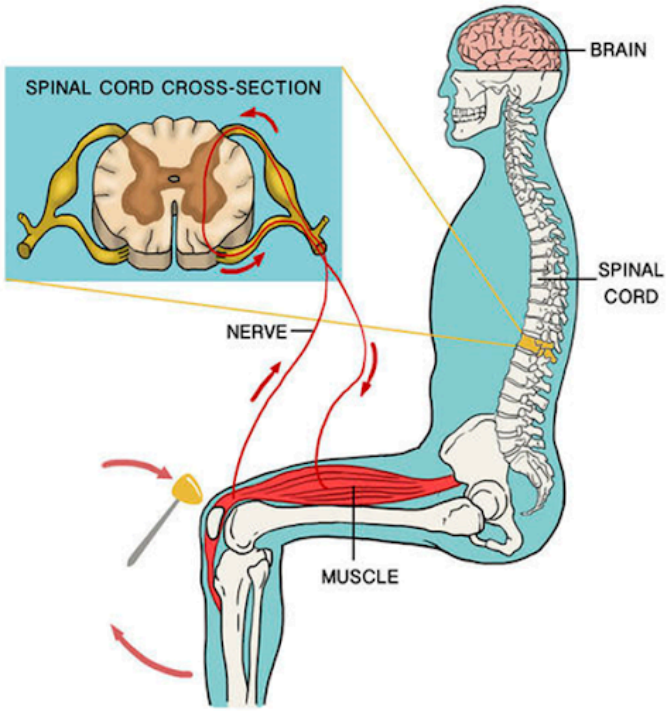

Figure 22: Reflex arc.

(Credit: Laura Guerin, Source: CK-12 Foundation License: CC BY-NC 3.0, https://flexbooks.ck12.org/cbook/ck-12-middle-school-life-science-2.0/section/11.51/primary/lesson/touch-ms-ls/)

The human body has many reflexes, including **autonomic** (affecting inner organs) and **somatic** (affecting muscles). Reflexes are tested differently for a newborn/infant versus an adult/older child, and this section generally focuses on somatic reflex testing related to adults/older children, specifically deep tendon reflexes. Testing these reflexes involves percussing (tapping) a tendon with a reflex hammer, causing a quick stretch of the muscle and then the reflex contraction – this is why some call these stretch reflexes as opposed to deep tendon reflexes.

Many types of reflex hammers are available including the **Taylor reflex hammer** and the **Queen Square hammer** (see **Figure 23**). The Taylor reflex hammer is one of the most common because it is small and easy to carry around. However, many healthcare providers prefer the Queen Square hammer because it has a heavy end with a long flexible handle.

When trying to elicit a reflex, the **target muscle must be relaxed**. You can ensure this by positioning the limb so that the muscle is in a more relaxed state, and ask the client to relax the muscle. If this does not work, try what is called **reinforcement**: this technique involves eliciting an **isometric muscle contraction** of a limb/area that is distant from the muscle you are testing. For example, when assessing upper limbs, you can ask the client to cross their legs and tighten

their leg muscles; when assessing lower limbs, ask them to flex their arm, tighten their arm muscles, and clench their fist. Additionally, some ask the client to close their eyes tightly and clench their jaw.

The client may be positioned in various ways, often sitting on the exam table with their legs hanging over the edge. Expose the area you are assessing; tap the tendon on bare skin with sufficient force at least twice, and sometimes 3–5 times to elicit a reproducible reflex response. When striking a tendon with the reflex hammer, use a quick tap – on and off the area – while your wrist is loose and flexible.

Many scales have been developed to rate reflexes, so you should check with your unit/institution. **Table 5** presents one commonly used scale that can be useful when rating and qualitatively describing the reflex. You should note whether reflexes are symmetrical and also the presence of any clonus, which is a rhythmic and oscillating contraction of the muscle associated with brisk responses and upper motor neuron diseases (see **Video 24**).

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2317#oembed-1

Video 24: Clonus.

Figure 23: Taylor reflex hammer (left) and Queen Square hammer (right).

Table 5: Deep tendon reflex scale. (Pociask, n.d.).

Rating	Description
0+	No response or absent reflex
1+	Trace or decreased response
2+	Normal response
3+	Exaggerated or brisk response
4+	Sustained response (or very brisk response)

The most commonly tested deep tendon reflexes are described and demonstrated in **Video 25**. After reviewing the steps in evaluating the deep tendon reflexes below, watch this video to observe how testing is done.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2317#oembed-2*

Video 25: Deep tendon reflexes.

Brachioradialis tendon reflex (testing integrity primarily C6, but can include C5 and C7 of the spinal cord):

1. Ask the client to rest their forearm/wrists on their upper legs with the ulnar side resting on the legs.
2. Tap the tendon about 5 cm superior to the wrist (radial styloid process); some testers tap at about 5–10 cm, but do not tap beyond 10 cm.
3. The tap should elicit contraction of the brachioradialis muscle causing slight forearm supination and elbow flexion.
4. Repeat on the other arm.

Bicep tendon reflex (testing integrity primarily C6, but can include C5 of the spinal cord):

1. Ask the client to rest their forearm/wrists on their upper legs with the ulnar side resting on the legs and palms of hands facing slightly upwards.
2. Place the thumb pad or index finger pad of your non-dominant hand over the bicep tendon with your hand wrapped around the arm/elbow. You should be able to feel the tendon, but do not apply too much pressure.
3. Tap your thumb nail.
4. The tap should elicit contraction of the bicep muscle causing elbow flexion and sometimes supination. Your focus should be on feeling, and possibly seeing, bicep muscle contraction.
5. Repeat on the other arm.

Tricep tendon reflex (testing integrity primarily C7, but can include C6 and C8 of the spinal cord):

1. Ask the client to hang their arms at their side and place your non-dominant hand on one of the upper arms just above the antecubital fossa. Then, gently lift their arm out to the side while the client bends their elbow at 90 degrees and allows you to hold the weight of their arm. It may be helpful to tell the client to fully relax their arm and lean on your hand like a railing or table.
2. Tap 1–2 cm superior to the elbow.
3. The tap should elicit contraction of the tricep muscle causing slight elbow extension. Your focus should be on feeling, and possibly seeing, tricep muscle contraction.
4. Repeat on the other arm.

Patellar tendon reflex (testing integrity primarily L4, but can include L2 and L3 of the spinal cord):

1. Ask the client to sit on the exam table with their legs hanging over the edge.
2. Although not shown in the video, it is best practice to gently place your non-dominant hand over the quadricep muscle just superior to the patella.
3. Tap inferior to the patella.
4. The tap should elicit quadricep muscle to contract and also cause moderate knee extension. Your focus should be on feeling the quadricep muscle contraction.
5. Repeat on the other leg.

Achilles tendon reflex (testing integrity primarily S1, but can include S2 and L5 of the spinal cord):

1. Ask the client to sit on the exam table with their legs hanging over the edge.
2. Although not shown in the video, you should assist the client to abduct the hip by lifting the upper leg away from the other leg.
3. On the abducted leg, place your hand under the ball/toes of the foot and apply slight pressure to dorsiflex the foot.
4. Tap the Achilles tendon at the back of the foot superior to the heel at the level of the ankle malleolus.
5. The tap should elicit the calf muscle to contract and also cause plantar flexion (slight to moderate).
6. Repeat on the other leg.

Normal findings might be documented as: "2+ reflexes bilaterally noted with brachioradialis, bicep, tricep, patellar, and Achilles deep tendon reflexes."

Abnormal findings might be documented as: "1+ reflex with reinforcement noted with right patellar reflex."

Knowledge Bites

The plantar reflex (Babinski reflex) is a superficial reflex via the skin (as opposed to deep tendon reflexes). It provides information about the possible presence of an upper motor neuron disease in the brain or spinal cord associated with conditions and diseases such as presence of a tumour, cerebral hemorrhage, amyotrophic lateral sclerosis, or multiple sclerosis. See **Video 26** on how to test the plantar reflex (Babinski reflex), and follow these steps to evaluate the plantar reflex:

- Ask the client to lie in a supine position with legs/knees extended straight and shoes and socks off.
- Use a blunt instrument that is not too sharp, e.g., the end point of a reflex hammer, a cotton tip applicator, the end of a key, or your own thumbnail.
- Let the client know that the test might feel slightly uncomfortable.
- Hold the client's foot under the ankle and then stroke the plantar side of the foot with the instrument from the medial to the lateral side of the heel up the lateral side of the foot and across the arch of the foot from lateral to medial. This can be uncomfortable, so only apply as much force as necessary. Typically, you will need to apply a moderate amount of force to elicit a response.

In adults, a normal response is toe flexion that is more pronounced in the smaller toes than the big toe; an abnormal response (sometimes called a positive Babinski) is toe extension that is more pronounced in the big toe, sometimes accompanied by separation of the toes (often called fanning), particularly the smaller toes (see **Figure 24**). Remember that a positive Babinski is normal in children younger than two years.

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Video 26: How to test the Babinski reflex.

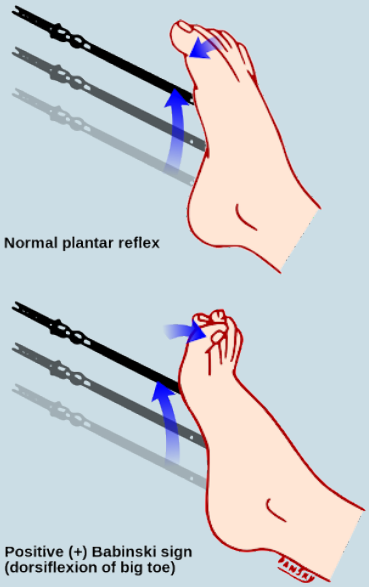

Figure 24: Babinski reflex.
(This file is licensed under the Creative Commons Attribution-Share Alike 3.0 Unported license. https://commons.wikimedia.org/wiki/File:Lawrence_1960_20.4-en.svg)

Contextualizing Inclusivity

Reflexes must be tested on bare skin, so it is important to recall the principles of a trauma-informed approach. Be aware that not all people will feel comfortable exposing their arms and legs due to cultural

and/or other reasons. Thus, it is important to support the client and offer alternatives that work for them such as ensuring privacy, using a drape, having a family or friend present, and for some having the nurse be of the same gender.

Amyotrophic lateral sclerosis (ALS) is a neurological disorder that affects the motor neurons in the brain and spinal cord (Oh & Kim, 2017). When performing deep tendon reflexes on a client with ALS, the reaction is hyperreflexia (Lewis, 2023). In addition, the Babinski reflex is elicited, which indicates the disease is in the upper motor neurons. Hyperreflexia and Babinski reflex are also symptoms of other conditions such as multiple sclerosis (MS) or cocaine toxicity (Ali et al., 2019; Lewis, 2023; Mader et al., 2019; National Multiple Sclerosis Society, n.d).

Black clients with ALS are negatively affected by some healthcare professionals' lack of knowledge. Some professionals mistakenly believe that Black people are not affected by diseases such as ALS, but these beliefs are not based on research and instead stem from racial biases (Carter, 2020; Casey, 2023). Additionally, some professionals have misdiagnosed ALS symptoms in Black clients as substance use or HIV (Carter, 2020). As a result of racial bias, Black clients may be misdiagnosed and/or experience delays in referral such that many clients are past the point of effective treatment (Carter, 2020). From an anti-oppressive and anti-racist perspective, nurses must acknowledge racial biases and inequities associated with ALS and the potential for discriminatory care. Nurses can also advocate for health resources for Black clients to receive accessible support care needs that are more person-centred (Oh & Kim, 2017).

Priorities of Care

A complication that can occur later in pregnancy is pre-eclampsia: this condition is characterized by high blood pressure and can lead to eclampsia (seizures). Affected clients may be ordered an anticonvulsant medication called magnesium sulfate to help prevent eclampsia convulsions (Shennan et al., 2021). A client who is administered magnesium sulfate must be monitored closely because there is a risk of toxicity causing neurological effects, such as the loss of deep tendon reflexes (Shennan et al., 2021). Deep tendon reflex testing can be used as a tool to determine the effects of the medication and whether the client is experiencing toxicity.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2317#h5p-127

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Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion and disease prevention strategies for a healthy neurological system need to be appropriate for each specific individual, so you should carefully consider all collected data, both subjective and objective. Subjective data collection involves asking the client about risk factors, social determinants, and other considerations. This kind of inquiry should be integrated throughout the entire assessment. You will ask many probing questions during the subjective assessment, but also formulate additional questions based on critical reflection of the data you have collected during the subjective and objective assessment. Together, the findings will inform your clinical judgement for each specific client and the health promotion needed.

Healthy Blood Pressure and Weight

High blood pressure and obesity are linked to cardiovascular-related illnesses that can cause neurological problems. For example, clients should monitor their weight and blood pressure to decrease the risk of stroke and other common problems associated with the neurological system such as cerebral aneurysms.

Probing questions may include:

- Have you ever been diagnosed with high blood pressure?
- When was the last time you had your blood pressure taken?
- Do you know what your blood pressure normally is?
- Have you had any recent changes in your weight?
- Do you have any concerns about your weight?

In collaboration with the client, discuss an approach to maintaining a healthy blood pressure and weight. Many interventions related to healthy eating, activity/exercise, and stress management can help facilitate a healthy blood pressure and weight. Discuss with the client any factors that might affect their ability to eat a healthy diet, exercise, and manage any stress. Nurses can also advocate on behalf of clients and take actions to develop and advance equitable healthy public policies.

Diet

Diets that are high in saturated and trans fats, cholesterol, sodium, sugar, and those low in fibre are risk factors that contribute to atherosclerosis and diabetes. This kind of diet is a risk factor related to other neurological-related conditions such as Parkinson's and dementia.

Probing questions related to diet include:

- Tell me about your usual diet?
- What have you eaten in the last 24 hours? Is that your usual diet?
- Have you had any recent changes in your life that have affected your diet?
- Do you add sugar and salt to your food?
- How much fluid do you typically drink in a day? What fluids (e.g., water, caffeinated beverages, alcohol)?

You may want to assess a client's familiarity with Health Canada's (2019) Food Guide and discuss with them how to use it. Be aware that this new version of the food guide still has a Eurocentric bias, so it is best to collaborate with the client about its relevance in the context of their cultural food practices. The Food Guide is now offered in multiple languages that you can refer clients to, and many resources are available about food safety for Indigenous peoples.

Some **key elements** of Canada's Food Guide are:

- Be mindful of eating patterns.
- Choose water as the drink of choice.
- A dinner plate should be one-half vegetables/fruit, one-quarter protein, and one-quarter whole grains.
- Make time to enjoy eating meals with others.
- Cook when possible, as opposed to eating processed meals or purchasing fast foods.
- Reduce sodium, saturated and trans fats, and sugar, and monitor portion sizes.

Canada's guidelines now suggest that there are health risks associated with any level of alcohol consumption, although negligible with two drinks or less weekly (Paradis et al., 2022). Although some previous research had suggested some positive benefits to alcohol, this is now being disputed: new findings indicate that drinking alcohol of any kind does not decrease risks of heart disease, and high levels of consumption increase the risk for coronary artery disease, myocardial infarction, heart failure, hypertension, and stroke (Paradis et al., 2022).

Many types of diets can be heart healthy, but some research points especially to the benefits of the **Mediterranean** and **DASH** diets. The American Heart Association (2020) recommends the Mediterranean diet as heart healthy: it includes plenty of fruits and vegetables, grains, potatoes, legumes, nuts and seeds, and olive oil, along with small amounts of dairy, eggs, fish, and poultry. The Heart and Stroke Foundation of Canada (n.d.) recommends the DASH (Dietary Approaches to Stopping Hypertension) diet as heart healthy and helpful to lower blood pressure: it is rich in vegetables, fruit, and low-fat dairy foods, and lower in saturated fat, total fat, and cholesterol. The two diets are very similar and may be used in combination; the Mediterranean diet typically emphasizes more fish and less dairy products than the DASH diet.

Healthy eating involves behavioural actions but also **relational and structural actions**. First, individuals need access to healthy food and the financial capacity to purchase it; this is referred to as food security. The rising cost of food globally has made this a challenge, and in many remote regions of Canada's North, access to nutritious food is limited in terms of availability; even when available, the costs are excessive.

Socioeconomic status is known to affect food purchasing: individuals from socioeconomically disadvantaged communities – those with lower household income – purchase fewer healthy foods like fruits and vegetables (Turrell et al., 2002). This can be due to the high cost of food and living in areas that are considered a food desert. Therefore, health promotion efforts should focus on narrowing socioeconomic differences in food purchasing. As a nurse, you should work in partnership with disadvantaged individuals and tailor a health promotion approach to their particular needs and attend to structural and economic barriers (Turrell et al., 2002). For example, you could direct clients to organizations that partner with vulnerable communities to support access to healthy foods, skill development, and capacity-building in terms of community-led initiatives (Turrell et al., 2002). You could also advocate on behalf of these communities for more effective social policy to address food insecurity (Turrell et al., 2002). The Government of Canada provides tips on Healthy eating on a budget.

Activity and Exercise

A sedentary lifestyle with limited activity and exercise is another risk factor that contributes to cardiovascular disease, diabetes, and other common problems associated with the neurological system including neurodegenerative diseases.

Probing questions related to activity are:

- Do you have any concerns about your level of activity?
- Tell me about your daily pattern of activity? What activity are you involved in?
- What exercise do you engage in? How long do you do this type of exercise? How many days a week do you exercise? If a client plays sports, ask about their use of protective equipment.

You can collaborate with clients to create an activity/exercise care plan that is specific to their needs and goals. Assess the client's symptoms (e.g., paresis, balance, incoordination) to maintain optimal client safety during activity/exercises. Start at a realistic and attainable level, depending on physical capability, energy level, and health status. Many interventions are available to support clients to achieve their activity goals: community walking groups, fitness apps, local gyms, and group activities. Additionally, it may be worthwhile to refer clients to physiotherapy and occupational therapy. The participACTION website is a helpful resource for activity guidelines.

Nurses should use a **relational health promotion approach** when addressing activity. A community of support can promote activity, so you should assess the client's access to support (e.g., friends, family, acquaintances) who may have similar activity interests or goals. A **structural approach to health promotion** can also help address and eliminate inequities. For example, some clients may not be able to afford gym memberships or sports registration fees. They may have little time to exercise due to the need to work multiple jobs. Additionally, those in urban areas may have more access to specific activities or rehabilitation programs than those living in rural or remote regions such as Northern regions of Canada. You will need to consider these factors and tailor activity programming to each client. For example, some clients who use public transportation could get off one or more stops early and walk the rest; this might be reasonable for some clients, but you also need to consider issues that might inhibit this such as safey. You could also advocate for policies to address inequities.

Stress

Stress is subjective and can have emotional, physical, mental, social, and financial effects. It is a risk factor for neurological-related illness and can exacerbate symptoms. Stress is usually caused by a combination of multiple stressors. How a person talks about themselves, their life, and their situation can indicate potential concerns and areas that need further assessment.

Probing questions related to stress could include:

- Tell me about the stress in your life?
- Have you experienced stress recently? Physically? Emotionally?
- Have you had any recent changes in your life? (Tell me more?)
- How does stress affect you?
- How do you handle this stress?
- Tell me about the coping strategies you use?

Stress management and coping strategies may include:

- Regular physical activity.
- Getting adequate sleep.
- Spending time with family and friends.
- Taking time for personal interests and hobbies.
- Practicing relaxation techniques such as meditation, deep breathing exercises, and tai chi.

From a relational and structural health promotion perspective, it is important to be aware that stress does not exist in a vacuum: how it is experienced, perceived, and managed is affected by relationships with others. All clients experience stress sometimes, but structural factors influence whether a client is more at risk for stress or able to manage stress. For example, racism is a major determinant that can lead to highly stressful experiences. Apply an anti-racist approach to stress and stress management to understand how the client is being influenced by racism and microaggressions, and how best to support them. Socioeconomic status can also influence a person's access to resources to cope with stress. When collaborating with clients to develop stress management techniques, you must be aware of these larger structural influences.

Alcohol

Alcohol can affect the neurological system because it can increase the risk for many neurological-related problems. For example, alcohol use can be associated with diabetes, cardiovascular health (e.g., cerebral aneurysms), seizures, movement disorders, dementia, cancers, cause inflammation, and increase the risk for injury and infections. The most recent Canadian guidelines now suggest that there are health risks associated with any level of alcohol consumption, although negligible with two drinks or less weekly (Paradis et al., 2022). Alcohol is considered a carcinogen and can affect the arteries (Paradis et al., 2022).

Reflect on your own biases about alcohol. The use of these substances can be stigmatized, so self-reflection is crucial to help facilitate a non-judgmental approach to care.

Probing questions may include:

- Tell me about how much alcohol you consume in a day? If the client does not consume alcohol daily, you can assess consumption based on weekly, monthly, or none. If the client's answer is affirmative, ask probing questions such as: How much (e.g., ounces a day)? What type of alcohol (e.g., red wine, beer)? For how long have you been drinking? Can you tell me the reasons that you began drinking?
- If you do not currently consume alcohol, have you ever? If affirmative, ask similar probing questions, including why the client quit.

The liver is the main organ that processes alcohol, and heavy drinking over a long period can damage the liver and lead to cirrhosis. The liver processes many medications, so a damaged liver can affect how medications are absorbed and their effects. Overall, the key is to abstain or consume limited amounts of alcohol.

Smoking Tobacco and Vaping

Smoking tobacco and vaping are major risk factors that can affect health.

The chemicals in tobacco cause inflammation of the blood vessels and contribute to plaque buildup and narrowing of the blood vessels. Smoking is a common risk factor for problems associated with the neurological system such as stroke, cerebral aneurysm, and seizures.

Vaping involves the inhalation of heated aerosols from a vaping device (e.g., electronic cigarettes, vape pens); the aerosols frequently contain nicotine (Miech et al., 2019). Although vaping aerosols may contain less chemicals than cigarettes, many toxins in vaping can cause lung damage among other health problems (Park et al., 2021). The long-term health effects of vaping are still being determined.

Probing questions related to smoking and vaping tobacco-related products include:

- Do you smoke (or vape) cigarettes or any tobacco-related products? If the answer is affirmative, ask probing questions: how much do you smoke or vape (e.g., how many packs of cigarettes a day)? For how many years? Can you tell me about the reasons that you began smoking or vaping?
- If you do not currently smoke (or vape), have you ever? If the answer is affirmative, ask similar probing questions, including why the client quit.
- If relevant: Have you ever tried quitting? If the answer is affirmative, ask probing questions: What made you want to quit? How long did you quit for? Did you use any strategies to help you quit?
- If relevant: Have you ever thought of quitting? If the answer is negative, respond in a non-judgmental way: "If you ever want to discuss quitting let me know; there are many resources to help you."

Client interest in quitting smoking/vaping and collaborative intervention are both important for a successful outcome. Interventions must be tailored to each client; many options are available: counselling, cognitive-behavioural therapy, support groups, pharmacology treatments (e.g., nicotine replacement therapy), smartphone applications, and short text message services. Sometimes even a brief discussion about the risks and a recommendation to quit smoking or vaping is sufficient.

You should consider both relational and structural health promotion approaches related to smoking and vaping tobacco-related products. For example, a client's success in cessation can be affected by their intimate and physically close relationships with family, friends, and work colleagues. Another issue to consider is that access to smoking or vaping cessation resources can be costly and are not necessarily covered by provinces and territories. Many primary care clinics may offer group support, counselling, and access to nicotine replacement at no charge, so it can be helpful to encourage clients to access these resources. You may also advocate for healthy social policy around smoking and vaping cessation and support and participate in the development of educational campaigns and resources about how smoking affects health.

Cannabis

Cannabis can have positive and negative effects on the neurological system (Miller et al., 2027; Newton & Newton, 2020). Some research has reported that cannabidiol (CBD) oral solution can be used effectively to help control seizures (Miller et al., 2020; Newton & Newton, 2020), although Health Canada's external Science Advisory Committee has recommended more research (Government of Canada, 2022). Cannabis can affect a person's cognition, cause drowsiness, fatigue, dizziness, headaches, impair balance, and lead to dry mouth/eyes (Government of Canada, 2022; Newton & Newton, 2020). When cannabis is used as a treatment, it should be approved by Health Canada and followed according to standards (Government of Canada, 2020). In addition, clients should discuss cannabis use with their primary healthcare provider prior to consuming.

Probing questions related to cannabis could include:

- Do you smoke, vape, or ingest cannabis? If affirmative, ask similar probing questions as noted above in the section on smoking. Also ask if it is medically prescribed or recreational.
- If you do not currently consume cannabis, have you ever? If affirmative, you can ask similar probing questions as above, including the reason that the client quit.
- Have you had an allergic reaction to cannabis? If affirmative, ask probing questions such as: What is the reaction? When did it start? How do you treat it?

Health promotion education should focus on each client's lifestyle and reasons for consuming cannabis. Interventions related to using safely or quitting the consumption should be tailored to each client and could include counselling,

cognitive-behavioural therapy, and support groups. You should also consider the relational promotion approach: for example, a client's consumption can be influenced by their surrounding environment (e.g., family, friends, workplace).

If the client is interested in using medical cannabis, your role as a nurse is to understand their interest and guide them to find appropriate learning resources. You can also advocate for educational resources about medical cannabis if a client's healthcare setting or community lacks resources or support. Additionally, your practice as a nurse should be informed by any legislation or regulatory bodies in your region. In Canada, refer to the Cannabis Act and in Ontario, refer to the CNO Scope of Practice standard and CNO Medication practice standard: see additional information.

Sleep

Adequate sleep is important for restoration of the body and mind: 6–8 hours is usually considered adequate sleep. Pulse and blood pressure lower during deep sleep, known as non-rapid eye movement, which is important for neurological health. Lack of sleep quality and quantity has been linked to illnesses such as hypertension, obesity, myocardial infarction, stroke, seizures, dementia, and migraines.

Probing questions related to sleep include:

- How much sleep do you get each day/night? How many hours? Do you rest during the day?
- Do you have any concerns about your sleep?
- Tell me about your sleep routine? What do you do before you go to bed? Do you take any medications to help you sleep?
- Do you wake up during the night? If so, why? Are you able to fall back to sleep?
- Do you feel rested when you wake up?

One behavioural intervention is a sleep journal. Ask the client to record how much sleep they get. If less than recommended, address potential triggers that may be disrupting the client's sleep, such as stress or pain. Limiting screen time two hours prior to bedtime can also be helpful. You may also discuss the possibility of naps with the client.

The physical and social environment affects sleep. Siengsukon (2020) reported that sleep may be affected by factors including:

- Living in an unsafe or noisy neighbourhood or home.
- Not having access to private transportation and needing to get up early to commute via public transportation.
- Living in congregate or multigenerational housing, which might mean that clients share bedrooms or beds.
- Being a caregiver for a child, spouse, or parent, or living with someone who works long hours or shift work.

Note that many of these physical and social factors influencing sleep are associated with race, ethnicity, and socioeconomic status (Siengsukon, 2020).

Contextualizing Inclusivity

Always use a culturally inclusive and non-judgemental approach when asking about consumption of

tobacco or cannabis or providing health education. For example, be aware that tobacco plays an important part in traditional and spiritual practices in many communities, such as some Indigenous communities, where individuals may use it for ceremonial and medicinal purposes (CAN-ADAPTT, 2011).

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Clinical Judgement: Case Study

A 68-year-old client went for a walk with a friend, and then went grocery shopping to buy food to make dinner. The client and their partner made dinner. While eating dinner, the client's partner noticed the client staring into the distance, not responding to their name. Within a few seconds, the client tried to respond and their speech was slurred, with the right side of their cheek and mouth drooping. The client tried to stand up but was unable to use their right arm to support them up.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2321#h5p-128

The client's partner called 911 immediately. The ambulance arrived within 15 minutes and began interventions according to the signs of stroke. The client received the stroke medication Alteplase (used to dissolve a clot) shortly after being admitted to the unit.

The client is now at day 3 on the stroke unit. The client has a medical history of breast cancer at 49 years old, diagnosed with hypertension and high cholesterol two years ago, and is taking medication. The client has a history of smoking, but quit a year and a half ago. The client lives with their partner in a two-story house and retired last year. The client does not have children. The client has a younger brother, who has a partner, and a nephew who lives in the same city. The client enjoys walking and swimming.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2321#h5p-129

As a result of the stroke, the client has dysphagia, right facial droop, dysarthria, and right-sided paresis. After a week in the hospital, the client was transferred to a stroke center, has mild expressive aphasia, and is progressing well.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2321#h5p-130

Key Takeaways

- The neurological system is composed of the central and peripheral nervous system and is involved in regulating senses, motor function, and cognition.
- Common symptoms that can be related to the neurological system include headache, paresis, paralysis, paraesthesia, dysphagia, dysarthria, visual impairment, dizziness, impairment of balance, incoordination, seizures, tremors, confusion, fatigue, and nausea and vomiting.
- An objective assessment of the neurological system includes a brief scan, Glasgow Coma Scale, cranial nerve testing, motor function and cerebellar testing, sensory function testing, and reflex testing.
- Health promotion interventions should be developed in collaboration with the client and focus on what is important to them.

CHAPTER 16 - VESTIBULOCOCHLEAR SYSTEM ASSESSMENT - THE EARS

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Learning Outcomes

- Apply subjective assessment skills.
- Apply objective assessment skills.
- Use clinical judgement.
- Integrate an inclusive approach to vestibulocochlear system assessment.
- Integrate health promotion interventions into actions.

Introduction to the Vestibulocochlear System: The Ears

The **vestibulocochlear system** is important to assess because it is responsible for **hearing** and **equilibrium** (sense of balance). In this chapter, we focus mainly on hearing; additional information particularly related to objective assessment related to balance can be found in the neurological system assessment chapter.

As a nurse, your assessment of the vestibulocochlear system provides information about the functioning of this system and potential cues that may require your action.

The main components of the vestibulocochlear system include:

- External ear (auricle/pinna): **Figure 1** and **Figure 2**.
- Middle ear and inner ear: **Figure 2**.
- Vestibulocochlear nerve (cranial nerve [CN] VIII): **Figure 2**.

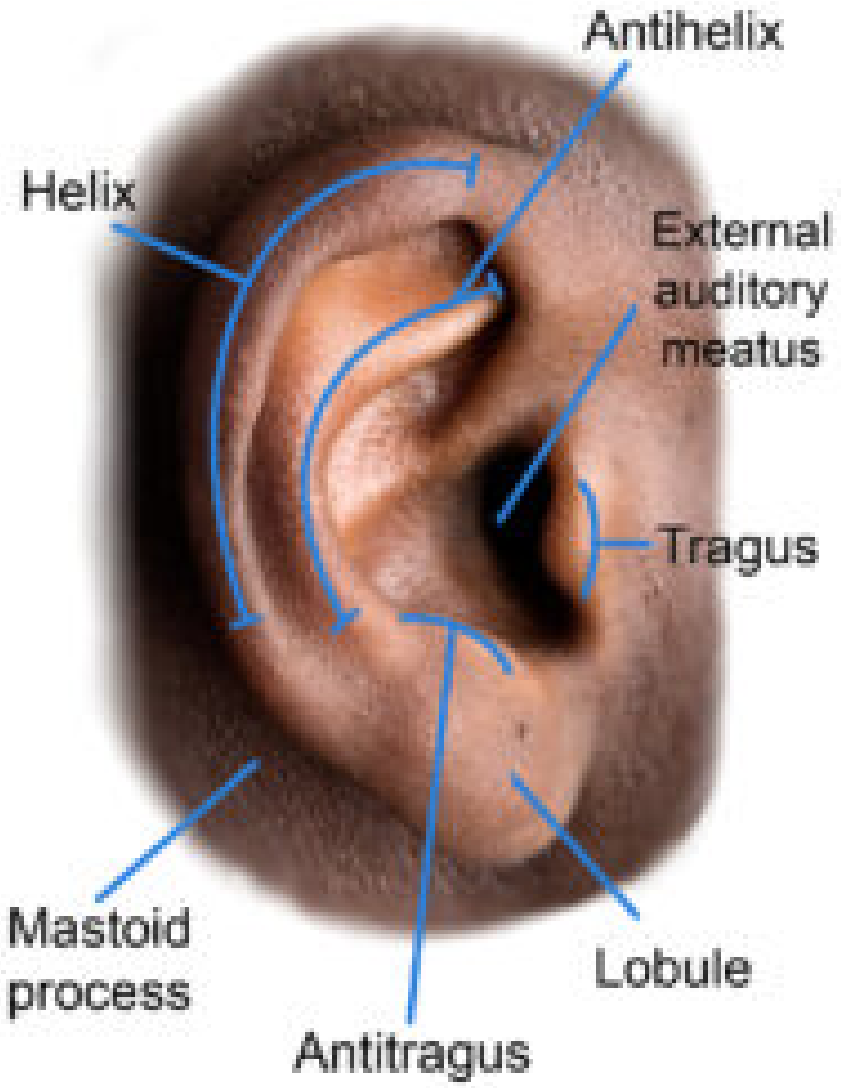

Figure 1: External ear.

This file is licensed under the Creative Commons Attribution-Share Alike 4.0 International license. Attribution: Genusfotografen (genusfotografen.se) & Wikimedia Sverige (wikimedia.se). From: https://commons.wikimedia.org/wiki/File:Human_right_ear_(cropped).jpg. Our team made modifications with labelling (artist: Tayiba Rahman).

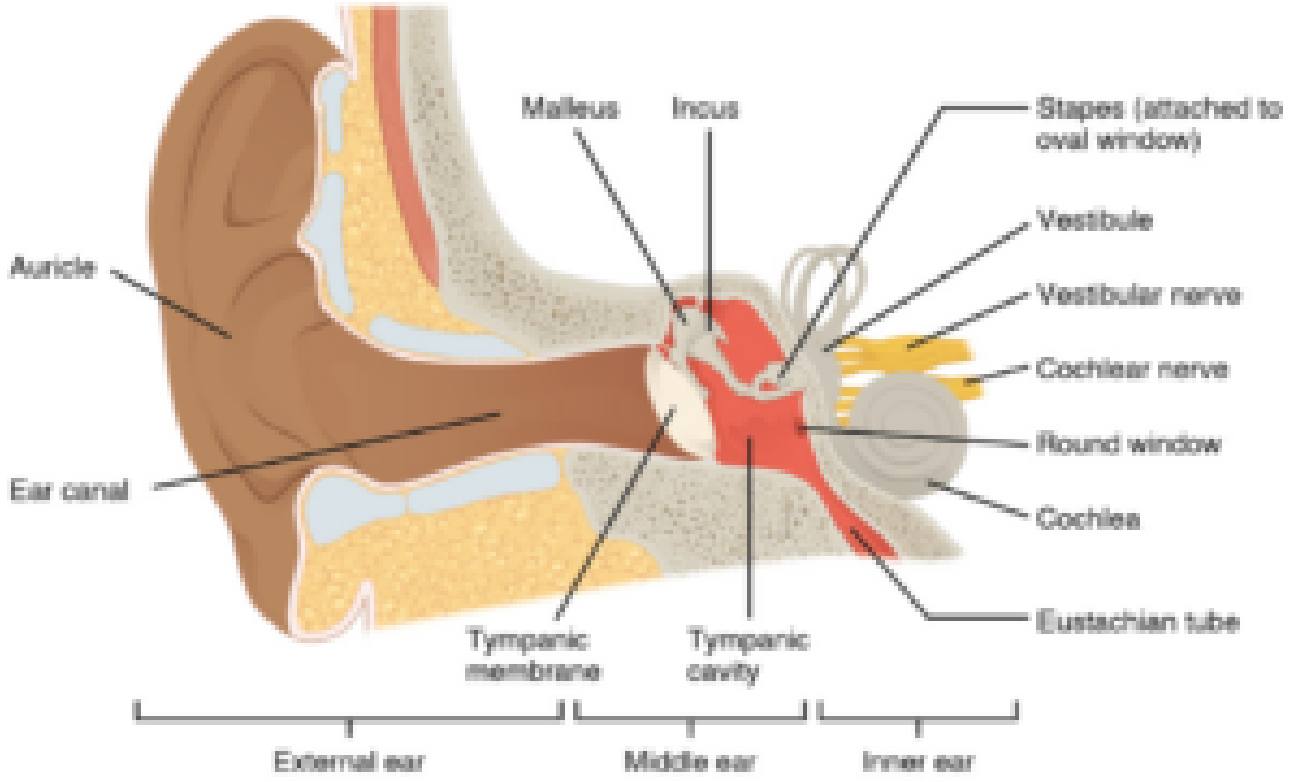

Figure 14.8 Structures of the Ear The external ear contains the auricle, ear canal, and tympanic membrane. The middle ear contains the ossicles and is connected to the pharynx by the Eustachian tube. The inner ear contains the cochlea and vestibule, which are responsible for audition and equilibrium, respectively.

Figure 2: External, middle, and inner ear and vestibulocochlear nerve.

J. Gordon Betts, Kelly A. Young, James A. Wise, Eddie Johnson, Brandon Poe, Dean H. Kruse, Oksana Korol, Jody E. Johnson, Mark Womble, Peter DeSaix. (2022). The Somatic Nervous System. In Anatomy and Physiology 2e. OpenStax. CC BY 4.0 license

Watch this video to refresh your knowledge of anatomy and physiology of the vestibulocochlear system.

Clinical Tip

The vestibulocochlear system is closely interconnected with the neurological, ophthalmic, and musculoskeletal system, so it is rarely assessed in isolation. Also, when assessing the ears, you will often assess the lymph nodes around the ears: lymphatic assessment.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Subjective Assessment

Subjective assessment of the vestibulocochlear system involves asking the client about their health as it relates to their ears. A full exploration of ear **pathologies** is beyond the scope of this chapter, but **common conditions** associated with this system include hearing impairment, **cerumen impaction**, **otitis media**, **otitis externa**, **ear barotrauma**, **labyrinthitis**, **vestibular neuritis**, and **otosclerosis**.

Common symptoms that may be related to the vestibulocochlear system include pain, hearing impairment, dizziness, vertigo, pruritus, discolouration, discharge, tinnitus, and other vestibulocochlear-related symptoms. See **Table 1** for guidance on subjective health assessment: many of the questions in the table align with the PQRSTU mnemonic (or variations of it). Try to ask questions in order of importance – you will not necessarily follow the sequential order of PQRSTU.

Always ask about any **medications** (prescribed or over-the-counter) or **supplements** the client is taking: name, dose, frequency, reason it was prescribed, and how long they have been taking it. This information is important as it can affect ear health and potentially interact with medications that may be prescribed to address any ear problems. Be aware that some medications are **ototoxic**, including acetaminophen, quinine, and some nonsteroidal anti-inflammatory drugs, antibiotics, and chemotherapeutic medications (Joo et al., 2019).

Remember to ask questions related to health promotion. Depending on the context of the assessment, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on "Health Promotion Considerations and Interventions" is included later in this chapter after the discussion of objective assessment.

Knowledge Bites

Cytomegalovirus (CMV) is a common viral infection that can affect people of all ages and affect many body systems including the ears, leading to hearing loss. CMV can lay dormant in the body and not cause problems in healthy people. It can be transmitted to babies through pregnant people; congenital CMV commonly leads to hearing loss and regular hearing checks are advised (CDC, 2024). Hearing loss in babies is important to evaluate because hearing is critical to language learning, communication, and social skills (CDC, 2024).

Table 1: Common symptoms, questions, and clinical tips.

Symptoms	Questions	Clinical Tips
Pain or **pressure** are common unpleasant sensations associated with the ears. **Ear pain** (otalgia) is subjectively described as tenderness, discomfort, and sharp pain on or around the ear or in the ear. **Ear pressure** can be described as a fullness in the ear. Pain and pressure can be related to a variety of conditions such as allergies, infections, and ear barotrauma.	Have you recently had any ear pain or pressure in the ears? If yes, do you currently have it? **Additional probes** if the client's responses are affirmative may include: **Region/radiation**: Where is it located? Is it in one or both ears? Does it radiate anywhere? **Quality/quantity**: What does it feel like? How bad is it? **Severity**: Can you rate it on a scale of 0 to 10 with 0 being no ear pain (or pressure) and 10 being the most pain you have ever had? **Provocative/palliative**: Is there anything that makes it worse? Is there anything that makes it better? **Timing/treatment**: When did it begin? Did it begin suddenly? What were you doing when it began? Is it constant or intermittent? How often do you get it? Have you taken anything to treat it? Have you taken any medications? **Understanding**: Do you know what is causing it? **Other**: How does it affect your daily life?	With **pre-verbal** or **non-verbal children**, you may observe the client crying, grabbing their ear, being unable to settle or sleep, and not eating. Ear pain is sometimes caused by an **infection**, so attend to cues that may suggest an ear infection such as being febrile. Ear infections may be more common in areas with poor air quality (often during the fall and winter months) and can be related to group settings (such as group child care). Ear infections can also be common in children who swim regularly, especially if they don't dry their ears afterwards or if they swim in natural environments that may be affected by bacteria, so you may see these ear infections during the warmer months. Young children are particularly at risk for infections due to their underdeveloped immune system and the shape of their eustachian tubes (more narrow and horizontal), making it difficult for fluids to drain. Other risk factors include infants who are fed in the supine position, and those who are formula fed; breast milk contains antibodies that can provide protection for the infant.

Hearing impairment refers to difficulty hearing and can be categorized as partial hearing loss or complete loss of hearing (deafness). Symptoms can include inability to hear, muffled sounds, difficulty hearing in noisy environments or when there is background noise, difficulty hearing over the telephone, and difficulty hearing certain words/sounds and higher tones (such as higher voices and consonants as opposed to vowels). **Common causes** include ear infections, ear trauma, environmental/loud noises, cerumen impaction, and ototoxic medications. Hearing loss and deafness are often categorized as: • **Sensorineural degeneration** (the most common type of hearing loss) involves damage to cranial nerve VIII, the inner ear, or the brain. Presbycusis is a specific type of sensorineural degeneration that involves gradual hearing loss, which usually begins in people older than 50 years. • **Conductive hearing loss** in which sound waves are not carried through to the inner ear due to some sort of blockage (cerumen impaction, foreign body).	Have you experienced any difficulty hearing? **Additional probes** if the client's responses are affirmative may include: **Quality/quantity**: Tell me about it? How bad is it? **Region**: Does it affect one or both ears? **Provocative/palliative**: Is there anything that makes your hearing better? Is there anything that makes it more difficult to hear (e.g., loud environments or background noise)? **Timing/treatment**: When did it begin? Did it begin suddenly? What were you doing when it began? Is it constant or intermittent? If intermittent, how often do you get it? Have you done anything to help your hearing? **Understanding**: Do you know what is causing it? **Other**: How does it affect your daily life?	With **newborns/young children**, you may observe that they do not startle to loud noises or turn their head to sounds. They may begin speaking later in life and may have unclear speech. Some clients may report difficulty hearing, but sometimes hearing loss is so gradual that the client will not necessarily notice it. Family members or others living with the client may report that the client is turning up the volume on the television or radio, or often asks people to repeat themselves, or is speaking louder than normal. Hearing loss can also be associated with **stigma**, which may prevent some clients from reporting a problem. This stigma can be associated with feelings of being old, being categorized as having a disability, and being misperceived as cognitively impaired. This kind of stigma can lead to diminished sense of self and a sense of belonging, withdrawal from social gatherings, and social isolation. Some **tips when communicating** with clients who have a hearing impairment: • Ensure a well-lit and quiet environment. • Face them directly and be at their eye level when speaking. • Project your voice clearly, but don't exaggerate speech volume or mouth movements. • Use a moderate pace with pauses between sentences. Be aware that some clients may require a sign language interpreter; you may need to advocate for the client to ensure one is available. Also, some clients may be lip readers so ensure you face them directly.

Dizziness is a sensation of feeling light-headed and even faint (the feeling that you might lose consciousness), whereas **vertigo** is a sensation in which the person feels like they or their surroundings are moving or spinning when there is actually no movement. Both dizziness and **syncope** can be associated with nausea, vomiting, and loss of balance. Note that components of the inner ear are used to gather information and are involved in motion, changes in space, and balance.	Have you experienced any dizziness or a sensation like you or the room is spinning? If yes, do you currently have it? **Additional probes** if the client's responses are affirmative may include: **Quality/quantity**: What does it feel like? How bad is it? **Provocative/palliative**: Is there anything that makes it worse? Is there anything that makes it better (e.g. lying down)? **Timing/treatment**: When did it begin? Did it begin suddenly? What were you doing when it began? Is it constant or intermittent? How often do you get it? Have you taken anything to treat it? Have you taken any medications? **Understanding**: Do you know what is causing it? **Other**: How does it affect your daily life?	Ask specific probing questions to help determine the cause of dizziness or vertigo. For example, dizziness can be caused by many conditions and factors such as anxiety, dehydration, **shock**, **orthostatic hypotension**, and medications that cause drowsiness. Other causes of dizziness and vertigo can be more directly related to the vestibulocochlear system such as **vestibular neuritis**, **labyrinthitis**, and **Ménière's disease**. Always ensure the client's safety when they are experiencing dizziness and vertigo: help them to sit or lay down. Measure their pulse and blood pressure. Clients experiencing vertigo may feel distressed, especially if it is the first time. Although the cause may not be yet known, support the client and talk with them. It might be helpful to discuss management strategies such as sitting or lying down as needed, keeping the head elevated when in supine, moving slowly when standing up, focusing on a spot on the wall, and using relaxation strategies (close eyes, deep breathing). If the client has chronic dizziness or vertigo, discuss fall safety prevention strategies with them.

Pruritus and **discolouration** are symptoms that can sometimes be related. Clients may describe that their ears are itchy particularly just inside the external auditory meatus. This is sometimes associated with changes in colour such as **erythema**. Erythema can also be associated with inflammatory processes such as infections. **Otorrhea** (discharge from inside the ear) or discharge from around the ear can occur as a result of infection or injury. Discharge can be clear, serous (clear to yellow), sanguineous (blood, red), and purulent (pus). **Cerumen** is a protective substance produced by the glands in the ear canal. It lubricates and cleans the ear and also prevents microorganisms and other irritants from entering and damaging the ears. Some people experience excessive cerumen production and impaction (blockage) which can lead to pain, pruritus, and hearing impairment. Cerumen combined with dead skin cells, dust, and other debris, is commonly referred to as earwax.	Have you experienced any itching in or around your ears? Colour changes? Ear discharge? Excessive earwax? **Additional probes** if the client's responses are affirmative may include: **Quality/quantity**: What does it feel like or look like? How bad is it? **Region**: Where have you noticed it? Is one or both ears affected? **Provocative/palliative**: Is there anything that makes it worse? Is there anything that makes it better? **Timing/treatment**: When did it begin? Did it begin suddenly? What were you doing when it began? Is it constant or intermittent? How often do you get it? Have you taken anything to treat it? Have you taken any medications? **Understanding**: Do you know what is causing it?	Pruritus in the ears can be distressing, and some clients may resort to scratching inside their ear with small objects such as a cotton swab (Q-tip). **Putting any object inside the ear is risky** as it can damage the ear canal, or even perforate the tympanic membrane. Always discuss these risks with clients. The presence of **excessive earwax** can affect a client's perception of self; it can lead to stigma (e.g., being considered dirty or unhygienic). Additionally, extensive earwax blockage can also lead to impaired hearing. In general, ears don't require cleaning, but you can advise clients to wipe away loose earwax in the external part of the ear with a warm damp washcloth. Clients with extensive earwax or cerumen impaction should be referred to their primary care provider. Sometimes, a warm mineral oil solution (or 1 part hydrogen peroxide, 1 part warm water) will be advised to soften and loosen the earwax (American Academy of Otolaryngology-Head and Neck Surgery Foundation, 2024). This may be followed by flushing of the ear with a gentle spray of warm water in the shower or with a syringe. Although the above interventions are fairly safe, they should not be used without consulting a physician or nurse practitioner, especially if the client has had ear surgery, ear infections, or perforation of the tympanic membrane (Berg, 2023).

Tinnitus is an intermittent or constant sound in the ear that is often described as a ringing, humming, or buzzing. Most people have experienced a temporary and mild form of tinnitus after a loud concert or an event with loud music. Although the underlying cause is unknown, several related factors may include excessive noise exposure, damage to the inner ear hair cells, hearing loss, ear infections and blockages, head or neck trauma affecting the inner ear, and some ototoxic medications.	Have you experienced any abnormal sounds like ringing, humming, or buzzing in your ears? **Additional probes** if the client's responses are affirmative may include: **Quality/quantity**: What does it sound like? How bad is it? **Provocative/palliative**: Is there anything that makes it worse? Is there anything that makes it better? **Timing/treatment**: Do you have it now? When did it begin? What were you doing when it began? Is it constant or intermittent? How often do you get it? Have you taken anything to treat it? Have you taken any medications for it? **Understanding**: Do you know what is causing it? **Other**: How does it affect your daily life? Always ask about the client's current or recent medications.	Advise clients that it is important to protect their ears from physical trauma and loud sounds to prevent conditions such as tinnitus. The constant sound associated with tinnitus can affect quality of life and can lead to difficulty concentrating, sleep disruption, and overall irritability. White noise (e.g., a fan) may be of therapeutic value by masking the sound of tinnitus. Hearing aids are another form of treatment: in addition to treating hearing impairment, they may be used to amplify external noises or generate a type of white noise that masks the sound of tinnitus.

Other **vestibulocochlear symptoms** can include fatigue, nausea, vomiting, and issues with balance or falling. Always ask about **personal** and **family history of vestibulocochlear** conditions and diseases. These can include a wide variety of conditions such as chronic ear infections, cerumen impaction, deafness, otosclerosis, Ménière's disease, and tinnitus.	Explore these symptoms further with clients. Use variations of the PQRSTU mnemonic to assess the symptoms. Do you have any chronic conditions or diseases associated with your ears? Do you have a familial history of any conditions or diseases associated with your ears? If the client's response is affirmative, begin with an open-ended probe: Tell me about the condition/disease? How does it affect your daily life? Remember to incorporate the language that the client uses into your probing questions. If the client has a personal history, probing questions might include: **Timing**: When were you diagnosed? How often do you get it? **Quality/quantity**: How does it affect you? What symptoms do you have? **Treatment**: How is it treated? Do you take medication? **Provocative/palliative**: Is there anything that makes it worse? Is there anything that makes it better?	These symptoms can be related to the vestibulocochlear system as well as other body systems. Risk factors may be influenced by genetics and/or culture, so you should ask about the biological and non-biological nature of family. Some vestibulocochlear associated diseases are related to genetics, but environmental and cultural factors (such as family traditions and practices related to diet or smoking) usually play a larger role. Note that personal conditions including hearing loss can be gendered. For example, loud environmental noises are a major risk factor associated with hearing loss and more men than women are in occupations that may pose this kind of risk (e.g., construction, carpentry, military).

Priorities of Care

Immediately report any of the following findings to a physician or nurse practitioner:

- **Sudden hearing loss** and **vertigo**: they can be associated with stroke and this should be ruled out first. Conduct a primary survey and assess for other stroke-related symptoms such as slurred speech, loss of vision, change in vision (double vision), paralysis, or paresis. It can be helpful to use BE-FAST to assess the presence of a stroke.
- **Ear discharge** following a head trauma or postoperatively involving brain or spine surgery: this could be associated with a **cerebrospinal fluid leak** (CSF).

Ear pain and signs of infection require prompt treatment; if untreated, they can lead to rupture of the tympanic membrane, worsening of the infection, and permanent hearing impairment.

Hearing impairment in newborns and children needs to be evaluated and treated as it can lead to developmental delays. It should also be further investigated in adults: a range of causes can be easily treated, but can also become permanent, leading to mental and cognitive decline and diminished quality of life.

Contextualizing Inclusivity

The **Deaf** and **hard of hearing communities** include those who are deaf (little to no functional hearing) and those who are hard of hearing (some hearing, with difficulty). As a nurse, you should ensure that clients who are deaf or hard of hearing are accepted for who they are and included in the care and decision-making process. Explore their needs, such as their preferred way to communicate (speech, lipreading, sign language, written communication), and whether an interpreter is needed. Masking requirements related to COVID-19 and other healthcare concerns can complicate communication for individuals who lipread, so ensure you take this into consideration. Also, be aware that there are many types of sign language, including American Sign Language (ASL), la Langue des Signes Quebecoise (LSQ), Indigenous Sign Language, and Maritime Sign Language (Canadian Association of the Deaf, 2015; Sign Language Institute of Canada, 2023). Follow this link to hear Isabella's story of being deaf, which will help you understand the diverse deaf culture: Isabella's story.

Remember to critically **reflect on your own implicit biases** as these influence how a person is labelled or judged. For example, people who have a hearing impairment may be mistakenly perceived as confused or not intelligent. Additionally, the hearing population typically considers ability to hear as the "norm" and may consider those who are deaf or hard of hearing as having a "deficit." This kind of terminology has a negative connotation suggesting a deficiency or inadequacy – be aware that words matter.

Nurses also need to be aware that **racist medical practices** can lead to inequities in care and even cause harm to racialized clients. Racism and systemic inequities have led to undiagnosed pain in non-dominant racialized groups (Morais et al., 2022), in turn leading to sub-optimal and even catastrophic outcomes for Black people when their pain is not believed or recognized (Akinlade, 2020). This can apply to racialized children and adults that have ear pain and are not believed or perceived as exaggerating the pain. These general racist attitudes contribute to racialized disparities in pain assessment and pain management (Morais et al., 2022).

It is difficult to detect hearing loss in children, particularly mild hearing loss, and it may be misinterpreted as a behavioural or social disorder (e.g., the child may appear distracted or isolated). Listen to the concerns parents have about their child and assess the various speech and language milestones for children (American Speech-Language-Hearing Association, 1997-2024). For example, milestones include startling at loud sounds, turning their head when their name is called, and following simple commands.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2963#h5p-257

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Objective Assessment

You may not always be able to immediately complete a brief scan of the vestibulocochlear system when you enter a client's room, because the ears are not always visible: they may have hair covering their ears or wear a head covering such as a hijab, turban, scarf, or hat. Still, you can make basic observations: Is the client grimacing or holding their ear? If the client is looking down when you enter their room, do they react when you open the door or greet them? Does the client speak louder than normal or have challenges enunciating words? Does the client turn one ear (their ear with greater hearing acuity) toward you? Do they appear to be lipreading?

A nurse's objective assessment of the vestibulocochlear system often includes the following examinations:

- Inspection and palpation of the external ear.
- Otoscopic examination.
- Hearing assessment.

An objective assessment is usually completed after the subjective assessment, but if the client shows signs of clinical deterioration, you may proceed directly to the objective assessment and associated interventions.

Contextualizing Inclusivity

Always approach assessment with **cultural humility** because you cannot know and fully understand all cultures and whether exposing or having the area around the ear touched is culturally acceptable. A cultural humility approach involves a life-long process of reflection and self-critique to address power imbalances within systems and develop mutually beneficial partnerships and relationships (Tervalon & Murray-Garcia, 1998). Healthcare professionals should engage in continuous, critical reflection on power and privilege, and find ways to interact with clients of all genders, sexes, races, ages, and abilities. For example, some clients may wear head coverings or coverings over their head including the ears: some Muslim women wear hijabs that cover their heads or niqabs that cover their faces; some Sikh individuals wear turbans; and some married Jewish women cover their hair with scarves or wear wigs. Additionally, for some clients, touch (i.e., physical assessment) from a person of the opposite gender may not be permissible or encouraged. For example, some Muslim women may prefer or require a female healthcare provider, while others may feel that receiving healthcare from a male practitioner can be medically necessary and is therefore permitted. Another issue to consider is the historical and intergenerational trauma associated with forced cutting of hair in residential schools, so some Indigenous clients may be hesitant to have the area around their ears (and their hair) touched. Cultural humility begins with exploring a client's needs and also using a trauma-informed approach, whereby gaining consent first is always recommended.

Hearing screening is recommended for people of all ages, but specific recommendations vary by age and jurisdiction. As a nurse, you can conduct a basic screening during each client encounter by observing whether the client hears you, watches your lips move, frequently asks you to repeat yourself, and other cues that may suggest a hearing impairment. In Ontario, Canada, the Infant Hearing Program involves screening for all newborns, continued monitoring of children who are at risk of hearing loss, and language

development services when needed (Ministry of Children, Community and Social Services, 2023). With a physician's referral, hearing assessments by audiologists are covered by OHIP (Ontario Health Insurance Plan).

Hearing aids and cochlear implants are sometimes used for hearing impairment. These devices can be quite expensive but may be partially or fully covered by workplace insurance and government programs.

Knowledge Bites

Earwax can provide important cues about a person's health. First, be aware that the appearance of earwax is diverse: in general, lighter colours suggest it is newer while darker colours suggest it is older earwax. Texture can also vary and is influenced by genetics: it can vary from dry and flaky to wet and sticky (Jarry, 2024).

- Normal colours range from shades of beige, yellow, orange, and brown.
- Abnormal colours include red (could indicate bleeding/injury), green (could indicate an infection), and black (could indicate an impaction).

Watch this video about earwax and what it can reveal about health:

earwax and health.

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Inspection and Palpation of External Ear

Inspection and palpation of the external ear can be done with the client in any position, but is typically completed with the client sitting in an upright position.

Steps of **inspection** include (see **Video 1**):

1. Inspect **symmetry**, **lesions**, and **deformities** on or around the ears.
    - Normally, the ears are symmetrical with no lesions or deformities. However, one common and normal ear lesion is Darwin's tubercle (a thickening of or nodule on the middle to upper portion of the helix) (**Figure 3**).
    - In some congenital abnormalities, one ear is significantly smaller or larger, or parts of an ear or the whole ear is not present. Another common deformity is cauliflower ear (**Figure 4**) caused by a physical trauma to the ear such as a sports injury: disruption to the blood supply causes inflammation and cartilage overgrowth, resulting in a deformity that has the textured appearance of a cauliflower. Ear keloids (**Figure 5** and **6**) are also a common deformity: these are nodules that can range in size and are firm and rubbery, often caused by minor trauma and scar tissue formation such as with ear-piercing. Ear keloids usually have the same colour as the client's skin, but can also appear as shades of pink, red, and purple.

Figure 3: Darwin's tubercle.

Figure 4: Cauliflower ear. (From: https://jetem.org/cauliflower_ear/cauliflower-ear-photograph-1-jetem-2018/ Cauliflower Ear. Photograph 1. JETem 2018 6. This work is licensed under a Creative Commons Attribution 4.0 International License).

Figure 5: Ear keloid. (By Htirgan, This file is licensed under the Creative Commons Attribution-Share Alike 3.0 Unported license, https://commons.wikimedia.org/wiki/File:Earlobe_Keloid,_Bulky.JPG)

Figure 6: Ear keloid (right image). By Htirgan – Own work, Creative Commons Attribution-Share Alike 3.0 Unported license, https://commons.wikimedia.org/w/index.php?curid=32782666

2. Inspect for **skin integrity**, **colour**, and **swelling** on and around the ears.

    - Normally, the skin is intact with no signs of discolouration or swelling. If piercings are present, assess for and describe any signs of infection such as erythema and swelling.
    - Abnormal findings may include skin that is not intact such as an open ulcer (**Figure 7**) or the presence of scars. Discolouration of the ear from the client's baseline is important to evaluate such as erythema (**Figure 8**) and swollen or darker than the client's baseline skin colour including shades of purple and blue and turning very black. If present, describe the location and appearance.

3. Inspect for **bugs** and insect bites. Ensure you inspect the crevices of the external ear and behind the ears.

    - Normally, no bugs or bites are present.
    - If bugs or bites are present, note the location and appearance. For example, lice are bugs that are commonly found among school-age children and are often observed behind the ears.

4. Inspect the external auditory meatus and canal for **discharge**, **swelling**, **discolouration (erythema)**, and **foreign objects**.

    - Normally, no discharge, swelling, discolouration, or foreign object are present.
    - If you observe discharge, swelling, or discolouration, note the appearance (colour), quantity, and location, including which ear. If a foreign object is present, describe the appearance and location, including which ear.

5. Inspect for the presence of **earwax**.

    - Normally, some or no earwax is present.
    - If earwax is present, note the colour, texture, and quantity.

6. Note the **findings**:

    - **Normal findings** might be documented as: "Ears symmetrical and intact with no lesions, deformities, discolouration, swelling, bugs, discharge, foreign objects, or earwax."
    - **Abnormal findings** might be documented as: "Left auditory meatus is red and swollen with a yellow sticky discharge" or "Scaly skin rash posterior to right ear" (see example of postauricular eczema). See **Figures 9**, **10**, and **11** for images of an ear infection with discharge.

Figure 7: Ulcer. (By Paul D.R. Johnson, Joseph Azuolas, Caroline J. Lavender, Elwyn Wishart, Timothy P. Stinear, John A. Hayman, Lynne Brown, Grant A. Jenkin, and Janet A.M. Fyfe. – Mycobacterium ulcerans in Mosquitoes Captured during Outbreak of Buruli Ulcer, Southeastern Australia. Emerging Infectious Diseases, Volume 13, Number 11.,

This image is a work of the Centers for Disease Control and Prevention, part of the United States Department of Health and Human Services, taken or made as part of an employee's official duties. As a work of the U.S. federal government, the image is in the public domain,

https://commons.wikimedia.org/w/index.php?curid=34972908)

Figure 8: Erythema. (Left image by Tayiba Rahman, CC BY NC. Right image by Giorgio Lambru, Sarah Miller and Manjit S Matharu – "The red ear syndrome", The Journal of Headache and Pain 2013, 14:83. doi: 10.1186/1129-2377-14-83, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=40946332)

Figures 9, **10**, and **11**: Ear infection (external otitis [swimmer's ear]).

Figure 9: (By Grook Da Oger – Own work, Creative Commons Attribution-Share Alike 3.0 Unported license, https://commons.wikimedia.org/w/index.php?curid=16079610)

Figure 10: External otitis. (By Klaus D. Peter, Wiehl, Germany – Own work, Creative Commons Attribution 3.0 Germany license, https://commons.wikimedia.org/w/index.php?curid=9655043)

Figure 11: External otitis – severe case (By James Heilman, MD – Own work, Creative Commons Attribution 3.0 Unported license, https://commons.wikimedia.org/w/index.php?curid=10313999)

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2967#oembed-1

Video 1: Ear inspection. [0.59 seconds].

Steps for **palpation** include (see **Video 2**):

1. Assess one ear at a time. Ask the client if they have any **pain** as you gently pull the helix upwards and the lobe downwards, and then push on the tragus and the mastoid process.
    - Normal findings are no pain.
    - Pain is an abnormal finding. If pain is present, assess with the PQRSTU mnemonic.
2. Gently palpate and describe any **lumps** or **deformities** that you observed.
    - Normally, no lumps or deformities are present.
    - If a lump or deformity is present, ask the client if it is painful and measure its size, and note any signs of infection such as erythema and swelling. Describe the following characteristics: location on ear(s), colour, texture (smooth, rough, dotted), consistency (soft, firm), and mobility (moveable, fixed).
3. Note the **findings**:

- **Normal findings** might be documented as: "Client reports no pain when palpating the ear, and no lumps or deformities."
- **Abnormal findings** might be documented as: "Firm, rubbery lump at back of ear lobe, 2×2 centimetres. Colour consistent with client's face."

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2967#oembed-2

Video 2: Ear palpation. [0.26 seconds].

Contextualizing Inclusivity

If a client has **ear jewelry**, assess for any signs of infection, which can result from non-sterile piercing approaches. Remember to critically reflect on your biases related to ear jewelry: you are likely to observe various types and quantities of ear jewelry on many parts of the ear. Earlobes are a common location, but you may observe jewelry on other areas such as the cartilage of the upper ear and also on the tragus. Some clients may have stretched their ear-piercing holes to accommodate spacers (large round jewelry), **Figures 12**, **13**, and **14**. Ear-piercings may be related to culture and spirituality; they are common among women, but may be observed among people of all genders and ages. For example, people of South Asian and Southeast Asian heritage often have their ears pierced before the age of one (Anwar, 2024). Reflect on your own biases and ensure a non-judgemental approach.

Figure 12: Photo by Sneha Cecil on Unsplash

Figure 13: By Gabriele from Bologna, ITALY – lobe stretching xxl, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=5246354

Figure 14: By Lish Daelnar – Lish Daelnar, http://compunction.org, CC BY 3.0 us, https://commons.wikimedia.org/w/index.php?curid=4733704

In young children, it is important to assess the presence and size of ears. **Microtia** is a congenital deformity of an incompletely formed external ear in which the ear is smaller and sometimes has missing or deformed key features, or the outer ear may be missing altogether (see **Figure 15**). **Macrotia** is another congenital deformity in which the external ear is larger than normal and not in proportion to the head; it may be longer and/or wider than normal.

Figure 15: Microtia. (By Mulgamutt at English Wikipedia – Transferred from en.wikipedia to Commons by Filip em using CommonsHelper., Public Domain, https://commons.wikimedia.org/w/index.php?curid=4120960)

Priorities of Care

Report all abnormal findings to the physician or nurse practitioner.

- Erythema, swelling, and discharge are signs of infection and should be reported promptly: an infection needs treatment so it doesn't lead to permanent damage such as hearing impairment. If the client shows signs of ear infection and/or pain, assess the head and neck lymph nodes: inspection and palpation process.
- Any foreign objects should also be reported promptly. For example, a child might put a small disc battery (button battery) in their ear. This requires immediate action and should be reported immediately, as moisture in the ear can quickly cause batteries to release chemicals, leading to chemical burns, tissue necrosis, tympanic perforation, and/or hearing impairment.

- If a client presents with hypothermia due to extreme cold exposure, assess for findings related to frostbite, which can present as a range of red, purple, pale, blue, and black shades. Assess for pain and paresthesia and numbness or lack of sensation in particular. Slowly rewarm the ears to protect the skin.
- Findings such as lesions should be reported promptly, as they may suggest potential carcinoma. Some clients may tell you they have noticed an open sore that has developed with no physical trauma and has not healed. Any sore that doesn't heal should be of concern: the healing process depends on the type and severity of the sore, but a typical timeframe to heal is 4 to 6 weeks. Lesions are not a critical finding that require immediate action, but they can be life-threatening and require prompt intervention because they may be curable if diagnosed and treated early.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2967#h5p-251

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Otoscopic Examination

You will use an **otoscope (see Figure 16)** to conduct the otoscopic examination. This medical instrument has a pointed end that fits just inside the opening of the ear and provides **illuminated magnification** so that you can view the external ear canal and tympanic membrane.

Figure 16: Otoscope.

(By Rouibi Dhia Eddine Nadjm – Own work, https://commons.wikimedia.org/w/index.php?curid=120072656 This file is licensed under the Creative Commons Attribution-Share Alike 4.0 International license.)

If the client's ear is **obstructed with earwax**, you might be unable to visualize the tympanic membrane. If so, **begin by cleaning the ear.** The best way to do this is to place 2 to 3 drops of a warm mineral oil solution into the ear (or use 1 part hydrogen peroxide, 1 part warm water) (American Academy of Otolaryngology-Head and Neck Surgery Foundation, 2024). With the client lying on their side with the affected ear up, leave the solution in for at least 15 minutes to both soften and loosen the earwax. Next, you can use a bulb syringe with warm water to gently flush the ear over a basin or

sink. Consult a physician or nurse practitioner first if the client has had ear surgery, ear infections, or perforation of the tympanic membrane (Berg, 2023).

Steps for the **otoscopic examination** include (see this video for an example of an otoscopic examination):

1. Have the client sit on the examination table or in a high Fowler's position. A young child may sit on a parent's lap or in a supine position with their head turned away from you so that they are stabilized and still.
2. Place a speculum cover on the otoscope and turn the otoscope light on.
3. Using the hand of the same side as the ear you are inspecting (e.g., right ear, right hand), grasp the handle close to the otoscope head gently between your thumb, index finger, and middle finger (similar to how you would hold a pen).
4. Ask the client to slightly tilt their head away from you and keep their head still in this position while using your opposite hand to pull the helix up and back to straighten the external canal so that you can better visualize the tympanic membrane. If the client is under 3 years of age, pull the earlobe down and slightly back instead.
5. **Gently** insert the **speculum tip** just inside the external auditory meatus. **Do NOT force the speculum tip in. Do NOT push the whole speculum in – only the tip.**
6. To stabilize the otoscope and ensure the speculum doesn't move, you can rest the back of your hand (the one holding the otoscope) on the client's cheek. Some healthcare professionals gently rest the speculum tip on the back of the tragus to stabilize it, which can be helpful. Otherwise, ensure the speculum touches no other parts of the ear: this can damage the ear canal and can also be very painful if the client has an ear infection.
7. Look through the lens and inspect the canal for any signs of inflammation (erythema, swelling), discharge, and foreign bodies (e.g., toys, beads, pebbles, cotton from a cotton swab, or bugs such as spiders, bed bugs, flies, or earwigs). Describe the colour and quantity of earwax.
8. Continue looking through the lens to inspect the tympanic membrane for colour, contour, discharge, and integrity.
    - Normally, the tympanic membrane is a whitish-light grey colour, shiny and translucent resembling a stretched piece of plastic wrap, flat, with no discharge, and intact with no perforations such as holes or tears.
    - Abnormal findings include:
        - Discolouration. If present, note the colour. Reddened membranes are often associated with infections, yellow membranes may reflect fluid in the inner ear, and dark/black/blue membranes can be associated with hemorrhage. White patches may indicate scarring of the membrane from chronic ear infections.
        - Bulging membrane. If present, note the level of bulging (mild, moderate, severe). Bulging sometimes occurs with cases of otitis media and effusion.
        - Discharge. If present, note the colour (clear, sanguineous, serous, yellow, green, white) and the consistency (thin, thick).
        - Perforations. If present, note the appearance and the location.
9. Repeat for the other ear.
10. Document the **findings**:
    - **Normal findings** might be documented as: "External ear canals have no signs of erythema, swelling, discharge, or foreign bodies. Tympanic membranes are intact, pearly grey in colour, shiny, flat, with no discharge."
    - **Abnormal findings** might be documented as: "Bright red tympanic membrane in left ear with perforation."

Activity: Check Your Understanding

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2969#h5p-253

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Hearing Assessment

Part of the vestibulocochlear system assessment involves evaluating the **client's hearing**. This assessment provides information on the **sensorineural** and **conductive processes** and **potential problems**.

Sound waves are conducted through the ear canal and the tympanic membrane. The vibrations set the ossicles of the middle ear in motion and then move fluid within the cochlea of the inner ear, in turn stimulating thousands of nerve endings. The vibrations are then transformed into electrical impulses that travel to the brain along the cochlear portion of CN VIII (vestibulocochlear nerves) (Stangor & Walinga, 2014).

Testing can begin with the client sitting on the exam table. Before testing the vestibulocochlear nerves, ask the client about any history of impaired hearing and use of hearing devices. If the client wears a hearing aid, they should keep it on.

The following rudimentary hearing tests can be done by nurses and require no specialized equipment.

1. **General ability**: Begin by noting the client's general ability to hear you throughout your ongoing assessment process. For example, have you noticed any difficulties in hearing as manifested by leaning forward, appearing to lipread, or frequently asking you to repeat yourself?
2. **Finger/thumb rub test**: This test helps evaluate the cochlear nerve. Ask the client to look straight forward and place their index finger on the tragus of the right ear and push the tragus in and move in a circular motion until you ask the client to stop. It may be simplest to demonstrate this for them. Ask them to close their eyes so you are specifically testing hearing and not their ability to see your hand moving. Then, place your hand in front of the opposite ear (left ear) and rub your fingers and thumbs together and ask them if they can hear it. Repeat on the other side. See **Video 3**.
    - **Normally**, the client should be able to hear the sounds in both ears with a similar intensity.
    - **Abnormal findings** are when the client cannot hear the sounds or if the sounds differ in intensity

> *One or more interactive elements has been excluded from this version of the text. You can view them online here:* https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2971#oembed-1

Video 3: Finger/thumb rub test. [0.40 seconds].

3. **Whisper voice test**: This test also helps evaluate the cochlear nerve. Tell the client that you are going to whisper a combination of three numbers and/or letters and you want them to repeat what you say. Ask them to look straight forward and place their index finger on the tragus of the right ear and push the tragus in and move their finger over the tragus in a circular motion until you ask them to stop. Stand on their left side (slightly behind them and about an arm's length away) to test the left ear. Take a breath in, and as you breathe out, whisper a mixture of three numbers/letters (e.g., 8, E, 4). The client should be able to repeat what you say. If they don't, whisper another set of three numbers/letters (e.g., 2, K, 10). Repeat on the opposite ear with a different set of numbers/letters. **See Video 4**.
    - **Normally**, the client can repeat what you say into both ears. If you need to repeat the set of numbers/letters on one ear (for a total of six), a normal finding is if the client is able to repeat at least half of the numbers/

letters.

- **Abnormal findings** are when the client is unable to repeat the set of numbers/letters for one or both ears, or unable to repeat at least half of them if the test is repeated twice.

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Video 4: Whisper voice test. [0.50 seconds].

4. Note the **findings**:

- **Normal findings** might be documented as: "Cochlear nerve test: With whispered voice test, client able to hear and repeat numbers and letters in both ears, able to hear examiner rubbing fingers together beside both ears."
- **Abnormal findings** might be documented as: "Client unable to hear and repeat numbers and letters whispered in left ear."

Priorities of Care

Always consider abnormal hearing test findings in combination with your findings from other assessments. If you observe a hearing impairment with no obvious cause (such as cerumen impaction), refer the client to a hearing specialist (audiologist). The audiologist will complete a comprehensive hearing assessment that involves several tests in which each ear is tested separately. One common test involves the use of an audiometer, with the client in a sound-treated room and wearing headphones. The audiometer is a machine that can transmit speech as well as different sounds: frequencies (pitch) and intensities (loudness), and during testing the client is asked to acknowledge when they hear the sounds.

Activity: Check Your Understanding

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https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2971#h5p-261

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Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion and disease prevention strategies for a healthy vestibulocochlear system need to be appropriate for each specific individual, so you should carefully consider all collected data, both subjective and objective. Subjective data collection involves asking the client about risk factors and social determinants, while also attending to developmental considerations. This kind of inquiry should be integrated throughout the entire assessment. You will ask many probing questions during the subjective assessment, but also formulate additional questions based on critical reflection of the data you have collected during the subjective and objective assessment. Together, the findings will inform your clinical judgement for each specific client and the health promotion needed.

Ear Hygiene

Ear hygiene is a common topic of discussion, as clients often wonder how they should clean their ears. However, typically ears do not require cleaning as cerumen keeps them clean.

Most importantly, discuss with clients that they **should NOT insert** any sort of small instrument to clean their ears such as cotton swabs, one's fingers, pens/pencils, or car keys.

Clients with **loose earwax** can be advised to use a warm damp washcloth to wipe the external facing part of the ear. If the client has extensive earwax or cerumen impaction, refer them to their primary care provider. In these cases, it is sometimes advised to insert 2 to 3 drops of a warm mineral oil solution (or 1 part hydrogen peroxide, 1 part warm water) in the ear and leave it for at least 15 minutes to both soften and loosen the earwax (American Academy of Otolaryngology-Head and Neck Surgery Foundation, 2024). This is then followed by flushing of the ear with **gentle** spray of warm water in the shower or with a syringe. This kind of interventions is fairly safe, but should not be attempted without consulting a physician or nurse practitioner if the client has had ear surgery, ear infections, or perforation of the tympanic membrane (Berg, 2023).

Probing questions related to ear hygiene include:

- Do you clean your ears? If so, how do you clean them? How often do you clean them?
- Do you use cotton swabs? (i.e., Q-tips).
- Have you noticed excessive earwax?

Contextualizing Inclusivity

In some cultures, ear candling is used to clean the ears and remove cerumen. It is important to use a cultural humility approach to understand why clients choose this procedure and remain non-judgemental. If the client has an issue with earwax, you should discuss safer ways to clean the ears. Health Canada (2023)

has concluded that ear candling provides no benefits and can even worsen cerumen impaction and cause damage to the ear.

Environment

Advise clients to use **ear protection** – against physical trauma as well as loud sounds and environments – to prevent various conditions. Physical trauma to the ear can lead to external ear deformities, damage to the middle and inner ear, and hearing impairment, among other conditions. Excessive loud sounds and environments are a common cause of hearing impairment that is often not recognized until later in life.

Therefore, advise clients to wear ear protection in environments where the ear is at risk of physical injury. Many jurisdictions have implemented recommendations or requirements to wear helmets or specific headgear protection during activities such as wrestling, boxing, baseball, cycling, and hockey.

Loud noises – often defined as **85 decibels or louder** – are of concern because they can cause impaired hearing (National Institute on Deafness and Other Communication Disorders, 2022; WHO, 2015).

To give you a sense of how loud 85 decibels is, here are the decibels of some common sounds:

- Whispering: 30 decibels.
- Talking with another person (normal level): 60 to 70 decibels.
- Hairdryer or subway train: 100 decibels.
- Motor sounds (lawnmower, vacuum, power tools): 75 to 100 decibels.
- Ambulance siren, bulldozer, chainsaw, nightclub/bar: 95 to 129 decibels.
- Listening to music at maximum volume through headphones: 94 to 110 decibels.

(National Institute for Occupational Safety and Health, 2024; National Institute on Deafness and Other Communication Disorders, 2022; World Health Organization, 2015)

Loud noises can cause problems if they involve **one-time exposure** to a very loud noise (a firecracker) or **prolonged exposure** to loud noise (a music concert or occupational hazards). Therefore, it is important to consider both the intensity and the duration of the sound, as well as the distance one is from the sound source (WHO, 2015). If the sound cannot be turned down, or it is impossible to move away from it, hearing protectors (wearable equipment such as earplugs or earmuffs) should be worn (National Institute on Deafness and Other Communication Disorders, 2022). Explore with clients whether they are exposed to activities or hobbies that involve loud noises such as music and concerts, sports like auto racing, or use of loud equipment such as power tools.

Many jurisdictions have developed **recommendations specific to workplace-related noise**. For example, the Canada Labour Code and the Canada Occupational Health and Safety Regulations include regulations about health hazards such as exposure to loud sounds in workplaces and the need for hearing protectors (Government of Canada, 2022). It may be useful to discuss the CDC NIOSH Sound Level Meter App with clients and workplace communities: https://www.cdc.gov/niosh/noise/about/app.html.

Use the following guidelines to help clients prevent or manage noise-induced hearing impairment:

- Ensure clients are aware of noisy environments, particularly those 85 decibels or louder.
- Educate clients about occupational guidelines related to noise.
- Recommend hearing protectors for noisy environments, especially those involving very loud noises or prolonged exposure. Variety types of hearing protectors are available, including ear plugs (small devices inserted into the

external ear canal) and earmuffs (soft ear cushions that fit over the entire ear, typically with hard outer cups held together by a headband). Depending on the type used, ear protectors should be replaced regularly or cleaned. In particular, foam earplugs should be replaced regularly because they can provide a warm, moist place for bacteria to grow and lead to risk of infection.

- Discuss personal use of audio devices:
  - Inform clients about the 60-60 rule (reduce use to 60 minutes per day and reduce volume to less than 60% of the maximum volume of the device). However, be aware that the volume on devices isn't always standardized so this isn't always a truly objective recommendation. The main point: keep the volume below 85 decibels.
  - Suggest use of well-fitting in-ear earbuds (fit right into the external ear canal) or noise canceling over-the-ear headphones (sit over the entire external ear). Well-fitting earbuds and noise-canceling headphones can help reduce extraneous noise, enabling clients to keep the volume low while still hearing music well. Still, the main point remains: keep the volume below 85 decibels.

Probing questions include:

- Are you involved in any physical activity or work-related activity where your ears could be physically injured? For example, do you play any sports such as wrestling?
- Are you exposed to noise in your home or with any hobbies or sports (e.g., music, gaming)?
  - If affirmative, do you use any strategies to protect your ears?
- Are you exposed to noisy environments in your workplace?
  - If affirmative, does your workplace provide hearing protectors or guidance or training related to protecting your hearing?

Diet

An **overall healthy diet** is important to all body systems including the vestibulocochlear system. A healthy diet promotes **vascular health to the ear** and **reduces inflammation** (Curhan et al., 2018).

Hearing health is supported by diets high in vitamins (particularly vitamin D) and antioxidants, low in fat, and rich in fruits and vegetables overall (Dawes et al., 2020). One study involving women found that healthy dietary patterns were associated with lower risks for hearing impairments, particularly the Mediterranean diet and the Dietary Approaches to Stop Hypertension (DASH diet) (Curhan et al., 2018).

Probing questions related to diet include:

- Tell me about your usual diet?
- What have you eaten in the last 24 hours? Is that your usual diet?
- Have you had any recent changes in your life that have affected your diet?

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Clinical Judgement: Case Study

A two and a half year old child presents with rhinorrhea and a 38.7 degrees Celsius fever. The child's caregiver stated the child has been tugging their left ear, saying "ouch," and has been inconsolable for the past 6 hours. The child did not sleep well last night. No nausea, vomiting, or diarrhea. Client is eating and drinking well. Client attends daycare and has no known allergies. No family history of vestibulocochlear disease. Pulse 140, respirations 28, oxygen saturations 97%, blood pressure 82/44 mm Hg. Upon inspection, there is no swelling or erythema of the external ear or external ear canal.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
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Key Takeaways

- The vestibulocochlear system is composed of the external ear, the middle ear, inner ear, and the vestibulocochlear nerve (cranial nerve [CN] VIII), and are responsible for hearing and instrumental for motion, head position, spatial orientation, balance, and posture (some of these latter components are discussed in the neurological chapter).
- Common symptoms that can be related to the vestibulocochlear system include pain, hearing impairment, dizziness, vertigo, pruritus, discolouration, discharge, and tinnitus.
- An objective assessment of the vestibulocochlear system includes a brief scan, inspection and palpation of the external ear, otoscopic examination, and hearing assessment.
- Health promotion interventions should be developed in collaboration with the client and focus on what is important to them.

CHAPTER 17 - OPHTHALMIC SYSTEM ASSESSMENT - THE EYES

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Learning Outcomes

- Apply subjective assessment skills.
- Apply objective assessment skills.
- Use clinical judgement.
- Integrate an inclusive approach to ophthalmic system assessment.
- Integrate health promotion interventions into actions.

Introduction to the Ophthalmic System

The **ophthalmic system** is important to assess because it is responsible for vision. As a nurse, your assessment of the ophthalmic system provides information about the functioning of this system and potential cues that may require your action.

Ophthalmic System Components

See **Figures 1, 2, 3**, and **4: Anatomy of the eye** for the main components of the ophthalmic system. The main components of the ophthalmic system include:

- Eyelids, eyebrows, and palpebral fissures.
- Pupil, iris, sclera, lens, cornea, conjunctiva, and canthus.
- Lacrimal apparatus.
- Extraocular eye muscles.
- Retina and optic nerve.

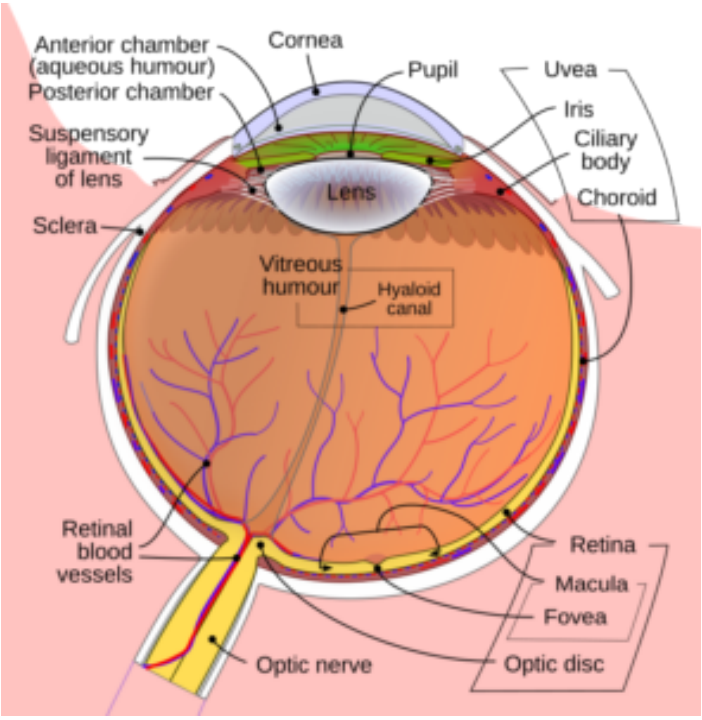

Figure 1: Anatomy of the eye.

(By Rhcastilhos. And Jmarchn. – Schematic_diagram_of_the_human_eye_with_English_annotations.svg, Creative Commons Attribution-Share Alike 3.0 Unported license, https://commons.wikimedia.org/w/index.php?curid=1597930).

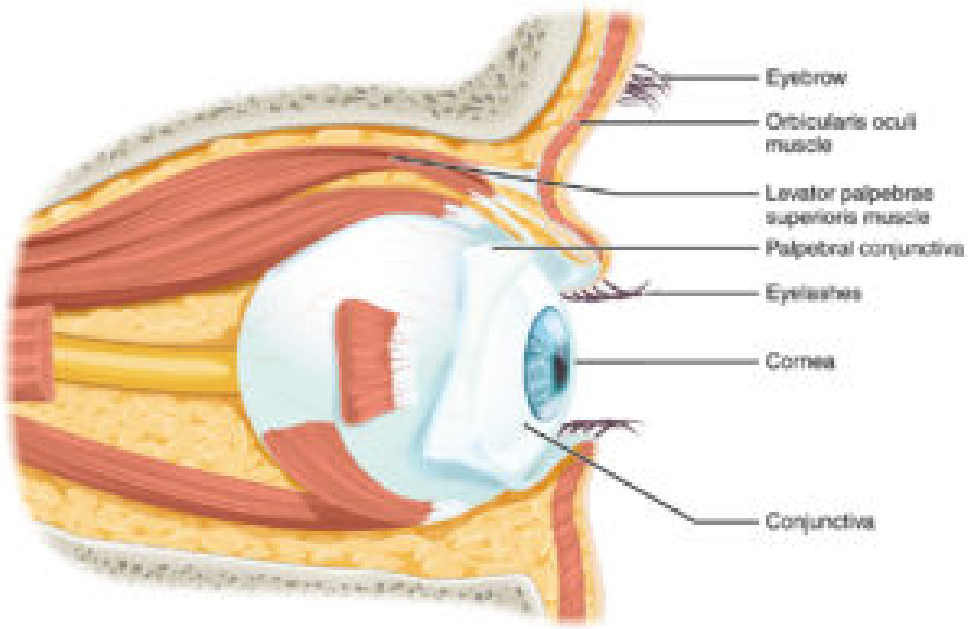

Figure 2: Anatomy of the eye.

(From: J. Gordon Betts, Kelly A. Young, James A. Wise, Eddie Johnson, Brandon Poe, Dean H. Kruse, Oksana Korol, Jody E. Johnson, Mark Womble, Peter DeSaix, 2022, The Somatic Nervous System. In Anatomy and Physiology 2e. OpenStax. CC BY 4.0 license).

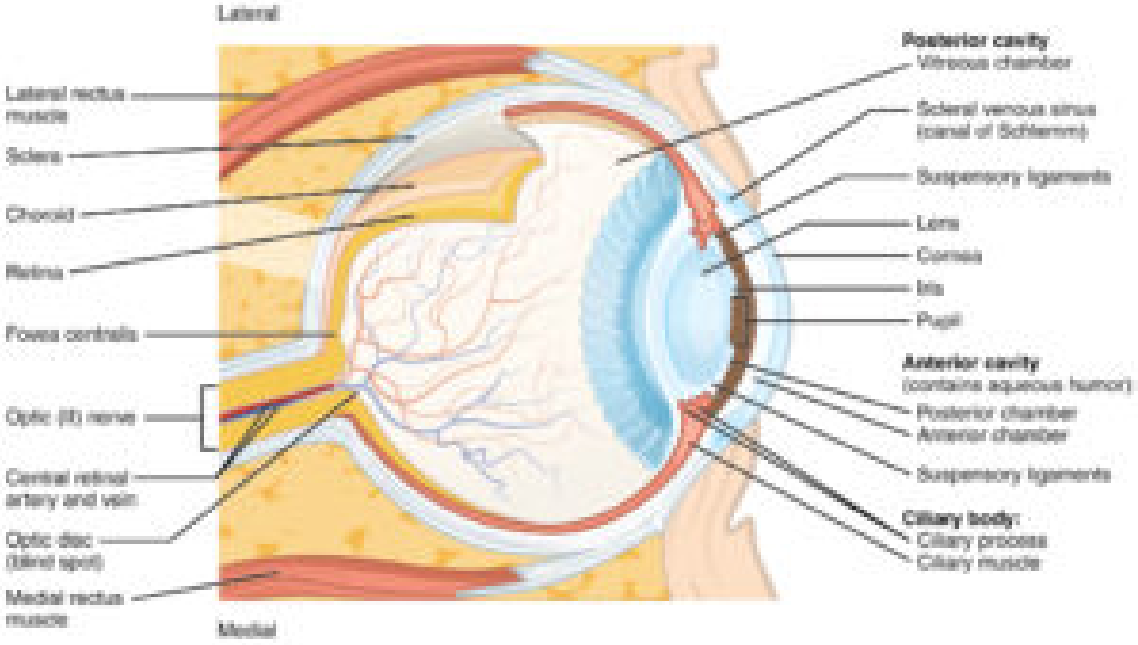

Figure 3: Anatomy of the eye.

(From: J. Gordon Betts, Kelly A. Young, James A. Wise, Eddie Johnson, Brandon Poe, Dean H. Kruse, Oksana Korol, Jody

E. Johnson, Mark Womble, Peter DeSaix, 2022, The Somatic Nervous System. In Anatomy and Physiology 2e. OpenStax. CC BY 4.0 license).

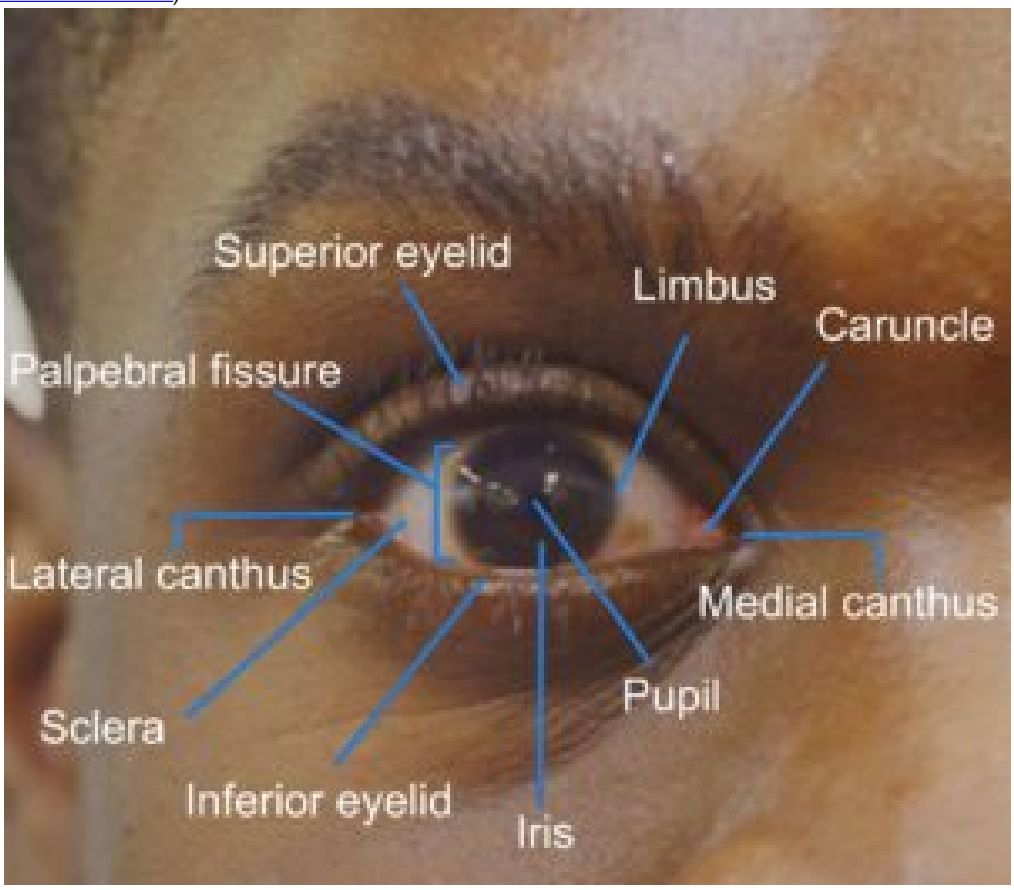

Figure 4: Anatomy of the external eye (artist: Tayiba Rahman).

If you want to refresh your knowledge of anatomy and physiology of ophthalmic system, watch this video: Vision: Crash Course Anatomy & Physiology [9:38]

Clinical Tip

The ophthalmic system is closely interconnected with the neurological system, so it is rarely assessed in isolation. Several **cranial nerves (CN)** innervate the eye and are responsible for visual acuity and eye movement. For example, **CN II (optic nerve)** allows you to see an object in the distance and see an object off to one side without moving your head or eyes. More to come later in the chapter.

Subjective Assessment

Subjective assessment of the ophthalmic system involves asking questions about the health of the client as related to the eye. A full exploration of these **pathologies** is beyond the scope of this chapter, but common conditions associated with the ophthalmic system include eye trauma (injury to the eye), **conjunctivitis**, **refractive errors**, **cataracts**, **glaucoma**, **macular degeneration**, **retinal detachment**, **vitreous detachment**, **diabetic retinopathy**, and **colour vision deficiency**.

Common symptoms that may be related to the ophthalmic system include vision impairments, eye pain or strain, discolouration, pruritus, swelling, lesions, discharge, dry eyes, and **gritty eyes**. See **Table 1** for guidance on subjective health assessment: many of the questions in the table align with the PQRSTU mnemonic (or variations of it). Try to ask questions in order of importance – you will not necessarily follow the sequential order of PQRSTU.

It is best to begin the assessment by inquiring if the client wears **corrective lenses** (glasses or contact lenses). If so, ask probing questions such as:

- When did you begin wearing them? Tell me about the reasons you wear them? Do you wear them constantly or at particular times of the day?
- Have you had any issues with them?
- When was your last appointment with an eye specialist?
- Have you had changes in your vision since your last appointment?

Ask the client if they have had eye surgery or any **eye trauma** such as a physical injury or chemical exposure. If so, assess details surrounding the surgery and/or trauma, how the eye was affected, when it occurred, how it was treated, and whether it continues to affect them.

Always ask about any **medications** (prescribed or over-the-counter) or supplements the client is taking: name, dose, frequency, reason it was prescribed, and how long they have been taking it.

Remember to ask questions related to health promotion. Depending on the context of the assessment, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on "Health Promotion Considerations and Interventions" is included later in this chapter after the discussion of objective assessment.

Contextualizing Inclusivity – Blindness

Blindness includes a spectrum of visual impairments from partial (low vision) to total blindness. In Canada, legal blindness is defined as "visual acuity of 20/200 or less in both eyes after correction, and/or a visual field of 20 degrees or narrower" (Canadian National Institute for the Blind, 2024).

In the province of Ontario, Canada, the **Accessibility for Ontarians with Disabilities Act** (AODA) (2005) provides legislation regarding accessibility for people with disabilities, including those who are blind. It includes the requirement that building and healthcare is accessible to people who are blind and accommodations are provided as needed.

As a nurse, you must not make assumptions about the needs and accommodations of a person with visual impairment. Use a cultural humility approach: inquire about how to best support the client and provide

accommodations as necessary. For example, health-related material may need to be provided in larger font, in an alternate format such as auditory, or in Braille. As shown in **Figure 5**, Braille is a tactile system used to read and write, in which patterns of tiny bumps on a page represent letters and symbols (Braille Literacy Canada, 2024).

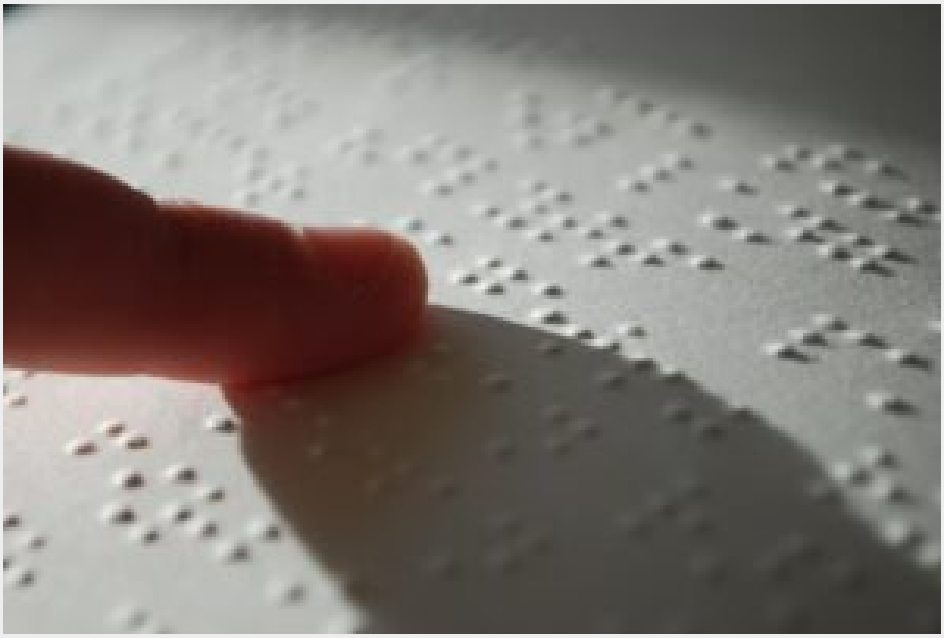

Figure 5: Braille (Author: Stefan Malmesjö, This file is licensed under the Creative Commons Attribution 2.0 Generic license. Link: https://flickr.com/photos/39061023@N08/4959534304).

Contextualizing Inclusivity: Optometric Screening Examinations

Ask the client when their **last eye exam** was. They may need frequent optometric screening examinations to support eye health and detect eye conditions. See **Table 2** for the recommendations made by the Canadian Association of Optometrists related to eye examinations for clients who are low risk and asymptomatic. Frequencies are increased for individuals who are at higher risk, such as clients with diabetes, macular degeneration, and glaucoma.

These recommendations may be problematic because jurisdictional (provincial and territorial) coverage for eye exams varies in Canada, and do not necessarily include coverage for corrective lenses. For example, OHIP (Ontario Health Insurance Plan) only covers certain age groups and people with certain eye conditions, as discussed in more detail later in this chapter: see section on "optometry (eye-health

services)". Complicating the matter are structural inequities: for example, rural, remote, and Indigenous communities may lack access to eye specialists. As a nurse, you should be aware of any policy changes; for example, OHIP coverage may change. Some clients may have private insurance coverage. You may need to support clients by helping them find additional resources to support eye assessment and corrective lenses.

Table 2: Canadian Association of Optometrists screening recommendations for low-risk and asymptomatic clients.

Birth to 2 years.	First exam between 6 to 9 months of age.
2 to 5 years.	At least one exam.
6 to 19 years.	Annually.
20 to 39 years.	Every 2 to 3 years.
40 years to 64 years.	Every 2 years.
65 years and older.	Annually.

Table 1: Common symptoms, questions, and clinical tips.

Symptoms	Questions	Clinical Tips
Visual impairments is an umbrella term for vision difficulty. **Refractive errors** are a common type of impairment in which the eye's shape results in light being incorrectly focused on the retina. These conditions most often include: • **Myopia**. • **Hyperopia**. • **Astigmatism**. • **Presbyopia**. Other common eye conditions include: • **Strabismus**. • **Amblyopia**. In addition to blurry vision, other symptoms include: • **Floaters**. • **Halos around lights**. • **Diplopia**.	Do you currently have or have you recently had any difficulty seeing? You may need to ask specific questions about the presence of: blurry vision, double vision, floaters like black dots that move across their eyes, blind spots, colourful circles such as a rainbow around light sources like a streetlight, and difficulty seeing at night or in a dimly lit environment. If the responses are affirmative, you might need to provide **additional probes**: **Quality/quantity**: Can you describe it? How bad is it? **Timing/treatment**: When did it begin? Did it begin suddenly or gradually? Is it constant or intermittent? If intermittent, how long does it last? Have you seen a doctor for it? Has it been treated? **Provocative/palliative**: What makes it better? What makes it worse? **Understanding**: Do you know what is causing it?	All people have **occasional floaters**; these become more frequent with age. To assess the seriousness, ask whether there has been a sudden increase in the number of floaters and whether they are permanent and/or associated with flashes of light or a dark shadow like a curtain. Refer clients experiencing **halos** to a physician because halos can be associated with specific eye diseases. Prompt attention may be needed if halos are associated with other symptoms such as pain and blurred vision. **Diplopia** may also be indicative of an urgent condition such as a cerebral bleed (stroke, aneurysm) so immediate referral is required, particularly when associated with related symptoms such as confusion, slurred speech, weakness, and dizziness. As the nurse, you should immediately notify the physician or nurse practitioner and conduct a primary survey

Eye pain or **eye strain** are unpleasant sensations. **Eye pain** is subjectively described in many ways such as tenderness, discomfort, burning, throbbing, stabbing, and sharp pain on, around, or behind the eye. Pain can be associated with trauma, infection, corneal abrasion, foreign body, and glaucoma. **Eye strain** is described as tired and achy eyes. It can sometimes be associated with looking at something for a long period of time such as a computer screen or wearing an incorrect or new corrective lens prescription.	Have you recently had any eye pain or eye strain? If yes, do you currently have it now? If the responses are affirmative, you might need to provide **additional probes**: **Region/radiation**: Where is it located? Is it in one or both eyes? Does it radiate anywhere? **Quality/quantity**: What does it feel like? How bad is it? **Severity**: Can you rate it on a scale of 0 to 10 with 0 being no eye pain (or strain) and 10 being the worst you have ever had? **Provocative/ palliative**: Is there anything that makes it worse? Is there anything that makes it better? **Timing/treatment**: When did it begin? Did it begin suddenly? What were you doing when it began? Is it constant or intermittent? How often do you get it? Have you taken anything to treat it? Have you taken any medications? **Understanding**: Do you know what is causing it? **Other**: How does it affect your daily life?	Eye pain can have many causes. The cause may be obvious as the client may have experienced an injury. Refer clients to a physician or nurse practitioner if they have had recent eye surgery or a history of glaucoma or the pain is: • Severe with sudden onset. • Associated with an injury or redness or discharge. Eye strain is a common symptom today because of the increased use of computers and smartphones. One common recommendation is that individuals should limit screen time and follow the **20-20-20 rule:** every 20 minutes, take a 20-second break to focus on something approximately 20 feet away to help relax the eye muscles.

Discolouration (erythema, jaundice), **pruritus**, **swelling**, and **lesions** (open sores, bumps). **Discolouration** is often associated with the sclera of the eye or lesions surrounding the eye. For example, a client might tell you that the whites of their eyes are reddened or have become yellow. **Pruritus** may be generalized over the area of the whole eye or associated with a specific **lesion** on the eyelid. Lesions can be small bumps that are often red with evidence of **swelling**. Lesions can also be open sores that may be draining discharge.	Have you noticed any discolouration of your eyes or around the eyes (such as redness or yellowish colour)? Have you noticed any swelling (or itching, sores, or bumps) on or around the eye? If the responses are affirmative, you might need to provide **additional probes**: **Quality/quantity**: Tell me about it? What does it look like? What does it feel like? How bad is it? **Region/radiation**: Where is it located? Has it extended into other areas? **Severity**: Pruritus is the only one of these symptoms you might ask a client to rate on a scale of 0 to 10. **Provocative/palliative**: Is there anything that makes it worse? Is there anything that makes it better? **Timing/treatment**: When did it begin? What were you doing when it began? Is it constant or intermittent? How often do you get it? Have you taken anything to treat it? Have you applied anything on the eye to treat it? Have you taken any medications? **Understanding**: Do you know what is causing it? **Other**: How does it affect your daily life? When asking about open sores, you may ask about any discharge and the colour.	**Conjunctivitis** (pink eye) is a condition in which the sclera become red. Erythema can appear around the eye. With darker skin tones, erythema may appear reddish/purple in colour. With very dark skin tones, it may be difficult to visualize. With lighter skin tones, erythema is typically dark pink to red. Conjunctivitis can be caused by allergies or contact with chemicals (make-up, chlorine) and be accompanied by related symptoms such as pruritus and swollen eyes. It can involve bacterial or viral infections. When the cause isn't obvious (like allergies), refer the client to a doctor or nurse practitioner. Tell clients to wash their hands well, avoid touching their eyes, and avoid sharing anything that touches their eyes such as towels and make-up. If relevant, advise clients to remove their contact lenses. By Microrao – Own work, Creative Commons Attribution -Share Alike 4.0 International License https://commons.wikimedia.org/w/index.php?curid=82090761 By James Heilman. This file is licensed under the Creative Commons Attribution -Share Alike 4.0 International License https://commons.wikimedia.org/wiki/File:Allergicconjunctivitis.jpg **Jaundice** can result in the **yellowing of the complete sclera**. It can cause pruritus and skin discolouration. In persons with darker skin tones, the discolouration may be subtle or go unnoticed but visible in the sclera as shown in image below. In persons with lighter skin tones, jaundice can appear yellow or even orange in colour. Jaundice can be associated with infections, cancer, and other conditions affecting the liver, pancreas, and gallbladder. Always report this finding to the physician or nurse practitioner as

		it can be a sign of a new disease or the advancement of a disease. Taken from https://phil.cdc.gov/details.aspx?pid=2860 (This image is in the public domain and thus free of any copyright restrictions.) **Blepharitis** is an inflammatory condition in which the eyelids appear red and sometimes swollen and irritated. It is usually caused by an excessive amount of bacteria or clogged oil glands on the eyelids. This work has been released into the public domain by its author, clubtable, at the German Wikipedia from: https://commons.wikimedia.org/wiki/File:Blepharitis.JPG

Discharge, **dry**, or **gritty eyes** are symptoms that can be associated with a variety of conditions. Small amounts of clear eye **discharge** can be normal: clients might wake up with a small amount of crusted mucous on the side of the eyes. However, persistent watery eyes can be associated with allergies, blocked lacrimal apparatus (tear duct), and infections. Yellow, green, or white discharge can be associated with infections and appear as mucous or crusty debris around the eyes, often associated with erythema and swelling. **Dry eyes** can occur when the lacrimal gland doesn't make sufficient tears to irrigate the eyes. It can be associated with a **burning**, **gritty**, **scratchy feeling**. Dry and gritty eyes are commonly associated with aging and hormonal changes, but can also be associated with certain medications, environmental conditions, or diseases that affect normal blinking	Have you noticed any discharge from your eyes? Have you had any problems with dry or gritty eyes? If the responses are affirmative, you might need to provide **additional probes**: **Quality/quantity**: Tell me about it? What does it feel like? How bad is it? **Region**: Where is it located? **Provocative/ palliative**: Is there anything that makes it worse? Is there anything that makes it better? **Timing/treatment**: When did it begin? What were you doing when it began? Is it constant or intermittent? How often do you get it? Have you taken anything to treat it? Have you taken any medications? **Understanding**: Do you know what is causing it? **Other**: How does it affect your daily life?	Refer any client with eye discharge, particularly when not associated with allergies, to a physician or nurse practitioner. This file is licensed under the Creative Commons Attribution 3.0 Unported license. Attribution: Tanalai at English Wikipedia https://commons.wikimedia.org/wiki/File:Swollen_eye_with_conjunctivitis.jpg
Other **symptoms** can include headache, fever, light sensitivity (photophobia), twitching, confusion, and nausea and vomiting.	Have you experienced any headaches? Ask about other symptoms: use variations of the PQRSTU mnemonic to assess symptoms further if the client's response is affirmative.	These symptoms can be related to other body systems and non-ophthalmic issues. Conduct a focused assessment on the related body systems.

Personal and **family history** of conditions such as refractive errors, cataracts, glaucoma, diabetic retinopathy, and retinal detachment. Always inquire whether the client has had any eye injuries.	Do you have any chronic eye conditions? Do you have a family history of any of these conditions? If the responses are affirmative, you might need to provide **additional probes**: Tell me about the condition. When did the symptoms begin? When were you diagnosed? How has it been treated? How well did the treatment work? How are you managing it?	The biological and non-biological nature of family may be important to explicate when asking questions, considering that the risk factors may be influenced by genetics and/or culture. This assessment will help you gain a better understanding of the client and determine appropriate interventions and education.

Priorities of Care

Any **eye trauma** or **sudden change in vision** is a priority of care. Changes may include blurry vision, dark spots, shadows or a dark curtain across the central or peripheral vision, dim, distorted or double vision, or halos or flashing lights. These may require immediate treatment to avoid permanent damage to vision, among other consequences. For example, sudden changes to vision may be related to a stroke, retinal tears, detachments, or hemorrhages. Conduct a primary survey and report the findings to the physician or nurse practitioner. Prompt attention is also needed when clients report eye pain, conjunctivitis, and any symptoms suggestive of infections such as purulent discharge, redness, and swelling.

Cultural Inclusivity

In some cultures, certain substances are used for **newborn eye care** in the first 24 hours following birth (Osman et al., 2018). Approach this kind of tradition with cultural humility, but also ensure patient safety with regard to how these substances may affect the integrity of the eyes and vision. Additionally, some individuals use **over-the-counter eye drops** when they have dry, red, and/or itchy eyes. Some of these eye drops can constrict the vasculature, not address the actual problem, and actually worsen the issue

(Mukamal, 2024). Consider referring the client to the physician or nurse practitioner to discuss their symptoms and find safer alternatives. If the client has used eye drops for more than a few weeks or the client is uncertain of the cause, refer them to an eye doctor for a proper diagnosis and effective treatment.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2988#h5p-262

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Objective Assessment

An objective assessment is usually completed after the subjective assessment, but if the client shows signs of clinical deterioration, you may proceed directly to the objective assessment and associated interventions. In this case, it is important to prioritize care after a brief scan that involves components of the primary survey.

An **objective assessment of the ophthalmic system** includes:

- Brief scan of the ophthalmic system.
- External eye assessment.
- Visual acuity assessment.
- Peripheral vision assessment.
- Extraocular eye movement assessment.
- Ophthalmoscope examination.

Assessments of most components of the ophthalmic system don't require touching the eye, but in some cases you may need to palpate areas around the eye or closely observe conditions that are transmissible such as conjunctivitis: if so, wear gloves and attend to infection prevention and control measures.

Brief Scan of the Ophthalmic System

A **brief scan** of the ophthalmic system allows you to quickly recognize ophthalmic signs, changes in clinical status, and/or cues of clinical deterioration. This brief scan will influence your decision on whether immediate action is required and whether a focused assessment is needed.

Steps of a **brief scan** include checking the following:

1. Are there any observable cues that suggest the client may have a vision impairment (e.g., eyeglasses, cane, ocular prosthesis, eye patch)?
    - Knowing whether a client has a potential existing vision impairment may inform how you conduct your assessment. For example, where you physically position yourself as the nurse may be influenced by the presence of an ocular prosthesis in one of the client's eyes.
2. Is the client using their hands to guide their movement, bumping into objects, squinting and/or having difficulty maintaining eye contact?
    - This cue needs to be explored as it can suggest vision impairment or other eye problems.
3. Are there any observable signs of redness or discolouration, swelling, discharge, or lesions?
    - These signs are quickly observable when you see a client. They can provide cues that inform your clinical judgement. If present, wear gloves and examine these cues further as part of the external eye assessment.

Contextualizing Inclusivity

Do not make assumptions related to **eye contact**; be aware of cultural differences in terms of maintaining or avoiding eye contact. Eye contact is intentionally or subconsciously avoided among some groups: for example, eye contact led to punishment in some residential schools, so some Indigenous clients may begin an interaction with eye contact and then look away (Indigenous Corporate Training Inc., 2024). Some clients from Eastern and Caribbean cultures consider direct eye contact to be disrespectful and even aggressive (Bauer, 2015). In contrast, in many Western cultures there is an expectation to maintain eye contact, with the misguided assumption that a person who doesn't maintain eye contact is dishonest or shy.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2992#h5p-264

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External Eye Assessment and Anterior Eyeball Assessment

The external eye assessment and anterior eyeball assessment includes assessing all visible eye-related structures: the area surrounding the eye, the eyelids, and the anterior eyeball. The assessment includes:

- General Inspection
- Pupillary light reflex and accommodation.

General inspection

This assessment should be done with the client looking straight ahead. Steps in the assessment include:

1. Inspect for **symmetry** and **placement** of the eyebrows, eyes, eyelids, and **palpebral fissures**.
    - Normally, the eye area is symmetrical, with the eyebrows and eyes at the same level on the left and right side. The upper eyelids should cross the **limbus** and sit above the pupil so that you can see some of the upper iris (i.e., iris above the pupil). The palpebral fissures should be equal bilaterally, and you should observe even distribution of eyelashes and eyebrow hair. Symmetry is a normal finding, but be aware that eye shape varies by ethnic background and can include eyes that are upward- or downward-turned, round, or almond-shaped, with a monolid or double eyelid.
    - Describe the appearance and location of any asymmetry such as eyelid drooping or retraction or unequal palpebral fissures. Describe any loss of eyelashes or loss of hair across eyebrows.
2. Inspect **eyeball alignment** in sockets.
    - Normally, eyeballs are aligned in the eye socket and are not protruding or sunken. See **Figure 6**.

Figure 6: Aligned eyeballs. (Photo by ABSOLUT on Unsplash: weblink).

- Abnormal findings may include protrusion of the eyeballs in which they bulge out of the socket (medical term: exophthalmos, also known as proptosis). This can be associated with eyelid retraction in which you can see visible sclera above the iris. The most common cause of this is **hyperthyroidism**. Another abnormal finding is sunken eyeballs (medical term: enophthalmos). This can be associated with age in which the client experiences atrophy around the eye, but it can also be associated with other conditions such as physical trauma.

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Video 1: Inspection for symmetry and placement of the eyebrows, eyes, eyelids, and palpebral fissures and inspection of eyeball alignment [0.43 seconds].

3. Inspect for **lesions**, **swelling**, and **discolouration** (such as redness) of the eyelids and around the eyes.

   - Normally, you will not observe lesions, swelling, or discolouration, but be aware that some lesions are normal. For example, freckles and nevi can be considered normal, but you should always use the ABCDE mnemonic to assess. **Lentigo/lentigines** are caused by sun exposure and may appear on the face around the eyes. The area around the eyes is normally the same colour as the rest of the face, although the skin below the eyes may be a slightly darker shade.
   - If present, describe the appearance and location of any lesions, swelling, and discolouration. Common lesions associated with swelling and redness include **hordeolum** and **chalazia**. Intraocular hemorrhage (bleeding in

the eye) can be visualized in the sclera of the eye and caused by conditions such as physical injury or retinal detachment.

4. Inspect for any **discharge** associated with the eyes.

    - Normally, you will observe no discharge, although a small amount of crust around the eyes (sometimes called "sleep") is normal after first waking up.
    - If present, describe the colour (clear, purulent, sanguineous, serosanguineous), consistency (thin, thick, stringy), quantity (mild, moderate, severe), and location of discharge.

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Video 2: Inspect for lesions, swelling, discolouration and discharge. [0.27 seconds].

5. Inspect the **cornea**, **lens**, and **sclera** on the anterior eyeball. It can be helpful to look directly at the eyeball from the front of the client and also look at the eyeball when standing at the side of the client while shining a penlight tangentially across the eyeball in order to better visualize the eyeball.

    - Normally, the cornea are smooth and the lens and cornea are clear. The sclera may be white or may have a soft (muted) greyish-blue tone in clients with darker skin (see **Figure 7**). You may observe flat small brown specs (freckles) on some sclera (**Figure 8**), particularly in clients with darker skin tones.
    - Abnormal findings include corneal abrasions (scratches), which are often painful. The cornea and lens may be cloudy, sometimes having a milky appearance (**Figure 9**).

Figure 7: Greyish-blue tone (left) and white tone (right) sclera.

Image on left: Author: By Basile Morin – Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=105228490

Image on right: Author: 8thstar at English Wikipedia, Creative Commons Attribution-Share Alike 3.0 Unported license, https://commons.wikimedia.org/w/index.php?curid=1944750)

Figure 8: Freckle on sclera.

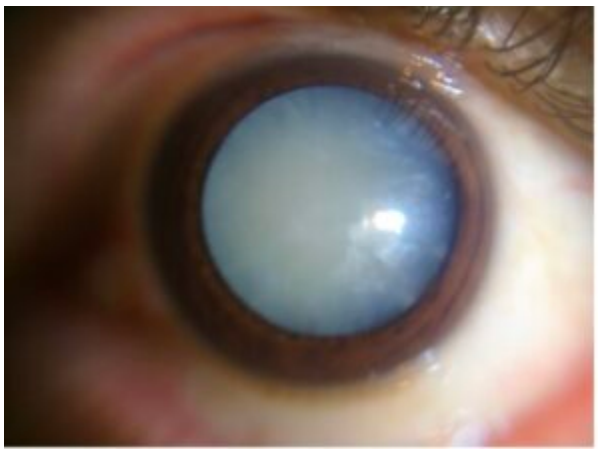

Figure 9: Cloudy lens (probable diagnosis: cataract).
(Author: Imrankabirhossain, Creative Commons Attribution-Share Alike 4.0 International license, from: https://commons.wikimedia.org/wiki/File:Intumescent_cataract.jpg).

6. Inspect the **conjunctiva** of the inside of lower and upper eyelids. Place the pads of your thumbs below the client's eyelids (on the orbital bone) and gently pull downward. Ask the client to look up towards the ceiling while inspecting the inner lower eyelid. Next, place the pads of your thumbs on the orbital bone above the eye and gently pull upward. Begin by inspecting the inner upper eyelid, and then ask the client to look to the right and then to the left while you inspect the outer and inner canthus.
    - Normally, the conjunctiva is transparent with a slightly pink colour particularly over the area that covers the inside of the lower eyelids, visible blood vessels, and no lesions, swelling, or foreign bodies (**Figure 10**).

- Describe the location and appearance of any lesions, swelling, foreign bodies, or discolouration. See **Figure 11** for an example of a melanoma.

Figure 10: Transparent conjunctiva with a slightly pink colour, visible blood vessels, no swelling or foreign bodies, small brown macule on right eye medial to the limbus, no other lesions.
(By http://commons.wikimedia.org/wiki/User:Brazilianboy94 – Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=80905686)

Figure 11: Melanoma.
(Author: Jonathan Trobe, Creative Commons Attribution 3.0 Unported license, from: https://commons.wikimedia.org/wiki/File:Iris_melanoma.jpg).

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Video 3: Inspect the Cornea, Lens, Sclera, and Conjunctiva. [1.06].

7. Note the **findings:**
    - **Normal findings** might be documented as: "Eyebrows, eyes, eyelids, and palpebral fissures symmetrical. Even distribution of eyebrows and eyelids. Normal alignment of eyeballs with no protrusion or sunken eyeballs. No lesions, swelling, and discolouration of eyelids and around eyes. No eye discharge. Smooth cornea with no abrasions, lens and cornea are clear with white sclera and no lesions. Conjunctiva are transparent with a slightly pink colour, no lesions, swelling, or foreign bodies."
    - An **abnormal finding** might be documented as: "Drooping left eyelid."

Contextualizing Inclusivity

Periorbital hyperpigmentation (sometimes referred to as "circles" under the eyes) and puffiness (sometimes referred to as "bags" under the eyes) can be genetic, worsen with age (natural atrophy in which the skin begins to sag), and be influenced by other factors such as lack of sleep, allergies, dehydration, and fluid retention. The **skin under the eyes** is thin and transparent, so the underlying structures (vasculature) can create darkness under the eyes in which the pigmentation may vary in shades from brown, black, blue, and purple. People with darker skin often have hyperpigmentation around the eyes and darker circles under the eyes related to genetics, while the underlying structures may be more prominent in people with lighter skin.

False Eyelashes were invented more than 100 years ago, but have become a more common cosmetic enhancement in the last 20 years. If a client wears false eyelashes, assess the eyelids for any signs of inflammation, as long-term use without breaks can block the glands and damage the follicles. Remember to use an inclusive assessment approach because false eyelashes are a gendered and racialized beauty trend that can lead to judgement and discrimination.

Ptosis, when bilateral, is common with age due to muscle atrophy around the eye. It can also occur in children; if a child is born with it, the ptosis is typically congenital. Surgery may be considered, particularly if it affects vision.

Note that **eyebrows** change with age: hormonal changes beginning in the 40s can lead to thinning eyebrows (particularly the outer third) in women and more bushy eyebrows and stray hairs in men.

Dry eyes can affect people of all ages, but this condition is common in older adults and people experiencing menopause because the lacrimal apparatus production of tears is reduced. This condition can

also be caused by adverse effects to medical treatment; it can lead to watery eyes, along with erythema and itchiness.

Some clients may have an **ocular prosthesis** (an artificial eye, as shown in **Figure 12**). These are typically made of an acrylic material and customized for a person's eye socket. The quality of these vary, but many look quite real. In the province of Ontario (Canada), the costs are covered by OHIP (see artificial eyes). Explain to clients that prostheses must be removed and cleaned regularly and will require replacement after developmental changes, especially childhood growth spurts.

Figure 12: Ocular prosthesis.

(By MalastiC, from https://commons.wikimedia.org/wiki/File:Colocaci%C3%B3n_Protesis_Ocular_4.jpg, the Creative Commons Attribution-Share Alike 4.0 International license.).

Priorities of Care

Report any abnormal findings to the physician or nurse practitioner.

In certain cases, findings should be reported immediately:

- **New onset of drooping eyelid** could be a potential sign of stroke. Conduct a primary survey and a focused neurological and eye assessment.
- If you observe an **intraocular hemorrhage**, begin with a primary survey, followed by an eye assessment, and sometimes a brief scan of the neurological system.

Loss of eyebrow hair or eyelashes is usually not a major concern. However, if the client is also experiencing

thinning hair or hair loss on their scalp, along with other symptoms such as fatigue and weight change, you should investigate further.

Eye hordeolum and chalazions may be treated by applying warm compresses. If they don't disappear within a few days, you should investigate further.

Pupillary light reflex and accommodation

The pupillary light reflex is used to assess the eye's response to light and innervation of CN II (optic) and CN III (oculomotor) while testing for accommodation assesses the eye's ability to accommodate for near objects and innervation of CN III (oculomotor). These assessments usually begin with the pupillary light reflex (**Video 4**) followed by accommodation (**Video 5**), as described below:

1. To test **pupillary light reflex**, ask the client to look straight ahead at a distant point on the wall behind you (i.e., at the opposite end of the room) to slightly dilate the pupils. If possible, also reduce the lighting in the room to dilate the pupils.
2. First, assess the pupils for shape, equality, and size.
    - Normally, the pupils should be round, equal in size and shape, and sized 2 to 8 mm in diameter **(Figure 13)**. Normal size will depend on the ambient lighting; for example, the diameters of normal pupils are smaller in a well-lit environment (2–4 mm) and bigger in a darker environment (4–8 mm).
    - Abnormal findings may include pupils that are not round, are unequal in size and shape, or are smaller (**miosis**: **Figure 14**) or larger (**mydriasis**: **Figure 15**) than the normal size.

Figure 13: Normal pupil size.
(By Biswarup Ganguly, https://commons.wikimedia.org/w/index.php?curid=10066382, Creative Commons Attribution-Share Alike 3.0 Unported license.)

Figure 14: Miosis.
(By Thomas Bonini, from: https://commons.wikimedia.org/wiki/File:Miosis_caused_by_opium_consumption.jpg, Creative Commons CC0 1.0 Universal Public Domain Dedication)

Figure 15: Mydriasis.
(By Nutschig at the English-language Wikipedia, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=137216882)

3. Ask the client to continue looking straight ahead at the distant point on the wall. Turn on your penlight and move it from the right side of the client to directly in front of their right eye. Shine the penlight on the eye, pause for 1–2 seconds, and then move the light back out to the side: the light should activate CN II to send a message to the brain, and then CN III should send a message to the pupillary muscles causing pupillary constriction.

   When pausing the light on the eye, observe the client's right eye and left eye for pupillary constriction. If necessary, perform this procedure twice so that you can focus on the right eye (for direct response: meaning the pupil of the eye on the side where the light is introduced constricts), and then focus on the left eye (for consensual response: meaning the pupil of the opposite eye where the light is introduced also constricts). Repeat this step for the left eye and observe direct and consensual responses. Also note the size of the pupil afterwards: it should return to the same size as before the light was introduced.

   - Normally, you should see a direct response and a consensual response of both eyes. Normal constriction is often described as prompt or brisk, meaning it happens right away. Normally, when you remove the light, pupils will return to the same size/shape they had before you introduced the light.
   - Abnormal findings include no direct and/or consensual response (response is absent and pupils do not constrict), or when pupillary constriction is sluggish (slow).

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Video 4: Pupillary light reflex test. [0.25 seconds].

4. To test **accommodation**, first ask the client to stare straight ahead at a distant point on the far wall and if possible, have the lights dimmed to dilate the pupils. While they are staring straight ahead, explain that you are going to move your index finger (or your penlight turned off) in front of their nose and slowly bring it closer to their nose. Ask them to shift their gaze from looking at the distant point on the wall to your finger and stay focused on your finger. Next, place your index finger in front of their nose (about 20–30cm from the tip of their nose and slowly move it closer so that it is about 8 cm from the tip of their nose).

    - Normally, the client should shift their gaze to your finger (convergence of the eyes inward) accompanied by pupillary constriction.
    - Abnormal findings include inability to shift eyes simultaneously and lack of pupillary constriction.

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Video 5: Testing for accommodation. [0.37 seconds].

5. Note the findings:

    - **Normal findings** might be documented as: "Pupils round, 3 millimetres, and equal in size. Prompt, direct and consensual light reflex noted bilaterally. When testing for accommodation: pupillary constriction and convergence of eyes noted." (In some institutions, this is sometimes noted as PERRLA: pupils equal, round, and reactive to light and accommodation.)
    - **Abnormal findings** might be documented as: "No direct or consensual light reflex noted bilaterally."

Contextualizing Inclusivity

It can be difficult to evaluate the pupil size and pupillary constriction in clients with dark irises. If necessary, ask them to look up while doing the assessment; this can help. Alternatively, use a second penlight and shine the light tangentially to highlight the iris without causing an unintentional pupillary reflex.

Prioritizing Care

One serious finding is a **"blown" pupil**: the pupil is dilated and also fixed and unresponsive. This condition resembles mydriasis, as shown above in **Figure 15**; it is often associated with brain herniation, meaning the brain tissue shifts due to increased intracranial pressure. Brain herniation can be related to various pathophysiological processes such as brain trauma, stroke, aneurysm, or tumour. New onset of unilateral or bilateral fixed and dilated pupils should be immediately reported to the physician or nurse practitioner: as the nurse you should stay with the client and complete a primary survey.

Anisocoria (unequal pupil size) **Figure 16**, image below, does not require treatment unless it is new onset. Many clients have unequal pupil size, but new onset anisocoria may be of concern because it can be associated with neurological problems, stroke, infection, or eye trauma. Complete a focused assessment and report the findings to the physician or nurse practitioner.

Figure 16: By Tair1978 – Own work, Creative Commons Attribution-Share Alike 4.0 International license, from: https://commons.wikimedia.org/w/index.php?curid=82053909).

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2994#h5p-265

Central Visual Acuity Assessment

Central visual acuity refers to the **clarity** or **sharpness of vision** in the **centre field of view** as a client looks straight ahead. Testing for central visual acuity can assess distance vision (far-away objects, e.g., for driving or reading a chalkboard at school) or near vision (close-up objects, e.g., for reading). Put simply, central visual acuity is the ability to see, and is innervated by CN II (the optic nerves).

Distance vision

Evaluating visual acuity for distance vision is easily assessed using the Snellen eye chart (see **Figure 17**). The **steps include:**

1. In a well-lit environment, have the client stand 20 feet away from the Snellen eye chart. The chart should be placed on the wall at eye level, about 5–6 feet from the floor. If the client uses glasses or contact lenses for distance, they should leave them on/in during this test. Snellen eye charts are also available in 10-feet format; in this case, the client stands 10 feet away from the chart.
2. Ask the client to fully cover one eye with the palm of their hand or an eye occluder if you have one.
3. Ask the client to read as many lines as they can, without squinting, beginning with the top line and reading one line at a time. If necessary, you may point to the line.
4. When the client states they have read as far as they can, ask them to try to read the next line.
5. If they make an error on a line, ask them to repeat the line. Clients may make a maximum of two errors on a line in order for their visual acuity to be identified on that line; if they make more than two errors, their visual acuity is noted as the line above.
6. Note the client's visual acuity using a fraction: the numerator (top number) is the distance the client is standing from the chart and the denominator (bottom number) is the distance at which a person with normal vision can read that line as noted on the Snellen eye chart (Canadian Association of Optometrists, 2023; Porter, 2022). According to the standard Snellen eye chart, normal vision is 20/20, meaning the client can read at 20 feet what a person with normal/good vision can read at 20 feet (Porter, 2022). Record the denominator as the last line the client could read with a maximum of two errors on the line. Record the eye (left or right), how many letters they missed, and whether or not they were wearing glasses or contact lenses (see **Clinical Tip textbox** for more information).
7. Repeat steps 2–6 for the other eye.

    - As noted above, normal visual acuity is 20/20 (Porter, 2022).
    - Abnormal visual acuity can involve cases in which the denominator is bigger, and sometimes where the numerator is smaller. For example, 20/60 means that the client can read at 20 feet what a person with normal/good vision can read at 60 feet. Sometimes a client cannot read any letters at 20 feet: if so, ask them to move closer to the chart (i.e., 10 feet from the Snellen eye chart) and try again. In this case, the numerator would be recorded as 10. As an example, you may report vision as 10/80, meaning that the client can read at 10 feet what a person with normal/good vision can read at 80 feet.

8. Note the **findings**:

    - **Normal findings** might be documented as: "Visual acuity 20/20 -1 in both eyes with contact lenses." (Here, -1 represents the number of letters they missed with each eye.)

- **Abnormal findings** might be documented as: "20/20 -2 in left eye, 20/200 in right eye with no glasses/ contact lenses." (This reflects abnormal findings in the right eye).

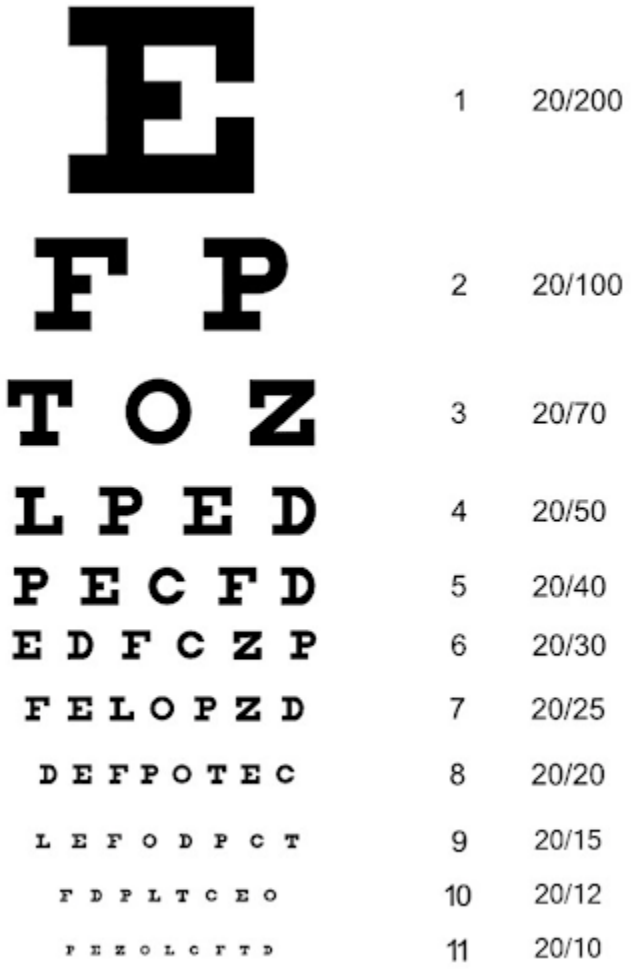

Figure 17: Snellen eye chart.
(By Khex14 – Own work, Creative Commons Attribution-Share Alike 3.0 Unported license, https://commons.wikimedia.org/w/index.php?curid=31308551)

Near vision

You should evaluate visual acuity for near vision if a client reports difficulty or if you observe potential issues. For example, you might observe a client extending their arms to hold a book far away or bringing it very close to their eyes.

There are various near vision eye charts available that have varying size numbers or letters to read (e.g., Rosenbaum pocket vision screener, Runge near card, Jaeger card, **Figure 18**). However, these near vision eye charts have not undergone the same kind of rigorous research as the Snellen eye chart has. Additionally, there have been reported issues such as lack of standardization in terms of font type, font thickness, and letter size progression (Cooke et al., 2019; Horton & Jones, 1997).

Nurses often conduct a basic evaluation of near vision by having the client read a newspaper or book out loud. Use the **following steps:**

1. Ensure the environment is well-lit.
2. If the client uses glasses or contact lenses for near vision, they should leave them on/in during this test.
3. Ask the client to fully cover one of their eyes with the palm of their hand or an eye occluder if you have one and then, hold the reading material about 35–45 cm away from their eyes and read a couple of sentences out loud.
4. Repeat step three with the opposite eye.

    - Normally, clients can read with no blurry vision, no squinting, and no adjustment of the reading material closer or farther away from them.
    - Abnormal findings may include blurry vision, squinting, and adjustment of the reading material by extending their arms or bringing it closer to them.

Figure 18: Near vision eye chart.
"111012-F-ZT401-067.JPG" by Airman 1st Class Brooke P. Beers for U.S. Air Force is in the Public Domain. Access for free at https://www.pacaf.af.mil/News/Article-Display/Article/593609/keeping-sight-all-right/

Clinical Tip

When assessing visual acuity for distance, note the line where the client can read all of the letters with a maximum of two errors.

Example 1: If the client incorrectly identifies two of the five letters on the 20/40 line, this means they were unable to correctly read all of the letters on this line except two. Thus, their visual acuity is noted as 20/40 – 2. Remember, they can make a maximum of two errors on the line where their visual acuity is noted.

Example 2: If the client can accurately read all of the letters on the 20/30 line and only 3 of the 7 letters on the next line (20/25 line), this means they made more than two errors on the 20/25 line. Thus, their visual acuity is noted as 20/30 +3. The +3 refers to the three letters they could read on the next line: the 20/25 line.

Contextualizing Inclusivity

Some clients may be unable to stand due to muscle weakness, fatigue, balance problems, or being in a wheelchair. If so, lower the Snellen eye chart so that it is located on the wall at about their eye level.

Several alternatives are available for young children or individuals who are unable to read letters, including the Tumbling E chart (**Figure 19**) or a chart with pictures.

Figure 19: Tumbling E chart.
(By Tigana chileshe – Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=64435390).

Prioritizing Care

All abnormal findings related to visual acuity should be documented and reported to the physician or nurse practitioner. If a client has visual acuity worse than 20/30, you should refer them to an eye specialist.

However, some abnormal findings require immediate action. For example, a sudden change in vision (e.g., partial or complete loss) is a priority of care and you should immediately notify the physician or nurse practitioner.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2996#h5p-254

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Cooke, M., Winter, P., McKenney, K., Packard, K., Williams, V., Dorsey, E., Szabo, A., Visotcky, A., Warren, C., Wirostko, W., Weinberg, D., Kim, J., & Han, D. (2019). An innovative visual acuity chart for urgent and primary care settings: validation of the Runge near vision card. Eye, 33 (7), 1104-1110. https://doi.org//10.1038/s41433-019-0372-8

Horton, J., & Jones, M. (1997). Warning on inaccurate Rosenbaum cards for testing near vision. Survey of Ophthalmology, 42(2), 169-174. https://doi.org//10.1016/s0039-6257(97)00055-6

Peripheral Vision Assessment

Peripheral vision can be assessed using the **confrontational visual field exam**. This exam can be conducted in several ways including client peripheral vision compared to examiner, the wiggle finger method, and the counting finger method. For each of these tests, move your arm/hand into three of the client's peripheral vision fields as shown in **Figure 20**: superior, eye level, and inferior.

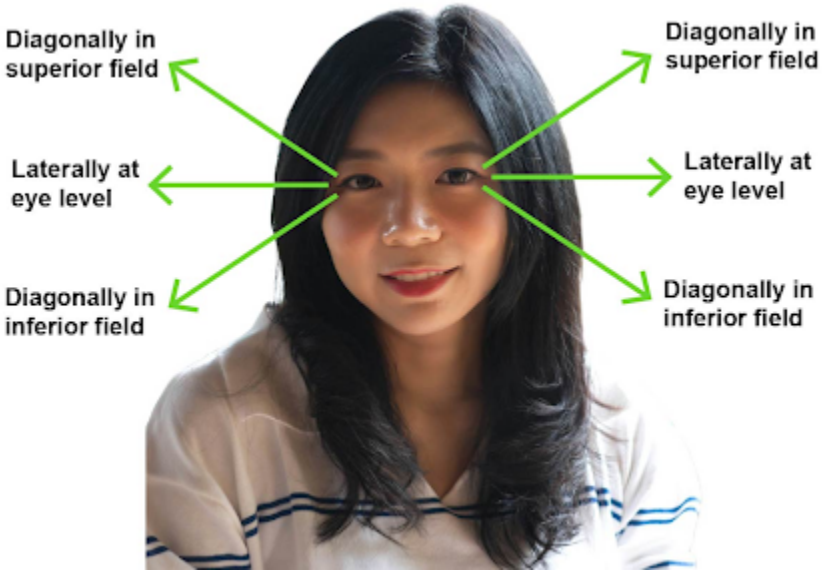

Figure 20: Peripheral vision fields.

Conduct these assessments in well-lit environments with the client's eyes at the same level as yours. Both of you may stand if your eye levels are similar. Alternatively, you can stand and then raise or lower the exam table so that the client's eyes are at the same level as yours.

Ask the client to remove anything that could interfere with peripheral vision such as a hat with a rim. Additionally, if they have a loose head covering, they may need to tighten/tuck it behind their ears. Ask them to look at your face and whether they can clearly see you with no difficulty and no blurring.

Then, **follow these steps** for each of the assessments:

1. **Client peripheral vision compared to examiner:** Stand about one foot away from the client. Cover your own right eye and ask the client to cover their left eye with the palm of their hand and stare directly at your open eye; you will also stare at their open eye. Stretch your left arm/hand out laterally as far as you can and diagonally into the superior field, at the client's eye level, midway between you and the client. Begin to move your arm/hand inward. Ask the client to state "now" when they first see your hand: they should see it at the same time you see it. Repeat this by stretching your arm/hand diagonally into the inferior field and moving your arm/hand inward. Then, repeat a third time with your arm/hand stretched out laterally at the client's eye level, but this time closer to them as opposed to midway between you and the client. Then, repeat the same three steps on the opposite eye.

    - Normally, the client's peripheral vision should equal the examiner's vision. Be aware that the validity of this exam is based on the assumption that you as the examiner have normal peripheral vision, which is about 90 degrees at the superior and inferior field, and a bit greater than this at the eye level.
    - Abnormal findings are when the client has decreased peripheral vision such as less than 90 degrees.

For the Wiggle finger method and the counting finger method, position yourself about 3–4 feet away from the client.

2. **Wiggle finger method:** Ask the client to fixate (focus) on your nose. Stretch both of your arms out to the side, pointed diagonally into the superior quadrants. Wiggle/flex the index finger on one of your hands and ask the client to point to the side that they see your finger moving. Then repeat with your other hand. Repeat the same steps with your arms stretched out to the side laterally at eye level and then out to the side pointed diagonally into the inferior quadrants (**see Video 6**).

    - Normally, the client should be able to identify the correct hand that is moving each time.
    - Abnormal findings are when the client reports not seeing the hand wiggle and/or not being able to identify the correct hand that is moving each time.

One or more interactive elements has been excluded from this version of the text. You can view them online here: *https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=2998#oembed-1*

Video 6: Wiggle finger method. [0.45 seconds].

3. **Counting finger method:** To test the client's right eye, cover your right eye and ask the client to cover their left eye with the palm of their hand and stare directly at your open eye; you should do the same. Now, stretch your left arm/hand out pointed diagonally into the superior quadrant, then laterally out at the eye level, and then diagonally down into the inferior quadrant. In each of these fields, hold up 1–5 fingers (use a different number each time) and ask the client how many fingers they see. Your hand should be midway (equidistant) between you and the client (i.e., not closer to you, nor closer to them) with the palm of your hand facing the client, so they can tell how many fingers you are holding up. Repeat the same steps to test the client's left eye; this time asking them to cover their right eye while you cover your left and use your right arm/hand. See **Video 7** for an example of testing the right eye.

    - Normally, the client should be able to accurately report how many fingers are held up in the superior, lateral/eye, and inferior field on both sides.
    - Abnormal findings are when the client has difficulty seeing the fingers and/or has difficulty or is unable to identify how many fingers are being held up.

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Video 7: Counting finger method for testing the right eye. [0.42 seconds].

4. Note the **findings:**

    - **Normal findings** might be documented as: "Confrontational visual field exam: client able to identify correct numbers and hand wiggling in all three peripheral positions on left and right sides. Client's peripheral vision intact (equal to the examiner's)."

- **Abnormal findings** might be documented as: "Confrontational visual field exam: client unable to see correct numbers displayed by examiner's fingers and examiner's hands wiggling in superior and inferior fields bilaterally. Client's peripheral vision is less than the examiner's."

Priorities of Care

Clients with decreased peripheral vision should be encouraged to see an eye specialist.

However, new onset and sudden loss of peripheral vision such as a dark spot or shadow requires emergency care as these symptoms could be related to a stroke or **retinal detachment**. In these cases, notify the physician or nurse practitioner immediately, stay with the client, take their blood pressure, and perform a primary survey.

Extraocular Eye Movement

The extraocular eye movement is innervated by:

- CN III (oculomotor).
- IV (trochlear).
- VI (abducens)

See **Figure 21** and **Figure 22**.

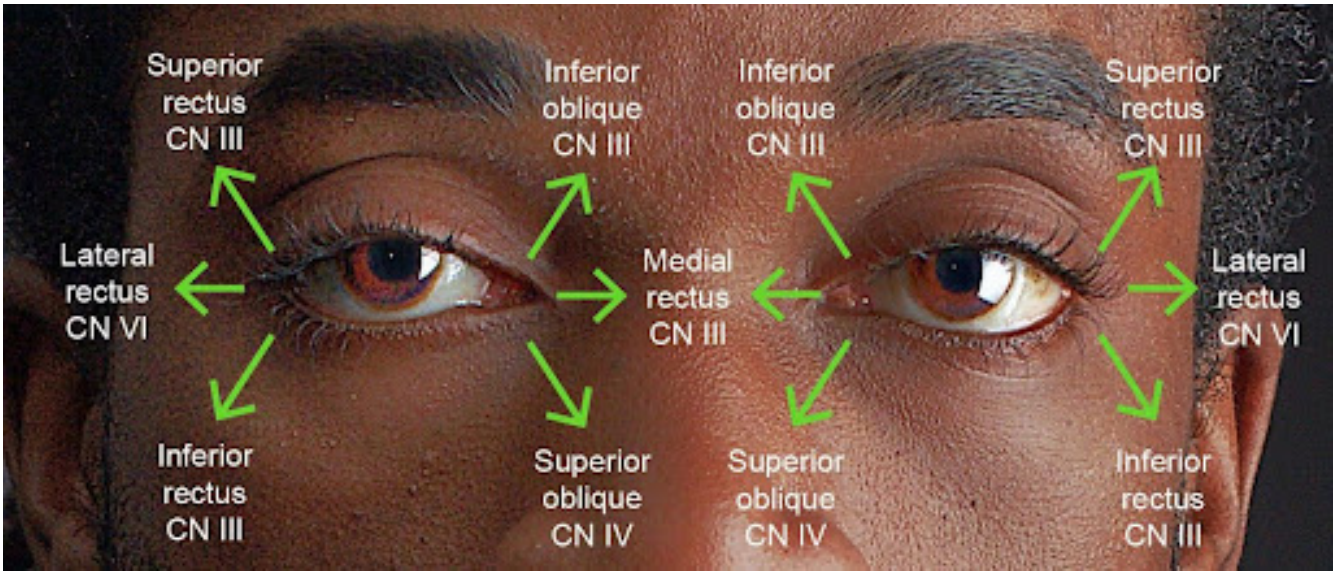

Figure 21: Extraocular movement via cranial nerves. (Illustrator Arina Bogdan)

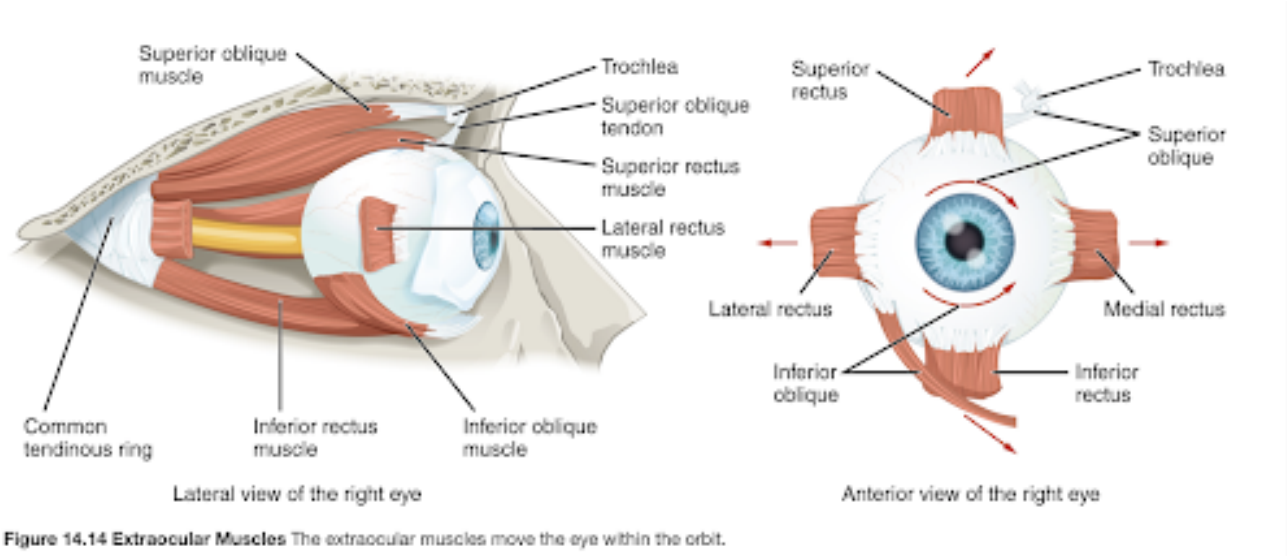

Figure 14.14 Extraocular Muscles The extraocular muscles move the eye within the orbit.

Figure 22: Extraocular muscles.
(J. Gordon Betts, Kelly A. Young, James A. Wise, Eddie Johnson, Brandon Poe, Dean H. Kruse, Oksana Korol, Jody E. Johnson, Mark Womble, Peter DeSaix. (2022). The Muscular System. In anatomy and physiology 2e. OpenStax. CC BY 4.0 license).

Extraocular eye movement can be assessed using the **diagnostic positions test**. Use the following steps:

1. Sit or stand about 3–4 feet (about two arms-lengths) away from the client, at the same level.
2. Ask the client to focus on your nose.
    - Normally, the client's gaze is midline.
    - Abnormal findings include deviation of one of the eyes or both: deviation may involve the eye moving inward, outward, up, or down.
3. Place your index finger straight out in front of you and ask the client to focus on your finger. Instruct the client to keep their head still as they follow your finger with their eyes through the six cardinal positions of gaze; see **Figure 23**). Positions include: diagonally in superior field, laterally at eye level, and diagonally in the inferior field. Move your finger into each of these positions by fully extending your arm: move back to centre each time you move to one of these positions and complete these movements on both sides. Hold your finger in each of these six positions for about two seconds. If the client moves their head, remind them to keep their head still and only follow your finger with their eyes. Ask the client if they experience any double vision. See **Video 8.**
    - Normally, eye movement is smooth, **conjugate**, with no **nystagmus**, and no double vision.
    - Abnormal findings might include **disconjugate movement**, nystagmus, and double vision. Report any abnormal findings to the physician or nurse practitioner for further evaluation.
4. Note the **findings**:
    - **Normal findings** might be documented as: "Smooth, conjugate movement with no double vision."
    - **Abnormal findings** might be documented as: "Disconjugate eye movement, nystagmus of left eye with extreme lateral gaze, and double vision noted by client."

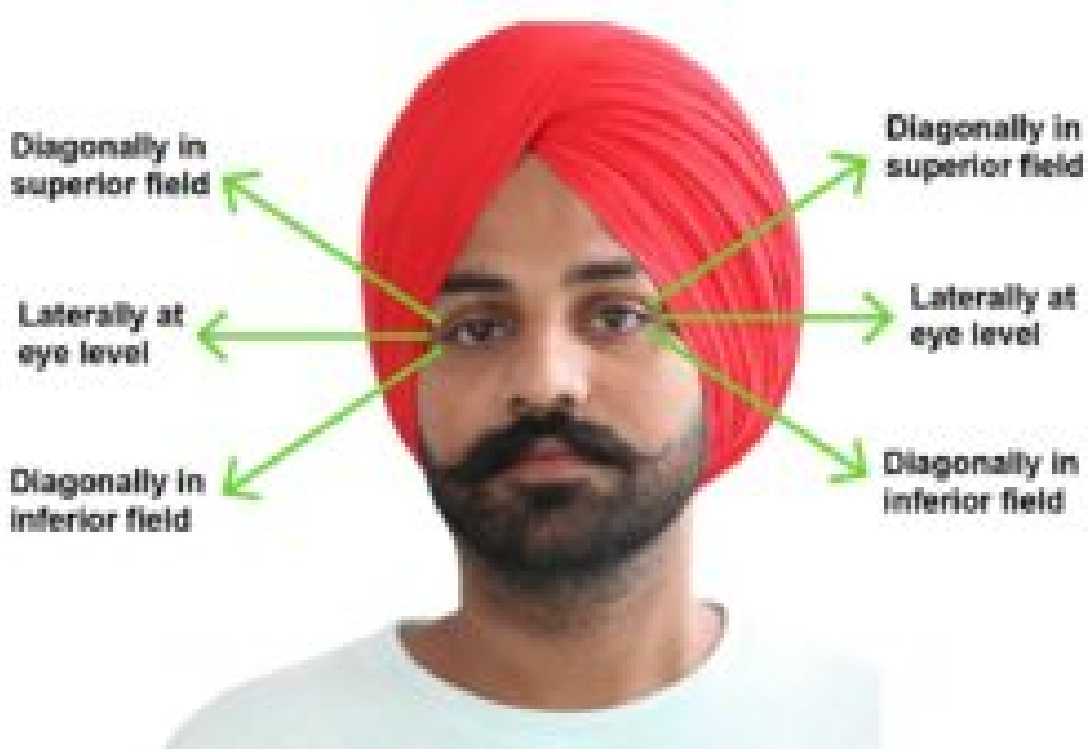

Figure 23: Six diagnostic positions for testing.

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Video 8: Extraocular eye movement test. [0.45 seconds].

Ophthalmoscope Examination

Use an ophthalmoscope examination (see **Figure 24**) to assess the presence of any **ocular opacities**. Assess the ocular fundus (back of the eye) structures such as the retina, the macula, optic disc, and the vasculature (artery and vein; see **Figure 25**).

One component of the ophthalmoscope exam involves assessing the **ocular fundus reflex**. This test was originally – and inaccurately – called the "red reflex" based on the colour of light reflected from the back of the eye in white babies. The ophthalmoscope has a light that is directed onto the pupil to highlight this reflex.

Conduct this assessment with the client standing or sitting on the edge of the examination table. Again, position yourself so that your eyes are at the same level as the client's. If relevant, both you and the client should remove eyeglasses as these can obstruct assessment. The ophthalmoscope has different types of lights: the medium circle is usually sufficient for the purposes of a nursing assessment. Brighter lights are more uncomfortable for clients, so always use the least brightness possible.

Begin by **comparing the ocular fundus reflexes** in the left and right eyes as follows:

1. Ask the client to look straight ahead at a distant point on the wall behind you (i.e., at the opposite end of the room) to slightly dilate the pupils and keep eye structures still. If possible, reduce the lighting in the room to dilate the pupils.
2. Hold the ophthalmoscope in your dominant hand.
3. Look through the viewing aperture as you place the ophthalmoscope against your orbital and cheek bone on your dominant side.
4. You may need to adjust the lens selector dial to focus so the image is clear (if it is your first time, try this out first by focusing on a few objects in the room).
5. Stand 15 degrees lateral to the eye that will first be assessed and place your opposite hand on the client's forehead above their eye, with your arm extended about 30 cm away from the client.
6. Direct the light on the client's pupil and observe the ocular fundus reflex.
7. Then repeat on the other eye so that you can compare.

    - Normally, the ocular fundus reflexes are present in both eyes and are symmetrical in terms of colour and intensity (brightness). Colour varies by pigmentation:
        - Clients who have darker skin colour often have darker reflexes that appear as green or blue.
        - Clients who have medium skin colour often have reflexes that appear as orange to yellow.
        - Clients who have lighter skin colour often have reflexes that appear red to orange. (WE C Hope, 2023).

    - Abnormal ocular fundus reflex findings may include asymmetry in terms of colour and intensity, a dark patch, and/or one or both eyes having an absent/black, dull or white reflex. These findings can be associated with eye conditions such as cataracts, infections, tumours, retinal detachment, hemorrhage, and cornea abrasion. Report all abnormal findings to the physician or nurse practitioner.

8. Note the findings:

    - **Normal findings** might be documented as: "Ocular fundus reflex present in both eyes and symmetrical in colour and brightness."
    - **Abnormal findings** might be documented as: "Ocular fundus reflex asymmetrical, left eye shows whitening of reflex."

The second step in this examination is assessment of the **ocular fundus**. This assessment is usually done by a physician, but nurses may also complete it. Follow steps 1–6 above and then continue to hold the ophthalmoscope against your orbital and cheek bone while slowly moving in and maintaining focus on the ocular fundus reflex until you can view the ocular fundus. This part of the examination involves assessing the optic disc. Normally, it will be round/oval in shape with demarcated boundaries (no blurring) and yellow-orange-pink in colour (no paleness or dark spots). You should also assess the other areas of the fundus, including the retina, retinal vasculature, and macula.

Figure 24: Ophthalmoscope – viewed on the left.
(By James Heilman, MD – Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=4398920)

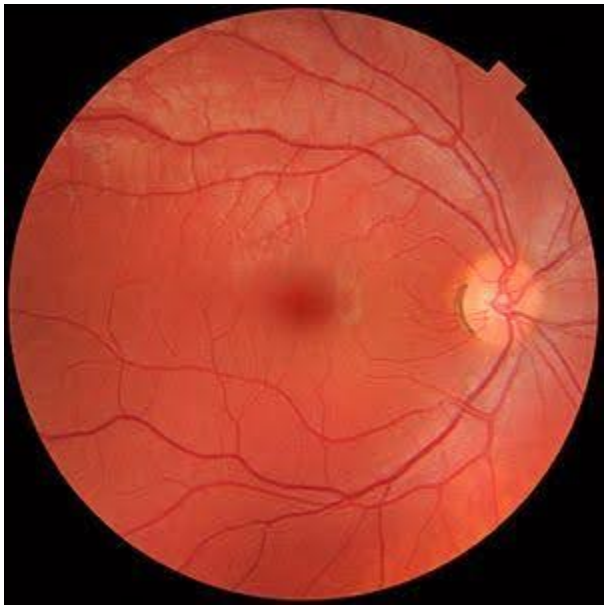

Figure 25: Ocular fundus

(By: Häggström, Mikael (2014). "Medical gallery of Mikael Häggström 2014". WikiJournal of Medicine 1 (2). DOI:10.15347/wjm/2014.008. ISSN 2002-4436. Public Domain. or By Mikael Häggström, used with permission. – Own work)

Contextualizing Inclusivity

The continued use of "red reflex" terminology reflects unconscious bias and a tendency to use the white body as the norm in nursing and medicine. It is important to challenge this racist discourse and use the term "ocular fundus reflex" in order to shift this language and advocate for more inclusive approaches to ophthalmological examinations.

Prioritizing Care

Any abnormal findings related to the ocular fundus reflex or the ocular fundus require specialist examination. Always report abnormal findings to the physician or nurse practitioner.

Activity: Check Your Understanding

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=3002#h5p-258

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Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion and disease prevention strategies for a healthy ophthalmic system need to be appropriate for each specific individual. Carefully consider all the data you have collected, both subjective and objective. Subjective data collection involves asking the client about risk factors, social determinants, and other considerations. This kind of inquiry should be integrated throughout the entire assessment. You will ask many probing questions during the subjective assessment, but you should also formulate additional questions based on critical reflection of the data you have collected during the subjective and objective assessment. Together, these findings will inform your clinical judgement for each specific client and the health promotion needed.

Smoking

Smoking cigarettes and consuming tobacco in any form is a risk factor that can negatively affect ocular health. Smoking is linked to vision loss, blindness, cataracts, and macular degeneration (Brûlé et al., 2018; Government of Canada, 2023). The chemicals in the smoke can damage cells in the eye (e.g., the retina) and decrease blood flow to the blood vessels. Some consider vaping to be healthier, but the American Heart Association (2024) also considers vaping to be unsafe.

Probing questions related to smoking and tobacco consumption may include:

- Do you smoke cigarettes (such as conventional tobacco cigarettes), e-cigarettes/vapes, or use any tobacco-related products? If the client's answer is affirmative, ask probing questions (using their own language): How much do you smoke? How many packages of cigarettes do you smoke a day? How many years have you smoked? Can you tell me about the reasons that you started smoking?
- If the client does not currently smoke or consume tobacco, ask if they have ever done so. If the answer is affirmative, ask similar probing questions as above, including the reason that they quit.
- If the client currently smokes or consumes tobacco, ask if they have ever tried quitting.
    - If the client's answer is affirmative, ask probing questions: Tell me about what made you want to quit? How long did you quit? Did you use any strategies to help you quit?
    - If the client's answer is negative or dissentive, make a non-judgemental comment like: "If you ever want to discuss quitting, let me know, there are many resources to help you."

The effectiveness of health promotion efforts are influenced by client interest and collaborative intervention: both factors are important in producing a successful outcome (in this case, smoking cessation). Each intervention must be tailored to the client, and could include counselling, cognitive-behavioural therapy, pharmacology treatments (e.g., nicotine replacement therapy), smart-phone applications, and short text message services. Sometimes a brief discussion about risks and a recommendation to quit smoking is sufficient. You might also choose to be involved in developing public health educational campaigns and resources about how smoking affects health as a population-based prevention strategy. Nurses and healthcare providers need to educate clients who smoke, as well as non-smokers of the risk of smoking to eye health (Brûlé et al., 2018). Health promotion interventions can include smoking cessation and prevention programs in school, smoke-free community and recreation centres, and age-specific warning labels on cigarette packages. It may be helpful to access training in smoking cessation counseling, such as programs offered by the Centre for Addiction and Mental Health.

Contextualizing health promotion related to smoking from a sociocultural perspective will help you understand who

might be more vulnerable or at risk. For example, smoking is more prevalent among individuals with lower socio-economic status and lower education attainment, and those experiencing racial and ethnic discrimination (Wang & Wu, 2020). These populations are also less likely to have access to resources pertaining to smoking cessation. It is important to consider interventions as they relate to the social determinants of health, rather than using a one-size-fits all approach (Brady, 2020).

Contextualizing Inclusivity

Tobacco plays an important part in traditional and spiritual practices in many Indigenous communities (CAN-ADAPTT, 2010; First Nations Health Authority, 2024). Many, but not all, Indigenous peoples use it for ceremonial and medicinal purposes (CAN-ADAPTT, 2010). Nurses should recognize and distinguish between commercial tobacco/misuse as opposed to tobacco use for healing and ceremony (First Nations Health Authority, 2024). Questions to the client should be culturally sensitive and respectful of these differences (CAN-ADAPTT, 2010).

Diet

A diet rich in antioxidants (vitamins C and E) and nutrients such as lutein, zeaxanthin, zinc, and omega-3 fatty acids are beneficial to ocular health and can help protect eyes from disease (American Academy of Ophthalmology, 2023a; Grant et al., 2022). These vitamins and nutrients can be found in dark leafy vegetables, citrus fruits, nuts, fish, and red meats. Adequate consumption of vitamin B12 and omega-3 monounsaturated fatty acids, also found in fish, are also important to ocular health and vision (Cirone et al., 2023). Therefore, you might advise clients who follow a vegan diet to supplement with vitamins (Cirone et al., 2023). In addition, it is best for clients to choose water on a regular basis and try to reduce their caffeine and alcohol intake.

Probing questions related to diet may include:

- Tell me about your usual diet?
- What have you eaten in the last 24 hours? Is that your usual diet?
- Have you had any recent changes in your life that have affected your diet?
- Do you add sugar and salt to your food?
- How much fluid do you typically drink in a day? What fluids (e.g., water, caffeinated beverages, alcohol)?
- Do you take any supplements? If so, what?

You may want to assess a client's familiarity with Health Canada's (2019) Food Guide and discuss with them how to use it. This is the newest version of the guide, but it still has a Eurocentric bias, so you should collaborate with clients about its relevance in the context of their cultural food practices. In addition to Canada's Food Guide, the Food Guide Snapshot is now offered in dozens of languages, and many resources related to food safety for Indigenous people are also available, such as Healthy Eating and Food Safety for Indigenous Peoples.

Some key elements of Canada's Food Guide are:

- Be mindful of eating patterns.
- Choose water as the drink of choice.
- A dinner plate should be one-half vegetables/fruit, one-quarter protein, and one-quarter whole grains.
- Make time to enjoy eating meals with others.
- Cook when possible, as opposed to eating processed meals and purchasing fast foods.
- Reduce sodium, saturated and trans fats, sugar, processed foods, and monitor portion sizes.

Many types of diets can be healthy, and research suggests that the Mediterranean diet in particular, which emphasizes more plant-based foods and fish, can decrease the risk of age-related macular degeneration (American Academy of Ophthalmology, 2023b; Grant et al., 2022).

Healthy eating is related to behavioural actions but also relational and structural actions. A healthy diet first requires the ability to access healthy food and the financial capacity to purchase it – this is known as food security. The rising cost of food globally has made this a challenge, and in many remote regions of Canada's North access to nutritious food is limited in terms of availability – and even when available, the costs are excessive.

Socioeconomic status is well-known to affect food purchasing. Individuals from socioeconomically disadvantaged communities – those with lower household income and lower levels of education – purchase fewer healthy foods like fruits and vegetables (Turrell et al., 2002). Therefore, health promotion efforts should focus on narrowing socioeconomic differences in food purchasing.

Nurses can work in partnership with individuals experiencing structural, social, and financial barriers, and then tailor a health promotion approach to their particular needs (Turrell et al., 2002). For example, you could direct clients to organizations that partner with vulnerable communities to support access to healthy foods, skill development, and capacity-building in terms of community-led initiatives (Turrell et al., 2002). One example of an innovative initiative to address food security in Toronto, Canada, involves use of mobile food trucks to bring fresh food into local communities. Other examples include community initiatives in the Niagara region of Canada, which are working to address access via partnerships and community gardens. As a nurse, you can also advocate on behalf of vulnerable communities for more effective social policy to address food insecurity (Turrell et al., 2002). It is important to partner with communities and co-create effective strategies to improve access.

Exercise

The eye, its vasculature, and its muscles, benefit from overall exercise and exercise of the eye muscles.

Continuous screen time, such as on the computer, television or videos, can negatively affect ocular health. Prolonged screen time can lead to symptoms including eye strain, dry eyes, heaviness in eyelids, eye redness, blurry vision, sensitivity to light, difficulty focusing, and myopia in children (Trott et al., 2022). Eye exercises can assist in strengthening eye muscles and relieve eye strain. Dr. Valeria Lam discusses eye strain in the video "Why Do Our Eyes Hurt When Looking At Screens?"

Guidelines vary based on age and health, but most recommendations suggest that individuals participate in about 30–60 minutes of aerobic activity, five to seven times per week. Nurses should use a relational and structural health promotion approach when addressing activity. A community of support can promote activity, so you should assess the client's access to support (e.g., friends, family, acquaintances) who may have similar activity interests or goals. A structural approach to health promotion can also help address and eliminate inequities. For example, culturally traditional forms of exercising or even walking outside may not be accessible due to maldistribution of resources. Community infrastructure may lack playgrounds or basketball courts, gym memberships and sports registration fees may be unaffordable, and neighbourhoods may be unsafe. It is important to be aware of these factors and consider them as you partner with clients on activity plans. You may also need to advocate for policies to address these inequities.

Probing questions related to activity may include:

- Tell me about your screen time (e.g., computer, phones, television, videos)?
- What screen time have you engaged in the last 24 hours? Is that your usual amount?
- Do you have any concerns about your level of screen time?
- Do you take physical breaks from screens? What type of breaks do you take?
- Do you have any concerns about your level of activity or exercise?
- Tell me about your daily pattern of activity? What activities are you involved in?
- What exercise do you engage in? How long do you engage in this type of exercise? How many days of the week do you participate in exercise? If the client plays sports, ask about their use of protective equipment, if relevant.

Nurses can educate clients about the effects of prolonged screen time and encourage them to monitor their screen time to promote ocular health. For example, you could draw from the Canadian Association of Optometrists/Canadian Ophthalmological Society Joint Position Statement: Effects of Electronic Screens on Children's Vision and Recommendations for Safe Use to discuss screen time recommendations for children. Also encourage clients to follow the 20-20-20 rule: every 20 minutes, take a 20-second break to focus on something approximately 20 feet away – this helps relax the eye muscles and promote ocular health (Canadian Association of Optometrists, 2023).

Environment

A client's physical environment can also affect their ocular health, so nurses can play an important role in educating clients on how to create a healthy environment. Some elements to consider include sun exposure, engagement in physical activities, and work environments.

You should educate clients about the effects of the sun's ultraviolet (UV) rays, which can increase the risk for cancer, cataracts, **pterygium**, and **photokeratitis** (American Academy of Ophthalmology, 2020). Encourage clients to monitor their time in the sun, avoid looking directly at the sun, and be aware of the importance of wearing UV-blocking sunglasses and brimmed hats to protect their eyes from direct sunlight.

Another risk factor is eye injuries during sports, activities, or certain work situations. Advise clients to use appropriate eye equipment to decrease the risk of damaging the ocular structures and vision when engaging in activities and sports such as racquetball, hockey, cycling, and swimming. Some work environments require eye goggles due to potential contact with various elements such as chemicals, projectile objects, bloodborne pathogens, and/or microorganisms; these employees may include gardeners, construction workers, welders, and healthcare providers.

Nurses can also be involved in larger structural approaches involving education campaigns, healthy social policy, and scientific research related to the environment.

Probing questions related to the physical environment may include:

- Tell me about your sun care routine? What sun preventative strategies do you use (e.g., sun glasses, brim hats)?
- Do you wear eye protection when playing sports, activities, or at work? What type of eye protection do you use?
- Do you have access to eye protection at work?

Hygiene

Hygiene practices are another important element of promoting eye health and preventing eye conditions. Regular handwashing is important, especially in healthcare and work settings, when returning home, prior to making and eating food, and before and after using the washroom. Tell clients to wet their hands with water, lather with soap for 20

seconds, rinse and dry their hands, and then turn off the tap with their elbow or a paper towel. Consider ways to make this fun for children: you could tell them to sing a song that lasts 20 seconds, like Happy Birthday.

Advise clients to avoid touching their eyes and when necessary, to wash their hands first. Encourage them to avoid sharing towels and cosmetics including make-up, and when applicable, to take proper care of contact lenses. Keep in mind that there are many types of contact lenses: some are used to address a refractive error whereas others are used for aesthetic reasons. Some lenses are not approved by regulatory bodies such as Health Canada and may pose a risk to the eyes because of the material used; they can cause corneal abrasions and infections. Also be aware that the lens colour may be used to change the eye colour so the iris might not be reflective of the person's true iris colour.

Probing questions related to handwashing and immunization may include:

- Tell me about when you wash your hands?
- What is involved in washing your hands? What are the steps involved? How long do you do it for?
- If the client wears contact lenses, ask: Tell me about the reasons you wear them? At one time, how long do you wear them for? Tell me about the process you use to insert and remove them? How do you store and clean them?

Contextualizing Inclusivity

Some clients may lack continuous access to running water and soap, so you should brainstorm with these clients about how to perform hand hygiene. Depending on the client's circumstances, for example those who are unhoused, this may include finding public spaces with washrooms or accessing a shelter. In some regions and countries, continuous running water is not part of the daily reality (Esrich, 2020). The Water Project presents ways to construct tippy taps and leaky tins as alternatives to help with this (Esrich, 2020).

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Clinical Judgement: Case Study

A 51-year-old client presents with loss of vision in their right eye. The client's peripheral vision suddenly began to decrease early this morning and has become progressively worse. The client describes blurred vision with dark spots and the sensation that a dark curtain-like shadow emerged from the side of the affected right eye and is now affecting the vision. The client stated they noticed flashing lights and floaters the previous day. The client has no pain or headache. Heart rate 96 bpm, respiration rate 20 bpm.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=3006#h5p-259

Key Takeaways

- The main components of the ophthalmic system are the eyelids, eyebrows, pupil, iris, sclera, lens, cornea, conjunctiva, extraocular eye muscles, retina, and nerves.
- Common symptoms that can be related to the ophthalmic system include vision impairments, eye pain or strain, discolouration, pruritus, swelling, lesions, discharge, and dry, or gritty eyes.
- An objective assessment of the ophthalmic system includes a brief scan, external eye assessment and anterior eyeball assessment, central visual acuity assessment, peripheral vision assessment, extraocular eye movement, and ophthalmoscope examination.
- Health promotion interventions should be developed in collaboration with the client and focus on what is important to them.

Glossary

12-lead electrocardiography

is a non-invasive test that involves attaching sticky patches on the client's chest which records the heart's electrical activity from 12 different viewpoints (often referred to as an ECG).

nitroglycerin

is a medication that acts to dilate/expand blood vessels so that oxygenated blood is more easily perfused to the heart muscle, which thus reduces cardiac pain caused by hypoxemia.

anaphylaxis

is a severe and life-threatening allergic reaction.

ascites

is the accumulation of fluid in the peritoneal cavity.

atherosclerosis

is a build up of plaque on the arterial walls.

blood clot

is an opioid narcotic that is used in acute settings to treat cardiac pain and has a vasodilation effect, thus allowing oxygenated blood to perfuse to the cardiac muscle more easily.

cancer

refers to a group of diseases that can affect any part of the body and involves abnormal cell growth.

cardiac ischemia

a deficit of oxygen-rich blood to the cardiac muscle.

cleft lip

is a congenital split in the lip.

cleft palate

is a congenital split in the palate.

client safety

Client safety is the reduction and mitigation of preventable unsafe acts and practices during the process of healthcare.

constipation

refers to decreased frequency in bowel movements (BM) (i.e., less than three times per week) and difficulties in having a BM (i.e., having to strain to push stool out, hard stool).

deep vein thrombosis

is the formation of a blood clot in one of the deep veins.

electrolyte imbalances

refers to high or low levels of electrolytes in the body such as potassium, sodium, and calcium.

gender non-conforming

refers to people who do not follow other people's ideas or stereotypes about how they should look or behave based on the sex they were assigned at birth.

hemorrhoids

are swollen and enlarged veins in the lower part of the rectum that are sometimes visible around the anus.

hepatitis

refers to inflammation of the liver. There are many types related to viruses (viral hepatitis e.g., hepatitis A, B, C), medications/drugs/alcohol, or autoimmune conditions.

hernias

refer to an organ that pushes through a weakened muscle or gap in the muscle/tissue that is supposed to hold the organ in place, resulting in an abdominal protrusion.

hypercapnia

refers to high blood levels of carbon dioxide.

ileus

refers to the lack of intestinal peristalsis movement (contraction of the muscles) in which the intestines stop moving contents through the passageway.

irritable bowel syndrome

a functional disorder of the bowels that affects the function, not the structure, leading to pain, bloating, gas, diarrhea, and constipation.

morphine

is an opioid narcotic that is used in acute settings to treat cardiac pain and has a vasodilation effect, thus allowing oxygenated blood to perfuse to the cardiac muscle more easily.

Nocturia

is increased urination or the urgent need to urinate at night.

older adults

The definition of older adult varies, but is typically 65 and older.

pericarditis

is inflammation of the pericardium (tissue surrounding the heart).

proton pump inhibitors

are a type of medication that reduces acid secretion, often used in combination with antibiotics to treat ulcers in the presence of H. pylori.

sickle cell crisis

is acute pain associated with sickle cell disease, an inherited red blood cell disorder.

stridor

is a high-pitched breathing sound typically heard upon inspiration and associated with a partially obstructed airway.

systemic oppression

also referred to as institutional oppression, is when established customs and practices reflect and produce mistreatment and inequities based on a person's membership in a social group.

ulcers

are sores on the lining of the GI system, usually the small intestine, stomach, and sometimes the esophagus and mouth.

valve stenosis/prolapse

refers to a narrowing of one of the valves in the heart or when the valve does not close completely and bulges backwards into the atrium or ventricle leading to regurgitation/leaking of blood backwards.

A cultural humility approach

refers to a life-long journey in which you are humble and open to the cultural perspectives and experiences of others (Greene-Moton & Minkler, 2020).

Ableism

is prejudice and discrimination against disabled people.

abnormal findings

are findings of concern because they are not normal and not consistent with a client's age, developmental stage, and sex.

achondroplasia

is a rare genetic bone disorder resulting in short stature

adipose tissue

refers to fat tissue.

adolescent

Adolescents are ages 12 to 17.

affect

refers to a person's outward expression of their emotional state such as their facial expression.

Ageism

is prejudice and discrimination against individuals and groups based on age, usually older age.

alopecia

is hair loss.

Amblyopia

is sometimes referred to as lazy eye and involves image suppression from the affected eye meaning that the brain relies on the unaffected eye's vision. One main cause is strabismus.

analgesics

are medication to relieve pain such as acetaminophen or ibuprofen (commonly known as Tylenol and Advil)

anaphylaxis

is a severe and life-threatening allergic reaction.

aneurysm

is an enlargement or ballooning of the vessel. Aneurysms can rupture, which is a life-threatening situation due to bleeding.

angina

is a type of chest pain caused by a reduction in oxygen-rich blood flow to the heart muscle.

arteriosclerosis

refers to arteries that become hard and stiff, and thus less elastic.

arthrocentesis

involves aspiration of fluid from a joint.

articular cartilage

is flexible connective tissue covering the end of bones in synovial joints and help the bones glide over one another.

ascites

involves the accumulation of fluid in the peritoneal cavity.

aspiration pneumonia

is a pulmonary infection as a result of food, fluid, saliva, or vomit breathed into the airways and lungs.

asthma

is a chronic disease which involves inflammation, bronchospasm, and narrowing of the bronchial tubes leading to dyspnea and wheezing.

Astigmatism

is an irregular-shaped cornea/lens that results in close-up and distant objects being seeing as out-of-focus (not as sharp) and appearing blurry.

ataxia

refers to disorganized movement such as staggered gait or impaired fine motor skills.

atelectasis

is a partial collapse of lung when the alveoli become deflated usually caused by shallow breathing following surgery, blocked airways, or insufficient surfactant.

atherosclerosis

is a build up of plaque on the arterial walls.

atrophy

refers to decreasing in size or commonly referred to as wasting.

Atypical nevi

is a mole with irregular features.

auras

are visual disturbances (e.g., seeing spots, starts), sensory changes (tingling, numbness), and speech problems.

avulsion

is when the nail is lifted off the nail bed either partial or completely.

Bag-mask-ventilation

refers to a mask that fits over the mouth/nose during an emergency situation and is attached to a self-inflating bag with 100% oxygen that is squeezed to ventilate the lungs.

basal cell carcinoma

is a type of skin cancer, commonly found on the face.

baseline

refers to a starting point before any intervention.

benign

refers to something that is mild, non-invasive and doesn't spread (i.e., non-cancerous)

bilirubin

a substance that the body produces when breaking down red blood cells.

biomarkers

refer to objective characteristics that can be measured as an indicator of a condition or disease. These can be molecular, histologic, radiographic, or physiological characteristics such as blood tests, x-rays, and vital signs.

blood clot

is a gel-like clump of blood.

blood clots

gel-like clumps of blood.

brain lesion

is an abnormal occurring area in the brain.

brain tumours

are abnormal growth of cells that multiply uncontrollably.

Brian Sinclair

was an Indigenous man who was sent to the hospital for a treatable bladder infection and died while waiting for care in the emergency waiting room.

bronchitis

is an acute or chronic condition causing inflammation of the bronchial tubes typically caused by infection or smoking.

bronchospasm

refers to muscles surrounding the airways spasm/contract.

bruxism

refers to the clenching of the upper and low teeth and grinding.

café-au-lait spots

is dark brown pigmented skin/spot present at birth.

cancer

refers to a group of diseases that can affect any part of the body and involves abnormal cell growth.

care partner

Care partners are family and friends who are involved in helping to care for the client.

care partners

Care partners are family and friends who are involved in helping to care for the client

carotid stenosis

is the narrowing of the carotid artery.

cataracts

are when the eye's lens becomes cloudy resulting in symptoms such as blurred vision. Often caused by the breakdown of proteins in the eye that happens at the age of 40 to 60 and older.

cephalocaudal

an approach that moves from head down to the toes.

cephalocaudally

is a head to toe approach.

cerebellum

is a structure located at the back of the brain underneath the occipital and temporal lobes of the cerebral cortex and is responsible for actions such as balance, posture, and coordination of voluntary movements.

cerebral aneurysms

is a weakened blood vessel in the brain that bulges out like a balloon.

cerebrospinal fluid leak

is when cerebrospinal fluid (clear liquid surrounding the brain and spinal cord) leaks through a tear or hole and is often associated with a headache.

cerebrovascular accidents (stroke)

are when the vascular supply to part of the brain is blocked or when a blood vessel in the brain leaks or bursts.

cerumen impaction

refers to the accumulation of ear wax in the ear canal.

chalazia

small red and swollen bumps, sometimes painful, caused by blocked oil glands that clog up.

cherry angiomas

are red, benign growths on skin made of blood vessels.

Cheyne–Stokes respiration pattern

is fast, shallow breathing followed by slow, deep breathing with periods of apnea.

children

Although legally anyone 17 and under is considered a child, the term is usually reserved for ages 1-11; thus, it includes toddlers, preschoolers and middle childhood.

Chronic headaches

often categorized as 15 or more days per month lasting three months or longer.

chronic obstructive pulmonary disease

is a restrictive and inflammatory disease (including emphysema and bronchitis) that affects both the airflow in and out of the lungs, typically caused by smoking.

cisgender

refers to person whose gender identity aligns with their sex at birth

client safety

Client safety is the reduction and mitigation of preventable unsafe acts and practices during the process of healthcare.

coalescing

come together/combine.

collaborative interventions

Interventions that are developed with the client, not for the client.

colour vision deficiency

is the reduced ability to see colour or distinguish between colours, sometimes referred to as colour blindness.

conjugate

refers to eyes moving together (in unison).

conjunctivitis

a condition when the sclera and the area around the eye becomes red, sometimes it is infectious.

consistency

refers to the degree of density or firmness.

consolidation

is when the air-filled spaces of the lungs are filled with fluid or abnormal tissue.

constipation

refers to decreased frequency in bowel movements (BM) (i.e., less than three times per week) and difficulties in having a BM (i.e., having to strain to push stool out, hard stool).

contagions

are microorganisms transmitted by close contact (direct or indirect).

contractures

are abnormal shortening of muscles that cause temporary or permanent limited ROM and sometimes the impossibility to move the joint. They are often caused by lack of use related to atrophy (wasting away of tissue and muscle), scar formation from injury, or chronic disease.

contraindicated

in reference to solutions/interventions, refers to solutions and interventions that should not be used because they may be harmful.

contusions

is a discoloration of the skin from damage to the tissue below (bruise).

COPD

is a restrictive disease that affects both the airflow in and out of the lungs.

corneal reflex

refers to bilateral blinking (corneal reflex) when a stimulus is applied to the edge of the cornea.

coronary artery disease

is a disease that affects the coronary arteries (the arteries that deliver blood to the heart muscle). It involves narrowing or blockage of the arteries, often caused by atherosclerosis.

coronaviruses

are a large family of various types of infectious viruses such as COVID-19.

costal cartilage

connects the sternum to the ribs and helps with motion to expand the chest during respiration.

crepitation

is an abnormal grating or crunching sound or sensation felt and heard over joints.

crepitus

an acute condition related to subcutaneous emphysema in which air shifts out of the lungs and into the subcutaneous tissues.

critical care response team

is an interdisciplinary group of practitioners trained in critical care and have expertise in assessing and intervening during code or pre-code situations when a client is deteriorating.

critical care response team (CCRT)

is an interdisciplinary group of practitioners trained in critical care and have expertise in assessing and intervening during code or pre-code situations when a client is deteriorating.

critical findings

are findings that require prompt and immediate action to prevent clinical deterioration or intervene when a client is deteriorating.

cues

are a sign or symptom that prompts an action such as an abnormal finding that signals a potential concern.

cultural humility approach

refers to a life-long journey in which you are humble and open to the cultural perspectives and experiences of others (Greene-Moton & Minkler, 2020).

cultural safety

Creation of safe spaces for clients to interact with health professionals without judgment, racial reductionism, racialization, or discrimination.

cutaneous

a term indicating something related to the skin.

cutaneous cysts

are encapsulated sacs under the skin filled with material, fluid or gas.

cyanosis

a discolouration that can appear as a grey/white shade with people of darker skin tones and a dusky bluish/purple shade in people with yellow and lighter skin tones, often visualized in the extremities (fingertips, toes, palms of hands, and soles of feet), conjunctiva and circumoral (around lips) and mucous membranes. Often caused by lack of oxygen in the blood and issues with tissue perfusion caused by conditions related to the respiratory, cardiovascular, and peripheral vascular systems.

cystic fibrosis

is a progressive genetic disease that primarily affects the lungs and digestive system, involving thick mucous production and persistent lung infections.

deep vein thrombosis

is the formation of a blood clot in one of the deep veins, usually a leg.

defecation

refers to the excretion of the body's indigestible contents through the anus in the form of feces.

deformities

are abnormal malformations of the body.

degenerative disc disease

is when one or more discs between the vertebrae of the spinal column wear down/deteriorate

delirium

is an acute change in cognitive status.

demyelination

is a process when the myelin sheath surrounding nerves becomes damaged and is destroyed.

dental cavities

are tiny openings onto the hard surface of the teeth caused by decay.

dermatome

is an area of the skin that follows a single spinal nerve root.

dermatomes

are areas of skin innervated by specific nerves.

desaturation

refers to the dropping of oxygen saturation via pulse oximetry.

deteriorate

refers to a patient's health/condition getting worse.

Diabetes

is a disease that affects insulin production or effective use of insulin, a hormone required to regulate blood glucose (sugar).

diabetes-related neuropathy

is nerve damage caused by diabetes resulting in symptoms such as pain, burning and tingling.

diabetic retinopathy

a disease caused by diabetes in which high blood sugar levels damage the retina's blood vessel resulting in vision impairment such as dark spots floating across the eyes, blurred vision, and vision loss.

diaphoresis

refers to excessive sweating.

diastole

is the cardiac phase when the heart's chambers are at their lowest pressure and filling with blood.

dicrotic upstroke

is an abnormal double beat of the carotid artery.

Diplopia

is double vision in which two of the same image are seen.

disconjugate movement

refers to when eyes do not move together (in unison), but rather one eye moves in a different direction than the other eye.

discrimination

refers specifically to actions against a person or community/group of people based on the group/category that they belong (e.g., race, gender, socioeconomic status).

disposition

refers to a person's general mood or attitude.

diuretics

are medications that help the heart pump better and reduce blood pressure by reducing fluid buildup in the body and increase urine output.

drape

A small sheet that is used to cover a person.

Duchenne muscular dystrophy

is a progressive disorder resulting in muscle degeneration and weakness with onset beginning in early childhood

dysarthria

is a neuromotor impairment in speaking in which clients have difficulty saying or forming a word and the strength and speed of speaking.

dysesthesia

is an abnormal sensation, such as burning, stinging, tingling, prickling, itching.

dysphagia

is an impairment in swallowing (ie., difficulty or trouble swallowing).

ear barotrauma

is ear damage that occurs because of a pressure difference in between the middle ear and the atmospheric air leading to pressure, pain, and sometimes hearing loss.

eczema

is a skin condition that causes dry skin and inflammation.

Edematous

or edema refers to swelling that occurs from excess fluid in the interstitial space.

electrocardiogram

refers to a non-invasive test where electrodes are attached to the chest and sensors detect the heart's electrical activity which is recorded on graph paper. This test aids in the diagnosis of cardiac issues such as a myocardial infarction.

emphysema

is a lung condition in which the alveoli become damaged and rupture, typically caused by smoking, and leading to hypercapnia.

enamel

is the hard and shiny surface that covers and protects the teeth.

erosions

is a breakdown of the top layer of skin/skin loss.

erythema

is a reddening or darkening of skin: with darker skin tones, erythema may appear reddish/purple in colour; with very dark skin tones, it may be difficult to visualize; and with lighter skin tones, erythema is typically dark pink to red.

exacerbate

To worsen or increase in severity

exudate (pus)

is fluid seeping from a lesion.

fasciculations

are involuntary and random twitching-like movements that aren't rhythmic.

fecal incontinence

is the involuntary release of stool.

fibromyalgia

is a chronic condition that causes pain and discomfort all over the body as well as fatigue.

First-hand

is the direct inhalation of smoke by the person smoking.

fixed pupils

refers to pupils that are non reactive to light.

flaccid/atonic

refers to muscles that have no resistance and no tone.

flat affect

refers to no emotional expression.

Floaters

are small dots or wiggly lines that move across a person's vision. They are composed of cellular debris within the eye's vitreous.

focused assessments

Assessments specific to a health issue and usually limited to one or two body systems.

fontanelles

are soft spots on the newborns head where the cranial bones have not yet fused together, allowing for movement of the bones during delivery and brain growth in the first year.

food security

is when all people have financial and physical access to a sufficient amount of healthy food (FAO, IFAD, UNICEF, WFP and WHO, 2021).

functional assessment of ROM

is the required ROM for someone to function in their activities of daily living.

gait

refers to balance and movement of limbs while walking.

gangrene

is the death of tissue that can occur when there is insufficient oxygen supply.

gastroesophageal reflux disease

is when acidic stomach contents leak from the stomach back into the esophagus.

gender incongruence

refers to when a person's gender identity is not congruent or does not align with the gender they were assigned at birth (Claahsen - van der Grinten et al., 2021).

gender non-conforming

refers to people who do not follow other people's ideas or stereotypes about how they should look or behave based on the sex they were assigned at birth.

glaucoma

is the build-up of fluid and intraocular pressure that damages the optic nerve resulting in blindness.

gritty eyes

refers to the sensation that there is some sort of grit or sand in the eyes.

guarding

refers to tense abdominal muscles as a result of nervousness, pain, cold room temperature or hands of the nurse, or ticklishness.

Halos around lights

are colourful circles (like a rainbow) around light sources such as a streetlight.

health equity

is when all individuals have fair access to resources that they need and fair opportunity to reach their full potential and optimal health and well-being (Public Health Ontario, 2023; WHO, 2023).

health history

A term often used in reference to, or in place of, the complete subjective health assessment.

health predispositions

are tendencies to suffer from a particular genetic condition

heart failure

a condition that involves a weakening of the heart muscle affecting its ability to contract and pump out sufficient stroke volume.

heartburn

is a burning sensation felt behind the sternum that develops after eating and is aggravated when in supine position.

Hematemesis

refers to blood in vomit.

hemodynamic instability

a clinical state in which circulatory perfusion is compromised.

Hemoglobin A1c

is a blood test that measures the amount of sugar (glucose) attached to hemoglobin giving a sense of the average glucose levels over the last three months.

hemopoiesis

refers to blood cell formation.

hemorrhage

refers to bleeding from a damaged blood vessel, when severe it can cause hypovolemic shock with signs of tachycardia and hypotension.

hemorrhoids

are swollen and enlarged veins in the lower part of the rectum that are sometimes visible around the anus.

hemosiderin staining

is a patch of skin where broken down hemoglobin are stored.

hepatitis

refers to inflammation of the liver. There are many types related to viruses (viral hepatitis e.g., hepatitis A, B, C), medications/drugs/alcohol, or autoimmune conditions.

hernias

refer to an organ that pushes through a weakened muscle or gap in the muscle/tissue that is supposed to hold the organ in place, resulting in an abdominal protrusion.

High-pitched sounds

High-pitched sounds are sounds with a high frequency that resemble a shrill or a piercing, sharp scream.

hordeolum

are small, red, and painful bumps on the eyelid often caused by bacterial infections (commonly called styes).

hypercapnia

refers to high blood levels of carbon dioxide.

Hyperopia

is farsightedness meaning that close-up objects are blurry

hyperpnea

is rapid and deep breathing.

hyperthyroidism

is a disease involving an overactive thyroid gland leading to high levels of thyroid hormone in the blood.

hypoxemia

refers to low levels of oxygen in the blood.

hypoxia

refers to low levels of oxygen in tissues and organs.

ideology of choice

refers to the belief that people have choice and choose their health outcomes.

ileus

refers to the lack of intestinal peristalsis movement (contraction of the muscles) in which the intestines stop moving contents through the passageway.

impulses

are movements visualized on the chest wall.

indicated/effective

, in reference to solutions/interventions, refers to solutions and interventions that are suggested as a desirable or necessary course of action.

infants

Infants are 0 -1 year old.

intercostal retractions

are when the intercostal muscles are pulled inward when breathing.

intercostal tugging/pulling/retractions

are when the muscles in between the ribs are sucked inward when breathing.

internalized powerlessness

is when an oppressed person/group internalizes the beliefs of the advantaged group or the group in power, making them feel like they have no power.

interstitial space

is the area that surrounds the vasculature and the body's tissues and organs in which fluid passes back and forth between capillaries and the tissue.

intraluminal

are valves within the veins.

intraluminal valves

are valves within the veins.

ipsilateral

refers to same side.

irritable bowel syndrome

a functional disorder of the bowels that affects the function, not the structure, leading to pain, bloating, gas, diarrhea, and constipation.

ischemia

is a deficit of oxygen-rich blood to tissue.

isometric muscle contraction

is a muscle contraction without movement such as tightening the muscle.

Joyce Echaquan

was an Indigenous woman who was not provided effective care for pain and died from pulmonary edema. https://pressbooks.library.torontomu.ca/assessmentnursing/chapter/inclusive-health-assessments-with-indigenous-clients/

labile affect

refers to rapid and exaggerated changes in mood.

labyrinthitis

is inflammation of the labyrinth in the inner ear, can lead to hearing loss and vertigo.

laceration

is a cut or tear in the nail.

language discordance

is when you (ie., the nurse) and the client do not speak the same language.

lentigo

is a small patch of skin that is darker than surrounding skin.

Lentigo/lentigines

are flat, irregular shaped macula that are slightly darker than the client's normal skin colour and found on sun-exposed areas of the body.

lesions

A general term referring to an abnormal appearance or growth.

limbus

refers to the border between the cornea and the sclera, looks like a darker ring around the iris.

lipid panel

is a blood test that measures lipids (fats) in the blood stream.

lobectomy

is the surgical removal of one of the lobes of the lung.

Low-pitched sounds

Low-pitched sounds are sounds with a low frequency that resemble a booming drum or a person with a deep, low voice.

lupus

is an autoimmune disease that causes inflammation.

lymphadenopathy

refers to diseases of the lymph nodes resulting in enlarged lymph nodes.

lymphatic vessels

are a network of vessels throughout the body similar to the vascular network.

lymphedema

refers to swelling in interstitial spaces (usually in the arms and legs) as a result of conditions that obstruct or puts pressure on the lymphatic vessels and/or lymph nodes such as cancer treatments (e.g., radiation, lymph node removal), obesity, and physical trauma such as fractures.

lymphomas

are cancers of the lymphatic system that begin in the lymphocytes (white blood cells).

macular degeneration

refers to damage to the macula in the back of the eye (retina) that results in the loss of central vision.

malformations

are faulty formations of a structure such as body tissue or organs.

malignant

refers to abnormal cell division (i.e., cancer).

malleoli

is the bony prominence on each side of the ankle.

measles

are a highly infectious viral infection characterized by a fever and a rash.

mechanism of injury

refers to the method or cause of trauma to the musculoskeletal system.

melanin

a substance that produces pigment and typically the more that is produced the darker the skin.

melanoma

is an aggressive and severe type of skin cancer.

Ménière's disease

is an idiopathic disease that involves an abnormality in the labyrinth of the inner ear causing symptoms such as vertigo, balance issues, hearing impairment, and tinnitus.

migraine

is a specific type of headache that is typically reoccurring and described as throbbing and pounding. It can last hours or days. Additionally, migraines have associated symptoms such as nausea, vomiting, visual auras, and sensitivity to noise, light, and smells. Although the cause of migraines is not clear, triggers vary from person to person, and can include stress, lack of sleep, dehydration, weather changes, and food/drinks such as alcohol, caffeine, cheese, and chocolate.

migraines

are a neurological condition often described as throbbing, pulsating, and pounding intense headaches with associated symptoms such as nausea and vomiting, sensitivity to light, noise and smell, and auras.

miosis

refers to excessive constriction of pupil.

mitral regurgitation

refers to when the valve does not fully close and blood flows backwards.

morbidities

refers to having more than one disease or condition.

motor system

includes central and peripheral structures in the nervous system that supports the planning and executing of simple and complex motor functions such as movement.

movement disorders

are neurological disorders that affect movement resulting in increased, decreased, and altered movement. For example, dystonia is characterized by involuntary muscle movements such as contractions and tremors as well as painful muscle cramps.

mydriasis

refers to excessive dilation of the pupil.

Myopia

is nearsightedness meaning that distant objects are blurry.

nasal polyps

are benign growths lining the nasal cavity or sinuses.

nausea

is an uneasiness in one's stomach in which one feels like they may vomit.

neoliberal

in the context of healthcare, refers to an emphasis on personal autonomy and individualism.

neoplasms

an abnormal growth.

neurodegenerative disorders

are diseases and conditions that damage and progressively destroy parts of the nervous system.

neurodiverse conditions

is an umbrella term referring to various conditions that affect a person's brain processes affecting how they learn and behave (e.g., autism, dyslexia, attention deficit hyperactivity disorder).

nevi

is a mole.

nitrates

are nitrogen-based chemicals found in some foods such as in some processed meats, wine, and chocolate.

nociceptors

are sensory neurons that mediate pain.

nodules

are a general term referring to any lump.

non-binary

refers to people who feel their gender cannot be defined based on the gender binary.

nonessential

in reference to solutions/interventions, refers to solutions and interventions that are not needed and not absolutely necessary.

normal findings

are findings that are not of concern and expected for a client's age, developmental stage, and sex.

nystagmus

is repetitive, involuntary eye movement in which the eye looks like it is quivering and can move up-down, side-to-side or in a circular motion.

objective

are information that is collected when performing a physical exam.

objective data

Information that the health professional collects when performing a physical exam.

ocular fundus reflex

is the reflection of the ophthalmoscope light from the back of the eye.

ocular opacities

refers to the loss of transparency when the cornea becomes opaque (cloudy) due to damage or scarring.

oliguria

is decreased urine output.

open fractures

when the bone protrudes through the skin and is exposed to the external environment.

Opioid

is a powerful narcotic substance typically used for pain management such as oxycodone, morphine, and fentanyl.

oppressive

refers to burdensome and unjust impositions of power upon a person or group.

orthostatic hypotension

is a drop in blood pressure when the client moves from lying to sitting to standing.

osteoarthritis

is a degenerative joint disease resulting in pain, stiffness, and reduced mobility

osteogenesis imperfecta

is a genetic disorder present at birth resulting in soft bones that are formed normally and fracture easily with minimal injury or no obvious trauma

otitis externa

is inflammation or infection of the external ear canal when caused by bacteria or fungus growth.

otitis media

is an inflammation and/or infection of the middle ear usually when there is an accumulation of fluid (effusion)

leading to bacterial and viral growth (often associated with eustachian tube malfunction that is responsible for pressure equalization and normal fluid drainage).

otosclerosis

refers to abnormal bone growth in the middle ear.

ototoxic

are medications that can damage the ears causing hearing impairment, balance problems, and tinnitus.

overnutrition

is increased intake of food, calories and nutrients than the body requires.

oxygenated blood perfusion

refers to the flow of blood that is oxygenated to the body's tissues such as the legs.

pallor

is a discolouration that can appear as a grey shade to the mucous membranes/lips, nail beds, extremities in people with darker skin tones, a yellowish shade in people with lighter brown skin, a pale whitish shade in people with lighter skin tones, and a white or very pale pink conjunctiva in all people. The discolouration reflects a combination of the client's normal skin colour and the connective tissue (white) with the lack of oxygenated hemoglobin due to many states when the sympathetic nervous system is activated (with stress), hypothermia, shock, and anemia. Pallor affects the integument colour because blood is shunted towards the vital organs.

palpebral fissures

are the opening/space between the upper and lower eyelids.

papules

paraesthesia

refers to abnormal sensory sensations such as numbness (loss of feeling) or tingling (sometimes described as pins and needles) or other characteristics such as burning and prickling.

paralysis

is the inability to move a muscle such as a limb.

paresis

is decreased muscle strength of the voluntary muscle groups (often referred to as muscle weakness).

pectus excavatum

is a congenital condition where the sternum is sunken into the chest at birth and can worsen with age, affecting breathing.

pericarditis

is inflammation of the pericardium, the layer of tissue surrounding the heart.

peripheral arterial disease

a condition causing narrowed arteries and restricting or blocking blood flow to the extremities.

peripheral artery disease

a condition causing narrowed arteries and restricting or blocking blood flow to the extremities.

peripheral vascular disease

refer to a group of diseases that affect the arteries and veins in the arms, legs, and abdominal area.

peritoneal cavity

is the potential space in between the parietal peritoneum (a membrane which surrounds the abdominal cavity) and the visceral peritoneum (a membranes which surrounds the abdominal organs).

peritonitis

refers to inflammation of the peritoneal cavity that can be caused by a variety of conditions.

petechia

are small non-blanchable red or purple spots caused by blood loss under the skin.

photokeratitis

is painful eye damage caused from exposure to ultraviolet light

photosensitivity

is skin sensitivity when exposed to the sun.

pitting edema

refers to an indentation that remains after applying pressure over the location.

pleural effusion

refers to excessive fluid accumulation in the pleural space between the visceral and parietal pleura.

pneumonia

is a lung infection leading to inflamed airways and excessive mucous production, typically caused by bacteria or virus.

pneumothorax

is when air leaks into the pleural space pushing on the lung and causing partial or complete collapse of the lung.

postauricular skin

referring to behind the ear.

power

refers to the capacity to influence.

preeclampsia

is a serious and life-threatening condition associated with a rise in blood pressure, proteinuria, and swelling.

Presbyopia

refers to a condition that affects the aging eye (40 to 50 years of age) resulting in difficulty seeing close-up objects (objects become blurry).

primary source

Data provided by the client.

prosthetics

are artificial devices that replace a missing body part such as an artificial limb

proton pump inhibitors

are a type of medication that reduces acid secretion, often used in combination with antibiotics to treat ulcers in the presence of H. pylori.

prurigo

is a chronic condition causing itching.

pruritus

is itchy skin.

Psoriasis

is a skin condition that causes a rash, scaling, and itching.

psychometric testing

refers to evaluating whether a tool is measuring what it is designed to measure (validity), whether the tool results in consistent responses under similar conditions or with the same level of pain (reliability), and whether the tool is sensitive to detect changes in pain (responsiveness).

pterygium

is a benign fleshy growth on the eye's conjunctiva that grows onto the cornea.

Ptosis

refers to the drooping of the upper eyelid over the eye.

pulmonary embolism

is a serious issue in which a blood clot travels from a blood vessel to the lungs, blocks an artery, and suddenly blocks blood flow can lead to symptoms such as sudden shortness of breath and chest pain.

pulmonary hypertension

refers to high blood pressure in the pulmonary arteries.

pulsatility

The quality of pulsations, such as the pulse.

racial trauma

refers to the cumulative and traumatic effects of racism and its continual reoccurrence, including psychological and physical effects (e.g., stress, nightmares, flashbacks, headaches, heart palpitations) (Comas-Diaz et al., 2019).

racism

refers to individual behaviour and policies and practices entrenched by biased attitudes based on race and privileging white people and disadvantaging racialized people.

radiocarpal joint

Is where the radius bone meets the carpal bones.

rapid response systems

refers to an institution's approach to an urgent situation of managing a deteriorating client. It typically involves a team of critical care providers who are available to rush to the bedside of any deteriorating client.

referred pain

is pain that is felt in a location other than the origin of the pain.

refractive errors

are a condition in which the eye has problems bending and focusing light appropriately onto the retina (back of the eye) making it difficult to see.

regurgitation

refers to blood leaking backwards through the valve.

residual volume

is the volume of air that stays in the lungs after a maximum expiration.

retinal detachment

is an emergency situation when the retinal tissue pulls away from the back of the eye (without immediate treatment it can result in permanent loss of vision).

Review of the Systems

Questions specific to each body system.

rigidity

is increased muscle resistance that is consistent at rest and with movement.

rosacea

is a condition where the facial cheeks and nose have a flushed appearance from enlarged facial blood vessels.

RSV

is a common respiratory virus called respiratory syncytial virus affects people of all ages particularly children with cold-like symptoms of coughing, runny nose, and fever.

salivary glands

are glands in the mouth that produce saliva, providing moisture in the mouth and assisting with digestion of food.

sclera

is the white part of the eye.

sebaceous

sometimes referred to as oil glands and produce and secrete sebum (a protective substance that helps retain moisture) all over the body except the palms of hands and the soles of feet.

seborrheic dermatitis

is a condition that mainly affects the scalp, causing scaly patches and inflammation.

seborrheic keratosis

is a benign growth associated with aging.

second-hand

is the inhalation of exhaled smoke from another person or smoke from a burning cigarette.

secondary sources

Data provided by someone other than the client.

sedation

is medication that relaxes the client, induces sleep, and reduces agitation and irritability.

seizures

are sudden changes in the brain's electrical function that affects consciousness, sensations, muscle tone and movement.

sepsis

is a life-threatening bodily response to infection that can lead to tissue damage.

Shingles

viral infection that can cause a painful rash.

shock

is a life-threatening state whereby the body is not getting enough blood flow.

sickle cell disease.

is an inherited red blood cell disorder that affects the hemoglobin causing red blood cells to become sticky and C-shaped.

signs

Something that the health professional observes.

sinusitis

is an infection involving fluid accumulation and inflammation in the sinuses.

skin discolouration

refers to a change in colour from the person's natural skin colour.

skin folds

are when two areas of skin lie in close contact and fold onto one another such as in between rolls of adipose tissue or under the breasts.

somatosensory nervous system

refers to the network of nerve cells throughout the brain and body that produce the perception pain and other sensations such as touch and temperature.

spasticity

is increased muscle resistance that decreases with continuous movement and worsens at extreme ROM.

spinal cord injuries

are injuries to the spinal cord that can result in weakness, loss of sensations, paralysis, breathing problems, and impairment in bladder and bowel control.

squamous cell carcinoma

is a type of skin cancer.

St. John's wort

is a plant, commonly used as a dietary supplement/herbal remedy.

St. John’s wort

is a plant, commonly used as an herb for depression.

staccato touch

Quick, short taps.

standing orders

are written protocols that authorize designated members of the health care team (e.g., nurses) to complete certain tasks (e.g., apply oxygen) without a physician order.

Steven-Johnson syndrome/toxic epidermal necrolysis

is a severe disorder that affects the mucous membranes, typically caused by certain medications.

Strabismus

is misalignment of the eyes in which they don't work together because one is pointed in a different direction. This results in double vision, poor revision, and amblyopia (image suppression from the affected eye meaning that the brain relies on the unaffected eye's vision). Often clients are born with it or develop it at a young age, but adults can also develop it as a result of neurological conditions.

strength-based approach

An approach or philosophy that focuses on empowerment, views the client as resourceful, and emphasizes their strengths, but does not ignore their challenges.

structural barriers

refers to barriers that affect certain groups disproportionately and perpetuate disparities in outcomes. These structures can include practices, policies, and norms that privilege advantaged groups while systematically disadvantaging oppressed and marginalized groups.

subcutaneous emphysema

is when air shifts out of the lungs and into the subcutaneous tissues as a result of traumatic, surgical, or infectious causes.

subjective

are information that the client shares spontaneously or in response to a question.

subjective data

Information that the client shares with the health professional.

subjective data

Information that the client shares with you.

subungual hematoma

is bleeding under the nail.

summation

is when frequent stimuli are perceived as one stimulus.

Supplemental oxygen

is oxygen added in addition to what a person normally breathes in from the air, often provided via a face mask or nasal prongs.

symptoms

Something that the client feels.

syncope

is a temporary loss of consciousness commonly described as fainting.

systemic oppression

also referred to as institutional oppression, is when established customs and practices reflect and produce mistreatment and inequities based on a person's membership in a social group.

systole

is the cardiac phase when the heart is full of blood and the ventricles contract ejecting blood into the arteries.

tachypnea

is rapid respiratory rate.

tangential lighting

refers to a light (penlight) directed from the side at a low angle across the body.

third-hand smoke

is exposure to the residue left on surfaces (e.g., furniture, walls) from smoke.

thoracic duct

is the largest lymphatic vessel in the body that returns lymph to the vasculature.

title table test

is an automatic table that moves the client from supine to a standing position while measuring blood pressure and pulse at various intervals.

toxic erythema from chemotherapy

is a skin reaction to chemotherapy.

transgender

refers to a person whose gender identity incongruent with their sex at birth.

trauma

Trauma is the response or outcome of a distressing experience or event that affects a person's sense of self and overwhelms a person and their ability to function and cope (e.g., violence, accident, natural disaster).

trauma-informed approach

recognizes clients may have a history of trauma and integrates principles of safety, choice, collaboration, trustworthiness, and empowerment into care approaches (Arthur et al., 2013).

traumatic brain injury

is an injury to the brain that occurs as a result of an external, physical bump or jolt to the body/head (referred to as TBI).

tremors

are involuntary rhythmic twitching-like movements.

trends

are general directions/changes over time (e.g., weight loss or weight gain).

tricuspid valve stenosis / prolapse

refers to a narrowing of the tricuspid valve or when the valve does not close completely and bulges up into the atrium leading to regurgitation/leaking of blood backwards.

tripod position

is leaning forward with hands and/or forearms resting on their legs or another surface such as a table.

tugging/pulling/retractions

are when the muscles in between the ribs are sucked inward when breathing.

ulcerations

is an open sore related to inadequate blood perfusion.

ulcers

open sores.

unconditionally accepting way of being

Behaviour of accepting the client, respecting their right to self-determination, and supporting them regardless of our perception of what they say or do.

undernutrition

is a deficiency of calories and nutrients.

unrelated

in reference to solutions/interventions, refers to solutions and interventions that are not connected or related to the problem.

urinalysis

is a series of tests that examine the urine.

urinary stasis

is when the bladder doesn't empty completely (also referred to as urinary retention).

vaccine hesitant

is when a person is reluctant or refuses to receive a vaccine.

varicose veins

are dilated, bulging, and twisted veins that can often be observed on the skin's surface and can also be deep within the leg and not visible.

vasodilators

are medications that are used to to lower blood pressure and treat heart failure and angina by relaxing the vasculature muscles and dilate the blood vessels (ie., open up or widen the blood vessels).

vasopressors

are medications that support blood pressure.

Venous hypertension

refers to high blood pressure in the veins.

venous stasis

is a collection or pooling of blood in the veins typically in the legs.

vesicular

is a term that refers to a structure containing vesicles.

vestibular neuritis

is inflammation of the vestibulocochlear nerve (cranial nerve VIII), can lead to vertigo.

victim blaming

refers to when those who are affected by ill-health and blamed for their health choices.

vital capacity

is the maximum volume of air that is expired following maximum inspiration.

vitiligo

is a chronic skin condition characterized by patches of depigmented skin.

vitreous detachment

is when the vitreous pulls away from the retina resulting in floaters and flashes of light (the vitreous is a jelly-like substance that fills the inside of the eye and is connected to the retina). Although in of itself is not serious, it can cause retinal detachment.

vocal intonation

Rise and fall of voice.

well-demarcated

to set clear and obvious borders of where the condition starts and ends

Xanthoma

is a skin condition where fat builds up under the surface the skin.

Glossary

12-lead electrocardiography

is a non-invasive test that involves attaching sticky patches on the client's chest which records the heart's electrical activity from 12 different viewpoints (often referred to as an ECG).

nitroglycerin

is a medication that acts to dilate/expand blood vessels so that oxygenated blood is more easily perfused to the heart muscle, which thus reduces cardiac pain caused by hypoxemia.

anaphylaxis

is a severe and life-threatening allergic reaction.

ascites

is the accumulation of fluid in the peritoneal cavity.

atherosclerosis

is a build up of plaque on the arterial walls.

blood clot

is an opioid narcotic that is used in acute settings to treat cardiac pain and has a vasodilation effect, thus allowing oxygenated blood to perfuse to the cardiac muscle more easily.

cancer

refers to a group of diseases that can affect any part of the body and involves abnormal cell growth.

cardiac ischemia

a deficit of oxygen-rich blood to the cardiac muscle.

cleft lip

is a congenital split in the lip.

cleft palate

is a congenital split in the palate.

client safety

Client safety is the reduction and mitigation of preventable unsafe acts and practices during the process of healthcare.

constipation

refers to decreased frequency in bowel movements (BM) (i.e., less than three times per week) and difficulties in having a BM (i.e., having to strain to push stool out, hard stool).

deep vein thrombosis

is the formation of a blood clot in one of the deep veins.

electrolyte imbalances

refers to high or low levels of electrolytes in the body such as potassium, sodium, and calcium.

gender non-conforming

refers to people who do not follow other people's ideas or stereotypes about how they should look or behave based on the sex they were assigned at birth.

hemorrhoids

are swollen and enlarged veins in the lower part of the rectum that are sometimes visible around the anus.

hepatitis

refers to inflammation of the liver. There are many types related to viruses (viral hepatitis e.g., hepatitis A, B, C), medications/drugs/alcohol, or autoimmune conditions.

hernias

refer to an organ that pushes through a weakened muscle or gap in the muscle/tissue that is supposed to hold the organ in place, resulting in an abdominal protrusion.

hypercapnia

refers to high blood levels of carbon dioxide.

ileus

refers to the lack of intestinal peristalsis movement (contraction of the muscles) in which the intestines stop moving contents through the passageway.

irritable bowel syndrome

a functional disorder of the bowels that affects the function, not the structure, leading to pain, bloating, gas, diarrhea, and constipation.

morphine

is an opioid narcotic that is used in acute settings to treat cardiac pain and has a vasodilation effect, thus allowing oxygenated blood to perfuse to the cardiac muscle more easily.

Nocturia

is increased urination or the urgent need to urinate at night.

older adults

The definition of older adult varies, but is typically 65 and older.

pericarditis

is inflammation of the pericardium (tissue surrounding the heart).

proton pump inhibitors

are a type of medication that reduces acid secretion, often used in combination with antibiotics to treat ulcers in the presence of H. pylori.

sickle cell crisis

is acute pain associated with sickle cell disease, an inherited red blood cell disorder.

stridor

is a high-pitched breathing sound typically heard upon inspiration and associated with a partially obstructed airway.

systemic oppression

also referred to as institutional oppression, is when established customs and practices reflect and produce mistreatment and inequities based on a person's membership in a social group.

ulcers

are sores on the lining of the GI system, usually the small intestine, stomach, and sometimes the esophagus and mouth.

valve stenosis/prolapse

refers to a narrowing of one of the valves in the heart or when the valve does not close completely and bulges backwards into the atrium or ventricle leading to regurgitation/leaking of blood backwards.

A cultural humility approach

refers to a life-long journey in which you are humble and open to the cultural perspectives and experiences of others (Greene-Moton & Minkler, 2020).

Ableism

is prejudice and discrimination against disabled people.

abnormal findings

are findings of concern because they are not normal and not consistent with a client's age, developmental stage, and sex.

achondroplasia

is a rare genetic bone disorder resulting in short stature

adipose tissue

refers to fat tissue.

adolescent

Adolescents are ages 12 to 17.

affect

refers to a person's outward expression of their emotional state such as their facial expression.

Ageism

is prejudice and discrimination against individuals and groups based on age, usually older age.

alopecia

is hair loss.

Amblyopia

is sometimes referred to as lazy eye and involves image suppression from the affected eye meaning that the brain relies on the unaffected eye's vision. One main cause is strabismus.

analgesics

are medication to relieve pain such as acetaminophen or ibuprofen (commonly known as Tylenol and Advil)

anaphylaxis

is a severe and life-threatening allergic reaction.

aneurysm

is an enlargement or ballooning of the vessel. Aneurysms can rupture, which is a life-threatening situation due to bleeding.

angina

is a type of chest pain caused by a reduction in oxygen-rich blood flow to the heart muscle.

arteriosclerosis

refers to arteries that become hard and stiff, and thus less elastic.

arthrocentesis

involves aspiration of fluid from a joint.

articular cartilage

is flexible connective tissue covering the end of bones in synovial joints and help the bones glide over one another.

ascites

involves the accumulation of fluid in the peritoneal cavity.

aspiration pneumonia

is a pulmonary infection as a result of food, fluid, saliva, or vomit breathed into the airways and lungs.

asthma

is a chronic disease which involves inflammation, bronchospasm, and narrowing of the bronchial tubes leading to dyspnea and wheezing.

Astigmatism

is an irregular-shaped cornea/lens that results in close-up and distant objects being seeing as out-of-focus (not as sharp) and appearing blurry.

ataxia

refers to disorganized movement such as staggered gait or impaired fine motor skills.

atelectasis

is a partial collapse of lung when the alveoli become deflated usually caused by shallow breathing following surgery, blocked airways, or insufficient surfactant.

atherosclerosis

is a build up of plaque on the arterial walls.

atrophy

refers to decreasing in size or commonly referred to as wasting.

Atypical nevi

is a mole with irregular features.

auras

are visual disturbances (e.g., seeing spots, starts), sensory changes (tingling, numbness), and speech problems.

avulsion

is when the nail is lifted off the nail bed either partial or completely.

Bag-mask-ventilation

refers to a mask that fits over the mouth/nose during an emergency situation and is attached to a self-inflating bag with 100% oxygen that is squeezed to ventilate the lungs.

basal cell carcinoma

is a type of skin cancer, commonly found on the face.

baseline

refers to a starting point before any intervention.

benign

refers to something that is mild, non-invasive and doesn't spread (i.e., non-cancerous)

bilirubin

a substance that the body produces when breaking down red blood cells.

biomarkers

refer to objective characteristics that can be measured as an indicator of a condition or disease. These can be molecular, histologic, radiographic, or physiological characteristics such as blood tests, x-rays, and vital signs.

blood clot

is a gel-like clump of blood.

blood clots

gel-like clumps of blood.

brain lesion

is an abnormal occurring area in the brain.

brain tumours

are abnormal growth of cells that multiply uncontrollably.

Brian Sinclair

was an Indigenous man who was sent to the hospital for a treatable bladder infection and died while waiting for care in the emergency waiting room.

bronchitis

is an acute or chronic condition causing inflammation of the bronchial tubes typically caused by infection or smoking.

bronchospasm

refers to muscles surrounding the airways spasm/contract.

bruxism

refers to the clenching of the upper and low teeth and grinding.

café-au-lait spots

is dark brown pigmented skin/spot present at birth.

cancer

refers to a group of diseases that can affect any part of the body and involves abnormal cell growth.

care partner

Care partners are family and friends who are involved in helping to care for the client.

care partners

Care partners are family and friends who are involved in helping to care for the client

carotid stenosis

is the narrowing of the carotid artery.

cataracts

are when the eye's lens becomes cloudy resulting in symptoms such as blurred vision. Often caused by the breakdown of proteins in the eye that happens at the age of 40 to 60 and older.

cephalocaudal

an approach that moves from head down to the toes.

cephalocaudally

is a head to toe approach.

cerebellum

is a structure located at the back of the brain underneath the occipital and temporal lobes of the cerebral cortex and is responsible for actions such as balance, posture, and coordination of voluntary movements.

cerebral aneurysms

is a weakened blood vessel in the brain that bulges out like a balloon.

cerebrospinal fluid leak

is when cerebrospinal fluid (clear liquid surrounding the brain and spinal cord) leaks through a tear or hole and is often associated with a headache.

cerebrovascular accidents (stroke)

are when the vascular supply to part of the brain is blocked or when a blood vessel in the brain leaks or bursts.

cerumen impaction

refers to the accumulation of ear wax in the ear canal.

chalazia

small red and swollen bumps, sometimes painful, caused by blocked oil glands that clog up.

cherry angiomas

are red, benign growths on skin made of blood vessels.

Cheyne–Stokes respiration pattern

is fast, shallow breathing followed by slow, deep breathing with periods of apnea.

children

Although legally anyone 17 and under is considered a child, the term is usually reserved for ages 1-11; thus, it includes toddlers, preschoolers and middle childhood.

Chronic headaches

often categorized as 15 or more days per month lasting three months or longer.

chronic obstructive pulmonary disease

is a restrictive and inflammatory disease (including emphysema and bronchitis) that affects both the airflow in and out of the lungs, typically caused by smoking.

cisgender

refers to person whose gender identity aligns with their sex at birth

client safety

Client safety is the reduction and mitigation of preventable unsafe acts and practices during the process of healthcare.

coalescing

come together/combine.

collaborative interventions

Interventions that are developed with the client, not for the client.

colour vision deficiency

is the reduced ability to see colour or distinguish between colours, sometimes referred to as colour blindness.

conjugate

refers to eyes moving together (in unison).

conjunctivitis

a condition when the sclera and the area around the eye becomes red, sometimes it is infectious.

consistency

refers to the degree of density or firmness.

consolidation

is when the air-filled spaces of the lungs are filled with fluid or abnormal tissue.

constipation

refers to decreased frequency in bowel movements (BM) (i.e., less than three times per week) and difficulties in having a BM (i.e., having to strain to push stool out, hard stool).

contagions

are microorganisms transmitted by close contact (direct or indirect).

contractures

are abnormal shortening of muscles that cause temporary or permanent limited ROM and sometimes the impossibility to move the joint. They are often caused by lack of use related to atrophy (wasting away of tissue and muscle), scar formation from injury, or chronic disease.

contraindicated

in reference to solutions/interventions, refers to solutions and interventions that should not be used because they may be harmful.

contusions

is a discoloration of the skin from damage to the tissue below (bruise).

COPD

is a restrictive disease that affects both the airflow in and out of the lungs.

corneal reflex

refers to bilateral blinking (corneal reflex) when a stimulus is applied to the edge of the cornea.

coronary artery disease

is a disease that affects the coronary arteries (the arteries that deliver blood to the heart muscle). It involves narrowing or blockage of the arteries, often caused by atherosclerosis.

coronaviruses

are a large family of various types of infectious viruses such as COVID-19.

costal cartilage

connects the sternum to the ribs and helps with motion to expand the chest during respiration.

crepitation

is an abnormal grating or crunching sound or sensation felt and heard over joints.

crepitus

an acute condition related to subcutaneous emphysema in which air shifts out of the lungs and into the subcutaneous tissues.

critical care response team

is an interdisciplinary group of practitioners trained in critical care and have expertise in assessing and intervening during code or pre-code situations when a client is deteriorating.

critical care response team (CCRT)

is an interdisciplinary group of practitioners trained in critical care and have expertise in assessing and intervening during code or pre-code situations when a client is deteriorating.

critical findings

are findings that require prompt and immediate action to prevent clinical deterioration or intervene when a client is deteriorating.

cues

are a sign or symptom that prompts an action such as an abnormal finding that signals a potential concern.

cultural humility approach

refers to a life-long journey in which you are humble and open to the cultural perspectives and experiences of others (Greene-Moton & Minkler, 2020).

cultural safety

Creation of safe spaces for clients to interact with health professionals without judgment, racial reductionism, racialization, or discrimination.

cutaneous

a term indicating something related to the skin.

cutaneous cysts

are encapsulated sacs under the skin filled with material, fluid or gas.

cyanosis

a discolouration that can appear as a grey/white shade with people of darker skin tones and a dusky bluish/purple shade in people with yellow and lighter skin tones, often visualized in the extremities (fingertips, toes, palms of hands, and soles of feet), conjunctiva and circumoral (around lips) and mucous membranes. Often caused by lack of oxygen in the blood and issues with tissue perfusion caused by conditions related to the respiratory, cardiovascular, and peripheral vascular systems.

cystic fibrosis

is a progressive genetic disease that primarily affects the lungs and digestive system, involving thick mucous production and persistent lung infections.

deep vein thrombosis

is the formation of a blood clot in one of the deep veins, usually a leg.

defecation

refers to the excretion of the body's indigestible contents through the anus in the form of feces.

deformities

are abnormal malformations of the body.

degenerative disc disease

is when one or more discs between the vertebrae of the spinal column wear down/deteriorate

delirium

is an acute change in cognitive status.

demyelination

is a process when the myelin sheath surrounding nerves becomes damaged and is destroyed.

dental cavities

are tiny openings onto the hard surface of the teeth caused by decay.

dermatome

is an area of the skin that follows a single spinal nerve root.

dermatomes

are areas of skin innervated by specific nerves.

desaturation

refers to the dropping of oxygen saturation via pulse oximetry.

deteriorate

refers to a patient's health/condition getting worse.

Diabetes

is a disease that affects insulin production or effective use of insulin, a hormone required to regulate blood glucose (sugar).

diabetes-related neuropathy

is nerve damage caused by diabetes resulting in symptoms such as pain, burning and tingling.

diabetic retinopathy

a disease caused by diabetes in which high blood sugar levels damage the retina's blood vessel resulting in vision impairment such as dark spots floating across the eyes, blurred vision, and vision loss.

diaphoresis

refers to excessive sweating.

diastole

is the cardiac phase when the heart's chambers are at their lowest pressure and filling with blood.

dicrotic upstroke

is an abnormal double beat of the carotid artery.

Diplopia

is double vision in which two of the same image are seen.

disconjugate movement

refers to when eyes do not move together (in unison), but rather one eye moves in a different direction than the other eye.

discrimination

refers specifically to actions against a person or community/group of people based on the group/category that they belong (e.g., race, gender, socioeconomic status).

disposition

refers to a person's general mood or attitude.

diuretics

are medications that help the heart pump better and reduce blood pressure by reducing fluid buildup in the body and increase urine output.

drape

A small sheet that is used to cover a person.

Duchenne muscular dystrophy

is a progressive disorder resulting in muscle degeneration and weakness with onset beginning in early childhood

dysarthria

is a neuromotor impairment in speaking in which clients have difficulty saying or forming a word and the strength and speed of speaking.

dysesthesia

is an abnormal sensation, such as burning, stinging, tingling, prickling, itching.

dysphagia

is an impairment in swallowing (ie., difficulty or trouble swallowing).

ear barotrauma

is ear damage that occurs because of a pressure difference in between the middle ear and the atmospheric air leading to pressure, pain, and sometimes hearing loss.

eczema

is a skin condition that causes dry skin and inflammation.

Edematous

or edema refers to swelling that occurs from excess fluid in the interstitial space.

electrocardiogram

refers to a non-invasive test where electrodes are attached to the chest and sensors detect the heart's electrical activity which is recorded on graph paper. This test aids in the diagnosis of cardiac issues such as a myocardial infarction.

emphysema

is a lung condition in which the alveoli become damaged and rupture, typically caused by smoking, and leading to hypercapnia.

enamel

is the hard and shiny surface that covers and protects the teeth.

erosions

is a breakdown of the top layer of skin/skin loss.

erythema

is a reddening or darkening of skin: with darker skin tones, erythema may appear reddish/purple in colour; with very dark skin tones, it may be difficult to visualize; and with lighter skin tones, erythema is typically dark pink to red.

exacerbate

To worsen or increase in severity

exudate (pus)

is fluid seeping from a lesion.

fasciculations

are involuntary and random twitching-like movements that aren't rhythmic.

fecal incontinence

is the involuntary release of stool.

fibromyalgia

is a chronic condition that causes pain and discomfort all over the body as well as fatigue.

First-hand

is the direct inhalation of smoke by the person smoking.

fixed pupils

refers to pupils that are non reactive to light.

flaccid/atonic

refers to muscles that have no resistance and no tone.

flat affect

refers to no emotional expression.

Floaters

are small dots or wiggly lines that move across a person's vision. They are composed of cellular debris within the eye's vitreous.

focused assessments

Assessments specific to a health issue and usually limited to one or two body systems.

fontanelles

are soft spots on the newborns head where the cranial bones have not yet fused together, allowing for movement of the bones during delivery and brain growth in the first year.

food security

is when all people have financial and physical access to a sufficient amount of healthy food (FAO, IFAD, UNICEF, WFP and WHO, 2021).

functional assessment of ROM

is the required ROM for someone to function in their activities of daily living.

gait

refers to balance and movement of limbs while walking.

gangrene

is the death of tissue that can occur when there is insufficient oxygen supply.

gastroesophageal reflux disease

is when acidic stomach contents leak from the stomach back into the esophagus.

gender incongruence

refers to when a person's gender identity is not congruent or does not align with the gender they were assigned at birth (Claahsen - van der Grinten et al., 2021).

gender non-conforming

refers to people who do not follow other people's ideas or stereotypes about how they should look or behave based on the sex they were assigned at birth.

glaucoma

is the build-up of fluid and intraocular pressure that damages the optic nerve resulting in blindness.

gritty eyes

refers to the sensation that there is some sort of grit or sand in the eyes.

guarding

refers to tense abdominal muscles as a result of nervousness, pain, cold room temperature or hands of the nurse, or ticklishness.

Halos around lights

are colourful circles (like a rainbow) around light sources such as a streetlight.

health equity

is when all individuals have fair access to resources that they need and fair opportunity to reach their full potential and optimal health and well-being (Public Health Ontario, 2023; WHO, 2023).

health history

A term often used in reference to, or in place of, the complete subjective health assessment.

health predispositions

are tendencies to suffer from a particular genetic condition

heart failure

a condition that involves a weakening of the heart muscle affecting its ability to contract and pump out sufficient stroke volume.

heartburn

is a burning sensation felt behind the sternum that develops after eating and is aggravated when in supine position.

Hematemesis

refers to blood in vomit.

hemodynamic instability

a clinical state in which circulatory perfusion is compromised.

Hemoglobin A1c

is a blood test that measures the amount of sugar (glucose) attached to hemoglobin giving a sense of the average glucose levels over the last three months.

hemopoiesis

refers to blood cell formation.

hemorrhage

refers to bleeding from a damaged blood vessel, when severe it can cause hypovolemic shock with signs of tachycardia and hypotension.

hemorrhoids

are swollen and enlarged veins in the lower part of the rectum that are sometimes visible around the anus.

hemosiderin staining

is a patch of skin where broken down hemoglobin are stored.

hepatitis

refers to inflammation of the liver. There are many types related to viruses (viral hepatitis e.g., hepatitis A, B, C), medications/drugs/alcohol, or autoimmune conditions.

hernias

refer to an organ that pushes through a weakened muscle or gap in the muscle/tissue that is supposed to hold the organ in place, resulting in an abdominal protrusion.

High-pitched sounds

High-pitched sounds are sounds with a high frequency that resemble a shrill or a piercing, sharp scream.

hordeolum

are small, red, and painful bumps on the eyelid often caused by bacterial infections (commonly called styes).

hypercapnia

refers to high blood levels of carbon dioxide.

Hyperopia

is farsightedness meaning that close-up objects are blurry

hyperpnea

is rapid and deep breathing.

hyperthyroidism

is a disease involving an overactive thyroid gland leading to high levels of thyroid hormone in the blood.

hypoxemia

refers to low levels of oxygen in the blood.

hypoxia

refers to low levels of oxygen in tissues and organs.

ideology of choice

refers to the belief that people have choice and choose their health outcomes.

ileus

refers to the lack of intestinal peristalsis movement (contraction of the muscles) in which the intestines stop moving contents through the passageway.

impulses

are movements visualized on the chest wall.

indicated/effective

, in reference to solutions/interventions, refers to solutions and interventions that are suggested as a desirable or necessary course of action.

infants

Infants are 0 -1 year old.

intercostal retractions

are when the intercostal muscles are pulled inward when breathing.

intercostal tugging/pulling/retractions

are when the muscles in between the ribs are sucked inward when breathing.

internalized powerlessness

is when an oppressed person/group internalizes the beliefs of the advantaged group or the group in power, making them feel like they have no power.

interstitial space

is the area that surrounds the vasculature and the body's tissues and organs in which fluid passes back and forth between capillaries and the tissue.

intraluminal

are valves within the veins.

intraluminal valves

are valves within the veins.

ipsilateral

refers to same side.

irritable bowel syndrome

a functional disorder of the bowels that affects the function, not the structure, leading to pain, bloating, gas, diarrhea, and constipation.

ischemia

is a deficit of oxygen-rich blood to tissue.

isometric muscle contraction

is a muscle contraction without movement such as tightening the muscle.

Joyce Echaquan

was an Indigenous woman who was not provided effective care for pain and died from pulmonary edema. https://pressbooks.library.torontomu.ca/assessmentnursing/chapter/inclusive-health-assessments-with-indigenous-clients/

labile affect

refers to rapid and exaggerated changes in mood.

labyrinthitis

is inflammation of the labyrinth in the inner ear, can lead to hearing loss and vertigo.

laceration

is a cut or tear in the nail.

language discordance

is when you (ie., the nurse) and the client do not speak the same language.

lentigo

is a small patch of skin that is darker than surrounding skin.

Lentigo/lentigines

are flat, irregular shaped macula that are slightly darker than the client's normal skin colour and found on sun-exposed areas of the body.

lesions

A general term referring to an abnormal appearance or growth.

limbus

refers to the border between the cornea and the sclera, looks like a darker ring around the iris.

lipid panel

is a blood test that measures lipids (fats) in the blood stream.

lobectomy

is the surgical removal of one of the lobes of the lung.

Low-pitched sounds

Low-pitched sounds are sounds with a low frequency that resemble a booming drum or a person with a deep, low voice.

lupus

is an autoimmune disease that causes inflammation.

lymphadenopathy

refers to diseases of the lymph nodes resulting in enlarged lymph nodes.

lymphatic vessels

are a network of vessels throughout the body similar to the vascular network.

lymphedema

refers to swelling in interstitial spaces (usually in the arms and legs) as a result of conditions that obstruct or puts pressure on the lymphatic vessels and/or lymph nodes such as cancer treatments (e.g., radiation, lymph node removal), obesity, and physical trauma such as fractures.

lymphomas

are cancers of the lymphatic system that begin in the lymphocytes (white blood cells).

macular degeneration

refers to damage to the macula in the back of the eye (retina) that results in the loss of central vision.

malformations

are faulty formations of a structure such as body tissue or organs.

malignant

refers to abnormal cell division (i.e., cancer).

malleoli

is the bony prominence on each side of the ankle.

measles

are a highly infectious viral infection characterized by a fever and a rash.

mechanism of injury

refers to the method or cause of trauma to the musculoskeletal system.

melanin

a substance that produces pigment and typically the more that is produced the darker the skin.

melanoma

is an aggressive and severe type of skin cancer.

Ménière's disease

is an idiopathic disease that involves an abnormality in the labyrinth of the inner ear causing symptoms such as vertigo, balance issues, hearing impairment, and tinnitus.

migraine

is a specific type of headache that is typically reoccurring and described as throbbing and pounding. It can last hours or days. Additionally, migraines have associated symptoms such as nausea, vomiting, visual auras, and sensitivity to noise, light, and smells. Although the cause of migraines is not clear, triggers vary from person to person, and can include stress, lack of sleep, dehydration, weather changes, and food/drinks such as alcohol, caffeine, cheese, and chocolate.

migraines

are a neurological condition often described as throbbing, pulsating, and pounding intense headaches with associated symptoms such as nausea and vomiting, sensitivity to light, noise and smell, and auras.

miosis

refers to excessive constriction of pupil.

mitral regurgitation

refers to when the valve does not fully close and blood flows backwards.

morbidities

refers to having more than one disease or condition.

motor system

includes central and peripheral structures in the nervous system that supports the planning and executing of simple and complex motor functions such as movement.

movement disorders

are neurological disorders that affect movement resulting in increased, decreased, and altered movement. For example, dystonia is characterized by involuntary muscle movements such as contractions and tremors as well as painful muscle cramps.

mydriasis

refers to excessive dilation of the pupil.

Myopia

is nearsightedness meaning that distant objects are blurry.

nasal polyps

are benign growths lining the nasal cavity or sinuses.

nausea

is an uneasiness in one's stomach in which one feels like they may vomit.

neoliberal

in the context of healthcare, refers to an emphasis on personal autonomy and individualism.

neoplasms

an abnormal growth.

neurodegenerative disorders

are diseases and conditions that damage and progressively destroy parts of the nervous system.

neurodiverse conditions

is an umbrella term referring to various conditions that affect a person's brain processes affecting how they learn and behave (e.g., autism, dyslexia, attention deficit hyperactivity disorder).

nevi

is a mole.

nitrates

are nitrogen-based chemicals found in some foods such as in some processed meats, wine, and chocolate.

nociceptors

are sensory neurons that mediate pain.

nodules

are a general term referring to any lump.

non-binary

refers to people who feel their gender cannot be defined based on the gender binary.

nonessential

in reference to solutions/interventions, refers to solutions and interventions that are not needed and not absolutely necessary.

normal findings

are findings that are not of concern and expected for a client's age, developmental stage, and sex.

nystagmus

is repetitive, involuntary eye movement in which the eye looks like it is quivering and can move up-down, side-to-side or in a circular motion.

objective

are information that is collected when performing a physical exam.

objective data

Information that the health professional collects when performing a physical exam.

ocular fundus reflex

is the reflection of the ophthalmoscope light from the back of the eye.

ocular opacities

refers to the loss of transparency when the cornea becomes opaque (cloudy) due to damage or scarring.

oliguria

is decreased urine output.

open fractures

when the bone protrudes through the skin and is exposed to the external environment.

Opioid

is a powerful narcotic substance typically used for pain management such as oxycodone, morphine, and fentanyl.

oppressive

refers to burdensome and unjust impositions of power upon a person or group.

orthostatic hypotension

is a drop in blood pressure when the client moves from lying to sitting to standing.

osteoarthritis

is a degenerative joint disease resulting in pain, stiffness, and reduced mobility

osteogenesis imperfecta

is a genetic disorder present at birth resulting in soft bones that are formed normally and fracture easily with minimal injury or no obvious trauma

otitis externa

is inflammation or infection of the external ear canal when caused by bacteria or fungus growth.

otitis media

is an inflammation and/or infection of the middle ear usually when there is an accumulation of fluid (effusion)

leading to bacterial and viral growth (often associated with eustachian tube malfunction that is responsible for pressure equalization and normal fluid drainage).

otosclerosis

refers to abnormal bone growth in the middle ear.

ototoxic

are medications that can damage the ears causing hearing impairment, balance problems, and tinnitus.

overnutrition

is increased intake of food, calories and nutrients than the body requires.

oxygenated blood perfusion

refers to the flow of blood that is oxygenated to the body's tissues such as the legs.

pallor

is a discolouration that can appear as a grey shade to the mucous membranes/lips, nail beds, extremities in people with darker skin tones, a yellowish shade in people with lighter brown skin, a pale whitish shade in people with lighter skin tones, and a white or very pale pink conjunctiva in all people. The discolouration reflects a combination of the client's normal skin colour and the connective tissue (white) with the lack of oxygenated hemoglobin due to many states when the sympathetic nervous system is activated (with stress), hypothermia, shock, and anemia. Pallor affects the integument colour because blood is shunted towards the vital organs.

palpebral fissures

are the opening/space between the upper and lower eyelids.

papules

paraesthesia

refers to abnormal sensory sensations such as numbness (loss of feeling) or tingling (sometimes described as pins and needles) or other characteristics such as burning and prickling.

paralysis

is the inability to move a muscle such as a limb.

paresis

is decreased muscle strength of the voluntary muscle groups (often referred to as muscle weakness).

pectus excavatum

is a congenital condition where the sternum is sunken into the chest at birth and can worsen with age, affecting breathing.

pericarditis

is inflammation of the pericardium, the layer of tissue surrounding the heart.

peripheral arterial disease

a condition causing narrowed arteries and restricting or blocking blood flow to the extremities.

peripheral artery disease

a condition causing narrowed arteries and restricting or blocking blood flow to the extremities.

peripheral vascular disease

refer to a group of diseases that affect the arteries and veins in the arms, legs, and abdominal area.

peritoneal cavity

is the potential space in between the parietal peritoneum (a membrane which surrounds the abdominal cavity) and the visceral peritoneum (a membranes which surrounds the abdominal organs).

peritonitis

refers to inflammation of the peritoneal cavity that can be caused by a variety of conditions.

petechia

are small non-blanchable red or purple spots caused by blood loss under the skin.

photokeratitis

is painful eye damage caused from exposure to ultraviolet light

photosensitivity

is skin sensitivity when exposed to the sun.

pitting edema

refers to an indentation that remains after applying pressure over the location.

pleural effusion

refers to excessive fluid accumulation in the pleural space between the visceral and parietal pleura.

pneumonia

is a lung infection leading to inflamed airways and excessive mucous production, typically caused by bacteria or virus.

pneumothorax

is when air leaks into the pleural space pushing on the lung and causing partial or complete collapse of the lung.

postauricular skin

referring to behind the ear.

power

refers to the capacity to influence.

preeclampsia

is a serious and life-threatening condition associated with a rise in blood pressure, proteinuria, and swelling.

Presbyopia

refers to a condition that affects the aging eye (40 to 50 years of age) resulting in difficulty seeing close-up objects (objects become blurry).

primary source

Data provided by the client.

prosthetics

are artificial devices that replace a missing body part such as an artificial limb

proton pump inhibitors

are a type of medication that reduces acid secretion, often used in combination with antibiotics to treat ulcers in the presence of H. pylori.

prurigo

is a chronic condition causing itching.

pruritus

is itchy skin.

Psoriasis

is a skin condition that causes a rash, scaling, and itching.

psychometric testing

refers to evaluating whether a tool is measuring what it is designed to measure (validity), whether the tool results in consistent responses under similar conditions or with the same level of pain (reliability), and whether the tool is sensitive to detect changes in pain (responsiveness).

pterygium

is a benign fleshy growth on the eye's conjunctiva that grows onto the cornea.

Ptosis

refers to the drooping of the upper eyelid over the eye.

pulmonary embolism

is a serious issue in which a blood clot travels from a blood vessel to the lungs, blocks an artery, and suddenly blocks blood flow can lead to symptoms such as sudden shortness of breath and chest pain.

pulmonary hypertension

refers to high blood pressure in the pulmonary arteries.

pulsatility

The quality of pulsations, such as the pulse.

racial trauma

refers to the cumulative and traumatic effects of racism and its continual reoccurrence, including psychological and physical effects (e.g., stress, nightmares, flashbacks, headaches, heart palpitations) (Comas-Diaz et al., 2019).

racism

refers to individual behaviour and policies and practices entrenched by biased attitudes based on race and privileging white people and disadvantaging racialized people.

radiocarpal joint

Is where the radius bone meets the carpal bones.

rapid response systems

refers to an institution's approach to an urgent situation of managing a deteriorating client. It typically involves a team of critical care providers who are available to rush to the bedside of any deteriorating client.

referred pain

is pain that is felt in a location other than the origin of the pain.

refractive errors

are a condition in which the eye has problems bending and focusing light appropriately onto the retina (back of the eye) making it difficult to see.

regurgitation

refers to blood leaking backwards through the valve.

residual volume

is the volume of air that stays in the lungs after a maximum expiration.

retinal detachment

is an emergency situation when the retinal tissue pulls away from the back of the eye (without immediate treatment it can result in permanent loss of vision).

Review of the Systems

Questions specific to each body system.

rigidity

is increased muscle resistance that is consistent at rest and with movement.

rosacea

is a condition where the facial cheeks and nose have a flushed appearance from enlarged facial blood vessels.

RSV

is a common respiratory virus called respiratory syncytial virus affects people of all ages particularly children with cold-like symptoms of coughing, runny nose, and fever.

salivary glands

are glands in the mouth that produce saliva, providing moisture in the mouth and assisting with digestion of food.

sclera

is the white part of the eye.

sebaceous

sometimes referred to as oil glands and produce and secrete sebum (a protective substance that helps retain moisture) all over the body except the palms of hands and the soles of feet.

seborrheic dermatitis

is a condition that mainly affects the scalp, causing scaly patches and inflammation.

seborrheic keratosis

is a benign growth associated with aging.

second-hand

is the inhalation of exhaled smoke from another person or smoke from a burning cigarette.

secondary sources

Data provided by someone other than the client.

sedation

is medication that relaxes the client, induces sleep, and reduces agitation and irritability.

seizures

are sudden changes in the brain's electrical function that affects consciousness, sensations, muscle tone and movement.

sepsis

is a life-threatening bodily response to infection that can lead to tissue damage.

Shingles

viral infection that can cause a painful rash.

shock

is a life-threatening state whereby the body is not getting enough blood flow.

sickle cell disease.

is an inherited red blood cell disorder that affects the hemoglobin causing red blood cells to become sticky and C-shaped.

signs

Something that the health professional observes.

sinusitis

is an infection involving fluid accumulation and inflammation in the sinuses.

skin discolouration

refers to a change in colour from the person's natural skin colour.

skin folds

are when two areas of skin lie in close contact and fold onto one another such as in between rolls of adipose tissue or under the breasts.

somatosensory nervous system

refers to the network of nerve cells throughout the brain and body that produce the perception pain and other sensations such as touch and temperature.

spasticity

is increased muscle resistance that decreases with continuous movement and worsens at extreme ROM.

spinal cord injuries

are injuries to the spinal cord that can result in weakness, loss of sensations, paralysis, breathing problems, and impairment in bladder and bowel control.

squamous cell carcinoma

is a type of skin cancer.

St. John's wort

is a plant, commonly used as a dietary supplement/herbal remedy.

St. John’s wort

is a plant, commonly used as an herb for depression.

staccato touch

Quick, short taps.

standing orders

are written protocols that authorize designated members of the health care team (e.g., nurses) to complete certain tasks (e.g., apply oxygen) without a physician order.

Steven-Johnson syndrome/toxic epidermal necrolysis

is a severe disorder that affects the mucous membranes, typically caused by certain medications.

Strabismus

is misalignment of the eyes in which they don't work together because one is pointed in a different direction. This results in double vision, poor revision, and amblyopia (image suppression from the affected eye meaning that the brain relies on the unaffected eye's vision). Often clients are born with it or develop it at a young age, but adults can also develop it as a result of neurological conditions.

strength-based approach

An approach or philosophy that focuses on empowerment, views the client as resourceful, and emphasizes their strengths, but does not ignore their challenges.

structural barriers

refers to barriers that affect certain groups disproportionately and perpetuate disparities in outcomes. These structures can include practices, policies, and norms that privilege advantaged groups while systematically disadvantaging oppressed and marginalized groups.

subcutaneous emphysema

is when air shifts out of the lungs and into the subcutaneous tissues as a result of traumatic, surgical, or infectious causes.

subjective

are information that the client shares spontaneously or in response to a question.

subjective data

Information that the client shares with the health professional.

subjective data

Information that the client shares with you.

subungual hematoma

is bleeding under the nail.

summation

is when frequent stimuli are perceived as one stimulus.

Supplemental oxygen

is oxygen added in addition to what a person normally breathes in from the air, often provided via a face mask or nasal prongs.

symptoms

Something that the client feels.

syncope

is a temporary loss of consciousness commonly described as fainting.

systemic oppression

also referred to as institutional oppression, is when established customs and practices reflect and produce mistreatment and inequities based on a person's membership in a social group.

systole

is the cardiac phase when the heart is full of blood and the ventricles contract ejecting blood into the arteries.

tachypnea

is rapid respiratory rate.

tangential lighting

refers to a light (penlight) directed from the side at a low angle across the body.

third-hand smoke

is exposure to the residue left on surfaces (e.g., furniture, walls) from smoke.

thoracic duct

is the largest lymphatic vessel in the body that returns lymph to the vasculature.

title table test

is an automatic table that moves the client from supine to a standing position while measuring blood pressure and pulse at various intervals.

toxic erythema from chemotherapy

is a skin reaction to chemotherapy.

transgender

refers to a person whose gender identity incongruent with their sex at birth.

trauma

Trauma is the response or outcome of a distressing experience or event that affects a person's sense of self and overwhelms a person and their ability to function and cope (e.g., violence, accident, natural disaster).

trauma-informed approach

recognizes clients may have a history of trauma and integrates principles of safety, choice, collaboration, trustworthiness, and empowerment into care approaches (Arthur et al., 2013).

traumatic brain injury

is an injury to the brain that occurs as a result of an external, physical bump or jolt to the body/head (referred to as TBI).

tremors

are involuntary rhythmic twitching-like movements.

trends

are general directions/changes over time (e.g., weight loss or weight gain).

tricuspid valve stenosis / prolapse

refers to a narrowing of the tricuspid valve or when the valve does not close completely and bulges up into the atrium leading to regurgitation/leaking of blood backwards.

tripod position

is leaning forward with hands and/or forearms resting on their legs or another surface such as a table.

tugging/pulling/retractions

are when the muscles in between the ribs are sucked inward when breathing.

ulcerations

is an open sore related to inadequate blood perfusion.

ulcers

open sores.

unconditionally accepting way of being

Behaviour of accepting the client, respecting their right to self-determination, and supporting them regardless of our perception of what they say or do.

undernutrition

is a deficiency of calories and nutrients.

unrelated

in reference to solutions/interventions, refers to solutions and interventions that are not connected or related to the problem.

urinalysis

is a series of tests that examine the urine.

urinary stasis

is when the bladder doesn't empty completely (also referred to as urinary retention).

vaccine hesitant

is when a person is reluctant or refuses to receive a vaccine.

varicose veins

are dilated, bulging, and twisted veins that can often be observed on the skin's surface and can also be deep within the leg and not visible.

vasodilators

are medications that are used to to lower blood pressure and treat heart failure and angina by relaxing the vasculature muscles and dilate the blood vessels (ie., open up or widen the blood vessels).

vasopressors

are medications that support blood pressure.

Venous hypertension

refers to high blood pressure in the veins.

venous stasis

is a collection or pooling of blood in the veins typically in the legs.

vesicular

is a term that refers to a structure containing vesicles.

vestibular neuritis

is inflammation of the vestibulocochlear nerve (cranial nerve VIII), can lead to vertigo.

victim blaming

refers to when those who are affected by ill-health and blamed for their health choices.

vital capacity

is the maximum volume of air that is expired following maximum inspiration.

vitiligo

is a chronic skin condition characterized by patches of depigmented skin.

vitreous detachment

is when the vitreous pulls away from the retina resulting in floaters and flashes of light (the vitreous is a jelly-like substance that fills the inside of the eye and is connected to the retina). Although in of itself is not serious, it can cause retinal detachment.

vocal intonation

Rise and fall of voice.

well-demarcated

to set clear and obvious borders of where the condition starts and ends

Xanthoma

is a skin condition where fat builds up under the surface the skin.

12-lead electrocardiography

is a non-invasive test that involves attaching sticky patches on the client's chest which records the heart's electrical activity from 12 different viewpoints (often referred to as an ECG).

nitroglycerin

is a medication that acts to dilate/expand blood vessels so that oxygenated blood is more easily perfused to the heart muscle, which thus reduces cardiac pain caused by hypoxemia.

anaphylaxis

is a severe and life-threatening allergic reaction.

ascites

is the accumulation of fluid in the peritoneal cavity.

atherosclerosis

is a build up of plaque on the arterial walls.

blood clot

is an opioid narcotic that is used in acute settings to treat cardiac pain and has a vasodilation effect, thus allowing oxygenated blood to perfuse to the cardiac muscle more easily.

cancer

refers to a group of diseases that can affect any part of the body and involves abnormal cell growth.

cardiac ischemia

a deficit of oxygen-rich blood to the cardiac muscle.

cleft lip

is a congenital split in the lip.

cleft palate

is a congenital split in the palate.

client safety

Client safety is the reduction and mitigation of preventable unsafe acts and practices during the process of healthcare.

constipation

refers to decreased frequency in bowel movements (BM) (i.e., less than three times per week) and difficulties in having a BM (i.e., having to strain to push stool out, hard stool).

deep vein thrombosis

is the formation of a blood clot in one of the deep veins.

electrolyte imbalances

refers to high or low levels of electrolytes in the body such as potassium, sodium, and calcium.

gender non-conforming

refers to people who do not follow other people's ideas or stereotypes about how they should look or behave based on the sex they were assigned at birth.

hemorrhoids

are swollen and enlarged veins in the lower part of the rectum that are sometimes visible around the anus.

hepatitis

refers to inflammation of the liver. There are many types related to viruses (viral hepatitis e.g., hepatitis A, B, C), medications/drugs/alcohol, or autoimmune conditions.

hernias

refer to an organ that pushes through a weakened muscle or gap in the muscle/tissue that is supposed to hold the organ in place, resulting in an abdominal protrusion.

hypercapnia

refers to high blood levels of carbon dioxide.

ileus

refers to the lack of intestinal peristalsis movement (contraction of the muscles) in which the intestines stop moving contents through the passageway.

irritable bowel syndrome

a functional disorder of the bowels that affects the function, not the structure, leading to pain, bloating, gas, diarrhea, and constipation.

morphine

is an opioid narcotic that is used in acute settings to treat cardiac pain and has a vasodilation effect, thus allowing oxygenated blood to perfuse to the cardiac muscle more easily.

Nocturia

is increased urination or the urgent need to urinate at night.

older adults

The definition of older adult varies, but is typically 65 and older.

pericarditis

is inflammation of the pericardium (tissue surrounding the heart).

proton pump inhibitors

are a type of medication that reduces acid secretion, often used in combination with antibiotics to treat ulcers in the presence of H. pylori.

sickle cell crisis

is acute pain associated with sickle cell disease, an inherited red blood cell disorder.

stridor

is a high-pitched breathing sound typically heard upon inspiration and associated with a partially obstructed airway.

systemic oppression

also referred to as institutional oppression, is when established customs and practices reflect and produce mistreatment and inequities based on a person's membership in a social group.

ulcers

are sores on the lining of the GI system, usually the small intestine, stomach, and sometimes the esophagus and mouth.

valve stenosis/prolapse

refers to a narrowing of one of the valves in the heart or when the valve does not close completely and bulges backwards into the atrium or ventricle leading to regurgitation/leaking of blood backwards.

A cultural humility approach

refers to a life-long journey in which you are humble and open to the cultural perspectives and experiences of others (Greene-Moton & Minkler, 2020).

Ableism

is prejudice and discrimination against disabled people.

abnormal findings

are findings of concern because they are not normal and not consistent with a client's age, developmental stage, and sex.

achondroplasia

is a rare genetic bone disorder resulting in short stature

adipose tissue

refers to fat tissue.

adolescent

Adolescents are ages 12 to 17.

affect

refers to a person's outward expression of their emotional state such as their facial expression.

Ageism

is prejudice and discrimination against individuals and groups based on age, usually older age.

alopecia

is hair loss.

Amblyopia

is sometimes referred to as lazy eye and involves image suppression from the affected eye meaning that the brain relies on the unaffected eye's vision. One main cause is strabismus.

analgesics

are medication to relieve pain such as acetaminophen or ibuprofen (commonly known as Tylenol and Advil)

anaphylaxis

is a severe and life-threatening allergic reaction.

aneurysm

is an enlargement or ballooning of the vessel. Aneurysms can rupture, which is a life-threatening situation due to bleeding.

angina

is a type of chest pain caused by a reduction in oxygen-rich blood flow to the heart muscle.

arteriosclerosis

refers to arteries that become hard and stiff, and thus less elastic.

arthrocentesis

involves aspiration of fluid from a joint.

articular cartilage

is flexible connective tissue covering the end of bones in synovial joints and help the bones glide over one another.

ascites

involves the accumulation of fluid in the peritoneal cavity.

aspiration pneumonia

is a pulmonary infection as a result of food, fluid, saliva, or vomit breathed into the airways and lungs.

asthma

is a chronic disease which involves inflammation, bronchospasm, and narrowing of the bronchial tubes leading to dyspnea and wheezing.

Astigmatism

is an irregular-shaped cornea/lens that results in close-up and distant objects being seeing as out-of-focus (not as sharp) and appearing blurry.

ataxia

refers to disorganized movement such as staggered gait or impaired fine motor skills.

atelectasis

is a partial collapse of lung when the alveoli become deflated usually caused by shallow breathing following surgery, blocked airways, or insufficient surfactant.

atherosclerosis

is a build up of plaque on the arterial walls.

atrophy

refers to decreasing in size or commonly referred to as wasting.

Atypical nevi

is a mole with irregular features.

auras

are visual disturbances (e.g., seeing spots, starts), sensory changes (tingling, numbness), and speech problems.

avulsion

is when the nail is lifted off the nail bed either partial or completely.

Bag-mask-ventilation

refers to a mask that fits over the mouth/nose during an emergency situation and is attached to a self-inflating bag with 100% oxygen that is squeezed to ventilate the lungs.

basal cell carcinoma

is a type of skin cancer, commonly found on the face.

baseline

refers to a starting point before any intervention.

benign

refers to something that is mild, non-invasive and doesn't spread (i.e., non-cancerous)

bilirubin

a substance that the body produces when breaking down red blood cells.

biomarkers

refer to objective characteristics that can be measured as an indicator of a condition or disease. These can be molecular, histologic, radiographic, or physiological characteristics such as blood tests, x-rays, and vital signs.

blood clot

is a gel-like clump of blood.

blood clots

gel-like clumps of blood.

brain lesion

is an abnormal occurring area in the brain.

brain tumours

are abnormal growth of cells that multiply uncontrollably.

Brian Sinclair

was an Indigenous man who was sent to the hospital for a treatable bladder infection and died while waiting for care in the emergency waiting room.

bronchitis

is an acute or chronic condition causing inflammation of the bronchial tubes typically caused by infection or smoking.

bronchospasm

refers to muscles surrounding the airways spasm/contract.

bruxism

refers to the clenching of the upper and low teeth and grinding.

café-au-lait spots

is dark brown pigmented skin/spot present at birth.

cancer

refers to a group of diseases that can affect any part of the body and involves abnormal cell growth.

care partner

Care partners are family and friends who are involved in helping to care for the client.

care partners

Care partners are family and friends who are involved in helping to care for the client

carotid stenosis

is the narrowing of the carotid artery.

cataracts

are when the eye's lens becomes cloudy resulting in symptoms such as blurred vision. Often caused by the breakdown of proteins in the eye that happens at the age of 40 to 60 and older.

cephalocaudal

an approach that moves from head down to the toes.

cephalocaudally

is a head to toe approach.

cerebellum

is a structure located at the back of the brain underneath the occipital and temporal lobes of the cerebral cortex and is responsible for actions such as balance, posture, and coordination of voluntary movements.

cerebral aneurysms

is a weakened blood vessel in the brain that bulges out like a balloon.

cerebrospinal fluid leak

is when cerebrospinal fluid (clear liquid surrounding the brain and spinal cord) leaks through a tear or hole and is often associated with a headache.

cerebrovascular accidents (stroke)

are when the vascular supply to part of the brain is blocked or when a blood vessel in the brain leaks or bursts.

cerumen impaction

refers to the accumulation of ear wax in the ear canal.

chalazia

small red and swollen bumps, sometimes painful, caused by blocked oil glands that clog up.

cherry angiomas

are red, benign growths on skin made of blood vessels.

Cheyne–Stokes respiration pattern

is fast, shallow breathing followed by slow, deep breathing with periods of apnea.

children

Although legally anyone 17 and under is considered a child, the term is usually reserved for ages 1-11; thus, it includes toddlers, preschoolers and middle childhood.

Chronic headaches

often categorized as 15 or more days per month lasting three months or longer.

chronic obstructive pulmonary disease

is a restrictive and inflammatory disease (including emphysema and bronchitis) that affects both the airflow in and out of the lungs, typically caused by smoking.

cisgender

refers to person whose gender identity aligns with their sex at birth

client safety

Client safety is the reduction and mitigation of preventable unsafe acts and practices during the process of healthcare.

coalescing

come together/combine.

collaborative interventions

Interventions that are developed with the client, not for the client.

colour vision deficiency

is the reduced ability to see colour or distinguish between colours, sometimes referred to as colour blindness.

conjugate

refers to eyes moving together (in unison).

conjunctivitis

a condition when the sclera and the area around the eye becomes red, sometimes it is infectious.

consistency

refers to the degree of density or firmness.

consolidation

is when the air-filled spaces of the lungs are filled with fluid or abnormal tissue.

constipation

refers to decreased frequency in bowel movements (BM) (i.e., less than three times per week) and difficulties in having a BM (i.e., having to strain to push stool out, hard stool).

contagions

are microorganisms transmitted by close contact (direct or indirect).

contractures

are abnormal shortening of muscles that cause temporary or permanent limited ROM and sometimes the impossibility to move the joint. They are often caused by lack of use related to atrophy (wasting away of tissue and muscle), scar formation from injury, or chronic disease.

contraindicated

in reference to solutions/interventions, refers to solutions and interventions that should not be used because they may be harmful.

contusions

is a discoloration of the skin from damage to the tissue below (bruise).

COPD

is a restrictive disease that affects both the airflow in and out of the lungs.

corneal reflex

refers to bilateral blinking (corneal reflex) when a stimulus is applied to the edge of the cornea.

coronary artery disease

is a disease that affects the coronary arteries (the arteries that deliver blood to the heart muscle). It involves narrowing or blockage of the arteries, often caused by atherosclerosis.

coronaviruses

are a large family of various types of infectious viruses such as COVID-19.

costal cartilage

connects the sternum to the ribs and helps with motion to expand the chest during respiration.

crepitation

is an abnormal grating or crunching sound or sensation felt and heard over joints.

crepitus

an acute condition related to subcutaneous emphysema in which air shifts out of the lungs and into the subcutaneous tissues.

critical care response team

is an interdisciplinary group of practitioners trained in critical care and have expertise in assessing and intervening during code or pre-code situations when a client is deteriorating.

critical care response team (CCRT)

is an interdisciplinary group of practitioners trained in critical care and have expertise in assessing and intervening during code or pre-code situations when a client is deteriorating.

critical findings

are findings that require prompt and immediate action to prevent clinical deterioration or intervene when a client is deteriorating.

cues

are a sign or symptom that prompts an action such as an abnormal finding that signals a potential concern.

cultural humility approach

refers to a life-long journey in which you are humble and open to the cultural perspectives and experiences of others (Greene-Moton & Minkler, 2020).

cultural safety

Creation of safe spaces for clients to interact with health professionals without judgment, racial reductionism, racialization, or discrimination.

cutaneous

a term indicating something related to the skin.

cutaneous cysts

are encapsulated sacs under the skin filled with material, fluid or gas.

cyanosis

a discolouration that can appear as a grey/white shade with people of darker skin tones and a dusky bluish/purple shade in people with yellow and lighter skin tones, often visualized in the extremities (fingertips, toes, palms of hands, and soles of feet), conjunctiva and circumoral (around lips) and mucous membranes. Often caused by lack of oxygen in the blood and issues with tissue perfusion caused by conditions related to the respiratory, cardiovascular, and peripheral vascular systems.

cystic fibrosis

is a progressive genetic disease that primarily affects the lungs and digestive system, involving thick mucous production and persistent lung infections.

deep vein thrombosis

is the formation of a blood clot in one of the deep veins, usually a leg.

defecation

refers to the excretion of the body's indigestible contents through the anus in the form of feces.

deformities

are abnormal malformations of the body.

degenerative disc disease

is when one or more discs between the vertebrae of the spinal column wear down/deteriorate

delirium

is an acute change in cognitive status.

demyelination

is a process when the myelin sheath surrounding nerves becomes damaged and is destroyed.

dental cavities

are tiny openings onto the hard surface of the teeth caused by decay.

dermatome

is an area of the skin that follows a single spinal nerve root.

dermatomes

are areas of skin innervated by specific nerves.

desaturation

refers to the dropping of oxygen saturation via pulse oximetry.

deteriorate

refers to a patient's health/condition getting worse.

Diabetes

is a disease that affects insulin production or effective use of insulin, a hormone required to regulate blood glucose (sugar).

diabetes-related neuropathy

is nerve damage caused by diabetes resulting in symptoms such as pain, burning and tingling.

diabetic retinopathy

a disease caused by diabetes in which high blood sugar levels damage the retina's blood vessel resulting in vision impairment such as dark spots floating across the eyes, blurred vision, and vision loss.

diaphoresis

refers to excessive sweating.

diastole

is the cardiac phase when the heart's chambers are at their lowest pressure and filling with blood.

dicrotic upstroke

is an abnormal double beat of the carotid artery.

Diplopia

is double vision in which two of the same image are seen.

disconjugate movement

refers to when eyes do not move together (in unison), but rather one eye moves in a different direction than the other eye.

discrimination

refers specifically to actions against a person or community/group of people based on the group/category that they belong (e.g., race, gender, socioeconomic status).

disposition

refers to a person's general mood or attitude.

diuretics

are medications that help the heart pump better and reduce blood pressure by reducing fluid buildup in the body and increase urine output.

drape

A small sheet that is used to cover a person.

Duchenne muscular dystrophy

is a progressive disorder resulting in muscle degeneration and weakness with onset beginning in early childhood

dysarthria

is a neuromotor impairment in speaking in which clients have difficulty saying or forming a word and the strength and speed of speaking.

dysesthesia

is an abnormal sensation, such as burning, stinging, tingling, prickling, itching.

dysphagia

is an impairment in swallowing (ie., difficulty or trouble swallowing).

ear barotrauma

is ear damage that occurs because of a pressure difference in between the middle ear and the atmospheric air leading to pressure, pain, and sometimes hearing loss.

eczema

is a skin condition that causes dry skin and inflammation.

Edematous

or edema refers to swelling that occurs from excess fluid in the interstitial space.

electrocardiogram

refers to a non-invasive test where electrodes are attached to the chest and sensors detect the heart's electrical activity which is recorded on graph paper. This test aids in the diagnosis of cardiac issues such as a myocardial infarction.

emphysema

is a lung condition in which the alveoli become damaged and rupture, typically caused by smoking, and leading to hypercapnia.

enamel

is the hard and shiny surface that covers and protects the teeth.

erosions

is a breakdown of the top layer of skin/skin loss.

erythema

is a reddening or darkening of skin: with darker skin tones, erythema may appear reddish/purple in colour; with very dark skin tones, it may be difficult to visualize; and with lighter skin tones, erythema is typically dark pink to red.

exacerbate

To worsen or increase in severity

exudate (pus)

is fluid seeping from a lesion.

fasciculations

are involuntary and random twitching-like movements that aren't rhythmic.

fecal incontinence

is the involuntary release of stool.

fibromyalgia

is a chronic condition that causes pain and discomfort all over the body as well as fatigue.

First-hand

is the direct inhalation of smoke by the person smoking.

fixed pupils

refers to pupils that are non reactive to light.

flaccid/atonic

refers to muscles that have no resistance and no tone.

flat affect

refers to no emotional expression.

Floaters

are small dots or wiggly lines that move across a person's vision. They are composed of cellular debris within the eye's vitreous.

focused assessments

Assessments specific to a health issue and usually limited to one or two body systems.

fontanelles

are soft spots on the newborns head where the cranial bones have not yet fused together, allowing for movement of the bones during delivery and brain growth in the first year.

food security

is when all people have financial and physical access to a sufficient amount of healthy food (FAO, IFAD, UNICEF, WFP and WHO, 2021).

functional assessment of ROM

is the required ROM for someone to function in their activities of daily living.

gait

refers to balance and movement of limbs while walking.

gangrene

is the death of tissue that can occur when there is insufficient oxygen supply.

gastroesophageal reflux disease

is when acidic stomach contents leak from the stomach back into the esophagus.

gender incongruence

refers to when a person's gender identity is not congruent or does not align with the gender they were assigned at birth (Claahsen - van der Grinten et al., 2021).

gender non-conforming

refers to people who do not follow other people's ideas or stereotypes about how they should look or behave based on the sex they were assigned at birth.

glaucoma

is the build-up of fluid and intraocular pressure that damages the optic nerve resulting in blindness.

gritty eyes

refers to the sensation that there is some sort of grit or sand in the eyes.

guarding

refers to tense abdominal muscles as a result of nervousness, pain, cold room temperature or hands of the nurse, or ticklishness.

Halos around lights

are colourful circles (like a rainbow) around light sources such as a streetlight.

health equity

is when all individuals have fair access to resources that they need and fair opportunity to reach their full potential and optimal health and well-being (Public Health Ontario, 2023; WHO, 2023).

health history

A term often used in reference to, or in place of, the complete subjective health assessment.

health predispositions

are tendencies to suffer from a particular genetic condition

heart failure

a condition that involves a weakening of the heart muscle affecting its ability to contract and pump out sufficient stroke volume.

heartburn

is a burning sensation felt behind the sternum that develops after eating and is aggravated when in supine position.

Hematemesis

refers to blood in vomit.

hemodynamic instability

a clinical state in which circulatory perfusion is compromised.

Hemoglobin A1c

is a blood test that measures the amount of sugar (glucose) attached to hemoglobin giving a sense of the average glucose levels over the last three months.

hemopoiesis

refers to blood cell formation.

hemorrhage

refers to bleeding from a damaged blood vessel, when severe it can cause hypovolemic shock with signs of tachycardia and hypotension.

hemorrhoids

are swollen and enlarged veins in the lower part of the rectum that are sometimes visible around the anus.

hemosiderin staining

is a patch of skin where broken down hemoglobin are stored.

hepatitis

refers to inflammation of the liver. There are many types related to viruses (viral hepatitis e.g., hepatitis A, B, C), medications/drugs/alcohol, or autoimmune conditions.

hernias

refer to an organ that pushes through a weakened muscle or gap in the muscle/tissue that is supposed to hold the organ in place, resulting in an abdominal protrusion.

High-pitched sounds

High-pitched sounds are sounds with a high frequency that resemble a shrill or a piercing, sharp scream.

hordeolum

are small, red, and painful bumps on the eyelid often caused by bacterial infections (commonly called styes).

hypercapnia

refers to high blood levels of carbon dioxide.

Hyperopia

is farsightedness meaning that close-up objects are blurry

hyperpnea

is rapid and deep breathing.

hyperthyroidism

is a disease involving an overactive thyroid gland leading to high levels of thyroid hormone in the blood.

hypoxemia

refers to low levels of oxygen in the blood.

hypoxia

refers to low levels of oxygen in tissues and organs.

ideology of choice

refers to the belief that people have choice and choose their health outcomes.

ileus

refers to the lack of intestinal peristalsis movement (contraction of the muscles) in which the intestines stop moving contents through the passageway.

impulses

are movements visualized on the chest wall.

indicated/effective

, in reference to solutions/interventions, refers to solutions and interventions that are suggested as a desirable or necessary course of action.

infants

Infants are 0 -1 year old.

intercostal retractions

are when the intercostal muscles are pulled inward when breathing.

intercostal tugging/pulling/retractions

are when the muscles in between the ribs are sucked inward when breathing.

internalized powerlessness

is when an oppressed person/group internalizes the beliefs of the advantaged group or the group in power, making them feel like they have no power.

interstitial space

is the area that surrounds the vasculature and the body's tissues and organs in which fluid passes back and forth between capillaries and the tissue.

intraluminal

are valves within the veins.

intraluminal valves

are valves within the veins.

ipsilateral

refers to same side.

irritable bowel syndrome

a functional disorder of the bowels that affects the function, not the structure, leading to pain, bloating, gas, diarrhea, and constipation.

ischemia

is a deficit of oxygen-rich blood to tissue.

isometric muscle contraction

is a muscle contraction without movement such as tightening the muscle.

Joyce Echaquan

was an Indigenous woman who was not provided effective care for pain and died from pulmonary edema. https://pressbooks.library.torontomu.ca/assessmentnursing/chapter/inclusive-health-assessments-with-indigenous-clients/

labile affect

refers to rapid and exaggerated changes in mood.

labyrinthitis

is inflammation of the labyrinth in the inner ear, can lead to hearing loss and vertigo.

laceration

is a cut or tear in the nail.

language discordance

is when you (ie., the nurse) and the client do not speak the same language.

lentigo

is a small patch of skin that is darker than surrounding skin.

Lentigo/lentigines

are flat, irregular shaped macula that are slightly darker than the client's normal skin colour and found on sun-exposed areas of the body.

lesions

A general term referring to an abnormal appearance or growth.

limbus

refers to the border between the cornea and the sclera, looks like a darker ring around the iris.

lipid panel

is a blood test that measures lipids (fats) in the blood stream.

lobectomy

is the surgical removal of one of the lobes of the lung.

Low-pitched sounds

Low-pitched sounds are sounds with a low frequency that resemble a booming drum or a person with a deep, low voice.

lupus

is an autoimmune disease that causes inflammation.

lymphadenopathy

refers to diseases of the lymph nodes resulting in enlarged lymph nodes.

lymphatic vessels

are a network of vessels throughout the body similar to the vascular network.

lymphedema

refers to swelling in interstitial spaces (usually in the arms and legs) as a result of conditions that obstruct or puts pressure on the lymphatic vessels and/or lymph nodes such as cancer treatments (e.g., radiation, lymph node removal), obesity, and physical trauma such as fractures.

lymphomas

are cancers of the lymphatic system that begin in the lymphocytes (white blood cells).

macular degeneration

refers to damage to the macula in the back of the eye (retina) that results in the loss of central vision.

malformations

are faulty formations of a structure such as body tissue or organs.

malignant

refers to abnormal cell division (i.e., cancer).

malleoli

is the bony prominence on each side of the ankle.

measles

are a highly infectious viral infection characterized by a fever and a rash.

mechanism of injury

refers to the method or cause of trauma to the musculoskeletal system.

melanin

a substance that produces pigment and typically the more that is produced the darker the skin.

melanoma

is an aggressive and severe type of skin cancer.

Ménière's disease

is an idiopathic disease that involves an abnormality in the labyrinth of the inner ear causing symptoms such as vertigo, balance issues, hearing impairment, and tinnitus.

migraine

is a specific type of headache that is typically reoccurring and described as throbbing and pounding. It can last hours or days. Additionally, migraines have associated symptoms such as nausea, vomiting, visual auras, and sensitivity to noise, light, and smells. Although the cause of migraines is not clear, triggers vary from person to person, and can include stress, lack of sleep, dehydration, weather changes, and food/drinks such as alcohol, caffeine, cheese, and chocolate.

migraines

are a neurological condition often described as throbbing, pulsating, and pounding intense headaches with associated symptoms such as nausea and vomiting, sensitivity to light, noise and smell, and auras.

miosis

refers to excessive constriction of pupil.

mitral regurgitation

refers to when the valve does not fully close and blood flows backwards.

morbidities

refers to having more than one disease or condition.

motor system

includes central and peripheral structures in the nervous system that supports the planning and executing of simple and complex motor functions such as movement.

movement disorders

are neurological disorders that affect movement resulting in increased, decreased, and altered movement. For example, dystonia is characterized by involuntary muscle movements such as contractions and tremors as well as painful muscle cramps.

mydriasis

refers to excessive dilation of the pupil.

Myopia

is nearsightedness meaning that distant objects are blurry.

nasal polyps

are benign growths lining the nasal cavity or sinuses.

nausea

is an uneasiness in one's stomach in which one feels like they may vomit.

neoliberal

in the context of healthcare, refers to an emphasis on personal autonomy and individualism.

neoplasms

an abnormal growth.

neurodegenerative disorders

are diseases and conditions that damage and progressively destroy parts of the nervous system.

neurodiverse conditions

is an umbrella term referring to various conditions that affect a person's brain processes affecting how they learn and behave (e.g., autism, dyslexia, attention deficit hyperactivity disorder).

nevi

is a mole.

nitrates

are nitrogen-based chemicals found in some foods such as in some processed meats, wine, and chocolate.

nociceptors

are sensory neurons that mediate pain.

nodules

are a general term referring to any lump.

non-binary

refers to people who feel their gender cannot be defined based on the gender binary.

nonessential

in reference to solutions/interventions, refers to solutions and interventions that are not needed and not absolutely necessary.

normal findings

are findings that are not of concern and expected for a client's age, developmental stage, and sex.

nystagmus

is repetitive, involuntary eye movement in which the eye looks like it is quivering and can move up-down, side-to-side or in a circular motion.

objective

are information that is collected when performing a physical exam.

objective data

Information that the health professional collects when performing a physical exam.

ocular fundus reflex

is the reflection of the ophthalmoscope light from the back of the eye.

ocular opacities

refers to the loss of transparency when the cornea becomes opaque (cloudy) due to damage or scarring.

oliguria

is decreased urine output.

open fractures

when the bone protrudes through the skin and is exposed to the external environment.

Opioid

is a powerful narcotic substance typically used for pain management such as oxycodone, morphine, and fentanyl.

oppressive

refers to burdensome and unjust impositions of power upon a person or group.

orthostatic hypotension

is a drop in blood pressure when the client moves from lying to sitting to standing.

osteoarthritis

is a degenerative joint disease resulting in pain, stiffness, and reduced mobility

osteogenesis imperfecta

is a genetic disorder present at birth resulting in soft bones that are formed normally and fracture easily with minimal injury or no obvious trauma

otitis externa

is inflammation or infection of the external ear canal when caused by bacteria or fungus growth.

otitis media

is an inflammation and/or infection of the middle ear usually when there is an accumulation of fluid (effusion) leading to bacterial and viral growth (often associated with eustachian tube malfunction that is responsible for pressure equalization and normal fluid drainage).

otosclerosis

refers to abnormal bone growth in the middle ear.

ototoxic

are medications that can damage the ears causing hearing impairment, balance problems, and tinnitus.

overnutrition

is increased intake of food, calories and nutrients than the body requires.

oxygenated blood perfusion

refers to the flow of blood that is oxygenated to the body's tissues such as the legs.

pallor

is a discolouration that can appear as a grey shade to the mucous membranes/lips, nail beds, extremities in people with darker skin tones, a yellowish shade in people with lighter brown skin, a pale whitish shade in people with lighter skin tones, and a white or very pale pink conjunctiva in all people. The discolouration reflects a combination of the client's normal skin colour and the connective tissue (white) with the lack of oxygenated hemoglobin due to many states when the sympathetic nervous system is activated (with stress), hypothermia, shock, and anemia. Pallor affects the integument colour because blood is shunted towards the vital organs.

palpebral fissures

are the opening/space between the upper and lower eyelids.

papules

paraesthesia

refers to abnormal sensory sensations such as numbness (loss of feeling) or tingling (sometimes described as pins and needles) or other characteristics such as burning and prickling.

paralysis

is the inability to move a muscle such as a limb.

paresis

is decreased muscle strength of the voluntary muscle groups (often referred to as muscle weakness).

pectus excavatum

is a congenital condition where the sternum is sunken into the chest at birth and can worsen with age, affecting breathing.

pericarditis

is inflammation of the pericardium, the layer of tissue surrounding the heart.

peripheral arterial disease

a condition causing narrowed arteries and restricting or blocking blood flow to the extremities.

peripheral artery disease

a condition causing narrowed arteries and restricting or blocking blood flow to the extremities.

peripheral vascular disease

refer to a group of diseases that affect the arteries and veins in the arms, legs, and abdominal area.

peritoneal cavity

is the potential space in between the parietal peritoneum (a membrane which surrounds the abdominal cavity) and the visceral peritoneum (a membranes which surrounds the abdominal organs).

peritonitis

refers to inflammation of the peritoneal cavity that can be caused by a variety of conditions.

petechia

are small non-blanchable red or purple spots caused by blood loss under the skin.

photokeratitis

is painful eye damage caused from exposure to ultraviolet light

photosensitivity

is skin sensitivity when exposed to the sun.

pitting edema

refers to an indentation that remains after applying pressure over the location.

pleural effusion

refers to excessive fluid accumulation in the pleural space between the visceral and parietal pleura.

pneumonia

is a lung infection leading to inflamed airways and excessive mucous production, typically caused by bacteria or virus.

pneumothorax

is when air leaks into the pleural space pushing on the lung and causing partial or complete collapse of the lung.

postauricular skin

referring to behind the ear.

power

refers to the capacity to influence.

preeclampsia

is a serious and life-threatening condition associated with a rise in blood pressure, proteinuria, and swelling.

Presbyopia

refers to a condition that affects the aging eye (40 to 50 years of age) resulting in difficulty seeing close-up objects (objects become blurry).

primary source

Data provided by the client.

prosthetics

are artificial devices that replace a missing body part such as an artificial limb

proton pump inhibitors

are a type of medication that reduces acid secretion, often used in combination with antibiotics to treat ulcers in the presence of H. pylori.

prurigo

is a chronic condition causing itching.

pruritus

is itchy skin.

Psoriasis

is a skin condition that causes a rash, scaling, and itching.

psychometric testing

refers to evaluating whether a tool is measuring what it is designed to measure (validity), whether the tool results in consistent responses under similar conditions or with the same level of pain (reliability), and whether the tool is sensitive to detect changes in pain (responsiveness).

pterygium

is a benign fleshy growth on the eye's conjunctiva that grows onto the cornea.

Ptosis

refers to the drooping of the upper eyelid over the eye.

pulmonary embolism

is a serious issue in which a blood clot travels from a blood vessel to the lungs, blocks an artery, and suddenly blocks blood flow can lead to symptoms such as sudden shortness of breath and chest pain.

pulmonary hypertension

refers to high blood pressure in the pulmonary arteries.

pulsatility

The quality of pulsations, such as the pulse.

racial trauma

refers to the cumulative and traumatic effects of racism and its continual reoccurrence, including psychological and physical effects (e.g., stress, nightmares, flashbacks, headaches, heart palpitations) (Comas-Diaz et al., 2019).

racism

refers to individual behaviour and policies and practices entrenched by biased attitudes based on race and privileging white people and disadvantaging racialized people.

radiocarpal joint

Is where the radius bone meets the carpal bones.

rapid response systems

refers to an institution's approach to an urgent situation of managing a deteriorating client. It typically involves a team of critical care providers who are available to rush to the bedside of any deteriorating client.

referred pain

is pain that is felt in a location other than the origin of the pain.

refractive errors

are a condition in which the eye has problems bending and focusing light appropriately onto the retina (back of the eye) making it difficult to see.

regurgitation

refers to blood leaking backwards through the valve.

residual volume

is the volume of air that stays in the lungs after a maximum expiration.

retinal detachment

is an emergency situation when the retinal tissue pulls away from the back of the eye (without immediate treatment it can result in permanent loss of vision).

Review of the Systems

Questions specific to each body system.

rigidity

is increased muscle resistance that is consistent at rest and with movement.

rosacea

is a condition where the facial cheeks and nose have a flushed appearance from enlarged facial blood vessels.

RSV

is a common respiratory virus called respiratory syncytial virus affects people of all ages particularly children with cold-like symptoms of coughing, runny nose, and fever.

salivary glands

are glands in the mouth that produce saliva, providing moisture in the mouth and assisting with digestion of food.

sclera

is the white part of the eye.

sebaceous

sometimes referred to as oil glands and produce and secrete sebum (a protective substance that helps retain moisture) all over the body except the palms of hands and the soles of feet.

seborrheic dermatitis

is a condition that mainly affects the scalp, causing scaly patches and inflammation.

seborrheic keratosis

is a benign growth associated with aging.

second-hand

is the inhalation of exhaled smoke from another person or smoke from a burning cigarette.

secondary sources

Data provided by someone other than the client.

sedation

is medication that relaxes the client, induces sleep, and reduces agitation and irritability.

seizures

are sudden changes in the brain's electrical function that affects consciousness, sensations, muscle tone and movement.

sepsis

is a life-threatening bodily response to infection that can lead to tissue damage.

Shingles

viral infection that can cause a painful rash.

shock

is a life-threatening state whereby the body is not getting enough blood flow.

sickle cell disease.

is an inherited red blood cell disorder that affects the hemoglobin causing red blood cells to become sticky and C-shaped.

signs

Something that the health professional observes.

sinusitis

is an infection involving fluid accumulation and inflammation in the sinuses.

skin discolouration

refers to a change in colour from the person's natural skin colour.

skin folds

are when two areas of skin lie in close contact and fold onto one another such as in between rolls of adipose tissue or under the breasts.

somatosensory nervous system

refers to the network of nerve cells throughout the brain and body that produce the perception pain and other sensations such as touch and temperature.

spasticity

is increased muscle resistance that decreases with continuous movement and worsens at extreme ROM.

spinal cord injuries

are injuries to the spinal cord that can result in weakness, loss of sensations, paralysis, breathing problems, and impairment in bladder and bowel control.

squamous cell carcinoma

is a type of skin cancer.

St. John's wort

is a plant, commonly used as a dietary supplement/herbal remedy.

St. John’s wort

is a plant, commonly used as an herb for depression.

staccato touch

Quick, short taps.

standing orders

are written protocols that authorize designated members of the health care team (e.g., nurses) to complete certain tasks (e.g., apply oxygen) without a physician order.

Steven-Johnson syndrome/toxic epidermal necrolysis

is a severe disorder that affects the mucous membranes, typically caused by certain medications.

Strabismus

is misalignment of the eyes in which they don't work together because one is pointed in a different direction. This results in double vision, poor revision, and amblyopia (image suppression from the affected eye meaning that the brain relies on the unaffected eye's vision). Often clients are born with it or develop it at a young age, but adults can also develop it as a result of neurological conditions.

strength-based approach

An approach or philosophy that focuses on empowerment, views the client as resourceful, and emphasizes their strengths, but does not ignore their challenges.

structural barriers

refers to barriers that affect certain groups disproportionately and perpetuate disparities in outcomes. These structures can include practices, policies, and norms that privilege advantaged groups while systematically disadvantaging oppressed and marginalized groups.

subcutaneous emphysema

is when air shifts out of the lungs and into the subcutaneous tissues as a result of traumatic, surgical, or infectious causes.

subjective

are information that the client shares spontaneously or in response to a question.

subjective data

Information that the client shares with the health professional.

subjective data

Information that the client shares with you.

subungual hematoma

is bleeding under the nail.

summation

is when frequent stimuli are perceived as one stimulus.

Supplemental oxygen

is oxygen added in addition to what a person normally breathes in from the air, often provided via a face mask or nasal prongs.

symptoms

Something that the client feels.

syncope

is a temporary loss of consciousness commonly described as fainting.

systemic oppression

also referred to as institutional oppression, is when established customs and practices reflect and produce mistreatment and inequities based on a person's membership in a social group.

systole

is the cardiac phase when the heart is full of blood and the ventricles contract ejecting blood into the arteries.

tachypnea

is rapid respiratory rate.

tangential lighting

refers to a light (penlight) directed from the side at a low angle across the body.

third-hand smoke

is exposure to the residue left on surfaces (e.g., furniture, walls) from smoke.

thoracic duct

is the largest lymphatic vessel in the body that returns lymph to the vasculature.

title table test

is an automatic table that moves the client from supine to a standing position while measuring blood pressure and pulse at various intervals.

toxic erythema from chemotherapy

is a skin reaction to chemotherapy.

transgender

refers to a person whose gender identity incongruent with their sex at birth.

trauma

Trauma is the response or outcome of a distressing experience or event that affects a person's sense of self and overwhelms a person and their ability to function and cope (e.g., violence, accident, natural disaster).

trauma-informed approach

recognizes clients may have a history of trauma and integrates principles of safety, choice, collaboration, trustworthiness, and empowerment into care approaches (Arthur et al., 2013).

traumatic brain injury

is an injury to the brain that occurs as a result of an external, physical bump or jolt to the body/head (referred to as TBI).

tremors

are involuntary rhythmic twitching-like movements.

trends

are general directions/changes over time (e.g., weight loss or weight gain).

tricuspid valve stenosis / prolapse

refers to a narrowing of the tricuspid valve or when the valve does not close completely and bulges up into the atrium leading to regurgitation/leaking of blood backwards.

tripod position

is leaning forward with hands and/or forearms resting on their legs or another surface such as a table.

tugging/pulling/retractions

are when the muscles in between the ribs are sucked inward when breathing.

ulcerations

is an open sore related to inadequate blood perfusion.

ulcers

open sores.

unconditionally accepting way of being

Behaviour of accepting the client, respecting their right to self-determination, and supporting them regardless of our perception of what they say or do.

undernutrition

is a deficiency of calories and nutrients.

unrelated

in reference to solutions/interventions, refers to solutions and interventions that are not connected or related to the problem.

urinalysis

is a series of tests that examine the urine.

urinary stasis

is when the bladder doesn't empty completely (also referred to as urinary retention).

vaccine hesitant

is when a person is reluctant or refuses to receive a vaccine.

varicose veins

are dilated, bulging, and twisted veins that can often be observed on the skin's surface and can also be deep within the leg and not visible.

vasodilators

are medications that are used to to lower blood pressure and treat heart failure and angina by relaxing the vasculature muscles and dilate the blood vessels (ie., open up or widen the blood vessels).

vasopressors

are medications that support blood pressure.

Venous hypertension

refers to high blood pressure in the veins.

venous stasis

is a collection or pooling of blood in the veins typically in the legs.

vesicular

is a term that refers to a structure containing vesicles.

vestibular neuritis

is inflammation of the vestibulocochlear nerve (cranial nerve VIII), can lead to vertigo.

victim blaming

refers to when those who are affected by ill-health and blamed for their health choices.

vital capacity

is the maximum volume of air that is expired following maximum inspiration.

vitiligo

is a chronic skin condition characterized by patches of depigmented skin.

vitreous detachment

is when the vitreous pulls away from the retina resulting in floaters and flashes of light (the vitreous is a jelly-like substance that fills the inside of the eye and is connected to the retina). Although in of itself is not serious, it can cause retinal detachment.

vocal intonation

Rise and fall of voice.

well-demarcated

to set clear and obvious borders of where the condition starts and ends

Xanthoma

is a skin condition where fat builds up under the surface the skin.

Glossary

12-lead electrocardiography

is a non-invasive test that involves attaching sticky patches on the client's chest which records the heart's electrical activity from 12 different viewpoints (often referred to as an ECG).

nitroglycerin

is a medication that acts to dilate/expand blood vessels so that oxygenated blood is more easily perfused to the heart muscle, which thus reduces cardiac pain caused by hypoxemia.

anaphylaxis

is a severe and life-threatening allergic reaction.

ascites

is the accumulation of fluid in the peritoneal cavity.

atherosclerosis

is a build up of plaque on the arterial walls.

blood clot

is an opioid narcotic that is used in acute settings to treat cardiac pain and has a vasodilation effect, thus allowing oxygenated blood to perfuse to the cardiac muscle more easily.

cancer

refers to a group of diseases that can affect any part of the body and involves abnormal cell growth.

cardiac ischemia

a deficit of oxygen-rich blood to the cardiac muscle.

cleft lip

is a congenital split in the lip.

cleft palate

is a congenital split in the palate.

client safety

Client safety is the reduction and mitigation of preventable unsafe acts and practices during the process of healthcare.

constipation

refers to decreased frequency in bowel movements (BM) (i.e., less than three times per week) and difficulties in having a BM (i.e., having to strain to push stool out, hard stool).

deep vein thrombosis

is the formation of a blood clot in one of the deep veins.

electrolyte imbalances

refers to high or low levels of electrolytes in the body such as potassium, sodium, and calcium.

gender non-conforming

refers to people who do not follow other people's ideas or stereotypes about how they should look or behave based on the sex they were assigned at birth.

hemorrhoids

are swollen and enlarged veins in the lower part of the rectum that are sometimes visible around the anus.

hepatitis

refers to inflammation of the liver. There are many types related to viruses (viral hepatitis e.g., hepatitis A, B, C), medications/drugs/alcohol, or autoimmune conditions.

hernias

refer to an organ that pushes through a weakened muscle or gap in the muscle/tissue that is supposed to hold the organ in place, resulting in an abdominal protrusion.

hypercapnia

refers to high blood levels of carbon dioxide.

ileus

refers to the lack of intestinal peristalsis movement (contraction of the muscles) in which the intestines stop moving contents through the passageway.

irritable bowel syndrome

a functional disorder of the bowels that affects the function, not the structure, leading to pain, bloating, gas, diarrhea, and constipation.

morphine

is an opioid narcotic that is used in acute settings to treat cardiac pain and has a vasodilation effect, thus allowing oxygenated blood to perfuse to the cardiac muscle more easily.

Nocturia

is increased urination or the urgent need to urinate at night.

older adults

The definition of older adult varies, but is typically 65 and older.

pericarditis

is inflammation of the pericardium (tissue surrounding the heart).

proton pump inhibitors

are a type of medication that reduces acid secretion, often used in combination with antibiotics to treat ulcers in the presence of H. pylori.

sickle cell crisis

is acute pain associated with sickle cell disease, an inherited red blood cell disorder.

stridor

is a high-pitched breathing sound typically heard upon inspiration and associated with a partially obstructed airway.

systemic oppression

also referred to as institutional oppression, is when established customs and practices reflect and produce mistreatment and inequities based on a person's membership in a social group.

ulcers

are sores on the lining of the GI system, usually the small intestine, stomach, and sometimes the esophagus and mouth.

valve stenosis/prolapse

refers to a narrowing of one of the valves in the heart or when the valve does not close completely and bulges backwards into the atrium or ventricle leading to regurgitation/leaking of blood backwards.

A cultural humility approach

refers to a life-long journey in which you are humble and open to the cultural perspectives and experiences of others (Greene-Moton & Minkler, 2020).

Ableism

is prejudice and discrimination against disabled people.

abnormal findings

are findings of concern because they are not normal and not consistent with a client's age, developmental stage, and sex.

achondroplasia

is a rare genetic bone disorder resulting in short stature

adipose tissue

refers to fat tissue.

adolescent

Adolescents are ages 12 to 17.

affect

refers to a person's outward expression of their emotional state such as their facial expression.

Ageism

is prejudice and discrimination against individuals and groups based on age, usually older age.

alopecia

is hair loss.

Amblyopia

is sometimes referred to as lazy eye and involves image suppression from the affected eye meaning that the brain relies on the unaffected eye's vision. One main cause is strabismus.

analgesics

are medication to relieve pain such as acetaminophen or ibuprofen (commonly known as Tylenol and Advil)

anaphylaxis

is a severe and life-threatening allergic reaction.

aneurysm

is an enlargement or ballooning of the vessel. Aneurysms can rupture, which is a life-threatening situation due to bleeding.

angina

is a type of chest pain caused by a reduction in oxygen-rich blood flow to the heart muscle.

arteriosclerosis

refers to arteries that become hard and stiff, and thus less elastic.

arthrocentesis

involves aspiration of fluid from a joint.

articular cartilage

is flexible connective tissue covering the end of bones in synovial joints and help the bones glide over one another.

ascites

involves the accumulation of fluid in the peritoneal cavity.

aspiration pneumonia

is a pulmonary infection as a result of food, fluid, saliva, or vomit breathed into the airways and lungs.

asthma

is a chronic disease which involves inflammation, bronchospasm, and narrowing of the bronchial tubes leading to dyspnea and wheezing.

Astigmatism

is an irregular-shaped cornea/lens that results in close-up and distant objects being seeing as out-of-focus (not as sharp) and appearing blurry.

ataxia

refers to disorganized movement such as staggered gait or impaired fine motor skills.

atelectasis

is a partial collapse of lung when the alveoli become deflated usually caused by shallow breathing following surgery, blocked airways, or insufficient surfactant.

atherosclerosis

is a build up of plaque on the arterial walls.

atrophy

refers to decreasing in size or commonly referred to as wasting.

Atypical nevi

is a mole with irregular features.

auras

are visual disturbances (e.g., seeing spots, starts), sensory changes (tingling, numbness), and speech problems.

avulsion

is when the nail is lifted off the nail bed either partial or completely.

Bag-mask-ventilation

refers to a mask that fits over the mouth/nose during an emergency situation and is attached to a self-inflating bag with 100% oxygen that is squeezed to ventilate the lungs.

basal cell carcinoma

is a type of skin cancer, commonly found on the face.

baseline

refers to a starting point before any intervention.

benign

refers to something that is mild, non-invasive and doesn't spread (i.e., non-cancerous)

bilirubin

a substance that the body produces when breaking down red blood cells.

biomarkers

refer to objective characteristics that can be measured as an indicator of a condition or disease. These can be molecular, histologic, radiographic, or physiological characteristics such as blood tests, x-rays, and vital signs.

blood clot

is a gel-like clump of blood.

blood clots

gel-like clumps of blood.

brain lesion

is an abnormal occurring area in the brain.

brain tumours

are abnormal growth of cells that multiply uncontrollably.

Brian Sinclair

was an Indigenous man who was sent to the hospital for a treatable bladder infection and died while waiting for care in the emergency waiting room.

bronchitis

is an acute or chronic condition causing inflammation of the bronchial tubes typically caused by infection or smoking.

bronchospasm

refers to muscles surrounding the airways spasm/contract.

bruxism

refers to the clenching of the upper and low teeth and grinding.

café-au-lait spots

is dark brown pigmented skin/spot present at birth.

cancer

refers to a group of diseases that can affect any part of the body and involves abnormal cell growth.

care partner

Care partners are family and friends who are involved in helping to care for the client.

care partners

Care partners are family and friends who are involved in helping to care for the client

carotid stenosis

is the narrowing of the carotid artery.

cataracts

are when the eye's lens becomes cloudy resulting in symptoms such as blurred vision. Often caused by the breakdown of proteins in the eye that happens at the age of 40 to 60 and older.

cephalocaudal

an approach that moves from head down to the toes.

cephalocaudally

is a head to toe approach.

cerebellum

is a structure located at the back of the brain underneath the occipital and temporal lobes of the cerebral cortex and is responsible for actions such as balance, posture, and coordination of voluntary movements.

cerebral aneurysms

is a weakened blood vessel in the brain that bulges out like a balloon.

cerebrospinal fluid leak

is when cerebrospinal fluid (clear liquid surrounding the brain and spinal cord) leaks through a tear or hole and is often associated with a headache.

cerebrovascular accidents (stroke)

are when the vascular supply to part of the brain is blocked or when a blood vessel in the brain leaks or bursts.

cerumen impaction

refers to the accumulation of ear wax in the ear canal.

chalazia

small red and swollen bumps, sometimes painful, caused by blocked oil glands that clog up.

cherry angiomas

are red, benign growths on skin made of blood vessels.

Cheyne–Stokes respiration pattern

is fast, shallow breathing followed by slow, deep breathing with periods of apnea.

children

Although legally anyone 17 and under is considered a child, the term is usually reserved for ages 1-11; thus, it includes toddlers, preschoolers and middle childhood.

Chronic headaches

often categorized as 15 or more days per month lasting three months or longer.

chronic obstructive pulmonary disease

is a restrictive and inflammatory disease (including emphysema and bronchitis) that affects both the airflow in and out of the lungs, typically caused by smoking.

cisgender

refers to person whose gender identity aligns with their sex at birth

client safety

Client safety is the reduction and mitigation of preventable unsafe acts and practices during the process of healthcare.

coalescing

come together/combine.

collaborative interventions

Interventions that are developed with the client, not for the client.

colour vision deficiency

is the reduced ability to see colour or distinguish between colours, sometimes referred to as colour blindness.

conjugate

refers to eyes moving together (in unison).

conjunctivitis

a condition when the sclera and the area around the eye becomes red, sometimes it is infectious.

consistency

refers to the degree of density or firmness.

consolidation

is when the air-filled spaces of the lungs are filled with fluid or abnormal tissue.

constipation

refers to decreased frequency in bowel movements (BM) (i.e., less than three times per week) and difficulties in having a BM (i.e., having to strain to push stool out, hard stool).

contagions

are microorganisms transmitted by close contact (direct or indirect).

contractures

are abnormal shortening of muscles that cause temporary or permanent limited ROM and sometimes the impossibility to move the joint. They are often caused by lack of use related to atrophy (wasting away of tissue and muscle), scar formation from injury, or chronic disease.

contraindicated

in reference to solutions/interventions, refers to solutions and interventions that should not be used because they may be harmful.

contusions

is a discoloration of the skin from damage to the tissue below (bruise).

COPD

is a restrictive disease that affects both the airflow in and out of the lungs.

corneal reflex

refers to bilateral blinking (corneal reflex) when a stimulus is applied to the edge of the cornea.

coronary artery disease

is a disease that affects the coronary arteries (the arteries that deliver blood to the heart muscle). It involves narrowing or blockage of the arteries, often caused by atherosclerosis.

coronaviruses

are a large family of various types of infectious viruses such as COVID-19.

costal cartilage

connects the sternum to the ribs and helps with motion to expand the chest during respiration.

crepitation

is an abnormal grating or crunching sound or sensation felt and heard over joints.

crepitus

an acute condition related to subcutaneous emphysema in which air shifts out of the lungs and into the subcutaneous tissues.

critical care response team

is an interdisciplinary group of practitioners trained in critical care and have expertise in assessing and intervening during code or pre-code situations when a client is deteriorating.

critical care response team (CCRT)

is an interdisciplinary group of practitioners trained in critical care and have expertise in assessing and intervening during code or pre-code situations when a client is deteriorating.

critical findings

are findings that require prompt and immediate action to prevent clinical deterioration or intervene when a client is deteriorating.

cues

are a sign or symptom that prompts an action such as an abnormal finding that signals a potential concern.

cultural humility approach

refers to a life-long journey in which you are humble and open to the cultural perspectives and experiences of others (Greene-Moton & Minkler, 2020).

cultural safety

Creation of safe spaces for clients to interact with health professionals without judgment, racial reductionism, racialization, or discrimination.

cutaneous

a term indicating something related to the skin.

cutaneous cysts

are encapsulated sacs under the skin filled with material, fluid or gas.

cyanosis

a discolouration that can appear as a grey/white shade with people of darker skin tones and a dusky bluish/purple shade in people with yellow and lighter skin tones, often visualized in the extremities (fingertips, toes, palms of hands, and soles of feet), conjunctiva and circumoral (around lips) and mucous membranes. Often caused by lack of oxygen in the blood and issues with tissue perfusion caused by conditions related to the respiratory, cardiovascular, and peripheral vascular systems.

cystic fibrosis

is a progressive genetic disease that primarily affects the lungs and digestive system, involving thick mucous production and persistent lung infections.

deep vein thrombosis

is the formation of a blood clot in one of the deep veins, usually a leg.

defecation

refers to the excretion of the body's indigestible contents through the anus in the form of feces.

deformities

are abnormal malformations of the body.

degenerative disc disease

is when one or more discs between the vertebrae of the spinal column wear down/deteriorate

delirium

is an acute change in cognitive status.

demyelination

is a process when the myelin sheath surrounding nerves becomes damaged and is destroyed.

dental cavities

are tiny openings onto the hard surface of the teeth caused by decay.

dermatome

is an area of the skin that follows a single spinal nerve root.

dermatomes

are areas of skin innervated by specific nerves.

desaturation

refers to the dropping of oxygen saturation via pulse oximetry.

deteriorate

refers to a patient's health/condition getting worse.

Diabetes

is a disease that affects insulin production or effective use of insulin, a hormone required to regulate blood glucose (sugar).

diabetes-related neuropathy

is nerve damage caused by diabetes resulting in symptoms such as pain, burning and tingling.

diabetic retinopathy

a disease caused by diabetes in which high blood sugar levels damage the retina's blood vessel resulting in vision impairment such as dark spots floating across the eyes, blurred vision, and vision loss.

diaphoresis

refers to excessive sweating.

diastole

is the cardiac phase when the heart's chambers are at their lowest pressure and filling with blood.

dicrotic upstroke

is an abnormal double beat of the carotid artery.

Diplopia

is double vision in which two of the same image are seen.

disconjugate movement

refers to when eyes do not move together (in unison), but rather one eye moves in a different direction than the other eye.

discrimination

refers specifically to actions against a person or community/group of people based on the group/category that they belong (e.g., race, gender, socioeconomic status).

disposition

refers to a person's general mood or attitude.

diuretics

are medications that help the heart pump better and reduce blood pressure by reducing fluid buildup in the body and increase urine output.

drape

A small sheet that is used to cover a person.

Duchenne muscular dystrophy

is a progressive disorder resulting in muscle degeneration and weakness with onset beginning in early childhood

dysarthria

is a neuromotor impairment in speaking in which clients have difficulty saying or forming a word and the strength and speed of speaking.

dysesthesia

is an abnormal sensation, such as burning, stinging, tingling, prickling, itching.

dysphagia

is an impairment in swallowing (ie., difficulty or trouble swallowing).

ear barotrauma

is ear damage that occurs because of a pressure difference in between the middle ear and the atmospheric air leading to pressure, pain, and sometimes hearing loss.

eczema

is a skin condition that causes dry skin and inflammation.

Edematous

or edema refers to swelling that occurs from excess fluid in the interstitial space.

electrocardiogram

refers to a non-invasive test where electrodes are attached to the chest and sensors detect the heart's electrical activity which is recorded on graph paper. This test aids in the diagnosis of cardiac issues such as a myocardial infarction.

emphysema

is a lung condition in which the alveoli become damaged and rupture, typically caused by smoking, and leading to hypercapnia.

enamel

is the hard and shiny surface that covers and protects the teeth.

erosions

is a breakdown of the top layer of skin/skin loss.

erythema

is a reddening or darkening of skin: with darker skin tones, erythema may appear reddish/purple in colour; with very dark skin tones, it may be difficult to visualize; and with lighter skin tones, erythema is typically dark pink to red.

exacerbate

To worsen or increase in severity

exudate (pus)

is fluid seeping from a lesion.

fasciculations

are involuntary and random twitching-like movements that aren't rhythmic.

fecal incontinence

is the involuntary release of stool.

fibromyalgia

is a chronic condition that causes pain and discomfort all over the body as well as fatigue.

First-hand

is the direct inhalation of smoke by the person smoking.

fixed pupils

refers to pupils that are non reactive to light.

flaccid/atonic

refers to muscles that have no resistance and no tone.

flat affect

refers to no emotional expression.

Floaters

are small dots or wiggly lines that move across a person's vision. They are composed of cellular debris within the eye's vitreous.

focused assessments

Assessments specific to a health issue and usually limited to one or two body systems.

fontanelles

are soft spots on the newborns head where the cranial bones have not yet fused together, allowing for movement of the bones during delivery and brain growth in the first year.

food security

is when all people have financial and physical access to a sufficient amount of healthy food (FAO, IFAD, UNICEF, WFP and WHO, 2021).

functional assessment of ROM

is the required ROM for someone to function in their activities of daily living.

gait

refers to balance and movement of limbs while walking.

gangrene

is the death of tissue that can occur when there is insufficient oxygen supply.

gastroesophageal reflux disease

is when acidic stomach contents leak from the stomach back into the esophagus.

gender incongruence

refers to when a person's gender identity is not congruent or does not align with the gender they were assigned at birth (Claahsen - van der Grinten et al., 2021).

gender non-conforming

refers to people who do not follow other people's ideas or stereotypes about how they should look or behave based on the sex they were assigned at birth.

glaucoma

is the build-up of fluid and intraocular pressure that damages the optic nerve resulting in blindness.

gritty eyes

refers to the sensation that there is some sort of grit or sand in the eyes.

guarding

refers to tense abdominal muscles as a result of nervousness, pain, cold room temperature or hands of the nurse, or ticklishness.

Halos around lights

are colourful circles (like a rainbow) around light sources such as a streetlight.

health equity

is when all individuals have fair access to resources that they need and fair opportunity to reach their full potential and optimal health and well-being (Public Health Ontario, 2023; WHO, 2023).

health history

A term often used in reference to, or in place of, the complete subjective health assessment.

health predispositions

are tendencies to suffer from a particular genetic condition

heart failure

a condition that involves a weakening of the heart muscle affecting its ability to contract and pump out sufficient stroke volume.

heartburn

is a burning sensation felt behind the sternum that develops after eating and is aggravated when in supine position.

Hematemesis

refers to blood in vomit.

hemodynamic instability

a clinical state in which circulatory perfusion is compromised.

Hemoglobin A1c

is a blood test that measures the amount of sugar (glucose) attached to hemoglobin giving a sense of the average glucose levels over the last three months.

hemopoiesis

refers to blood cell formation.

hemorrhage

refers to bleeding from a damaged blood vessel, when severe it can cause hypovolemic shock with signs of tachycardia and hypotension.

hemorrhoids

are swollen and enlarged veins in the lower part of the rectum that are sometimes visible around the anus.

hemosiderin staining

is a patch of skin where broken down hemoglobin are stored.

hepatitis

refers to inflammation of the liver. There are many types related to viruses (viral hepatitis e.g., hepatitis A, B, C), medications/drugs/alcohol, or autoimmune conditions.

hernias

refer to an organ that pushes through a weakened muscle or gap in the muscle/tissue that is supposed to hold the organ in place, resulting in an abdominal protrusion.

High-pitched sounds

High-pitched sounds are sounds with a high frequency that resemble a shrill or a piercing, sharp scream.

hordeolum

are small, red, and painful bumps on the eyelid often caused by bacterial infections (commonly called styes).

hypercapnia

refers to high blood levels of carbon dioxide.

Hyperopia

is farsightedness meaning that close-up objects are blurry

hyperpnea

is rapid and deep breathing.

hyperthyroidism

is a disease involving an overactive thyroid gland leading to high levels of thyroid hormone in the blood.

hypoxemia

refers to low levels of oxygen in the blood.

hypoxia

refers to low levels of oxygen in tissues and organs.

ideology of choice

refers to the belief that people have choice and choose their health outcomes.

ileus

refers to the lack of intestinal peristalsis movement (contraction of the muscles) in which the intestines stop moving contents through the passageway.

impulses

are movements visualized on the chest wall.

indicated/effective

, in reference to solutions/interventions, refers to solutions and interventions that are suggested as a desirable or necessary course of action.

infants

Infants are 0 -1 year old.

intercostal retractions

are when the intercostal muscles are pulled inward when breathing.

intercostal tugging/pulling/retractions

are when the muscles in between the ribs are sucked inward when breathing.

internalized powerlessness

is when an oppressed person/group internalizes the beliefs of the advantaged group or the group in power, making them feel like they have no power.

interstitial space

is the area that surrounds the vasculature and the body's tissues and organs in which fluid passes back and forth between capillaries and the tissue.

intraluminal

are valves within the veins.

intraluminal valves

are valves within the veins.

ipsilateral

refers to same side.

irritable bowel syndrome

a functional disorder of the bowels that affects the function, not the structure, leading to pain, bloating, gas, diarrhea, and constipation.

ischemia

is a deficit of oxygen-rich blood to tissue.

isometric muscle contraction

is a muscle contraction without movement such as tightening the muscle.

Joyce Echaquan

was an Indigenous woman who was not provided effective care for pain and died from pulmonary edema. https://pressbooks.library.torontomu.ca/assessmentnursing/chapter/inclusive-health-assessments-with-indigenous-clients/

labile affect

refers to rapid and exaggerated changes in mood.

labyrinthitis

is inflammation of the labyrinth in the inner ear, can lead to hearing loss and vertigo.

laceration

is a cut or tear in the nail.

language discordance

is when you (ie., the nurse) and the client do not speak the same language.

lentigo

is a small patch of skin that is darker than surrounding skin.

Lentigo/lentigines

are flat, irregular shaped macula that are slightly darker than the client's normal skin colour and found on sun-exposed areas of the body.

lesions

A general term referring to an abnormal appearance or growth.

limbus

refers to the border between the cornea and the sclera, looks like a darker ring around the iris.

lipid panel

is a blood test that measures lipids (fats) in the blood stream.

lobectomy

is the surgical removal of one of the lobes of the lung.

Low-pitched sounds

Low-pitched sounds are sounds with a low frequency that resemble a booming drum or a person with a deep, low voice.

lupus

is an autoimmune disease that causes inflammation.

lymphadenopathy

refers to diseases of the lymph nodes resulting in enlarged lymph nodes.

lymphatic vessels

are a network of vessels throughout the body similar to the vascular network.

lymphedema

refers to swelling in interstitial spaces (usually in the arms and legs) as a result of conditions that obstruct or puts pressure on the lymphatic vessels and/or lymph nodes such as cancer treatments (e.g., radiation, lymph node removal), obesity, and physical trauma such as fractures.

lymphomas

are cancers of the lymphatic system that begin in the lymphocytes (white blood cells).

macular degeneration

refers to damage to the macula in the back of the eye (retina) that results in the loss of central vision.

malformations

are faulty formations of a structure such as body tissue or organs.

malignant

refers to abnormal cell division (i.e., cancer).

malleoli

is the bony prominence on each side of the ankle.

measles

are a highly infectious viral infection characterized by a fever and a rash.

mechanism of injury

refers to the method or cause of trauma to the musculoskeletal system.

melanin

a substance that produces pigment and typically the more that is produced the darker the skin.

melanoma

is an aggressive and severe type of skin cancer.

Ménière's disease

is an idiopathic disease that involves an abnormality in the labyrinth of the inner ear causing symptoms such as vertigo, balance issues, hearing impairment, and tinnitus.

migraine

is a specific type of headache that is typically reoccurring and described as throbbing and pounding. It can last hours or days. Additionally, migraines have associated symptoms such as nausea, vomiting, visual auras, and sensitivity to noise, light, and smells. Although the cause of migraines is not clear, triggers vary from person to person, and can include stress, lack of sleep, dehydration, weather changes, and food/drinks such as alcohol, caffeine, cheese, and chocolate.

migraines

are a neurological condition often described as throbbing, pulsating, and pounding intense headaches with associated symptoms such as nausea and vomiting, sensitivity to light, noise and smell, and auras.

miosis

refers to excessive constriction of pupil.

mitral regurgitation

refers to when the valve does not fully close and blood flows backwards.

morbidities

refers to having more than one disease or condition.

motor system

includes central and peripheral structures in the nervous system that supports the planning and executing of simple and complex motor functions such as movement.

movement disorders

are neurological disorders that affect movement resulting in increased, decreased, and altered movement. For example, dystonia is characterized by involuntary muscle movements such as contractions and tremors as well as painful muscle cramps.

mydriasis

refers to excessive dilation of the pupil.

Myopia

is nearsightedness meaning that distant objects are blurry.

nasal polyps

are benign growths lining the nasal cavity or sinuses.

nausea

is an uneasiness in one's stomach in which one feels like they may vomit.

neoliberal

in the context of healthcare, refers to an emphasis on personal autonomy and individualism.

neoplasms

an abnormal growth.

neurodegenerative disorders

are diseases and conditions that damage and progressively destroy parts of the nervous system.

neurodiverse conditions

is an umbrella term referring to various conditions that affect a person's brain processes affecting how they learn and behave (e.g., autism, dyslexia, attention deficit hyperactivity disorder).

nevi

is a mole.

nitrates

are nitrogen-based chemicals found in some foods such as in some processed meats, wine, and chocolate.

nociceptors

are sensory neurons that mediate pain.

nodules

are a general term referring to any lump.

non-binary

refers to people who feel their gender cannot be defined based on the gender binary.

nonessential

in reference to solutions/interventions, refers to solutions and interventions that are not needed and not absolutely necessary.

normal findings

are findings that are not of concern and expected for a client's age, developmental stage, and sex.

nystagmus

is repetitive, involuntary eye movement in which the eye looks like it is quivering and can move up-down, side-to-side or in a circular motion.

objective

are information that is collected when performing a physical exam.

objective data

Information that the health professional collects when performing a physical exam.

ocular fundus reflex

is the reflection of the ophthalmoscope light from the back of the eye.

ocular opacities

refers to the loss of transparency when the cornea becomes opaque (cloudy) due to damage or scarring.

oliguria

is decreased urine output.

open fractures

when the bone protrudes through the skin and is exposed to the external environment.

Opioid

is a powerful narcotic substance typically used for pain management such as oxycodone, morphine, and fentanyl.

oppressive

refers to burdensome and unjust impositions of power upon a person or group.

orthostatic hypotension

is a drop in blood pressure when the client moves from lying to sitting to standing.

osteoarthritis

is a degenerative joint disease resulting in pain, stiffness, and reduced mobility

osteogenesis imperfecta

is a genetic disorder present at birth resulting in soft bones that are formed normally and fracture easily with minimal injury or no obvious trauma

otitis externa

is inflammation or infection of the external ear canal when caused by bacteria or fungus growth.

otitis media

is an inflammation and/or infection of the middle ear usually when there is an accumulation of fluid (effusion)

leading to bacterial and viral growth (often associated with eustachian tube malfunction that is responsible for pressure equalization and normal fluid drainage).

otosclerosis

refers to abnormal bone growth in the middle ear.

ototoxic

are medications that can damage the ears causing hearing impairment, balance problems, and tinnitus.

overnutrition

is increased intake of food, calories and nutrients than the body requires.

oxygenated blood perfusion

refers to the flow of blood that is oxygenated to the body's tissues such as the legs.

pallor

is a discolouration that can appear as a grey shade to the mucous membranes/lips, nail beds, extremities in people with darker skin tones, a yellowish shade in people with lighter brown skin, a pale whitish shade in people with lighter skin tones, and a white or very pale pink conjunctiva in all people. The discolouration reflects a combination of the client's normal skin colour and the connective tissue (white) with the lack of oxygenated hemoglobin due to many states when the sympathetic nervous system is activated (with stress), hypothermia, shock, and anemia. Pallor affects the integument colour because blood is shunted towards the vital organs.

palpebral fissures

are the opening/space between the upper and lower eyelids.

papules

paraesthesia

refers to abnormal sensory sensations such as numbness (loss of feeling) or tingling (sometimes described as pins and needles) or other characteristics such as burning and prickling.

paralysis

is the inability to move a muscle such as a limb.

paresis

is decreased muscle strength of the voluntary muscle groups (often referred to as muscle weakness).

pectus excavatum

is a congenital condition where the sternum is sunken into the chest at birth and can worsen with age, affecting breathing.

pericarditis

is inflammation of the pericardium, the layer of tissue surrounding the heart.

peripheral arterial disease

a condition causing narrowed arteries and restricting or blocking blood flow to the extremities.

peripheral artery disease

a condition causing narrowed arteries and restricting or blocking blood flow to the extremities.

peripheral vascular disease

refer to a group of diseases that affect the arteries and veins in the arms, legs, and abdominal area.

peritoneal cavity

is the potential space in between the parietal peritoneum (a membrane which surrounds the abdominal cavity) and the visceral peritoneum (a membranes which surrounds the abdominal organs).

peritonitis

refers to inflammation of the peritoneal cavity that can be caused by a variety of conditions.

petechia

are small non-blanchable red or purple spots caused by blood loss under the skin.

photokeratitis

is painful eye damage caused from exposure to ultraviolet light

photosensitivity

is skin sensitivity when exposed to the sun.

pitting edema

refers to an indentation that remains after applying pressure over the location.

pleural effusion

refers to excessive fluid accumulation in the pleural space between the visceral and parietal pleura.

pneumonia

is a lung infection leading to inflamed airways and excessive mucous production, typically caused by bacteria or virus.

pneumothorax

is when air leaks into the pleural space pushing on the lung and causing partial or complete collapse of the lung.

postauricular skin

referring to behind the ear.

power

refers to the capacity to influence.

preeclampsia

is a serious and life-threatening condition associated with a rise in blood pressure, proteinuria, and swelling.

Presbyopia

refers to a condition that affects the aging eye (40 to 50 years of age) resulting in difficulty seeing close-up objects (objects become blurry).

primary source

Data provided by the client.

prosthetics

are artificial devices that replace a missing body part such as an artificial limb

proton pump inhibitors

are a type of medication that reduces acid secretion, often used in combination with antibiotics to treat ulcers in the presence of H. pylori.

prurigo

is a chronic condition causing itching.

pruritus

is itchy skin.

Psoriasis

is a skin condition that causes a rash, scaling, and itching.

psychometric testing

refers to evaluating whether a tool is measuring what it is designed to measure (validity), whether the tool results in consistent responses under similar conditions or with the same level of pain (reliability), and whether the tool is sensitive to detect changes in pain (responsiveness).

pterygium

is a benign fleshy growth on the eye's conjunctiva that grows onto the cornea.

Ptosis

refers to the drooping of the upper eyelid over the eye.

pulmonary embolism

is a serious issue in which a blood clot travels from a blood vessel to the lungs, blocks an artery, and suddenly blocks blood flow can lead to symptoms such as sudden shortness of breath and chest pain.

pulmonary hypertension

refers to high blood pressure in the pulmonary arteries.

pulsatility

The quality of pulsations, such as the pulse.

racial trauma

refers to the cumulative and traumatic effects of racism and its continual reoccurrence, including psychological and physical effects (e.g., stress, nightmares, flashbacks, headaches, heart palpitations) (Comas-Diaz et al., 2019).

racism

refers to individual behaviour and policies and practices entrenched by biased attitudes based on race and privileging white people and disadvantaging racialized people.

radiocarpal joint

Is where the radius bone meets the carpal bones.

rapid response systems

refers to an institution's approach to an urgent situation of managing a deteriorating client. It typically involves a team of critical care providers who are available to rush to the bedside of any deteriorating client.

referred pain

is pain that is felt in a location other than the origin of the pain.

refractive errors

are a condition in which the eye has problems bending and focusing light appropriately onto the retina (back of the eye) making it difficult to see.

regurgitation

refers to blood leaking backwards through the valve.

residual volume

is the volume of air that stays in the lungs after a maximum expiration.

retinal detachment

is an emergency situation when the retinal tissue pulls away from the back of the eye (without immediate treatment it can result in permanent loss of vision).

Review of the Systems

Questions specific to each body system.

rigidity

is increased muscle resistance that is consistent at rest and with movement.

rosacea

is a condition where the facial cheeks and nose have a flushed appearance from enlarged facial blood vessels.

RSV

is a common respiratory virus called respiratory syncytial virus affects people of all ages particularly children with cold-like symptoms of coughing, runny nose, and fever.

salivary glands

are glands in the mouth that produce saliva, providing moisture in the mouth and assisting with digestion of food.

sclera

is the white part of the eye.

sebaceous

sometimes referred to as oil glands and produce and secrete sebum (a protective substance that helps retain moisture) all over the body except the palms of hands and the soles of feet.

seborrheic dermatitis

is a condition that mainly affects the scalp, causing scaly patches and inflammation.

seborrheic keratosis

is a benign growth associated with aging.

second-hand

is the inhalation of exhaled smoke from another person or smoke from a burning cigarette.

secondary sources

Data provided by someone other than the client.

sedation

is medication that relaxes the client, induces sleep, and reduces agitation and irritability.

seizures

are sudden changes in the brain's electrical function that affects consciousness, sensations, muscle tone and movement.

sepsis

is a life-threatening bodily response to infection that can lead to tissue damage.

Shingles

viral infection that can cause a painful rash.

shock

is a life-threatening state whereby the body is not getting enough blood flow.

sickle cell disease.

is an inherited red blood cell disorder that affects the hemoglobin causing red blood cells to become sticky and C-shaped.

signs

Something that the health professional observes.

sinusitis

is an infection involving fluid accumulation and inflammation in the sinuses.

skin discolouration

refers to a change in colour from the person's natural skin colour.

skin folds

are when two areas of skin lie in close contact and fold onto one another such as in between rolls of adipose tissue or under the breasts.

somatosensory nervous system

refers to the network of nerve cells throughout the brain and body that produce the perception pain and other sensations such as touch and temperature.

spasticity

is increased muscle resistance that decreases with continuous movement and worsens at extreme ROM.

spinal cord injuries

are injuries to the spinal cord that can result in weakness, loss of sensations, paralysis, breathing problems, and impairment in bladder and bowel control.

squamous cell carcinoma

is a type of skin cancer.

St. John's wort

is a plant, commonly used as a dietary supplement/herbal remedy.

St. John’s wort

is a plant, commonly used as an herb for depression.

staccato touch

Quick, short taps.

standing orders

are written protocols that authorize designated members of the health care team (e.g., nurses) to complete certain tasks (e.g., apply oxygen) without a physician order.

Steven-Johnson syndrome/toxic epidermal necrolysis

is a severe disorder that affects the mucous membranes, typically caused by certain medications.

Strabismus

is misalignment of the eyes in which they don't work together because one is pointed in a different direction. This results in double vision, poor revision, and amblyopia (image suppression from the affected eye meaning that the brain relies on the unaffected eye's vision). Often clients are born with it or develop it at a young age, but adults can also develop it as a result of neurological conditions.

strength-based approach

An approach or philosophy that focuses on empowerment, views the client as resourceful, and emphasizes their strengths, but does not ignore their challenges.

structural barriers

refers to barriers that affect certain groups disproportionately and perpetuate disparities in outcomes. These structures can include practices, policies, and norms that privilege advantaged groups while systematically disadvantaging oppressed and marginalized groups.

subcutaneous emphysema

is when air shifts out of the lungs and into the subcutaneous tissues as a result of traumatic, surgical, or infectious causes.

subjective

are information that the client shares spontaneously or in response to a question.

subjective data

Information that the client shares with the health professional.

subjective data

Information that the client shares with you.

subungual hematoma

is bleeding under the nail.

summation

is when frequent stimuli are perceived as one stimulus.

Supplemental oxygen

is oxygen added in addition to what a person normally breathes in from the air, often provided via a face mask or nasal prongs.

symptoms

Something that the client feels.

syncope

is a temporary loss of consciousness commonly described as fainting.

systemic oppression

also referred to as institutional oppression, is when established customs and practices reflect and produce mistreatment and inequities based on a person's membership in a social group.

systole

is the cardiac phase when the heart is full of blood and the ventricles contract ejecting blood into the arteries.

tachypnea

is rapid respiratory rate.

tangential lighting

refers to a light (penlight) directed from the side at a low angle across the body.

third-hand smoke

is exposure to the residue left on surfaces (e.g., furniture, walls) from smoke.

thoracic duct

is the largest lymphatic vessel in the body that returns lymph to the vasculature.

title table test

is an automatic table that moves the client from supine to a standing position while measuring blood pressure and pulse at various intervals.

toxic erythema from chemotherapy

is a skin reaction to chemotherapy.

transgender

refers to a person whose gender identity incongruent with their sex at birth.

trauma

Trauma is the response or outcome of a distressing experience or event that affects a person's sense of self and overwhelms a person and their ability to function and cope (e.g., violence, accident, natural disaster).

trauma-informed approach

recognizes clients may have a history of trauma and integrates principles of safety, choice, collaboration, trustworthiness, and empowerment into care approaches (Arthur et al., 2013).

traumatic brain injury

is an injury to the brain that occurs as a result of an external, physical bump or jolt to the body/head (referred to as TBI).

tremors

are involuntary rhythmic twitching-like movements.

trends

are general directions/changes over time (e.g., weight loss or weight gain).

tricuspid valve stenosis / prolapse

refers to a narrowing of the tricuspid valve or when the valve does not close completely and bulges up into the atrium leading to regurgitation/leaking of blood backwards.

tripod position

is leaning forward with hands and/or forearms resting on their legs or another surface such as a table.

tugging/pulling/retractions

are when the muscles in between the ribs are sucked inward when breathing.

ulcerations

is an open sore related to inadequate blood perfusion.

ulcers

open sores.

unconditionally accepting way of being

Behaviour of accepting the client, respecting their right to self-determination, and supporting them regardless of our perception of what they say or do.

undernutrition

is a deficiency of calories and nutrients.

unrelated

in reference to solutions/interventions, refers to solutions and interventions that are not connected or related to the problem.

urinalysis

is a series of tests that examine the urine.

urinary stasis

is when the bladder doesn't empty completely (also referred to as urinary retention).

vaccine hesitant

is when a person is reluctant or refuses to receive a vaccine.

varicose veins

are dilated, bulging, and twisted veins that can often be observed on the skin's surface and can also be deep within the leg and not visible.

vasodilators

are medications that are used to to lower blood pressure and treat heart failure and angina by relaxing the vasculature muscles and dilate the blood vessels (ie., open up or widen the blood vessels).

vasopressors

are medications that support blood pressure.

Venous hypertension

refers to high blood pressure in the veins.

venous stasis

is a collection or pooling of blood in the veins typically in the legs.

vesicular

is a term that refers to a structure containing vesicles.

vestibular neuritis

is inflammation of the vestibulocochlear nerve (cranial nerve VIII), can lead to vertigo.

victim blaming

refers to when those who are affected by ill-health and blamed for their health choices.

vital capacity

is the maximum volume of air that is expired following maximum inspiration.

vitiligo

is a chronic skin condition characterized by patches of depigmented skin.

vitreous detachment

is when the vitreous pulls away from the retina resulting in floaters and flashes of light (the vitreous is a jelly-like substance that fills the inside of the eye and is connected to the retina). Although in of itself is not serious, it can cause retinal detachment.

vocal intonation

Rise and fall of voice.

well-demarcated

to set clear and obvious borders of where the condition starts and ends

Xanthoma

is a skin condition where fat builds up under the surface the skin.

Practice

Epilepsy

One or more interactive elements has been excluded from this version of the text. You can view them online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=3865#audio-3865-1

pathology

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://pressbooks.library.torontomu.ca/assessmentnursingmain/?p=3865#h5p-281

– H5P audio and it can't go any smaller

pathology Pathology – goes to an attachment page, you're unable to just listen
Pathology – goes to the website page, unable to just listen

pathology Pathology – audio but brings you to another page as well