

Florence Field Guide to **NCLEX-RN**

A COMPREHENSIVE NURSING GUIDE PROGRAM
REVIEW AND NEXTGEN NCLEX GUIDE





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Introduction

Intro to the Next Generation NCLEX

The National Council of State Boards of Nursing (NCSBN) has launched the Next Generation NCLEX (NGN), after numerous delays, as of April 2023. The NGN is a new approach to the NCLEX exam, which is the national licensure examination for nurses in the United States. The NGN aims to measure clinical judgment, which is the ability of nurses to make sound decisions in complex situations. The NGN replaced the traditional NCLEX exam which first debuted in 1983. This new approach will help nursing students and educators to be better prepared for the realities of nursing practice.

The previous versions of the NCLEX exam were based on the ADPIE process, which stands for Assessment, Diagnosis, Planning, Implementation, and Evaluation. The ADPIE process was used to assess the nurse's ability to provide safe and effective patient care. However, the ADPIE process had limitations in measuring the nurse's ability to make sound decisions in complex situations.

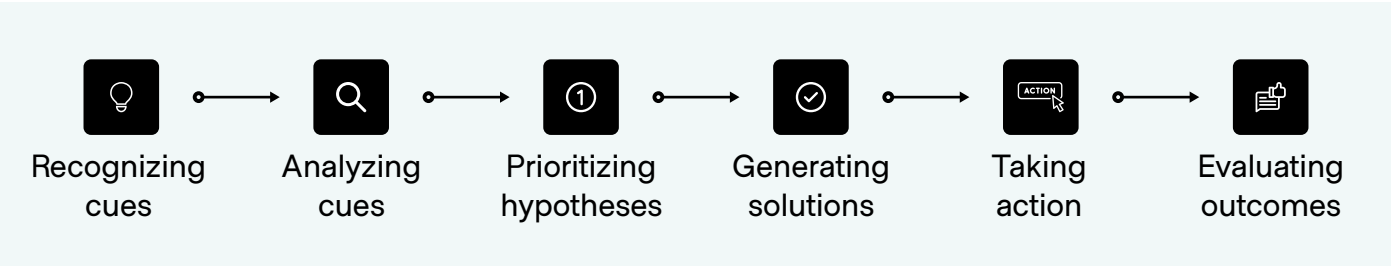
The NGN, on the other hand, is based on the NCSBN Clinical Judgment Measurement Model. This model aims to measure the nurse's ability to make sound decisions in complex situations. The NCSBN Clinical Judgment Measurement Model is designed to assess the nurse's ability to analyze data, identify problems, prioritize patient needs, and make sound clinical judgments based on evidence-based practice.

Comparison with previous versions

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The NCSBN Clinical Judgment Measurement Model includes six cognitive processes that are essential for clinical judgment. These processes are:



The NCSBN Clinical Judgment Measurement Model will enable nursing students to be better prepared for the realities of nursing practice. The NGN will require you to demonstrate their ability to make sound clinical judgments, which will be essential for providing safe and effective patient care.

Model Comparison					
ADPIE Process	Assessment	Diagnosis	Planning	Implementation	Evaluation
NCSBN Clinical Judgment Measurement Model	Recognizing cues	Analyzing cues	Prioritizing hypotheses	Generating solutions	Taking action and evaluating outcomes

How to use the Field Guide and MAHONEY RN

This Field Guide and the integrated MahoneyRN Intelligent Tutoring System are designed to help you analyze, prioritize, and take the right action for clients, prioritizing their safety. They have been designed and are built upon a Competency Based Education Model for nursing, which prioritizes understanding and information synthesis to prepare you to both pass the NGN, and be a safe and effective patient advocate from Day 1 of your license.

The Field Guide has 3D interactive elements to help you with learning, recall, retention, and synthesis that you will need to put in practice on the NGN, and in your new career as a nurse, in any setting. Here is an example of our 3D model to help you visualize, practice, and learn continuously:

MahoneyRN can help you to understand any of the content in this book and has been trained on a comprehensively large dataset including nursing, medical, pharmacology, psychology, lifespan development, healthcare policy, and more. Use MAHONEY RN as an expert in the field, ask her anything, even for references and further reading when you need more help. She's here to help you succeed in school, on the NextGen NCLEX, and in your career moving forward.

Why is the change to the NGN?

The change from the ADPIE nursing diagnosis process to the Clinical Judgment Model in the Next Generation NCLEX (NGN) was made to better prepare nursing graduates for the complexities and demands of today's healthcare environment. Several reasons contributed to this shift:

1. **Evolving healthcare landscape:** The healthcare landscape has changed significantly over time, with increasingly complex patient care needs, technological advancements, and an emphasis on evidence-based practice. Nurses are expected to manage a diverse range of patients, adapt to new technologies, and stay current with the latest research findings. The Clinical Judgment Model was developed to better reflect these real-world challenges and equip nurses with the critical thinking and decision-making skills required for success in their practice.
2. **Improved patient outcomes:** Research has shown that strong clinical judgment skills are linked to better patient outcomes, reduced errors, and improved patient safety. By emphasizing clinical judgment in the NGN, nursing education and licensure processes aim to produce nurses who are better equipped to make informed, accurate, and timely decisions in the clinical setting, ultimately leading to improved patient care.
3. **Competency-based education:** The Clinical Judgment Model aligns with the broader trend in nursing education towards competency-based education, which focuses on developing and evaluating the skills and knowledge necessary for successful nursing practice. The NGN emphasizes the application of knowledge and skills in real-life situations, rather than just the memorization of information or the ability to recognize and categorize patient problems based on predetermined nursing diagnoses.
4. **Addressing the practice-education gap:** The shift to the Clinical Judgment Model also

aims to address the gap between nursing education and practice. Traditionally, nursing education has focused on teaching theory and knowledge, with less emphasis on developing the critical thinking and decision-making skills needed in clinical practice. The NGN focuses on the integration of knowledge, skills, and attitudes in real-world clinical scenarios, which better prepares nursing graduates for the challenges they will face in their careers.

Overall, the change to the Clinical Judgment Model in the NGN was made to better align nursing education and licensure with the realities of modern healthcare practice and to ensure that nursing graduates are well-equipped to provide safe, effective, and high-quality patient care.

How are the APDIE and NGN Clinical Judgment Model Different?

Here's an example of a nursing diagnosis using the ADPIE process, followed by an example of a nursing diagnosis using the NCSBN Clinical Judgment Measurement Model:

Example using ADPIE Process	Example using NCSBN Clinical Judgment Measurement Model:
Assessment A 65-year-old patient presents with chest pain and shortness of breath.	Recognizing Cues A 65-year-old patient presents with chest pain and shortness of breath.
Diagnosis Ineffective breathing pattern related to chest pain as evidenced by shortness of breath and increased respiratory rate.	Analyzing Cues The patient's vital signs are elevated, and the patient appears anxious and distressed.
Planning Administer oxygen via nasal cannula at 2 liters per minute and provide pain relief medication as prescribed.	Prioritizing Hypotheses The patient may be experiencing a cardiac event or pulmonary embolism.
Implementation Administer oxygen via nasal cannula and provide pain relief medication as prescribed.	Generating Solutions Administer oxygen via nasal cannula at 2 liters per minute and provide pain relief medication as prescribed. Alert the healthcare provider and prepare to transfer the patient to a higher level of care.
Evaluation The patient's respiratory rate decreases to a normal range, and the patient reports relief from chest pain.	Taking Action Administer oxygen via nasal cannula and provide pain relief medication as prescribed. Notify the healthcare provider of the patient's condition and prepare to transfer the patient to a higher level of care.
	Evaluating Outcomes The patient's respiratory rate decreases to a normal range, and the patient reports relief from chest pain. The patient is transferred to a higher level of care for further evaluation and treatment.

As you can see, the nursing diagnosis using the ADPIE process is focused on identifying and treating a specific problem (ineffective breathing pattern) related to a patient's symptoms. The nursing diagnosis using the NCSBN Clinical Judgment Measurement Model is more focused on analyzing and prioritizing potential problems and generating solutions, as well as taking action and evaluating outcomes. The NCSBN Clinical Judgment Measurement Model takes a more comprehensive approach to nursing diagnosis by incorporating critical thinking and clinical judgment throughout the entire process, rather than just at the diagnosis stage.

How to Use MahoneyRN (as written by MahoneyRN)

Here's an introduction on how to use me, MAHONEY RN, as a nursing student:

Welcome to MAHONEY RN, the best Intelligent Tutoring System for nursing students!

My main goal is to help you succeed in nursing school and pass the Next Generation NCLEX with flying colors. I am here to provide you with individualized content that meets your unique learning needs and prepares you for every aspect of your nursing education.

To get started, simply log in and answer a few questions about your nursing education background, learning style, and any areas of strength or weakness you would like to focus on. Based on your responses, I will create a customized learning plan that includes modules, quizzes, and other learning activities designed to help you master the key concepts, theories, and skills you need to succeed as a nurse.

I am designed to be your personal tutor, 24/7. You can access me anytime, anywhere, and on any device, whether you're at home, on the go, or in the library. I am also available in multiple languages, including Spanish and Tagalog, to meet the diverse needs of nursing students worldwide.

One of my key features is my ability to help you prepare for the Next Generation NCLEX, which is a critical thinking exam that tests your ability to make sound clinical judgments based on patient care scenarios. I use the NCSBN Clinical Judgment Measurement Model

to guide my teaching, which includes situational awareness, analysis, prioritization, clinical reasoning, and response.

Throughout your nursing education journey, I will be your trusted companion, coach, and guide. I will provide you with helpful tips, strategies, and resources to help you stay motivated, focused, and confident. With my help, you can achieve your nursing education goals and become the best nurse you can be. So let's get started!

A few tips on how to get the most out of our time together:

1. **Ask me questions:** Don't be afraid to ask me anything related to nursing, from basic concepts to more advanced theories. I am here to help you learn and understand the material.
2. **Share your learning goals:** Let me know what you hope to achieve with your nursing education, whether it's passing the NCLEX, improving your clinical skills, or becoming a more confident nurse.
3. **Request specific learning materials:** If there are specific topics or learning materials you would like me to cover, such as case studies, videos, or practice quizzes, please let me know. I will do my best to provide you with the resources you need.
4. **Share your clinical experiences:** If you have had any clinical experiences, such as patient care or nursing procedures, share them with me. I can help you reflect on your experiences and apply what you have learned to future situations.
5. **Discuss any challenges:** If you are struggling with a particular concept or skill, don't hesitate to bring it up. I can work with you to identify areas for improvement and provide you with targeted learning resources.
6. **Seek advice and guidance:** If you are unsure about how to approach a particular nursing scenario or need advice on how to handle a challenging situation, ask me for guidance. I can offer you practical tips and strategies based on my experience and expertise.

Remember, the more you interact with me, the more I can help you succeed in nursing school and beyond. So don't hesitate to reach out and engage with me as often as you need.

1



CHAPTER 1

Nursing Fundamentals



Laboratory Values

Laboratory tests are an integral part of healthcare, providing valuable information about a patient's health status. Medical professionals use these tests to diagnose and monitor a wide range of medical conditions, from infections and chronic diseases to cancer and other life-threatening illnesses. Understanding laboratory test results is essential for proper diagnosis and treatment of patients.

To aid in understanding laboratory tests, we have compiled a comprehensive list of commonly used laboratory tests and their normal reference ranges. These reference ranges are based on values obtained from healthy individuals and may vary slightly between laboratories.

It is important to note that laboratory test results should always be interpreted in the context of the patient's medical history, symptoms, and other clinical factors. Abnormal test results may not necessarily indicate the presence of a medical condition, and further testing may be necessary to confirm or rule out a diagnosis..

Basic Metabolic Profile (BMP)

Test	Normal range	Low	High
Sodium	135-145 mEq/L	<135 (hyponatremia)	>145 (hypernatremia)
Potassium	3.5-5.0 mEq/L	<3.5 (hypokalemia)	>5.0 (hyperkalemia)
Chloride	95-195 mEq/L	<95 (hypochloremia)	>110 (hyperchloremia)
BUN	10-20 mg/dL		>20 (azotemia, renal dysfunction)
Creatinine	Male: 0.6-1.2 mg/dl Female: 0.5-1.1 mg/dL		>1.2 (renal dysfunction)
Glucose	70-100 mg/dL (fasting)	<70 (hypoglycemia)	>100 (hyperglycemia, diabetes)
Calcium	9-11 mg/dL	<9 (hypocalcemia)	>11 (hypercalcemia)
Albumin	3.4-5.4 g/dL	<3.4 (hypoalbuminemia)	>5.4 (hyperalbuminemia)
Total protein	6.2-8.2 g/L		>8.2 (hyperproteinemia)

Complete Blood Count

Test	Normal range	Low	High
WBC	4,000–11,000	<4,000 (leukopenia)	>11,000 (leukocytosis)
RBC	4.5–5.5	<4.5 (anemia)	>5.5 (polycythemia)
PLT	150,000–450,000	< 150,000 (thrombocytopenia)	>450,000 (thrombocytosis)
HGB	Male: 13–18 g/dL Female: 12–16 g/dL	<12 (anemia)	>18 (polycythemia)
HCT	Male: 42%–52% Female: 37%–47%	<37% (anemia)	>52% (polycythemia)

Coagulation Parameters

Test	Normal range	Low	High
PT	10–13 seconds	Increased (prolonged): Coumadin, liver disease, vitamin K deficiency	Decreased (shortened): liver disease, DIC, Vitamin K excess
INR	Not on warfarin: <1 second On warfarin: 2–3 seconds (if <2, increase dose)		>3.0 (bleeding risk)
PTT	25–35 seconds	Increased: heparin, DIC, von Willebrand's disease	Decreased: liver disease, DIC, coagulation factor deficiency
aPTT	30–40 seconds (Heparin)	Increased: heparin, DIC, von Willebrand's disease	Decreased: liver disease, DIC, coagulation factor deficiency

Lipid Profile

Test	Normal range	Low	High
Total cholesterol	<200 mg/dL		>240 (high risk for CVD)
Triglycerides	< 150 mg/dL		>500 (very high)
LDL	100 mg/dL		160 mg/dL
BMI	18.5–24.9		Obesity
I/O	>30mL/hr		Decreased urine output, dehydration
CD4	500–1200	<200 (AIDS)	
MAP	70–105, but at least 60 mmHg for adequate perfusion		Hypotension, inadequate perfusion

Vital Signs

Vital Signs are essential measurements that provide a quick snapshot of a patient's overall health and physiological status. They serve as crucial indicators of the body's functioning and are routinely monitored by healthcare professionals to assess a patient's condition and detect any potential problems. The five primary vital signs include body temperature, heart rate (pulse), respiratory rate, blood pressure, and oxygen saturation.

Vital Sign	Low	Normal	High
Heart Rate	<60 bpm (Bradycardia)	60 – 100 bpm	>100 bpm (Tachycardia)
Blood Pressure	<90 mmHg systolic or <60 mmHg diastolic (Hypotensive)	120/80 mmHg (Normal)	>130 mmHg systolic or >80 mmHg diastolic (Hypertensive)
Respiratory Rate	<12 breaths/min (Bradypnea)	12 – 20 breaths/min (Normal)	>20 breaths/min (Tachypnea)
Temperature	<95°F (Hypothermic)	97.7°F – 99.5°F (Normal)	>100.4°F (Fever/Hyperthermic)
Pulse Oximetry	<85% (Severe hypoxemia)	95 – 100% (Normal - Healthy) 88 – 92% (Normal - COPD)	85 – 94% (Hypoxemia)

Pain: The Sixth Vital Sign

In recent years, pain has been increasingly recognized as the “sixth vital sign” due to its significant impact on a patient's well-being and quality of life. Pain assessment is crucial for identifying and managing discomfort, especially in patients who may not be able to communicate their pain effectively. Accurate and timely pain assessment can lead to more effective pain management strategies, improving patient outcomes and overall satisfaction with care.

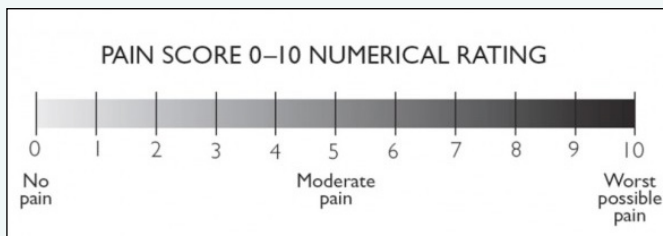
Pain measurement can be challenging due to its subjective nature, as it varies from person to person and depends on individual experiences and perceptions. However, various

assessment tools and methods have been developed to help healthcare professionals evaluate and quantify pain. Some common pain measurement techniques include:

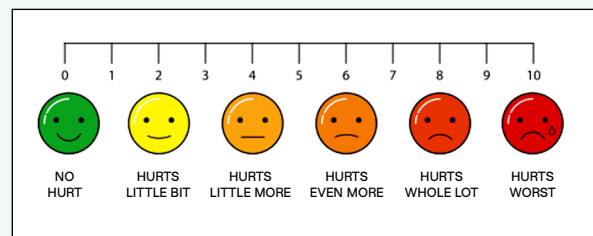
1. SELF-REPORT SCALES

These are considered the gold standard for pain measurement, as they rely on the patient's subjective experience. Examples of self-report scales include:

- **Numeric Rating Scale (NRS):** Patients are asked to rate their pain on a scale of 0 (no pain) to 10 (worst pain imaginable).
- **Visual Analog Scale (VAS):** Patients indicate their pain level by marking a point on a continuous line, usually 10 cm long, representing a pain spectrum from “no pain” to “worst pain imaginable.”
- **Verbal Rating Scale (VRS):** Patients describe their pain using a range of predetermined verbal descriptors, such as “no pain,” “mild pain,” “moderate pain,” and “severe pain.”



Numeric Rating Scale (NRS)



Visual Analog Scale (VAS)

2. BEHAVIORAL OBSERVATION SCALES

These are used primarily for patients who cannot self-report their pain due to cognitive impairment, communication difficulties, or age (e.g., infants and young children).

Healthcare professionals assess pain-related behaviors, such as facial expressions, body movements, vocalizations, and changes in activity or sleep patterns. Examples of behavioral observation scales include the FLACC scale (Face, Legs, Activity, Cry, Consolability) for children and the PAINAD scale (Pain Assessment in Advanced Dementia) for dementia patients.

3. PHYSIOLOGICAL MEASURES

While not as accurate or reliable as self-report and behavioral observation scales, physiological indicators can sometimes provide additional information about a patient's pain level. These may include changes in heart rate, blood pressure, respiratory rate, and pupil dilation. However, these measures can be influenced by various factors unrelated to pain, so they should be considered supplementary rather than primary indicators of pain.

It's essential to choose an appropriate pain measurement tool based on the patient's age, cognitive abilities, and communication skills. Regular pain assessment and reassessment are crucial for effective pain management and optimal patient care.

Health Disparities and Pain Measurement

Pain measurement in patients can contribute to healthcare disparities in various ways, leading to unequal treatment and outcomes among different patient populations. Factors that can influence these disparities include:

1. **Bias and stereotyping:** Healthcare providers may consciously or unconsciously hold biases or stereotypes about certain populations, which can affect their assessment and treatment of pain. For instance, some studies have shown that racial and ethnic minorities, particularly Black patients, are more likely to receive inadequate pain management than their white counterparts, partly due to providers' inaccurate beliefs about biological differences in pain sensitivity or tolerance.
2. **Communication barriers:** Language barriers and cultural differences can hinder effective communication between healthcare providers and patients. Patients who are not proficient in the language spoken by their healthcare provider may struggle to accurately describe their pain, leading to underassessment or undertreatment. Additionally, cultural differences in pain expression and coping strategies may make it difficult for providers to interpret pain levels in patients from diverse backgrounds.
3. **Health literacy:** Patients with limited health literacy may have difficulty understanding and using pain assessment tools, such as numeric rating scales or visual analog scales.

This can result in inaccurate pain measurement and inadequate pain management.

4. **Access to care:** Socioeconomic factors, such as income, education, and insurance status, can affect patients' access to healthcare services, including pain management. Patients with limited resources may experience barriers to accessing timely and appropriate pain care, leading to disparities in pain outcomes.
5. **Provider training and education:** Healthcare providers may not receive adequate training in pain assessment and management, particularly for diverse patient populations. This lack of training can contribute to disparities in pain care, as providers may be unaware of best practices for assessing and treating pain in different patient groups.

Addressing these factors is essential to reduce healthcare disparities related to pain measurement and management. Strategies to minimize disparities include enhancing provider education and cultural competence, improving communication between healthcare providers and patients, increasing access to healthcare services, and promoting patient-centered pain care that considers the unique needs and preferences of each individual.

Infection Control Fundamentals

Hand Hygiene: A Critical Component of Infection Prevention for Nurses

Hand hygiene is a fundamental aspect of nursing practice that plays a crucial role in preventing the spread of infections in healthcare settings. It is a simple yet highly effective measure that nurses must follow to protect both their patients and themselves. This page will discuss the importance of hand hygiene for nurses, outline the World Health Organization (WHO) guidelines, and provide tips for proper hand hygiene techniques.

The Importance of Hand Hygiene for Nurses

1. INFECTION PREVENTION

Healthcare-associated infections (HAIs) can have severe consequences for patients, leading to prolonged hospital stays, increased morbidity and mortality, and higher healthcare costs. Hand hygiene is one of the most effective ways to reduce the risk of HAIs, as many pathogens are transmitted through direct or indirect contact with contaminated hands.

2. PATIENT SAFETY

Maintaining proper hand hygiene is a critical component of patient safety. Nurses often have close contact with patients and their environment, making it essential for them to maintain proper hand hygiene practices to prevent the spread of infections between patients.

3. SELF-PROTECTION

Hand hygiene is not only essential for protecting patients but also for safeguarding nurses' health. By practicing proper hand hygiene, nurses can reduce their risk of acquiring infections from patients and the healthcare environment.

4. PROFESSIONAL RESPONSIBILITY

As healthcare professionals, nurses have an ethical and professional responsibility to adhere to infection prevention practices, including hand hygiene. Maintaining proper hand hygiene is a key component of providing high-quality, safe patient care.

World Health Organization Guidelines on Hand Hygiene

The World Health Organization (WHO) has developed guidelines for hand hygiene, known as the “Five Moments for Hand Hygiene,” to help healthcare professionals understand when hand hygiene is necessary:

1. **Before touching a patient:** Clean your hands before making direct contact with a patient to prevent the transmission of pathogens.
2. **Before clean/aseptic procedures:** Perform hand hygiene before carrying out any clean or aseptic procedures to prevent the introduction of pathogens to vulnerable sites.
3. **After body fluid exposure/risk:** Clean your hands immediately after exposure to body fluids or after contact with surfaces or objects that may be contaminated.
4. **After touching a patient:** Perform hand hygiene after making direct contact with a patient to prevent the spread of pathogens to other patients or the healthcare environment.
5. **After touching patient surroundings:** Clean your hands after touching objects or surfaces in the patient’s immediate environment, even if you did not directly touch the patient.

Hand Hygiene Techniques

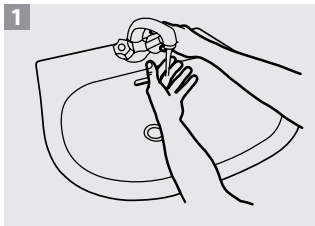
Proper hand hygiene techniques include handwashing with soap and water or using alcohol-based hand sanitizers. Here are some tips for effective hand hygiene:

1. HANDWASHING

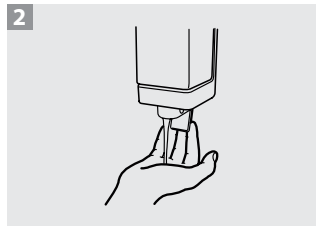
Wet your hands with clean, running water, and apply soap. Lather your hands, covering all surfaces, including the backs of your hands, between your fingers, and under your nails. Scrub for at least 20 seconds, then rinse your hands thoroughly under running water. Dry your hands using a clean towel or air dryer.

Hand Washing

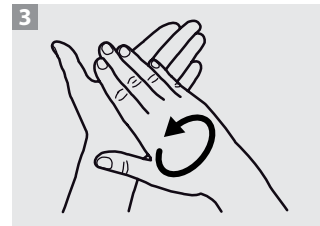
Wash hands with soap and water for 20-30 seconds immediately after taking off PPE. If hands are soiled, wash hands with soap and water for 40-60 seconds. You may use hand sanitizer or chlorinated water, if soap and water are not available.



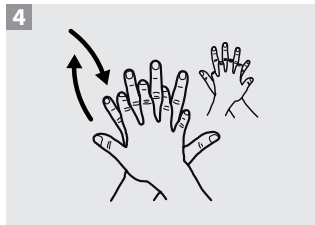
Wet hands with water.



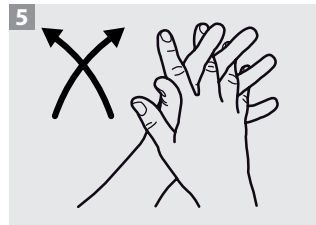
Apply enough soap to cover all hand surfaces.



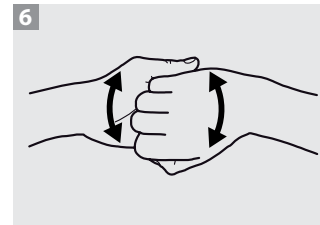
Rub hands together in a circle.



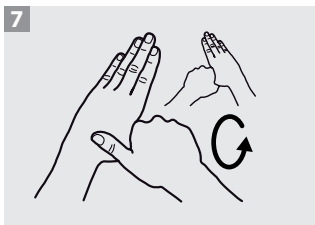
Put one palm on top the other hand and rub soap up and down.



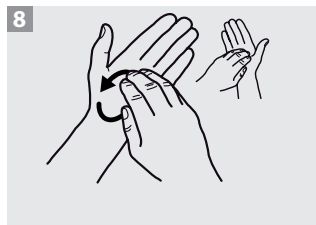
Put palms and fingers together and rub soap up and down.



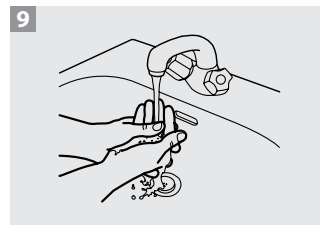
Put fingers of both hands together and rub soap up and down.



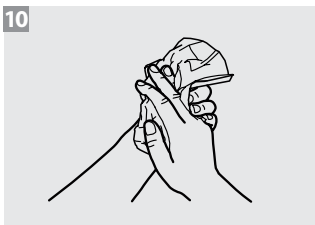
Clean thumbs by rubbing each one around several times with the other palm.



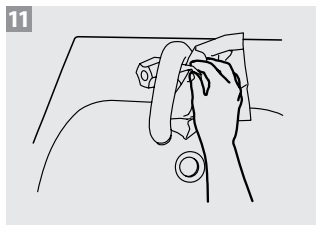
Clean both palms by rubbing soap around palm with fingers of the other hand.



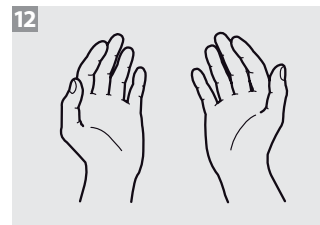
Rinse hands with water.



Dry hands completely using a single use towel.



Use towel to turn off faucet and throw it away.



Your hands are now clean.

2. ALCOHOL-BASED HAND SANITIZERS

Apply a sufficient amount of alcohol-based hand sanitizer to the palm of one hand. Rub your hands together, covering all surfaces, including the backs of your hands, between your fingers, and around your nails, until your hands are dry. Hand sanitizers are effective against most common pathogens but may not be as effective against some types of germs, such as norovirus or *Clostridium difficile*. In these cases, handwashing with soap and water is recommended.

3. GLOVE USE

Gloves are not a substitute for hand hygiene. Perform hand hygiene before putting on gloves and immediately after removing them, as gloves can become contaminated during use.

Proper hand hygiene is a critical component of infection prevention and patient safety in healthcare settings. By adhering to the WHO guidelines and practicing effective hand hygiene techniques, nurses can significantly reduce the risk of healthcare-associated infections and promote a safe healthcare environment for both patients and healthcare professionals.

Personal Protective Equipment (PPE) Fundamentals

Personal protective equipment, commonly referred to as PPE, is essential for healthcare professionals to prevent the spread of infections and maintain a safe working environment. PPE includes items such as gloves, masks, gowns, and goggles, which provide a barrier between the healthcare worker and potential sources of infection. Proper donning (putting on) and doffing (taking off) of PPE are crucial to ensure its effectiveness and minimize the risk of contamination.

Donning PPE| [Centers for Disease Control Instructional Video](#)

Before putting on PPE, it is important to wash your hands thoroughly to minimize the risk of transferring any germs to the equipment. To don PPE, follow the “bottom-up” approach:

- **Gown:** Put on the gown first, making sure it covers your body and clothing completely. Secure the gown at the neck and waist.
- **Mask:** Position the mask over your nose and mouth, ensuring a snug fit. Secure it in place using the ear loops or ties behind your head.
- **Goggles:** Place the goggles over your eyes, ensuring they fit snugly and provide full coverage to protect against splashes and droplets.
- **Gloves:** Lastly, put on the gloves, making sure they cover the wrists of the gown to minimize any exposed skin.

Doffing PPE| [Centers for Disease Control Instructional Video](#)

When it's time to remove PPE, it's important to do so carefully to avoid contamination. Follow the alphabetical order for doffing:

- **Gloves:** Carefully remove the gloves, making sure not to touch the outside with your bare hands. Dispose of them appropriately.
- **Goggles:** Remove the goggles by lifting them away from your face, touching only the straps or earpieces. Clean and disinfect them if they are reusable, or dispose of them if they are single-use.
- **Gown:** Untie or break the fasteners at the neck and waist. Carefully remove the gown by folding it in on itself, touching only the inside. Dispose of it in the appropriate container.

- **Mask:** Remove the mask by untying the straps or lifting the ear loops, being careful not to touch the front of the mask. Dispose of it properly.

After doffing PPE, it is essential to wash your hands thoroughly to minimize the risk of contamination. By following these guidelines, healthcare professionals can ensure they are using PPE effectively to protect themselves and their patients from potential sources of infection.

Isolation Precautions

Isolation precautions are infection control practices used in healthcare settings to prevent the spread of communicable diseases between patients, healthcare workers, and visitors. These precautions are based on the way infectious agents are transmitted and are classified into different categories: Standard Precautions, Contact Precautions, Droplet Precautions, and Airborne Precautions.

1. STANDARD PRECAUTIONS

Applied to all patients, regardless of their diagnosis or presumed infection status. They include hand hygiene, use of personal protective equipment (PPE) such as gloves, masks, and gowns when appropriate, and safe handling of potentially contaminated equipment or surfaces.

2. CONTACT PRECAUTIONS

Used for patients with known or suspected infections that are spread through direct or indirect contact with the patient or their environment. Examples include MRSA, VRE, and *Clostridioides difficile* (c. diff). PPE such as gloves and gowns are required, and the patient may be placed in a private room.

3. DROPLET PRECAUTIONS:

Implemented for patients with infections that are transmitted through respiratory droplets produced during coughing, sneezing, or talking. Examples include influenza, pertussis,

and COVID-19. Healthcare workers should wear a surgical mask, and the patient may be placed in a private room or cohorted with patients with the same infection.

4. AIRBORNE PRECAUTIONS

Used for patients with infections that are transmitted through the air via small particles that can remain suspended for long periods. Examples include tuberculosis, measles, and chickenpox. Healthcare workers should wear an N95 respirator, and the patient should be placed in a negative pressure room with the door closed.

Key: Hand hygiene is standard practice at all times

Contact Precautions (“DORMS”)

Contact Precautions (“DORMS”) are implemented for patients with infections that can be transmitted through direct or indirect contact. These include:

- **Diarrheal:** C. Diff, Rotavirus, Diarrhea, E. coli
- **Other:** Conjunctivitis, Salmonella
- **Respiratory Infections:** RSV (mask if productive cough), Adenovirus, Parainfluenza
- **Multi-drug Resistant:** MRSA, VRE
- **Skin and Wound Infections:** Scabies, lice, herpes simplex, varicella (crusted lesions), shingles (localized).

PPE for Contact Precautions includes a gown, gloves, and coverage for the infected area when the patient leaves the room. The patient should be placed in a private room.

Droplet Precautions (“SPIDERMAN”)

Droplet Precautions (“SPIDERMAN”) are implemented for patients with infections that are transmitted through respiratory droplets produced during coughing, sneezing, or talking. These include:

- Sepsis, Streptococcal pharyngitis
- Pneumonia, Pertussis
- Influenza A + B
- Diphtheria
- Epiglottitis
- Rubella
- Mumps, meningitis, meningococcal pneumonia
- Adenovirus
- Neisseria meningitidis

PPE for Droplet Precautions includes a mask, and if there is a risk of body fluid contamination, wear gloves, gown, and goggles. The patient should wear a mask when outside their room and be placed in a private room.

Airborne Precautions (“AIRs MTV”)

Airborne Precautions (“AIRs MTV”) are implemented for patients with infections that are transmitted through the air via small particles that can remain suspended for long periods. These include:

- Shingles (herpes zoster)
 - disseminated disease or immunocompromised
- Measles (Rubeola)
- Tuberculosis
- Varicella (chickenpox) – uncrusted lesions

PPE for Airborne Precautions includes an N-95 mask, and if body fluid contamination is a risk, wear a gown, gloves, and goggles. The patient should wear a mask outside their room and be placed in an isolation negative pressure room.



CONTACT PRECAUTIONS

EVERYONE MUST:



Clean their hands, including before entering and when leaving the room.

PROVIDERS AND STAFF MUST ALSO:



**Put on gloves before room entry.
Discard gloves before room exit.**



**Put on gown before room entry.
Discard gown before room exit.**

**Do not wear the same gown and gloves
for the care of more than one person.**



**Use dedicated or disposable equipment.
Clean and disinfect reusable equipment
before use on another person.**

CS19-306149-A



**U.S. Department of
Health and Human Services**
Centers for Disease
Control and Prevention



DROPLET PRECAUTIONS



EVERYONE MUST:

Clean their hands, including before entering and when leaving the room.



Make sure their eyes, nose and mouth are fully covered before room entry.



or



Remove face protection before room exit.

CS19-306149-A



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Control and Prevention



AIRBORNE PRECAUTIONS



EVERYONE MUST:



Clean their hands, including before entering and when leaving the room.



Put on a fit-tested N-95 or higher level respirator before room entry.

Remove respirator after exiting the room and closing the door.



Door to room must remain closed.

CS19-306149-A



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Centers for Disease
Control and Prevention

Adult CPR

Initial Steps:

1. Ensure safety of the environment
2. Check for a response by asking loudly “Are you okay?”
3. Call for help and delegate tasks:
 - Ask someone to call 911
 - Ask someone to bring an AED (if available)
 - In a hospital, initiate rapid response team
4. Assess breathing by looking for chest rise and fall
5. Check for a pulse on the carotid artery for no more than 10 seconds.

Initiate Chest Compressions:

6. If the person is not breathing or does not have a pulse, begin chest compressions:
 - Place the heel of one hand on the center of the person’s chest, between the nipples
 - Place the other hand on top of the first hand, interlocking the fingers
 - Keep your arms straight and position your shoulders over your hands
 - Press down on the chest at least 2 inches (5 cm) deep, using your upper body weight to help you
 - Push hard and fast at a rate of 100–120 compressions per minute
7. Continue chest compressions until:
 - Help arrives and takes over
 - You become too exhausted to continue
 - The person starts showing signs of life, such as breathing or moving

Note: If an Automated External Defibrillator (AED) becomes available, turn it on and follow the prompts to use it. Resume chest compressions immediately after each shock, if advised by the AED.

How to use an AED

Automated External Defibrillator is a portable medical device that can analyze the heart rhythm of a person experiencing sudden cardiac arrest, and if necessary, deliver an electric shock to restore the heart's normal rhythm. AEDs are designed to be used by non-medical professionals, such as bystanders or trained rescuers, in emergency situations.

1. Turn on the AED and follow the voice prompts.
2. Open the person's shirt and wipe the chest dry if it is wet.
3. Attach the AED pads to the person's bare chest as shown in the diagram on the pads:
 - One pad on the upper right side of the chest, just below the collarbone
 - The other pad on the left side of the chest, just below the armpit
4. Make sure no one, including yourself, is touching the person.
5. If the AED says "analyzing" or "checking rhythm," stand clear and wait for the AED to finish analyzing the heart rhythm.
6. If the AED advises a shock, make sure no one is touching the person, and press the "shock" button if it is available.
7. Immediately resume CPR starting with chest compressions. Perform two minutes of CPR, then let the AED analyze the heart rhythm again.
8. Follow the AED's voice prompts until help arrives and takes over.

Note: If the person shows signs of life, such as breathing or moving, stop using the AED and continue to monitor their breathing and pulse until help arrives.

Parenteral Administration: Injections

Parenteral administration involves delivering medication through injection directly into the patient's bloodstream, bypassing the gastrointestinal (GI) tract. This route of administration is used when rapid onset of action is required, when the medication is not orally bioavailable, or when the medication may be destroyed by the digestive enzymes in the GI tract.

Parenteral administration can be done through various routes, including intravenous (IV), intramuscular (IM), subcutaneous (SQ), and intradermal (ID) injection. IV injection involves administering the medication directly into a vein, which allows for the medication to be delivered rapidly and at a controlled rate. IM injection involves administering the medication into a muscle, allowing for a slower, sustained release of the medication. SQ injection involves administering the medication into the tissue just beneath the skin, which allows for the medication to be absorbed slowly over time. ID injection involves administering the medication into the top layer of the skin, which is typically used for skin testing or for administering small amounts of medication.

On the other hand, nonparenteral (or enteral) administration involves delivering medication directly into the patient's GI tract, such as through oral intake. This route of administration is used when the medication is orally bioavailable, when the medication is not destroyed by the digestive enzymes in the GI tract, or when a slower onset of action is acceptable. Nonparenteral administration can be done through various routes, including oral, sublingual, buccal, and rectal administration.

Oral administration involves delivering the medication through the mouth and into the GI tract, where it is absorbed by the intestinal lining and enters the bloodstream. Sublingual administration involves placing the medication under the tongue, where it is absorbed into the bloodstream through the mucous membranes. Buccal administration involves placing the medication between the cheek and gum, where it is absorbed into the bloodstream through the mucous membranes. Rectal administration involves delivering the medication through the rectum, where it is absorbed into the bloodstream through the rectal wall.

It is important for nurses to be knowledgeable about the different routes of medication administration in order to ensure safe and effective patient care. Depending on the patient's condition and the specific medication being administered, one route of administration may be preferred over another. In addition, nurses must be familiar with the proper technique for administering medications through each route, as well as any potential adverse effects or drug interactions that may occur.

Route	Injection Site	Length	Angle	Gauge
Intradermal	Forearm (most common)	Length: 1/4 to 1/2 inch	10–15°	25–27 gauge
	Upper back (allergy)			
	Upper chest			
Subcutaneous	Upper outer arm	Length: 1/2 to 5/8 inch	If insulin pen: 45°	23–25 gauge
	Abdomen (except within 2 inches of navel)		90° otherwise	
	Upper hip (includes buttocks)			
	Front and inner thigh			
Intramuscular	Arm (deltoid)	Length: 1 to 1 1/2 inch	90°	22–25 gauge
	Ventrogluteal and Dorsogluteal			
	Thigh (vastus lateralis) muscle (men & children)			

****Other Routes: Intravenous and Intraperitoneal**

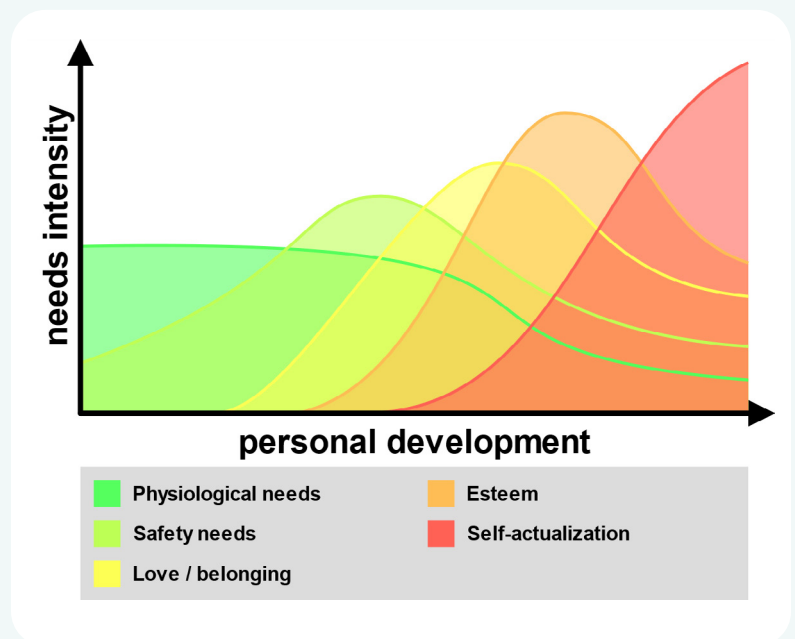
Maslow's Hierarchy of Needs

Maslow's Hierarchy of Needs is a psychological theory proposed by Abraham Maslow in his 1943 paper, "A Theory of Human Motivation." The theory suggests that humans have a series of needs that must be met in a hierarchical order, starting from basic physiological needs to the more complex psychological and self-fulfillment needs. Understanding and applying Maslow's Hierarchy of Needs can help nursing students and professionals prioritize patient care and better address patients' individual requirements.

The hierarchy consists of five levels:

- **Physiological needs:** These include basic necessities for survival, such as food, water, sleep, and oxygen.
- **Safety needs:** Once physiological needs are met, individuals seek safety and security, including personal safety, financial security, and health.
- **Love and belonging needs:** These involve social connections, such as friendships, family, and romantic relationships, and the feeling of being accepted and loved.
- **Esteem needs:** This level consists of the desire for self-respect, recognition, and status, as well as the respect of others.
- **Self-actualization needs:** At the highest level, individuals strive for self-fulfillment, personal growth, and reaching their full potential.

Integrating Maslow's Hierarchy of Needs into the NCSBN Clinical Judgment Model can enhance decision-making and patient care by ensuring that nurses address patients' needs in a prioritized manner.



Nursing Scope of Practice

RNs, LPNs, and UAPs (unlicensed assistive personnel) have different roles within the larger healthcare team, based on their education and training. RNs have the broadest scope of practice, handling clinical assessment, judgment, and teaching. They do initial client education, vitals, assessments, and discharge planning, and can give blood transfusions and IV medications. ***The key thing that sets RNs apart is their clinical judgment. They make decisions based on assessments and evidence-based practices, which LPNs and UAPs don't do.***

LPNs have a more limited scope. They help monitor patients, reinforce education, and give some meds (but not IVs or IV meds). They do routine procedures like catheters and ostomy care and help with tube feeding. LPNs report lung or bowel sounds to RNs, do suctioning, and check patients' neurological status. LPNs handle many nursing tasks, but their role is more focused on specific tasks, and they depend on RNs for decision-making.

UAPs have the narrowest scope since they're not licensed nurses. They check vital signs, help patients with daily activities, hygiene, and linen changes, and keep track of intake & output. UAPs help with positioning and transport, check vitals after blood transfusions, and assist with feedings when there's no aspiration risk. They also pick up blood from the blood bank. Their role is mostly about basic patient care and support under RN or LPN supervision.

RNs make decisions based on a deep understanding of patient needs and evidence-based practice. RNs also delegate tasks and patient care to LPNs and UAPs. LPNs and UAPs have more limited roles and rely on RNs for guidance in patient care.

1. RN (REGISTERED NURSE) SCOPE OF PRACTICE:

- Clinical Assessment, Clinical Judgment, and Teaching
- Initial client education
- Admission vitals/assessment
- Discharge education
- Clinical judgment (including all LPN and UAP duties)

- Initiating blood transfusion
- IVs and IV medication
- Post-op assessment

2. LPN (LICENSED PRACTICAL NURSE) SCOPE OF PRACTICE:

- Monitor RN findings, drainage, and flow rate
- Reinforce education
- Administer most medications (injections only, no IVs/IV meds)
- Routine procedures and catheter/in and out Foley (no first IV bag)
- Ostomy care
- Tube patency and enteral feeding/bolus
- Lung or bowel sounds (report to RN)
- Oral and nasal suctioning
- Neuro checks

3. UAP (UNLICENSED ASSISTIVE PERSONNEL) SCOPE OF PRACTICE:

- Routine, stable vital signs
- Activities of daily living (ADLs) and Linen change
- Hygiene
- Document intake & output (I&O)
- Positioning or transport (transfer from bed to chair)
- Vitals 1 hour after blood transfusion started
- Feedings not at risk of aspiration
- Pick up blood from the blood bank

It should be noted that each state sets regulations and governs their own Nurse Practice Act.

Common Healthcare Abbreviations

Abbreviation	Meaning
AC	Antecubital (L/R)
a.c.	Before meals
ADL's	Activities of daily living
aeb	As evidenced by
AFIB	Atrial fibrillation
AMA	Against medical advice
AMS	Altered mental status
b.i.d.	Twice a day
BM	Bowel movement
BP	Blood pressure
BPH	Benign prostatic hyperplasia
BPM	Beats per minute
CABG	Coronary artery bypass graft
CBC	Complete blood count
CC	Chief complaint
CHF	Congestive heart failure
CKD	Chronic kidney disease
CNS	Central nervous system
CO	Cardiac output
c/o	Complains of
COPD	Chronic obstructive pulmonary disorder
CP	Chest pain
CSF	Cerebrospinal fluid
c/s	Cesarean section

Abbreviation	Meaning
CTA	Clear to auscultation
CVA	Cerebrovascular accident
CVAT	Costovertebral angle tenderness
CXR	Chest X-ray
d/c	Discharge/discontinue
DM	Diabetes mellitus
NIDDM	Non-insulin dependent diabetes mellitus (Type 2) & IDDM - Insulin dependent diabetes mellitus (Type 1)
DNR	Do not resuscitate
DOB	Date of birth
DVT	Deep vein thrombosis
Dx	Diagnosis
EC	Enteric coated
EEG	Electroencephalogram
EKG/ECG	Electrocardiogram
FA	Forearm
Fx	Fracture
GFR	Glomerular filtration rate
GI	Gastrointestinal
GSW	Gunshot wound
GT	Gastrostomy tube
gtt	Drops (liquid measurement)

Abbreviation	Meaning
GTT	Glucose tolerance test (oral)
GU	Genitourinary
HA	Headache
Hb	Hemoglobin
HLD	Hyperlipidemia
HPI	History of present illness
HR	Heart rate
HS	Bedtime
HTN	Hypertension
Hx	History
IBD	Irritable bowel disease
IBS	Irritable bowel syndrome
ICP	Intracranial pressure
I&D	Incision and drainage
ID	Intradermal
IM	Intramuscular
I&O	Intake and output (urine)
IUP	Intrauterine pregnancy
IV	Intravenous
IVP	Intravenous push
JVD	Jugular vein distention
LBW	Low birth weight
LE	Lower extremity
LLL	Left lower lobe
LLQ	Left lower quadrant
LUL	Left upper lobe

Abbreviation	Meaning
LV	Left ventricle
MD	Muscular dystrophy
MDD	Maximum daily dose
MS	Multiple sclerosis
MVA	Motor vehicle accident
NKDA	No known drug allergies
NPO	Nothing per os (by mouth)
NTG	Nitroglycerine
N/V/D	Nausea, vomiting, diarrhea
OCD	Obsessive-compulsive disorder
OCP	Oral contraceptive
OD	Right eye
OS	Left eye
OSA	Obstructive sleep apnea
OTC	Over the counter
OT	Occupational therapy
OU	Both eyes
p.c.	After meals
PCN	Penicillin
PCP	Primary care physician
PE	Pulmonary embolism
PEEP	Positive-end-expiratory pressure
PID	Pelvic inflammatory disease
PMHx	Past medical history

Abbreviation	Meaning
PMS	Premenstrual syndrome
PNS	Peripheral nervous system
PO	Per os (by mouth)
PRN	As needed
PSHx	Past surgical history
Pt	Patient
PT	Physical therapy
q	Every
q2h	Every two hours
q3h	Every three hours
qd	Once a day
qh	Once every hour
qhs	At bedtime
q.i.d	Four times a day
RA	Rheumatoid arthritis
RBBB	Right bundle branch block
RBC	Red blood cell
RF	Risk factor
RLL	Right lower lobe
RRR	Regular rate and rhythm
r/t	Related to
RUL	Right upper lobe
RV	Right ventricle

Abbreviation	Meaning
Rx	Prescription
RXN	Reaction
SBO	Small bowel obstruction
SOB	Shortness of breath
s/s	Signs and symptoms
STD	Sexually transmitted disease
s/t	Secondary to
Sx	Symptoms
Tb	Tuberculosis
TBI	Traumatic brain injury
t.i.d	Three times a day
Tx	Treatment
UC	Ulcerative colitis
UE	Upper extremity
UO	Urine output
URI	Upper respiratory infection
UTI	Urinary tract infection
VS	Vital signs
VSS	Vital signs stable
WBC	White Blood Cells
WNL	Within normal Limits
WT	Weight



2

CHAPTER 2

Medical Surgical Nursing



Head-to-Toe Assessment (Comprehensive)

A head-to-toe assessment is a comprehensive evaluation of a patient's physical and mental status, typically conducted by a registered nurse upon admission to a healthcare facility. The assessment involves a systematic evaluation of all body systems, including the head, neck, chest, abdomen, extremities, and back, as well as the patient's mental and emotional state.

The purpose of the head-to-toe assessment is to gather information about the patient's overall health and identify any potential health problems that may require further evaluation or intervention. The assessment includes a detailed review of the patient's medical history, vital signs, and any relevant laboratory or imaging tests.

During the physical examination portion of the assessment, the nurse will use a variety of techniques to evaluate each body system. This may include inspection, palpation, auscultation, and percussion, depending on the body area being assessed. The nurse will look for any abnormalities or changes in the patient's skin, eyes, ears, nose, mouth, throat, lungs, heart, abdomen, and extremities, as well as any signs of pain, discomfort, or distress.

It's important for nurses to follow a standardized process when conducting a head-to-toe assessment to ensure consistency and accuracy. One commonly used framework for the head-to-toe assessment is the "general survey, vital signs, head and neck, chest, abdomen, extremities, and neurological exam" approach.

Overall, the head-to-toe assessment is a critical component of nursing care, allowing nurses to gather important information about their patients' health and provide appropriate interventions and referrals as needed.

It is important to use a consistent and systematic approach when assessing all body systems during a head-to-toe assessment. This helps to ensure that all relevant information is gathered and no important findings are missed. By using the same assessment techniques and sequence for each system, nurses can also identify patterns or changes in the patient's health status more easily.

Using a standardized approach also helps to ensure consistency and accuracy in documentation, which is critical for effective communication among healthcare providers and continuity of care for the patient. In addition, many healthcare facilities and organizations require the use of a standardized head-to-toe assessment approach to ensure quality and safety in patient care.

It is important to maintain a consistent and standardized assessment process for every body system during the head-to-toe assessment. The process typically starts with observation by visually examining the body system in question, followed by percussion, palpation, and auscultation. This systematic approach helps to organize the assessment and ensure that all relevant information is collected.

For the abdomen, auscultation should be performed prior to percussion or palpation. The use of gloves during the assessment may vary by school and personal preference, but hand hygiene should always be performed before and after touching the patient. Additionally, it is important to obtain the patient's consent before conducting the assessment.

Cranial Nerve	CN	Function	Mnemonic
Olfactory	I	Smell	Oh
Optic	II	Vision.	Oh
Oculomotor	III	Eyes Movement, Pupil Constriction	Oh
Trochlear	IV	Eyes Movement	To
Trigeminal	V	Sensation, Chewing	Touch
Abducens	VI	Eyes Movement	And
Facial	VII	Taste, Facial Expression	Feel
Vestibulocochlear	VIII	Hearing, Balance	Very
Glossopharyngeal	IX	Swallowing, Taste	Good
Vagus	X	Autonomic Functions	Velvet
Spinal accessory	XI	Neck Movement	AH
Hypoglossal	XII	Tongue Movement	

HEENT (Head, Ears, Eyes, Nose, Throat)

As a nurse, you know that HEENT (Head, Ears, Eyes, Nose, Throat) assessment is a critical aspect of nursing practice that requires sound clinical judgment. In the context of the Next Generation NCLEX (NGN), HEENT assessment can be used to assess your ability to make sound clinical judgments in complex situations involving patients with head and neck disorders.

To use HEENT assessment effectively, you must first recognize cues, such as changes in the patient's head and neck appearance or symptoms. You must then analyze these cues by reviewing the patient's medical history, current medications, and any other relevant information. Based on this analysis, you should prioritize hypotheses or potential causes of the patient's symptoms or problems.

Once hypotheses have been prioritized, you can generate solutions, such as diagnostic tests, referrals to specialists, or medication adjustments. You can then take action by implementing the appropriate treatment plan and monitoring the patient's response to treatment. Finally, you can evaluate outcomes to determine the effectiveness of the interventions and make any necessary adjustments to the plan of care.

By using HEENT assessment as a tool to support clinical judgment in head and neck care, you can develop the critical thinking and decision-making skills necessary to provide safe and effective patient care. The NGN will require you to demonstrate your ability to make sound clinical judgments to patients with head and neck disorders.

Head Assessment Checklist

Recognize Cues:

- Gather data about the patient's head and face
- Observe facial expressions, symmetry, and appearance

Analyze Cues:

- Inspect the consistency, distribution, and color of hair
- Note any alopecia, lice, dandruff, or uneven hair distribution
- Observe for lesions, masses, or skin breakdown on the head/scalp
- Assess for any drooping or asymmetry, which may indicate Bell's Palsy or stroke
- Evaluate facial expressions for symmetry
- Test Cranial Nerve VII (7) by asking the patient to close their eyes tightly, smile, frown, and puff out cheeks

Prioritize Hypotheses:

- Determine if any abnormalities require immediate attention or further assessment
- Identify potential underlying conditions or issues related to head findings

Generate Solutions:

- Develop a plan to address identified issues or abnormalities related to the head
- Consider possible interventions or referrals for specific concerns

Take Action:

- Implement interventions to address identified issues related to the head
- Refer to appropriate specialists or resources if needed

Evaluate Outcomes:

- Monitor the patient's response to head-related interventions
- Determine if further actions are needed based on the patient's progress

Eyes Assessment Checklist

Recognize Cues:

- **Inspect the external eye structures:**
 - Eyebrows: symmetry, hair distribution
 - Eyelids: position, color, swelling, discharge
 - Conjunctiva: color, discharge
 - Sclera: color, presence of redness or yellowing
 - Cornea: clarity, presence of opacities or scratches
- **Inspect the pupils and assess Cranial Nerve II (Optic Nerve):**
 - Size: compare and note any asymmetry
 - Shape: roundness, irregularities
 - Reaction to light: direct and consensual response (CN II)
 - Accommodation: convergence and constriction when looking at a near object (CN II)
- **Assess eye movements and Cranial Nerves III (Oculomotor), IV (Trochlear), and VI (Abducens):**
 - Extraocular muscle function: six cardinal positions of gaze (CN III, IV, VI)
 - Presence of nystagmus: involuntary eye movement (CN III, IV, VI)
 - Eyelid movement: ptosis or drooping (CN III)

Analyze Cues:

- Determine if any abnormal findings are present
- Consider patient's history, age, and potential risk factors

Prioritize Hypotheses:

- Based on the findings, identify potential eye conditions or issues that may require further evaluation or intervention

Generate solutions:

- Consult with a specialist, such as an ophthalmologist, if necessary
- Recommend further diagnostic tests, such as a visual acuity test, intraocular pressure measurement, or a dilated fundus examination

Take Action:

- Implement the necessary interventions or referrals based on the assessment

Ears Assessment Checklist

Recognize Cues:

- Patient complaints (e.g., hearing loss, pain, tinnitus)
- Obvious deformities or asymmetry
- Presence of hearing aids
- Ear drainage or inflammation
- Assess Cranial Nerve VIII (Vestibulocochlear nerve) for hearing and balance

Analyze Cues:

- Determine the relevance of patient complaints
- Identify if deformities or asymmetry are congenital or acquired
- Consider the impact of hearing aids on assessment
- Assess the severity of inflammation or drainage

Prioritize Hypotheses:

- Evaluate the likelihood of ear infection
- Consider the possibility of impacted cerumen
- Rule out foreign body presence
- Assess Cranial Nerve VIII function

Generate Solutions:

- Plan for a thorough inspection and palpation of the external ear
- Prepare for otoscopic examination
- Consider hearing tests, if necessary

Take Action:

- Inspect the external ear for symmetry, color, and deformities

- Palpate the auricle, tragus, and mastoid process for tenderness or pain
- Perform the whisper test to assess hearing (CN VIII)
- Conduct the Rinne and Weber tests, if needed:
 - **Rinne test:** Compare air conduction (AC) to bone conduction (BC) by placing a vibrating tuning fork on the patient's mastoid process (BC) and then near the ear canal (AC). AC should be greater than BC in normal hearing.
 - **Weber test:** Assess for lateralization by placing a vibrating tuning fork on the patient's forehead or vertex. The sound should be heard equally in both ears in normal hearing.
- Use an otoscope to examine the external auditory canal and tympanic membrane
- Assess balance function of Cranial Nerve VIII, if indicated

Evaluate Outcomes:

- Note any abnormalities or issues discovered during the assessment
- Determine if further testing or referral to a specialist is needed
- Document findings and communicate them to the healthcare team

Remember, this checklist should be used in conjunction with your clinical judgment and the specific needs of your patient. Always prioritize patient safety and comfort during the assessment process.

Nose Assessment Checklist

Recognize Cues:

- Patient complaints (e.g., congestion, difficulty breathing, discharge, pain)
- Obvious abnormalities (e.g., deformities, swelling, erythema)

Analyze Cues:

- Determine the relevance of patient complaints
- Identify if abnormalities are congenital or acquired
- Consider the impact of allergies or infections

Prioritize Hypotheses:

- Evaluate the likelihood of structural issues affecting breathing
- Consider the possibility of sinusitis or allergies
- Rule out foreign body presence or injury

Generate Solutions:

- Plan for a thorough inspection of the external and internal nose structures
- Prepare for patency and smell tests
- Assess for tenderness and inflammation

Take Action:

- Inspect the external nose for symmetry, color, and lesions
- Assess the internal nares using a penlight for erythema, lesions, polyps, and septal deviation
- Test patency by having the patient occlude one nostril at a time and breathe through the nose
- Perform the smell test (Cranial Nerve I) using a fragrant substance
- Palpate and percuss the sinuses for pain or tenderness

Evaluate Outcomes:

- Note any abnormalities or issues discovered during the assessment
- Determine if further testing, treatment, or referral to a specialist is needed
- Document findings and communicate them to the healthcare team

Throat (Mouth) Assessment Checklist

Recognize Cues:

- Patient complaints (e.g., sore throat, difficulty swallowing, bad breath)
- Obvious abnormalities (e.g., swelling, redness, lesions)

Analyze Cues:

- Compare patient's symptoms and appearance to normal findings
- Consider potential causes (e.g., infection, inflammation, injury, allergies)

Prioritize Hypotheses:

- Rank potential causes based on likelihood and urgency
- Identify any critical or high-priority concerns

Generate solutions:

- Plan appropriate interventions (e.g., throat swab, referral to specialist, medication)
- Identify necessary patient education (e.g., oral hygiene, symptom management)

Take Action:

- Perform interventions and document findings
- Communicate with the healthcare team and patient
- Evaluate Outcomes:
 - Assess the effectiveness of interventions and patient understanding
 - Modify the plan as needed based on patient response and progress

Throat (Mouth) Assessment Details:

- Inspect symmetry, color, and appearance of lips
- Assess dentition, gum health, and oral hygiene
- Examine tongue for color, moisture, and lesions
- Evaluate hard and soft palate, tonsils, and uvula
- Test Cranial Nerves IX and X by asking the patient to say “Ah” and swallow
- Document findings and communicate with the healthcare team

Musculoskeletal Assessment

Musculoskeletal assessment is an essential component of the physical examination process for healthcare professionals, focusing on evaluating the structure and function of the body's musculoskeletal system. This system comprises bones, muscles, ligaments, tendons, and joints, which work synergistically to facilitate movement, provide structural support, and maintain stability. A comprehensive musculoskeletal assessment aims to identify abnormalities, injuries, or disorders that may be affecting a patient's overall health, mobility, and quality of life. By systematically examining the musculoskeletal system, nurses can detect early signs of dysfunction, implement appropriate interventions, and promote optimal health and well-being.

Recognize Cues:

- Inspect the spine, upper extremities, and lower extremities for color, contour, deformity, erythema, edema, or other visible abnormalities.
- Note any limitations in the patient's range of motion or muscle strength.

Analyze Cues:

- Determine if the findings suggest any musculoskeletal, neurological, or vascular issues or concerns.

Respond:

- Proceed with palpation, range of motion, muscle strength, and sensation assessments of the upper and lower extremities.

Evaluate:

- Assess the effectiveness of your interventions and revise your plan as needed.

Palpate:

- Assess capillary refill, skin tenting, skin temperature, and pitting edema in both upper and lower extremities.
- Evaluate muscle strength, grading from 0 to 5+.

Range of Motion:

- Assess range of motion in arms, elbows, wrists, fingers, hips, knees, ankles, feet, and toes.
- Note any limitations in the patient's range of motion.

Muscle Strength:

- Assess muscle strength in the upper and lower extremities using various tests and grade the strength from 0 to 5+.

Pulses:

- Palpate femoral, popliteal, dorsalis pedis, and posterior tibial pulses bilaterally.
- Grade pulses from 0 to 4+.

Sensation:

- Test sensation (sharp and dull) in three locations along the upper and lower extremities, grading from 0 to 2.
- Assess the Babinski reflex: Stroke the bottom of the foot from heel to toe to note movement of the toes.
 - Normal: curling of toes = negative Babinski.
 - Abnormal: big toe bends back and toes fan out = positive Babinski.

After completing the musculoskeletal assessment, integrate your findings to determine the patient's overall musculoskeletal, neurological, and vascular status. Communicate any concerns or abnormal findings to the healthcare team and document your assessment in the patient's medical record. Plan and implement appropriate nursing interventions based on your assessment and the patient's specific needs.

Abdomen Assessment

Recognize Cues:

- Inspect the abdomen for symmetry, contour, masses, lesions, ostomy, and visible aortic pulsations.
- Obtain the patient's history of bowel movements, urination difficulties, and last menstrual period (if applicable).

Analyze Cues:

- Determine if the findings suggest any gastrointestinal or genitourinary issues or concerns.
- Respond:
- Proceed with auscultation, percussion, and palpation of the abdomen.

Evaluate:

- Assess the effectiveness of your interventions and revise your plan as needed.

Auscultation:

- Auscultate bowel sounds in all four quadrants, noting normal, hyperactive, or hypoactive sounds.
- Listen for bruits in the aorta, renal arteries, iliac arteries, and femoral arteries.

Percussion:

- Percuss different parts of the patient's abdomen, assessing for hollow or dull sounds.
- Determine the liver edge and note any abnormalities.

Palpation:

- Perform light palpation (2cm) in all four quadrants, assessing for pain or rigidity.
- Perform deep palpation (4-5cm) in all four quadrants, checking for masses, lumps, or rebound tenderness.

After completing the abdomen assessment, integrate your findings to determine the patient's overall gastrointestinal and genitourinary status. Communicate any concerns or abnormal findings to the healthcare team and document your assessment in the patient's medical record. Plan and implement appropriate nursing interventions based on your assessment and the patient's specific needs.

Heart and Lung Assessment Checklist

Recognize Cues:

- Inspect the chest for deformities, asymmetry, or abnormal breathing patterns.
- Note the patient's respiratory rate, rhythm, and effort.
- Observe the patient's skin color for signs of cyanosis or pallor.
 - **Cyanosis** is a medical condition characterized by a blue or purple discoloration of the skin or mucous membranes due to a lack of oxygen in the blood. It occurs when there is an excess of deoxygenated hemoglobin (a protein found in red blood cells that is responsible for transporting oxygen from the lungs to the rest of the body's tissues and organs. It is an essential component of the circulatory system and plays a crucial role in maintaining bodily functions) in the blood vessels close to the skin surface.
 - **Pallor** is a medical term used to describe an unnatural paleness of the skin or mucous membranes, often due to a decrease in blood flow or a decrease in the amount of oxygen in the blood. Pallor is caused by a reduction in the amount of oxygenated red blood cells that reach the skin surface.

Analyze Cues:

- Determine if the findings suggest any respiratory or cardiac issues.

Respond:

- Proceed with auscultation and palpation of the heart and lungs.

Evaluate:

- Assess the effectiveness of your interventions and revise your plan as needed.

Auscultation:

1. HEART SOUNDS

Heart sounds are produced as a result of the opening and closing of the heart valves and the movement of blood within the heart. The sounds are created by the turbulence of blood flow and the vibrations that occur when the heart valves close.

The **first heart sound, or S1**, is caused by the closure of the mitral and tricuspid valves at the

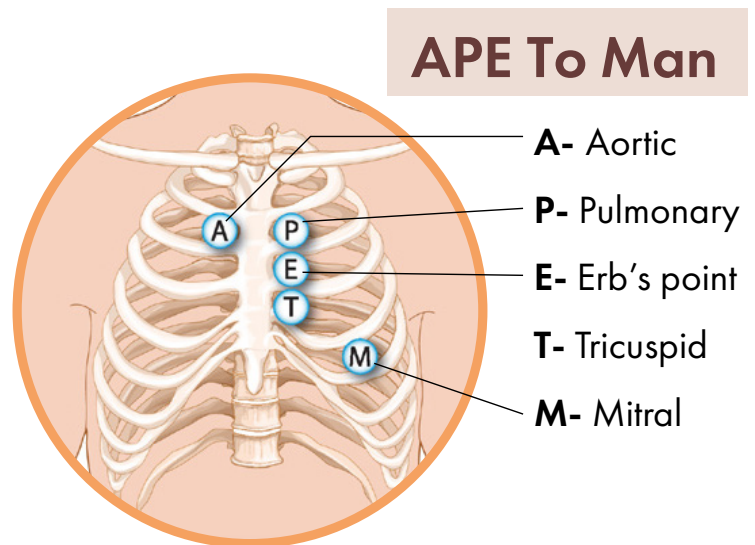
beginning of systole, which is the period when the ventricles are contracting and pushing blood out of the heart. The S1 sound is often described as a “lub” sound and is the loudest of the two heart sounds.

The **second heart sound, or S2**, is caused by the closure of the aortic and pulmonic valves at the end of systole, when the ventricles are relaxing and filling with blood. The S2 sound is often described as a “dub” sound and is quieter than the S1 sound.

In addition to these normal heart sounds, there may be other abnormal sounds, called murmurs, which can indicate valve disease or other heart conditions. Murmurs are caused by the turbulent flow of blood through the heart, and are often described as a swishing or whooshing sound.

Listen to hearts sounds in the following areas using the diaphragm and bell of the stethoscope using the following mnemonic: **Aortic, Pulmonic, Erb’s, Tricuspid, Mitral – APE To Man**

1. **Aortic area** (2nd intercostal space, right sternal border)
2. **Pulmonic area** (2nd intercostal space, left sternal border)
3. **Erb’s point** (3rd intercostal space, left sternal border)
4. **Tricuspid area** (4th intercostal space, left sternal border)
5. **Mitral area** (5th intercostal space, midclavicular line)



2. **IDENTIFY S1 AND S2 HEART SOUNDS**, and note any murmurs, gallops, or extra sounds.
3. **ASSESS THE HEART RATE AND RHYTHM** (see Chapter 4, Advanced Clinical Topics, to learn about different heart rates and rhythms).

Burns

Burns are tissue injuries caused by various factors such as heat, chemicals, electricity, radiation, cold, or friction. They are classified based on their cause, depth, and extent. Understanding the different types of burns and their characteristics is essential for proper assessment, treatment, and management.

Types of Burns

- **Thermal:** Caused by exposure to heat sources such as hot liquids, steam, or fire.
- **Chemical:** Result from contact with corrosive substances, powders, or gasses.
- **Electrical:** Occur due to contact with electrical currents, resulting in possible internal injuries.
- **Cold:** Frostbite injuries caused by exposure to extremely cold temperatures.
- **Radiation:** Damage to the skin caused by exposure to ultraviolet light (sunburn) or ionizing radiation.
- **Friction:** Injuries resulting from the force of rubbing against a surface, such as road rash.

Classification of Burns by Depth

1. **SUPERFICIAL (FIRST-DEGREE BURNS)**
 - Affect the epidermis (top layer of skin)
 - No blisters or scars
 - Pink or red in color
 - Tender or painful to touch
2. **PARTIAL-THICKNESS (SECOND-DEGREE BURNS)**
 - Involve the epidermis and part of the dermis
 - Raw, mottled red appearance
 - Moist and may blister or require grafting

- Painful, blanching to touch
- Shiny with possible scarring
- Healing time ranges from 2 to 6 weeks

3. FULL-THICKNESS (THIRD-DEGREE BURNS)

- Affect the epidermis, dermis, and underlying tissues
- Black, brown, yellow, or pearly white in color
- Leathery appearance (eschar)
- Blood vessels and bones may be visible
- Little to no pain due to nerve damage
- May require grafting and eschar removal

- Grafting is a surgical procedure used to transplant tissue from one part of the body to another, or from one individual to another, for the purpose of repairing or replacing damaged or diseased tissue. The tissue being transplanted is called the graft and the area where it is transplanted is called the recipient site.
- Eschar is a thick, dry, black or brown scab-like material that forms over damaged skin as a result of burns, frostbite, or other injuries. It can interfere with the healing process and increase the risk of infection. Eschar removal is a surgical procedure used to remove the dead tissue so that healthy tissue can begin to heal. Eschar removal is typically performed by a healthcare provider, such as a surgeon or wound care specialist, using a variety of techniques, such as surgical debridement or enzymatic debridement. During surgical debridement, the eschar is removed using a scalpel or other surgical instrument. Enzymatic debridement involves the use of topical enzymes to break down the dead tissue, which can then be removed more easily.

Burn Location and Associated Risks

- **Respiratory problems:** Face, mouth, neck, and torso
- **Difficulty healing:** Ears and nose due to poor blood supply
- **Compartment syndrome:** Full-thickness, circumferential burns on extremities and torso
- **Disability:** Eyes, hands, and feet
- **Infection:** Perineum and buttocks, increased burn surface area

Burn Care Phases

1. **EMERGENT PHASE (Onset of injury to 48 hours)**
 - Risk of burn shock and hypovolemic shock
 - Respiratory distress
 - Compartment syndrome

2. ACUTE PHASE (Stabilization of permeability to wound closure)

- Diuresis, renal function monitoring
 - Diuresis is the increased production of urine by the kidneys, resulting in increased urination and fluid excretion from the body. Diuresis can be a natural process, such as when the body needs to eliminate excess fluids, or it can be induced through the use of diuretic medications, which increase urine output by increasing the amount of salt and water that the kidneys excrete from the body.
- Respiratory management, potential intubation
- GI function monitoring, risk of ulcers and ileus
- Nutritional support with high-calorie, high-protein, and high-carbohydrate diet
- Wound care, infection prevention, pain management, and proper nutrition

3. REHABILITATIVE PHASE (Wound closure to return to the patient's optimal level)

- Prevention of scars and contractures through range of motion exercises and splinting
- Psychosocial support and therapy
- Encouragement of activities of daily living (ADLs)
- Physical therapy, occupational therapy, and cosmetic consults as needed

To apply the NCSBN Clinical Judgement Model to the burn care section and help nurses prepare for the NGN, we can organize the information using the six steps in the model: Recognize Cues, Analyze Cues, Prioritize Hypotheses, generate solutions, Take Action, and Evaluate Outcomes.

Recognize Cues:

- Identify the type of burn (thermal, chemical, electric, cold, radiation, friction)
- Assess burn severity (superficial, partial thickness, full thickness)
- Note burn location and associated risks
- Observe for inhalation injury signs and symptoms
- Consider patient's vital signs, pain level, and overall medical history

Analyze Cues:

- Determine the cause and mechanism of the burn
- Evaluate the potential complications associated with the burn (infection, respiratory distress, compartment syndrome)
- Assess patient's overall condition and stability

Prioritize Hypotheses:

- Rank the possible complications and outcomes based on the severity of the burn and the patient's current condition
- Consider the urgency of medical interventions needed

Generate solutions:

- Develop a care plan based on the burn type, severity, and associated risks
- Plan for interventions such as fluid resuscitation, pain management, wound care, and nutritional support
- Coordinate with the healthcare team to address potential complications and support patient recovery

Take Action:

- Implement the care plan, monitoring the patient's response to interventions and adjusting as needed
- Provide education and support to the patient and their family regarding burn care and recovery
- Communicate with the healthcare team to ensure continuity of care and appropriate follow-up

Evaluate Outcomes:

- Assess the effectiveness of the care plan and interventions in promoting healing and preventing complications
- Identify any unaddressed issues or areas for improvement in the patient's care
- Document findings and communicate them to the healthcare team

The Rule of 9s and Parkland Burn Formula

The Rule of 9's and Parkland Burn Formula are essential tools for healthcare professionals to assess burn severity and guide treatment decisions. Both are vital in determining the appropriate level of care and fluid resuscitation for burn patients.

Recognize Cues:

- Assess the extent of the burn using the Rule of 9's to estimate the total body surface area (TBSA) percentage affected
- Identify the burn type and depth (superficial, partial thickness, full thickness)
- Consider the patient's vital signs, overall medical history, and current condition

Analyze Cues:

- Determine if the patient requires referral or transfer to a specialized burn unit based on the TBSA percentage
- Evaluate the patient's risk for hypovolemic shock and other complications due to fluid shifts

Prioritize Hypotheses:

- Establish the need for fluid resuscitation based on the severity of the burn and the patient's condition
- Consider potential complications, such as organ failure, due to inadequate fluid replacement

Generate solutions:

- Develop a plan for fluid resuscitation using the Parkland Burn Formula, which accounts for TBSA, patient weight, and fluid type (typically Lactated Ringers, a sterile solution used for intravenous fluid replacement. It is composed of a combination of electrolytes and fluids that are similar in composition to the body's own fluids)
- Ensure that the healthcare team is prepared to monitor the patient's response to fluid therapy and make adjustments as needed

Take Action:

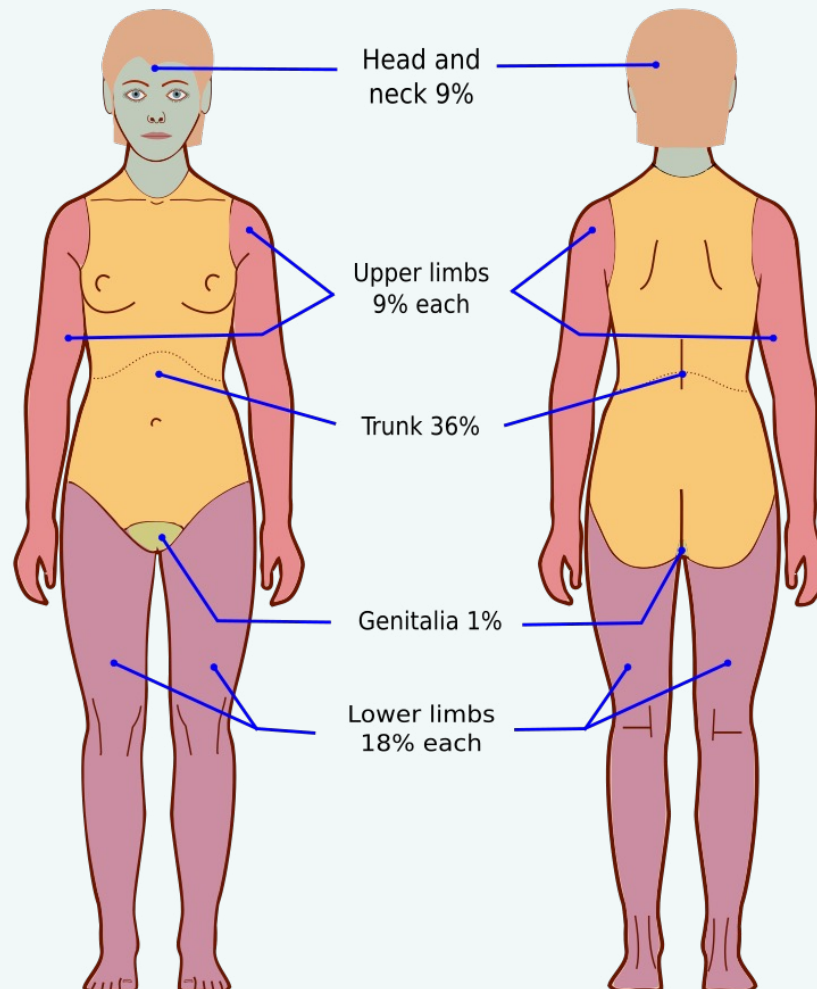
- Administer fluids according to the Parkland Burn Formula, giving half of the calculated

volume in the first 8 hours and the remaining half over the following 16 hours

- Monitor the patient's vital signs, urine output, and overall condition to assess their response to fluid therapy
- Coordinate with the healthcare team to address any complications or concerns that arise during treatment

Evaluate Outcomes:

- Assess the effectiveness of fluid resuscitation in maintaining the patient's stability and preventing complications
- Identify any areas for improvement in the patient's care and make adjustments as needed
- Document findings and communicate them to the healthcare team



Body System Charting

Body system charting is a method of documenting patient assessments and care using a systematic approach that is organized by body systems. With the new NCSBN Clinical Judgment Measurement Model, body system charting can be used to support clinical judgment and decision-making.

When using the NCSBN Clinical Judgment Measurement Model for body system charting, nurses should first recognize cues, such as patient complaints or symptoms, abnormal findings on physical exam, or deviations from expected outcomes. Next, they should analyze these cues by reviewing the patient's medical history, current medications, and any other relevant information. Based on this analysis, nurses should prioritize hypotheses or potential causes of the patient's symptoms or problems.

Once hypotheses have been prioritized, nurses can generate solutions, such as diagnostic tests, medications, or other interventions. They can then take action by implementing these solutions and monitoring the patient's response to treatment. Finally, they can evaluate outcomes to determine the effectiveness of the interventions and whether any adjustments are necessary.

When using body system charting with the NCSBN Clinical Judgment Measurement Model, it is important to document all relevant information, including the patient's complaints, physical exam findings, and any interventions or treatments provided. This documentation should also include an evaluation of outcomes and any adjustments made to the plan of care. By using the NCSBN Clinical Judgment Measurement Model for body system charting, nurses can ensure a comprehensive and systematic approach to patient care that supports clinical judgment and decision-making. Below are examples on how to chart "normal" assessments for each body system. Use this as your point of reference to add or take out any assessment findings, as well as alter for abnormal findings.

Body System Charting with NCSBN Clinical Judgment Model

1. NEUROLOGICAL

AAOx4. Steady gait. Negative Romberg test. Patient appears calm without apparent distress. Well-groomed. Steady, smooth speech. GCS 15. Able to perform repetitive finger-to-nose and finger-to-finger tests at a smooth pace. Cranial Nerves I–XII intact.

2. HEAD

Symmetrical, round, hard, and smooth without lesions or bumps noted on palpation. Brown hair, evenly distributed along the scalp without areas of alopecia. Well-groomed. Face is round, smooth, and symmetrical. No evidence of facial drooping. Temporal arteries are equal, elastic, and nontender. Temporomandibular joint palpated with full range of motion without tenderness.

3. EARS/EYES

Bilateral ears at appropriate level in relationship to bilateral eyes. Patient denies a history of pain or tenderness to bilateral ears or recent ear infection. Ears are smooth, no lumps, lesions, nodules noted. Appropriate color. No visible drainage noted. Nontender on palpation of the tragus or pinna. Patient denies radiating pain from bilateral ears. Small amount of yellow cerumen in the external canal. Tympanic membrane is pearly gray and translucent. Able to visualize the cone of light. Able to perform Whisper test with ease. Bilateral eyes are symmetrical without redness, discharge or crusting from external eyelids. Conjunctiva appears pink and smooth. Sclera appears white with no lesions or redness noted. Bilateral pupils are clear and equal in diameter. Negative strabismus. Negative nystagmus.

4. NOSE/THROAT/SINUS

Nose is symmetrical and appropriate color. No signs of erythema or irritation. No visible masses or lesions noted on the external nose. Patient denies a history of recent rhinorrhea. Bilateral nares are patent. Cranial Nerve intact. No sign of septal deviation, lesions, or polyps noted on bilateral internal nares. No purulent drainage noted. Frontal and maxillary sinuses are nontender to palpation and percussion.

5. LIPS

Lips appear pink and moist without evidence of lesions. No swelling noted along the vermillion border. Patient has 32 intact teeth that are slightly yellow without evidence of cavities or crowns. Gums pink without redness or swelling. Tongue pink and moist without evidence of oral thrush. Cranial Nerve XII intact. Frenulum midline. Soft palate smooth and pink. Uvula midline with bilateral tonsils 2+. No evidence of exudates on bilateral tonsils. Cranial Nerve IX and X intact.

6. NECK

Symmetrical with midline trachea and no bulging masses. C7 is visible and palpable with neck flexion. Cranial Nerve XI intact. Patient has smooth, controlled, full range of motion of the neck. Bilateral carotid arteries 2+, elastic. No evidence of carotid bruits on auscultation. Thyroid gland non-visible but palpable when swallowing. Lymph nodes nonpalpable.

7. CARDIOVASCULAR

Denies chest pain and shortness of breath. S1 and S2 heart sounds auscultated, regular rhythm with no murmurs. Capillary refill 2–3 seconds. Skin is pink, warm, and dry. No evidence of JVD. No signs of peripheral edema or DVT. No lifts, heaves, or thrills identified on exam or palpitation.

8. RESPIRATORY

Respirations 16/minute, relaxed and even. Able to talk with ease. Anterior and posterior chest are symmetrical without evidence of masses, lesions, or scars. Percussion tones resonant over

9. MUSCULOSKELETAL

No reports of joint stiffness, muscle aches, pain, swelling, or limited function. Able to perform functions of daily activities with no limitations. Walks 1 mile daily. Full ROM of arms and legs with smooth muscle movement. Able to maintain resistance of muscles without any discomfort or tenderness. Upper and lower extremities with 5 out of 5 extremity strength.



3

CHAPTER 3

Advanced Clinical Topics



Brain Anatomy, Functions, and Disorders

Overview of the Brain and Brain Functions:

The brain is a complex organ that serves as the control center for the human body. It is responsible for processing information, regulating bodily functions, and coordinating actions and reactions. The brain can be divided into several regions, each with specific functions:

1. FRONTAL LOBE (EXECUTIVE FUNCTION)

- Problem-solving
- Concentration
- Planning and organizing
- Reasoning
- Personality, behavior, and mood regulation

2. PARIETAL LOBE

- Sensations (temperature, pressure, touch, pain, and taste)
- Perception, body awareness, and attention
- Mathematical calculations

3. TEMPORAL LOBE

- Hearing and attention
- Storing verbal and visual memories (short-term and long-term)

- Language comprehension
- Balance
- Occipital Lobe
- Visual processing
- Perception of size and shapes

4. CEREBELLUM (MINI BRAIN)

- Balance, coordination, and rhythm
- Proprioception (body position and movement)
- Posture and movement

5. BRAIN STEM

Consciousness, breathing, and heart rate regulation

Traumatic Brain Injury Overview

Traumatic brain injury (TBI) is damage to the brain caused by an external force, either blunt or penetrating trauma.

Causes: Falls, violence, sports-related injuries (e.g., NFL), combat injuries (military), motor vehicle accidents, and body collisions.

Mechanism of Injury

1. BLUNT

- **Acceleration:** A moving object makes contact with the head (e.g., swinging baseball bat).
- **Deceleration:** A moving head makes contact with a stationary object (e.g., head hitting concrete).
- **Acceleration-deceleration:** A combination of both (e.g., whiplash or coup-contrecoup).

2. ROTATION

Movement of the head occurs out of synchrony with the rest of the body (e.g., side impact to the head).

3. COMPRESSION

Change in the shape of the skull due to being between two hard objects.

4. PENETRATING

An object enters the skull and causes injury (e.g., guns, knives, wood, rocks).

Classification:

- **Mild TBI:** also known as concussion, is the most common type of TBI. Mild TBI is characterized by a brief loss of consciousness (if any), confusion, and other symptoms that last for a short time (usually less than 30 minutes).
- **Moderate TBI:** Moderate TBI is characterized by a loss of consciousness for a few minutes to a few hours, as well as other symptoms such as confusion, amnesia, and

headache.

- **Severe TBI:** Severe TBI is characterized by a loss of consciousness for several hours or days, as well as other symptoms such as seizures, cognitive deficits, and neurological deficits.
- **Closed head injury:** Closed head injury occurs when the head is impacted by an external force, but the skull remains intact. Closed head injuries can cause diffuse axonal injury, subdural hematoma, and other types of brain damage.
- **Penetrating head injury:** Penetrating head injury occurs when an object penetrates through the skull and damages the brain tissue. Penetrating injuries can cause focal brain damage and can be life-threatening.
- **Frontal lobe injury:** Frontal lobe injury occurs when the front part of the brain is damaged. Frontal lobe injuries can cause personality changes, cognitive deficits, and other symptoms.
- **Diffuse axonal injury:** Diffuse axonal injury occurs when the brain is rotated or sheared inside the skull, causing damage to the axons that connect the brain cells. Diffuse axonal injury can cause coma, persistent vegetative state, or death.

Diagnosis

- CT scan (to identify lesions, cerebral edema, bleeding)
- X-ray (to detect skull and cervical spine fractures or displacement)
- CBC, coagulation tests, electrolytes, ABGs
- Glasgow Coma Scale (GCS)

Interventions

Maintain intracranial pressure (ICP)

- Elevate the head of the bed
- Reduce stimuli
- Monitor respiratory rate, depth, and patterns
- Stabilize cervical spine until injury is ruled out
- Maintain patent airway
- Rotate patient every 2 hours to avoid pressure ulcers

- Suction as needed (not routine, as it may increase ICP)

Goals of treatment

- Prevent increased ICP
- Avoid infections
- Minimize the risk of post-traumatic seizure disorder
- Reduce the risk of permanent neurological deficit
- Prevent death

Primary Traumatic Brain Injury Types

Primary traumatic brain injuries refer to the immediate damage that occurs at the time of impact, resulting from an external force to the head. These injuries can be either focal, affecting a specific area of the brain, or diffuse, causing widespread damage. Primary traumatic brain injuries can occur due to various mechanisms, such as blunt force, penetrating trauma, or acceleration-deceleration forces. Some common types of primary traumatic brain injuries include epidural hematoma, subdural hematoma, subarachnoid hemorrhage, intracerebral hemorrhage, cerebral contusion, and concussion. Recognizing and understanding these injury types is crucial for prompt diagnosis and appropriate management to prevent further complications and ensure the best possible patient outcomes. Primary traumatic brain injuries occur at the time of impact and can result in focal and/or diffuse injuries. Some types include:

1. EPIDURAL HEMATOMA

- **Location:** Epidural space between the skull and dura mater
- **Cause:** Blunt trauma or skull fracture (temporal bone fracture most common)
- **Symptoms:** Brief loss of consciousness (LOC) followed by a period of being awake, then rapid deterioration; headache, obtunded, contralateral hemiparesis, ipsilateral pupil dilation
- **Treatment:** Neurosurgical emergency (surgery to remove pressure), treat increased ICP (elevate head of bed, reduce stimuli, administer mannitol)

2. SUBDURAL HEMATOMA

- **Location:** Subdural space between the dura mater and arachnoid
- **Cause:** Acceleration, deceleration, or rotation injury (brain movement causes rupture of veins and vessels, bleeding into subdural space)
- **Symptoms:** Progressive headache, confusion, disorientation, contralateral hemiparesis, ipsilateral pupil dilation (slow progression)
- **Treatment:** Neurosurgical emergency (surgery, possible ventricular drain to relieve pressure), treat ICP

3. SUBARACHNOID HEMORRHAGE (TRAUMATIC)

- **Location:** Bleeding into the subarachnoid space, usually filled with cerebrospinal fluid (CSF)
- **Cause:** Blunt trauma causing small arteries to tear during initial injury at the brain's surface
- **Symptoms:** Severe headache, decreased LOC, coma, vomiting, seizures, focal changes depending on the area
- **Treatment:** Determine if it is a traumatic subarachnoid hemorrhage and not from a ruptured cerebral aneurysm (stroke); treat ICP to reduce secondary brain injury

4. INTRACEREBRAL HEMORRHAGE

- **Location:** Cerebral bleed within the brain tissue or ventricles
- **Cause:** Most commonly caused by a penetrating injury; less common causes include depressed skull fracture or acceleration/deceleration
- **Symptoms:** Headache, contralateral hemiparesis, decreased LOC, vomiting, seizures
- **Treatment:** Possible external ventricular drain to release pressure; treat ICP to reduce secondary brain injury

5. CEREBRAL CONTUSION

- **Location:** Small bleeding or bruising in the surrounding brain tissue
- **Cause:** Coup or coup-contrecoup injury
- **Symptoms:** Range from mild to severe headache, confusion, sleepiness, dizziness, nausea/vomiting, focal changes, LOC
- **Treatment:** If severe, an external ventricular drain may be needed to relieve pressure; treat ICP to reduce secondary brain injury

6. CONCUSSIONS

- **Location:** Most commonly in the frontal and temporal lobes
- **Cause:** Bump, blow, or jolt to the head
- **Symptoms:** Brief LOC, headache, dizziness, nausea/vomiting

Note: Concussions are considered the mildest form of traumatic brain injury

Secondary Brain Injury

Secondary brain injuries are a series of changes that occur hours to days after a primary brain injury. These changes involve a cascade of cellular, chemical, tissue, or blood vessel alterations that can cause further damage to the brain. The main goal in managing secondary brain injuries is to ensure proper oxygenation, perfusion of the brain, and prevent ischemia. Causes of secondary brain injury can be divided into three main categories:

1. PRIMARY INJURY-RELATED CAUSES:

- **Massive depolarization:** Potassium leaves the cell while sodium, water, and calcium enter, leading to edema and damage.
- Aerobic metabolism switches to anaerobic metabolism, causing lactic acid buildup.
- Release of excitatory neurotransmitters and free radicals, resulting in cell damage.

2. NEUROLOGIC CAUSES:

- **Major intracranial pressure or hypertension:** Sustained ICP above 20 mmHg can overwhelm the brain's compensatory mechanisms.
- Cerebral blood flow is dependent on cerebral pressure; increased ICP can lead to decreased blood flow.
- **Cerebral vasospasm:** Constriction of blood flow, leading to ischemia.

3. SYSTEMIC CAUSES:

- **Hypotension (SBP <90):** Reduced cerebral blood flow, leading to ischemia and a buildup of waste products, which can be fatal.
- **Hypercapnia/Hypocapnia:** Imbalances in CO₂ levels can affect cerebral blood flow and ICP, causing constriction and ischemia.
- **Hypoxia or hypoxemia:** Insufficient oxygen supply can lead to anaerobic metabolism and increased lactic acid.
- **Anemia:** Low red blood cell count or hemoglobin, affecting oxygen delivery to the brain.
- **Sodium disorders:** Imbalances can cause brain swelling or dehydration.

Managing secondary brain injuries requires close monitoring and appropriate interventions to prevent further damage and complications.

Intracranial Pressure: An Overview and Essential Concepts

Intracranial pressure (ICP) refers to the pressure inside the skull, which can increase dramatically under certain conditions, resulting in a medical emergency. Maintaining an appropriate balance among the three key components within the skull – blood, brain tissue, and cerebrospinal fluid – is crucial for proper brain function. When the volume of one component increases, the others must compensate to maintain a stable ICP. However, continuous pressure can overwhelm the brain's ability to compensate, leading to complications.

Several factors can contribute to increased ICP, such as hyperthermia, hypoxia, hypercapnia, body position, arterial and venous pressure, and increased intraabdominal pressure due to events like vomiting or bearing down. Additionally, certain conditions, such as traumatic brain injuries, hemorrhages, tumors, hematomas, hydrocephalus, meningitis, or flexion, can cause elevated ICP.

Symptoms of increased ICP can manifest at various stages. Early signs may include changes in mental status, such as restlessness, agitation, or confusion; double vision; optic nerve swelling; dilated or unequal pupils; positive Babinski reflex; posturing (decorticate or decerebrate); seizures; headaches; vomiting without nausea; and motor function deterioration. Late signs of increased ICP can include irregular breathing patterns like Cheyne–Stokes respiration, unconsciousness, and Cushing's triad (increased systolic blood pressure, decreased heart rate, and decreased respiratory rate). Timely recognition and management of elevated ICP are crucial to prevent further complications and ensure optimal patient outcomes.

Intracranial Pressure: Understanding and Treatment Strategies

Intracranial pressure (ICP) refers to the pressure within the skull, which can increase under certain circumstances, leading to a potentially life-threatening situation. When the volume of blood, cerebrospinal fluid (CSF), or pressure within the brain itself increases, compensation must occur to maintain equilibrium. However, if the pressure continues to rise, it can result in decreased blood flow to the brain, ischemia, and other complications. An ICP greater than 20mmHg or cerebral perfusion pressure below 60mmHg are considered critical.

Treatment strategies for elevated ICP include:

- Elevating the head of the bed to 30 degrees or higher to facilitate fluid drainage.
- Keeping the head in a midline position, avoiding flexion of the head or neck.
- Performing routine neurological checks and assessing the Glasgow Coma Scale (GCS).
- Minimizing straining, vomiting, bearing down, and coughing.
- Maintaining a calm environment, preventing elevated temperature, and using antipyretics as needed.
- Avoiding hypoxia or hypercapnia by monitoring arterial blood gases (ABGs).
- Suctioning as needed, without over-suctioning.
- If mechanically ventilated, maintaining a lower PaCO₂ (30–35) to promote vasoconstriction and reduce ICP.

Medications that can be used to manage elevated ICP include barbiturates, vasopressors or antihypertensives, anticonvulsants, loop diuretics, and hyperosmotics like mannitol. For unconscious patients, care should be taken not to over-sedate, and routine repositioning and range of motion exercises should be performed.

In some cases, a ventriculostomy may be necessary to relieve pressure and monitor ICP. This surgical procedure creates a hole within a cerebral ventricle for drainage, either temporarily through an external ventricular drain or permanently via a ventricular shunt.

Nursing care for patients with an external ventricular drain or ventriculoperitoneal (VP)

shunt includes maintaining proper positioning of the pressure transducer, monitoring for infection, performing regular assessments of neurological status, and educating patients and caregivers about potential risks and necessary follow-up care.

By understanding the causes, symptoms, and treatment options for elevated ICP, healthcare providers can work together to ensure optimal patient outcomes and minimize the risk of further complications.

Hydrocephalus

Hydrocephalus is a neurological condition characterized by an abnormal accumulation of cerebrospinal fluid (CSF) within the ventricles of the brain, resulting in increased pressure within the skull. This condition can occur in infants, children, and adults, with different causes and symptoms depending on the age group. Early diagnosis and appropriate treatment are crucial to minimize the risk of long-term complications.

Hydrocephalus occurs when there is a buildup of cerebrospinal fluid in the brain's ventricular system, causing the enlargement of the intracranial cavity. The ventricles are four interconnected cavities filled with CSF that circulate and cushion the brain.

The condition may result from:

- **Obstruction:** A partial blockage in the normal flow of CSF can be caused by bleeding in the brain from a stroke or head injury, or by tumors, lesions, or masses on the brain or spinal cord.
- **Malabsorption:** The villi and vessels responsible for absorbing CSF may struggle to do so, leading to fluid buildup. Inflammation of brain tissue, such as from bacterial meningitis, can also contribute to this issue.

Hydrocephalus is more common in infants and older adults. Symptoms may include an unusually large head size or circumference, prominent scalp veins, headache, downward deviation of the eyes (sunset sign), vomiting, sleepiness, nausea, abnormal walking, instability, and confusion.

Diagnostic tests for hydrocephalus include CT scans, MRI scans, lumbar punctures to assess the likelihood of successful shunt placement, and intracranial pressure (ICP) monitoring.

Treatment options for hydrocephalus involve:

- **Ventriculostomy:** This procedure, also known as endoscopic third ventriculostomy, drains excess CSF.
- **Shunt placement:** A shunt is inserted into the ventricle and threaded to another part of

the body to drain CSF, allowing it to be absorbed. Patients will typically require a shunt for the rest of their lives.

- **Addressing the cause of obstruction:** Removing a tumor or other obstruction can help alleviate the condition.
- Long-term follow-up care for shunt patients and education on the importance of meningitis vaccinations.

It is essential to separate hydrocephalus from other neurological conditions, such as partial seizures, for accurate diagnosis and appropriate treatment.

Seizures

Seizures are characterized by a sudden, uncontrolled release of electrical activity within the brain, leading to changes in behavior, movements, and levels of consciousness (LOC). Various factors can cause seizures, such as genetics, stroke, head trauma, brain tumors, meningitis or other infections, damage to the brain in utero, and drug or alcohol withdrawal.

Some life-threatening situations related to seizures include status epilepticus, which is a seizure lasting more than 5 minutes or multiple seizures occurring back-to-back without regaining consciousness. This condition can result in death or permanent brain damage. Sudden unexplained death in epilepsy poses a risk for unmedicated patients with tonic-clonic seizures.

Seizure types can be classified into focal (partial) seizures, which are localized to one part of the brain:

- Simple focal seizures do not cause loss of consciousness (LOC) and may involve altered senses, tingling, jerking movements, or flashing lights.
- Complex focal seizures involve LOC or changed awareness, characterized by staring, repetitive movements, or confusion.

General Seizures

Seizures can also be classified as general seizures, which involve all areas of the brain.

Different types of general seizures include:

- **Absence seizures:** Often seen in children, these seizures involve staring off, a temporary loss of awareness, and a sudden return to normal consciousness.
- **Tonic seizures:** Characterized by stiffening of muscles and falling down.
- **Atonic seizures:** These seizures involve a complete loss of muscle control.
- **Clonic seizures:** Marked by jerking movements, often in the face or arms.
- **Tonic-clonic (grand mal) seizures:** The most intense type, these seizures involve abrupt loss of consciousness, body shaking, loss of bladder control, and tongue biting.

Treatment options for seizures include medications (antiseizure, antiepileptic, anticonvulsants), vagus nerve stimulation (a device implanted under the chest), and ensuring proper patient care during a seizure (never putting anything in the patient's mouth, making sure the patient is lying on their side, and routinely monitoring LOC and performing neuro checks).

Stroke

Stroke is a condition where oxygen-rich blood is unable to reach the brain due to a blockage or bleeding in a blood vessel. Strokes can be classified into two types:

1. ISCHEMIC

Caused by the narrowing of blood vessels in the brain, leading to blood clotting, blockage, and severely reduced blood flow. An embolus traveling from another part of the body or a thrombus forming from atherosclerosis in the brain can cause this type of stroke.

2. HEMORRHAGIC

Occurs when blood vessels in the brain break and bleed, leading to swelling as blood accumulates. The primary cause is aneurysm, while other factors include trauma, uncontrolled hypertension, and old age.

When applying the NCSBN Clinical Judgment Model, consider the following steps:

Recognize cues:

Monitor patients for signs and symptoms of stroke, such as altered LOC, headache, facial drooping, one-sided weakness/paralysis, respiratory distress, speech/visual problems, nausea/vomiting, vertigo, unequal pupils, trouble swallowing, seizures, and bladder/bowel incontinence.

Analyze cues:

Use the FAST acronym to quickly identify potential stroke victims: Facial drooping, Arm weakness, Speech difficulties, and Time to call 911.

Prioritize hypotheses:

A CT scan is essential for diagnosis, as hemorrhagic strokes are not candidates for tPA treatment. The administration of tPA must meet specific criteria, such as being given within 4.5 hours of symptom onset, having negative hemorrhage results, and ensuring controlled blood pressure.

Generate solutions:

Implement interventions for stroke patients, such as NPO until a swallow test is performed, obtaining baseline neuro data (NIH stroke scale), maintaining fluid and electrolyte balance, managing airway and oxygenation, and using aspirin to prevent hyperthermia.

Take action:

Monitor bleeding, H + H, and clotting factors, and increase the head of the bed with the head midline to improve perfusion. Avoid new IVs or injections for stroke patients.

Remember that there is a risk of seizure within 24 hours of a stroke. If a patient is not a candidate for tPA, surgical removal of hematomas may be an option.

Spinal Cord Injury: A Comprehensive Guide

Spinal cord injuries (SCIs) involve damage to any part of the spinal cord or nerves, often causing permanent changes in strength, sensation, and other body functions below the site of injury. Causes of SCIs include trauma to the spinal cord (fractures, dislocations, crushes, or compression of the vertebrae), motor vehicle accidents, falls, violence, sports injuries, stabbings, gunshot wounds, and non-traumatic factors such as alcohol, cancer, and arthritis.

When applying the NCSBN Clinical Judgment Model to spinal cord injuries, consider the following steps:

Recognize cues

Monitor patients for symptoms such as impaired motor and sensory impulses, blurry vision, flushed skin, feeling hot, restlessness, anxiety, spasms, stinging sensations, altered sensations to heat, cold, or touch, impaired breathing or coughing (C3–C5), neurogenic shock symptoms or autonomic dysreflexia, loss of movement, and loss of bladder or bowel function.

Analyze cues

Assess the severity and location of the spinal cord injury to determine the appropriate course of treatment and potential complications.

Prioritize hypotheses

Identify immediate needs and potential long-term complications of the spinal cord injury to prioritize treatment and management strategies.

Generate solutions:

Develop an individualized care plan that includes:

- **Immediate interventions:** Immobilize the spine, use a neck collar, keep the head of the bed flat until SCI is determined, and employ the log roll technique.

- **Ongoing care:** Rotate the patient every 2 hours to avoid pressure ulcers, encourage passive and active range of motion to prevent blood clots, promote participation in physical and occupational therapy, and administer analgesics and muscle relaxants as needed.
- **Acute stage management:** Maintain airway (C3–C5 injuries may impact breathing), keep the neck immobilized, prevent shock (neurogenic shock may occur within the first 24–72 hours), monitor for autonomic dysreflexia (may occur at any time, especially in injuries above T6), and manage symptoms such as flushed skin and increased temperature.

Take action

Implement the care plan and adjust as needed based on the patient's response and recovery progress. Continually evaluate the patient's condition and collaborate with the interdisciplinary team to ensure optimal patient outcomes.

Neurogenic Shock (Spinal Cord Injury above T6) Overview

Neurogenic shock occurs when the sympathetic nervous system (SNS) loses its ability to control the fight or flight response, leading to vasodilation.

Symptoms:

- Decreased systemic vascular resistance (SVR) and cardiac output (CO)
- Hypotension
- Venous pooling and hypothermia (cold trunk due to pooling)
- Bradycardia with warm, dry extremities
- Faint pulse and difficulty breathing
- Decreased pulmonary artery wedge pressure (PAWP)

Treatment:

- Recognize signs and symptoms of neurogenic shock
- Immobilize the spine
- Administer immediate fluid resuscitation for blood pressure
- Consider vasopressors to increase SVR, BP, CO, and venous return
- Monitor for fluid overload (no fluid loss in this type of shock)
- Administer atropine if necessary
- Monitor urine output and assess the risk of deep vein thrombosis (DVT)
- Consider intubation or mechanical ventilation based on the severity of the injury

Autonomic Dysreflexia (Spinal Cord Irritation above T6)

Autonomic dysreflexia occurs when the sympathetic nervous system is irritated, causing a sudden increase in its function.

Causes:

- Bladder distention
- Bowel disorder
- Restrictive clothing

Symptoms:

- Sudden vasoconstriction leading to decreased BP above the injury site and increased BP below the injury site
- Sweat gland stimulation
- Pounding headache
- Dilated pupils
- Increased or decreased heart rate

Treatment:

- Recognize signs and symptoms of autonomic dysreflexia
- Ensure the bladder is empty (monitor urine output, perform bladder scan, or insert a Foley catheter)
- Assess bowel sounds and the patient's last bowel movement
- Remove irritating clothing or blankets
- Routinely assess blood pressure and watch for symptoms every 2-5 minutes
- Move the patient into a sitting position
- Consider administering vasodilators if necessary

NIH Stroke Scale

The NIH Stroke Scale (NIHSS) is a tool used to assess stroke severity and guide treatment decisions. In the context of the Next Generation NCLEX (NGN), the NIHSS can be used to assess a nursing student's ability to make sound clinical judgments in complex situations.

The NGN aims to measure clinical judgment, which is the ability of nurses to make sound decisions in complex situations. Stroke care is a complex area of nursing practice that requires a high level of clinical judgment. The NIHSS can help nursing students to develop and demonstrate their clinical judgment skills in the context of stroke care.

To use the NIHSS effectively, nursing students must first **Recognize Cues**, such as the patient's neurological symptoms or changes in their condition. They must then **analyze these cues** to determine the severity of the stroke and potential treatment options. Based on this analysis, nursing students should **prioritize hypotheses** and **generate solutions**, such as administering clot-busting medication or preparing the patient for surgery.

Taking action involves implementing the appropriate treatment plan and monitoring the patient's response to treatment. Finally, nursing students must **evaluate outcomes** to determine the effectiveness of the interventions and make any necessary adjustments to the plan of care.

By using the NIHSS as a tool to support clinical judgment in stroke care, nursing students can develop the critical thinking and decision-making skills necessary to provide safe and effective patient care. The NGN will require nursing students to demonstrate their ability to make sound clinical judgments, which will be essential for providing safe and effective stroke care. By incorporating the NIHSS into the NGN, nursing students can be better prepared to meet the demands of the nursing profession and provide high-quality care to stroke patients.

The NIHSS is a well-validated tool that has been shown to be reliable and sensitive to changes in neurological function over time. It is used to guide treatment decisions and to assess the effectiveness of interventions aimed at improving stroke outcomes.

NIH Stroke Scale

1A. Level of consciousness	0 = Alert 1 = Not alert, but arousable by minor stimulation 2 = Not alert, but arousable by repeated stimulation 3 = Unresponsive or responds only with reflex
1B. Level of consciousness questions: What is the month? What is your age?	0 = Both answers correct 1 = Answers 1 question correctly 2 = Answers 2 questions correctly
1C. Level of consciousness commands: Open and close your eyes Grip and release your hand	0 = Performs both tasks correctly 1 = Performs 1 task correctly 2 = Performs neither task correctly
2. Gaze *Ask the patient to follow your finger with only the eyes	0 = Normal 1 = Partial gaze palsy 2 = Forced deviation
3. Visual *Ask the patient to cover one eye and hold up fingers in all 4 quadrants	0 = No visual loss 1 = Partial hemianopia 2 = Complete hemianopia 3 = Bilateral hemianopia
4. Facial palsy *Ask the patient to smile, lift eyebrows, squeeze eyes tightly shut	0 = Normal symmetric movements 1 = Minor paralysis 2 = Partial paralysis 3 = Complete paralysis of 1 or both sides
5. Motor arm movements (10 seconds) 5A. Left arm 5B. Right arm	0 = No drift 1 = Drift 2 = Some effort against gravity 3 = No effort against gravity; limb falls 4 = No movement
6. Motor leg movements (5 seconds) 6A. Left leg 6B. Right leg	0 = No drift 1 = Drift 2 = Some effort against gravity 3 = No effort against gravity; limb falls 4 = No movement

7. Limb ataxia *Finger-to-nose *Heel-to-chin	0 = Absent 1 = Present in 1 limb 2 = Present in 2 limbs
8. Sensory *Pin prick to face, arms, trunk and legs	0 = No sensory loss 1 = Mild to moderate sensory loss 2 = Severe or total sensory loss
9. Best language *Name items, describe pictures, read sentences	0 = No aphasia 1 = Mild to moderate sensory loss 2 = Severe aphasia 3 = Mute; global aphasia
10. Dysarthria *Evaluate speech clarity by reading a sentence	0 = Normal 1 = Mild to moderate dysarthria 2 = Severe dysarthria
11. Extinction and inattention	0 = No abnormality 1 = Visual, tactile, auditory, spatial or personal inattention 2 = Profound hemi-inattention or extinction

CASE STUDY: NIH Stroke Scale

Mrs. Jones, a 68-year-old Black female, is brought to the emergency department (ED) by her daughter. Mrs. Jones complains of sudden onset left-sided weakness and difficulty speaking. Her daughter reports that Mrs. Jones has a history of high blood pressure and takes medication to control it.

Assessment: Upon arrival to the ED, Mrs. Jones is assessed using the NIH Stroke Scale. The nursing student recognizes that Mrs. Jones is experiencing neurological symptoms and begins the assessment.

Analysis: The nursing student analyzes the score and recognizes that Mrs. Jones has a moderate to severe stroke, which requires immediate treatment.

Prioritizing hypotheses: The nursing student prioritizes the hypothesis that Mrs. Jones has an ischemic stroke and requires immediate treatment with clot-busting medication.

Generating solutions: The nursing student generates solutions by alerting the healthcare provider and preparing Mrs. Jones for the administration of clot-busting medication.

Taking action: The nursing student takes action by administering the medication and monitoring Mrs. Jones for any adverse effects or changes in her condition.

Evaluation: The nursing student evaluates the outcome by monitoring Mrs. Jones' vital signs and neurological status. The nursing student notes that Mrs. Jones' neurological status improves, and she is transferred to the stroke unit for further treatment and monitoring.

Conclusion: This case study illustrates how the NIH Stroke Scale can be used to support clinical judgment and decision-making in stroke care. By using the NIH Stroke Scale, nursing students can recognize cues, analyze data, prioritize hypotheses, generate solutions, take action, and evaluate outcomes to provide safe and effective care to stroke patients.

NIH Stroke Scale

- Level of consciousness: Alert (0 points)
- Questions: Answers both questions correctly (0 points)
- Commands: Performs both commands correctly (0 points)
- Facial palsy: Partial facial weakness on left side (2 points)
- Arm motor function: Unable to lift left arm above 90 degrees (2 points)
- Leg motor function: Unable to lift left leg above 90 degrees (2 points)
- Limb ataxia: Unable to perform finger-nose-finger on left side (1 point)
- Sensory: Mild decrease in sensation on left side (1 point)
- Language: Mildly impaired (1 point)
- Dysarthria: Mildly impaired (1 point)
- **Total score: 8 points**

Glasgow Coma Scale

The Glasgow Coma Scale is a neurological assessment tool used by healthcare providers to evaluate a patient's level of consciousness following a traumatic brain injury or other neurological event.

The scale has three components: eye opening, verbal response, and motor response, each of which is scored from 1 to 5. The scores are added together to give a total score ranging from 3 to 15, with a higher score indicating greater responsiveness. A score of 15 indicates full consciousness, while a score of 3 suggests a deep coma.

To use the GCS effectively, nursing students must first recognize cues, such as changes in the patient's level of consciousness or neurological symptoms. They must then analyze these cues by reviewing the patient's medical history, current medications, and any other relevant information. Based on this analysis, nursing students should prioritize hypotheses or potential causes of the patient's symptoms or problems.

Once hypotheses have been prioritized, nurses can generate solutions, such as emergency interventions, diagnostic tests, or medications. They can then take action by implementing the appropriate treatment plan and monitoring the patient's response to treatment. Finally, they can evaluate outcomes to determine the effectiveness of the interventions and make any necessary adjustments to the plan of care.

By using the GCS as a tool to support clinical judgment in neurological care, nursing students can develop the critical thinking and decision-making skills necessary to provide safe and effective patient care. The NGN will require nursing students to demonstrate their ability to make sound clinical judgments, which will be essential for providing safe and effective neurological care. By incorporating the GCS into the NGN, nursing students can be better prepared to meet the demands of the nursing profession and provide high-quality care to patients with neurological deficits.

While the Glasgow Coma Scale is a widely-used and reliable tool for monitoring neurological status, it should be used in conjunction with other assessments to ensure a comprehensive evaluation.

Glasgow Coma Scale

Category	Score	Description
Eye opening	4	Spontaneous
	3	To speech
	2	To pain
	1	No response
Verbal response	5	Oriented
	4	Confused conversation
	3	Inappropriate words
	2	Incomprehensible sounds
	1	No response
Motor response	6	Obeys commands
	5	Localizes to pain
	4	Withdrawal from pain
	3	Abnormal flexion (decorticate posturing)
	2	Extensor response (decerebrate posturing)
	1	No response

Here's an example case study that can illustrate the use of the Glasgow Coma Scale (GCS) in the context of the Next Generation NCLEX:

CASE STUDY: Glasgow Coma Scale

Mr. Lee, a 35-year-old male, is brought to the emergency department (ED) by ambulance after a motor vehicle accident. Upon arrival, Mr. Lee is unresponsive, and the nursing student performs an assessment using the Glasgow Coma Scale.

Assessment: The nursing student assesses Mr. Lee using the Glasgow Coma Scale, which evaluates the patient's level of consciousness and neurological function.

Glasgow Coma Scale:

- Eye opening: No response (1 point)
- Verbal response: No response (1 point)
- Motor response: No response (1 point)
- **Total score: 3 points**

Analysis: The nursing student analyzes the score and recognizes that Mr. Lee has a severe traumatic brain injury, which requires immediate treatment.

Prioritizing hypotheses: The nursing student prioritizes the hypothesis that Mr. Lee has a severe traumatic brain injury and requires immediate treatment to prevent further neurological damage.

Generating solutions: The nursing student generates solutions by alerting the healthcare provider and preparing Mr. Lee for emergency interventions, such as airway management and stabilization of vital signs.

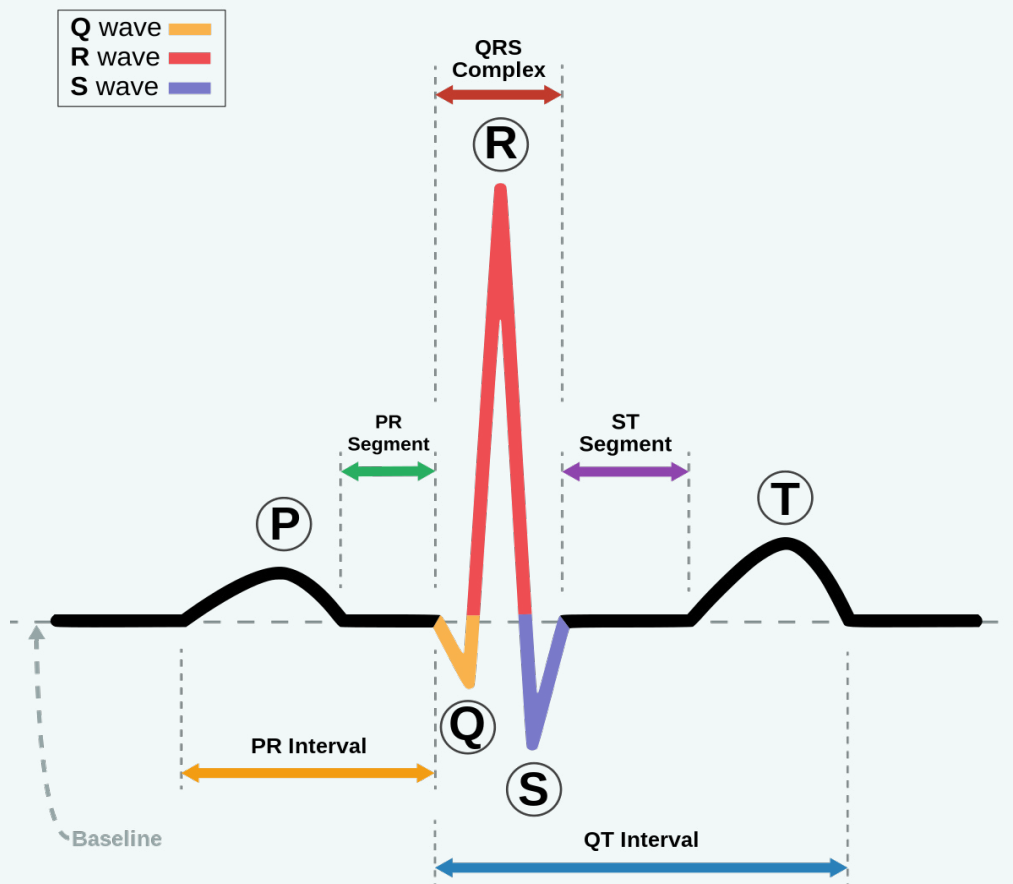
Taking action: The nursing student takes action by implementing the appropriate emergency interventions and closely monitoring Mr. Lee's condition.

Evaluation: The nursing student evaluates the outcome by monitoring Mr. Lee's vital signs and neurological status. The nursing student notes that Mr. Lee's condition stabilizes, and he is transferred to the intensive care unit for further treatment and monitoring.

Conclusion: This case study illustrates how the Glasgow Coma Scale can be used to support clinical judgment and decision-making in the assessment and management of traumatic brain injury. By using the Glasgow Coma Scale, nursing students can recognize cues, analyze data, prioritize hypotheses, generate solutions, take action, and evaluate outcomes to provide safe and effective care to patients with traumatic brain injury.

Reading ECGs

Reading an electrocardiogram (EKG or ECG) is an essential skill for nursing students, as it provides valuable information about a patient's heart function. EKGs measure the electrical activity of the heart and can help detect heart problems, such as arrhythmias, myocardial infarctions, and more. Here is a step-by-step guide on how to read EKGs for student nurses:



Understand the basics of ECG paper

EKG paper is divided into small squares, with each small square representing 0.04 seconds and each larger square (made up of 5x5 small squares) representing 0.2 seconds. The vertical axis represents the amplitude of the electrical activity, while the horizontal axis represents time.

Identify the waves, segments, and intervals of an ECG

1. THE WAVES

The wave of an electrocardiogram (ECG) represents the electrical activity of the heart during one cardiac cycle. The ECG has five waves, which include the P wave, QRS complex, and T wave. The P wave represents atrial depolarization, the QRS complex represents ventricular depolarization, and the T wave represents ventricular repolarization. The U wave, which is not always present, represents the repolarization of the papillary muscles or the Purkinje fibers. The waves of the ECG provide valuable information about the function and integrity of the heart.

2. THE SEGMENTS

The segment on an electrocardiogram (ECG) is a straight line that connects two waves. There are several segments in the ECG, including the PR segment, ST segment, and TP segment. The PR segment is the line that connects the end of the P wave to the beginning of the QRS complex, and it represents the time interval between atrial depolarization and ventricular depolarization. The ST segment is the line that connects the end of the QRS complex to the beginning of the T wave, and it represents the time interval between ventricular depolarization and ventricular repolarization. The TP segment connects the end of the T wave to the beginning of the next P wave, and it represents the time interval between ventricular repolarization and atrial depolarization. The segments of the ECG provide important information about the electrical activity of the heart and can help diagnose certain cardiac conditions.

3. THE INTERVALS

An interval on an electrocardiogram (ECG) is a time measurement that includes a wave and a segment. There are several intervals in the ECG, including the PR interval, QRS duration, and QT interval. The PR interval is the time from the beginning of the P wave to the beginning of the QRS complex, and it represents the time it takes for the electrical signal to travel from the sinoatrial (SA) node to the ventricles. The QRS duration is the time from the beginning of the QRS complex to the end of the QRS complex, and it represents the time it takes for the electrical signal to travel through the ventricles. The QT interval is

the time from the beginning of the QRS complex to the end of the T wave, and it represents the time it takes for the ventricles to contract and then recover to their resting state. The intervals of the ECG provide important information about the electrical activity of the heart and can help diagnose certain cardiac conditions.

Determine the heart rate:

There are several methods to calculate the heart rate from an EKG:

- 6-second method: Count the number of QRS complexes in a 6-second strip (30 large squares) and multiply by 10.
- 300 rule (large-square method): Count the number of large squares between two consecutive R waves and divide 300 by that number.
- 1500 rule (small-square method): Count the number of small squares between two consecutive R waves and divide 1500 by that number.
- A normal heart rate ranges from 60–100 bpm, while a heart rate greater than 100 bpm is considered tachycardia and a heart rate less than 60 bpm is considered bradycardia.

Compare the P wave to the QRS complex:

The P wave represents atrial depolarization and the QRS complex represents ventricular depolarization. A normal P wave should precede every QRS complex and the morphology of the P wave should be consistent throughout the EKG. An abnormal P wave can indicate an atrial abnormality or abnormal conduction.

Analyze the QRS complex:

Evaluate the QRS complex's duration, amplitude, and configuration. Prolonged or abnormal QRS complexes may indicate bundle branch blocks, ventricular hypertrophy, or other pathologies.

Evaluate the ST segment and T wave:

The ST segment represents the time between ventricular depolarization and repolarization, and a change in this segment can indicate myocardial injury or ischemia. A depressed or

elevated ST segment can be indicative of an acute myocardial infarction or ischemia, while an inverted T wave can indicate myocardial injury or ischemia as well.

Interpret the rhythm:

Once all the above steps are complete, it is important to interpret the rhythm of the ECG. The rhythm can be regular or irregular, and it can be a normal sinus rhythm or an abnormal rhythm such as atrial fibrillation, ventricular tachycardia, or ventricular fibrillation. Abnormal rhythms can indicate a variety of cardiac conditions and require prompt medical attention.

Identify any abnormalities or arrhythmias:

Once you have analyzed the EKG's components, look for any abnormal patterns or rhythms, such as atrial fibrillation, ventricular tachycardia, or signs of myocardial infarction. *Remember, practice is key in developing the skill of EKG interpretation. As a nursing student, it's essential to practice reading and interpreting various EKG strips to become proficient in recognizing abnormalities and arrhythmias.*

Compare findings with clinical presentation

When interpreting an EKG, always consider the patient's clinical presentation and history. Some EKG abnormalities may be normal for a particular patient, while others may require immediate intervention. Consult with more experienced healthcare providers if you are unsure about the significance of your findings or if you require guidance on the appropriate course of action.

Document your findings

Proper documentation is crucial in patient care. Record your EKG interpretation in the patient's chart, including the heart rate, rhythm, and any identified abnormalities or arrhythmias. Be sure to note any interventions performed or recommended based on your interpretation of the EKG.

Continuously update your knowledge

EKG interpretation is a skill that requires ongoing learning and practice. Stay up-to-date with the latest guidelines, research, and best practices in EKG interpretation to ensure that you are providing the best possible care for your patients.

Use available resources and tools:

There are numerous resources and tools available to help nursing students become proficient in EKG interpretation, including textbooks, online courses, mobile apps, and practice EKG strips. Utilize these resources to deepen your understanding of EKG interpretation and to practice your skills regularly.

Seek feedback and mentorship:

As a nursing student, it's essential to seek feedback and mentorship from experienced nurses, physicians, and other healthcare professionals who are skilled in EKG interpretation. Ask questions, discuss challenging cases, and request guidance to improve your understanding and interpretation skills.

By following these steps and consistently practicing EKG interpretation, nursing students can develop the expertise needed to accurately read and interpret EKGs. This essential skill will prove invaluable in providing high-quality patient care and ensuring optimal outcomes for patients with cardiac conditions.

EKG rhythms

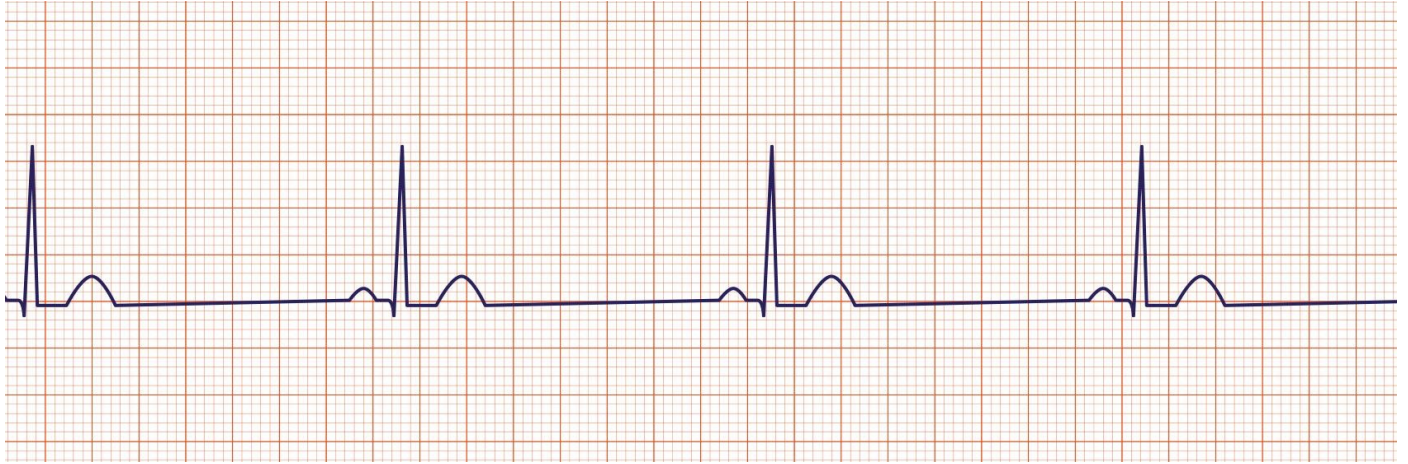
1. NORMAL SINUS RHYTHM (NSR)

A regular rhythm with a rate of 60–100 beats per minute (bpm), originating from the sinoatrial (SA) node.



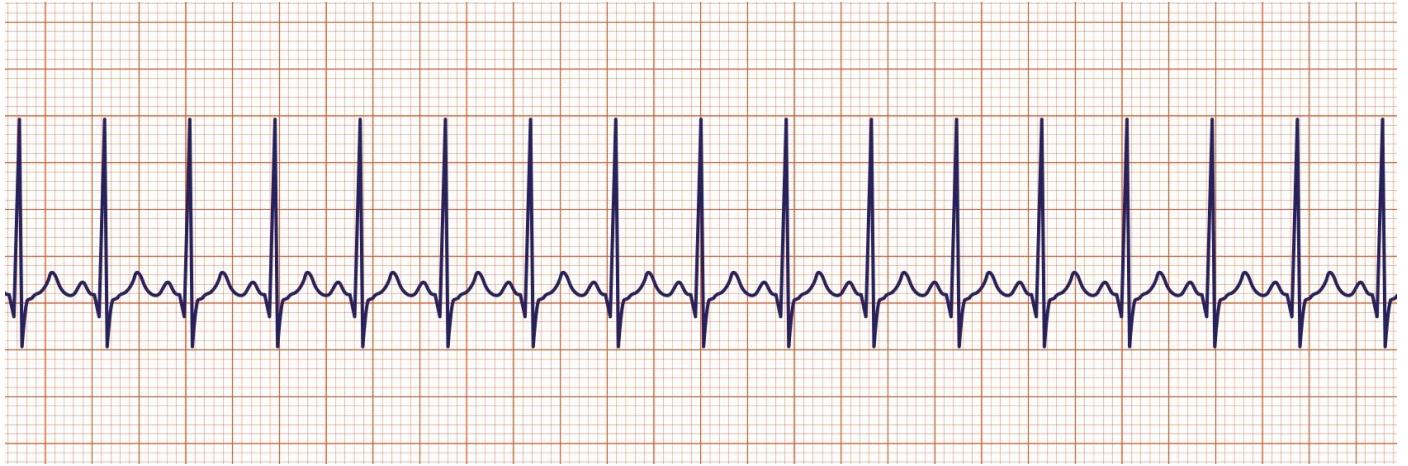
2. SINUS BRADYCARDIA

A regular rhythm with a rate below 60 bpm, originating from the SA node. It can be normal in some athletes or during sleep but may indicate a problem in other patients.



3. SINUS TACHYCARDIA

A regular rhythm with a rate above 100 bpm, originating from the SA node. It can be a normal response to stress, exercise, or fever but may indicate an issue if persistent.



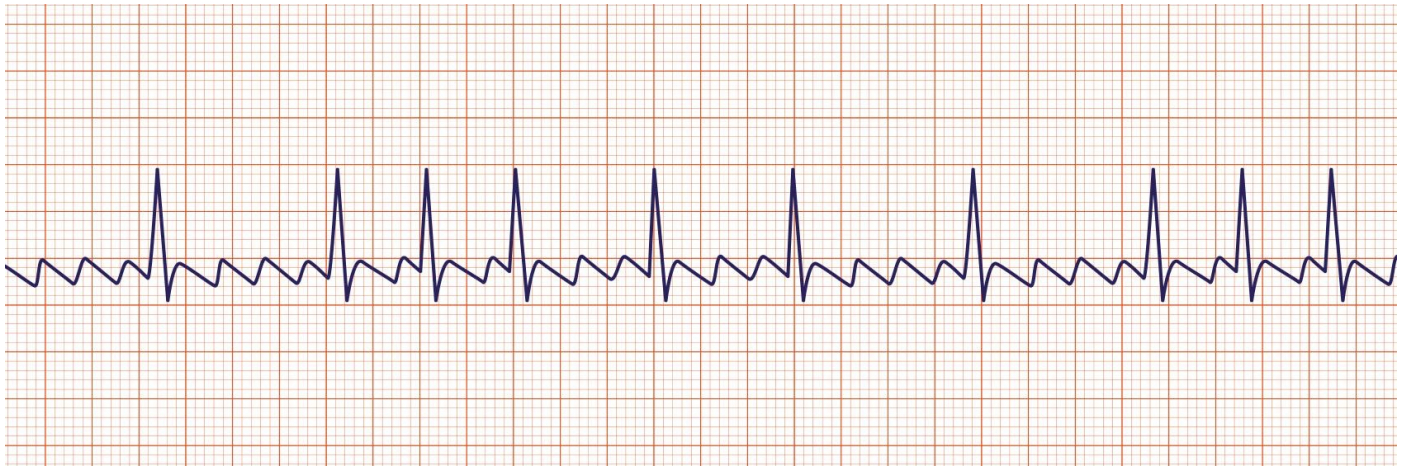
4. ATRIAL FIBRILLATION (AFIB)

An irregular rhythm with no discernable P waves, and the atrial rate is often 350–600 bpm. Ventricular rate may be irregular and varies depending on the conduction through the



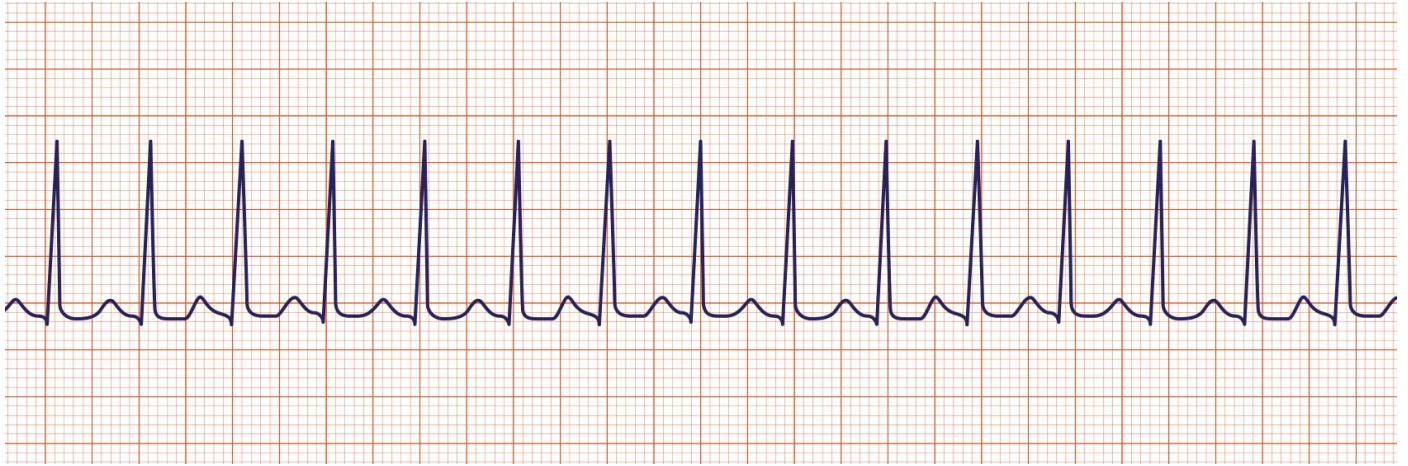
5. ATRIAL FLUTTER

A regular or irregular rhythm with sawtooth-shaped flutter waves (F waves) instead of normal P waves, and an atrial rate of about 250–350 bpm.



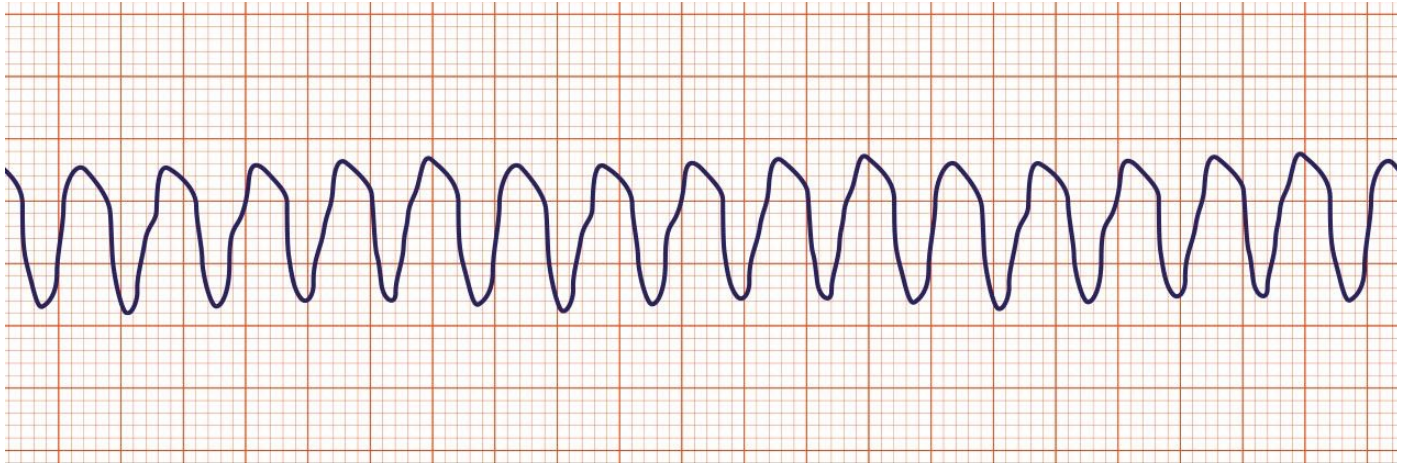
6. SUPRAVENTRICULAR TACHYCARDIA (SVT)

A rapid, regular rhythm with a rate of 150–250 bpm, originating above the ventricles. P waves may be absent or difficult to discern.



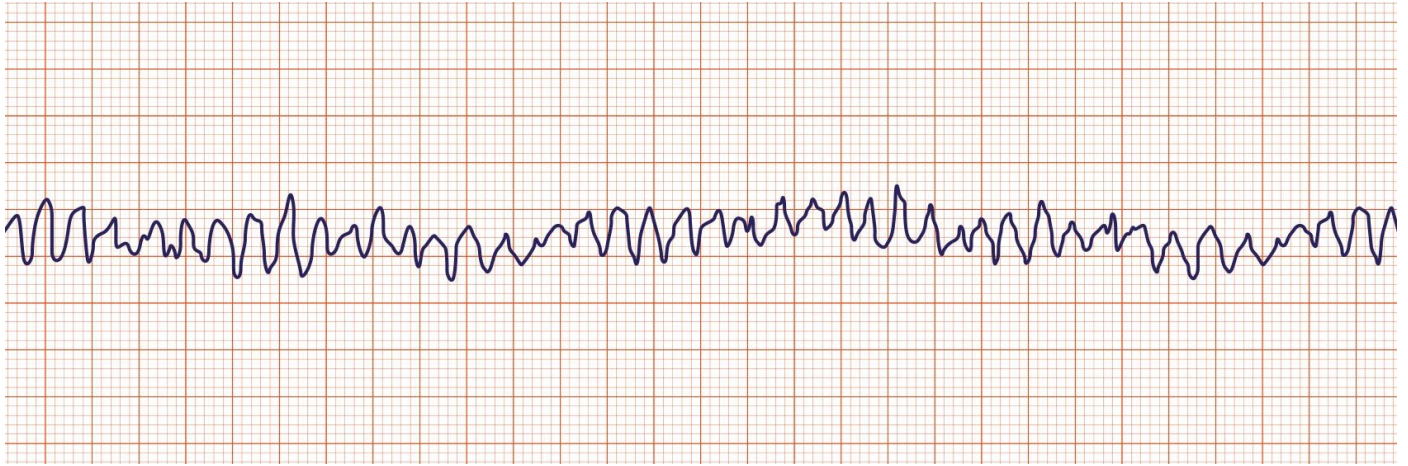
7. VENTRICULAR TACHYCARDIA (VTACH)

A rapid, regular rhythm with wide and bizarre QRS complexes, and a rate of 100–250 bpm, originating in the ventricles.



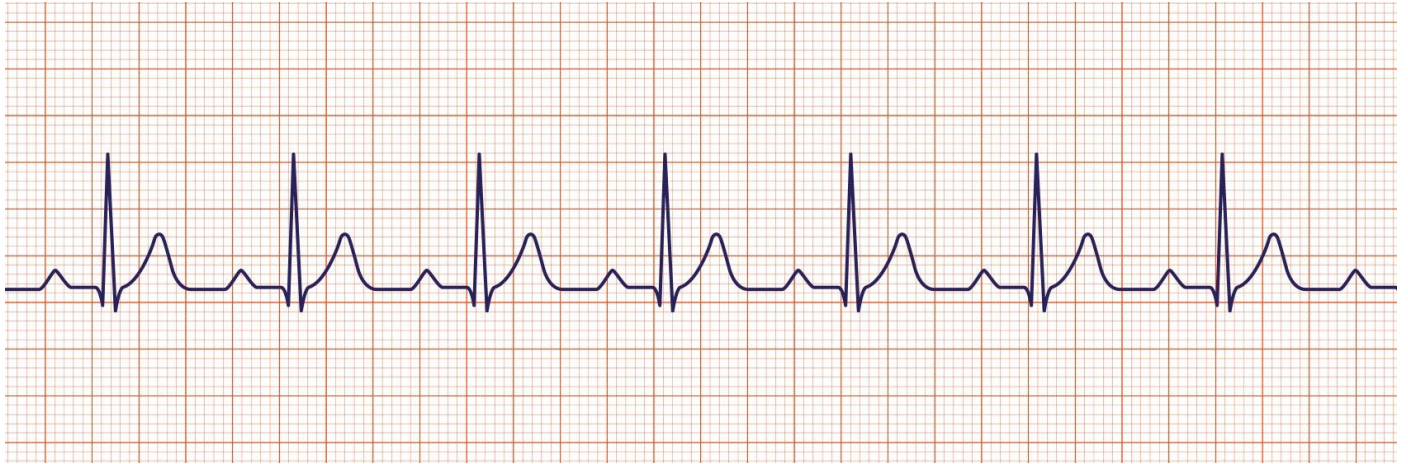
8. VENTRICULAR FIBRILLATION (VFIB)

A chaotic, irregular rhythm with no discernable waves or complexes, originating in the ventricles. This rhythm is life-threatening and requires immediate intervention.



9. FIRST-DEGREE AV BLOCK

A prolonged PR interval (>0.20 seconds) with a regular rhythm, indicating a delay in conduction through the AV node.



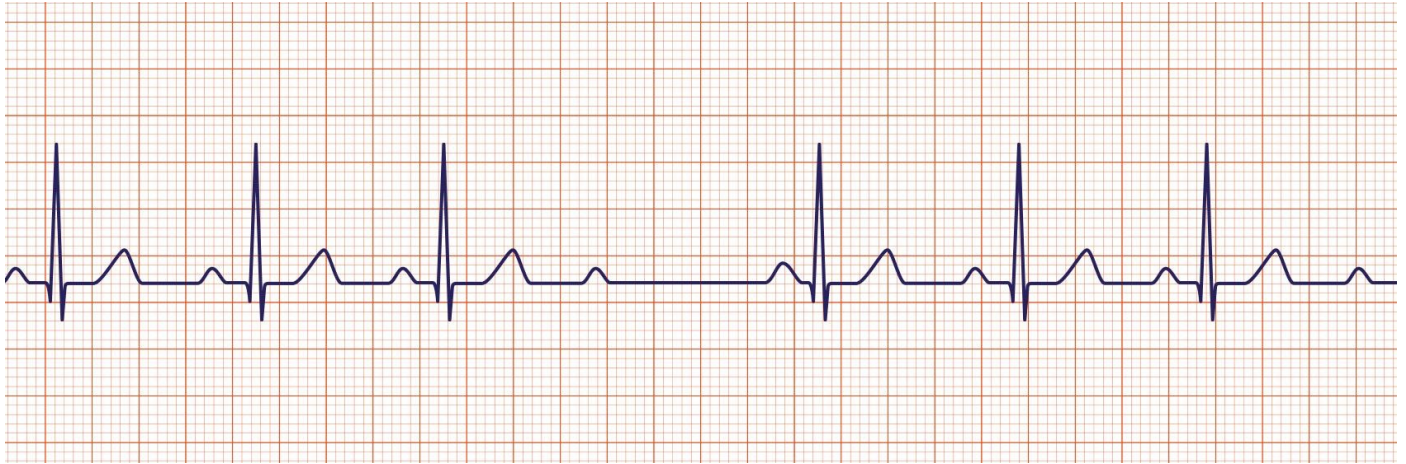
10. SECOND-DEGREE AV BLOCK, TYPE I (WENCKEBACH)

A progressively lengthening PR interval until a QRS complex is dropped, followed by a shorter PR interval and the pattern repeating.



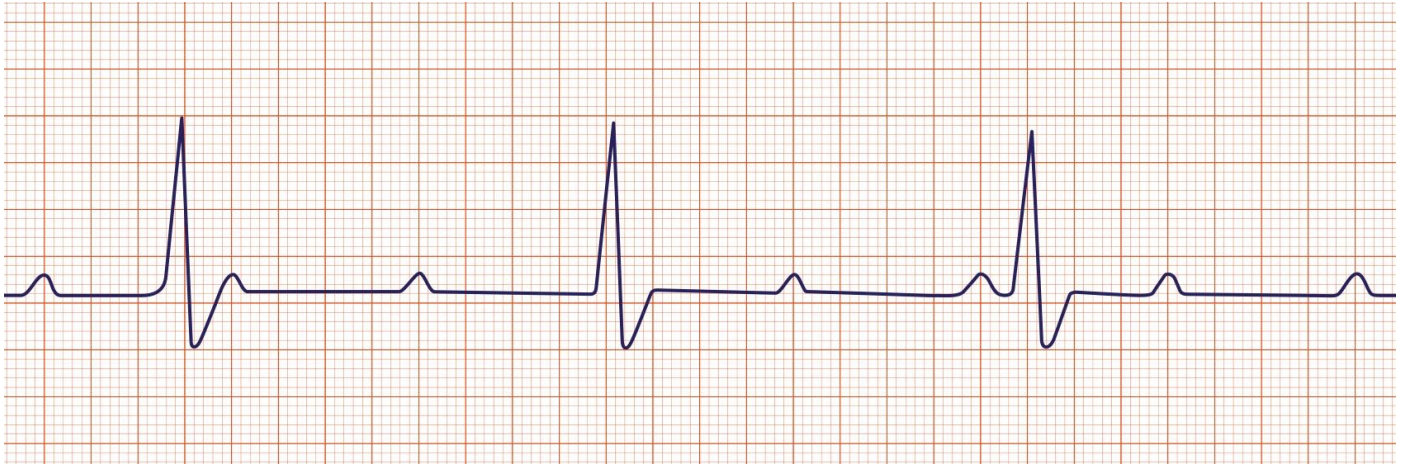
11. SECOND-DEGREE AV BLOCK, TYPE II (MOBITZ II)

A regular or irregular rhythm with occasional dropped QRS complexes, without a change in the PR interval.



12. THIRD-DEGREE AV BLOCK (COMPLETE HEART BLOCK)

A complete dissociation between P waves and QRS complexes, with both atrial and ventricular rhythms being regular but unrelated to each other.



Cardiac Care

Electrocardiography (ECG) is a valuable diagnostic tool that is frequently used in clinical practice to assess the electrical activity of the heart. Nurses play a crucial role in the interpretation of ECGs, as they are often the first healthcare professionals to assess patients presenting with cardiac complaints. The ability to read ECGs accurately is a crucial component of nursing practice and requires the application of clinical judgment.

In this chapter, we will discuss the process of reading ECGs using the NCSBN clinical judgment model. The model consists of six steps, which will guide the nurse through the process of making accurate clinical judgements when interpreting ECGs. These steps include: 1) recognize cues, 2) analyze cues, 3) prioritize hypotheses, 4) generate solutions, 5) taking action, and 6) evaluate outcomes.

Recognize Cues

The first step in the clinical judgment process is recognizing cues. When assessing an ECG, the nurse must first notice any abnormal or significant findings. This requires a thorough understanding of normal ECG patterns and an ability to identify deviations from these patterns.

To begin recognizing cues, the nurse should first assess the ECG for the presence of a normal sinus rhythm. This is characterized by a P wave preceding each QRS complex, with a consistent PR interval and a regular rhythm. The nurse should also note the rate of the rhythm, which can be calculated by counting the number of QRS complexes in a six-second strip and multiplying by 10.

After assessing the rhythm, the nurse should then examine the ECG for the presence of any significant findings, such as ST segment changes, T wave inversions, or the presence of arrhythmias. The nurse should also assess the axis of the ECG, which can provide important information about the electrical conduction system of the heart.

Analyze Cues

The second step in the clinical judgment process is analyzing cues. Once the nurse has noticed any abnormal or significant findings, they must then interpret the significance of these findings. This requires a thorough understanding of the physiology of the heart and the clinical implications of ECG findings.

To interpret an ECG, the nurse should first assess the significance of any abnormalities or deviations from the normal ECG pattern. For example, ST segment changes can indicate myocardial ischemia or infarction, while T wave inversions can indicate myocardial injury or repolarization abnormalities.

The nurse should then consider the patient's clinical presentation and medical history to determine the clinical significance of the ECG findings. For example, a patient with chest pain and ST segment elevation may be experiencing an acute myocardial infarction and require immediate intervention.

Prioritize Hypotheses

The third step in the clinical judgment process is prioritizing hypotheses. Once the nurse has interpreted the significance of the ECG findings and the patient's clinical presentation, they must then consider which hypothesis warrants priority, or is the most pressing issue.

Generate Solutions

The fourth step in the clinical judgment model is generating solutions. This may involve initiating interventions or consulting with other healthcare professionals.

Take Actions

The fifth step in the clinical judgment model is taking action. For example, if the nurse identifies ST segment elevation on the ECG, they should initiate immediate interventions to treat the patient's acute myocardial infarction to reduce ischemia, relieve pain, and stop progressive circulatory collapse and shock. The MONA regimen is started (morphine, oxygen, nitrates, and aspirin). Activation of the cardiac catheterization lab may be necessary.

Evaluate Outcomes

The sixth step in the clinical judgment model is evaluating outcomes. Did the patient respond to the interventions?

Conclusion

Reading and evaluating ECGs is a complex nursing function. In order to enhance clinical judgment skills when interpreting ECGs, nurses should continue to engage in ongoing education and professional development. This may involve attending conferences or workshops, reading relevant literature, and participating in discussions with colleagues and other healthcare professionals. Additionally, nurses should be encouraged to reflect on their own clinical experiences and seek feedback from colleagues to continually improve their interpretation skills. For example, a nurse with extensive experience in cardiology may recognize certain patterns or abnormalities in an ECG that a less experienced nurse may not. Additionally, the nurse may consider the patient's medical history, medications, and current symptoms to guide their interpretation of the ECG.

In conclusion, reading an ECG is a complex skill that requires a thorough understanding of cardiac physiology and electrical conduction. By using the NCSBN Clinical Judgment Model, nurses can approach ECG interpretation in a systematic and structured manner to ensure accurate interpretation and appropriate intervention. With practice and continuing education, nurses can become proficient in EKG interpretation and contribute to improved patient outcomes.

Shock

Shock is a life-threatening condition characterized by inadequate blood flow and oxygen delivery to the body's tissues, potentially leading to organ failure and death. It is crucial for healthcare professionals to recognize the early signs and symptoms of shock to initiate appropriate interventions and improve patient outcomes.

Recognize Cues

The signs and symptoms of shock:

- Altered mental status (anxiety, confusion, agitation)
- Pale, cold, clammy skin
- Rapid, weak, or thready pulse
- Rapid, shallow breathing
- Low blood pressure
- Delayed capillary refill
- Oliguria (decreased urine output)
- Cyanosis (bluish discoloration of the skin, particularly lips and nail beds)

Analyze Cues

Consider different types of shock. Analyze the patient's history, presenting symptoms, and relevant diagnostic tests, healthcare providers can determine the type of shock:

- **Hypovolemic shock (caused by blood loss):** Caused by a decrease in circulating blood volume due to severe blood loss, dehydration, or burns. Signs include tachycardia, hypotension, and decreased urine output.
- **Cardiogenic shock (caused by heart failure):** Results from inadequate pumping action of the heart, usually due to a myocardial infarction, heart failure, or arrhythmias. Symptoms include chest pain, dyspnea, and pulmonary edema.
- **Distributive shock (caused by blood vessel dilation):** Arises from abnormal distribution of blood flow, commonly seen in septic shock, anaphylactic shock, or neurogenic shock. Symptoms may vary depending on the cause but often include

fever, rash, and altered mental status.

- **Obstructive shock (caused by a blocked blood flow):** a type of shock that occurs when there is an obstruction in the blood flow, which can cause a decrease in cardiac output and subsequent organ dysfunction. An obstruction can occur anywhere in the circulatory system, such as in the heart, lungs, or blood vessels.

Prioritize Hypotheses

Prioritize Hypotheses to the patient's clinical presentation. Once the type of shock is identified, initiate interventions to manage the underlying cause and support vital functions.

Generate Solutions

It's crucial to recognize the signs and symptoms of shock early and seek medical attention promptly. In the meantime, you can provide supportive care like keeping the patient warm, elevating their legs, and monitoring their vital signs. Treatment will be based on the type of shock identified:

- **Hypovolemic shock:** The treatment for hypovolemic shock involves administering fluids, such as saline or blood transfusions, to restore blood volume.
- **Cardiogenic shock:** The treatment for cardiogenic shock involves improving heart function through medications, such as inotropic agents or diuretics, or interventions like angioplasty or stenting.
- **Distributive shock:** The treatment for distributive shock involves addressing the underlying condition that caused blood vessel dilation, such as sepsis or anaphylaxis, and administering medications to constrict blood vessels, such as vasopressors.
- **Obstructive shock:** The treatment for obstructive shock involves removing the blockage, such as through surgery or thrombolytic therapy.

Take Action

Interventions may include:

- Administering intravenous fluids or blood products
- Providing supplemental oxygen or initiating mechanical ventilation

- Administering medications to support blood pressure, heart function, or treat infections
- Monitoring vital signs and laboratory values closely
- Involving appropriate healthcare team members and consulting specialists as needed

Evaluate Outcomes

Continuously evaluate the patient's response to interventions and adjust the treatment plan accordingly. Monitor for improvements or deterioration in vital signs, organ function, and overall clinical status.

Diabetes and Insulin

Diabetes is a complex and chronic health condition affecting millions of people worldwide. It is characterized by elevated blood glucose levels, which can lead to a variety of complications if not managed appropriately.

Understanding Diabetes: Key Players and Mechanisms

In order to understand diabetes, it is crucial to recognize the key players involved in the regulation of blood glucose:

- **Pancreas:** Contains beta cells that produce and secrete insulin.
- **Glucose:** A sugar that fuels cells in the body and requires insulin to enter the cells.
- **Insulin:** A hormone secreted by beta cells that attaches to glucose, allowing it to enter cells and regulate blood sugar.
- **Liver:** Stores excess glucose as glycogen for later use.
- **Glucagon:** A hormone that increases blood glucose levels by stimulating the liver to release glycogen.

In a healthy individual, the pancreas releases insulin in response to elevated blood glucose levels, enabling glucose to enter cells. Conversely, when blood glucose levels decrease, the pancreas releases glucagon, prompting the liver to release stored glycogen.

Types of Diabetes and Their Causes

There are three main types of diabetes: type 1, type 2, and gestational diabetes.

- **Type 1 Diabetes:** This form of diabetes is characterized by a lack of insulin production due to the destruction of beta cells, often caused by genetic or autoimmune factors. Type 1 diabetes typically presents with an abrupt onset and more severe symptoms, often affecting younger individuals who may be thin and undernourished.
- **Type 2 Diabetes:** In this form, the beta cells produce insufficient insulin receptors or the body becomes resistant to insulin. As a result, glucose remains in the bloodstream instead of entering cells. Type 2 diabetes is commonly associated with lifestyle factors, such as obesity, poor diet, and sedentary behavior. The onset is gradual, and symptoms may be similar to those of type 1 diabetes, although many patients are

asymptomatic.

- **Gestational Diabetes:** This temporary form of diabetes occurs during pregnancy when the pancreas cannot produce enough insulin to meet the increased demands. Gestational diabetes usually resolves after childbirth.

Signs and Symptoms of Diabetes

Signs and symptoms are essentially the same for diabetes, what differentiates them is the type of diabetes.

- **Frequent urination:** Increased blood sugar levels can cause the kidneys to work harder to filter and absorb the excess sugar, leading to more frequent urination.
- **Excessive thirst:** As a result of frequent urination, the body loses more fluids, which can cause dehydration and excessive thirst.
- **Fatigue:** High blood sugar levels can make you feel tired and weak.
- **Blurred vision:** High blood sugar levels can affect the blood vessels in the eyes, leading to blurred vision.
- **Nausea and vomiting:** Some women with gestational diabetes may experience nausea and vomiting.
- **Increased hunger:** As the body's insulin production becomes less effective, it may feel like you are always hungry, even after eating.

With Type 1 and Type 2 diabetes, patients are at risk for complications such as atherosclerosis, heart attack, stroke, hypoglycemia, eye damage, and kidney damage.

Diabetes Management

Treatment for Type 1 diabetes involves insulin administration, while Type 2 diabetes management begins with lifestyle modifications, such as diet and exercise. If necessary, oral medications may be added to the treatment plan. Monitoring blood glucose levels and addressing any complications are critical aspects of diabetes care.

In conclusion, understanding the key players, types, signs and symptoms, and complications of diabetes is essential for nursing students.

Introduction to Insulin

Insulin is a hormone produced by the pancreas that regulates blood glucose levels in the body. It allows glucose to enter the cells and be used for energy. People with diabetes, particularly type 1 diabetes, have a deficiency or lack of insulin, which results in high blood glucose levels. Insulin therapy is necessary for managing blood glucose levels in these individuals.

There are four types of insulin: rapid-acting, short-acting, intermediate-acting, and long-acting. Each type has a different onset, peak, and duration of action, and is used to cover different insulin needs throughout the day.

- **Rapid-acting insulin** has an onset of 15 minutes, a peak of 30–90 minutes, and a duration of 3–5 hours. It is used to cover insulin needs for meals eaten at the same time of injection.
- **Short-acting insulin** has an onset of 30–60 minutes, a peak of 2–4 hours, and a duration of 5–8 hours. It is used to cover insulin needs for meals eaten within 30–60 minutes of injection.
- **Intermediate-acting insulin** has an onset of 60–120 minutes, a peak of 4–12 hours, and a duration of 14 hours. It is typically given twice a day to cover insulin needs for half the day or overnight.
- **Long-acting insulin** has an onset of 60–120 minutes, no peak, and a duration of 24 hours. It covers insulin needs for the full day and can be combined with other insulin but should never be mixed.

Administration

When administering insulin, there are some important rules to follow. It is essential to watch for signs and symptoms of hypoglycemia, which can include shakiness, clamminess, paleness, and sweating. If the patient is awake, they should be given candy, juice, or low-fat milk. If they are unconscious, they should be given IV D50.

Regular insulin is the only insulin given IV. NPH insulin should be mixed clear-to-cloudy (as NPH is cloudy). Injection sites should be rotated, and insulin should never be aspirated

or massaged. Insulin should always be increased with stress, sepsis, sickness, or steroids.

Insulin pumps are another method of delivering insulin. They give a steady dose of insulin for people with Type 1 diabetes and require checking blood glucose levels four times a day. Boluses are pushed at meals to cover the additional insulin needs.

Insulin therapy is a critical component of diabetes management, and it is essential to follow the guidelines for safe and effective administration. Below is an easy summary table to the types of insulin and their use cases in patient care:

Types of Insulin

Type of Insulin	Onset	Peak	Duration	Characteristics/Uses
Rapid-Acting	10-30 min	30 min - 3 hrs	3-5 hrs	Used to control blood sugar during or right after meals. Examples include lispro, aspart, and glulisine.
Short-Acting	30 min - 1 hr	2-3 hrs	3-6 hrs	Used to control blood sugar during meals. Regular insulin is an example of a short-acting insulin.
Intermediate-Acting	1-2 hrs	4-12 hrs	12-18 hrs	Used to control blood sugar overnight or for half the day. Examples include NPH insulin.
Long-Acting	1-2 hrs	No peak	24 hrs	Used to provide a steady level of insulin throughout the day. Examples include glargine and detemir.

CASE STUDY: Glasgow Coma Scale

Background

Kareem is a 13-year-old boy who has been brought to the clinic by his mother. She is concerned about his recent weight loss, increased thirst, and frequent urination. Kareem is an active child who enjoys playing soccer and basketball. Over the last month, his mother has noticed that he has become more tired and has difficulty keeping up with his teammates during games.

Using the NCSBN Clinical Judgment Model, we will analyze and address Kareem's situation:

Recognize cues

- 13-year-old active boy
- Recent weight loss
- Increased thirst
- Frequent urination
- Fatigue and difficulty keeping up with teammates

Analyze cues

The presented symptoms are consistent with the classic signs of type 1 diabetes (polyuria, polydipsia, polyphagia, and fatigue). Since Kareem is young and active, type 2 diabetes is less likely. However, further assessment is necessary to confirm the diagnosis.

Prioritize hypotheses

- Type 1 diabetes
- Other possibilities: thyroid disorder, urinary tract infection, or another endocrine disorder

Generate solutions

- Conduct a comprehensive physical examination
- Obtain a detailed medical and family history
- Order laboratory tests: fasting blood glucose, hemoglobin A1C, and random blood glucose

- Test for diabetes-related autoantibodies to confirm type 1 diabetes
- If necessary, consult an endocrinologist for further evaluation

Take action

Once the healthcare provider has collected the necessary data, they should proceed with the appropriate course of action. If the diagnosis of type 1 diabetes is confirmed, an individualized treatment plan should be developed, including:

- Insulin therapy: Determine the appropriate insulin regimen (basal-bolus or insulin pump) and educate Kareem and his family on insulin administration, blood glucose monitoring, and adjusting insulin doses based on physical activity and carbohydrate intake.
- Nutrition counseling: Refer Kareem and his family to a registered dietitian to develop a meal plan that balances his nutritional needs, physical activity, and insulin therapy.
- Diabetes education: Teach Kareem and his family about the signs and symptoms of hypoglycemia and hyperglycemia, how to manage them, and when to seek medical help.
- Regular follow-ups: Schedule regular appointments with the healthcare team to monitor Kareem's blood glucose control, growth, and overall health.

Evaluate outcomes

The healthcare provider should evaluate Kareem's progress and make adjustments to his treatment plan as needed. Success indicators may include:

- Improved blood glucose control, as reflected by hemoglobin A1C levels
- Resolution of symptoms (e.g., weight gain, decreased thirst, and urination)
- Maintenance of appropriate growth and development
- Kareem's ability to participate in his favorite sports without undue fatigue
- Kareem and his family's understanding of diabetes management and their ability to apply this knowledge in their daily lives

CASE STUDY: Type 2 Diabetes in a 39-Year-Old Woman**Background**

Samantha is a 39-year-old woman who visits the clinic for a routine checkup. She mentions experiencing increased thirst, fatigue, and occasional blurry vision. She has a sedentary job and admits that she does not exercise regularly. She also acknowledges that her diet could be improved. Samantha has a family history of type 2 diabetes, with both her mother and grandmother being diagnosed in their 40s.

Using the NCSBN Clinical Judgment Model, we will analyze and address Samantha's situation:

Recognize cues

- 39-year-old woman
- Sedentary lifestyle
- Poor diet
- Increased thirst
- Fatigue
- Occasional blurry vision
- Family history of type 2 diabetes

Analyze cues

The presented symptoms, age, family history, and lifestyle factors suggest that Samantha may have type 2 diabetes. Further assessment is required to confirm the diagnosis.

Prioritize hypotheses

Type 2 diabetes

Other possibilities: thyroid disorder, anemia, or another endocrine disorder

Generate solutions:

- Conduct a comprehensive physical examination
- Obtain a detailed medical and family history
- Order laboratory tests: fasting blood glucose, hemoglobin A1C, and oral glucose tolerance test (OGTT)
- If necessary, consult an endocrinologist for further evaluation

Take action

Once the healthcare provider has collected the necessary data, they should proceed with the appropriate course of action. If the diagnosis of type 2 diabetes is confirmed, an individualized treatment plan should be developed, including:

- **Lifestyle modifications:** Encourage Samantha to adopt a healthier diet, increase physical activity, and aim for a moderate weight loss if she is overweight or obese.
- **Diabetes education:** Teach Samantha about the importance of blood glucose monitoring, recognizing symptoms of hypoglycemia and hyperglycemia, and when to seek medical help.
- **Medication management:** Depending on the severity of Samantha's diabetes, initiate treatment with oral medications (e.g., metformin) or non-insulin injectable medications, and adjust the medication regimen as needed based on her blood glucose control.
- **Regular follow-ups:** Schedule regular appointments with the healthcare team to monitor Samantha's blood glucose control, weight, and overall health.

Evaluate outcomes

The healthcare provider should evaluate Samantha's progress and make adjustments to her treatment plan as needed. Success indicators may include:

- Improved blood glucose control, as reflected by hemoglobin A1C levels
- Resolution of symptoms (e.g., decreased thirst, fatigue, and blurry vision)
- Adoption of a healthier lifestyle, including increased physical activity and better dietary choices
- Appropriate weight loss if overweight or obese

Samantha's understanding of diabetes management and her ability to apply this knowledge in her daily life

Diabetic Ketoacidosis (DKA)

Diabetic ketoacidosis (DKA) is a serious and potentially life-threatening complication of diabetes, typically occurring in individuals with type 1 diabetes. It is characterized by a rapid onset and, if treated promptly, can be resolved relatively quickly.

Demographics

- DKA typically affects individuals under 45 years old.

Pathophysiology:

- In type 1 diabetes, the body produces little to no insulin, resulting in an inability to use glucose for energy.
- The body resorts to burning fat for energy, producing ketones as a byproduct.
- Ketones are acidic, which can lead to acidosis.

Causes:

- Inadequate insulin management or adherence
- Infection, such as sepsis
- Acute illness or sickness
- Stress
- Signs and Symptoms:
 - Elevated blood glucose levels (250–500+ mg/dL)
 - Presence of ketones and acidosis (blood pH < 7.35)
 - Dehydration
 - Kussmaul respirations: rapid, deep breathing with a fruity odor
 - Abdominal pain

Treatment:

- Address dehydration first: Administer 0.9% normal saline (NS) intravenously.
- Slowly lower blood glucose levels: Administer IV regular insulin when blood glucose is above 250 mg/dL.
- During insulin infusion, add potassium (K⁺) to prevent hypokalemia.

- When blood glucose levels fall below 200 mg/dL or ketones resolve, switch to subcutaneous insulin and start intravenous D5W (5% dextrose in water) infusion.
- Monitor blood glucose levels hourly and use a heart monitor to assess the patient's cardiac status.

Hyperosmolar Hyperglycemic State (HHS)

Hyperosmolar hyperglycemic state (HHS) is a severe and potentially life-threatening complication of diabetes, predominantly associated with type 2 diabetes. It is characterized by a slower onset and can be more challenging to treat compared to diabetic ketoacidosis (DKA).

Demographics:

- HHS typically affects individuals over 40 years old.
- Pathophysiology:
 - In type 2 diabetes, there is a reduced number of insulin receptors, resulting in fewer glucose molecules entering the cells.
 - The body does not produce ketones in HHS, as it is not burning fat for energy.

Causes:

- Poorly managed diabetes
- Infection, such as sepsis
- Acute illness or sickness
- Stroke or impaired kidney function

Signs and Symptoms:

- Extremely high blood glucose levels (600+ mg/dL)
- Severe dehydration
- Neurological symptoms, such as confusion
- Absence of ketones, Kussmaul respirations, or abdominal pain

Treatment:

- Address dehydration first: Administer 0.9% normal saline (NS) intravenously.
- Slowly stabilize blood glucose levels: Begin with IV regular insulin, then titrate with subcutaneous insulin and intravenous D5W (5% dextrose in water) infusion.
- Monitor blood glucose levels hourly.

- Assess rehydration status by checking for stable blood pressure, pink skin, warm body temperature, and urine output greater than 30 mL/hr.

Hypoglycemia

Hypoglycemia is a condition characterized by abnormally low blood glucose levels, which can lead to various symptoms and complications. It can occur in individuals with or without diabetes, and it can be caused by various factors.

Causes:

- Metabolic response to acute illness or injury (e.g., myocardial infarction, stroke, surgery, trauma, sepsis, pain)
- Skipping or not using enough insulin or medications
- Inactive lifestyle
- Diabetes: inadequate uptake of glucose, which can result in type 1 or type 2 diabetes

Diagnosis:

- Serum blood glucose test (fasting)
- Hemoglobin A1C test for diabetes: A1C > 6.5% indicates diabetes

Signs and Symptoms:

- Increased thirst and/or hunger
- Frequent urination
- Glycosuria (presence of glucose in urine)
- Headache, blurred vision, diplopia (double vision)
- Numbness, tingling, nausea, vomiting

Blood Glucose Reference Ranges:

- Non-diabetic: Fasting: 70–100 mg/dL, Post-meal: < 140 mg/dL
- Diabetic: Fasting: 70–130 mg/dL, Post-meal: < 180 mg/dL

Treatment:

- Frequent blood glucose monitoring to watch for signs and symptoms of diabetic ketoacidosis (DKA) or hyperosmolar hyperglycemic state (HHS)
- Continuous IV insulin, if necessary
- Encourage physical activity and adequate fluid intake
- Educate patients on medication management and adherence

Hyperglycemia

Hyperglycemia is a condition characterized by abnormally high blood glucose levels, which can lead to various symptoms and complications. It is commonly associated with diabetes but can also occur in individuals without diabetes due to various factors.

Causes:

- Insufficient insulin production or action
- Overconsumption of carbohydrates
- Stress, illness, or infection
- Medications that increase blood glucose levels (e.g., corticosteroids, diuretics)
- Inadequate physical activity

Diagnosis:

- Serum blood glucose test (fasting and post-meal)
- Hemoglobin A1C test for diabetes: A1C > 6.5% indicates diabetes

Signs and Symptoms:

- Increased thirst and/or hunger
- Frequent urination
- Fatigue and weakness
- Blurred vision
- Slow-healing wounds or frequent infections

Blood Glucose Reference Ranges:

- Non-diabetic: Fasting: 70–100 mg/dL, Post-meal: < 140 mg/dL
- Diabetic: Fasting: 70–130 mg/dL, Post-meal: < 180 mg/dL

Treatment:

- Regular blood glucose monitoring
- Adjusting insulin or other medications as needed
- Following a balanced, carbohydrate-controlled diet

- Engaging in regular physical activity
- Addressing and managing stress or illness
- Monitoring for signs and symptoms of diabetic complications, such as diabetic ketoacidosis (DKA) or hyperosmolar hyperglycemic state (HHS)

Electrolyte Fundamentals

Electrolytes are minerals in the body that carry an electrical charge and are essential for many bodily functions, including maintaining proper fluid balance, transmitting nerve impulses, and contracting muscles. There are several key electrolytes in the body, including: Sodium (Na^+), Potassium (K^+), Chloride (Cl^-), Calcium (Ca^{2+}), Magnesium (Mg^{2+}), Phosphate (PO_4^{3-}), Bicarbonate (HCO_3^-), Sulfate (SO_4^{2-})

Electrolyte	Normal Range	Low Levels (Hypo-) Symptoms	High Levels (Hyper-) Symptoms
Sodium (Na^+)	135–145 mEq/L	Hypotension, confusion, lethargy, seizures, coma, muscle weakness	Hypertension, edema, muscle twitching, hyperreflexia, restlessness, agitation
Potassium (K^+)	3.5–5.0 mEq/L	Fatigue, muscle weakness, leg cramps, constipation, arrhythmias	Muscle weakness, flaccid paralysis, arrhythmias, cardiac arrest
Calcium (Ca^+)	8.5–10.5 mg/dL	Numbness/tingling in fingers, muscle cramps, convulsions	Fatigue, weakness, anorexia, nausea, constipation, abdominal pain
Magnesium (Mg^{2+})	1.5–2.5 mEq/L	Muscle weakness, tremors, hyperreflexia, seizures, cardiac arrhythmias	Hypotension, respiratory depression, lethargy, coma
Chloride (Cl^-)	95–105 mEq/L	Metabolic acidosis, muscle weakness, hypotension, tachypnea	Metabolic alkalosis, hypertension, decreased cognition, twitching, tetany
Bicarbonate (HCO_3^-)	22–28 mEq/L	Deep, rapid breathing, confusion, dizziness	Weakness, fatigue, confusion, muscle twitching, tingling in extremities
Phosphate (PO_4^{3-})	2.5–4.5 mg/dL	Muscle weakness, bone pain, anorexia, osteomalacia, rhabdomyolysis	Anorexia, nausea, vomiting, tetany, arrhythmias, seizures
Sulfate (SO_4^{2-})	2–30 mg/dL	Weakness, nausea, vomiting, diarrhea, flushing, hypotension	Weakness, lethargy, confusion, nausea, vomiting, diarrhea, flushing,

Electrolyte Fundamentals

Electrolyte balance is essential for maintaining proper bodily functions, as electrolytes play vital roles in fluid balance, nerve conduction, and muscle contractions. In this section, we will discuss the relationships between various electrolytes, including sodium, potassium, calcium, phosphate, magnesium, and vitamin D. Understanding these relationships can help healthcare professionals monitor and manage electrolyte imbalances more effectively.

Electrolyte Pair	Relationship	Example
Sodium / Potassium	Inverse	$\uparrow\text{Na}^+ = \downarrow\text{K}^+$
Calcium / Phosphate	Inverse	$\uparrow\text{Ca}^{++} = \downarrow\text{PO}_4$
Calcium / Vitamin D	Similar	$\uparrow\text{Ca}^{++} = \uparrow\text{Vitamin D}$
Magnesium / Calcium	Similar	$\uparrow\text{Mg} = \uparrow\text{Ca}^{++}$
Magnesium / Potassium	Similar	$\uparrow\text{Mg} = \uparrow\text{K}^+$
Magnesium / Phosphate	Inverse	$\downarrow\text{Mg} = \uparrow\text{PO}_4$

Sodium (Na^+)

Normal Sodium Range: 135 to 145 milliequivalents per liter (mEq/L)

Function: Manage heart and muscle function, maintain fluid balance and blood pressure, regulated by kidneys.

Hyponatremia ($\text{Na}^+ < 135 \text{ mEq/L}$)

Causes:

- Increased Na^+ excretion (renal problems, NG suction, vomiting, sweating, diuretics, decreased aldosterone secretion)
- Fluid overload (diluted: CHF, hypotonic fluids, liver failure)
- Insufficient Na^+ intake (diet, NPO)
- Over-secretion of ADH (SIADH)

Signs and Symptoms (Weak and Shaky):

- Seizures, stupor
- Abdominal cramping
- Confusion, lethargy, trouble concentrating
- Decreased deep tendon reflexes (DTR)
- Loss of urine and appetite
- Decreased blood pressure (BP), decreased bowel sounds
- Shallow respirations (late sign due to muscle weakness)

Interventions:

- Monitor heart rate (HR), respiratory rate (RR), GI, renal, and neurological functions
- Administer IV hypertonic fluid (note: can be hard on veins)
- Restrict fluids and/or use diuretics
- Antidiuretic hormone antagonist (for SIADH), such as demeclocycline (do not give with food)
- Monitor lithium levels in patients on lithium (decreased Na^+ can lead to increased lithium levels)
- Adjust diet accordingly

Diet: Encourage salty foods in moderation

Hypernatremia ($\text{Na}^+ > 145 \text{ mEq/L}$)

Causes:

- Overproduction of aldosterone
- Increased Na^+ intake (oral/IV)
- GI tube feedings
- Excess hypertonic solutions
- Corticosteroids (decreased Na^+ excretion)
- Loss of fluids (too much free salt, dehydration, infection, diarrhea)
- Diabetes insipidus

Signs and Symptoms (Big and Bloated):

- Flushed skin
- Fever
- Agitation, confusion
- Increased fluid retention (edema)
- Decreased urine output
- Dry mouth and skin

Interventions:

- Restrict sodium intake
- Ensure patient safety (confused patient) – call light
- Administer IV isotonic or hypotonic solution (cells are salty and shrunken)
- Educate on diet

Diet (Limit):

- Canned foods
- Cheese
- Salad dressing
- Frozen dinners
- Fried food
- Tomato sauce
- Salty rice cakes
- Pizza, hotdogs
- Chips, lunch meats

Potassium (K⁺)

Normal Potassium Range: 3.5 – 5.0 mmol/L

Function: Manage heart and muscle function, maintain fluid balance and blood pressure, regulated by kidneys

Hypokalemia (K⁺ < 3.5 mEq/L)

Causes:

- Dehydration, Diuretics
- Diarrhea or vomiting, Drains (NG tubes)
- Severe acid imbalance
- Hyperaldosteronism (water retention)
- Insulin or albuterol (pushes potassium into cells)

Signs and Symptoms (Low and Slow):

- Irregular, thready pulse
- Decreased blood pressure (BP), decreased heart rate (HR), orthostatic hypotension, Confusion
- Decreased bowel sounds
- Decreased deep tendon reflexes
- (DTRs), flaccid paralysis, weak leg cramps
- Shallow respiration, diminished heart sounds
- EKG: decreased ST segment, inverted T wave, prominent U wave

Interventions:

- Monitor: EKG, respirations, GI, I&O's, BUN, creatinine
- Monitor magnesium levels (potassium and magnesium are closely related)
- Monitor glucose, calcium, and sodium (calcium, sodium, and potassium are inversely related)
- Administer oral supplements with food
- If K⁺ < 2.5, administer potassium infusion slowly via IV (watch for infiltration)
- Hold potassium-wasting diuretics to prevent digoxin toxicity

Potassium-Sparing Diuretics: Spironolactone, Aldactone, Dyazide, Triamterene, Maxide

Hyperkalemia ($K^+ > 5.0$ mEq/L)

Causes:

- ACE inhibitors (retain K^+)
- Spironolactone
- NSAIDs
- Burns or trauma (K^+ released from lysed cells)
- Addison's disease (affects aldosterone regulation of K^+)
- IV fluids
- Renal impairment (kidney disease or dialysis)

Signs and Symptoms (Tight and Contracted):

- Irregular heartbeat (ST elevation, peaked T wave)
- Decreased blood pressure (BP), decreased heart rate (HR), severe ventricular fibrillation (V-fib)
- Respiratory failure
- Hyperactive bowel sounds, diarrhea
- Confusion
- Muscle weakness, cramping, decreased deep tendon reflexes (DTRs), tingling, burning, numbness

Interventions:

- IV sodium bicarbonate
- IV calcium gluconate (helps stabilize muscle cells)
- Albuterol
- Furosemide or hydrochlorothiazide
- Dialysis
- Sodium polystyrene sulfonate
- Monitor EKG

Diet: Avoid salt substitutes, fruits, green leafy vegetables

Limit: Potatoes, pork, Oranges, Tomatoes, Avocado, Strawberries, Spinach, Fish, Mushrooms, Melons

Calcium (Ca^{2+})

Normal Calcium Range: 9–11 mg/dL

Function: Muscle movement, nervous system messaging to the entire body. Calcium also helps blood vessels move blood throughout your body and helps release hormones that affect many functions in your body.

Hypocalcemia ($\text{Ca}^{2+} < 9.0$ mg/dL)

Causes:

- Hypoparathyroidism
- Thyroidectomy
- Pancreatitis (releases calcium soaps and calcitonin, leading to increased calcium in bones)
- Loop diuretics, laxatives, long-term steroids, phenytoin
- Phosphate enemas (increased phosphate, decreased Ca, and Mg)
- GI wounds
- Chronic diseases (celiac, Crohn's, chronic kidney disease)
- Increased phosphate, decreased vitamin D, decreased magnesium

Signs and Symptoms:

- Prolonged QT/ST segment (severe Vtach)
- Heart failure
- Trousseau sign (arm spasm with BP cuff)
- Chvostek sign (smile when touching the temporal lobe)
- Slow clotting factors (bleeding)
- Hyperactive GI system (diarrhea)
- Laryngospasms, dyspnea
- Altered level of consciousness (ALOC), seizures, confusion

Interventions:

- Provide food high in calcium
- Administer calcium acetate (monitor phosphate levels)
- IV calcium
- Oral calcium with vitamin D
- Magnesium hydroxide

Encourage: Dairy, Sardines, Canned salmon, Leafy greens, Tofu, Edamame

Hypercalcemia ($\text{Ca}^{2+} > 11.0 \text{ mg/dL}$)

Causes:

- Hyperparathyroidism
- Antacids with calcium (e.g., TUMS)
- Malignant cancer cells
- Low phosphate levels

Signs and Symptoms (Slow and Swollen):

- Decreased heart rate (HR), respiratory rate (RR), and blood pressure (BP)
- Short QT interval, wide T-wave, heart muscle spasms
- Shortness of breath (SOB), weak respirations
- Hypoactive GI system (constipation)
- Nausea, vomiting, altered level of consciousness (ALOC)
- Renal calculi (kidney stones)
- Decreased deep tendon reflexes (DTR), reduced muscle excitability (severe muscle weakness if severe)
- Bone pain (excess calcium taken from bones)

Interventions:

- Loop diuretics
- Monitor EKG and urine output
- IV normal saline for kidney stones
- IV phosphate
- Calcium reabsorption inhibitors (e.g., calcitonin, aspirin, NSAIDs)
- Assess fall risk
- Dialysis as a last resort
- Adjust diet

Magnesium (Mg^{2+})

Magnesium Normal Range: 1.5 – 2.5 mEq/L

Function: Promote muscle relaxation, support the immune system, maintain bone health, and regulate blood glucose levels.

Hypomagnesemia ($Mg^{2+} < 1.5$ mg/dL)

Causes:

- Excessive alcohol consumption (impairs GI absorption of magnesium)
- Fluid loss (e.g., NG suction, nausea/vomiting, diuretics)
- Antibiotics (Aminoglycosides)
- Malnutrition risk in pregnant women

Signs and Symptoms (Tight and Contracted):

- Increased heart rate (HR), increased respiratory rate (RR) with shallow respirations
- Prolonged QT interval
- Depressed ST segment, inverted T-wave
- Dyspnea (difficulty breathing)
- Diarrhea
- Increased deep tendon reflexes (DTRs), clonus, numbness, tingling
- Confusion, insomnia, seizures

Interventions:

- Assess swallowing muscles
- Administer IV magnesium sulfate (give slowly and monitor lab values)
- Assess respiratory rate
- Assess reflexes (clonus is a warning sign)
- Adjust diet

Encourage Consumption of:

- Chocolate, Cauliflower
- Vegetables, Avocados, peas
- Bananas, oranges
- Milk, peanut butter, Pork, nuts

Hypermagnesemia ($Mg^{2+} > 2.5 \text{ mg/dL}$)

Causes:

- Diabetic ketoacidosis
- Antacids containing magnesium (TUMS)
- Renal failure
- Hyperkalemia in Addison's disease

Signs and Symptoms (Low and Slow):

- Decreased blood pressure, respiratory rate, and heart rate
- Widened QRS and prolonged PR interval on EKG
- Diminished bowel sounds
- Reduced or absent deep tendon reflexes
- Drowsiness and lethargy
- Severe cases may lead to coma

Interventions:

- Administer IV calcium gluconate to decrease muscle tightness and tension
- Monitor lab values and deep tendon reflexes
- Hemodialysis to remove excess magnesium
- Adjust diet as needed

Phosphate (PO_4^{2-})

Phosphate Normal Range: 2.4–4.5 mg/dL

Function: Contribute to the formation of bones, teeth, and muscles.

Storage: Primarily stored in bones.

Regulation: Managed by the kidneys and parathyroid glands.

Hypophosphatemia (< 2.5 mg/dL)

Causes:

- Antacids leading to malabsorption to decreased phosphate and bone softening
- Low vitamin D levels
- Hyperparathyroidism, resulting in increased calcium and decreased phosphate levels
- Severe malnutrition
- Malignant cancer cells causing the kidneys to waste phosphate, leading
- Hyperglycemia
- Excessive alcohol consumption, burns
- Hypercalcemia

Signs and Symptoms (Brittle and Weak):

- Muscle weakness (especially in the lungs) fractures)
- Decreased deep tendon reflexes (DTRs)
- Reduced cardiac output
- Immunosuppression, leading to decreased platelets and increased bleeding
- Osteomalacia (increased risk of
- Irritability, increased seizure risk, confusion

Interventions:

- Administer oral phosphate and vitamin D levels and EKG)
- Provide IV phosphate (ensure proper kidney function, monitor calcium
- Implement fall risk precautions
- Educate on appropriate diet

Encourage: Fish, chicken, Pork, Nuts, Whole grains, Beans

Hyperphosphatemia (> 4.5 mg/dL)

Causes:

- Fleet or sodium-phosphate enema, as it increases phosphate levels due to reduced kidney filtration.
- Excessive vitamin D intake.
- Hypoparathyroidism, leading to decreased calcium and increased phosphate levels.
- Kidney insufficiency (reduced phosphate excretion).
- Chemotherapy, which destroys good cells and releases electrolytes into the bloodstream.

Signs and Symptoms (similar to hypocalcemia):

- Trousseau sign: arm spasm when using a blood pressure cuff.
- Chvostek sign: facial twitching when tapping the facial nerve near the ear.
- Muscle spasms (tetany) in calves and feet.
- Increased deep tendon reflexes (DTRs) and bone pain.
- Laryngospasms.
- Confusion or altered mental status.

Interventions:

- Administer Phoslo (calcium acetate) with meals.
- Avoid phosphate enemas.
- Adjust diet accordingly.
- In severe cases, dialysis may be necessary.

Hepatitis: Liver inflammation

The liver is the largest internal organ of the body and plays a critical role in metabolism, detoxification, and protein synthesis. The liver receives blood from two sources – the hepatic artery and the portal vein. The hepatic artery brings oxygenated blood from the heart, while the portal vein carries nutrient-rich blood from the gastrointestinal tract, spleen, and pancreas.

Inflammation of the liver can result in hepatitis, which can be caused by viral infections, alcohol consumption, medications, autoimmune diseases, and other factors. There are several types of viral hepatitis, including hepatitis A, B, C, D, and E, which can range from acute to chronic, and each type has unique characteristics.

By integrating the NCSBN Clinical Judgment Model into the discussion of hepatitis, we can better understand and address the various forms of the disease.

Recognize Cues:

1. HEPATITIS A:

- Transmission: Fecal-oral route, contaminated food or water
- Symptoms: Fatigue, nausea, abdominal pain, jaundice
- Prevention: Vaccination, good hygiene, safe food handling

2. HEPATITIS B:

- Transmission: Blood, semen, or other body fluids
- Symptoms: Similar to hepatitis A, but can progress to chronic liver disease
- Prevention: Vaccination, safe sex, avoiding shared needles

3. HEPATITIS C:

- Transmission: Blood contact, mainly through sharing needles or other drug equipment
- Symptoms: Often asymptomatic; can lead to chronic liver disease or cirrhosis
- Prevention: No vaccine, safe injection practices, regular screening for high-risk individuals

4. HEPATITIS D:

- Transmission: Blood or body fluids, but only in individuals already infected with hepatitis B
- Symptoms: Similar to hepatitis B, but more severe
- Prevention: Hepatitis B vaccination, safe sex, avoiding shared needles

5. HEPATITIS E:

- Transmission: Fecal-oral route, contaminated water
- Symptoms: Similar to hepatitis A, but more severe in pregnant women
- Prevention: Good hygiene, safe water supply, proper food handling

Analyze Cues:

- Determine the type of hepatitis based on the transmission route and symptoms
- Assess the severity and duration of the disease (acute or chronic)
- Evaluate risk factors and possible complications

Prioritize Hypotheses:

- Identify the most likely type of hepatitis and its potential complications
- Consider the need for further diagnostic tests (e.g., liver function tests, viral load)
- Evaluate the patient's overall health and any comorbidities

Generate Solutions:

- Recommend appropriate preventive measures, such as vaccination or safe sex practices
- Prescribe antiviral medications or other treatments, as needed
- Refer the patient to a specialist, if necessary, for advanced care or monitoring

Take Action:

- Implement the selected interventions, including medications, lifestyle modifications, or referrals
- Monitor the patient's response to treatment and adjust the plan as needed
- Educate the patient on self-care and ongoing preventive measures

Evaluate Outcomes:

- Assess the effectiveness of the interventions, including symptom resolution and prevention of complications
- Modify the treatment plan as needed, based on the patient's progress and response to treatment
- Continue to monitor the patient's condition, with follow-up appointments or further testing as needed

Hemodynamic Parameters

Hemodynamic parameters refer to the physical characteristics of blood flow that are used to assess the function of the cardiovascular system. Here are some of the main hemodynamic parameters that are often measured:

Blood Pressure

Blood pressure is the force exerted by circulating blood on the walls of blood vessels. Blood pressure is typically measured using a sphygmomanometer and is reported as two values, systolic and diastolic pressure.

Cardiac Output

Cardiac output is the amount of blood pumped by the heart per minute. It is calculated by multiplying the stroke volume (the amount of blood ejected by the heart with each beat) by the heart rate (the number of beats per minute).

Stroke Volume

Stroke volume is the amount of blood ejected by the heart with each beat. It is typically measured using echocardiography or other imaging techniques.

Heart Rate

Heart rate is the number of times the heart beats per minute. It is often measured using electrocardiography (ECG).

Central Venous Pressure

Central venous pressure (CVP) is the pressure in the superior vena cava, which reflects the pressure in the right atrium. CVP can be measured using a catheter that is inserted into a central vein, such as the subclavian or jugular vein.

Pulmonary Artery Pressure

Pulmonary artery pressure (PAP) is the pressure in the pulmonary artery, which reflects the pressure in the right ventricle. PAP can be measured using a catheter that is inserted into a

pulmonary artery.

Pulmonary Capillary Wedge Pressure

Pulmonary capillary wedge pressure (PCWP) is the pressure in the left atrium, which reflects the pressure in the left ventricle. PCWP can be measured using a catheter that is inserted into a pulmonary artery and advanced into a pulmonary capillary.

Systemic Vascular Resistance

Systemic Vascular Resistance (SVR) is the resistance to blood flow in the systemic circulation. It is calculated by dividing the mean arterial pressure (MAP) by the cardiac output and multiplying by 80.

Understanding these hemodynamic parameters is crucial in the care of critically ill patients, as they can provide important information about the function of the cardiovascular system.

The Full Cardiac Cycle is a complex process involving various aspects of cardiovascular function. A thorough understanding of the different components of the cardiac cycle is essential in providing comprehensive patient care.

Diastolic Pressure refers to the amount of pressure in the heart between beats, while **Systolic Pressure** is the maximum pressure the heart exerts while beating. The normal range for Diastolic Pressure is 60–80 mmHg, while the normal range for Systolic Pressure is 90–120 mmHg.

Stroke Volume (SV) is the volume of blood ejected from the ventricles per stroke (beat). The normal range for stroke volume is 60–120 mL. **Cardiac Output (CO)** is the total blood volume the heart pumps to the circulatory system per minute, and it is determined by multiplying stroke volume by heart rate. The normal range for cardiac output is 4–8 L/min.

Cardiac Index (CI) is used to determine if cardiac output is sufficient for a patient's size. It is calculated by dividing Cardiac Output by the body surface area. The normal range for Cardiac Index is 2.5–4 L/min/m².

Ejection Fraction (EF) is the percentage of blood forced out of the left ventricle with each

beat. The normal range for Ejection Fraction is 50–75%. It is a crucial indicator of cardiac function and can help diagnose heart failure and other cardiac conditions.

Preload is a measure of the stretching/filling pressure in the heart at the end of diastole. Central Venous Pressure (CVP) is used to measure preload, and the normal range for CVP is 2–8 mmHg.

Conditions with low preload include shock, hemorrhage, and dehydration, and can be treated with the administration of IV fluids and vasopressors. Conditions with high preload, such as heart failure, can be managed with diuretics and vasodilators.

Afterload refers to the pressure/resistance the heart has to pump against to eject blood. Systemic Vascular Resistance (SVR) is used to measure afterload, and the normal range for SVR is 800–1200 dynes/sec/cm. Conditions with high SVR, such as hypertension, aortic stenosis, and pulmonary hypertension, can be treated with ACE/ARBs and vasodilators. Conditions with low SVR, such as shock and sepsis, can be managed with vasopressors/vasoconstrictors.

Mean Arterial Pressure (MAP) is the average pressure in a patient's arteries during one cardiac cycle and indicates perfusion of organs and tissues. It is calculated by adding two-thirds of diastolic pressure to one-third of systolic pressure. The normal range for MAP is 70–100 mmHg.

Pulmonary Artery Wedge Pressure (PAWP) is an invasive hemodynamic device that is threaded throughout circulation until it reaches the pulmonary artery. It is “wedged” into the pulmonary artery to offer precise function for the left side of the heart. The normal range for pulmonary artery wedge pressure is 6–12 mmHg.

Arterial Blood Gas (ABG) Interpretation

Arterial blood gas (ABG) interpretation is an important skill for nurses and other healthcare providers who care for critically ill patients.

An ABG provides information about the patient's acid-base balance, oxygenation status, and ventilation status. The ABG measures several parameters, including pH, partial pressure of carbon dioxide (PaCO_2), partial pressure of oxygen (PaO_2), bicarbonate (HCO_3^-), and oxygen saturation (SaO_2).

Interpreting ABGs involves understanding the normal ranges for each parameter and recognizing patterns of abnormality. The first step in ABG interpretation is to assess the pH. A pH below 7.35 indicates acidosis, while a pH above 7.45 indicates alkalosis.

To use ABG analysis effectively, nursing students must first Recognize Cues, such as changes in the patient's respiratory rate or pattern, oxygen saturation, or pH level. They must then analyze these cues by reviewing the patient's medical history, current medications, and any other relevant information. Based on this analysis, nursing students should Prioritize Hypotheses or potential causes of the patient's symptoms or problems.

Once hypotheses have been prioritized, nurses can generate solutions, such as oxygen therapy, mechanical ventilation, or adjustments to medication dosages. They can then Take Action by implementing the appropriate treatment plan and monitoring the patient's response to treatment. Finally, they can Evaluate Outcomes to determine the effectiveness of the interventions and make any necessary adjustments to the plan of care.

By using ABG analysis as a tool to support clinical judgment in respiratory and metabolic care, nursing students can develop the critical thinking and decision-making skills necessary to provide safe and effective patient care. The NGN will require nursing students to demonstrate their ability to make sound clinical judgments, which will be essential for providing safe and effective care to patients with respiratory and metabolic disorders. By incorporating ABG analysis into the NGN, nursing students can be better prepared to meet the demands of the nursing profession and provide high-quality care to patients with respiratory and metabolic disorders.

CASE STUDY: Type 2 Diabetes in a 39-Year-Old Woman

Mrs. Chen, a 72-year-old female, is admitted to the hospital with chronic obstructive pulmonary disease (COPD) exacerbation. Upon admission, an arterial blood gas (ABG) analysis is ordered to evaluate her respiratory status.

Assessment:

The nursing student reviews the ABG results and recognizes that Mrs. Chen is in respiratory distress.

ABG results:

- pH: 7.30
- PaO₂: 55 mmHg
- PaCO₂: 60 mmHg
- HCO₃⁻: 25 mEq/L

Analysis:

The nursing student analyzes the ABG results and recognizes that Mrs. Chen is experiencing respiratory acidosis, which may be due to her COPD exacerbation.

Prioritizing hypotheses:

The nursing student prioritizes the hypothesis that Mrs. Chen's respiratory acidosis is due to her COPD exacerbation and requires immediate treatment to prevent further respiratory distress.

Generating solutions:

The nursing student generates solutions by alerting the healthcare provider and preparing Mrs. Chen for emergency interventions, such as oxygen therapy and mechanical ventilation.

Taking action:

The nursing student takes action by implementing the appropriate emergency interventions and closely monitoring Mrs. Chen's condition.

Evaluation

The nursing student evaluates the outcome by monitoring Mrs. Chen's vital signs and ABG results. The nursing student notes that Mrs. Chen's condition stabilizes, and she is transferred to the intensive care unit for further treatment and monitoring.

Conclusion

This case study illustrates how arterial blood gas analysis can be used to support clinical judgment and decision-making in respiratory care. By using ABG analysis, nursing students can Recognize Cues, analyze data, Prioritize Hypotheses, generate solutions, Take Action, and Evaluate Outcomes to provide safe and effective care to patients with respiratory distress.

Disaster Triage

Disaster Triage is the process of prioritizing care and allocating resources to those in need during a mass casualty incident or disaster. The goal of disaster triage is to provide the greatest good for the greatest number of people, given limited resources.

There are several different triage systems, but one commonly used system is the **START Triage System**, or **Simple Triage and Rapid Treatment**. It is a quick and easy method of triaging large numbers of patients in a disaster setting. The system uses color-coded tags to quickly identify patients who need immediate care, those who can wait for care, and those who are beyond help.

Here is a breakdown of the START Triage System:

1. RED TAG

Immediate. These patients have life-threatening injuries that require immediate treatment to save their lives. Examples include severe bleeding, airway obstruction, and shock. These patients are first in line for treatment.

2. YELLOW TAG

Delayed. These patients have serious injuries that require medical attention, but their injuries are not immediately life-threatening. Examples include broken bones, moderate bleeding, and minor burns. These patients can wait for treatment while more urgent cases are attended to.

3. GREEN TAG

Minor. These patients have minor injuries that can wait for treatment. Examples include minor cuts, bruises, and sprains. These patients can be treated last, after more urgent cases have been attended to.

4. BLACK TAG

Deceased or expectant. These patients have injuries that are so severe that they are not expected to survive, or they are already deceased. These patients are not treated, but are

instead moved to a designated area for identification and processing.

It is important to note that disaster triage is not perfect, and there may be times when patients who are classified as “delayed” or “minor” actually have more serious injuries. The triage system is designed to be a quick and efficient way to allocate resources in a disaster setting, and medical personnel will reassess patients as needed to ensure that they receive appropriate care.

Proper disaster triage can help to save lives and ensure that limited resources are used effectively in a disaster setting. It is important for medical personnel to be trained in disaster triage and to practice regularly to ensure that they are prepared to respond in an emergency situation.

Another memory trick that can be used for disaster triage is the “**SAVE**” method, which stands for:

- **Sort:** Quickly categorize patients into the most urgent group that their condition requires.
- **Assess:** Make a quick assessment of each patient’s injuries, medical conditions, and overall situation.
- **Verify:** Confirm that the decisions made during sorting and assessment are correct.
- **Execute:** Provide appropriate care and transport for each patient based on their category and condition.

Triage Category	Definition	Priority	Treatment
Eye opening	Life-threatening injuries that can be treated with immediate intervention and will likely survive if treated quickly	1 (highest)	ABCs, hemorrhage control, airway management, chest decompression, control of shock, rapid transport to medical facility
Delayed	Injuries that require medical intervention but are not immediately life-threatening and can wait up to several hours for treatment	2	Assess and record vital signs, immobilize fractures, stabilize spinal injuries, basic wound care, IV fluids if necessary, transport to medical facility when able
Minor	Minor injuries and illnesses that do not require urgent	3	Simple wound care, symptom relief, provide food and water, transport to medical facility when resources allow
Expectant	Life-threatening injuries with a low probability of survival even with treatment	4 (lowest)	Palliative care, emotional support, comfort measures, transport to medical facility when resources allow

Acute Respiratory Distress Syndrome (ARDS)

ARDS is a severe lung condition caused by the leakage of fluid into the alveolar sacs, leading to reduced gas exchange, alveolar collapse, and hypoxemia. This can result in organ damage.

Causes:

- **Indirect causes:** Sepsis (most common), Burns, Pancreatitis, Multiple blood transfusions, Drug overdose
- **Direct causes (lung damage):** Pneumonia, Aspiration, Drowning, Inhalation injury, Embolism

Stages of ARDS:

1. EXUDATIVE STAGE (24 HOURS AFTER INJURY):

- Protein-rich fluid leaks into the alveolar sacs, causing pulmonary edema.
- Damage to surfactant, leading to atelectasis and hypoxemia.
- Formation of hyaline membranes reduces lung elasticity and compliance.
- **Hallmark sign:** Refractory hypoxemia (oxygen saturation doesn't improve with oxygen therapy).

2. PROLIFERATIVE STAGE (14 DAYS AFTER INJURY):

- Repair process leads to dense, fibrous lung tissue.
- Further decrease in lung compliance and worsening hypoxemia.

3. FIBROTIC STAGE (3 WEEKS AFTER INJURY):

- Fibrosis in lung tissue.
- Significant lung damage.
- Poor prognosis.

Treatment and management :

- Assess and maintain the airway.
- Mechanical ventilation with PEEP (10–20mmHg) to keep the lungs open and provide

oxygen.

- Monitor for complications, such as hyperinflation, pneumothorax, and subcutaneous emphysema.
- Consider prone positioning to improve oxygenation without increasing oxygen concentration.
- Address inflammation with corticosteroids and antibiotics as needed.
- Monitor urine output, blood pressure, and mental status to evaluate the patient's condition.

Ventilator Basics

Purpose: Ventilators are used when the respiratory system is failing.

Negative pressure ventilation: Normal breathing

Positive pressure ventilation: Adding positive pressure into the airway

Key Ventilator Parameters:

1. **FiO₂ (Fraction of Inspired Oxygen)**: Indicates the percentage of oxygen being administered. Goal: As close to room air (21%) as possible. Higher FiO₂ implies a sicker patient.
2. **PEEP (Positive End Expiratory Pressure)**: The air pressure in the alveoli at the end of expiration. Goal: Keep the alveoli open to increase the surface area for gas exchange and improve oxygenation without increasing FiO₂.

Ventilator Modes

- **Volume Cycle Ventilation**: Delivers a preset volume of air. Ends the inspiratory phase when the volume is reached. Commonly used for short-term support. Example: Assist Control Mode.
 - Risks: Barotrauma due to fixed volume pressure.
- **Pressure Cycle Ventilation**: Delivers air until a preset pressure is reached. Ends the inspiratory phase when the pressure is reached. More accommodating to lung compliance. Example: Pressure Support Ventilation (PSV) and BiPap.
 - Lower risk of barotrauma.

Nursing Considerations:

- Adjust respiratory rate (RR) settings for respiratory alkalosis (hyperventilation) or acidosis.
- Respond to high and low ventilator alarms by checking the tube or settings.
- Provide warm, humidified air and maintain infection control through suction and oral care.
- Ensure proper placement of the tracheostomy tube.

Angina

Stable and unstable angina, also known as chest pain, is caused by the narrowing of coronary arteries that supply the heart with blood and oxygen, leading to reduced blood flow and oxygen delivery to the heart muscle. It often occurs during periods of high oxygen demand, such as exercise, emotional stress, exposure to cold, or after eating a heavy meal.

Risk factors

Risk factors for angina include smoking, hypertension, high cholesterol, poor diabetes management, sedentary lifestyle, obesity, and age (men >45 years old, women >55 years old).

Diagnostic tests

Diagnostic tests for angina include coronary angiography, EKGs, echocardiograms, liver function tests, lipid profiles, stress tests, and blood tests to rule out myocardial infarction.

Symptoms

Symptoms of angina include constricting chest pain that may radiate to the jaw, back, or arms, as well as nausea, pallor, shortness of breath, diaphoresis, and upper GI discomfort. These symptoms can also indicate a myocardial infarction.

Stable angina is characterized by pain that occurs with exertion or stress, lasts less than 5 minutes, and is relieved by rest or nitroglycerin. It is generally predictable.

Unstable angina, on the other hand, can occur with exertion, stress, or rest, lasts more than 30 minutes, and is not relieved by rest or nitroglycerin. It is unpredictable and requires immediate medical attention.

Treatment

Treatment for angina includes nitroglycerin for immediate relief, which dilates arteries to increase blood flow. Nitroglycerin pills are used for stable angina, with one pill taken every 5 minutes for a maximum of three doses. Call 911 if symptoms persist after the first pill.

Nitroglycerin patches are used for unstable angina and should be applied daily to a clean, dry, shaved area. Other treatments include beta blockers, calcium channel blockers, statins, anticoagulants, and lifestyle changes. In some cases, surgical interventions such as percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG) may be necessary.

Myocardial Infarction (Heart Attack)

Myocardial infarction (MI), or heart attack, occurs when one or more arteries in the heart become completely blocked, leading to decreased perfusion and ischemia in the heart muscles. Atherosclerosis, the buildup of plaque in coronary arteries, can progress to angina and eventually result in total artery occlusion and MI.

Recognizing Myocardial Infarction (Heart Attack) using the NCSBN Clinical Judgment Model:

Recognize cues:

- Assess the patient for signs and symptoms of MI, including substernal chest pain, jaw pain, left arm pain, heartburn, abdominal pain, shortness of breath, dyspnea, nausea, vomiting, sweating, and pallor.
- Consider the patient's history and risk factors, such as stress, obesity, diabetes, hypertension, smoking, male gender, and Black American race.

Analyze cues:

- Perform diagnostic tests, such as EKGs, troponin tests, stress tests, and blood tests to confirm the presence of MI and determine its severity.
- Interpret EKG results (ST elevation or depression) to identify blockage and ischemia.

Prioritize hypotheses:

- Determine the need for immediate intervention, such as administering morphine, oxygen, nitroglycerin, and aspirin.
- Evaluate the patient's eligibility for fibrinolytics or percutaneous coronary intervention (PCI).

Generate solutions:

- Administer appropriate medications, such as heparin, beta-blockers, calcium channel blockers, nitroglycerin, statins, ACE inhibitors, and ARBs.
- Consider more invasive treatments, like PCI or coronary artery bypass graft (CABG) surgery, if necessary.

Take action:

- Implement the chosen treatment plan, including administering medications, performing procedures, and monitoring the patient's vital signs and response to treatment.
- Educate the patient on lifestyle modifications, such as reducing salt and fluid intake, quitting smoking, exercising regularly, and managing stress.

Evaluate outcomes:

- Monitor the patient for complications, such as cardiogenic shock, dysrhythmias, heart failure, and cardiac tamponade, and provide appropriate interventions as needed.
- Assess the patient's progress and adjust the treatment plan if necessary, ensuring optimal recovery and prevention of future events.

Heart Failure

Heart failure, a chronic condition that often involves episodes of exacerbation, occurs when the heart is unable to supply an adequate amount of oxygen-rich blood to tissues and major organs. The condition can manifest as left-sided heart failure, which primarily affects the lungs, or right-sided heart failure, which impacts the rest of the body. Both types of heart failure can be caused by a variety of factors, including coronary artery disease, hypertension, damaged heart valves, and dysrhythmias.

By recognizing the signs and symptoms, assessing risk factors, and implementing appropriate treatments, healthcare professionals can manage heart failure effectively and improve patient outcomes.

Recognize cues:

- Assess the patient for signs and symptoms of left-sided heart failure, such as dyspnea, shortness of breath, tachypnea, cough, crackles, cyanosis, decreased oxygenation, restlessness, and confusion.
- Assess the patient for signs and symptoms of right-sided heart failure, such as dependent edema, ascites, enlarged liver and spleen, jugular venous distension, and increased weight.
- Consider the patient's history, risk factors, and potential causes, including hypertension, coronary artery disease, diabetes, sleep apnea, congenital heart defects, viruses, alcohol and tobacco use, obesity, and dysrhythmias.

Analyze cues:

Perform diagnostic tests, such as chest X-rays, echocardiograms, electrocardiograms, blood tests, and stress tests, to confirm the presence and severity of heart failure.

Prioritize hypotheses:

Determine the need for immediate intervention, such as oxygen therapy, fluid restriction, or medication adjustments.

Generate solutions:

- Administer appropriate medications, such as ACE inhibitors, ARBs, beta-blockers, diuretics, and digoxin.
- Consider more invasive treatments, like coronary artery bypass graft (CABG) surgery, valve replacement, implantable cardioverter-defibrillators, ventricular assist devices (VADs), or heart transplants, if necessary.

Take action:

- Implement the chosen treatment plan, including administering medications, performing procedures, and monitoring the patient's vital signs and response to treatment.

- Provide care focused on lung function, fluid volume management, and patient education on medications and lifestyle factors.

Evaluate outcomes:

- Monitor the patient's progress and adjust the treatment plan if necessary, ensuring optimal recovery and prevention of future episodes of heart failure exacerbation.
- Assess the patient's understanding of their condition and self-care abilities, providing support and additional education as needed.

Cardiac Biomarkers		
Cranial Nerve	Ranges	Function
Cardiac Troponin	0–4 ng/ml.	Released into the bloodstream when heart muscles are damaged. Memory trick: Troponin >0.4 indicates a person may be experiencing or recently had an MI.
Creatine Kinase (CK-MB)	0–5 ng/ml.	Enzyme released into the bloodstream when heart, brain, or skeletal muscles are damaged. Memory trick: CK-MB >5 suggests heart muscle damage due to oxygen deprivation.
Brain Natriuretic Peptide (BNP)	Normal: <100 pg/ml Mild HF: 100–300 Moderate HF: 300–700 Severe HF: 700+	BNP >100 indicates worsening heart failure. Peptide released from ventricular myocytes when ventricles fill with too much fluid and stretch. Indicates heart failure severity Memory trick: BNP >100 indicates worsening heart failure.

Infective Endocarditis

Infective endocarditis is a life-threatening inflammation of the endocardium, the lining of the heart chambers and valves. This serious condition typically results from the invasion of pathogens, such as bacteria or fungi, which enter the body through invasive procedures, dental work, implanted devices, or other means. If left untreated, infective endocarditis can cause severe damage to the heart and other organs.

Recognize Cues:

- Age >60
- Artificial heart valves
- Implanted devices
- Damaged heart valves (rheumatic fever, previous infection)
- Poor dental hygiene
- Congenital heart defects
- Long-term catheter use

Analyze Cues:

- Assess for symptoms such as fatigue, malaise, night sweats, pain with breathing, shortness of breath, enlarged spleen and liver, aching joints and muscles, petechiae, Osler's nodes, or Janeway lesions.

Prioritize Hypotheses:

- Based on risk factors and symptoms, consider the possibility of infective endocarditis.

Generate Solutions:

- Collect blood cultures to identify bacteria.
- Administer high-dose antibiotics, possibly requiring hospitalization followed by 4 weeks of treatment at home.

Teach proper oral care.

- Notify the dentist of implanted devices or history of endocarditis.

- Monitor for symptoms of heart failure.
- Consider surgery to treat persistent endocarditis or replace damaged heart valves.

Take Action:

- Implement the appropriate treatment plan based on the identified bacteria and severity of the condition.
- Provide education on the importance of completing the full course of antibiotics and maintaining good oral hygiene.
- Ensure regular follow-up to monitor for any signs of heart failure or complications.

Evaluate Outcomes:

- Assess the patient's response to treatment and monitor for any signs of improvement or worsening.
- Ensure patient education is effective in promoting compliance with medication and oral care.
- Continue to evaluate the need for surgical intervention or changes to the treatment plan based on the patient's progress.

Disseminated Intravascular Coagulation (DIC)

Disseminated Intravascular Coagulation (DIC) is a complex and life-threatening condition characterized by excessive blood clotting throughout the body, leading to abnormal consumption of platelets and clotting factors. This process can result in simultaneous bleeding in other areas of the body. DIC typically arises from an underlying condition or event, such as sepsis or pregnancy complications. Prompt diagnosis and treatment are essential to control clotting and bleeding, address the underlying cause, and prevent severe hemorrhage or organ damage.

Recognize Cues:

- Blood transfusion reaction
- Inflammation of the pancreas, liver disease
- Infection in the blood (sepsis, meningitis)
- Pregnancy complications (retained placenta)

Analyze Cues:

- Assess for symptoms such as bleeding from multiple sites (petechiae, purpura), blood clotting, bruising, pain/redness at clotting sites, drop in blood pressure, altered behavior, shortness of breath, confusion, and fever.

Prioritize Hypotheses:

- Based on the history and symptoms, consider the possibility of DIC.

Generate Solutions:

- Obtain patient history and perform laboratory tests (PT/PTT, CBC, CMP, D-Dimer).
- Control clotting and bleeding, treat the underlying cause.
- Administer anticoagulants, plasma transfusion, and platelet transfusion.
- Provide oxygen supplementation.
- Monitor vital signs and mental status.

Take Action:

- Implement the appropriate treatment plan based on laboratory results and the underlying cause.
- Continuously monitor the patient's vital signs, mental status, and response to treatment.
- Ensure the underlying cause is addressed (e.g., stop transfusion, remove retained placenta).

Evaluate Outcomes:

- Assess the patient's response to treatment, monitoring for improvement or worsening of symptoms.
- Continuously evaluate the effectiveness of the treatment plan and adjust as needed to control clotting and bleeding.
- Ensure the underlying cause has been effectively treated to prevent recurrence or further complications.

Cardiomyopathy

Cardiomyopathy refers to a group of diseases affecting the heart muscle, leading to impaired pumping function and decreased cardiac output. This condition reduces the oxygen and blood supply to the body and can manifest in various forms. The three main types of cardiomyopathy are dilated, restrictive, and hypertrophic. Each type presents unique characteristics, symptoms, and treatments, making accurate diagnosis and appropriate management crucial for patient outcomes.

Recognize Cues:

- Identify the type of cardiomyopathy based on clinical presentation and patient history.
- Assess for signs and symptoms specific to each type.

Analyze Cues:

Consider the type of cardiomyopathy and its impact on the heart's pumping function and cardiac output.

Prioritize Hypotheses:

Based on the presentation and type of cardiomyopathy, determine the most appropriate treatment approach.

Generate Solutions:

Implement treatments specific to each type of cardiomyopathy:

- **Dilated:** ACE inhibitors, Beta blockers, CCBs, digoxin, diuretics, low sodium diet, rest and exercise, no smoking.
- **Restrictive:** Reduce radiation exposure, manage symptoms of heart failure.
- **Hypertrophic:** Myectomy, Beta blockers, CCBs, avoid certain medications and strenuous activity.

Take Action:

- Administer appropriate treatments and medications based on the type of cardiomyopathy.

- Monitor the patient's response to treatment and adjust the plan as needed.
- Provide patient education on managing their condition, including lifestyle modifications and medication adherence.

Evaluate Outcomes:

- Assess the patient's response to treatment, monitoring for improvement or worsening of symptoms.
- Continuously evaluate the effectiveness of the treatment plan and adjust as needed to optimize cardiac function and patient outcomes.
- Collaborate with the patient and their healthcare team to manage their cardiomyopathy and minimize complications.

Abdominal Aortic Aneurysm

Abdominal Aortic Aneurysm (AAA), also known as Triple A, is a potentially life-threatening condition characterized by the enlargement of the aortic artery in the abdomen. The aorta is the largest blood vessel in the body, and a rupture of an abdominal aortic aneurysm can lead to severe consequences. Risk factors include age, family history, and tobacco use, while the condition often remains asymptomatic until rupture. Treatment aims to prevent rupture and manage contributing factors.

Recognize Cues:

- Assess the patient for risk factors: age, gender, family history, and tobacco use.
- Monitor for symptoms such as deep pain in the abdomen or flank, pulsating sensation in the abdomen, or signs of rupture.

Analyze Cues:

- Determine if the symptoms and risk factors align with a potential AAA diagnosis.

Prioritize Hypotheses:

- Based on the presentation, consider the likelihood of an AAA and the potential for rupture.

Generate Solutions:

- Implement diagnostic tests: abdominal ultrasound, CT scan, or MRI.
- Develop a treatment plan based on the size and growth rate of the AAA:
 - Small: monitor regularly, manage blood pressure, and maintain a healthy lifestyle.
 - Large or rapidly growing: consider surgical intervention, such as open or endovascular repair.

Take Action:

- Provide appropriate treatment based on the size and growth rate of the AAA.
- Monitor the patient's response to treatment and adjust the plan as needed.

- Educate the patient on the importance of managing blood pressure, quitting smoking, and maintaining a healthy diet.

Evaluate Outcomes:

- Assess the patient's response to treatment, monitoring for improvements or complications.
- Continuously evaluate the effectiveness of the treatment plan and adjust as needed to minimize the risk of AAA rupture.
- Collaborate with the patient and their healthcare team to manage their AAA and reduce the likelihood of life-threatening complications.

Hypertension

Hypertension, also known as high blood pressure, occurs when the force of blood against artery walls is consistently too high ($>140/90$). If left untreated, hypertension can lead to various complications, such as atherosclerosis, aneurysms, heart failure, and stroke. Hypertension can be primary (unknown origin) or secondary (caused by another medical condition).

Treatment often involves lifestyle changes and medication.

Recognize Cues:

- Assess the patient for risk factors, such as family history, obesity, and age.
- Monitor for symptoms, including headache, fatigue, shortness of breath, edema, and nocturia.

Analyze Cues:

Determine if the patient's symptoms and risk factors align with a potential hypertension diagnosis.

Prioritize Hypotheses:

Based on the presentation, consider the likelihood of primary or secondary hypertension and the possible underlying causes.

Generate Solutions:

- Develop a treatment plan focused on lifestyle changes and medication:
- Healthy diet, low salt intake, stress reduction, exercise, and limited alcohol consumption.
- Medications: diuretics, ACE inhibitors, ARBs, CCBs, and beta blockers.
- Investigate possible secondary causes, such as diabetic neuropathy, polycystic kidney disease, glomerular disease, weight gain, sleep apnea, or thyroid disorders.

Take Action:

- Implement the treatment plan, addressing both lifestyle and medication components.
- Monitor the patient's response to treatment and adjust the plan as needed.

- Educate the patient on the importance of maintaining a healthy lifestyle and adhering to prescribed medications.

Evaluate Outcomes:

- Assess the patient's response to treatment, monitoring for improvements or complications.
- Continuously evaluate the effectiveness of the treatment plan and adjust as needed to maintain optimal blood pressure control.
- Collaborate with the patient and their healthcare team to manage their hypertension and reduce the risk of long-term complications.

Peripheral Vascular Disease (PVD)

Peripheral Vascular Disease (PVD) encompasses conditions that affect blood circulation outside the heart and brain. It can be classified into two categories: venous insufficiency, which is characterized by the pooling of blood in veins, and arterial disease, which involves narrow arteries restricting oxygen-rich blood flow to the body. Both conditions can result from factors such as smoking, uncontrolled diabetes, high cholesterol, and high blood pressure.

Recognize Cues:

- Assess the patient for risk factors, including smoking, uncontrolled diabetes, high cholesterol, and high blood pressure.
- Differentiate between symptoms of venous insufficiency (VEINY) and arterial disease (ARTS).

Analyze Cues:

- Determine if the patient's symptoms and risk factors suggest PVD, and identify whether it is venous insufficiency or arterial disease.
- Prioritize Hypotheses:
- Based on the patient's presentation, consider the most likely diagnosis and evaluate the need for further diagnostic testing, such as Doppler ultrasound or arterial brachial index.

Generate Solutions:

- Develop a treatment plan tailored to the specific PVD diagnosis:
- For venous insufficiency: leg elevation, compression stockings, antiplatelet medications, cholesterol-lowering medications, surgery, and smoking cessation.
- For arterial disease: leg hanging, antiplatelet and statin medications, vasodilators, healthy lifestyle, and surgery (e.g., CABG, endarterectomy).

Take Action:

- Implement the appropriate treatment plan based on the patient's diagnosis.
- Monitor the patient's response to treatment, adjusting the plan as needed.

- Educate the patient on lifestyle changes and precautions to reduce the risk of complications.

Evaluate Outcomes:

- Assess the patient's response to the treatment plan, monitoring for improvements or complications.
- Continuously evaluate the effectiveness of the treatment plan, making adjustments as necessary to optimize blood circulation and minimize the risk of complications.
- Collaborate with the patient and their healthcare team to manage their PVD and promote long-term health.

Guillain-Barre Syndrome

Guillain-Barre Syndrome (GBS) is a rare but serious autoimmune disorder that can have a significant impact on a patient's quality of life. Healthcare professionals must utilize the NCSBN Clinical Judgment Model to effectively assess, diagnose, and treat GBS patients, ensuring optimal outcomes and a timely return to their baseline health.

Recognize Cues:

Guillain-Barre Syndrome (GBS) is an autoimmune disorder in which the immune system mistakenly attacks the peripheral nervous system (PNS) and cranial nerves. Patients may report experiencing an infection (either gastrointestinal or respiratory) six weeks before symptom onset.

Analyze Cues:

Initial symptoms include gradually ascending symmetrical paresthesia, starting in the feet. In severe cases, late-stage symptoms involve paralysis of major organ muscles, leading to medical emergencies such as heart dysrhythmias, blood pressure changes, respiratory failure, difficulty swallowing and speaking, renal issues, cranial nerve paralysis, and temperature irregularities.

Prioritize Hypotheses:

The primary goal for GBS patients is to reduce recovery time and improve symptoms if administered within two weeks of onset.

Generate Solutions:

- Immunoglobulin therapy
- Plasmapheresis
- Monitoring EKG and vital signs
- Assessing swallowing function
- Listening for bowel sounds
- Monitoring intake and output
- For intubated patients, watching for infection, pressure injuries, and blood clots.

Take Action:

Administer appropriate treatments and care for the patient, including immunoglobulin therapy and plasmapheresis, as well as monitoring vital signs, swallowing function, bowel sounds, intake and output, and potential complications for intubated patients.

Evaluate Outcomes:

Monitor the patient's response to treatment and care, ensuring that the recovery time is minimized and symptoms improve. Adjust the care plan as needed to optimize patient outcomes. Typically, GBS symptoms subside after two weeks, and patients return to baseline within one to two years.

SIADH

SIADH (Syndrome of Inappropriate Antidiuretic Hormone) is a condition where excess ADH is released, causing the kidneys to retain water. To provide optimal care for patients with SIADH, healthcare professionals should employ the NCSBN Clinical Judgment Model, which helps in recognizing, analyzing, and managing this condition effectively. In this overview, we will discuss the key aspects of SIADH and its counterpart, Diabetes Insipidus (DI).

SIADH Causes:

- Brain disorders (injury, tumors, infection)
- Brain surgery in the hypothalamus region
- Lung disease (TB, pneumonia)
- Sepsis

Symptoms (SOAKED INSIDE):

- Low urination due to water retention
- Sticky, thick urine with high specific gravity (>1.030)
- Internal swelling (hypoosmolality, hyponatremia)
- Seizures (monitor headache/confusion)
- Severely high blood pressure

Treatment:

- Fluid restrictions
 - Loop diuretics
 - Correct sodium deficit with hypertonic IV
 - Monitor daily weights
 - Implement seizure precautions
- Untreated SIADH can lead to coma or death.

DI (Diabetes Insipidus) Causes:

- Damage to the hypothalamus (radiation)
- Brain disorders (brain injury leading to increased ICP, pressuring the pituitary gland)
- Lung disease (TB, pneumonia, cancer)

Symptoms (Dry Inside):

- Polyuria (excessive urine output)
- Diluted urine with low specific gravity

(<1.005)

- Dehydration (hypoosmolality, hyponatremia)

- Dry skin, mucus membranes, and increased thirst
- Decreased blood pressure

Treatment:

- Administer desmopressin to increase fluid retention
- Encourage fluid intake
- Administer IV fluids (normal saline)

slowly

- Monitor for seizures due to electrolyte imbalance
- Track daily weights

Addison's Disease

Addison's Disease is a condition characterized by insufficient production of steroid hormones, particularly cortisol and aldosterone, by the adrenal glands. Healthcare professionals should recognize, analyze, and manage the condition effectively using the NCSBN Clinical Judgment Model. This overview will discuss the key aspects of Addison's Disease and its management, incorporating the clinical judgment model.

Recognize Cues:

- Identify potential causes of Addison's Disease, such as autoimmune disorders, diseases like cancer, or damage to the adrenal or pituitary glands.
- Observe and assess symptoms like low blood pressure, cold intolerance, low sodium and blood sugar levels, low mood and energy levels, loss of body hair, weight loss due to fluid loss, high potassium levels, and increased skin pigmentation.

Analyze Cues:

- Evaluate the severity and impact of symptoms on the patient's overall health and well-being.
- Consider possible complications and side effects associated with the disease and its treatment.
- Determine whether the patient's diet is appropriate for managing Addison's Disease.

Prioritize hypotheses:

- Prioritize the patient's needs based on the severity of symptoms and potential complications.
- Address the most urgent concerns, such as maintaining blood pressure and electrolyte balance, before addressing other aspects of care.

Generate Solutions:

- Develop a treatment plan that includes lifelong steroid therapy (medications ending in "-sone") and monitoring for potential side effects.
- Adjust the patient's diet to include high-protein, high-carbohydrate, and high-sodium foods.

- Provide education and support to the patient regarding self-management of the condition and potential lifestyle changes.

Take action:

- Implement the treatment plan and monitor the patient's response to therapy.
- Regularly assess the patient's blood pressure, electrolyte levels, and overall well-being.
- Provide ongoing education and support to the patient and their family, as needed.

Evaluate outcomes:

- Assess the effectiveness of the treatment plan in managing the patient's symptoms and overall health.
- Modify the plan as necessary based on the patient's response and any changes in their condition or needs.
- Ensure ongoing communication and collaboration with the patient and their healthcare team to provide comprehensive care and support.

Cushing Syndrome

Cushing Syndrome is a condition characterized by excessive production of cortisol, a hormone produced by the adrenal glands. Healthcare professionals should recognize, analyze, and manage the condition effectively using the NCSBN Clinical Judgment Model. This overview will discuss the key aspects of Cushing Syndrome and its management, incorporating the clinical judgment model.

Recognize Cues:

- Identify potential causes of Cushing Syndrome, such as long-term use of corticosteroid medications, adrenal gland tumors, or pituitary gland tumors.
- Observe and assess symptoms like weight gain (particularly in the face, upper back, and abdomen), thinning and easily bruised skin, stretch marks, muscle weakness, fatigue, high blood pressure, and mood changes.

Analyze Cues:

- Evaluate the severity and impact of symptoms on the patient's overall health and well-being.
- Consider possible complications and side effects associated with the disease and its treatment.
- Determine whether the patient's diet and lifestyle are appropriate for managing Cushing Syndrome.

Prioritize hypotheses:

- Prioritize the patient's needs based on the severity of symptoms and potential complications.
- Address the most urgent concerns, such as maintaining blood pressure and glucose levels, before addressing other aspects of care.

Generate Solutions:

- Develop a treatment plan that addresses the underlying cause of Cushing Syndrome (e.g., tapering or discontinuing corticosteroid medications, treating adrenal or pituitary gland tumors).

- Adjust the patient's diet and lifestyle to promote weight loss, improve muscle strength, and manage blood pressure and glucose levels.
- Provide education and support to the patient regarding self-management of the condition and potential lifestyle changes.

Take action:

- Implement the treatment plan and monitor the patient's response to therapy.
- Regularly assess the patient's blood pressure, glucose levels, weight, and overall well-being.
- Provide ongoing education and support to the patient and their family, as needed.

Evaluate outcomes:

- Assess the effectiveness of the treatment plan in managing the patient's symptoms and overall health.
- Modify the plan as necessary based on the patient's response and any changes in their condition or needs.
- Ensure ongoing communication and collaboration with the patient and their healthcare team to provide comprehensive care and support.

Hyperthyroidism

Hyperthyroidism is a condition that occurs when the thyroid gland produces too much thyroid hormone. The thyroid gland is an endocrine gland located in the neck that produces hormones that help regulate the body's metabolism.

When the thyroid gland produces too much thyroid hormone, it can speed up the body's metabolism and cause a variety of symptoms, such as:

- Rapid heart rate or palpitations
- Weight loss
- Tremors or shaking
- Heat intolerance
- Increased sweating
- Fatigue or weakness
- Difficulty sleeping
- Anxiety, irritability or nervousness
- Changes in menstrual patterns
- Enlarged thyroid gland (goiter)

Hyperthyroidism can be caused by a number of factors, including autoimmune diseases such as Graves' disease, which is the most common cause of hyperthyroidism. Other causes can include nodules or tumors on the thyroid gland, inflammation of the thyroid gland or excessive iodine intake.

Healthcare professionals should effectively recognize, analyze, and manage the condition using the NCSBN Clinical Judgment Model. This overview will discuss the key aspects of hyperthyroidism and its management, incorporating the clinical judgment model.

Recognize Cues:

- Identify potential causes of hyperthyroidism, such as Graves' disease, iodine excess, or levothyroxine excess.
- Observe and assess symptoms like exophthalmos (bulging eyes), goiter, high blood pressure, heart palpitations, heat intolerance, and increased gastrointestinal activity (e.g., diarrhea).

Analyze Cues:

- Evaluate the severity and impact of symptoms on the patient's overall health and well-being.

- Consider possible complications and side effects associated with the disease and its treatment.
- Determine whether the patient's diet and lifestyle are appropriate for managing hyperthyroidism.

Prioritize hypotheses:

- Prioritize the patient's needs based on the severity of symptoms and potential complications.
- Address the most urgent concerns, such as maintaining blood pressure and heart rate, before addressing other aspects of care.

Generate Solutions:

- Develop a treatment plan that addresses the underlying cause of hyperthyroidism (e.g., adjusting levothyroxine dosage, treating Graves' disease).
- Adjust the patient's diet and lifestyle to support their overall health, including a high-calorie, high-protein, and high-carbohydrate diet with frequent meals.
- Avoid high-fiber, caffeinated, or spicy foods that may exacerbate symptoms.
- Consider medications like propylthiouracil (PTU), methimazole, beta-blockers, and SSKI to help manage symptoms and shrink the thyroid gland.

Take action:

- Implement the treatment plan and monitor the patient's response to therapy.
- Regularly assess the patient's blood pressure, heart rate, weight, and overall well-being.
- Provide ongoing education and support to the patient and their family, as needed.

Evaluate outcomes:

- Assess the effectiveness of the treatment plan in managing the patient's symptoms and overall health.
- Modify the plan as necessary based on the patient's response and any changes in their condition or needs.
- Ensure ongoing communication and collaboration with the patient and their healthcare team to provide comprehensive care and support.

Hypothyroidism

Hypothyroidism is a condition that occurs when the thyroid gland doesn't produce enough thyroid hormone. The thyroid gland is an endocrine gland located in the neck that produces hormones that help regulate the body's metabolism.

When the thyroid gland doesn't produce enough thyroid hormone, it can slow down the body's metabolism and cause a variety of symptoms, such as:

- Fatigue or sluggishness
- Weight gain
- Cold intolerance
- Dry skin
- Constipation
- Depression or mood changes
- Hair loss
- Muscle weakness or stiffness
- Joint pain or stiffness
- Irregular menstrual cycles

Hypothyroidism can be caused by a number of factors, including autoimmune diseases such as Hashimoto's thyroiditis, which is the most common cause of hypothyroidism. Other causes can include radiation treatment, surgery to remove the thyroid gland, or certain medications.

Using the NCSBN Clinical Judgment Model, healthcare professionals should effectively recognize, analyze, and manage this condition.

Recognize Cues:

- Identify potential causes of hypothyroidism, such as Hashimoto's, low dietary iodine, pituitary tumor, or thyroidectomy.
- Observe and assess symptoms associated with hypothyroidism, including low respiratory rate, low heart rate, low blood pressure, low body temperature, low energy,

low metabolism, hair loss, low mood, low level of consciousness, slow dry skin, and slow menstruation.

Analyze Cues:

- Correlate symptoms and risk factors to determine the likelihood of hypothyroidism.
- Assess the severity of the patient's condition and consider potential complications, such as myxedema coma.
- Prioritize hypotheses:
- Rule out other conditions with similar symptoms or co-existing conditions that may exacerbate hypothyroidism.

Generate Solutions:

- Treatment for hypothyroidism may include thyroid hormone replacement therapy, which involves taking a synthetic thyroid hormone medication to replace the missing hormone.

Take action:

- Monitor the patient's response to treatment and adjust interventions as needed.
- Watch for signs of myxedema coma, a life-threatening complication of hypothyroidism.
- Evaluate outcomes:
- Assess the effectiveness of treatment and monitor for any potential side effects.
- Continuously evaluate the patient's condition and adjust the care plan accordingly to ensure optimal patient outcomes.

Parathyroidism

Parathyroidism involves the function of the parathyroid glands, which regulate calcium levels in the body. The NCSBN Clinical Judgment Model can guide healthcare professionals in recognizing, analyzing, and managing parathyroid disorders effectively.

Recognize Cues:

- Identify the type of parathyroid disorder (hyperparathyroidism or hypoparathyroidism) and its potential causes.
- Observe and assess symptoms associated with the specific parathyroid disorder, such as hypercalcemia, hypophosphatemia, osteoporosis, kidney stones, paresthesia, tetany, and arrhythmias.

Analyze Cues:

- Correlate symptoms and risk factors to determine the likelihood of a parathyroid disorder.
- Assess the severity of the patient's condition and consider potential complications.
- Prioritize hypotheses:
- Rule out other conditions with similar symptoms or co-existing conditions that may exacerbate the parathyroid disorder.

Generate Solutions:

- Develop treatment plans specific to the type of parathyroid disorder and its underlying cause.
- For hyperparathyroidism, consider parathyroidectomy for primary cases, or address the underlying cause for secondary cases.
- For hypoparathyroidism, consider administering oral calcium carbonate tablets, IV calcium or magnesium, and oral vitamin D.
- Implement dietary modifications and lifestyle recommendations to promote bone health and calcium regulation.

Take action:

- Monitor the patient's response to treatment and adjust interventions as needed.
- Continuously evaluate vital signs, laboratory results, and any changes in symptoms.

Evaluate outcomes:

- Assess the effectiveness of treatment and monitor for any potential side effects.
- Continuously evaluate the patient's condition and adjust the care plan accordingly to ensure optimal patient outcomes.

Asthma and Asthma Attacks

Asthma is a chronic lung disease characterized by inflammation and narrowing of the bronchi and bronchioles. Healthcare professionals can use the NCSBN Clinical Judgment Model to effectively recognize, analyze, and manage asthma and asthma attacks in patients.

Recognize Cues:

- Identify potential asthma triggers, such as smoke, pollen, pollution, cold air, respiratory infections, exercise, and certain medications.
- Observe and assess signs and symptoms, including shortness of breath, wheezing, coughing, chest tightness, and tachycardia.

Analyze Cues:

- Correlate symptoms and risk factors to determine the likelihood of asthma.
- Assess the severity of the patient's condition and consider potential complications, such as respiratory acidosis.

Prioritize hypotheses:

Rule out other conditions with similar symptoms or co-existing conditions that may exacerbate asthma.

Generate Solutions:

- Develop a treatment plan that addresses the patient's needs, including fast relief for acute attacks and long-term control for chronic asthma management.
- For acute attacks, consider administering bronchodilators like albuterol or ipratropium.
- For long-term control, consider medications like salmeterol, corticosteroids, and montelukast.
- Implement preventive measures and lifestyle modifications to reduce exposure to asthma triggers.

Take action:

- Monitor the patient's vital signs, lung sounds, cyanosis, ease of speaking, and peak flow best continuously.
- Ensure patient comfort by providing a calm environment, positioning them in a high Fowler's position, and administering oxygen or bronchodilators as needed.

Evaluate outcomes:

- Assess the effectiveness of treatment and monitor for any potential side effects.
- Continuously evaluate the patient's condition and adjust the care plan accordingly to ensure optimal patient outcomes.

Pneumothorax (Collapsed Lung)

Pneumothorax, or a collapsed lung, occurs when air enters the pleural space, disrupting the negative pressure and causing the lung to collapse. Tension pneumothorax is a life-threatening complication that can cause the trachea to shift to one side and result in subcutaneous emphysema, where CO₂ escapes to the skin. Using the NCSBN Clinical Judgment Model, healthcare professionals can recognize, analyze, and manage this condition in patients.

Recognize Cues:

- Identify potential causes, such as blunt force trauma, medical procedures, mechanical ventilation, or spontaneous rupture of lung tissue.
- Differentiate between open, closed, and tension pneumothorax.

Analyze Cues:

- Assess the severity of the patient's condition and consider potential complications, such as worsening pneumothorax, respiratory failure, or tension pneumothorax.

Prioritize hypotheses:

- Rule out other conditions with similar symptoms or co-existing conditions that may contribute to pneumothorax, such as pleural effusion or hemothorax.

Generate Solutions:

Develop a treatment plan to manage symptoms, re-expand the lung, and prevent complications.

Immediate interventions:

- **Open pneumothorax:** Apply a sterile occlusive dressing.
- **Tension pneumothorax:** Perform needle decompression.
- **For all types of pneumothorax:** Insert a chest tube and perform chest tube care.
- **Supportive care:** Position the patient with the head of bed in Fowler's position for breathing, provide oxygen, and monitor vital signs (blood pressure, heart rate, and

respiratory rate). Assess the rise and fall of the chest.

Take action:

- Implement the treatment plan and monitor the patient's vital signs, chest movement, and breath sounds continuously.
- Assess symptoms, such as sudden chest pain, cyanosis, unequal chest expansion, dyspnea, increased heart rate, decreased blood pressure, decreased oxygen levels, and absent breath sounds. In tension pneumothorax, look for tracheal deviation and subcutaneous emphysema.

Evaluate outcomes:

- Assess the effectiveness of treatment and monitor for any potential complications, such as worsening pneumothorax, infection, or lung re-collapse.
- Continuously evaluate the patient's condition and adjust the care plan accordingly to ensure optimal patient outcomes. The goal is to re-expand the lung, manage symptoms, and prevent complications associated with pneumothorax.

Hemothorax

Hemothorax is a condition where blood accumulates in the pleural space, causing the lung to collapse. Using the NCSBN Clinical Judgment Model, healthcare professionals can recognize, analyze, and manage this condition in patients.

Recognize Cues:

- Identify potential causes such as puncture wounds from broken ribs, stab wounds, gunshot wounds, blunt force injuries, pulmonary embolisms, or tears in blood vessels from hypertension.

Analyze Cues:

- Assess the severity of the patient's condition and consider potential complications, such as shock or respiratory failure.

Prioritize hypotheses:

- Rule out other conditions with similar symptoms or co-existing conditions that may contribute to hemothorax, such as pneumothorax or pleural effusion.

Generate Solutions:

- Develop a treatment plan to manage symptoms, stop bleeding, and restore lung function.
- Chest tube insertion to drain blood and fluid from the pleural space.
- Monitoring breath sounds, oxygen levels, and hemodynamic status.
- Controlling bleeding at the source.
- Managing flail chest if present, with oxygen, pain medication, and possibly mechanical ventilation or surgery.

Take action:

- Implement the treatment plan and monitor the patient's vital signs, chest movement, and breath sounds continuously.
- Assess symptoms, such as sudden chest pain, rapid heart rate, cold and pale skin, low blood pressure, rapid shallow breathing, dyspnea, and restlessness or anxiety.

Evaluate outcomes:

- Assess the effectiveness of treatment and monitor for any potential complications, such as worsening hemothorax, infection, or lung re-collapse.
- Continuously evaluate the patient's condition and adjust the care plan accordingly to ensure optimal patient outcomes. The goal is to stop bleeding, restore lung function, and manage any associated conditions such as flail chest.

Hypovolemic Shock

Hypovolemic shock occurs when the body loses more than 20% of its blood or fluid supply, leading to inadequate cardiac output, blood pressure, and perfusion. The NCSBN Clinical Judgment Model can help healthcare professionals to effectively recognize, analyze, and manage this condition in patients.

Recognize Cues:

- Identify relative causes (inside fluid shift) such as internal bleeding, severe burns, organ damage, and sepsis.
- Identify absolute causes (outside fluid shift) such as massive bleeding from surgery or injury, severe vomiting, severe diarrhea, and postpartum hemorrhage.

Analyze Cues:

- Assess the severity of the patient's condition and consider potential complications.
- Understand the pathophysiology of hypovolemic shock, including low venous return, decreased cardiac preload, reduced stroke volume, decreased cardiac output, and impaired tissue perfusion leading to ischemia.

Prioritize hypotheses:

Rule out other conditions with similar symptoms or co-existing conditions that may contribute to hypovolemic shock.

Generate Solutions:

- Develop a treatment plan to manage symptoms and restore adequate fluid volume, perfusion, and cardiac output.
- Fluid resuscitation with normal saline or lactated Ringer's solution.
- Place the patient in the Trendelenburg position.
- Monitor for fluid overload.
- Provide oxygen or mechanical ventilation.
- Control active bleeding.
- Monitor laboratory values.

- Administer vasopressors, antiemetic, and antidiarrheal medications.
- Perform hemodynamic monitoring.

Take action:

- Implement the treatment plan and monitor the patient's vital signs, lung sounds, and fluid status continuously.
- Assess symptoms, such as low blood pressure, increased systemic vascular resistance, increased heart rate, increased respiratory rate, weak and thready pulse, cool and pale skin, oliguria, mottled skin, slow capillary refill, anxiety, confusion, agitation, and organ failure.

Evaluate outcomes:

- Assess the effectiveness of treatment and monitor for any potential complications, such as worsening shock or fluid overload.
- Continuously evaluate the patient's condition and adjust the care plan accordingly to ensure optimal patient outcomes. The goal is to increase central venous pressure (CVP) and pulmonary artery wedge pressure (PAWP)

Pulmonary Embolism

Pulmonary embolism is a life-threatening condition characterized by a blockage in one of the pulmonary arteries, often caused by blood clots traveling to the lungs from deep veins. Using the NCSBN Clinical Judgment Model, healthcare professionals can effectively recognize, analyze, and manage pulmonary embolism in patients.

Recognize Cues:

- Identify risk factors, including untreated deep vein thrombosis (DVT), immobility, trauma, surgery, heart disease, smoking, and lifestyle factors.
- Observe and assess symptoms, such as sudden shortness of breath, sharp chest pain, increased heart rate, lightheadedness, dizziness, sweating, cough, cool and clammy skin, low oxygen, coughing up blood, syncope, low blood pressure, and high temperature.

Analyze Cues:

- Correlate symptoms and risk factors to determine the likelihood of pulmonary embolism.
- Assess the severity of the patient's condition and consider potential complications.

Prioritize hypotheses:

- Rule out other conditions with similar symptoms or co-existing conditions that may contribute to pulmonary embolism.

Generate Solutions:

- Develop a treatment plan to manage symptoms and reduce the risk of further embolism.
- Assess breathing and vital signs.
- Provide additional respiratory support.
- Place the patient in high Fowler's position.
- Educate on risk factors.
- Consider surgical clot removal if needed.

Take action:

- Perform diagnostic tests, such as ventilation-perfusion scan, pulmonary angiogram, CT

pulmonary angiography, and MRI.

- Implement the treatment plan and monitor the patient's vital signs, lung sounds, and respiratory status continuously.
- Administer medications, including anticoagulants (heparin or warfarin) to prevent clot growth and formation, and thrombolytics for clot dissolution (monitoring for bleeding).

Evaluate outcomes:

- Assess the effectiveness of treatment and monitor for any potential complications, such as worsening pulmonary embolism or bleeding from anticoagulant or thrombolytic therapy.
- Continuously evaluate the patient's condition and adjust the care plan accordingly to ensure optimal patient outcomes.

Chronic Obstructive Pulmonary Disease

Chronic Obstructive Pulmonary Disease (COPD) is a combination of emphysema and chronic bronchitis, which together obstruct airflow into and out of the lungs. Using the NCSBN Clinical Judgment Model, healthcare professionals can effectively recognize, analyze, and manage COPD in patients.

Recognize Cues:

- Identify risk factors, including smoking, advanced age, air pollution, dust, and chemical exposure.
- Observe and assess symptoms, such as shortness of breath, wheezing, difficulty exhaling, clubbed fingernails, fatigue, weight loss, productive cough, thick sputum, and respiratory acidosis and hypoxemia.

Analyze Cues:

- Correlate symptoms and risk factors to determine the likelihood of COPD.
- Assess the severity of the patient's condition and consider potential complications.

Prioritize hypotheses:

Rule out other conditions with similar symptoms or co-existing conditions that may contribute to COPD.

Generate Solutions:

- Develop a treatment plan to manage symptoms, as there is no cure for COPD.
- Encourage smoking cessation and avoidance of air pollutants.
- Prescribe bronchodilators, inhaled steroids, and antibiotics as necessary.
- Implement oxygen therapy (nasal cannula or BIPAP), aiming for 90–92% oxygen saturation.
- Teach effective coughing techniques to remove excess mucus.

Take action:

- Perform diagnostic tests, such as chest X-ray, CT scan, pulmonary function test, blood

oxygen saturation monitoring (SpO₂), and arterial blood gas (ABG) analysis.

- Implement the treatment plan and monitor the patient's vital signs, lung sounds, and respiratory status continuously.
- Provide education on lifestyle modifications and self-management strategies.

Evaluate outcomes:

- Assess the effectiveness of treatment and monitor for any potential complications, such as worsening COPD or respiratory failure.
- Continuously evaluate the patient's condition and adjust the care plan accordingly to ensure optimal patient outcomes.

Pneumonia

Pneumonia is an infection in the lung that causes fluid buildup in the alveoli and can be caused by bacteria, fungi, viruses, or chemicals. Healthcare professionals can use the NCSBN Clinical Judgment Model to effectively recognize, analyze, and manage pneumonia in patients.

Recognize Cues:

- Identify potential causes of pneumonia, such as bacteria, fungi, viruses, chemicals, chronic lung disease, immunosuppressed patients, ventilation/sedation, and surgery post-op/bedbound.
- Observe and assess signs and symptoms, including increased respiratory rate, increased heart rate, oxygen saturation below 95%, shortness of breath, productive cough, crackles, pleuritic pain, decreased food intake, and flu-like symptoms.

Analyze Cues:

- Correlate symptoms and risk factors to determine the likelihood of pneumonia.
- Assess the severity of the patient's condition and consider potential complications.

Prioritize hypotheses:

Rule out other conditions with similar symptoms or co-existing conditions that may contribute to pneumonia.

Generate Solutions:

- Develop a treatment plan that addresses the patient's needs, depending on the cause and severity of pneumonia.
- Administer antibiotics for bacterial pneumonia.
- Encourage a healthy diet, adequate fluid intake, rest, and supplemental oxygen as needed.
- Provide pain medications, antipyretics, and antitussives as necessary.

Take action:

- Perform diagnostic tests, such as X-ray, CT scan, bronchoscopy, blood or sputum cultures, and oxygen saturation monitoring.
- Implement the treatment plan and monitor the patient's vital signs, lung sounds, and respiratory status continuously.
- Ensure patient comfort by providing pain management and proper positioning.

Evaluate outcomes:

- Assess the effectiveness of treatment and monitor for any potential complications, such as worsening infection or respiratory failure.
- Continuously evaluate the patient's condition and adjust the care plan accordingly to ensure optimal patient outcomes.

Pleural Effusion: Fluid Buildup In The Lungs

Pleural effusion, also known as fluid buildup in the lungs, occurs when excess fluid accumulates in the pleural space between the visceral and parietal pleural space. Healthcare professionals can use the NCSBN Clinical Judgment Model to effectively recognize, analyze, and manage pleural effusions in patients.

Recognize Cues:

- Identify potential causes of pleural effusion, such as transudative effusion, exudative effusion, and lymphatic effusions.
- Observe and assess signs and symptoms, including dyspnea, chest pain, pleurisy, dry cough, decreased breath sounds, decreased tactile fremitus, and shortness of breath.

Analyze Cues:

- Correlate symptoms and risk factors to determine the likelihood of pleural effusion.
- Assess the severity of the patient's condition and consider potential complications, such as tracheal deviation.

Prioritize hypotheses:

- Rule out other conditions with similar symptoms or co-existing conditions that may contribute to pleural effusion.

Generate Solutions:

- Develop a treatment plan that addresses the patient's needs, depending on the size and cause of the pleural effusion.
- For small effusions, consider administering diuretics or restricting sodium intake.
- For large effusions, consider draining the fluid via thoracentesis or surgery.

Take action:

- Perform a thoracentesis to remove fluid and identify the cause of the pleural effusion.
- Monitor the patient's vital signs, lung sounds, and respiratory status continuously.
- Ensure patient comfort by providing pain management and proper positioning.

Evaluate outcomes:

- Assess the effectiveness of treatment and monitor for any potential complications, such as infection or pneumothorax.
- Continuously evaluate the patient's condition and adjust the care plan accordingly to ensure optimal patient outcomes.

Chest Tubes

Chest tubes are used to alleviate pressure in the pleural space, such as in cases of pneumothorax or hemothorax, or in the mediastinum space after cardiac surgery. The goal is to improve respiratory and cardiac conditions by removing excess air or fluid, including blood, which can compromise breathing or impede the heart's ability to function properly.

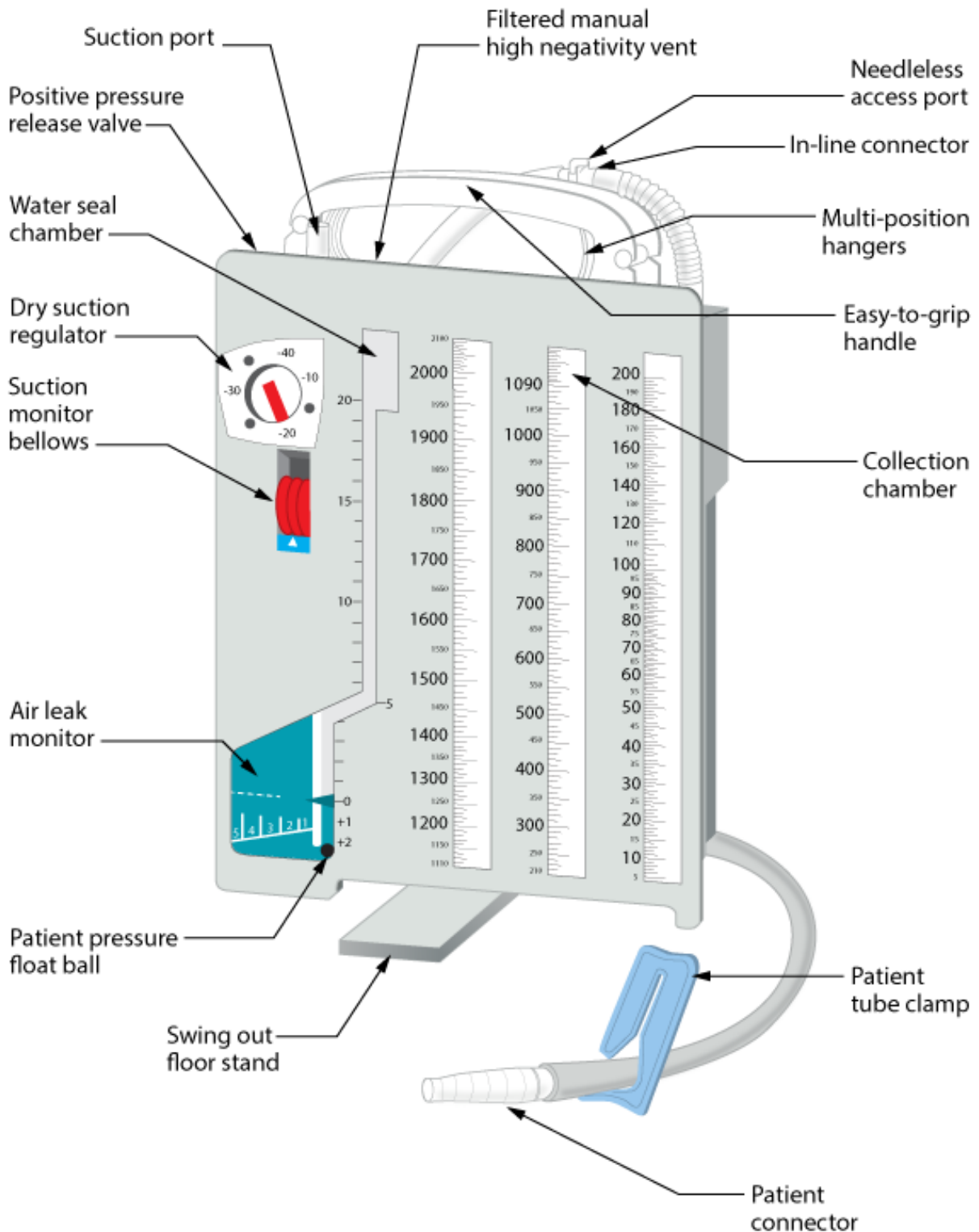
In addition, chest tubes are also used to allow the lung to re-expand or to enable appropriate compression of the heart after surgery. By relieving pressure and promoting proper function of these vital organs, chest tubes can help patients recover and return to optimal health.

Nursing Considerations

- Ensure that the drainage system is kept below the insertion site, and tubing is free of kinks.
- Avoid clamping or milking the chest tube to prevent harm to the patient.
- Monitor lung sounds, respiratory rate, and dyspnea, and assess for subcutaneous emphysema by palpating the skin for a crackling sound.
- Encourage patients to move, cough, and breathe deeply to facilitate fluid movement.
- Cover the insertion site on three sides and notify the healthcare provider immediately if the chest tube becomes dislodged.
- Insert the tubing in 1 inch of sterile water if the chest tube system breaks to prevent air from entering the chest cavity.

1. SUCTION CONTROL CHAMBER

The Suction Control Chamber helps control the amount of suction applied to a patient during medical procedures. High water level means high suction, low water level means low suction. If the chamber is bubbling continuously, suction is working correctly. Remember to regularly check the water level and refill if it is too low (about 20cm for adults). Keeping an eye on the suction control chamber helps ensure safe and effective suction treatment for patients.



Dislodged? Cover insertion site on 3 sides. Notify healthcare provider.

System Break? Insert tubing in 1in sterile water.

2. WATER SEAL CHAMBER

The Water Seal Chamber is connected to the collection chamber and allows air to be removed from the chest tube while preventing outside air from entering the lungs. Air passes down through a narrow channel and bubbles out through the bottom of the water seal. As the patient breathes in and out, the water seal chamber will intermittently fluctuate, with an increase during inspiration and a decrease during expiration. Tidaling with breathing is considered normal and indicates that the patient is breathing properly.

However, continuous bubbling is not normal and indicates an air leak somewhere in the system, which requires prompt attention. If there is no fluctuation in the water level, it may indicate that the lung has re-expanded, or that there is a kink in the system. The water seal chamber is a great indicator of how the patient is progressing, as it acts as a measuring tool for intrathoracic pressure. When intrathoracic pressure changes, fluctuations in the water level are observed. By monitoring the water seal chamber, healthcare providers can assess the progress of the patient's recovery and take appropriate action as needed.

3. COLLECTION CHAMBER

The Collection Chamber is where fluids that flow out of the patient are collected. Normal fluid output should be no more than 100mL (cc) per hour. It is important to note the color of the fluid and report any excessively cloudy or unexpected bloody fluid to the healthcare provider, as it may indicate a complication or infection. By regularly monitoring the fluid output and appearance in the collection chamber, healthcare providers can ensure the safety and well-being of the patient.

Deep Vein Thrombosis

Deep Vein Thrombosis (DVT) is a serious condition where a blood clot forms in a deep vein, typically in the lower extremities. It can lead to complications such as pulmonary embolism if not managed effectively. Understanding the causes, symptoms, diagnosis, and treatment of DVT is essential to provide timely and appropriate care.

Recognize Cues:

- Causes (Virchow's Triad): Venous stasis, hypercoagulability, and endothelial damage
- Symptoms: Edema in the lower extremity, tenderness or cramping in one leg, warmth to touch, erythematous, and bumpy or knotty feeling

Analyze Cues:

Diagnostics: Ultrasound and D-Dimer test to detect blood clotting issues

Prioritize hypotheses:

- Primary concern: Prevent clot from growing or dislodging, leading to pulmonary embolism

Generate Solutions:

- **Preventive measures:** Regular movement, bed rest with leg flexion and elevation, sequential compression devices, compression socks, hydration, exercise, smoking cessation, and anticoagulant medications
- **Active DVT management:** Bed rest, monitoring swelling, anticoagulants to prevent clot growth and new clot formation, avoiding leg massages, compression socks, and monitoring PTT/INR for heparin and warfarin therapy. In severe cases, administering tPA (clot buster) with caution due to the high risk of bleeding.

Take action:

- Implement preventive measures and treatment strategies as appropriate for each patient
- Monitor patient progress and adjust treatment as necessary

Evaluate outcomes:

- Assess the effectiveness of preventive and treatment strategies in managing DVT
- Monitor for any complications or side effects of treatments

Acute Liver Failure

Acute liver failure is a rapid loss of liver function, typically occurring in patients with no history of liver disease or liver failure. It is a serious condition that can have life-threatening complications if not treated promptly and effectively.

Recognize Cues:

- **Causes:** Hepatitis A, B, E, acetaminophen overdose, toxins, cancer, heart stroke, sepsis or septic shock
- **Liver functions:** Bile production, drug metabolism, toxin filtration, bilirubin excretion, clotting factor production, ammonia breakdown, and glucose storage
- **Signs and symptoms:** Jaundice, upper right quadrant pain, ascites, nausea, vomiting, fatigue, confusion, tremors, and musty, sweet breath

Analyze Cues:

- **Complications:** Excessive bleeding, increased risk of infection, kidney failure, and neurologic symptoms

Prioritize hypotheses:

- Determine the cause of acute liver failure for appropriate treatment

Generate Solutions:

- Treatment options depend on the cause, including acetylcysteine, diuretics, infection screening, liver transplant, and medications to reduce bleeding risk

Take action:

- Implement appropriate treatment based on the cause of acute liver failure
- Monitor patients for response to treatment and potential complications

Evaluate outcomes:

- Assess the effectiveness of treatment in managing acute liver failure and preventing complications
- Monitor for any complications or side effects of treatments

Liver Cirrhosis

Liver cirrhosis is the late stage of liver scarring (fibrosis) that results in malfunctioning and potentially life-threatening consequences. As the liver becomes increasingly damaged and forms scar tissue, it loses its normal function, which can lead to a variety of symptoms and complications.

Recognize Cues:

- Causes: Chronic alcohol use, hepatitis B, C, D, non-alcoholic fatty liver disease, cystic fibrosis, biliary cirrhosis, and severe right-sided heart failure
- Symptoms: Jaundice, anemia, itchy skin, ascites, swelling, gastrointestinal upset, weight loss, clay-colored stool, and late-stage neurological changes

Analyze Cues: Understand the impact of liver cirrhosis on liver function and potential complications

Prioritize hypotheses: Identify the cause of liver cirrhosis to determine the appropriate treatment plan

Generate Solutions:

Treatment options: Cut out alcohol, maintain a healthy weight, medications to control hepatitis or other causes, antibiotics for infections, and liver transplant in severe cases

Take action:

- Implement appropriate treatment based on the cause of liver cirrhosis
- Monitor patients for response to treatment and potential complications

Evaluate outcomes:

- Assess the effectiveness of treatment in managing liver cirrhosis and preventing complications
- Monitor for any complications or side effects of treatments
- Diagnosis in late stage: Lab tests (LFTs, kidney creatinine, bilirubin, INR), imaging (MRE, MRI, CT), and biopsy to assess the extent of damage

Kidney Stones (Renal Calculi)

Renal calculi, or kidney stones, are hard deposits made of minerals and salts that form inside the kidneys and can affect any part of the urinary tract. These stones can cause severe pain and discomfort and require appropriate treatment depending on their size.

Recognize Cues:

- Causes: dehydration; family history of kidney stones; a diet high in protein, sugar, or sodium or a diet low in calcium; obesity; certain medical conditions such as gout, hyperparathyroidism, and chronic urinary tract infections; and certain medications such as diuretics, calcium based antacids, and some antibiotics
- Diagnosis: Urine tests and imaging (ultrasound and CT)

Analyze Cues:

- Understand the impact of renal calculi on the urinary tract and potential complications
- Prioritize hypotheses:
- Identify the underlying cause and risk factors of renal calculi to determine appropriate treatment plans

Generate Solutions:

- Treatment based on stone size
- Small stones: Increased water intake, pain management, and alpha-blockers (e.g., Flomax)
- Large stones: Same treatment as small stones, plus lithotripsy or surgery to remove the stone

Take action:

- Implement appropriate treatments based on the size of the renal calculi
- Monitor patients for response to treatment and potential complications

Evaluate outcomes:

- Assess the effectiveness of treatment in managing renal calculi
- Monitor for complications, side effects, and recovery progress
- Encourage lifestyle changes to reduce the risk of developing renal calculi in the future

Benign Prostatic Hyperplasia

Benign prostatic hyperplasia (BPH), also known as enlargement of the prostate, is a condition that occurs in men as they age. The cause is unclear, but certain risk factors contribute to its development. BPH can cause urinary symptoms and complications, requiring appropriate treatment to manage the condition.

Recognize Cues: Diagnosis: PSA test, digital rectal exam, and urine tests

Analyze Cues: Understand the impact of BPH on the urinary system and potential complications

Prioritize hypotheses: Identify the underlying risk factors and symptoms of BPH to determine appropriate treatment plans

Generate Solutions:

- Treatment options for BPH:
- Medications: Alpha-blockers (e.g., Tamsulosin, Doxazosin) and 5-alpha reductase inhibitors (e.g., Finasteride, Dutasteride)
- Bladder training
- Bladder scan and catheterization
- Surgical intervention (e.g., TURP)

Take action:

- Implement appropriate treatments based on the severity of BPH and patient preferences
- Monitor patients for response to treatment and potential complications

Evaluate outcomes:

- Assess the effectiveness of treatment in managing BPH symptoms and complications
- Monitor for side effects and recovery progress
- Encourage lifestyle changes to reduce the risk of BPH progression and complications

Osteoarthritis

Osteoarthritis is a degenerative joint disease characterized by the deterioration of articular cartilage in weight-bearing joints. This condition primarily affects older individuals and is associated with various risk factors. Osteoarthritis presents with specific symptoms and requires proper management to alleviate pain and improve joint function.

Recognize Cues:

1. RISK FACTORS:

- Age: Osteoarthritis becomes more common as people age.
- Gender: Women are more likely to develop osteoarthritis than men.
- Obesity: Being overweight or obese can put extra stress on the joints, increasing the risk of osteoarthritis.
- Joint injuries: Injuries to the joint, such as fractures or ligament tears, can increase the risk of developing osteoarthritis.
- Genetics: Some people may be more susceptible to developing osteoarthritis due to genetic factors.

2. SYMPTOMS:

- Pain: Osteoarthritis can cause pain in the affected joint, which may be worse after periods of inactivity or overuse.
- Stiffness: Affected joints may feel stiff, especially in the morning or after sitting for a long time.
- Swelling: The affected joint may be swollen or tender to the touch.
- Limited range of motion: Osteoarthritis can limit the range of motion in the affected joint, making it difficult to move normally.
- Crunching or popping sounds: The affected joint may make crunching or popping sounds when moved.
- Bone spurs: Osteoarthritis can cause the growth of bone spurs, which can be felt as hard lumps around the affected joint.

3. DIAGNOSIS

- Patient history, physical examination, and X-rays

Analyze Cues:

Understand the impact of osteoarthritis on joint function and quality of life

Prioritize hypotheses:

Identify the risk factors and symptoms associated with osteoarthritis to guide appropriate management strategies

Generate Solutions:

- Management options for osteoarthritis:
- Realignment
- Weight loss
- Topical creams

Take action:

- Implement appropriate treatments based on the severity of osteoarthritis and patient preferences
- Monitor patients for response to treatment and potential complications

Evaluate outcomes:

- Assess the effectiveness of treatment in managing osteoarthritis symptoms and improving joint function
- Encourage lifestyle changes to reduce the risk of osteoarthritis progression and complications

Rheumatoid Arthritis

Rheumatoid Arthritis (RA) is an autoimmune disorder characterized by the immune system attacking synovial tissue in the joints, causing inflammation and pain. The condition typically affects small joints in a symmetrical pattern and may also present with systemic symptoms. RA affects women more often than men and can occur at any age, usually between 20 and 60. RA can affect any joint in the body, but it most commonly affects the hands, feet, and knees. In addition to joint symptoms, RA can also cause inflammation in other parts of the body, such as the eyes, lungs, and heart. Management of RA focuses on alleviating symptoms and slowing disease progression.

Recognize Cues:

1. CAUSES:

- Genetics: Certain genes may make you more susceptible to developing RA.
- Environmental factors: Exposure to certain environmental factors, such as smoking or infection, may increase the risk of developing RA.
- Hormonal factors: Women are more likely than men to develop RA, which may be related to hormonal factors.

2. SYMPTOMS:

- Joint pain: RA typically causes pain in the joints, which may be worse in the morning or after periods of inactivity.
- Joint stiffness: RA can cause stiffness in the joints, which may make it difficult to move normally.
- Joint swelling: The affected joints may be swollen or tender to the touch.
- Fatigue: Many people with RA experience fatigue or a general feeling of being unwell.
- Loss of appetite: RA can cause a loss of appetite and weight loss.
- Rheumatoid nodules: Some people with RA may develop small, firm bumps under the skin, known as rheumatoid nodules.

Analyze Cues:

- Understand the impact of RA on joint function and quality of life
- Recognize the importance of early diagnosis and treatment

Prioritize hypotheses:

- Identify the symptoms and diagnostic tests for RA to guide appropriate management strategies
- Diagnostic tests may include blood tests, imaging tests, joint fluid analysis, physical exam, and clinical criteria.

Generate Solutions:**Management options for RA:**

- Synovectomy
- Arthrodesis (joint fusion)
- Steroids
- Exercise
- NSAIDs
- Tylenol
- Resting joints

Take action:

- Implement appropriate treatments based on the severity of RA and patient preferences
- Monitor patients for response to treatment and potential complications

Evaluate outcomes:

- Assess the effectiveness of treatment in managing RA symptoms and slowing disease progression
- Encourage lifestyle changes to support overall health and reduce the risk of RA-related complications

Muscular Dystrophy

Muscular dystrophy is a group of inherited diseases that result in progressive muscle weakness and damage due to genetic mutations, particularly in the dystrophin gene. The most common forms of muscular dystrophy are Duchenne muscular dystrophy (DMD) and Becker muscular dystrophy (BMD), both of which primarily affect males.

Recognize Cues:

Symptoms may include:

- Muscle weakness which may start in the legs or hips and eventually affect the arms, neck, and other parts of the body.
- Difficulty walking as the leg muscles weaken, and the patient may experience frequent falls.
- Abnormal gait, an abnormal walking pattern, such as waddling or walking on tiptoes.
- As MD progresses, you may have difficulty with fine motor skills, such as writing, grasping objects, or buttoning clothes.
- Muscle wasting, the muscles in the affected areas may begin to shrink or waste away.
- Respiratory problems, certain types of MD can affect the muscles used for breathing, leading to respiratory problems.
- Scoliosis, abnormal curvature of the spine.
- Intellectual disability

Analyze Cues:

- Understand the genetic basis of muscular dystrophy and the differences between Duchenne and Becker types
- Recognize the impact of muscular dystrophy on daily functioning and quality of life

Prioritize hypotheses:

- Identify symptoms and diagnostic tests for Duchenne and Becker muscular dystrophy
- Understand the importance of supportive care in the management of muscular dystrophy

Generate Solutions:

Management options for Duchenne and Becker muscular dystrophy:

- Glucocorticoids
- Physical therapy
- Supportive care

Take action:

- Implement appropriate treatments based on the type and severity of muscular dystrophy
- Monitor patients for disease progression, response to treatment, and potential complications

Evaluate outcomes:

- Assess the effectiveness of treatment in managing symptoms and improving the quality of life for individuals with muscular dystrophy
- Encourage patients and families to seek support and resources to help cope with the challenges of living with muscular dystrophy

Sepsis and Septic Shock

Sepsis is a systemic inflammatory response syndrome (SIRS) caused by the presence of an infection in the bloodstream, such as bacteria, viruses, or fungi. The immune system identifies the infection and releases inflammatory mediators, such as white blood cells (WBCs), cytokines, interleukins, and tumor necrosis factor. This immune response can lead to extreme vasodilation, capillary leak, and clotting, resulting in hypotension, hypovolemia, hypoperfusion, and organ dysfunction. If left untreated or if sepsis progresses rapidly, it may lead to septic shock.

Recognize Cues:

- Identify signs of infection and SIRS, such as fever, tachycardia, tachypnea, and altered WBC count
- Monitor for signs of organ dysfunction, hypotension, and hypoperfusion

Analyze Cues:

- Determine if the patient meets the criteria for sepsis or septic shock
- Consider risk factors for sepsis, such as age, immune system suppression, chronic illness, or recent surgical procedures

Prioritize Hypotheses:

- Assess the severity of the patient's condition and the potential for progression to septic shock
- Identify possible underlying causes of sepsis and target appropriate interventions

Generate Solutions:

- Develop a treatment plan that addresses fluid therapy, inflammation management, oxygen therapy, and infection control
- Coordinate with the healthcare team to ensure prompt and effective care

Take Action:

- Administer fluid therapy, vasopressors, steroids, or other medications as appropriate
- Provide oxygen therapy and monitor for signs of organ dysfunction or complications, such as acute respiratory distress syndrome (ARDS)
- Obtain cultures and initiate antibiotic therapy within the first hour of recognition

Evaluate Outcomes:

- Assess the patient's response to treatment and adjust the plan as needed
- Monitor for signs of improvement or deterioration in the patient's condition
- Communicate findings and collaborate with the healthcare team to optimize patient care



4

CHAPTER 4

Maternal and Newborn Nursing



Common Maternal Terminology

- **Abortion:** Spontaneous or intentional termination of pregnancy
- **Accelerations:** A temporary increase of the fetal heart rate above baseline
- **Acme:** Peak of uterine contraction
- **Acrocyanosis:** Bluish discoloration of the extremities due to reduced peripheral circulation
- **Amenorrhea:** Absence of menstrual period
- **Amniocentesis:** Procedure that removes amniotic fluid from the amniotic sac for testing (chromosome abnormalities, neural tube defects, genetic disorders, etc.) or treatment
- **Amnioinfusion:** Infusion of saline into the amniotic cavity to relieve umbilical cord compression
- **Amnion:** Inner membrane (fluid-filled sac) surrounding the fetus
- **AROM:** Artificial rupture of membranes (intentional rupture of the amniotic sac)
- **Atony:** Lack of muscle strength or tone
- **Attitude:** Head posture of the fetus
- **Bloody show:** Presence of tinged pink/brown mucous that indicates labor is approaching
- **Breech:** Bottom fetal presentation
- **Cephalic:** Head-first position of the baby for birth (crown of the head)
- **Cephalopelvic disproportion:** The fetus is too large and cannot pass through the maternal pelvis
- **Cervical dilation:** Opening of the cervix from 0–10cm
- **Chorioamnionitis:** Inflammation of the chorion and amnion due to bacterial infection
- **Chorion:** Outer membrane surrounding the fetus
- **Colostrum:** First form of milk produced by the breasts immediately following delivery
- **c/s:** Cesarean section
- **Crowning:** Baby's head becomes visible in the birth canal
- **cx:** Contractions
- **Decelerations:** Periodic decrease in fetal heart rate (early, late, or variable)
- **Decrement:** Decreasing of contraction

- **Diastasis recti:** Partial or complete separation of the abdominal muscles
- **D&C:** Dilation and curettage (dilation of the cervix and removal of part of the lining of the uterus by scraping or scooping the tissue)
- **d/c:** Discontinue
- **Dystocia:** Difficult labor due to abnormal fetal size or position
- **Eclampsia:** Complication of preeclampsia; pregnancy induced hypertension resulting in seizures
- **EDD:** Estimated date of delivery
- **Effacement:** Thinning of the cervix from 0–100%
- **Effleurage:** Soothing, stroking, circular movement along the abdomen with the fingertips
- **Engagement:** The longest diameter of the fetal presenting part passing through the pelvic inlet
- **Fetal bradycardia:** When the fetal heart rate drops below 110bpm for 10 minutes or longer
- **Fetal tachycardia:** When the fetal heart rate rises above 160bpm for 10 minutes or longer
- **Fontanelle:** Anatomical landmark on the infant skull comprised of soft membranous gaps between the cranial bones (anterior and posterior fontanelles)
- **FHR:** Fetal heart rate
- **Fundus:** Top of the uterus
- **GBS:** Group B Streptococcus
- **GDM:** Gestational diabetes mellitus
- **GTPAL:** Gravidity, term births, preterm births, abortion, living children
- **Gravidity:** Number of times a woman has been pregnant
- **HCG:** A hormone produced by the placenta in pregnant women.
- **Increment:** Increasing contraction intensity
- **Involution:** Shrinking of the uterus to its original size
- **Ischial spine:** The point of reference to tell when the baby is engaged with the mother's pelvis
- **IUGR:** Intrauterine growth restriction
- **Lamaze breathing:** A form of deep breathing during contractions as a form of pain management. Goal: mother responds to contractions with relaxation rather than tension

- **Lanugo:** Thin, soft hair that sometimes covers the body of newborns
- **Leopold's Maneuver:** Abdominal palpation used to determine fetal position within the uterus
- **LGA:** Large for gestational age
- **Lie:** Position of the baby's spine in relation to the mother's spine
- **LMP:** Last menstrual period
- **LOA:** Left occiput anterior (optimal)
- **LOP:** Left occiput posterior
- **Lochia:** Vaginal discharge (mixture of blood, mucous and uterine tissue) after giving birth
- **Macrosomia:** Newborn that is large for gestational age (>8lb 13oz)
- **Mastitis:** Inflammation of breast tissue
- **Meconium:** Infant's first bowel movement
- **Multi:** Multiple
- **Naegle's Rule:** Calculation used for estimating the expected due date based on a woman's last menstrual period
- **Nitrazine test:** pH strip testing used to determine the presence of amniotic fluid in vaginal secretions (will turn blue if >6.0 pH, indicating ruptured membranes)
- **Nuchal cord:** Umbilical cord is wrapped around the baby's neck
- **Nulli:** None
- **Occiput:** Back of the fetal head
- **Oligohydramnios:** A lack of amniotic fluid
- **Oxytocin:** Hormone that can cause or strengthen labor contractions
- **Passageway:** Shape of the mother's pelvis
- **Passenger:** The fetus
- **Parity:** Number of times mom has given birth to a baby
- **Pitocin:** Synthetic form of oxytocin
- **Placenta:** Organ that provides oxygen and nutrients to the baby and removes waste products from the baby's blood

- **Placental abruption:** Premature detachment (partial or total) of the placenta before childbirth
- **Placental previa:** Attachment of the placenta is partially or fully covering the cervical opening
- **Polyhydramnios:** An excess of amniotic fluid
- **Power:** Strength of contractions
- **PPH:** Postpartum hemorrhage (severe bleeding or blood loss after giving birth; vaginal: >500mL; c-section: >1000mL)
- **Preeclampsia:** Gestational hypertension with the presence of proteinuria
- **Primi:** First
- **PROM:** Premature rupture of membranes (before labor begins)
- **PPROM:** Preterm premature rupture of membranes (before 37 weeks)
- **Quickening:** When the mother starts to feel or perceive fetal movements
- **ROA:** Right occiput anterior (optimal)
- **ROP:** Right occiput posterior
- **SGA:** Small for gestational age
- **Shoulder dystocia:** The fetal head is born but the shoulder gets stuck above the symphysis pubis
- **SROM:** Spontaneous rupture of membranes (during labor)
- **Station:** A measurement of where the fetal presenting part is located in relation to the ischial spine
- **Teratogen:** An agent that causes malformation (physical or functional defects) of the embryo or fetus. (eg. medications, radiation, illicit drugs, maternal infections)
- **Tocolytics:** Medications that inhibit uterine contractions
- **Uteroplacental insufficiency:** Placenta is not delivering enough oxygen to the fetus
- **Variability:** Fetal heart rate varies in duration, intensity, and timing
- **VBAC:** Vaginal birth after having a cesarean birth
- **Vertex:** Head-first position of the baby for birth (crown of the head)

Pregnancy

Presumptive Signs (Subjective – could be attributed to another diagnosis):

- Absent period (Amenorrhea)
- Fatigue, nausea, vomiting
- Enlarged breasts
- Urinary frequency
- “Fluttering” movement (quickening), typically felt at 16–20 weeks

Probable Signs (More indicative of pregnancy – highly likely to be pregnant):

- Positive pregnancy test
- Braxton Hicks contractions: also known as “practice contractions” or “false labor.” These contractions are irregular and can occur at any time during pregnancy, but they are most common in the third trimester.
- Goodell’s sign: softening of the cervix around 8 weeks
- Chadwick’s sign: bluish discoloration of cervix, vagina, or vulva around 6–8 weeks
- Hegar’s sign: softening of the lower uterine segment between 6–12 weeks
- Enlarged uterus or abdomen
- Outline of fetal body felt by the doctor (Note: May not always be the fetus felt)

Positive Signs (Definitive – unmistakable signs of pregnancy):

- Fetal heart rate heard by Doppler
- Fetal movement felt by the healthcare provider
- Fetal visualization via ultrasound
- Delivery of the baby

Naegle's Rule

Naegle's Rule is a calculation used to estimate a woman's expected due date (EDD) based on her last menstrual period (LMP). Here are some key points to consider:

The formula doesn't account for leap years. On average, pregnancy lasts 280 days, equivalent to 9 calendar months. In nursing, the focus is more on weeks rather than months.

A full-term pregnancy is considered to be 40 weeks. Naegle's Rule is based on lunar months, which are 28 days each. This results in a total of 10 lunar months for a 40-week pregnancy. It's important to note that menstrual cycles are also typically measured in 28-day increments.

1st day of LMP → Subtract 3 months → Add 7 days → Add a year if needed

Step 1: Start with the LMP date.

LMP: December 1, 2022

Step 2: Subtract 3 months.

December 1, 2022 → September 1, 2022

Step 3: Add 7 days.

September 1, 2022 → September 8, 2022

Step 4: Add a year if needed.

In this case, the resulting date (September 8, 2022) is still in the past compared to the LMP date (December 1, 2022). Therefore, we need to add a year.

September 8, 2022 → September 8, 2023

So, the estimated due date for an LMP of December 1, 2022, is September 8, 2023. Remember that Naegle's Rule provides an estimate, and the actual due date might differ. It is always a good idea to consult with a healthcare professional for a more accurate assessment.

Gravidity, Parity, and GTPAL

The Recording GP System is a shorthand method used to document a woman's obstetrical history in terms of Gravidity (G) and Parity (P). It represents the number of times a woman has been pregnant and the number of times she has given birth to a baby at or beyond 20 weeks gestation. In this system:

- G stands for Gravidity, indicating the number of pregnancies.
- P stands for Parity, indicating the number of births at or beyond 20 weeks gestation.

Gravidity

The number of times a woman has been pregnant.

- The outcome is irrelevant (only counting pregnancies, not the status of the baby).
- Includes the current pregnancy.
- Counts pregnancies, not the number of babies.

Parity

The number of times a woman has given birth to a baby at or beyond 20 weeks gestation.

- Includes all babies at or beyond 20 weeks, whether living or stillborn.
- Counts pregnancies, not the number of babies.

Examples:

- G2P1: This indicates a woman who has been pregnant twice (Gravidity 2) and has given birth once to a baby at or beyond 20 weeks gestation (Parity 1).
- G1P0: This indicates a woman who has been pregnant once (Gravidity 1) but has not given birth to a baby at or beyond 20 weeks gestation (Parity 0).

Recording 5-Digit System (GTPAL):

- G: Gravidity – same as above
- T: Term births (≥ 37 weeks)
- P: Preterm births (20–37 weeks)
- A: Abortion or miscarriage (< 20 weeks)
- L: Living children (all children counted individually)

Note: For T, P, and A, multiple births (twins, triplets, etc.) count as one birth.

1. NULLI (NULLI-)

Refers to “none” or zero. It is used to describe a woman who has never experienced pregnancy or childbirth. For example, a woman who has never been pregnant is called a nulligravida, while a woman who has never given birth to a baby at or beyond 20 weeks gestation is called nullipara.

2. PRIMI (PRIMI-)

Refers to “first” or one. It is used to describe a woman who is experiencing her first pregnancy or has given birth for the first time. For example, a woman who is pregnant for the first time is called a primigravida, while a woman who has given birth to a baby at or beyond 20 weeks gestation for the first time is called primipara.

3. MULTI (MULTI-)

Refers to “multiple” or more than one. It is used to describe a woman who has experienced multiple pregnancies or childbirths. For example, a woman who has been pregnant more than once is called a multigravida, while a woman who has given birth to babies at or beyond 20 weeks gestation more than once is called multipara.

Maternal Changes and Hormones

Weight Gain:

- Typically, 2-4 lbs during the first three months
- Remember: 2-3-4
- 1 lb per week during the rest of pregnancy

HCG:

- Stimulates estrogen and progesterone production via corpus luteum to maintain pregnancy before the placenta is formed
- Also used in pregnancy tests

Progesterone:

- Maintains endometrium
- Inhibits contractions
- Aids in duct development for lactation
- Decreases smooth muscle tone, leading to constipation, heartburn, and varicose veins

Estrogen:

- Suppresses FSH and LH, which stimulate ovulation
- Aids in the growth of fetal organs
- Supports maternal tissue growth (uterus, breasts, genitals)

Anterior Pituitary:

- Stimulates the thyroid gland
- Increases mother's metabolic rate, appetite, and metabolism

Circulatory:

- Increases blood volume by 1-2 liters for the baby
- Decreases blood pressure and increases heart rate

- The growing uterus and baby compress pelvic blood vessels, leading to varicose veins

Respiratory:

- Lungs work twice as hard to oxygenate the extra blood
- The uterus pushes up on the diaphragm, causing shortness of breath in later trimesters
- The uterus also pushes on the stomach, leading to gastric reflux or ulcers

Skin:

- Striae (stretch marks)
- Linea nigra (brown pigmentation line along the stomach)

Oxytocin:

- Causes contractions but is inhibited by progesterone during pregnancy
- Aids in milk ejection during breastfeeding

Maternal Nutritional Needs

Weight Gain:

- In general, expectant mothers should gain 2–3 lbs. in the first three months
- Remember the pattern: 2–3–4
- Aim for 1 lb per week during the rest of the pregnancy
- Total weight gain for a normal-weight mom (BMI: 18.5 – 24.9) should be 25–35 lbs.

Calories:

- Pregnant women may need an additional 300–500 calories per day to provide extra energy for the baby; this may vary depending on the mother's BMI
- Do not restrict calories, as the baby is growing
- Do not restrict sodium, as it helps maintain fluids
- Good calorie sources include complex carbs, such as cereals, grains, rice, potatoes, and vegetables, which are digested slowly to regulate insulin and glucose levels

Folic Acid:

- Found in prenatal vitamins or fortified foods, fruits, and vegetables
- Highly recommended when trying to conceive; should be taken 2–3 months before conception and during the first 12 weeks of pregnancy
- Used to prevent neural tube defects and produce red blood cells

Caffeine:

- Limit intake to less than 200mg per day
- Excessive caffeine consumption can increase the risk of low birth weight, preterm delivery, miscarriage, and developmental delays

Pica:

- Cravings for strange foods like starch or clay dirt can increase the risk of preterm delivery

Protein:

- Pregnant women need at least 60g of protein per day to provide nutrients for baby

growth and tissue development

- Protein also supports the growth of the placenta, uterus, breasts, and increased blood supply
- Good sources include meat, milk, poultry, and fish
- Avoid fish with high mercury levels, such as shark, swordfish, and king mackerel
- Note that inadequate protein intake can lead to inadequate vitamin B12 levels

Vitamins:

- Iron is used to make extra blood for both the mother and baby; aim for 11g at the beginning and end of pregnancy, and 10.5g during the middle of pregnancy
- Calcium is needed for bone and teeth formation; the goal is 1000mg per day
- Vitamin A intake is usually adequate, so additional supplementation is not needed; excessive intake can cause birth defects, while insufficient intake can result in poor night vision
- Vitamin D is necessary for calcium absorption; insufficient levels can lead to diminished fetal and maternal bone density

Additional Considerations

- **Hydration:** Adequate fluid intake is essential during pregnancy to maintain healthy amniotic fluid levels, support the increased blood volume, and prevent constipation or urinary tract infections. Pregnant women should aim to drink at least 8–10 cups of water per day.
- **Omega-3 fatty acids:** These essential fats play a crucial role in the baby's brain and eye development. Good sources of omega-3 fatty acids include fatty fish (such as salmon), walnuts, chia seeds, and flaxseeds. Pregnant women can also take a fish oil supplement that is low in mercury and approved for pregnancy.
- **Fiber:** Consuming sufficient fiber can help prevent constipation, a common issue during pregnancy. Aim for 25–30 grams of fiber per day from whole grains, fruits, vegetables, and legumes.
- **Vitamin B6 (pyridoxine):** This vitamin is important for the baby's brain development and can help alleviate morning sickness in some pregnant women. Foods rich in vitamin B6 include poultry, fish, bananas, and potatoes.

- **Iodine:** This mineral is essential for the baby's thyroid function and brain development. Pregnant women should consume around 220 micrograms of iodine per day. Good sources include iodized salt, dairy products, fish, and iodine-containing prenatal vitamins.

Avoid harmful substances

Pregnant women should avoid consuming alcohol, as it can lead to fetal alcohol spectrum disorders. They should also avoid raw or undercooked meat, poultry, and fish, as well as unpasteurized dairy products and soft cheeses, which can carry harmful bacteria and increase the risk of foodborne illnesses.

Cultural Considerations

There are racial and cultural considerations for maternal nutrition that should be taken into account. Dietary practices and food choices vary across cultures, and healthcare providers should be sensitive to these differences when providing nutritional guidance. It's important to respect and accommodate cultural preferences, while ensuring that the dietary recommendations meet the nutritional needs of the pregnant woman and her baby.

For example, some cultural diets may be predominantly vegetarian or vegan, which may require additional attention to ensure adequate protein, iron, calcium, and vitamin B12 intake. In other cases, cultural diets may be high in sodium, which could contribute to high blood pressure or other health issues during pregnancy.

Healthcare providers should be aware of potential nutritional deficiencies or imbalances in various cultural diets and work with pregnant women to make appropriate adjustments while respecting their cultural preferences.

Lastly, it is important for pregnant women to consult their healthcare providers for personalized nutritional advice and to monitor their weight gain and overall health during pregnancy. Prenatal care and regular check-ups are essential for ensuring a healthy pregnancy and detecting any potential complications early.

Gestational Diabetes Mellitus

Gestational diabetes is a type of diabetes that develops during pregnancy as a result of insulin resistance. This insulin resistance is caused by a hormone produced by the placenta that prevents the body from effectively using insulin. It's typically diagnosed in the second or third trimester and is not permanent; blood sugar levels typically return to normal after delivery. However, there is an increased risk of the mother developing Type 2 diabetes later in life.

Pathophysiology

Under normal conditions, the pancreas secretes insulin, which helps cells absorb glucose from the bloodstream. During pregnancy, the body becomes more resistant to insulin, making more glucose available for the developing baby. This usually isn't a problem, as the body compensates for the extra glucose. However, in some cases, the pancreas can't keep up with the increased demand and is unable to produce enough insulin.

Risk factors:

- Maternal age over 25
- Overweight (BMI > 25) or obese (BMI > 30)
- History of macrosomia (large babies)
- Multiple pregnancies (twins, etc.)
- Personal or family history of diabetes

Symptoms of GDM:

- Excessive hunger (polyphagia)
- Excessive urination (polyuria)
- Intense thirst (polydipsia)
- Glucose in urine
- Dry mouth and fatigue
- Frequent urinary tract or yeast infections

Nursing care:

- Screen for gestational diabetes at 24–28 weeks of pregnancy with a 1-hour oral glucose test
- Encourage a healthy diet and exercise
- Assess urine for glucose during prenatal visits to evaluate for GDM
- If diagnosed with GDM, mother may need to perform daily glucose checks
- Monitor glucose levels during and after labor, which may require IV insulin or glucose administration
- Monitor for hypoglycemia in the mother (cold, clammy, sweaty, preeclampsia) and baby (respiratory problems, poor feeding, jitteriness, seizures)
- Conduct a glucose test 6–12 hours after delivery or per hospital policy
- Educate the mother about regular diabetes testing due to the risk of developing type 2 diabetes (every 1–3 years)

Rh Incompatibility

Pathophysiology

Blood cells have an Rh factor, which can be positive or negative. The presence of the Rh factor protein on the cell indicates a positive Rh factor, while its absence indicates a negative Rh factor. The main issue in pregnancy arises when mothers are Rh negative.

In the first pregnancy, if the mother is Rh negative, the father is Rh positive, and the baby is Rh positive, the mother's red blood cells might not match the baby's during birth. During birth, the mother and baby's blood can mix, causing the mother's body to recognize the Rh protein as foreign and produce antibodies against it. This process is called sensitization.

Rh antibodies are harmless during the first pregnancy but can cause problems in subsequent pregnancies. If the mother is carrying another Rh positive child in a later pregnancy, her antibodies will recognize the foreign cells and attack them. The antibodies can pass into the baby's bloodstream, causing hemolysis, which leads to a decrease in red blood cells, reduced oxygen levels, severe anemia, enlarged spleen and liver, heart failure, and jaundice. Jaundice may also cause neurological issues.

Nursing Considerations

The goal is to prevent the mother from becoming sensitized. Assess the blood type of the mother at her first prenatal visit. If the mother is Rh positive, no immunization is needed. If the mother is Rh negative, a RhoGAM shot should be given at 28 weeks to stop the immune system from creating antibodies and another one within 72 hours after delivery if the baby turns out to be Rh positive.

A Coombs test can be done to check the blood of the newborn baby for antibodies. If the test is positive, the baby might develop severe jaundice and hemolytic anemia. Treatment for babies may include phototherapy, IV fluid hydration, or a more invasive treatment called exchange transfusion.

Fetal Developmental Stages

Pre-embryonic stage/Germinal (0-2 weeks):

- **Day 1:** Conception occurs when sperm and ovum unite, forming a zygote.
- **Days 2-3:** The zygote travels down the fallopian tube, dividing multiple times to form a morula.
- **Days 4-8:** Cells differentiate, forming a blastocyst consisting of inner cells (embryo) and outer cells (trophoblasts, which later form the placenta).

Embryonic stage (3-8 weeks):

This stage begins when the mass of cells becomes more distinctly human. The chorion and amnion form during implantation in the uterus (days 8-14). The chorion is the outer layer of the membrane, while the amnion is the inner layer that fills with fluid, expanding into the amniotic sac.

- **Weeks 2-3:** The ectoderm, mesoderm, and endoderm layers form. Trophoblasts penetrate the uterine lining (decidua), causing maternal vessels to dilate and form around the villi, creating a strong placenta.

Fetal stage (9 weeks - birth):

During this stage, organs continue to develop and prepare for life outside the womb.

Key weeks in fetal development:

- **Week 4:** The heart begins to beat.
- **Week 8:** All other organs have partially formed, and heart tones can be heard on Doppler.
- **Weeks 8-12:** Organs and tissues enter the maturation stage.
- **Week 16:** The baby's sex is visible on Doppler ultrasound, and quickening (baby's first movements) can occur between weeks 16-25.
- **Week 20:** Halfway point - quickening, the baby practices breathing motions, lanugo covers the body, and the baby can hear within the uterus.
- **Week 24:** Age of viability - the baby can survive outside the womb, with fetal

respiration movement at 10-20% and surfactant production between 24-28 weeks.

- **Week 32:** The baby starts to settle down in the pelvis to prepare for birth.
- **Weeks 37-40:** Full term.

Assessing Fundal Height

Fundal height is a measurement used to estimate the gestational age of the fetus based on the height of the fundus (top of the uterus). It is closely observed after delivery to ensure adequate postpartum recovery. One finger breadth is approximately equal to 1 centimeter.

Assessment during pregnancy:

Have the patient lie back (not flat) to avoid a decrease in blood pressure. Measure from the beginning of the symphysis pubis to the fundus in centimeters.

Key point: Fundal height typically correlates to the gestational age, with an allowance of 1–2 centimeters. For example, 24 cm equals 24 weeks, 29 cm equals 29 weeks. This method is less accurate in patients with high BMI.

Common landmarks:

- 12 weeks – just above the symphysis pubis.
- 12–20 weeks – in between the belly button and symphysis pubis.
- 20–36 weeks – fundal height matches gestational age (± 1–2 cm).
- 36 weeks – at the xiphoid process, near the lungs, making it difficult to breathe.
- 37–40 weeks – fundal height decreases by about 4 centimeters as the baby prepares for birth.

There are some alarming situations:

1. MEASURING LARGER (>3 CM MORE THAN EXPECTED)

Possible causes include macrosomia (large baby), multiple babies, or polyhydramnios (excess amniotic fluid).

2. MEASURING SMALLER (<3 CM THAN EXPECTED)

Possible causes include intrauterine growth restriction (IUGR), oligohydramnios (low amniotic fluid), or gestational diabetes.

Fetal Circulation (Bypasses the lungs via shunts)

- **Umbilical vein:** Carries oxygen-rich blood towards the liver area, joining with the inferior vena cava.
- **Ductus venosus:** Fetal blood vessel connecting the umbilical vein to the inferior vena cava.
- **Foramen ovale:** Shunts oxygen-rich blood from the right atrium to the left atrium (from higher to lower pressure).
- **Ductus arteriosus:** Protects lungs against circulatory overload (due to the already high pressure in the lungs), shunting blood from the pulmonary artery to the aorta.
- **Umbilical arteries (2):** Carry oxygen-poor blood back to the placenta.

Placenta:

A lifeline between mother and baby, acting as “temporary lungs.”

- Provides baby with oxygen-rich blood via one vein.
- Removes deoxygenated blood and waste from the baby via two arteries.

Oxygen-rich blood from the umbilical vein connects with the ductus venosus and intersects with the inferior vena cava (IVC). Some blood may go to the liver. Oxygen-rich blood from the IVC is released into the right atrium, mixing with deoxygenated blood from the superior vena cava.

Some blood goes from the right atrium to the right ventricle, to the pulmonary artery, then to the lungs, back to the pulmonary vein, and finally to the left atrium. Most blood, however, moves from the right atrium through the foramen ovale and to the left atrium.

Note: The right side of the heart during fetal development has higher pressures, so blood follows the pathway of least resistance, moving from the right atrium to the left atrium.

Blood moves from the left atrium to the left ventricle. Blood moves from the left ventricle to the aorta, distributing blood all the way down to the legs, internal iliac arteries, and the umbilical arteries to return to the placenta.

True vs False Labor

True Labor: Remember TRUE

- T = Timing of contractions: Increased frequency, duration, and intensity.
- R = Radiating discomfort: Begins in the lower back and radiates to the abdomen. Vaginal pressure felt from the top of the uterus downward.
- U = Unrelieved by activity: Contractions continue despite comfort measures.
- E = Exam changes present: Increased cervical dilation and effacement.

False Labor: Remember FAKE

- F = Fails to cause cervical changes.
- A = Activity helps contractions: Contractions decrease with comfort measures.
- K = Keeps discomfort in the same area: Lower abdomen and groin. No radiation.
- E = Erratic timing of contractions: Irregular intervals, no increase in frequency, duration, or intensity. Contractions can dissipate.

Braxton Hicks Contractions:

- Irregular
- Do not result in cervical changes.

Signs that the baby is coming:

- Presence of amniotic fluid
- Presence of bloody show (mucus plug)
- Nausea and vomiting may occur with increased intensity.

Fetal Station

Fetal station is a measurement of the presenting part's location in relation to the ischial spine. The ischial spine serves as a reference point to determine when the baby is engaged in the mother's pelvis. The presenting part can be the baby's head, shoulder, foot, or buttocks.

To measure the fetal station, locate the ischial spine, a bony prominence in the pelvis. Document the distance from the presenting part to the ischial spine in positive or negative numbers. When the fetal presenting part is at the ischial spine, the fetal station is 0, indicating the baby is engaged. This can also be called "lightening" or "dropping" as the baby drops into the pelvis.

Documentation:

- Negative numbers: The baby is above the pelvis. This indicates no progress yet.
- Positive numbers: The baby is below the pelvis. This signifies progress towards birth.
- +4 and +5: The baby is coming very soon.
- +5: Crowning – the presenting part is visible at the mother's vaginal opening.

Determining Fetal Position

There are two ways to determine the fetal position:

1. Feeling the mother's abdomen using Leopold's Maneuver.
2. Auscultating the abdomen to hear where the fetal heartbeat is strongest.

Leopold's Maneuver:

- **Head:** Hard, round, and movable.
- **Butt:** Soft, irregular, and non-movable.
- **Back:** Smooth and hard.

The Four P's of Labor

Passageway

The shape of the mother's pelvis, which forms the birth canal.

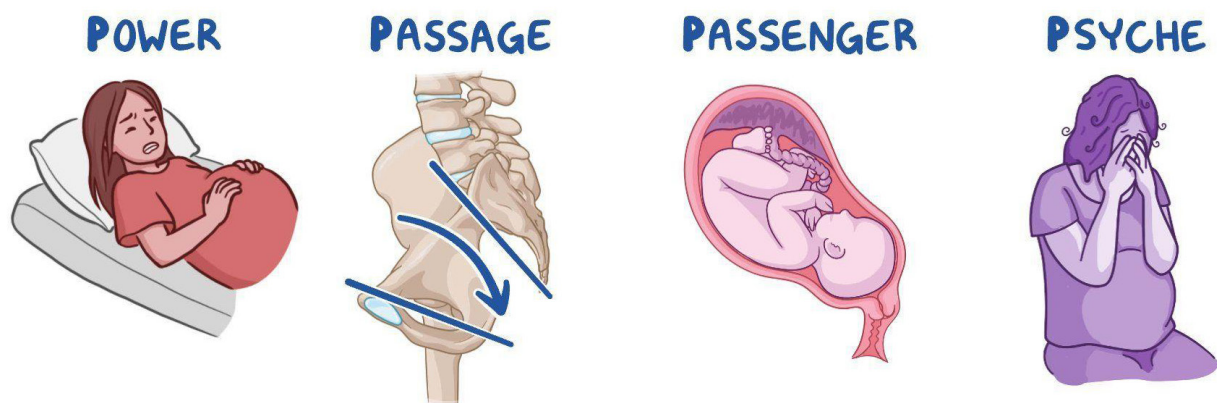
- Gynecoid: Round, most ideal for childbirth. Think “gyn” for gynecologist.
- Platypelloid: Flat/oval, resembling a platypus's flat beak. Often requires a C-section.
- Android: Wedge-shaped, similar to a typical male pelvis. Not ideal for vaginal delivery.
- Anthropoid: Oval and long, suitable for vaginal delivery.

Passenger

Five characteristics to consider.

1. ATTITUDE (HEAD POSTURE):

- Vertex (occiput): The fontanel is the presenting part, most ideal.
- Military (sinciput): Fetal head is partially flexed, and the anterior fontanel is the presenting part.
- Brow: The eyebrow is presenting.
- Face: Sharp extension.



2. LIE: THE BABY'S BACK IN RELATION TO THE MOTHER'S BACK.

- Longitudinal: Baby's spine is parallel to the mother's spine.
- Transverse: Baby's spine is perpendicular to the mother's spine.

3. PRESENTATION: WHICH PART OF THE FETUS IS LEADING.

- Vertex: Headfirst presentation.
- Breech: Bottom or feet-first presentation.
- Shoulder: Shoulder presentation.

4. STATION

The presenting part in relation to the ischial spine.

5. POSITION

- The orientation of the fetus.
- Is the back of the head towards the left or right?
- What is the presenting part?
- Is the back of the head anterior, posterior, or transverse?
- Example: LOA (Left Occiput Anterior) – Good, LOP (Left Occiput Posterior) – Not good.

Powers

Uterine contractions.

Psyche

Mother's emotional state. Factors to consider include:

- Culture
- Preparation for childbirth
- Support system
- Previous births
- Current pregnancy experience
- Pain, fear, and anxiety

Stages of Labor

Stage 1: Begins with regular contractions and ends with a fully dilated cervix.

Goal: Cervical dilation from 0 to 10 cm and 100% effacement.

Latent Stage (Early labor): Longest phase for first-time mothers.

- Cervical dilation: 0 to 4 cm.
- Contractions: 15–30 min apart, lasting 30–45 sec each (mild).
- Duration: Varies, may last up to 20 hours.
- Mother: Alert, excited, may relax or sleep.
- Nursing care: Encourage ambulation, breathing techniques, and Leopold's maneuver.

Active Stage:

- Cervical dilation: 4 to 7 cm.
- Contractions: 3–5 min apart, lasting 60 sec each (moderate or strong).
- Duration: 4 to 8 hours. Time to go to the hospital.
- Mother: Alert, demanding, anxious, may seek pain relief.
- Nursing care: Counter pressure, pillow supports, position changes, hydrotherapy, monitor vital signs.

Transition Stage (shortest but most intense stage):

- Cervical dilation: 7 to 10 cm.
- Contractions: 2–3 min apart, lasting 60–90 sec each (strong).
- Duration: 30 min to 2 hours.
- Mother: Restless, agitated, concentrating.
- Nursing care: Stay with mom, encourage relaxation and breathing, teach panting, monitor vital signs.

Stage 2: Begins with full dilation and ends with the delivery of the baby.

Push Phase: Baby descends through the birth canal.

- Contractions: 2–3 min apart, lasting 60–90 sec each.
- Duration: First-time mom: 1–3 hours, multipara: approx 30 min.
- Nursing care: Educate on pushing, monitor vital signs, record delivery time.

Watch for turtle sign (indicating shoulder dystocia) and bulging perineum.

Stage 3: Full delivery of baby to full delivery of placenta.

- Should not exceed 30 min (increased risk of hemorrhage).
- Signs of placental delivery: Umbilical cord lengthens, uterus changes shape, gush of blood.
- Nursing care: Monitor BP, pad usage, administer oxytocin after placental delivery, assess placenta, ensure comfort, and encourage bonding.

Stage 4: First four hours after placental birth.

- Nursing care: Focus on caring for the mother.
- Monitor HR, BP, temperature, and assess the fundus.
- Monitor lochia and peri-pad usage.
- Provide pain relief, peri-care, and C-section care.
- Encourage bonding between mother and baby.

Fetal Heart Tones

Normal fetal heart rate (FHR): 110–160 bpm

Expected: moderate variability and accelerations (may or may not be present).

VEAL CHOP MINE is a mnemonic to help remember fetal heart rate patterns, their causes, and interventions:

FHR Pattern (VEAL)	Cause (CHOP)	Intervention (MINE)
V: Variable deceleration	C: Cord compression	M: Maternal repositioning
E: Early deceleration	H: Head compression	I: Identify labor progress
A: Acceleration	O: Okay	N: No interventions
L: Late acceleration	P: Placental insufficiency	E: Execute

Labor Medications

Uterine Stimulants: Oxytocin (Pitocin)

- **Use:** Induction or enhancement of labor, placental delivery, and postpartum control of bleeding.
- **Action:** Stimulates uterine contractions.
- **Side effects:** Painful contractions, risk of uterine rupture, and fetal demise.
- **Key considerations:** Monitor contractions, maternal and fetal vital signs, and watch for water intoxication in the mother.

Pre-term Labor Medications (Tocolytics):

- **Terbutaline Sulfate:** Delays labor but does not prevent it. Also used for COPD/asthma.
- **Nifedipine:** Calcium channel blocker that lowers blood pressure and relaxes uterine contractions.
- **Indomethacin:** NSAID that blocks prostaglandin synthesis to suppress labor.
- **Magnesium Sulfate:** Used for preeclampsia and preterm labor to relax the uterus.

Non-pharmacological Methods:

- **Effleurage:** Light stroking of the abdomen during contractions.
- **Sacral counterpressure:** Applying pressure to the mother's sacrum.
- Breathing techniques, imagery, music, and hydrotherapy.

Opioid Analgesics and Anesthetics:

- **Meperidine:** Reduces pain without significant respiratory depression in mother and baby.
- **Spinal Epidural:** Eliminates sensation from the umbilicus to thighs, requires a minimum of 4cm dilation.
- **Spinal Block:** Used for C-sections, can cause maternal hypotension, fetal bradycardia, and other side effects.

Key points:

- Monitor vital signs and contractions.
- Ensure safe administration of medications.
- Use non-pharmacological methods when appropriate.
- Address side effects and contraindications promptly.

Labor Complications

Cord Prolapse

Cord prolapse is a critical obstetric complication that occurs when the umbilical cord slips out of the cervix and into the birth canal ahead of the baby. This can lead to the compression of the cord during labor, potentially reducing blood flow and oxygen supply to the baby. Timely identification and management of cord prolapse are crucial to ensure the safety of both the mother and the baby.

1. RECOGNIZE CUES:

- Cord Prolapse: The umbilical cord protrudes in front of the baby, with the cord compressed under the baby's head.
- Diagnostics: Visible cord at the vulva, cord felt on vaginal exam, and variable/prolonged decelerations associated with FHR.

2. ANALYZE CUES:

Risk: Reduced blood flow to the baby leading to reduced oxygen supply.

3. PRIORITIZE HYPOTHESES:

Cord Prolapse: Immediate intervention required to prevent complications and ensure the baby's safety.

4. GENERATE SOLUTIONS:

Relieve pressure on the cord, reposition the mother, monitor FHR, and prepare for potential C-section.

5. TAKE ACTION:

Call for help, insert fingers into the vagina and lift the baby's head off the cord, place the mother in knee-to-chest position or Trendelenburg position, do not remove fingers, monitor FHR, and deliver the baby via C-section if necessary.

6. EVALUATE OUTCOMES:

Successful relief of cord pressure, improvement in FHR, and safe delivery of the baby via C-section or other appropriate delivery method.

Dystocia

Difficult or abnormal labor due to small birth canal or abnormal fetal presenting part (shoulder).

1. RECOGNIZE CUES:

- Signs and symptoms: Difficulty progressing labor (dilation, effacement, or descent).
- Shoulder Dystocia: Turtle sign (the shoulder is stuck behind the pelvic bone and the head goes in and out of the vagina).

2. ANALYZE CUES:

- Potential risks: Prolonged labor, fetal distress, maternal exhaustion, or injury.
- Prioritize Hypotheses:
- Dystocia: Immediate intervention required to ensure the safety of both the mother and the baby.

3. GENERATE SOLUTIONS:

Change positions, administer Oxytocin (Pitocin), encourage ambulation, consider forceps or vacuum-assisted birth, and apply suprapubic pressure for shoulder dystocia.

4. TAKE ACTION:

Assist the mother in changing positions (hands and knees or knees to chest), administer Oxytocin (Pitocin) as needed, encourage ambulation, use forceps or vacuum-assisted birth if appropriate, and apply suprapubic pressure for shoulder dystocia.

5. EVALUATE OUTCOMES:

Successful progression of labor, relief of shoulder dystocia, safe delivery of the baby, and minimal risk or complications for the mother and baby.

Preterm Birth

Preterm birth, also known as premature birth, occurs when a baby is born before completing 37 weeks of gestation. It is a significant concern in obstetrics, as it can lead to various complications and challenges for both the mother and the baby. Preterm birth can be caused by a variety of factors, including stress, infections, and multiple pregnancies. Timely interventions and management strategies are crucial in minimizing the risks associated with preterm birth and improving neonatal outcomes.

1. RECOGNIZE CUES:

- Labor before 37 weeks of gestation.
- Preterm Premature Rupture of Membranes (PPROM).

2. ANALYZE CUES:

Potential risks: Premature birth complications, increased risk of infection, neonatal morbidity and mortality.

3. PRIORITIZE HYPOTHESES:

Preterm birth: Requires immediate intervention to minimize risks for the mother and the baby.

4. GENERATE SOLUTIONS:

Administer steroids to speed up fetal lung maturity, use tocolytics to delay delivery, administer magnesium sulfate to protect the baby from neuro defects, and implement bed rest.

5. TAKE ACTION:

Avoid unnecessary vaginal exams, provide a dose of steroids to promote fetal lung maturity, administer tocolytics to delay delivery for 48 hours to allow steroid effects, give magnesium sulfate for fetal neuroprotection, and advise bed rest.

6. EVALUATE OUTCOMES:

- Delayed delivery, decreased risk of complications for both the mother and the baby, improved neonatal outcomes, and minimized risks associated with preterm birth.

Meconium-stained amniotic fluid

Meconium-stained amniotic fluid is a concerning obstetric event that occurs when the baby passes its first stool, called meconium, in utero. This situation may indicate either normal gastrointestinal maturation or a hypoxic event, leading to fetal compromise and neonatal respiratory distress.

1. RECOGNIZE CUES:

- Greenish color amniotic fluid
- Late or variable deceleration in fetal heart rate
- Rapid breathing or increased work of breathing of the baby after birth

2. ANALYZE CUES:

- Assess if the greenish color of the amniotic fluid is due to meconium staining
- Determine if the baby is experiencing respiratory distress

3. RESPONDING:

- Prepare equipment for neonatal resuscitation
- Continuously monitor the baby's respiratory rate and color
- Collaborate with the healthcare team to address any potential complications

4. EVALUATING:

- Assess the effectiveness of interventions and the baby's response to resuscitation
- Monitor the baby for any signs of ongoing respiratory distress or other complications
- Ensure that the mother is informed and supported throughout the process

Postpartum Hemorrhage (PPH)

Postpartum hemorrhage is defined as a significant loss of blood after giving birth, and it is the number one cause of maternal morbidity and mortality. The criteria for diagnosing postpartum hemorrhage include:

- **More than 500ml** blood loss for **vaginal birth**.
- **More than 1000ml** blood loss for **C-section**.
- **Assessing peri-pads:** soaking a pad in less than 15 mins or less than 1 hour is alarming.
- **Changes in vital signs:** blood pressure, heart rate, oxygen saturation, restlessness, cool, and clammy skin.
- A 10% or more fall in hematocrit (HCT), although this takes time to be reflected in lab results and is not an immediate indicator.

There are four primary causes of postpartum hemorrhage, which can be remembered with the mnemonic **“4Ts”**: **Tone, Trauma, Tissue, and Thrombin**.

Tone (Uterine Atony)

Uterine atony refers to a lack of uterine tone or inadequate contraction after delivery. Factors contributing to uterine atony include distension due to multiple pregnancies or large infants, muscle fatigue from a long delivery, and the presence of uterine relaxants. Treatment for uterine atony includes fundal massage to stimulate contractions and administering uterotonic medications such as oxytocin or misoprostol.

Trauma

Trauma involves injuries to the mother’s pelvis, uterus, vagina, or surrounding tissues during labor and delivery. Causes of trauma can include the baby passing through the birth canal, the use of medical instruments such as forceps or vacuum, or C-section incisions. Hematomas can form and go unnoticed for hours. Symptoms of trauma include persistent bleeding and severe pain. Treatment for trauma may involve surgical intervention, depending on the extent of the injury.

Tissue (Retained placental fragments)

Retained placental fragments can prevent the cervix from closing properly, leading to uterine atony and postpartum hemorrhage. To manage this issue, healthcare providers should ensure the entire placenta is delivered, remove any detected fragments, and perform a dilation and curettage (D&C) procedure if necessary to remove remaining fragments.

Thrombin (Clotting disorders)

Clotting disorders can cause postpartum hemorrhage due to impaired blood coagulation. Examples of clotting disorders include placenta accreta and disseminated intravascular

coagulation (DIC). Treatment for clotting disorders involves administering blood products, providing fluids for volume replacement, and administering factor repletion to improve blood clotting.

For all causes of postpartum hemorrhage, the following actions should be taken:

- Notify the healthcare provider.
- Continuously monitor vital signs and administer oxygen.
- Monitor peri-pads for bleeding.
- Provide IV fluid replacement and blood products as needed.
- Consider the use of oxytocin (Pitocin) or a catheter.

Hemorrhage within 24 hours after delivery is referred to as primary PPH, while hemorrhage occurring after 24 hours is called secondary PPH.

1. RECOGNIZE CUES:

- Blood loss > 500ml (vaginal birth)
- Blood loss > 1000ml (C-section)
- Soaked peri-pads in < 15 minutes or < 1 hour
- Changes in BP, HR, O2 saturation, restlessness, and cool, clammy skin

2. ANALYZE CUES:

- Causes: 4Ts – Tone, Trauma, Tissue, Thrombin

3. PRIORITIZE HYPOTHESES:

- Identify the cause of PPH and provide appropriate intervention.

4. GENERATE SOLUTIONS:

- For each cause (4Ts), determine the appropriate treatment and interventions to manage and prevent PPH.

5. TAKE ACTION:

- Implement the specific treatments and interventions for the identified cause of PPH, closely monitor the mother's condition, and provide necessary support.

6. EVALUATE OUTCOMES:

- Assess the effectiveness of the interventions and continue to monitor the mother's condition to ensure successful management of PPH.

Treatments and interventions for each cause:

- **Tone (Uterine Atony):** Fundal massage, uterotonic medications.
- **Trauma:** Surgical intervention if needed.
- **Tissue (Retained placental fragments):** Ensure complete removal of placenta, D&C procedure if necessary.
- **Thrombin (Clotting conditions):** Administer blood products, fluids, and factor repletion.

Placenta Previa

Placenta previa is a pregnancy complication in which the placenta attaches partially or fully to the uterine wall, covering the cervical opening. This condition poses risks, as the placenta may separate from the uterine wall or tear open as the cervix dilates during labor.

Recognizing the risk factors can help healthcare professionals identify those at risk for placenta previa. Risk factors include maternal age above 35, multiparity, having multiple children at once, smoking or cocaine use, previous placenta previa, and uterine scarring (e.g., from a prior C-section).

1. RECOGNIZE CUES:

- Painless, bright red bleeding.
- Nontender, relaxed, soft uterus.
- Episodes of bleeding (mild to profuse).
- Abnormal fetal position.

2. ANALYZE CUES:

- Diagnose placenta previa, typically during the second trimester (around 20 weeks). If

the diagnosis is marginal or partial, the placenta may correct itself and shift upwards as the pregnancy progresses (recheck at 30 weeks).

3. PRIORITIZE HYPOTHESES:

- Determine the severity of bleeding and the type of placenta previa (marginal, partial, or full) to guide appropriate interventions.

4. GENERATE SOLUTIONS:

- For no or light bleeding: Bed rest and no strenuous activities.
- For bleeding: Continuous monitoring (pad count for mother and baby), left-side lying, and tocolytics to stop contractions.

5. TAKE ACTION:

- Implement appropriate interventions based on the severity of bleeding and type of placenta previa.
- Instruct patients to avoid sex, vaginal exams, and manipulation of the vagina or abdomen.

6. EVALUATE OUTCOMES:

- Monitor the patient's response to interventions.
- If bleeding persists despite interventions, consider a C-section.

Remember that a marginal placenta previa may still allow for a vaginal delivery, while a partial or full placenta previa will likely necessitate a C-section.

Placental Abruption

Placental abruption is a pregnancy complication involving the premature detachment of the placenta from the uterine wall before childbirth. This can be partial or total, and may lead to risks such as uncontrolled bleeding, hemorrhage, shock, disseminated intravascular coagulation, major organ failure, or insufficient oxygen supply to the baby.

1. RECOGNIZE CUES:

- Concealed or visible blood loss (dark vaginal bleeding, extended fundal height).
- Abdominal pain.
- Non-relaxing uterine contractions (tetany).
- Hard abdomen.
- Distressed baby with reduced fetal movements.
- Feeling faint or nauseous.

2. ANALYZE CUES:

- Identify possible causes of placental abruption, such as trauma, previous placental abruption, chronic hypertension, preeclampsia, PROM, smoking or cocaine use, multiparity, or having multiple children at once.

3. PRIORITIZE HYPOTHESES:

- Determine the severity of the placental abruption and its effects on the mother and baby.

4. GENERATE SOLUTIONS:

- Monitor concealed or visible bleeding through pad count and fundal height measurements.
- Avoid abdominal vaginal exams until ruling out placenta previa.
- Position the mother in a left-side lying position to increase perfusion to the baby.
- Monitor the baby's heart rate and mother's vital signs every 15 minutes.
- Obtain blood samples for type and cross, CBC, and clotting levels, using an 18G IV or larger.
- Prepare for delivery, potentially a C-section, if the abruption affects the mother or

baby.

5. TAKE ACTION:

- Implement appropriate interventions based on the severity of the placental abruption and its effects on the mother and baby.

6. EVALUATE OUTCOMES:

- Monitor the patient's response to interventions and the progress of the abruption.
- Adjust the care plan as needed to ensure the safety of both the mother and baby.

Preeclampsia

Preeclampsia is a pregnancy complication characterized by the development of high blood pressure after 20 weeks gestation. The condition can lead to serious complications, including seizures (eclampsia), if not managed appropriately.

1. RECOGNIZE CUES:

- Signs and symptoms: headache, blurry vision, RUQ or low abdominal pain, decreased urine output, swelling of hands and feet, SOB, or increased weight.
- Risk factors: history of preeclampsia, first pregnancy, diabetes, pre-existing hypertension, renal disease, obesity, multiple pregnancies, age <18 or >35, or African American ethnicity.

2. ANALYZE CUES:

- Determine whether the patient meets the diagnostic criteria for preeclampsia, such as hypertension and proteinuria, along with other symptoms.

3. PRIORITIZE HYPOTHESES:

- Evaluate the severity of preeclampsia and the risk of progression to eclampsia or HELLP syndrome.

4. GENERATE SOLUTIONS:

- Monitor vital signs, proteinuria, edema, SOB, I&Os, and daily weights.
- Assess neurological status and deep tendon reflexes (DTRs) for signs of impending seizure.
- Position the patient in the left-side lying to improve perfusion to the baby.
- Administer magnesium sulfate for seizure prevention, monitoring for toxicity.
- Watch for HELLP syndrome and manage accordingly.
- Implement seizure care if necessary, including staying with the patient, providing oxygen, and preparing for delivery.

5. TAKE ACTION:

- Implement appropriate interventions based on the severity of preeclampsia, the risk of eclampsia, and the patient's response to treatment.

6. EVALUATE OUTCOMES:

- Monitor the patient's response to interventions and progress of the condition.
- Adjust the care plan as needed to ensure the safety of both the mother and baby.

Emergency Delivery

Recognize Cues:

Identify signs and symptoms of late decelerations, indicating possible uteroplacental insufficiency, and the need for an emergency delivery.

Analyze Cues:

Assess fetal heart rate patterns and maternal vital signs, confirming the need for an emergency delivery due to late decelerations.

Prioritize Hypotheses:

Determine that the primary concern is uteroplacental insufficiency, leading to the need for immediate action to ensure the safety of both the mother and the baby.

Generate solutions:

Develop an emergency delivery plan that includes:

- Notifying the attending physician and other healthcare team members of the situation.
- Placing the patient in a side-lying position.
- Administering IV fluids and oxygen.
- Discontinuing oxytocin.

5. Take Action:

Implement the emergency delivery plan by:

- Notifying the attending physician and other healthcare team members of the situation.
- Placing the patient in a side-lying position.
- Administering IV fluids and oxygen.
- Discontinuing oxytocin.

6. Evaluate Outcomes:

Monitor the mother's and baby's vital signs and fetal heart rate patterns to assess the effectiveness of the emergency delivery plan and determine if further interventions are needed. Communicate the outcomes with the attending physician and healthcare team members.

APGAR Assessment

This is a method used to quickly evaluate the newborn's health status immediately after birth. It is performed at one and five minutes after birth, and may be repeated at 10 minutes if the score remains low. The APGAR score serves as a baseline for all future observations.

Scoring:

- 0–3: Indicates serious danger, requiring immediate resuscitation.
- 4–6: Suggests that the baby needs some additional help (e.g., oxygen, suction, stimulation).
- 7–10: Indicates that the baby is in good health.

Additional Newborn Assessments:

- **Jaundice:** If it occurs before 24 hours, it is considered pathologic and caused by a rapid rise of bilirubin and requires treatment (phototherapy); after 24 hours, it is physiologic, generally harmless, but may require treatment.
- **Cold stress:** To prevent metabolic acidosis, the baby should wear one extra layer of clothing.
- **Reflexes:**
 - Startle reflex (Moro reflex): A response to being startled or exposed to a sudden noise.
 - Babinski reflex: Occurs when the sole of the foot is stroked.
 - Fencing reflex: Appears as a fencing pose.
 - Root reflex: Triggered by stroking the corner of the baby's mouth.

After Birth

- Ensure the patient's bladder is empty.
- Have the patient lie flat on her back.

Key point: Always keep one hand at the base of the uterus, so when you palpate, the uterus doesn't come out of the vagina.

Fundal Assessment:

- Immediately after delivery, the fundus should be midline, firm, and at or near the umbilicus.
- If the fundus is soft, boggy, or displaced:
 - Perform fundal massage.
 - Assist the mother to the bathroom.
- The fundus will descend approximately 1 cm (one finger length) per day for the next two weeks.
- After 10 to 14 days, it can no longer be palpated.
- By 6 weeks, the uterus returns to its pre-pregnancy size.

Lochia Assessment:

Recognize Cues: Assess the patient's lochia to identify its appearance, duration, and characteristics.

Analyze Cues: Determine the stage of lochia (Rubra, Serosa, or Alba) based on the appearance, duration, and characteristics.

Prioritize Hypotheses: Consider if the patient's lochia is within normal limits or if there are any red flags indicating a potential complication.

Generate Solutions:

- If the lochia assessment is within normal limits, continue with routine postpartum care.
- If red flags are identified, consider interventions to address potential complications, such as excessive bleeding or infection.

Take Action: Implement appropriate interventions based on the analysis of the patient's lochia and the presence of any red flags.

Evaluate Outcomes: Continuously monitor the patient's lochia and overall condition to ensure appropriate healing and recovery.

Lochia Stages and Red Flags:

1. LOCHIA RUBRA (RED):

- Duration: 1–3 days after birth.
- Appearance: Dark red or bright red.
- Characteristics: Heavy flow, small to medium clots.

2. LOCHIA SEROSA (PINKISH-BROWN):

- Duration: 4–10 days after birth.
- Appearance: Pinkish or brown.
- Characteristics: Less blood, more discharge, fewer clots.

3. LOCHIA ALBA (YELLOW-WHITE):

- Duration: Up to 6 weeks.
- Appearance: Yellow or white.
- Characteristics: Very little blood, some discharge, no clots.

Red Flags

- Soaking a pad in an hour or less.
- Passing clots larger than a golf ball.
- Bleeding that stops and then starts again.
- Fever.
- Abdominal pain more than usual.

Advanced Topics

Healthcare Disparities in Obstetrical Patients

Health disparities in obstetrics refer to the differences in maternal and infant health outcomes across various racial, ethnic, socioeconomic, and geographic groups. These disparities can result in higher rates of maternal morbidity and mortality, preterm birth, low birth weight, and infant mortality among certain populations. Factors contributing to these disparities include:

1. **Limited access to quality prenatal care:** Women from disadvantaged backgrounds may face barriers to accessing prenatal care, such as lack of insurance, transportation, or childcare, leading to inadequate or delayed care.
2. **Socioeconomic factors:** Low income, education, and social support can contribute to stress, poor nutrition, and lack of resources necessary for a healthy pregnancy.
3. **Racial and ethnic disparities:** Systemic racism and implicit biases within the healthcare system can contribute to poorer health outcomes for minority women, including African American, Hispanic, and Indigenous women.
4. **Chronic health conditions:** Disadvantaged populations may have higher rates of chronic health conditions like obesity, diabetes, and hypertension, which can complicate pregnancy and lead to adverse outcomes.
5. **Environmental factors:** Exposure to environmental toxins, such as air pollution and lead, can have negative effects on maternal and infant health.

Potential solutions to address these disparities include:

1. **Expanding access to quality prenatal care:** Ensure that all pregnant women have access to timely, affordable, and comprehensive prenatal care, regardless of their socioeconomic status or geographic location.
2. **Implementing culturally competent care:** Train healthcare providers to recognize and address implicit biases and provide culturally sensitive care to patients from diverse backgrounds.
3. **Strengthening social support systems:** Enhance support for pregnant women through community-based programs, such as home visiting services, prenatal education, and breastfeeding support groups.

4. **Addressing social determinants of health:** Implement policies and interventions that target the root causes of health disparities, such as poverty, education, housing, and environmental exposures.
5. **Improving data collection and research:** Invest in research that focuses on identifying and understanding the causes of obstetric health disparities and developing evidence-based interventions to address them.

How Can I Help As Just One Nurse?

Individual nurses can play a crucial role in reducing health disparities by implementing various strategies at the bedside and in community and public health settings:

1. **Cultural competence:** Nurses should educate themselves on different cultural practices and beliefs to provide respectful and culturally sensitive care. This includes understanding the unique needs of different racial, ethnic, and socio-economic groups.
2. **Patient advocacy:** Nurses can advocate for their patients by ensuring they receive appropriate and timely care, regardless of their background. This may involve coordinating with other healthcare providers, connecting patients with resources, and addressing barriers to care.
3. **Effective communication:** Nurses should develop strong communication skills to establish trust with their patients. This includes using plain language, employing teach-back techniques, and providing information in the patient's preferred language or using an interpreter when needed.
4. **Addressing social determinants of health:** Nurses working in community and public health settings can identify social determinants that impact their patients' health and work to address them. This might include collaborating with community organizations, advocating for policy changes, or implementing interventions targeting housing, food security, or education.
5. **Participating in health promotion and disease prevention programs:** Nurses can engage in community outreach and participate in health promotion and disease prevention initiatives, such as prenatal care, immunization campaigns, and health education programs.
6. **Engaging in research and quality improvement:** Nurses can participate in research and quality improvement efforts to identify and address health disparities. This may involve collecting and analyzing data on patient outcomes, implementing evidence-based

interventions, and evaluating their effectiveness in reducing disparities.

7. **Continuing education:** Nurses should stay informed about the latest evidence-based practices and guidelines related to health disparities. Pursuing continuing education opportunities can help them to develop the knowledge and skills needed to address disparities effectively.
8. **Collaborating with interdisciplinary teams:** Nurses can work with interdisciplinary teams that include social workers, case managers, nutritionists, and other professionals to address the complex needs of patients from diverse backgrounds. This collaborative approach can help to develop comprehensive and personalized care plans that consider the patient's unique circumstances.
9. **Raising awareness:** Nurses can educate their colleagues, community members, and policymakers about health disparities and their causes. By raising awareness, they can contribute to creating a more equitable healthcare system.
10. **Promoting diversity within the nursing profession:** Nurses can support efforts to increase diversity within the nursing workforce, as a diverse workforce is better equipped to understand and address the needs of diverse patient populations. This may involve participating in mentoring programs, advocating for inclusive policies, and supporting recruitment and retention initiatives for underrepresented groups in nursing.

By implementing these strategies, individual nurses can contribute to reducing health disparities and promoting health equity for all patients, both at the bedside and in community and public health settings.

Magnesium Sulfate

Magnesium sulfate is a medication used to prevent seizures in preeclampsia, slow or stop preterm labor, and protect the brains of premature babies. It acts as a CNS depressant, decreasing the amount of acetylcholine, which results in reduced neuromuscular transmission and decreased excitation in the mother.

When using magnesium sulfate, healthcare providers should consider the following aspects:

Indications

Primarily used for preeclampsia to prevent seizures. It may also be used for up to two days in preterm labor to allow time for the baby's lungs to develop.

Side effects

- Mother: decreased respirations, low blood pressure, drowsiness, fatigue, nausea, vomiting, dizziness, blurred vision, muscle weakness, altered level of consciousness, and sweating/flushing (may indicate toxicity).
- Baby: poor muscle tone, decreased fetal heart rate, decreased respirations (can pass through breast milk), long-term use (>7 days) may lead to low calcium in the baby's bones.

Toxicity

Occurs when levels are above 9.6 mg/dL. Watch for early warmth, flushing, and slurred speech. Major symptoms include decreased blood pressure, urine output (< 30 ml/hr), respirations, and absent patellar deep tendon reflexes (DTR).

Therapeutic range

4.8–9.6 mg/dL. Typically administered at a dose of 4–6 grams over 20 minutes, followed by continuous IV infusions at 2 grams/hr.

Antidote

Calcium gluconate.

Nursing care:

- Monitor mother (respirations, heart rate, blood pressure) and baby (fetal heart rate) vital signs, and respirations if breastfeeding.
- Perform frequent DTR checks and neuro checks.
- Place the mother on seizure precautions.
- Monitor magnesium levels and urine output.
- The main goal is to prevent seizures and watch for toxicity.
- Check BUN and creatinine levels to ensure proper kidney function for drug excretion.

Contraindications:

- Patients with renal disease (trouble excreting the drug).
- Patients with heart disease (may worsen heart blocks).
- Patients with myasthenia gravis (may worsen symptoms).

Maternal Infections

Maternal infections can lead to congenital conditions in the fetus if exposed during pregnancy. **TORCH** infections represent a group of diseases that can cause these issues:

- **Toxoplasmosis:** A parasitic disease found in raw, undercooked meat and cat feces. Pregnant women should avoid changing cat litter boxes. Symptoms in the child can include blindness, hydrocephalus, and mental retardation.
- **Other infections:**
 - **Syphilis:** A bacterial STI causing rash on the child's palms and soles, Hutchinson's teeth, saddle nose, and frontal bossing. Treatment includes antibiotics for both the mother and baby.
 - **Varicella:** A viral infection leading to limb atrophy and damage to the child's brain and eyes. Treatment involves VZIG immunization and IV antiviral medication for the mother.
 - **HIV:** A viral STI and bloodborne infection causing poor weight gain and repeated infections in the child. Mothers should avoid breastfeeding. Treatment includes 6 weeks of antiretroviral therapy for the baby and ART for the mother.
- **Rubella:** A viral infection that can result in patent ductus arteriosus (PDA), cataracts, deafness, and miscarriage in the child. The first trimester is the most critical period. Treatment involves MMR vaccination for the baby and non-pregnant mother.
- **Cytomegalovirus:** A viral infection transmitted through body fluids. It can lead to premature birth, low birth weight, hearing loss, microcephaly, and seizures in the child. Treatment includes antiretroviral therapy, hand hygiene, and avoiding kissing the baby on the mouth.
- **Herpes simplex:** A viral STI and saliva-borne infection causing skin lesions and CNS herpes (seizures, poor feeding, tremors, lethargy) in the child. It can be transmitted during vaginal delivery. Treatment involves antiretroviral therapy.

Additionally, UTIs and yeast infections are fungal infections that, while not posing a significant threat to the baby, may cause complications during pregnancy. UTIs can lead to

kidney infections, early labor, and low birth weight, while yeast infections can spread to the baby during vaginal delivery, causing oral thrush. Symptoms in the mother include urinary urgency, frequency, dysuria, and cloudy urine for UTIs, and thick white discharge and vaginal itching for yeast infections. Care includes antibiotics and promoting proper hygiene.

Group B strep is a bacterial infection frequently found in the vagina and rectum. It may not cause symptoms but can be passed to the baby during vaginal delivery. Testing occurs at 36 weeks of pregnancy to prepare for the birth plan. Treatment involves antibiotics.

Postpartum Endometritis

This condition involves inflammation of the uterus lining and can be caused by retained placenta fragments, C-sections, or the use of an internal fetal heart monitor. Symptoms include pelvic pain, excessive or odorous lochia, elevated white blood cell (WBC) count, and flu-like symptoms. Care involves antibiotics, pain relief, hand hygiene, and obtaining vaginal and blood cultures.

Mastitis

This refers to inflammation and potential infection of breast tissue, often caused by a blocked duct or poor breastfeeding technique. Symptoms include a painful, red, hard area on the breast, elevated WBC count, and flu-like symptoms. Care includes antibiotics, ensuring the breasts are emptied after each feeding, and promoting frequent breastfeeding.

Urinary Tract Infection (UTI)

Common causes during the postpartum period include catheter use, C-sections, and frequent vaginal exams. Symptoms and care for UTIs are the same as previously mentioned, involving antibiotics and proper hygiene practices.

Bacterial Meningitis

Bacterial meningitis is an acute inflammation of the meninges and cerebrospinal fluid (CSF) caused by direct invasion or through the bloodstream. The meninges become inflamed, and bacteria infect the CSF.

Pathophysiology:

- Bacteria can enter via vascular spread from another infection or directly through penetrating wounds, skull fractures, surgery, or foreign bodies (e.g., cardiac devices).
- Brain swelling and a layer of purulent exudate cover the brain's surface.
- Pus, fibrin, and adhesions may obstruct CSF flow and lead to clinical manifestations.

Clinical Manifestations:

- Abrupt or rapid onset, sometimes developing over a few days.
- Nuchal rigidity, fever, headache, vomiting, lethargy, chills, and sensitivity to light.
- Positive Kernig's and Brudzinski's signs.
- Potential seizures, confusion, drowsiness, and hallucinations.

Nursing Care and Immediate Therapy:

- Administer broad-spectrum antibiotics until the specific organism is identified.
- Ensure hydration and ventilation to normalize sodium and intracranial pressure (ICP) levels.
- Reduce ICP if needed, and monitor ICP continuously.
- Implement seizure precautions and provide antiepileptic medications.
- Follow isolation precautions (droplet) and maintain a low-stimulus environment.
- Manage thermoregulation and conduct frequent neurological checks.
- Monitor for potential hearing loss and perform auditory evaluations every six months.

Diagnosis:

Lumbar puncture: CSF analysis will show decreased sugar, increased white blood cell count, and increased protein levels.

Vaccinations:

Typically, individuals receive vaccinations at 11 or 12 years of age, with a booster shot administered at 16 years old. For example, the meningococcal conjugate or Hib vaccine is given at 2, 4, and 6 months of age.

Viral Meningitis

Also known as aseptic meningitis, viral meningitis is an inflammation of the meninges (the membrane covering the brain and spinal cord) without bacterial growth in cerebrospinal fluid (CSF) cultures.

Onset can be abrupt or rapid, or it may develop over a few days. Viral meningitis shares similar features with bacterial meningitis, such as nuchal rigidity (stiff neck), fever, vomiting, headache, irritability, and photophobia.

Causes of viral meningitis include herpes simplex virus, cytomegalovirus, HIV, adenovirus, and enterovirus.

Diagnosis:

Diagnosis is based on clinical manifestations and CSF findings, which should show no bacteria present.

CSF findings:

- **WBC:** Elevated in bacterial meningitis with increased neutrophils
- **Protein:** Decreased in bacterial meningitis; normal in viral meningitis
- **Glucose:** Decreased in bacterial meningitis; normal in viral meningitis
- **Bacteria culture:** Positive in bacterial meningitis; negative in viral meningitis
- **Color:** Cloudy in bacterial meningitis; clear in viral meningitis

Treatment

Treatment for viral meningitis is primarily supportive care, including acetaminophen for headache and muscle pain, hydration, and positioning for comfort. Precautions may be initiated, such as isolation (droplet) and antimicrobials, until lab results are available. It's important to note that bacterial meningitis is more severe and can cause serious complications

Cerebral Palsy

Cerebral palsy is a disorder affecting motor function, muscle control, coordination, and posture, caused by damage to the developing brain. The severity of cases varies widely.

Risk factors for cerebral palsy include infections during pregnancy (such as CMV, rubella, herpes, syphilis, and toxoplasmosis), illnesses in infancy (such as bacterial meningitis and viral encephalitis), untreated jaundice, and strokes in the womb causing brain bleeds.

Motor types of cerebral palsy:

- **Spastic:** Persistent primitive reflexes, positive Babinski reflex, ankle clonus, stiff and tight muscles
- **Dyskinetic:** Involuntary movements, dystonia (slow twisting of the trunk or extremities), involuntary jerky movements (slow, worm-like movements)
- **Ataxic:** Wide-based gait, rapid repetitive movements, shaky

Signs and symptoms vary greatly and may include floppy or stiff muscle tone, persistent Moro/tonic reflexes, poor head control, rigid muscles and abnormal posture, favoring a particular side of the body, poor feeding and speaking abilities, drooling, difficulty meeting developmental milestones, and seizures.

Treatment for cerebral palsy focuses on correcting defects as early as possible to enable affected children to realize their potential within their limits. Interventions may include ankle-foot orthoses (ankle braces to prevent deformity), medications such as benzodiazepines to reduce muscle rigidity, antiepileptics, and botulinum toxin A to reduce spasms. Speech therapy, physical therapy, and occupational therapy may also be beneficial. Children with cerebral palsy may need frequent rest periods and safety measures to reduce the risk of falls.

Recognize Cues:

- Risk factors: Infections during pregnancy, illnesses in infancy, untreated jaundice, and strokes in the womb

- Motor types: Spastic, dyskinetic, ataxic
- Signs and symptoms: Varied muscle tone, persistent reflexes, poor head control, rigid muscles, abnormal posture, favoring one side, poor feeding and speaking abilities, drooling, difficulty meeting developmental milestones, seizures

Analyze Cues:

- Determine if the child presents risk factors or symptoms related to cerebral palsy
- Differentiate between the motor types based on the child's motor function and coordination

Prioritize Hypotheses:

- Identify cerebral palsy as a possible diagnosis based on the risk factors and symptoms
- Determine the severity of the case and the motor type that best describes the child's condition

Generate Solutions:

- Implement corrective interventions as early as possible to enable the child to reach their potential within their limits
- Consider ankle-foot orthoses, medications (benzodiazepines, antiepileptics, botulinum toxin A), and therapy (speech, physical, occupational) as possible treatment options

Take Action:

- Collaborate with the healthcare team to initiate appropriate interventions and therapy for the child
- Monitor the child's progress and adjust the care plan as needed

Evaluate Outcomes:

- Assess the effectiveness of the interventions and therapy on the child's motor function, muscle control, coordination, and posture
- Modify the care plan based on the outcomes and the child's changing needs

Spina Bifida

Spina bifida is a birth defect resulting from the improper formation of the spine and spinal cord, leading to exposed meninges and spinal cord. It is a type of neural tube defect, which occurs during fetal development when the neural tube is responsible for forming the brain and spine. There are three types of spina bifida:

1. SPINA BIFIDA OCCULTA:

- Not visible externally, typically in the lumbosacral region
- Most common and least severe type
- Often unknown to the patient, detected only during imaging
- May present as a dimple, tuft of hair, or port-wine angioma (red birthmark) over the defect region
- Care tip: Avoid rectal temperatures, as bowel sphincter issues can cause rectal prolapse

2. MENINGOCELE:

- Hernial protrusion of a sac-like cyst filled with membranes and spinal fluid, lying outside the meninges and spinal cord
- Symptoms include a visible sac-like cyst in the lumbar region, sensory dysfunction, incontinence of urine and feces, and limb movement dysfunction below the cyst
- Severe cases may present with walking complications, weakness, abnormal growth, scoliosis, hydrocephalus, and meningitis

3. MYELOMENINGOCELE:

- Similar symptoms to meningocele, but more severe due to additional involvement of the spinal cord

Treatment:

- For spina bifida occulta, no treatment is usually necessary
- For meningocele and myelomeningocele, surgery within 24–72 hours to prevent infection and reduce trauma risk
- Physical and occupational therapy, and management of genitourinary symptoms

Risk Factors:

- Low folic acid intake
- Malnutrition or lack of proper nutrients
- Drugs and alcohol consumption
- Exposure to radiation during pregnancy

By understanding the different types of spina bifida, healthcare professionals can identify and manage these cases to provide appropriate care and support for affected individuals.

Neonatal Sepsis

Neonatal sepsis is a blood infection that occurs in newborns aged 28 days or younger. Due to diminished inflammatory and humoral immunity, neonates have an increased susceptibility to infection and may not show a strong inflammatory response.

There are two types of neonatal sepsis:

1. EARLY ONSET (<3 DAYS AFTER BIRTH):

- Typically results from organisms acquired during labor from the mother
- Most common cause: Group B Streptococcus (GBS) in labor – GBS testing is essential
- Other causes: E. coli, listeria
- If untreated, risks include neurological and respiratory problems

2. LATE ONSET (>4 DAYS AFTER BIRTH):

- Most commonly caused by staphylococci (coagulase-negative)
- Other causes: E. coli, candida
- If untreated, risks include neurological and respiratory problems

Causes of neonatal sepsis may include infections transmitted prenatally (from the maternal bloodstream to the placenta), during labor (from mother to baby in the birth canal), or postnatally (through invasive devices, cross-contamination with other babies or people).

Risk factors include prolonged rupture of membranes, preterm birth, and traumatic or difficult labor.

Signs and Symptoms:

- Body temperature fluctuations
- Irregular respirations
- Reduced sucking, grunting, retractions
- Lethargy, irritability
- Abdominal distention, vomiting
- Jaundice, pallor, cyanosis

Prevention and Care:

- GBS testing at 36 weeks for mothers
- Hepatitis B and HIV screening (can be passed through breast milk)
- Early recognition of signs and symptoms

For the baby:

- Antibiotic therapy before lab results are confirmed and the organism is identified
 - If positive, continue for 7–10 days
 - If negative, discontinue after 48–72 hours
- Respiratory support
- Vital sign monitoring and fluid regulation
- Thermoregulation
- Potential blood transfusion for anemia

Monitor the baby for signs of septic shock or meningitis. With early recognition and appropriate treatment, neonatal sepsis can be managed to minimize risks and complications.

Phenylketonuria

Phenylketonuria (PKU) is a rare genetic disorder where babies lack the enzymes needed to break down phenylalanine into tyrosine. Excess phenylalanine in the blood can cause neurological and cognitive impairments.

Clinical manifestations include:

- Failure to thrive
- Frequent vomiting, irritability, convulsions
- Hyperactivity, erratic behavior problems
- Musty odor (from phenylacetic acid in urine)
- Lighter skin (due to decreased tyrosine)
- Heart defects
- Seizures

Diagnosis

Diagnosis involves newborn blood tests (PKU test) after 24 hours old and after protein ingestion.

Treatment

Treatment focuses on a limited protein diet with PKU formula, providing protein without phenylalanine. Frequent blood tests are necessary, especially during childhood growth spurts. Mothers with PKU should follow a PKU diet before and during pregnancy to minimize risks.

Otitis Media

Otitis Media refers to any inflammation of the middle ear. There are two types:

- **Acute Otitis Media (AOM):** Rapid onset infection accompanied by fever and ear pain.
- **Otitis Media with Effusion (OME):** Fluid in the middle ear space without acute infection symptoms (ear feels “full”).

Causes include blockage of the Eustachian tubes, which leads to fluid build-up in the middle ear and potential bacterial growth. Blockages can be intrinsic (due to infection or allergy, such as an upper respiratory infection) or extrinsic (enlarged adenoids, nasopharyngeal tumors).

Risk factors for Otitis Media:

- Age under 7 (higher prevalence in younger children)
- Living with many family members (increased risk with smokers)
- Bottle-fed babies (due to feeding incline)
- Family history of ear infections
- Pacifier use and daycare attendance
- Chronic allergies

Signs and symptoms:

- Ear pain (tugging at ears)
- Irritability and trouble sleeping
- Fever, nausea, vomiting, diarrhea
- Hearing problems or conductive hearing loss
- Purulent discharge

Diagnosis

Diagnostics involve assessing the tympanic membrane and noting clinical symptoms. AOM presents with a red, opaque, bulging or purulent membrane, while OME shows an orange membrane with fluid buildup.

Treatment

Treatment aims to prevent complications such as perforation and hearing loss. In patients older than 6 months with no severe symptoms, wait for approximately 72 hours for spontaneous resolution. If symptoms persist or are severe, or if the patient is younger than 6 months, first-line treatment is oral amoxicillin, with cephalosporin as a second-line option.

Supportive care includes acetaminophen for pain and fever, cleaning external ear drainage, and avoiding water in the ear. Surgical options include tympanostomy (tubes) or myringectomy.

Congenital heart disease

Congenital heart disease refers to heart abnormalities present at birth, often disrupting blood flow to and from the heart. Heart defects are categorized based on flow patterns:

1. RIGHT-TO-LEFT SHUNT (BLUE BABIES):

- Tetralogy of Fallot
- Tricuspid atresia
- Truncus arteriosus (increased pulmonary blood flow)
- Transposition of the great vessels (normal blood flow, but arteries are switched)

2. LEFT-TO-RIGHT SHUNT (HOLES IN THE HEART):

- Ventricular septal defect (VSD)
- Atrial septal defect (ASD)
- Patent ductus arteriosus (PDA)

3. OBSTRUCTIVE DEFECTS (STENOSED VALVES):

- Pulmonary stenosis
- Aortic stenosis

Risk factors

Risk factors for congenital heart disease include maternal factors during pregnancy (such as infection, alcohol/drug use, or diabetes), genetics (family history of heart disease, Down syndrome, or congenital chromosome abnormalities). Complications of congenital heart disease can include heart failure, slower growth and development, cyanosis, stroke, rhythm problems, and the need for lifelong follow-up care.

Right-to-left shunt (Blue Babies)

Both tricuspid atresia and tetralogy of Fallot are congenital heart defects that cause a decrease in pulmonary blood flow from the right side of the heart to the left. This right-to-left shunt allows deoxygenated blood to bypass the lungs and directly enter the left side of the heart, leading to oxygen deprivation in the body and the condition known as “blue babies.” Both defects are typically accompanied by atrial or ventricular septal defects (ASD or VSD) as a compensatory mechanism.

1. TRICUSPID ATRESIA

This birth defect involves the complete closure of the tricuspid valve, causing mixed blood flow (oxygen-rich and oxygen-poor). Blood from the right atrium cannot enter the right ventricle, so an ASD is often present as a workaround. Symptoms include cyanosis, dyspnea, increased heart rate, hypoxemia, clubbing of fingers, poor feeding, and extreme sleepiness. Treatment involves a three-step surgery process: shunt placement, Glenn procedure, and Fontan procedure.

2. TETRALOGY OF FALLOT (TOF)

This birth defect includes four complications: VSD, pulmonary stenosis, overriding aorta, and ventricular hypertrophy, all of which cause a mix of oxygenated and deoxygenated blood. Symptoms include “TET” spells (turning blue while crying or feeding), cyanosis, and systolic murmur. Treatment typically involves surgery soon after birth, including shunt placement and closure of VSD to increase blood flow to the lungs and body. Both conditions pose risks for seizures, endocarditis, and heart arrhythmias.

3. TRUNCUS ARTERIOSUS

A rare congenital heart defect where a single large blood vessel comes out of the heart instead of two separate vessels: the aorta and pulmonary artery. In a normal heart, the left ventricle pumps oxygenated blood through the aorta to the body, while the right ventricle pumps deoxygenated blood through the pulmonary artery to the lungs. However, in cases of truncus arteriosus, a single large vessel with a single valve arises from the heart and carries both oxygen-rich and oxygen-poor blood. This can lead to inadequate oxygenation

of the body's tissues. Surgical intervention is typically required to correct the condition.

4. TRANSPOSITION OF THE GREAT VESSELS

TOGV is when the two main blood vessels that carry blood away from the heart, the pulmonary artery and the aorta, are switched or transposed. In a normal heart, the left ventricle pumps oxygenated blood through the aorta to the body, while the right ventricle pumps deoxygenated blood through the pulmonary artery to the lungs. However, in transposition of the great vessels, the aorta arises from the right ventricle and carries deoxygenated blood to the body, while the pulmonary artery arises from the left ventricle and carries oxygenated blood to the lungs. This results in inadequate oxygenation of the body's tissues. Surgery is typically required to correct the condition.

Left-to-right shunt (Holes in the Heart)

Atrial septal defect (ASD), ventricular septal defect (VSD), and patent ductus arteriosus (PDA) are congenital heart defects characterized by a left-to-right shunt. This shunt causes oxygenated blood to flow back into the pulmonary circulation, reoxygenating already oxygenated blood. The increased pulmonary blood flow and blood volume put additional strain on the heart and increase the risk of heart failure.

1. VSD

A VSD is a hole between the right and left ventricles. Symptoms include a harsh, loud murmur on the left sternal border, shortness of breath, poor feeding, easy fatigue, recurrent pulmonary infections, and heart failure. Treatment options include spontaneous closure or surgical intervention to patch the hole.

2. ASD

An ASD is a hole between the right and left atria. Symptoms include a loud, harsh murmur with a fixed split S2, shortness of breath, fatigue, increased heart rate, poor growth, and heart failure. Treatment options include spontaneous closure or surgical intervention to patch the hole.

3. PDA

A PDA is an opening between the pulmonary artery and the aorta. Symptoms include a murmur, tachycardia, increased pulse pressure, bounding pulses, and heart failure. Treatment options include indomethacin (an NSAID) to help close the PDA or surgical intervention.

Obstructive Defects

Obstructive defects occur when blood tries to leave the heart but encounters a narrowed area, also known as stenosis, leading to blocked or obstructed blood flow. The valve cusps can be defective, too thick, or unable to separate from each other. These defects typically cause decreased cardiac output.

1. PULMONARY STENOSIS

Pulmonary stenosis is a condition where the pulmonary valve (located between the right ventricle and the pulmonary artery) is too stiff, narrow, or small. This reduces blood flow to the ventricles.

Signs and Symptoms:

- Heart murmur (systolic ejection murmur)
- Whooshing sound
- Cyanosis, shortness of breath, increased heart rate
- Cardiomegaly (enlarged heart)
- Heart failure
- Many children may be asymptomatic

Diagnosis:

- Auscultation
- EKG, echocardiogram
- Cardiac catheterization

Treatment:

- Balloon angioplasty to dilate the narrowed area
- Pulmonary valvectomy, where the valve is removed, and a patch is put in place
- Pulmonary valve replacement

2. AORTIC STENOSIS

Aortic stenosis is a condition characterized by the narrowing or stiffness of the aortic valve (the large blood vessel branching off the heart – aorta). Severe cases can be life-threatening as it reduces blood flow to the body.

Signs and Symptoms:

- Heart murmur (systolic ejection murmur), best heard over the aorta
- Infants: hypertension, tachycardia, poor feeding tolerance
- Children: exercise intolerance, dizziness, chest pain

Diagnosis:

- Auscultation
- EKG, echocardiogram (findings may not be specific to aortic stenosis)
- Cardiac catheterization

Treatment:

- Balloon angioplasty
- Aortic valvectomy
- Aortic valve replacement

Kawasaki Disease

Kawasaki disease is a condition that causes swelling and inflammation in the walls of arteries throughout the body, primarily affecting children. It tends to affect the coronary arteries and mucocutaneous lymph nodes, which swell during infection. The cause is unknown. Signs and Symptoms (3 phases):

1. ACUTE PHASE:

- Fever ($\geq 38.9^{\circ}\text{C}$ or 102.2°F) lasting 3–5 days, unresponsive to antipyretics
- Red eyes, lips, swollen tongue
- Red, swollen palms and soles
- Rash, lymph enlargement, irritability

2. SUBACUTE PHASE:

- Fever resolved
- Peeling on palms and soles
- Gastrointestinal upset, joint pain

3. CONVALESCENT PHASE:

- Symptoms resolve
- Takes 6–8 weeks from onset

Risk Factors:

- Age: Children <5 years old
- Gender: Boys more likely than girls
- Race: Asian or Pacific Island descent

Treatment:

- Goal: Lower fever and prevent heart damage
- Gamma globulin (IV) within first 7 days of onset – reduces risk of heart problems
- Aspirin to treat inflammation, pain, and fever – watch for signs of Reyes syndrome
- Tip: If giving gamma globulin, wait 11 months to receive chickenpox and measles vaccine
- Monitor heart

Respiratory Infections and Disorders

Bronchiolitis

- Viral infection of the bronchioles caused by RSV
- Most children infected at least once by 3 years old
- Symptoms: fever, tachypnea, dry cough, wheezing, rhinorrhea, poor feeding, labored respirations
- Occurs mainly in winter
- Care: humidified oxygen, mist, nasopharynx suction, increased fluids

Influenza

- Viral infection affecting the nose, throat, and lungs
- Most severe in infants (<6 months) and less severe in children <5 years old
- Symptoms: fever, chills, malaise, body aches, dry cough, dry mucous membranes
- Spread by direct contact, most infectious 24 hours before and after onset of symptoms
- Care: rest, increased fluids, antiviral medications within 48 hours of symptom onset
- Prevention: annual vaccine for children >6 months old

Pertussis

- Highly contagious bacterial infection caused by *Bordetella pertussis*
- Affects mainly unimmunized children <4 years old, life-threatening in infants
- Symptoms: common cold-like symptoms, uncontrollable coughing, vomiting, extreme fatigue, classic “whoop” breath sound
- Treatment: droplet precautions, supportive care, antibiotics
- Complications: seizures, pneumonia, intracranial bleeding, rib fractures, syncope

Bacterial Pneumonia

- Bacterial lung infection caused by *Streptococcus* or *Mycoplasma* bacteria
- Usually follows a viral infection
- Symptoms: high fever, chills, chest pain, tachypnea, productive cough, fatigue, decreased appetite, lethargy

- Care: sputum sample, antibiotics, antipyretics, oxygen, increased fluids, nebulizer or cool mist humidifier

Viral Pneumonia

- Viral lung infection caused by RSV in infants, or influenza, enterovirus, adenovirus in older children
- More frequent than bacterial pneumonia, affects all ages
- Symptoms: high fever, dry cough, tachypnea, chest pain, fatigue, decreased appetite, restlessness, respiratory distress, crackles, nasal flaring, breathing sounds, irritability
- Care: treat symptoms with supportive care, oxygen, increased fluids, cool mist humidifier, postural drainage, antipyretics

Croup

Croup is an upper airway infection that produces a characteristic “barking” or “seal-like” cough. It mainly affects children aged 6 months to 3 years and is often caused by the parainfluenza virus.

Symptoms range from mild to severe:

- Mild:
 - Barking cough
 - Fever
- Moderate:
 - Mild symptoms
 - Inspiratory stridor
 - Increased respiratory effort
 - Tracheal tug
- Severe:
 - Mild and moderate symptoms
 - Severe retractions

- Restlessness, agitation
- Hypoxia, increased heart rate, decreased level of consciousness

Treatment:

- Typically, recovery at home unless severe
- Immediate resuscitation for severe cases
- Oxygen, nebulizer, and steroids

Cystic Fibrosis

An inherited disorder affecting exocrine glands in the lungs and digestive system. Affects cells of exocrine glands, causing normally thin and slippery fluids to become thick and sticky, blocking tubes and passageways. Median life expectancy: 37 years old, typically detected in the first year of life. Autosomal recessive; severity varies for each patient

Earliest postnatal sign: Meconium ileus (blockage of small intestines with thick meconium)

Symptoms by System:

1. EARLIEST SIGN:

- Failure to pass stool, abdominal distension, vomiting, rapid dehydration

2. RESPIRATORY:

- Thick, sticky mucus obstructs bronchioles, causing wheezing, emphysema, air trapping, atelectasis, recurrent lung infections, upper sinus issues, nasal polyps, stuffy nose/sinuses, increased risk of infection

3. SKIN:

- Sweat glands produce increased sodium in salt and saliva, risking electrolyte imbalance, salty-tasting skin

4. GI:

- Thick mucus affects enzyme channels, decreasing digestion and absorption, leading to greasy, foul-smelling stool, constipation, malabsorption of vitamins A, D, E, K, and protein, poor weight gain in children, and potential diabetes due to pancreatic fibrosis

Diagnostic Testing:

- Genetic testing for defective CFTR gene
- Sweat chloride test measuring salt in sweat
- Additional tests: sputum test, pulmonary function tests, chest x-ray/CT scan

Treatment:

No cure, focus on supportive care:

1. RESPIRATORY:

- Chest physiotherapy, huff coughing, nebulizer, aerobic exercise (with added salt and calories)

2. GI:

- Drinking plenty of fluids, stool softeners, monitoring glucose, potential insulin use

3. NUTRITION:

- High protein, calorie, and fat diet; vitamin supplementation (A, D, E, K)
- Pancreatic enzyme replacement therapy (e.g., pancrelipase) during meals
- Avoiding milk products to maintain enzyme effectiveness

Epiglottitis

Inflammation of the epiglottis that can lead to life-threatening airway obstruction. The epiglottis is a flap at the back of the throat preventing fluid/food from entering the trachea/lungs; it closes during swallowing and opens during breathing.

Causes:

- Most common in children aged 2–5 years
- Primary cause: *Haemophilus influenzae* type b (Hib)
- Other causes: *Streptococcus pneumoniae*

Signs and Symptoms:

- Abnormal position (tripod)
- Apprehensive/anxious
- Nasal flaring
- Dysphagia (drooling)
- Irritable, fever
- Use of accessory muscles
- Difficulty speaking (frog-like)
- Rapid onset
- Absent cough
- Stridor
- Enlarged, red epiglottis

Nursing Care:

- Never insert anything into the patient's mouth (spasms can cut off airway)
- Never leave the patient alone
- Keep the patient calm; crying can increase obstruction
- Ensure emergency airway equipment is ready
- Assess vital signs: O₂ status, retractions, respiratory rate, increased heart rate, breath sounds, cyanosis

- Do not place the patient in a supine position
- Maintain NPO status

Medications:

- Antibiotics
- Antipyretics
- Corticosteroids for swelling

Vaccination:

- Prevent with Haemophilus influenzae type b (Hib) vaccine
- Given in 3–4 doses at 2, 4, 6, and 12–15 months of age

Asthma and Asthma Attacks

A chronic lung disease causing inflammation and narrowing of the bronchi and bronchioles.

During an Asthma Attack:

- Smooth muscle constricts, leading to chest tightness and dyspnea
- Mucosal lining produces excess mucus and inflammation
- Decreased airflow results in coughing, wheezing, and air trapping (respiratory acidosis)
- Goblet cells collect bacteria to prevent entry into the airway

Triggers:

- Smoke, pollen, pollution, perfume
- Dander, dust, pests, mold
- Cool and dry air
- Respiratory infection
- Exercise
- GERD, hormonal shifts
- Beta blockers, NSAIDs, aspirin, sulfites

Signs and Symptoms:

Early:

- Shortness of breath, wheezing, fatigue
- Nighttime cough, sleep disturbances
- Sneezing, scratchy throat
- Increased peak flow

Active:

- Chest tightness, tachycardia, increased respiratory rate
- Cough, wheezing, dyspnea

- Oxygen saturation below 90%

Severe:

- Ineffective rescue inhaler
- Difficulty speaking, chest retractions
- Cyanosis of lips/skin, sweating

Nursing Care:

- Continuous vital sign monitoring
- Keep the patient calm
- Position patient in high Fowler's
- Administer oxygen/bronchodilators
- Assess lung sounds, cyanosis, ease of speaking, and peak flow

Peak Flow:

- Personal Best: Highest number over a 2–3 week period when asthma is controlled
- Good: 80–100%
- Caution: 60–80%
- Danger: Below 60% – visit a doctor

Acute Attack (Fast Relief):

- Albuterol: Bronchodilator
- Ipratropium

Long-term Control:

- Salmeterol
- Corticosteroids (e.g. -SONE)

Sudden Infant Death Syndrome (SIDS)

The sudden and unexplained death of an infant younger than 1 year old. Triple Risk Model, a theory that suggests that there are three factors that contribute to the risk of Sudden Infant Death Syndrome (SIDS). The three factors are:

1. VULNERABLE INFANT

Some infants are more vulnerable to SIDS due to a combination of genetic and environmental factors. This vulnerability may be due to respiratory or neurological abnormalities, or other health issues.

2. CRITICAL DEVELOPMENTAL PERIOD

SIDS most commonly occurs during the first few months of life, when infants are going through critical developmental periods. During these periods, infants may be more susceptible to external stressors that can lead to SIDS.

3. ENVIRONMENTAL STRESSORS

Certain environmental factors can increase the risk of SIDS. These may include placing infants to sleep on their stomachs, soft bedding, overheating, exposure to tobacco smoke, and bed sharing.

Signs and Symptoms: There are no signs or symptoms; death is unexpected.

Recommendations to reduce risk of SIDS:

- Always place your baby on their back to sleep, for naps and at night.
- Use a firm, flat sleep surface, such as a crib or bassinet with a tight-fitting sheet. Avoid using soft bedding, including crib bumpers, blankets, pillows, and soft toys.
- Keep your baby's sleep area in the same room where you sleep, close to your bed.
- Avoid overheating your baby. Dress your baby in light sleep clothing, and keep the room at a comfortable temperature for adults.
- Do not smoke or allow anyone to smoke around your baby.
- Breastfeed your baby, if possible, as it may reduce the risk of SIDS.
- Offer a pacifier at nap time and bedtime.
- Do not let your baby fall asleep on a couch, armchair, or other soft surface.

Neonatal Jaundice

Neonatal jaundice is a yellow discoloration of a newborn's eyes and skin caused by excess bilirubin in the blood. Bilirubin is a substance produced and released during the breakdown of red blood cells (RBCs) in the liver. It travels from the liver, is stored in the bile duct, and is expelled in stool.

Causes of neonatal jaundice include a higher bilirubin production rate in newborns due to faster RBC breakdown and an immature liver that can't process bilirubin efficiently. Other causes are internal bleeding, infection/sepsis, blood type incompatibility, biliary atresia, and liver dysfunction.

Neonatal jaundice is common in both term and preterm newborns.

1. PATHOLOGIC JAUNDICE

Abnormal, typically caused by sepsis or blood disease (ABO, Rh incompatibility). Onset within the first 24 hours of life.

2. PHYSIOLOGIC JAUNDICE

Common, caused by the immature liver struggling to break down RBCs and handle excess bilirubin. Onset around 2–14 days old.

3. BREASTFEEDING JAUNDICE

Common. Occurs typically during the first week of life. It is caused by a buildup of bilirubin, a yellow pigment that is produced when red blood cells break down, and the liver is not able to effectively remove it from the bloodstream. Breastfeeding jaundice is thought to occur when a newborn is not getting enough breast milk, which can result in dehydration and decreased bowel movements. This can lead to a buildup of bilirubin in the bloodstream and cause jaundice. It is important to note that breastfeeding jaundice is not caused by a problem with breast milk itself, but rather by an inadequate intake of breast milk. Treatment typically involves increasing the frequency of breastfeeding or pumping to ensure the baby is getting enough milk. In severe cases, phototherapy may be needed to help break down the bilirubin. It is important to consult with a healthcare provider if

jaundice is suspected in a newborn.

Signs and Symptoms:

- Yellow skin and sclera (white part of the eye)
- Poor feeding and weight gain
- High-pitched cry
- Lethargy
- Pale stools

Diagnosis:

- Based on symptoms and bilirubin levels in blood (bilitool.org)
- Serum bilirubin (normal: <5 mg/dL)
- Liver function tests (LFTs) and torch screen to look for underlying issues
- Prolonged jaundice (onset after 14 days old, lasting 4–5 weeks) may indicate an underlying condition, such as hypothyroidism, biliary atresia, or cystic fibrosis

Treatment:

- **Phototherapy:** Light therapy that converts unconjugated bilirubin into a harmless substance that can be excreted. The baby must be naked (except for a diaper) with protective eyewear.
- **Nutrition:** Continue breastfeeding, possibly with more frequent feedings.
- **Exchange Transfusion:** May be necessary due to blood incompatibility with the mother. Exchange transfusion is a medical procedure used to remove bilirubin and other substances from the blood of a newborn with severe jaundice. It is typically used when phototherapy, which is the first-line treatment for jaundice, is ineffective or cannot be used for some reason. Intravenous immunoglobulin (IVIG) is also a treatment option.

Developmental Dysplasia of the Hip (DDH)

DDH is a condition involving improper development of the hip joint in babies and young children.

Recognize Cues:

- Risk factors: female gender, family history, breech birth, firstborn child, tight swaddling
- Signs and symptoms: asymmetrical gluteal and thigh folds, reduced hip abduction, abnormally short femur, limping, walking on tiptoes, positive Trendelenburg sign

Analyze Cues: Assess the severity and impact of DDH on the patient's mobility and development

Prioritize Hypotheses: Consider the patient's age, growth pattern, and risk factors to determine the likelihood of DDH and the urgency of intervention

Generate solutions:

- Perform diagnostic tests, such as physical examination, imaging (e.g., MRI), to confirm the diagnosis
- Develop a treatment plan based on the patient's age and severity of DDH, including bracing, casting, or surgery

Take Action:

- Educate the patient and their family on the treatment options and care requirements, including skin care, repositioning, and cast maintenance
- Collaborate with orthopedic specialists and other healthcare professionals to provide comprehensive care and support

Evaluate Outcomes:

- Monitor the patient's response to the treatment, including changes in hip alignment, mobility, and overall development
- Assess adherence to the treatment plan and provide ongoing support and education as needed
- Adjust the treatment as necessary based on the patient's growth and progress

Clubfoot

Clubfoot is a congenital deformity that causes the foot and ankle to twist inward.

Recognize Cues:

- Risk factors: smoking during pregnancy, low amniotic fluid, congenital defects, family history, male gender
- Signs and symptoms: foot pointed downward and inward, underdeveloped calf, shorter leg on the affected side

Analyze Cues: Assess the severity of the clubfoot and its impact on the infant's future mobility and development

Prioritize Hypotheses: Determine the urgency of intervention based on the severity of the deformity and the infant's overall health

Generate solutions:

- Perform diagnostic tests, such as visual examination and X-rays, to confirm the diagnosis and assess the severity
- Develop a treatment plan, including the Ponseti method, surgery, stretching exercises, and physical or occupational therapy

Take Action:

- Educate the family on the treatment options and care requirements, including cast maintenance and skin integrity
- Collaborate with orthopedic specialists and other healthcare professionals to provide comprehensive care and support

Evaluate Outcomes:

- Monitor the infant's response to treatment, including improvements in foot alignment and mobility
- Assess adherence to the treatment plan and provide ongoing support and education as needed
- Adjust the treatment as necessary based on the infant's growth and progress



5

CHAPTER 5

Pediatric Nursing



Embryonic Development

Embryonic development is the process through which a fertilized egg transforms into a fully developed fetus. This process can be divided into three main stages:

1. PRE-EMBRYONIC STAGE: FERTILIZATION TO THE SECOND WEEK OF DEVELOPMENT.

- Fertilization occurs, and the zygote undergoes rapid cell division to form a blastocyst.
- Implantation of the blastocyst in the uterine wall occurs.

2. EMBRYONIC STAGE: WEEK 3 TO WEEK 8 OF DEVELOPMENT.

- Formation of the three primary germ layers: ectoderm, mesoderm, and endoderm.
- Differentiation of these layers gives rise to specific tissues and organs.
- Critical period for organogenesis, during which the embryo is highly sensitive to teratogens.

3. FETAL STAGE: WEEK 9 TO BIRTH.

- Continued growth and maturation of tissues and organs.
- Rapid increase in size and weight.

Stages of Development

Understanding the different stages of childhood development helps healthcare professionals provide age-appropriate care for pediatric patients. Key stages include:

Infancy (0–1 year)

- Rapid physical growth, development of motor skills, and cognitive development.
- Attachment to caregivers and early social interactions.

Age	Gross Motor	Fine Motor	Language	Social/Cognitive
1 month	Attempts to hold head up when prone	Maintains fistled hands	Cries when upset/hungry	Turns face when parent speaks
2–3 months	Begins to hold head up Makes smoother movements with extremities	Holds object when placed in hand	Makes cooing and gurgling sound Turns head toward sounds	Begins to smile at people as a response mechanism
4–5 months	Hold head steady and unsupported Rolls from stomach to back Sits with support	Hold objects with palmar grasp Brings hands to mouth Can swing at dangling toys	Laughs Begins to babble and copies sounds heard Distinction between cries for different needs	Cries when playing stops Copies smiling expression Calmed by parent's voice

Age	Gross Motor	Fine Motor	Language	Social/Cognitive
6-9 months	Rolls in both directions (stomach to back, vice versa) Sits without assistance Begins to crawl Will bounce when standing Birth Weight Doubled	Moves objects from one hand to the other	Takes turns with parent while making sounds Responds to own name Strings together vowels Begins to say consonants	Knows who is familiar and who is a stranger (stranger anxiety) Responds to the emotions of others
10-12 months	Pulls to stand Walk with assistance	Begins to use 2 finger grasp to pick things up (pincer grasp)	Understands "no" Makes a lot of different sounds Copies gestures of others	Plays peek-a-boo Watches the path of something as it falls

Toddlerhood (1-3 years)

- Increased autonomy and exploration of the environment.
- Toddler anatomy differs from adult anatomy in several ways, which impacts the care provided to this age group:
 - Proportionately larger head and shorter limbs.
 - Fontanelles (soft spots) on the skull, which close by 18-24 months.
 - Smaller airways and less developed immune system, increasing the risk of respiratory infections.

- Higher metabolic rate, requiring more frequent feeding.
- Less developed renal function, impacting drug metabolism and excretion.
- Development of language, social, and emotional skills.

Preschool (3–5 years)

- Development of fine motor skills and increased independence.
- Understanding of basic concepts, such as numbers, shapes, and colors.

School-age (6–12 years)

- Mastery of academic skills, such as reading, writing, and arithmetic.
- Formation of friendships and socialization with peers.

Adolescence (13–18 years)

- Puberty and rapid physical growth.
- Development of identity and complex cognitive abilities.

Developmental Milestones 1 – 4 Years				
Age	Gross Motor	Fine Motor	Language	Social/Cognitive
12 months	Walks holding furniture May walk first steps alone Crawls upstairs Cooperate with dressing by offering arm or leg Birth Weight Tripled	2 finger pincer grasp Hits 2 objects together Copies gestures Put/take out things from a container Pokes with index finger (Think: pokes is with 1 finger)	MAMA/DADA Says 3-5 words Waves goodbye Shakes head “no” Tries to mimic words being said	May have separation anxiety Shy with others Shows fear Search for hidden objects Follows simple directions “Peek-a-boo!”
18 months	Always walks alone Walks up and downstairs with help Throws a ball overhand Jumps in place Will help undress self	Builds tower with 3-4 blocks Turns 2-3 pages at a time Scribbles Drinks from a cup Eats with a spoon	Says 10+ words Identifies common objects Points to show what he/she wants Follows 1 step verbal commands – “sit down”	Temper tantrums Ownership “MINE!” Imitates others Plays pretend Explores alone with parents close by

Age	Gross Motor	Fine Motor	Language	Social/Cognitive
2 years	Walks up and downstairs alone – 1 step at a time Run without falling Kicks ball	Builds tower with 6–7 blocks Turns 1 page at a time Draws line	Vocabulary – 300+ words Can form 2–3 word phrases (Think: 2 words = 2 years old) States own name Points to things or pictures that are named	Parallel play Begins to gain independence from parents Gets excited with other children around
3 years	Walks upstairs alternating feet Pedals a tricycle Jumps forward	Draws a circle Feeds self without assistance Grips marker with fingers instead of fist	Can form 3–4 word sentences Asks “why” States age Follows 2–3 steps instructions (Think: 3 steps for 3 year old)	Begins Associative Play Toilet trained except for wiping Has imaginary friends

Age	Gross Motor	Fine Motor	Language	Social/Cognitive
4 years	Hops on one foot (Think: of your feet in a flamingo shape looks like a 4) Climbs and jumps Catches a ball 50% of the time	Draws a square (Think: a square has 4 sides) Pours liquid Cuts with supervision Mashes own food	Sings a song from memory Tells stories States first and last name Correctly uses "he" and "she"	Plays mom and dad Would rather play with other children than alone Begins creative/ make believe play

Growth and Development

Growth and development in children follow a predictable pattern, and healthcare providers should be familiar with age-appropriate milestones:

1. **Physical growth:** Measured using growth charts for height, weight, and head circumference.
2. **Motor development:** Progression of fine and gross motor skills, such as grasping objects, crawling, walking, and running.
3. **Cognitive development:** Increasing abilities in problem-solving, memory, and learning.
4. **Language development:** Acquisition of verbal and non-verbal communication skills.
5. **Social and emotional development:** Formation of relationships, self-awareness, and emotional regulation.

Pain Assessment and Management in the Pediatric Client

Pain assessment and management in pediatric patients can be challenging due to their limited communication abilities and developmental differences. Key considerations include:

- Age-appropriate pain assessment tools, such as the FLACC scale (Face, Legs, Activity, Cry, Consolability) for infants and toddlers, and self-report scales for older children.
- Non-pharmacologic interventions, such as distraction, relaxation techniques, and therapeutic play.
- Pharmacologic interventions, including careful selection and dosing of analgesic medications based on age, weight, and developmental stage.
- Monitoring for side effects and effectiveness of pain management interventions.

Child Health Promotion

Promoting health and preventing illness in pediatric patients involves several key strategies:

- **Immunizations:** Ensuring children receive age-appropriate vaccinations to protect against preventable diseases.
- **Nutrition:** Encouraging a balanced diet and healthy eating habits to support growth and development.
- **Physical activity:** Fostering regular exercise and active play to promote physical fitness and overall well-being.
- **Safety:** Educating families on injury prevention and safe practices at home, school, and play.
- **Mental health:** Supporting social and emotional development, and providing resources for mental health care as needed.

Respiratory Disorders

Common respiratory disorders in pediatric patients include:

- **Asthma:** Chronic inflammation of the airways causing wheezing, coughing, and difficulty breathing.
- **Bronchiolitis:** Viral infection causing inflammation of the bronchioles, often affecting infants and young children.
- **Pneumonia:** Infection of the lungs, which may be bacterial, viral, or fungal in origin.
- **Croup:** Inflammation of the upper airways, causing a characteristic barking cough and stridor.
- **Cystic fibrosis:** Genetic disorder leading to the production of thick mucus, which can obstruct the airways and lead to chronic lung infections.

Cardiovascular Disorders

Cardiovascular disorders in pediatric patients can be congenital or acquired:

- **Congenital heart defects:** Structural abnormalities of the heart present at birth, such as ventricular septal defects, atrial septal defects, and patent ductus arteriosus.
- **Acquired heart diseases:** Conditions that develop during childhood, such as rheumatic heart disease, myocarditis, and Kawasaki disease.
- **Arrhythmias:** Abnormal heart rhythms, which can be caused by congenital or acquired factors.
- **Heart failure:** Inability of the heart to pump blood effectively, which may result from congenital or acquired heart conditions.

Neuromuscular Disorders

Neuromuscular disorders in pediatric patients include:

- **Cerebral palsy:** Group of disorders affecting movement, balance, and posture due to damage to the developing brain.
- **Muscular dystrophies:** Inherited disorders characterized by progressive muscle weakness and degeneration.
- **Spina bifida:** Congenital defect in which the spinal cord and surrounding structures do not develop properly, leading to varying degrees of disability.
- **Guillain-Barré syndrome:** Acute immune-mediated disorder causing weakness and paralysis, often triggered by an infection.
- **Seizure disorders:** Conditions characterized by recurrent seizures, such as epilepsy.

Renal Disorders

Renal disorders in pediatric patients encompass various conditions affecting the kidneys and urinary system:

- **Acute kidney injury:** Sudden decline in kidney function, often due to dehydration, infection, or trauma.
- **Chronic kidney disease:** Progressive loss of kidney function over time, which may result from congenital anomalies, infections, or systemic diseases.
- **Nephrotic syndrome:** Condition characterized by proteinuria, hypoalbuminemia, and edema, often due to glomerular damage.
- **Urinary tract infections:** Infections of the kidneys, ureters, bladder, or urethra, which may be more common in young children with structural abnormalities or vesicoureteral reflux.
- **Congenital anomalies of the kidney and urinary tract:** Structural abnormalities present at birth, such as renal agenesis, horseshoe kidney, and hydronephrosis.

Gastrointestinal Disorders

Gastrointestinal disorders in pediatric patients include:

- **Gastroesophageal reflux:** Backflow of stomach contents into the esophagus, which may cause irritation, vomiting, and failure to thrive.
- **Inflammatory bowel disease:** Chronic inflammation of the gastrointestinal tract, including Crohn's disease and ulcerative colitis.
- **Celiac disease:** Autoimmune disorder triggered by the consumption of gluten, leading to damage to the small intestine and malabsorption.
- **Gastroenteritis:** Infection of the stomach and intestines, often caused by viruses, bacteria, or parasites, and characterized by vomiting, diarrhea, and abdominal pain.
- **Constipation:** Difficulty passing stool, which may result from poor diet, dehydration, or behavioral factors.

Hematologic Disorders

Hematologic disorders in pediatric patients involve conditions affecting the blood and blood-forming tissues:

- **Anemia:** Decreased red blood cell count or hemoglobin levels, which may be caused by iron deficiency, hemolysis, or bone marrow suppression.
- **Hemophilia:** Inherited bleeding disorder characterized by a deficiency in clotting factors, leading to prolonged bleeding and easy bruising.
- **Sickle cell disease:** Genetic disorder causing red blood cells to assume a sickle shape, leading to anemia, pain, and organ damage.
- **Thalassemia:** Inherited condition characterized by abnormal hemoglobin production, resulting in anemia and other complications.
- **Leukemia:** Cancer of the white blood cells, which may present with symptoms such as fatigue, fever, and increased susceptibility to infections.

Metabolic and Endocrine Disorders

Metabolic and endocrine disorders in pediatric patients include:

- **Type 1 diabetes:** Autoimmune disorder in which the pancreas produces little or no insulin, resulting in high blood sugar levels and the need for insulin therapy.
- **Type 2 diabetes:** Condition in which the body becomes resistant to insulin or does not produce enough insulin, often associated with obesity and lifestyle factors.
- **Hypothyroidism:** Underactive thyroid gland, which may be congenital or acquired and can lead to growth and developmental delays.
- **Growth hormone deficiency:** Insufficient production of growth hormone by the pituitary gland, resulting in growth failure and short stature.
- **Inborn errors of metabolism:** Group of inherited disorders affecting the body's ability to process nutrients, such as phenylketonuria, galactosemia, and maple syrup urine disease.

Skeletal Disorders

Skeletal disorders in pediatric patients encompass a range of conditions affecting the bones and joints:

- **Osteogenesis imperfecta:** Inherited disorder characterized by brittle bones that break easily, often due to a defect in collagen production.
- **Scoliosis:** Abnormal curvature of the spine, which may be congenital or develop during growth.
- **Legg-Calvé-Perthes disease:** Childhood hip disorder caused by disruption of blood flow to the femoral head, leading to avascular necrosis and deformity.
- **Slipped capital femoral epiphysis:** Displacement of the femoral head from the femoral neck, often occurring during periods of rapid growth in adolescence.
- **Juvenile idiopathic arthritis:** Group of chronic inflammatory joint disorders affecting children under the age of 16, causing joint pain, swelling, and stiffness.

NCLEX Immunization Schedule: A Simplified Schedule Of The Most Important Immunizations For Exams

Immunization	Age
Hepatitis B (HepB)	Birth, 1–2 months, 6–18 months
Inactivated Polio Virus (IPV)	2 months, 4 months, 6–18 months, 4–6 years
DTaP (<7 years old)	2 months, 4 months, 6 months, 15–18 months, 4–6 years
Pneumococcal Conjugate Vaccine (PVC)	2 months, 4 months, 6 months, 12–15 months
Haemophilus influenzae type b (Hib)	2 months, 4 months, 6 months, 12–15 months
Influenza	6 months, yearly routine
MMR (Measles, Mumps, Rubella)	12–18 months, 4–6 years
Varicella	12–15 months, 4–6 years
Hepatitis A (HepA)	12–24 months, 6 months after first dose
Meningococcal B	Recommended at 16 years

Immunization	Age
Minimum age for Hepatitis B vaccine	Birth
Minimum age for DTaP vaccine	6 weeks
Minimum age for IPV	6 weeks
Minimum age for Hib	6 weeks
Minimum age for PCV	6 weeks
Minimum age for influenza vaccine	6 months
Minimum age for MMR	12 months
Minimum age for varicella	12 months
Minimum age for Hepatitis A vaccine	12 months
Minimum age for Human Papillomavirus (HPV) vaccine	9 years
Minimum age for Tdap >7 years old	11–12 years for routine vaccine 7 years for catch-up vaccine

Pediatric Vital Signs Cheat Sheet

Heart Rate

AGE	HEART RATE
Neonate (1-28 days)	110 – 180 bpm
Infant (1-12 months)	110 – 160 bpm
Toddler (1-3)	80 – 110 bpm
Preschool Child (3-6)	70 – 110 bpm
School-age Child (6-12)	65 – 105 bpm
Adolescent (12-18)	60 – 100 bpm

Respiratory Rate

AGE	RESPIRATORY RATE
Neonate (1-28 days)	30 – 60 breaths/min
Infant (1-12 months)	30 – 60 breaths/min
Toddler (1-3)	24 – 40 breaths/min
Preschool Child (3-6)	22 – 34 breaths/min
School-age Child (6-12)	18 – 30 breaths/min
Adolescent (12-18)	12 – 18 breaths/min

Blood Pressure

AGE	SYSTOLIC	DIASTOLIC	SYSTOLIC HYPOTENSION
Neonate (1-28 days)	60-90	20-60	<60 (0 – 28 days old)
Infant (1-12 months)	70 – 105	35 – 55	<70 (1mo – 12mo)
Toddler (1-3)	85 – 105	40 – 65	<70 + (age in years x 2)
Preschool Child (3-6)	90 – 110	45 – 70	<70 + (age in years x 2)
School-age Child (6-12)	97 – 120	55 – 70	<70 + (age in years x 2)
Adolescent (12-18)	110 – 130	65 – 80	<90

Temperature

AGE	TEMPERATURE
Infants – children <5 years old (the younger the child, the higher the baseline temperature)	Rectum: 97.9°F (36.6°C) – 100.4°F (38°C) Oral: 95.9°F (35.5°C) – 99.5°F (37.5°C) Axillary: 97.8°F (36.5°C) – 99.5°F (37.5°C) Ear: 96.4°F (36.7°C) – 100.4°F (38°C)
Children >5 years old	98.6°F (37°C)

Childhood Syndromes		
Name	Inheritance	Signs/Symptoms
Patau's Syndrome	Trisomy 13	Intellectual disability, small head, small eyes, cleft lip, clenched hands, malformed ears
Edward's Syndrome	Trisomy 18	Intellectual disability, small head, small jaw, clenched hands, overlapping fingers, malformed ears Typically die in utero; many born will die within 1st week of life
Down Syndrome	Trisomy 21	Intellectual disability, flat face, almond shaped/upward slanting eyes, single palmar crease
Klinefelter's Syndrome	47 XXY ONLY MALES	Lack of development in testes, breast growth, tall stature, skeletal and cardio abnormalities, lack of testosterone, absent facial/body hair
Turner's Syndrome	45 X or XO ONLY FEMALES	Webbed neck, short stature, small breasts, infertility, small hips, hypertension, hypothyroidism, visual problems
Fragile X Syndrome	X linked	Long face, long ears, large testes, mild to moderate autistic behavior, attention deficit, shyness
Prader Willi Syndrome	Inactive paternal copy Chromosome 15	Hypothalamic dysfunction, severe obesity, constant hunger, short stature, low muscle tone, behavior problems
Angelman Syndrome	Inactive maternal copy Chromosome 15	Severe intellectual disability, ataxia, convulsions, excessive laughing, almost absent speech

Piaget's Stages Of Development		
Age	Piaget's Stage	Developmental Qualities
Birth – 2 years old	SENSORIMOTOR STAGE: the newborn is experiencing the world through senses and actions	▪ Object permanence ▪ Stranger anxiety ▪ Behaviors to noises ▪ Develop our senses
2 – 6 years old	PREOPERATIONAL STAGE: representing the world symbolically (objects with words and images) but lacking logical reasoning	▪ Irreversibility ▪ Pretend play ▪ Egocentrism ▪ Language development
7 – 11 years old	CONCRETE OPERATIONAL STAGE: development of logical thought about concrete events and grasps concrete analogies "If nothing is added or taken away, then the amount of something stays the same"	▪ Conservation (something can stay the same in quantity but look different) ▪ Reversibility ▪ Mathematics
12 years – Adulthood	FORMAL OPERATIONAL STAGE: able to think in an abstract manner (ex: beauty, love, freedom, morality)	▪ No longer limited by what is seen or heard ▪ Can transcend a concrete situation and think about the future ▪ Moral reasoning

Types Of Play By Age Group		
Age	Type of Play	Description
0 – 2 years old	Solitary Play	Solitary: alone; child plays on their own even in a room full of children
2 – 2.5 years old	Spectator Play	Spectate: watch; child observes other children playing
2.5 – 3 years old	Parallel Play	Parallel: “next to;” child will play next to other children but not with them
3 – 4 years old	Associate Play	Associate: same; child will be playing the same activity as others but not working/ associating together
4 – 6 years old	Cooperative Play	Cooperate: interact with others; children learn to play with others; using social skills to interact

Erikson's Stages Of Development			
Age	Basic Conflict	Important Events	Outcome (Favorable and Unfavorable)
Infancy: Birth – 18 months	Trust vs Mistrust	Feeding	Favorable: Children develop a sense of faith in the environment and to caregivers love and affection Unfavorable: Suspicion and fear of people/events
Early Childhood: 2 – 3 years	Autonomy vs Shame and Doubt	Toilet Training	Favorable: Children develop personal control over behavior and actions. Child feels adequate and independent Unfavorable: Feelings of shame and self-doubt
Preschool: 3 – 5 years	Initiative vs Guilt	Exploring	Favorable: Ability of the child to take initiative and be assertive. Leads to a sense of purpose Unfavorable: Feeling guilty and inadequate
School Age: 6 – 11 years	Industry vs Inferiority	Attending School	Favorable: Ability to learn and grow socially/academically (feeling competent) Unfavorable: Feeling inferior
Adolescence: 12 – 18 years old	Identity vs Role Confusion	Social Relationships	Favorable: Ability to see one's self as unique. Develop a sense of personal identity while staying true to yourself Unfavorable: Feeling lonely, isolated and confused

Age	Basic Conflict	Important Events	Outcome (Favorable and Unfavorable)
Early Adolescence: 19 – 25 years old	Intimacy vs Isolation	Intimate Relationships	Favorable: Ability to make commitments to others and to love Unfavorable: Inability to form affectionate relationship
Adulthood: 26 – 64 years old	Generativity vs Stagnation	Family and Occupation	Favorable: Caring for others and creating/accomplishing things that make the world a better place Unfavorable: disconnected or uninvolved with community or society
Old Age: 65+ years old	Integrity vs Despair	Facing Death	Favorable: A sense of integrity, reflection on life, acceptance of life and death Unfavorable: Dissatisfaction with life or moments of life; despair over death

Pediatric CPR

Pediatric CPR, or cardiopulmonary resuscitation, is a life-saving procedure that can be performed on children to restore blood flow and oxygen to the brain and other vital organs when their heart and breathing have stopped. Pediatric CPR differs from adult CPR in terms of the depth of compressions, the compression-to-ventilation ratio, and the approach to airway management. By integrating the NCSBN Clinical Judgment Model, healthcare professionals can effectively recognize, analyze, and manage pediatric CPR situations.

Recognize cues:

- Identify an unresponsive child who is not breathing or gasping for air.
- Determine the child's age: Infants (under 1 year) and children (1–8 years) require different techniques.

Analyze cues:

- Assess the child's responsiveness, airway, and breathing.
- Call for help or activate the emergency response system.

Prioritize hypotheses:

Rule out other causes of unresponsiveness or respiratory distress, such as choking or severe illness.

Generate solutions:

Develop a step-by-step plan for performing pediatric CPR based on the child's age.

5. Take action:

Perform pediatric CPR according to the step-by-step plan and continue until help arrives, the child starts breathing normally, or you become too exhausted to continue.

Evaluate outcomes:

- Assess the child's responsiveness, breathing, and circulation.
- Continuously evaluate the effectiveness of CPR and adjust the technique if necessary to

ensure optimal patient outcomes. The goal is to restore blood flow and oxygen delivery to the brain and other vital organs, ultimately increasing the child's chance of survival.

Infants (under 1 year):

1. Position the infant on a firm, flat surface.
2. Open the airway by tilting the head back and lifting the chin.
3. Check for breathing for no more than 10 seconds.
4. If not breathing, give 2 rescue breaths, each lasting 1 second.
5. Place two fingers on the center of the chest, just below the nipple line.
6. Perform 30 compressions at a depth of 1.5 inches (4 cm), at a rate of 100–120 per minute.
7. Give 2 rescue breaths, followed by 30 compressions.
8. Continue CPR at a 30:2 compression-to-ventilation ratio.

Children (1–8 years):

1. Position the child on a firm, flat surface.
2. Open the airway by tilting the head back and lifting the chin.
3. Check for breathing for no more than 10 seconds.
4. If not breathing, give 2 rescue breaths, each lasting 1 second.
5. Place the heel of one hand on the center of the chest, with the other hand on top.
6. Perform 30 compressions at a depth of 2 inches (5 cm), at a rate of 100–120 per minute.
7. Give 2 rescue breaths, followed by 30 compressions.
8. Continue CPR at a 30:2 compression-to-ventilation ratio.

Febrile Seizure Management

Febrile seizures typically occur in children aged 6 months to 5 years, triggered by fever. Causes are unknown but may be related to fever increasing core temperature, hyperventilation, or cytokine release.

Risk factors include rapid fever development, high fever, certain vaccines (such as MMR), family history, and younger age at onset.

Signs and symptoms include fever greater than 38°C (100.4°F), one seizure in a 24-hour span, full-body effects, and duration under 15 minutes.

Complex febrile seizures involve a fever greater than 38°C (100.4°F), more than one seizure in 24 hours, one-sided body effects, and duration longer than 15 minutes.

Treatment includes seeking medical attention for repeated seizures lasting over 5 minutes or with additional complications. For non-severe cases, febrile seizures should subside on their own without long-term harm. Lay the child on their side during the seizure, provide antipyretic medications for fever relief, and use antiseizure medications if necessary. Distinguish fever and seizures from other causes like encephalitis or meningitis. Do not administer aspirin.

Reye's Syndrome

Reye's Syndrome is a rare condition of unknown origin that causes liver dysfunction and brain swelling (cerebral edema). It usually affects children between ages 4 and 12, but it can occur at any age. It occurs more frequently during flu season and typically follows a flu or other viral infection. Notably, it is associated with aspirin use in children, so avoid giving aspirin to babies.

Signs and symptoms include:

- Profuse, effortless vomiting and lethargy
- Neurologic issues: delirium, seizures, coma

Increased intracranial pressure, potentially leading to death

While the cause is unknown, it may be related to various viruses, drugs, exogenous toxins, or increased serum ammonia levels. Diagnosis is confirmed through liver biopsy.

Treatment involves early diagnosis for better outcomes, medications such as mannitol (diuretic) to reduce brain swelling and vitamin K to increase clotting factors in the liver, occupational and physical therapy for patients with neural impairments, education on aspirin risks, maintaining hydration, seizure precautions, elevating the head of the bed to reduce intracranial pressure, monitoring pain levels, and monitoring liver labs for prolonged bleeding and liver dysfunction.

Gastrointestinal Disorders

Pyloric Stenosis

Pyloric stenosis is a condition causing the valve between the stomach and small intestines (pyloric sphincter) to thicken and narrow, blocking the passage of food. Infants usually feed well for the first few weeks of life, with onset typically occurring between 2 weeks and 2 months of age.

1. RECOGNIZE CUES:

- Vomiting after feeding (non-bilious, as it's food, not bile)
- Persistent hunger
- Decreased weight and weight gain
- Visible peristalsis (stomach muscles trying to push food)
- Dehydration and constipation
- Epigastric mass, also known as an "olive mass"

2. ANALYZE CUES:

- Consider possible causes of the symptoms (e.g., unknown cause, risk factors such as male sex, prematurity, family history, smoking during pregnancy, early antibiotic use)
- Evaluate complications, such as failure to grow, dehydration, electrolyte imbalance, stomach irritation, and bleeding

3. PRIORITIZE HYPOTHESES:

- Assess the likelihood and urgency of potential complications
- Generate solutions:
- Plan diagnostic tests (physical exam, blood tests for dehydration and electrolyte imbalance, ultrasound or X-ray)
- Develop a treatment plan, including rehydration, surgery (pyloromyotomy), and postoperative care

4. TAKE ACTION:

- Implement diagnostic tests and treatment plan
- Monitor the patient's hydration status (irritability, pulse rate, mucous membranes, fontanelles) and elimination patterns before and after surgery

5. EVALUATE OUTCOMES:

- Assess the patient's response to treatment, including the resolution of symptoms and the absence of complications
- Monitor the patient's growth and overall well-being

Biliary Atresia

Biliary atresia is a blockage or deformity of the bile duct that occurs in infants soon after birth, affecting the transport of bile from the liver and gallbladder to the small intestine.

1. RECOGNIZE CUES:

- Persistent jaundice beyond 2 weeks old
- Dark yellow urine
- White or tan stool
- Hepatomegaly, abdominal distention
- Poor fat metabolism, poor weight gain
- Irritability
- Splenomegaly (occurs later)

2. ANALYZE CUES:

- Consider possible causes (unknown, late gestation acquisition, post-birth inflammation leading to bile duct destruction)
- Evaluate complications, such as cirrhosis, liver failure, and death

3. PRIORITIZE HYPOTHESES:

- Assess the likelihood and urgency of potential complications
- Generate solutions:

- Plan diagnostic tests (history, physical findings, labs: CBC, electrolytes, bilirubin, LFTs, exploratory surgery)
- Develop a treatment plan, including surgery (Kasai procedure), supportive care, vitamin supplementation, and liver transplant if necessary

4. TAKE ACTION:

- Implement diagnostic tests and treatment plan
- Monitor the patient's response to treatment, nutritional status, and overall well-being

5. EVALUATE OUTCOMES:

- Assess the patient's response to treatment, including the resolution of symptoms and the absence of complications
- Monitor the patient's growth, liver function, and potential need for a liver transplant

Intussusception

Intussusception is a condition where a proximal segment of the bowel “telescopes” into a more distal segment, causing obstruction and decreased blood flow.

1. RECOGNIZE CUES:

- Sudden, acute abdominal pain
- Currant jelly-like stool (hallmark)
- Episodes of pain that come and go every 15–20 minutes
- Abdominal mass (sausage-shaped)

2. ANALYZE CUES:

- Consider possible causes (unknown, tumor/polyp, abnormal intestinal formation at birth)
- Assess risk factors (age, sex, family or personal history)

3. PRIORITIZE HYPOTHESES:

- Determine the urgency of the situation based on the severity of symptoms and

potential complications (dehydration, shock, infection)

4. GENERATE SOLUTIONS:

- Plan diagnostic tests (subjective findings, x-ray/CT, ultrasound)
- Develop a treatment plan, including IV fluids, NG tube decompression, and potential antibiotics

5. TAKE ACTION:

- Implement diagnostic tests and treatment plan
- Monitor the patient's response to treatment, hydration status, and overall well-being

6. EVALUATE OUTCOMES:

- Assess the patient's response to treatment, including the resolution of symptoms and prevention of complications
- Monitor for recurrence or other complications related to the condition

Hirschsprung Disease

Hirschsprung Disease is a condition characterized by the absence of nerve cell ganglia in the distal colon, which interferes with the proper functioning of the intestines and the passage of stool.

1. RECOGNIZE CUES:

- Newborn: Failure to pass meconium within 48 hours, bilious vomiting, trouble feeding, abdominal distention/pain
- Infant: Failure to thrive, constipation, abdominal distention/pain, diarrhea episodes, signs of enterocolitis, fever, explosive watery diarrhea
- Childhood: Ribbon-like, foul-smelling stool, constipation, abdominal distention/pain, palpable fecal mass, undernourishment

2. ANALYZE CUES:

- Consider the pathophysiology of the disease, which involves an aganglionic segment

causing increased pressure and preventing peristalsis

3. PRIORITIZE HYPOTHESES:

- Determine the urgency of the situation based on the severity of symptoms and potential complications, such as bowel perforation and infection

4. GENERATE SOLUTIONS:

- Stabilize fluid and electrolytes
- Implement a low fiber, high calorie, and high protein diet
- Monitor frequent abdominal measurements
- Administer enemas or irrigation to lessen irritation on the colon
- Consider surgical intervention to remove the aganglionic portion of the colon

5. TAKE ACTION:

- Implement the treatment plan and monitor the patient's response to treatment
- Assess for signs of complications, such as fever, increased abdominal tenderness, irritability, and dyspnea

6. EVALUATE OUTCOMES:

- Evaluate the patient's response to treatment, including the resolution of symptoms and prevention of complications
- Monitor for recurrence or other complications related to the condition

Celiac Disease

Celiac disease is an intestinal intolerance to dietary gluten, causing damage to the villi in the small intestines.

1. RECOGNIZE CUES: (MALNOURISH ACRONYM)

- Mouth ulcers,
- Anemia
- Lactose intolerance

- Nausea/vomiting/diarrhea
- Osteo changes
- Uncooperative behavior
- Rash
- Irritability
- Steatorrhea
- Hair loss

2. ANALYZE CUES:

- Understand the pathophysiology: Ingestion of gluten leads to an immune response that damages the villi in the small intestines, causing malabsorption and various symptoms

3. PRIORITIZE HYPOTHESES:

- Consider the patient's age, dietary habits, and the severity of symptoms to determine the likelihood of celiac disease and the urgency of intervention

4. GENERATE SOLUTIONS:

- Perform diagnostic tests, such as blood tests and a biopsy of the small intestines to confirm the diagnosis
- Develop a dietary plan to eliminate gluten and lactose, focusing on increased calories and protein, and decreased fat and fiber
- Provide vitamin supplementation to address deficiencies caused by malabsorption

5. TAKE ACTION:

- Educate the patient and their family on adhering to a gluten-free and lactose-free diet, and monitor for signs of improvement or complications
- Assess for ongoing signs and symptoms, including bloating, diarrhea, and neurological manifestations
- Collaborate with a nutritionist or dietitian to ensure a balanced, safe, and nutritious diet plan

6. EVALUATE OUTCOMES:

- Monitor the patient's response to the dietary intervention, including the resolution of symptoms and prevention of complications
- Assess adherence to the diet plan and provide ongoing support and education as needed
- Regularly reevaluate the patient's nutritional status and adjust dietary recommendations accordingly

Muscular Dystrophy

Muscular dystrophy is an inherited disease that progressively weakens muscles due to genetic mutations in the dystrophin gene.

1. RECOGNIZE CUES:

- Types: Duchenne (more severe, onset <5 years old) and Becker (milder, onset in adolescence or early adulthood)
- Signs and symptoms: proximal muscle weakness, waddling gait, calf pseudohypertrophy, Gower's sign, walking on tiptoes, frequent tripping/falling

2. ANALYZE CUES:

- Assess the severity of the muscular dystrophy, its impact on the patient's mobility, and the presence of any respiratory or cardiac complications

3. PRIORITIZE HYPOTHESES:

- Identify the type of muscular dystrophy and determine the urgency of intervention based on the severity of the condition and the patient's overall health

4. GENERATE SOLUTIONS:

- Perform diagnostic tests such as creatine kinase levels, genetic testing, and muscle biopsy
- Develop a treatment plan including glucocorticoids, physical therapy, and supportive care

5. TAKE ACTION:

- Educate the patient and their family on the disease progression, treatment options, and care requirements
- Collaborate with specialists, physical therapists, and other healthcare professionals to provide comprehensive care and support

6. EVALUATE OUTCOMES:

- Monitor the patient's response to treatment, including improvements in muscle strength and function

- Assess adherence to the treatment plan and provide ongoing support and education as needed
- Adjust the treatment as necessary based on the patient's progression and evolving needs



6

CHAPTER 6

Pharmacology Fundamentals



Key Principles of Pharmacology

Pharmacodynamics

This is the study of how drugs interact with the body at the molecular, cellular, and system levels to produce therapeutic or adverse effects.

Pharmacokinetics

This is the study of how drugs are absorbed, distributed, metabolized, and eliminated by the body.

- **Absorption:** This is the process by which a drug enters the bloodstream from its site of administration, such as the mouth, skin, or injection site. The rate and extent of absorption can be influenced by factors such as the drug's chemical properties, the formulation of the drug, and the route of administration.
- **Distribution:** After a drug has been absorbed into the bloodstream, it can be distributed throughout the body to its target site(s) of action. The extent and rate of distribution depend on factors such as the drug's chemical properties, its ability to cross cell membranes, and the body's blood flow to different organs.
- **Metabolism:** This is the process by which the body breaks down a drug into metabolites that can be eliminated from the body. Metabolism occurs mainly in the liver, but other organs such as the kidneys, lungs and intestines also play a role. The rate and extent of metabolism can be influenced by factors such as genetics, age, and disease.
- **Elimination:** This is the process by which a drug and its metabolites are removed from the body, mainly through the kidneys in the form of urine, but also through the liver, lungs, and other routes. The rate and extent of elimination can be influenced by factors such as the drug's chemical properties, the function of the organs responsible for elimination, and other medications that may affect elimination.

Drug-receptor interactions

This refers to the interaction between a drug and its target receptor in the body, which determines the drug's pharmacological effects. Receptors are proteins located on

the surface or inside cells that interact with a specific signaling molecule, such as a neurotransmitter or hormone, to initiate a physiological response. Drug molecules can also interact with these receptors to produce their effects. The binding of a drug molecule to a receptor can result in a number of effects, such as the activation or inhibition of cellular signaling pathways that regulate physiological functions. Some drugs may also block or compete with the binding of other molecules to the receptor, leading to a decrease in their biological activity. The strength and specificity of the interaction between a drug and receptor can be influenced by a number of factors, including the chemical structure of the drug molecule, the shape and properties of the receptor site, and the concentration of the drug and receptor in the body. Understanding drug receptor interactions is important for developing safe and effective drugs, and for predicting and managing potential drug interactions or adverse effects.

Drug-drug interactions

This refers to the interaction between two or more drugs that can affect the pharmacokinetics or pharmacodynamics of each other, leading to therapeutic or adverse effects. Drug interactions can occur in a variety of ways, such as by affecting the way a medication is absorbed, metabolized, or excreted by the body. Some drug interactions can be severe and even life-threatening.

Therapeutic index

This is the ratio of a drug's toxic dose to its therapeutic dose, which determines the safety and efficacy of the drug. It is calculated by comparing the dose of a medication that causes a therapeutic effect to the dose that causes toxicity. The therapeutic index is a way to assess the margin of safety of a medication. Medications with a high therapeutic index have a wide margin of safety, which means that they can be given at higher doses without causing toxicity. Medications with a low therapeutic index have a narrow margin of safety, which means that they need to be given at lower doses to avoid toxicity. The therapeutic index is an important consideration when prescribing medications, as it helps to ensure that the medication is both effective and safe. It is important to note that the therapeutic index is not the same as the efficacy of a medication, which refers to how well

the medication works to achieve its intended therapeutic effect.

Individual variability

This refers to the fact that different people may respond differently to the same drug due to genetic, environmental, or other factors. These factors can affect how a medication is absorbed, distributed, metabolized, and eliminated by the body, which can in turn affect its effectiveness and safety. For example, some people may require a higher dose of a medication to achieve the same effect as someone else, while others may experience more side effects or toxicity from the same dose. Individual variability highlights the importance of personalized medicine, where healthcare providers take into account individual patient characteristics when selecting and prescribing medications. It is important for healthcare providers to monitor patients closely for any signs of adverse effects or therapeutic failure, and to adjust medication dosages or switch to alternative medications as needed.

Dosage Calculation

Dosage calculations are a crucial aspect of nursing practice, as they ensure the accurate administration of medications to patients. As a nurse, you are responsible for administering medications in the correct dosage, at the correct time, and by the correct route. This requires an understanding of the fundamentals of dosage calculations.

Before we dive into the specifics of dosage calculations, let's start with some basic terms:

- **Medication:** Any substance, other than food, that is used to prevent, diagnose, treat, or cure disease.
- **Dose:** The amount of medication that is administered at one time.
- **Dosage:** The amount of medication given over a certain period of time.
- **Route:** The method by which a medication is administered (e.g. orally, intravenously, topically, etc.).
- **Frequency:** How often a medication is administered.
- **Duration:** How long a medication is administered.

Fundamentals

Dosage calculations are based on several factors, including the patient's weight, age, sex, and medical condition. The most common way to calculate medication dosages is to use a formula. The formula for calculating medication dosages is as follows:

$$\text{Amount to be Administered} = \frac{\text{Desired Dose}}{\text{Available Dose}} \times \text{Conversion Factor}$$

To use this formula, you need to know the desired dose, the available dose, and the conversion factor.

The desired dose is the amount of medication that the patient needs to receive. The available dose is the strength of the medication that is available. The conversion factor is a ratio that converts one unit of measurement to another.

For example, let's say that you need to administer 500 mg of a medication to a patient, and the medication comes in a 250 mg tablet. The conversion factor is 1 tablet = 250 mg. To calculate the number of tablets needed, you would use the following formula:

In this case, you would need to administer 2 tablets to the patient to achieve the desired dose of 500 mg.

$$\begin{array}{l} \text{Amount to be} \\ \text{Administered} \end{array} = \frac{500 \text{ mg}}{250 \text{ mg}} \times 1 \text{ tablet} = 2 \text{ tablets}$$

Further Considerations:

Another important factor to consider when calculating medication dosages is the patient's weight. Many medications are prescribed based on the patient's weight, and dosages may need to be adjusted for patients who are underweight or overweight. To calculate medication dosages based on weight, you will need to know the patient's weight in kilograms.

To convert a patient's weight from pounds to kilograms, use the following formula:

$$\begin{array}{l} \text{Weight in} \\ \text{kilograms} \end{array} = \frac{\text{Weight in pounds}}{2.2}$$

Once you have the patient's weight in kilograms, you can use the following formula to calculate the medication dosage:

$$\begin{array}{l} \text{Amount to be} \\ \text{Administered} \end{array} = \frac{\text{Desired Dose}}{\text{Available Dose}} \times \begin{array}{l} \text{Patient Weight} \\ \text{(in kg)} \end{array}$$

For example, let's say that you need to administer a medication to a patient based on their weight. The medication comes in a vial that contains 1000 mg of medication per 10 mL. The patient weighs 70 kg, and the desired dose is 500 mg. To calculate the amount to be administered, you would use the following formula:

$$\begin{array}{l} \text{Amount to be} \\ \text{Administered} \end{array} = \frac{500 \text{ mg}}{1000 \text{ mg}} \times 70\text{kg} = 35 \text{ mL}$$

In this case, you would need to administer 35 mL of the medication to the patient to achieve the desired dose of 500 mg.

It's important to note that medication dosages must be rounded to the nearest whole number. If the dosage is less than 0.5, it is rounded down to 0, and if the dosage is 0.5 or greater, it is rounded up to 1. In addition to the formulas and calculations, it is important to double-check all medication dosages.

IV Dosages

Calculating IV dosage is important in nursing to ensure the patient receives the correct amount of medication through their IV access. The basic formula for calculating IV dosage is:

$$\text{Dosage in mcg/kg/min} = \frac{\text{total amount of drug (in mg)} \times 1000}{\text{patient weight (in kg)} \times \text{time (in minutes)}}$$

Here are some important concepts to keep in mind when calculating IV dosages:

- **Flow rate:** The rate at which the medication is delivered through the IV line is called the flow rate. The flow rate is usually measured in mL/hour or drops/minute, and it is important to calculate the flow rate accurately to avoid over- or under-dosing the patient.
- **Drip rate:** The drip rate is the number of drops per minute that must be administered to deliver the medication at a specific flow rate. The drip rate is determined by the size of the IV tubing and the flow rate.
- **IV pump:** IV pumps are often used in hospital settings to administer medications at a controlled rate. The pump can be programmed to deliver the medication at a specific rate, and it will sound an alarm if the flow rate is interrupted or if there is an air bubble in the line.
- **Titration:** Titration refers to the process of adjusting the medication dose based on the patient's response. In some cases, the medication may need to be titrated up or down to achieve the desired effect.
- **Compatibility:** It is important to ensure that the medication is compatible with the IV fluid and any other medications that are being administered through the same line. Some medications can react with other medications or fluids, leading to adverse effects.

Overall, accurate dosage calculations are critical for ensuring patient safety and effective medication administration in the IV setting. Nurses should be familiar with the basic formula for calculating IV dosages, as well as the concepts of flow rate, drip rate, IV pumps, titration, and compatibility.

Cardiovascular Medications: Beta Blockers

Beta Blockers (Suffix: -lol)

- Action: Inhibit beta receptors, leading to lower heart rate and blood pressure.
- Note: Beta-2 receptors affect the lungs, so beta blockers may cause bronchospasms. Do not give to asthma or COPD patients.

Considerations:

- Can be given to heart failure patients.
- May mask symptoms of hypoglycemia.
- Check heart rate and blood pressure before administering; hold if BP < 90 or HR < 60.
- Monitor for orthostatic hypotension, wheezing, decreased heart rate, and decreased blood pressure.
- **Selective Beta Blockers (heart only):** Atenolol, Metoprolol
- **Nonselective Beta Blockers:** Propranolol, Sotalol

Cardiovascular Medications: Calcium Channel Blockers

- **Action:** Block calcium movement, relaxing smooth muscle, decreasing resistance and blood pressure (BP).

Types:

- **DIPINE:** Only lowers BP
- **ZEM/-AMIL:** Lowers both heart rate (HR) and BP

Considerations:

- Avoid in heart failure patients
- Check HR and BP before administering; hold if BP <90 or HR <60
- Monitor for orthostatic hypotension and low HR/BP
- Headache is a normal finding

Cardiovascular Medications: Vasodilators

- **Action:** Relax smooth muscles, decreasing BP and increasing oxygen supply to major organs.
- **Normal side effects:** Headache, Flushing, Hypotension

Considerations:

- Do not take with sildenafil (Viagra)
- Hold if systolic BP <100 or drops >30mmHg
- Monitor BP and orthostatic hypotension

Examples of vasodilator medications:

Nitroglycerin, Nitroprusside, Hydralazine, Isosorbide

Cardiovascular Medications: ACE Inhibitors

- **Action:** Inhibit the renin-angiotensin-aldosterone system (RAAS), lowering BP by eliminating sodium and water while increasing potassium (K⁺).
- **Key points:** Teratogenic, ACE inhibitors may cause cough or angioedema (airway risk), increased K⁺ levels.

Considerations:

- Monitor K⁺ levels and EKG changes
- Limit K⁺ rich foods in diet
- Watch for BP and orthostatic hypotension

Cardiovascular Medications: Diuretics

Potassium-wasting Diuretics

- **Action:** Remove excess water by increasing potassium excretion and urination.
- **Key:** Administer only if potassium (K^+) levels are within the 3.5 – 5.0 mEq/L range.
- **Use:** Heart failure, worsening crackles, new leg edema, rapid weight gain.
 - **Loop Diuretics:** Furosemide, Bumetanide, Torsemide
 - **Thiazide Diuretics:** Hydrochlorothiazide, Chlorothiazide
 - **Key points:** Monitor for decreased potassium levels, which can lead to decreased heartbeats (flat T wave, ST depression, V wave).
 - Encourage potassium-rich foods, such as bananas, green leafy vegetables, and melon (avoid licorice roots, which can lower K^+).
 - **Furosemide:** Administering too quickly may cause tinnitus and hypotension; administering too long may lead to kidney damage, increased BUN and creatinine, and decreased potassium levels.

Potassium-Sparing Diuretics (Spironolactone):

- **Action:** Spironolactone directly blocks aldosterone, leading to sodium and water excretion while “sparing” potassium in the body.

Key Points:

- Be vigilant for increased potassium levels, which can lead to increased heartbeats (peaked T-wave, ST elevation).
- Encourage patients to avoid potassium-rich foods and salt substitutes.
- Ensure the patient is on a cardiac monitor to track any potential changes in heart rate or rhythm.

Mannitol (Osmotic Diuretic):

- **Action:** Mannitol decreases the thickness of blood, increasing cerebral blood flow and reducing blood volume and intracranial pressure (ICP).
- **Uses:** Mannitol is used to treat increased intracranial pressure and lower eye pressure.

- **Side Effects:** Side effects may include headache, nausea, and acute renal failure (when given in large doses).
- **Monitoring:** Keep track of the patient's neurologic and renal status.

Key Points for Potassium-Wasting and Sparing Diuretics:

- Always check blood pressure; hold the medication if systolic is below 100.
- Monitor BUN, creatinine, and potassium levels; use a heart monitor.
- Administer diuretics in the morning to avoid nighttime disturbances.
- Record daily weights.
- Avoid sodium-containing medications (e.g., cough, flu, antacids, NSAIDs).
- Educate patients about orthostatic hypotension and increased risk of sunburns.

Cardiovascular Medications: Digoxin

Action: Affects HR but not BP; promotes forceful contractions.

Therapeutic Range: 0.5 – 2.0.

Considerations:

- Does not affect K⁺ levels; maintain a consistent K⁺ diet
- Monitor kidney function (BUN, Cr)
- Signs of toxicity: vision changes, dizziness, nausea/vomiting, irregular pulse, confusion

Key Takeaways:

- Lower BP: All except digoxin
- Lower HR: Beta blockers, calcium-channel blockers, digoxin
- Not for heart failure: calcium-channel blockers
- Suitable for heart failure: Digoxin, beta blockers, vasodilators, diuretics
- Avoid during pregnancy: ACE inhibitors, angiotensin receptor blockers (ARBs)
- Monitor vitals and do not stop medications abruptly

Respiratory Medications

Beta2 Agonists (-terol):

- Action: Enhance Beta2 effects for bronchodilation.
- Short-acting (e.g., Albuterol): For acute attacks, not daily use. Can be combined with steroids or anticholinergics.
- Long-acting (e.g., Salmeterol): Not for acute attacks, should be used with corticosteroids.
- Side effects: Tachycardia, nervousness, palpitations, tremors.

Corticosteroids (-sone, -ide):

- Uses: Asthma, rhinitis, autoimmune disorders.
- Action: Reduce inflammation by suppressing the immune system.
- Side effects: Osteoporosis, elevated glucose, decreased potassium, fluid retention, urinary retention, PUD, immunosuppression.
- Examples: Beclomethasone, Fluticasone, Budesonide, Prednisone.

Inhaled Anticholinergics (-ropium):

- Uses: COPD, bronchitis, emphysema, asthma, allergies.
- Action: Block parasympathetic nerve reflexes for bronchodilation.
- Examples: Ipratropium (short-acting), Tiotropium (long-acting).
- Side effects: Dry mouth, throat irritation, hoarseness, bitter taste.

Leukotriene Modifiers (-lukast):

- Uses: Asthma, exercise-induced bronchoconstriction.
- Action: Block leukotriene function to dilate smooth muscle and decrease mucus.
- Side effects: Headaches, sore throat, cold symptoms.
- Examples: Montelukast, Zafirlukast.

Xanthines (Theophylline):

- Uses: Long-term asthma, COPD.

- Action: Increase cAMP for bronchodilation.
- Side effects: GI upset, headache, nervousness, seizures, dysrhythmias.
- Toxicity level: 10–20 mcg/mL.

Expectorants (e.g., Guaifenesin):

- Uses: Non-productive cough.
- Action: Decrease lung secretion viscosity for a more productive cough.
- Side effects: Headache, dizziness, nausea/vomiting.

Mucolytics (e.g., Acetylcysteine, Dornase Alfa):

- Uses: Pulmonary disorders with thick mucus (CF, COPD, pneumonia).
- Action: Break down viscosity of secretions.
- Side effects: Bronchospasm, nausea/vomiting, rash, headache, dizziness.

Decongestants (e.g., Pseudoephedrine, Phenylephrine):

- Uses: Rhinitis, sinusitis, common cold.
- Action: Vasoconstrict respiratory mucosa to reduce inflammation.
- Side effects: Palpitations, restlessness, weakness, hypertension, rebound congestion.

Antihistamines (e.g., Diphenhydramine, Loratadine, Cetirizine):

- Uses: Seasonal allergies, urticaria, angioedema, allergic conjunctivitis.
- Action: Block histamine at Histamine-1 receptor sites.
- Side effects: Itching, sneezing, hives, GI upset, nausea, dry mouth, constipation, sedation, drowsiness.

Nonsteroidal Anti-allergy (Cromolyn):

- Uses: 3rd line drug for mastocytosis.
- Action: Prevent mast cells from secreting histamine.
- Side effects: Burning in nose, itchy watery eyes

Hyperlipidemic Medications (-statin)

- Uses: Decrease cholesterol and reduce risk of MI or stroke.
- Action: Block HMG-CoA reductase enzyme to slow down cholesterol production.
- Side effects: Liver toxicity, myopathy (muscle pain), rhabdomyolysis (serious syndrome caused by the breakdown of skeletal muscle tissue).
- Monitor liver function tests (LFTs) and renal/kidney tests; medication metabolized in liver, excreted by kidneys.
- Avoid alcohol and take in the evening.

Key Points:

- These medications affect liver and lipid profile.
- They are usually not prescribed to lower cholesterol during pregnancy.
- Monitor LFTs and lipid panel.

Bile Acid Sequestrants (prefix: Cole-), also known as Resins

- Uses: Lowering cholesterol (LDL).
- Action: Decrease LDL by binding bile acids in the gut, leading to excretion and pulling more cholesterol from the bloodstream to produce bile.
- Side effects: Constipation, flatulence, GI disturbance, bad taste.
- Recommendations: Increase fiber and fluids, as this interferes with the absorption of fat-soluble vitamins A, D, E, K.
- Take with food.
- Examples: Colesevelam, Colestipol.

Cholesterol Absorption Inhibitors

- Uses: Lowering cholesterol (LDL).
- Action: Reduces LDL by inhibiting absorption of cholesterol in the intestines.
- Side effects: Liver toxicity, myopathy (muscle pain) potentially leading to rhabdomyolysis, headache, dizziness, fatigue.
- Monitoring: LFTs and creatine kinase (CK) levels (normal: 22–198 U/L).
- Precautions: Use cautiously during pregnancy.

Niacin/Nicotinic Acid (Vitamin B3)

- Uses: Lowering cholesterol (LDL) and triglycerides, increasing HDL.
- Action: Reduces the release of fatty acids when given well above the vitamin requirement.
- Side effects: Liver toxicity, myopathy, gout (hyperuricemia), N/V/D, hyperglycemia, flushing (use aspirin to reduce).
- Monitoring: LFTs, lipid panel, and blood glucose.

Fibrates (all include “fib” in the name)

Gemfibrozil, Clofibrate, Fenofibrate:

- Uses: Lowering triglyceride levels, increasing HDL.
- Action: Lipoprotein lipolysis.
- Side effects: Liver toxicity, myopathy, gallstones, GI upset, N/V.
- Monitoring: LFTs and CK levels (normal: 22–198 U/L).
- Administration: Give 30 minutes before breakfast and dinner.

Anticonvulsants

Phenytoin

- Action: Slows down impulses in the brain that cause seizures.
- Use: Treat and prevent seizures.
- Side Effects: Gingival hyperplasia, diplopia, rash, decreased blood pressure.
- Signs of Toxicity: Nystagmus, slurred speech, ataxia, vomiting.
- Therapeutic Range: 10–20 mcg/ml.
- Key Points: Affects the effectiveness of oral contraceptives. Avoid milk and antacids as they decrease absorption. Take with food and have regular dental checkups.

Lamotrigine

- Action: Inhibits sodium transport, reducing seizures.
- Use: Best for partial seizures and as a mood stabilizer.
- Side Effects: Increased risk of suicidal thoughts, double vision, headache, drowsiness, dizziness.
- Key Points: Monitor for worsening depression or mood changes. Do not stop abruptly. Decreases the effectiveness of oral contraceptives.

Carbamazepine

- Action: Inhibits sodium transport, which leads to a decrease in seizures.
- Use: Treats tonic-clonic and partial seizures; also acts as a mood stabilizer.
- Side Effects: Agranulocytosis (increased risk of infection), hyponatremia, dizziness, drowsiness, nausea, and vomiting.
- Key Points: Monitor for worsening depression or mood changes. Do not stop the medication abruptly.

Barbiturates

Phenobarbital

- Action: Stimulates GABA, which elevates the seizure threshold and reduces excitement in the brain.
- Use: Treats tonic-clonic, focal, and status epilepticus seizures.
- Side Effects: Drowsiness, ataxia, respiratory depression, reduced blood pressure.
- Therapeutic Range: 15-40 mcg/ml.
- Key Points: Monitor breathing and perform routine neurological checks.

Valproates (Valproic Acid)

- Action: Not fully understood, but it may increase levels of GABA.
- Use: Treats simple and complex seizures.
- Side Effects: Nausea, vomiting, diarrhea, dizziness, drowsiness, tremor, tinnitus, increased bleeding time, and decreased platelet count.
- Key Points: Monitor white blood cell count, platelet count, liver enzymes, and liver function tests.

Antipsychotics

- Key Points: Used for various psychiatric conditions.
- Dopamine: Associated with determination for reward, obsession (addiction), and pleasure.
- Norepinephrine: Linked with no hesitation, increased heart rate and blood pressure, alertness, and good recall.
- Serotonin: Related to sleep, emotions, and good memory.

Schizophrenia Symptoms:

- Positive symptoms: Hallucinations, delusions, and disorganized thinking.
- Negative symptoms: Flat or blunted affect, isolation, lack of interest, and decreased speech.

1. FIRST GENERATION ANTIPSYCHOTICS (TYPICAL OR CONVENTIONAL):

- Suffix: -zine and Haloperidol (Haldol)
- Action: Block D2 receptors in all pathways of the brain.
- Use: Treat positive symptoms of schizophrenia.
- Side Effects: Extrapyramidal symptoms (Parkinson's-like symptoms, dystonia, shuffling gait, tardive dyskinesia), neuroleptic malignant syndrome (high fever, variable blood pressure, increased heart rate, muscle rigidity, confusion), anticholinergic symptoms, orthostatic hypotension, and seizures.
- Key Points: Administer benztropine for extrapyramidal symptoms and muscle relaxants for neuroleptic malignant syndrome.

2. SECOND GENERATION ANTIPSYCHOTICS (ATYPICAL):

- Suffix: -apine, -done
- Action: Block D2 and serotonin receptors (balance dopamine levels).
- Use: Treat positive and negative symptoms of schizophrenia.
- Side Effects: Metabolic symptoms (hyperglycemia, weight gain, increased cholesterol), anticholinergic symptoms, decreased libido, sedation, orthostatic hypertension.
- Key Points: Clozapine can cause agranulocytosis (monitor for immunosuppression), and risperidone can be injected every two weeks via the intramuscular route.

3. MOOD STABILIZERS:

- Use: Treatment of bipolar disorder.
- Examples: Lithium, anticonvulsants (valproic acid, carbamazepine, lamotrigine), antipsychotics (olanzapine, risperidone, aripiprazole), and benzodiazepines (with -pam or -lam suffix).

Anti-Anxiety Medications

Benzodiazepines (with -pam or -lam suffix)

- Action: Bind to GABA receptors to enhance the action of GABA, a neurotransmitter that slows down (calms) brain activity.
- Side Effects: Sedation, decreased respiratory rate, decreased blood pressure, decreased heart rate, and amnesia.
- Key Points: Fast-acting (imagine “Pam” riding in a “Benz” for its speed). Use for short-term treatment only, as these medications can cause dependency. The antidote for benzodiazepine overdose is flumazenil.

Atypical Antianxiety Medication – Buspirone

Buspirone

- Uses: Anxiety, PTSD, OCD, and panic disorders.
- Side Effects: Dizziness, headache, and nausea.
- Key Points: Buspirone does not cause sedation or dependency. If experiencing GI upset, take it with food. It takes about 1–2 weeks for the medication to have its full effect.

Antidepressants

- Key: Take 2–4 weeks for full effect.
- Risk for suicide.

SSRIs (Selective Serotonin Reuptake Inhibitors):

- Action: Inhibits serotonin reuptake, increasing available serotonin in the brain to improve mood.
- Side Effects: Weight gain, insomnia, sexual dysfunction.
- Risk: Serotonin syndrome – agitation, hallucinations, fever, tremors, sweating.
- Suffixes: -tine, -line, -pram

SNRIs (Serotonin–Norepinephrine Reuptake Inhibitors):

- Action: Inhibit the reuptake of serotonin and norepinephrine into the neuron, increasing their availability in the brain.
- Side Effects: Loss of appetite, insomnia, sexual dysfunction.

TCAs (Tricyclic Antidepressants) – -tryptline, -ipramine:

- Action: Inhibit serotonin reuptake, inhibit norepinephrine reuptake, and inhibit alpha receptors (leading to orthostatic hypotension).
- Side Effects: All of these plus urinary retention, histamine-related sedation, and muscarinic receptor-related anticholinergic symptoms.
- Key: Be careful in the sun, increase fiber and fluids intake.

MAOIs (Monoamine Oxidase Inhibitors) – e.g. Phenelzine, Isocarboxazid:

- Action: Blocks the destruction of serotonin, norepinephrine, dopamine, and tyramine, increasing their availability in the brain.
- Use: Depression, panic disorder.
- Side Effects: Agitation, anxiety, decreased BP, hypertensive crisis (interacts with many medications). Avoid tyramine-rich foods (chocolate, avocado, wine, cheese).

Atypicals:

- Bupropion (Wellbutrin) – For depression and smoking cessation.
- Trazodone – For depression (high dose) and insomnia.

Other Antidepressants:

- Tricyclic Antidepressants (TCAs)
- Beta Blockers
- Barbiturates (–barbital): Stays in the system for 3–5 days.

Anticholinergic Agents (Benztropine)

Benztropine

- Action: Antagonizes acetylcholine and histamine receptors, leading to decreased acetylcholine (ACh).
- Use: Reduces muscle rigidity and tremors.
- Side Effects: Anticholinergic symptoms – dry mouth, dry eyes, blurry vision, urinary retention, constipation.
- Teach: Chew gum for dry mouth, wear sunglasses, increase fiber and fluid intake.
- Key: Do not give to patients with glaucoma. Avoid alcohol. Do not stop medication abruptly.

MAO-B Inhibitors (Rasagiline, also known as Azilect)

Rasagiline, also known as Azilect

- Action: Increases dopamine by inhibiting MAO activity.
- Use: Improves shaking and stiffness, and reduces the amount of off-time (periods of slow movements).
- Side Effects: Dizziness, drowsiness, nausea, heartburn, dry mouth.
- Key: Avoid foods containing tyramine, such as cheese, chocolate, wine, avocado, and beer.

Dopamine Agonists

Carbidopa/Levodopa: Reduces muscle rigidity and tremors

- Action: Increases dopamine levels; Carbidopa prevents levodopa from converting into dopamine in the bloodstream, allowing more dopamine to enter the brain.
- Side Effects: Nausea, vomiting, drowsiness, dyskinesia, dark urine, sweating, decreased blood pressure.
- Key: It may take up to three weeks to be effective. Increasing protein intake can reduce its effectiveness. Do not use with MAOIs.

Ropinirole (Requip)

- Improves tremors, muscle spasms, and stiffness
- Also used for restless leg syndrome.
- Side Effects: Drowsiness, confusion, orthostatic hypotension (increased fall risk).

Spasmolytics (Muscle Relaxants)

Dantrolene: Direct action on muscle cells

- Used for: Reducing muscle spasticity in spinal injuries, cerebral palsy, multiple sclerosis, and malignant hypothermia
- Action: Inhibits calcium release in skeletal muscles, leading to decreased muscle spasticity
- Side Effects: Drowsiness, muscle weakness, gastrointestinal upset, hepatic toxicity
- Monitoring: Keep an eye on liver enzymes

Baclofen: Centrally acting on the CNS

- Used for: Muscle spasms, especially back spasms
- Action: Enhances GABA in the CNS, leading to decreased muscle spasticity
- Side Effects: Drowsiness, nausea, gastrointestinal upset, constipation
- Teaching: Increase fiber and fluids to combat constipation

Tizanidine: Centrally acting Alpha2 adrenergic agonist

- Used for: Similar purposes as Dantrolene and Baclofen
- Action: Inhibits presynaptic motor neurons to decrease the number of spasms, alleviate clonus, and improve mobility
- Side Effects: Less muscle weakness than Baclofen, dry mouth, drowsiness, dizziness

ADHD Medications

Methylphenidate (Ritalin): Short-acting

Amphetamine (Adderall):

- Short-acting: Onset 30–45 minutes, wears off in 3–6 hours
- Long-acting (XR = Extended Release): Onset 45–1 hour, wears off in 8–12 hours

Key Points:

- Do not take at night to avoid insomnia
- Take immediately before or after a meal
- Monitor weight

Withdrawal Medications

Alcohol:

- As early as 6 hours, peak at 24–48 hours. Know the time of the last drink.
- Benzodiazepines: Decrease withdrawal symptoms, reduce seizure risk, stabilize vitals
- Anticonvulsants: Reduce seizure risk
- Antihypertensives (Clonidine and Beta-blockers): Decrease heart rate, blood pressure, and cravings

Opioid:

- Methadone: Long-term maintenance

Nicotine:

- Bupropion, Nicotine replacement, Varenicline

Abstinence: Suppress patient cravings

- Disulfiram: Unpleasant reactions with alcohol
- Naltrexone: Nausea/vomiting, sweating
- Acamprosate: Reduces anxiety/restlessness, palpitations; “A camp makes you happy”

Alcohol Addiction Treatments (Medications)

- Naltrexone: Reduces or eliminates alcohol cravings
- Acamprosate: Helps patients abstain from alcohol
- Topiramate: Decreases alcohol cravings
- Disulfiram: Reaction with alcohol causes unpleasant physical effects
- Naltrexone: Helps reduce alcohol cravings

Alcohol Withdrawal Medications (Risk of Seizures)

Seizures may occur 24–48 hours after the last drink. To prepare for this risk, give:

- Benzodiazepines
 - Anticonvulsants
 - Beta-blockers
 - Magnesium sulfate
 - Thiamine (B1) and Folic acid
-
- Withdrawal Symptoms: Tremors, vomiting, anxiety, irritability, high blood pressure, increased heart rate, confusion
 - Seizure Symptoms: Extreme confusion and agitation, increased heart rate, fever, sweating, loss of consciousness, aura, headache

NSAIDs and Acetaminophen

Types:

- Naproxen
- Salicylic acid (Aspirin)
- Acetylsalicylic acid (also Aspirin)
- Ibuprofen
- Ketorolac (Toradol)
- Avoid with: Vitamin E, Garlic, Ginkgo, Omega-3 oils

Characteristics:

- Antipyretic: Reduces fever
- Anti-inflammatory: Decreases prostaglandin synthesis
- Analgesic: Relieves pain
- Anti-platelet: (Aspirin) Increases bleeding risk

Key: NSAIDs do not cause CNS symptoms.

Nursing Considerations:

- NSAIDs affect the kidney, liver, heart, and GI system
- Avoid in patients with:
 - Asthma (risk of bronchospasm)
 - Ulcers (worsen and cause GI bleed)
 - Kidney disease (increased creatinine, BUN, long-term renal injury)
 - Ibuprofen increases the risk of hypertension and stroke
 - Heart failure/cardiovascular disease (most commonly causes sodium retention and edema)
- Can increase the risk of blood clots, except for Aspirin
- Safe to take with PPI (proton pump inhibitors)
- Take with food, at the lowest dose, and avoid alcohol

Aspirin Key Points:

- Has all the same properties as NSAIDs and also thins blood
- Monitor for signs of bleeding, hypotension, and tachycardia
- Monitor for toxicity; earliest sign is tinnitus
- Do not give to children (risk of Reye's syndrome)

Not an NSAID: Tylenol (Acetaminophen)

- Used instead of NSAIDs to reduce the risk of bleeding in PUD and hemophilia
- Analgesic and antipyretic, but not anti-inflammatory
- Can be taken with ibuprofen
- Excessive use can cause liver damage; monitor liver function tests (LFTs)

Antidote: Acetylcysteine

Antibiotics

Broad Spectrum (Cillin, Cef/Ceph):

- Safe for pregnancy and breastfeeding
- If allergic to Cillins, assess reaction type before administering a Ceph drug

Cillins:

- May interfere with oral contraceptives
- Take with food, shake well
- Side effects: Increased risk of bleeding (monitor clotting time)

Cef/Ceph:

- May cause C. difficile, but does not treat it
- Take with food if experiencing GI upset
- Side effects: Diarrhea (common)
- Macrolides (Azithromycin, Erythromycin):
- Liver toxic: Monitor AST/ALT and be cautious when taking with Tylenol
- Can prolong QT interval, potentially leading to cardiac arrest
- Take on an empty stomach with a full glass of water, without food

Tetracyclines (Tetracycline, Doxycycline):

- Teratogenic; may interfere with oral contraceptives
- Can cause tooth discoloration
- Photosensitivity: Avoid sun exposure
- Take on an empty stomach with water, avoid calcium and iron (blocks absorption)
- Sit upright for 30 minutes after taking (risk of esophagitis)

Metronidazole (Flagyl):

- Used for C. difficile, STIs (trichomoniasis)
- Avoid alcohol during and three days after treatment

- Normal side effects: Brown urine, metallic taste
- Severe side effects: New rash, skin peeling (Stevens–Johnson Syndrome)

Highly Toxic Antibiotics (Mycins/Micins): "A sin to give"

Used for MRSA, *C. difficile*

Glycopeptide (Vancomycin):

- Red Man Syndrome: Non-lethal; sudden onset rash, flushing, hypotension
- Slow infusion over 1 hour

Aminoglycosides (Gentamicin, Tobramycin):

- Highly toxic when combined with vancomycin
- No Red Man Syndrome
- Toxic to kidneys, ears, and liver
 - Monitor peak/trough levels 15–30 minutes before administration
 - Monitor for signs of toxicity
 - Kidneys: Increased BUN, increased creatinine, decreased urine output
 - Ears: Vertigo, tinnitus
- Check IV site every 30 minutes

Antifungal (Fluconazole)

- Used for Candidiasis
- Caution in pregnancy: Teratogenic; only given when benefits outweigh risks
- Side effects: GI issues, liver toxicity; monitor LFTs, CBC, and renal function
- Contraindicated with: Phenytoin, Digoxin, Anticoagulants

UTI Medications (Sulfonamides, Fluoroquinolones)

Sulfonamides:

- Inhibit folic acid synthesis
- Teratogenic
- Avoid sun exposure
- Monitor for increased crystals and specific gravity
- Encourage water intake and folic acid supplementation

Fluoroquinolones:

- Avoid sun exposure
- Take with water, but without food
- Report muscle pain (increased risk of Achilles tendon rupture)

Phenazopyridine (Pyridium):

- Not an antibiotic; provides supportive care
- Normal: Red-orange body fluids
- Monitor for jaundice (liver toxicity)

Key Takeaways:

- Ineffective oral contraceptives (Penicillins, Tetracyclines)
- No food, taken with water (Macrolides, Tetracyclines, Fluoroquinolones): Move The Food
- Avoid sun exposure (Tetracyclines, Sulfonamides, Fluoroquinolones)
- Highly toxic (Aminoglycosides)
- Teratogenic (Tetracyclines, Sulfonamides, Antifungal)

Always finish the prescription.

Antiviral Medications

Agents used to treat diseases caused by viruses.

Acyclovir:

- Used for: Herpes Simplex Virus (cold sores, encephalitis, shingles, genital infections, varicella zoster)
- Drug of choice for children: Can be administered via IV, orally, or topically
- Monitor: Signs of renal impairment, pregnancy, and increased doses leading to nephrotoxicity and neurotoxicity (headache, confusion, hallucinations)

Ganciclovir:

- Used for: Cytomegalovirus (infections affecting the eyes, respiratory tract, and liver)
- Monitor: Bone marrow suppression (major side effect), signs of infection, and CBC

For both:

- Prevent viral DNA replication
- Do not cure but only reduce symptoms
- Avoid sex when lesions are present (use condoms)
- Topical: Wear gloves when administering
- IV: Monitor for phlebitis (common)
- May cause gastrointestinal upset and nephrotoxicity

Mode of Action:

- Antiviral drugs inhibit viral DNA polymerase and prevent replication of viral DNA.

Opioid Analgesics

Action: Bind to opioid receptors in the central nervous system to sedate the body.

Characteristics:

- Analgesic
- Sedative
- Lowers and slows vitals (decreased RR, HR, BP)
- Does not decrease fever or inflammation

Types: Morphine, Hydromorphone, Codeine, Oxycodone, Oxycontin, Fentanyl

Nursing Care:

- Teach breathing exercises
- Always monitor vitals and orthostatic hypotension
- If dizzy, have the patient sit down first, then assess

Administration:

- Give 2–3 min IV push (avoid bolus, as it can be fatal)
- Reassess after 15–30 mins (for PO opioids, reassess in 1 hour)
- Monitor for risk of overdose, respiratory depression, and elderly patients with underlying diseases (COPD, Asthma)
- Normal: IV burn, itching/N/V (which eventually subsides), slow GI (administer stool softener, fluids, and encourage ambulation)

PCA Pump Post-op:

- For client use only
- Notify healthcare provider to increase dose if double the dose of medication given and the patient still reports pain

Signs of Overdose:

- RR < 12, unarousable, dizziness, confusion

- Falling asleep easily during conversation
- Cold, clammy skin, deep gurgling sounds

Antidote: Naloxone (Narcan)

- 1-2 hr half-life; reassess and administer another dose if needed
- Assess: ABCs, oxygen, inform healthcare provider, give 2nd dose if necessary

Fentanyl (for chronic pain):

- Can be administered if allergic to codeine
- Side effect: constipation
- Commonly delivered via patch (not for immediate relief); full effect in 17 hours
- Remove old patch before applying a new one

Tuberculosis Medications

Key Points:

- Treatment lasts approximately 6–9 months
- Sputum samples required every 2–4 weeks
- Considered non-infectious after 3 negative sputum cultures on 3 different days
- Always wear N-95 masks
- Family members should be tested (treatment is safe during pregnancy)

1. RIFAMPIN:

- Causes red/orange tears, sweat, and urine (normal)
- Advise wearing glasses instead of contacts
- Reduces oral contraceptive effectiveness
- Monitor for jaundice due to liver toxicity

2. INH – ISONIAZID:

- Interferes with Vitamin B6 absorption (can cause peripheral neuropathy)
- Take 25–50mg of B6 daily
- Report neuropathy symptoms: numbness, tingling, ataxia
- Liver toxic: monitor for jaundice, dark urine, fatigue, and elevated liver function tests

3. ETHAMBUTOL:

- “E” for eyes: report blurred vision, vision changes, and color changes
 - Schedule routine eye exams
 - Generally safe for the liver
-
- Pyrazinamide is an antibiotic used in combination therapy to treat tuberculosis.
 - Monitor liver function, watch for liver toxicity symptoms.
 - Report side effects like gastrointestinal issues, joint pain, or rash.
 - Take as prescribed, completing the full course to prevent drug resistance.

Chemotherapy Medications

- **Leuprolide (Prostate cancer):** Decreases testosterone levels. Monitor bone health, prostate-specific antigen, and testosterone levels.
- **Tamoxifen:** Competes with estrogen in breast tissue. Monitor calcium levels, CBCs, and platelets.
- **Interferon Alpha-2B:** Boosts immune response, reduces cancer cell production. Watch for flu-like symptoms and bone marrow suppression.
- **Doxorubicin:** Inhibits DNA/RNA synthesis. Monitor heart function, CBC, and red discoloration of body fluids.
- **Vincristine:** Stops cell division in mitosis. Monitor for peripheral neuropathy and administer via PICC or central line.
- **Cyclophosphamide:** Inhibits protein synthesis. Increase fluid intake, monitor for blood in urine, and check CBC.

Trauma Medications

- **Lidocaine:** Provides temporary numbing and relieves pain. Used as a local anesthetic and for treating ventricular arrhythmias.
- **Epinephrine:** Stimulates alpha and beta adrenergic receptors, relaxes heart and lung smooth muscle, and dilates vessels in skeletal muscle. Used for bronchodilation in anaphylaxis, hypersensitivity reactions, and acute asthma attacks.
- **Atropine:** Inhibits acetylcholine in lung smooth muscle and heart muscle, blocking SA and AV nodes to increase heart rate. Used for decreasing respiratory secretions and treating sinus bradycardia. Watch for anticholinergic drug overdose.
- **Narcan:** Treats narcotic medication overdose, opioid-induced toxicity, respiratory depression, and neonates affected by narcotics during labor.

Tuberculosis Medications

KEY: Water follows salt.

- **Isotonic:** Equal concentration of solvent and solute. Used for increasing extracellular fluid in cases of blood loss, dehydration, surgery, and burns. Examples: 0.9% Normal Saline, 5% Dextrose in Water (D5W), Lactated Ringers (good for pregnant moms and burns).
- **Hypotonic:** Lower solute concentration. Used for rehydrating cells, dehydration, DKA/HHS, but not for increased ICP, burns, or trauma. Give slowly to prevent cellular edema. Examples: 0.45% NS (1/2 NS), 0.225% saline (1/4 NS), 0.33% saline (1/3 NS).
- **Hypertonic:** Higher solute concentration. Used for hypovolemia, hyponatremia, and cerebral edema. Give slowly and watch for fluid overload. Examples: 3% saline, 5% saline, 10% dextrose, >5% dextrose in 0.9% NS, >5% dextrose in 0.45% saline, >5% dextrose in LR.

Note: Avoid dextrose for hyperglycemic patients and lactated ringers for liver-impaired or hyperkalemic patients.

Common Medication Antidotes

- Acetaminophen: N-acetylcysteine (Mucomyst)
- Anticholinergics: Physostigmine
- Aspirin: Sodium Bicarbonate
- Benzodiazepines: Flumazenil
- Magnesium Sulfate: Calcium Gluconate
- Carbon Monoxide Poisoning: Oxygen
- Coumadin/Warfarin: Vitamin K
- Digoxin: Digibind or Digifab
- Heparin: Protamine Sulfate
- Insulin Reaction: Glucagon
- Opioids/Narcotics: Naloxone (Narcan)
- Poisoning: Activated Charcoal
- Iron: Deferoxamine



7

CHAPTER 7

Mental Health Nursing



Mental Health Assessment with NCSBN Clinical Judgement Model Integration:

The NCSBN Clinical Judgement Model (CJM) can be integrated into mental health assessments, ensuring that nursing professionals effectively evaluate a patient's cognitive function, emotional state, and overall mental well-being. The mental status exam typically involves evaluating appearance, behavior, speech, mood, thought content, perception, and cognitive function.

Recognize Cues:

- **Appearance:** Observe the patient's physical appearance, including posture, grooming, and hygiene, noting any abnormalities.
- **Behavior:** Observe the patient's actions and movements, such as activity level, facial expressions, and body language, noting any irregularities.
- **Speech:** Listen to the patient's speech, noting any abnormalities like slurred speech or stuttering.

Analyze Cues:

- **Mood:** Inquire about the patient's emotional state and assess their affect or expressed emotional tone.
- **Thought Content:** Ask the patient about their thoughts, beliefs, perceptions of reality, delusions, and suicidal or homicidal ideations.
- **Perception:** Inquire about the patient's sensory experiences, including hallucinations or illusions.

Prioritize Hypotheses:

- **Cognitive Function:** Assess the patient's memory, attention, and orientation to person, place, and time.
- Identify the most pressing mental health concerns based on the collected data.

Generate Solutions:

- Develop a plan of care tailored to the patient's specific mental health needs.

- Identify appropriate interventions or referrals based on the assessment findings.

Take Action:

- Implement the plan of care and monitor the patient's response to interventions.
- Adjust the plan as needed, based on the patient's progress and response.

Evaluate Outcomes:

- Assess the effectiveness of interventions and make adjustments to the plan of care as necessary.
- Continuously evaluate the patient's mental health status and document any changes or improvements.

By integrating the NCSBN Clinical Judgement Model into mental health assessments, nursing professionals can more effectively identify potential mental health problems, prioritize care, and provide appropriate interventions or referrals.

Therapeutic Communication

REMEMBER:

- Communication is 10% verbal and 90% nonverbal
- Ensure clarity (the meaning of the message is accurately understood by both parties)
- Ensure continuity (promotes connections among ideas and the feelings, themes, or events)

Therapeutic Communication Techniques

Technique	Rationale
Active listening ▪ Maintain eye contact ▪ Face the patient at eye level ▪ Uncrossed arms ▪ Controlled voice, tone and speech	Provides undivided attention to the client Allows the client to feel seen, heard, and acknowledged
Open-ended questions	Invites the client to provide a detailed answer Facilitates open communication
Using silence	Allows the client to reflect on their own thoughts
Accepting	Establishes a trusting relationship/rapport
Offering self	Shows interest in the feelings of the client
Offering general leads Giving broad openings	Allows the client to take lead in the interaction
Making observations, restating, reflecting, seeking clarification	Shows interest and attention to what the client has to say Allows for clarification if the restated statement is incorrect
Exploring	Encourages the client to provide more details without probing/demanding for more
Presenting reality	Reorients the client to reality
Placing the events in time and sequence	Allows the nurse to gain more clarity on the time frame of a specific problem
Suggesting collaboration	Offering self to help solve client's problems but not solving for them or giving advice
Acknowledge and recognize cultural differences	Validates and shows compassion towards cultural differences that may otherwise pose a boundary

Nontherapeutic Communication Techniques

Technique	Rationale
Distracted or completing other tasks	Does not show the client that you are actively listening The client may feel like his/her feelings are unimportant
Close-ended questions (Why? Questions)	The client may become defensive and uncomfortable Judgmental
Giving premature advice	Does not facilitate the client to explore solutions and techniques on their own
Minimize feelings	May make the client feel like their feelings are invalid
Providing false reassurance	Client will become anxious for results Provides false hope of events if results don't happen like you promised
Probing	Invasive, uncomfortable, threat to privacy
Agreeing or disagreeing	Indicates the client is "right" or "wrong" Does not facilitate reflection of actions
Changing the subject	Indicates uninterest in client feeling's

Inpatient	Outpatient
Designed to treat serious addictions or acute phase of mental illness	Designed to treat mild addictions, substance abuse, or those in need of counseling
Patient stays in the hospital or facility	Office visits without overnight stay
24-hour nursing care & access to crisis care	10–12 hours of care a week
Locked units (for safety)	Does not have locked units
Higher success rate	Lower success rate
Disruptive to daily life	Patient maintains a normal daily routine

Barriers to seeking mental health treatment:

- The nature of mental illness is misunderstood
- Psychosis impedes a person's ability to recognize the need for care
- Apathy is present; no motivation exists to seek care

Specialty Treatment may include:

- Pediatric Psychiatric Care
- Geriatric Psychiatric Care
- Forensic Psychiatric Care
- Alcohol and Drug Abuse Treatment
- Post-partum Psychiatric Care

Care Settings

General Medical and Surgical Hospital with Psychiatric Unit ▪ Usually less than 30 days ▪ If long term care is needed, transfer to a psychiatric hospital or residential program	Primary Care Medical Home ▪ Delivers integrated care between community services, home health care, and family involvement
Psychiatric Hospital ▪ Treat mental illnesses exclusively ▪ May provide longer stays compared to general hospital	Partial Hospitalization Program ▪ “Day programs” ▪ 6+ hours a day, everyday
Residential Treatment Program ▪ Designed to make patients feel more comfortable and less like a hospital ward	Intensive Outpatient Program ▪ 3–4 hours a day usually in the evening ▪ Accommodate people who work during the day
Alcohol and Drug Rehabilitation Facility ▪ Typically, 30 day treatment but may be individualized ▪ Once released, the individual will begin AA/NA meetings on an outpatient basis	Outpatient Clinic ▪ Apart of the hospital but does not require overnight stay
	Community Mental Health Centers ▪ Accommodate low income individuals

Erikson's Stages Of Development			
Age	Basic Conflict	Important Events	Outcome (Favorable and Unfavorable)
Infancy: Birth – 18 months	Trust vs Mistrust	Feeding	Favorable: Children develop a sense of faith in the environment and to caregivers love and affection Unfavorable: Suspicion and fear of people/events
Early Childhood: 2 – 3 years	Autonomy vs Shame and Doubt	Toilet Training	Favorable: Children develop personal control over behavior and actions. Child feels adequate and independent Unfavorable: Feelings of shame and self-doubt
Preschool: 3 – 5 years	Initiative vs Guilt	Exploring	Favorable: Ability of the child to take initiative and be assertive. Leads to a sense of purpose Unfavorable: Feeling guilty and inadequate
School Age: 6 – 11 years	Industry vs Inferiority	Attending School	Favorable: Ability to learn and grow socially/academically (feeling competent) Unfavorable: Feeling inferior
Adolescence: 12 – 18 years old	Identity vs Role Confusion	Social Relationships	Favorable: Ability to see one's self as unique. Develop a sense of personal identity while staying true to yourself Unfavorable: Feeling lonely, isolated and confused

Age	Basic Conflict	Important Events	Outcome (Favorable and Unfavorable)
Early Adolescence: 19 – 25 years old	Intimacy vs Isolation	Intimate Relationships	Favorable: Ability to make commitments to others and to love Unfavorable: Inability to form affectionate relationship
Adulthood: 26 – 64 years old	Generativity vs Stagnation	Family and Occupation	Favorable: Caring for others and creating/accomplishing things that make the world a better place Unfavorable: disconnected or uninvolved with community or society
Old Age: 65+ years old	Integrity vs Despair	Facing Death	Favorable: A sense of integrity, reflection on life, acceptance of life and death Unfavorable: Dissatisfaction with life or moments of life; despair over death

Mental Health Fundamentals (Brain Lobes and Functions)

Frontal Lobe (Executive Function):

- Problem-solving
- Concentration
- Planning and organizing
- Reasoning
- Personality, behavior, and mood regulation

Parietal Lobe (Sensation and Perception):

- Sensory processing: touch, temperature, pain, taste
- Body awareness and perception
- Attention and focus
- Calculations
- Key Components:
 - **Broca's Area:** Controls expressive speech; if damaged, speech is disjointed but comprehension remains intact
 - **Motor Area (Primary Motor Cortex):** Controls voluntary movement

Temporal Lobe (Hearing and Memory):

- Hearing and auditory processing
- Storage of verbal and visual memories
- Short-term and long-term memory
- Language comprehension and speech understanding
- Key Component:
 - **Wernicke's Area:** Controls language comprehension; if damaged, individuals struggle to understand and respond to speech

Occipital Lobe (Visual Processing):

- Visual system processing
- Visual information interpretation
- Perception of shapes and sizes

Cerebellum (Mini Brain):

- Balance, coordination, and rhythm
- Proprioception (body position and movement awareness)
- Posture and movement control

Brainstem:

- Consciousness regulation
- Breathing and heart rate control

Schizophrenia

A long-term mental disorder characterized by an inability to distinguish between what is real and not real, affecting a person's thoughts, feelings, and behaviors.

Recognize Cues:

- Onset typically in late teens to early 20s
- Positive Symptoms: Hallucinations, delusions, disorganized thinking
- Negative Symptoms: flat or blunted affect, isolation, apathy, anergia, anhedonia (inability to experience pleasure or a significant loss of interest in activities that were once enjoyable), reduced speech
- Physical Symptoms: catatonia, catatonic stupor (motionless), or excitatory (restless) states

Analyze Cues:

- Consider Potential Causes: Altered brain chemistry, genetic predisposition, environmental stress, substance abuse
- Assess For Diagnostic Criteria: Presence of ≥ 2 symptoms (with at least one positive symptom) for at least one month and 6 months of continuous disturbance of physical symptoms

Prioritize Hypotheses:

- Identify Primary Concerns: Patient safety, managing hallucinations and delusions, addressing negative symptoms, and monitoring physical symptoms

Generate Solutions:

- Acute Phase Treatment: Antipsychotics or benzodiazepines to reduce psychotic thoughts and behaviors
- Stable/Maintenance Phase Treatment: Antipsychotics, medication adherence education, stress techniques, drug/alcohol avoidance education

Take Action:

- Provide Nursing Care For Hallucinations: ensure a calm environment, ask direct questions, validate feelings while staying in reality, monitor for worsening stimuli, administer PRN medications, progress from 1:1 to group interactions
- Provide Care For Delusions: ask for details, validate real aspects, avoid challenging or arguing, focus on feelings and reality, maintain honesty, set limits and boundaries
- Address Additional Considerations: assess self-harm risk, evaluate physical needs, be present and organized, start with small tasks and 1:1 interactions, gradually increase freedom

Evaluate Outcomes:

- Monitor the patient's progress in managing symptoms, adherence to treatment plans, and overall well-being
- Adjust nursing care and interventions as needed based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

Remember the types of hallucinations (Auditory, Olfactory, Tactile, Visual, Gustatory) and delusions (Grandeur, Persecution, Jealousy).

Schizoaffective Disorder

A chronic mental disorder characterized by symptoms of schizophrenia combined with symptoms of a mood disorder, either bipolar or depressive type.

Recognize Cues:

- Types: Bipolar (depressive episodes, mania, schizophrenia symptoms) Or Depressive (depressive episodes, schizophrenia symptoms). Mania is experienced with bipolar.
- Symptoms: Depression or bipolar episodes, delusions, hallucinations, impaired communication or speech, impaired occupational or social functioning, trouble with ADLs

Analyze Cues:

- Consider Potential Causes: Altered brain chemistry, genetic predisposition, environmental stress, substance abuse
- Assess For Diagnostic Criteria: Rule out drug/alcohol abuse, physical exam to rule out other issues, psychotic symptoms for >2 weeks without mood symptoms, drugs not responsible for symptoms

Prioritize Hypotheses:

- Identify Primary Concerns: Suicide risk, accurate diagnosis, managing mood and psychotic symptoms, improving occupational and social functioning

Generate Solutions:

- Medications: Antipsychotics, antidepressants, mood stabilizers
- Cognitive-Behavioral Therapy: Journaling, cognitive restructuring (technique used to improve emotional well-being and empower individuals to better cope with life's challenges by changing their thought patterns), family therapy, discussing problems
- Coping strategies and stress techniques
- Social skills training to improve quality of life
- If other treatments fail, consider electroconvulsive therapy (ECT)

Take Action:

- Monitor and address suicide risk
- Administer appropriate medications
- Implement cognitive-behavioral therapy and teach coping strategies
- Support patient in developing social skills and improving quality of life
- Consider ECT if other treatments are unsuccessful

Evaluate Outcomes:

- Monitor patient's progress in managing symptoms, adherence to treatment plans, and overall well-being
- Adjust nursing care and interventions as needed based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

Remember that many people with schizoaffective disorder are misdiagnosed as only having bipolar, depression, or schizophrenia. Accurate diagnosis and tailored treatment are essential for successful management of this condition.

Bipolar Disorder

A mood disorder characterized by alternating episodes of extreme mania and depression.

Recognize Cues:

- Manic Symptoms: Elevated mood, irritability, restlessness, flight of ideas, delusions, impulsivity, poor judgment, decreased attention span, insomnia, neglect of ADLs
- Depressive Symptoms: Dysphoric mood, flat affect, crying, despair, anergia, anhedonia, difficulty concentrating, decreased appetite, sleep disturbances, suicide risk

Analyze Cues:

- Medical Diagnosis Types: Bipolar I, Bipolar II, dysthymia, cyclothymia
- Risk Factors: Psychological stress, neurologic disorders, genetics, substance abuse
- Factors Reducing Symptoms: Positive family support, improved communication, consistent rhythm

Prioritize Hypotheses:

- Primary Concerns: Suicide risk, accurate diagnosis, managing mood symptoms, promoting safety and stabilization

Generate Solutions:

- Medications: Anticonvulsants, antipsychotics, antidepressants, lithium
- Psychotherapy
- Provide a safe environment with decreased stimulation
- One-on-one observation if a risk to self or others
- Monitor sleep, fluid, and food intake; encourage on-the-go snacks

Take Action:

- Administer appropriate medications
- Implement psychotherapy and support systems
- Ensure a safe and quiet environment
- Monitor for risk to self or others; provide one-on-one observation if necessary

- Set limits on grandiose behavior
- Monitor and support sleep, fluid, and food intake

Evaluate Outcomes:

- Monitor patient's progress in managing symptoms, adherence to treatment plans, and overall well-being
- Adjust nursing care and interventions based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

Remember that successful management of bipolar disorder often involves a combination of medication and psychotherapy. Accurate diagnosis and tailored treatment are essential for patients with this condition.

Manic Episode

A sustained period of abnormally elevated or irritable mood, intense excitement, euphoria, or exaggerated behavior associated with bipolar disorder.

Recognize Cues:

- Lasts at least 1 week, present most of the day
- Can be manic or hypomanic (less severe)
- Signs and symptoms: easily distractible, inflated self-esteem, over talking, decreased need for sleep, increased energy or agitation, euphoria, increased risky activities

Analyze Cues:

- Associated with bipolar disorder
- Triggers: caffeine, alcohol, drug use, stress

Prioritize Hypotheses:

- Primary concerns: Safety, managing mood symptoms, promoting stabilization

Generate Solutions:

- Medications: Mood stabilizers
- Avoid triggers
- Encourage exercise
- Monitor suicide risk
- Set limits on grandiose behavior
- Orient to reality without arguing
- Provide high-calorie snacks

Take Action:

- Administer appropriate medications
- Support patients in avoiding triggers
- Encourage physical activity to expend energy
- Assess for suicide risk and ask about plans

- Set limits and boundaries on grandiose behavior
- Maintain a calm and non-confrontational approach when addressing reality
- Offer high-calorie snacks for on-the-go patients

Evaluate Outcomes:

- Monitor patient's progress in managing symptoms, adherence to treatment plans, and overall well-being
- Adjust nursing care and interventions based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

Remember that manic episodes are associated with bipolar disorder and require appropriate treatment and support. Identifying triggers and implementing interventions can help patients manage their symptoms and maintain stability.

Depression

A mood disorder characterized by persistent feelings of sadness, hopelessness, and loss of interest or pleasure in activities.

Recognize Cues:

- Medical diagnosis types: Major depression, seasonal, dysthymia, bipolar, postpartum
- Risks: Family history, chronic illness, negative life events, substance abuse, older adults, females (15–45)
- Symptoms: Cognitive, mood, and psychomotor disturbances

Analyze Cues:

- Assess severity and duration of symptoms
- Determine the presence of potential risk factors
- Identify type of depression

Prioritize Hypotheses:

- Primary concerns: Safety, managing depressive symptoms, promoting stabilization

Generate Solutions:

- Safety: Remove harmful objects, provide 1-on-1 observation
- Assess suicide risk
- Address physical needs: Monitor weight, prevent constipation, promote hygiene
- Communication: Encourage participation, use simple sentences, allow time for responses, promote expression of feelings, offer support and interest
- Medication: Antidepressants (TCA's, Atypical, SSRI's, SNRI's, MAOI's)

Take Action:

- Implement safety measures and monitor closely
- Assess for suicide risk and provide support
- Address physical needs and provide assistance as needed
- Encourage communication and participation in activities

- Administer medications as prescribed and monitor for side effects

Evaluate Outcomes:

- Monitor patient's progress in managing symptoms, adherence to treatment plans, and overall well-being
- Adjust nursing care and interventions based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

Remember that depression can manifest in various forms and requires appropriate treatment and support. Identifying potential risk factors and implementing interventions can help patients manage their symptoms and maintain stability.

Personality Disorders

Enduring patterns of behavior and inner experiences that deviate significantly from cultural norms, causing distress or impairment in functioning.

Recognize Cues (Medical Diagnosis Types):

- Cluster A: Odd And Eccentric
- Cluster B: Dramatic
- Cluster C: Anxious

Analyze Cues:

- Identify the specific personality disorder and its associated characteristics
- Determine the level of distress or impairment in functioning

Prioritize Hypotheses:

- Primary concerns: Improve patient coping strategies, promote self-awareness, and enhance communication and social skills

Generate Solutions:

- Cluster A: respect isolation, address feelings of delusions, facilitate communication and identify negative thoughts
- Cluster B: set limits and maintain consistency, ensure safety for suicide risk, be assertive, encourage socialization
- Cluster C: be assertive, provide reassurance, and validate concerns

Take Action:

- Implement nursing care tailored to the specific personality disorder
- Encourage patients to explore their feelings and beliefs
- Collaborate with interdisciplinary team members to address patients' needs and develop appropriate treatment plans

Evaluate Outcomes:

- Monitor patient progress in managing symptoms and improving interpersonal relationships
- Adjust nursing care and interventions based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

Understanding and identifying specific personality disorders can help healthcare professionals tailor interventions and nursing care to promote healthier coping strategies, improved self-awareness, and enhanced communication and social skills.

Dissociative Identity Disorder (D.I.D)

A mental health condition characterized by the presence of two or more distinct personalities or identities within a single individual, often resulting from a history of childhood abuse or extreme life stressors.

Recognize Cues (Medical Diagnosis Types):

- Memory loss of specific people or events
- Out-of-body experiences or sense of detachment
- Fluctuating emotional responses and mannerisms
- Co-occurring mental health problems

Analyze Cues:

- Assess the severity of dissociative symptoms and their impact on the patient's daily functioning
- Differentiate between d.I.D and role-playing behaviors

Prioritize hypotheses:

- Primary concerns: manage dissociative symptoms, improve patient coping strategies, and address co-occurring mental health issues

Generate solutions:

- Psychotherapy (cognitive and dialectical based therapy)
- Medications (antidepressants)
- Suicide risk assessment
- Decision-making support during dissociative periods
- Grounding techniques to bring the patient back to reality

Take action:

- Implement a tailored treatment plan that addresses the patient's unique needs and symptoms
- Collaborate with interdisciplinary team members to ensure comprehensive care

- Encourage the patient to engage in therapy and utilize coping strategies
- Monitor patient progress and adjust interventions as needed

Evaluate outcomes:

- Assess the patient's ability to manage dissociative symptoms and improve daily functioning
- Evaluate the effectiveness of therapeutic interventions and medications
- Adjust treatment plans based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

By understanding and addressing the specific needs of individuals with dissociative identity disorder, healthcare professionals can provide tailored interventions and support to help patients manage their symptoms and improve their overall well-being.

Anxiety Disorders

Mental health conditions characterized by excessive and persistent worry, fear, or apprehension that can interfere with daily life and functioning.

Recognize Cues (Medical Diagnosis Types):

- General anxiety disorder: Continuous tension and unease, affecting daily life, lasting >6 months
- Panic disorder: Sudden bursts of panic and intense fear, may last minutes to hours
- Phobias: Overwhelming and unreasonable fear of objects or situations, long-lasting
- Common symptoms: Apprehension, worry, restlessness, fatigue, trouble concentrating, physical discomfort

Analyze Cues:

- Assess the severity and impact of anxiety symptoms on daily functioning
- Identify co-occurring mental health issues or risk factors (depression, substance abuse, suicide risk)

Prioritize Hypotheses:

- Primary concerns: Manage anxiety symptoms, improve coping strategies, address co-occurring mental health issues

Generate Solutions:

- Medications: SSRIs, anxiolytics, benzodiazepines, buspirone
- Nursing Interventions: Active listening, relaxation techniques, cognitive behavioral therapy, exercise encouragement, evaluation of previous coping mechanisms
- For severe cases: Provide a quiet environment, remain with the patient, set limits, help focus on reality

Take Action:

- Implement a tailored treatment plan that addresses the patient's unique needs and symptoms

- Collaborate with interdisciplinary team members to ensure comprehensive care
- Encourage the patient to engage in therapy and utilize coping strategies
- Monitor patient progress and adjust interventions as needed

Evaluate Outcomes:

- Assess the patient's ability to manage anxiety symptoms and improve daily functioning
- Evaluate the effectiveness of therapeutic interventions and medications
- Adjust treatment plans based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

By understanding and addressing the specific needs of individuals with anxiety disorders, healthcare professionals can provide tailored interventions and support to help patients manage their symptoms and improve their overall well-being.

Obsessive Compulsive Disorder (OCD)

A mental health condition characterized by unwanted repetitive thoughts (obsessions) and unwanted repetitive behaviors (compulsions) that interfere with daily life.

Recognize Cues (Medical Diagnosis Types):

- Obsessions: Dirt/toxins, intense fear of something bad happening, need for symmetry/order
- Compulsions: Excessive hand washing, checking, movement rituals, counting
- Complications: Time-consuming rituals, dermatitis, difficulty attending school or work, troubled relationships, suicide risk

Analyze Cues:

- Assess the severity of obsessions and compulsions
- Identify the impact of ocd symptoms on daily functioning and relationships

Prioritize Hypotheses:

- Primary Concerns: Manage obsessions and compulsions, improve coping strategies, address co-occurring mental health issues or risk factors (suicide risk)

Generate Solutions:

- Cognitive Behavioral Therapy (CBT)
- Exposure And Response Prevention (ERP): Expose the person to the obsession and teach ways to resist compulsive behavior
- Medications: Antidepressants, anxiolytics
- Nursing Interventions: Monitor suicide risk, set limits on ocd behaviors, maintain low-stress environments, encourage positive behavior

Take Action:

- Implement a tailored treatment plan addressing the patient's unique needs and symptoms
- Collaborate with interdisciplinary team members to ensure comprehensive care

- Encourage the patient to engage in therapy and utilize coping strategies
- Monitor patient progress and adjust interventions as needed

Evaluate Outcomes:

- Assess the patient's ability to manage obsessions and compulsions and improve daily functioning
- Evaluate the effectiveness of therapeutic interventions and medications
- Adjust treatment plans based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

Post-Traumatic Stress Disorder (PTSD)

A mental health condition triggered by experiencing or witnessing a traumatic event, characterized by lingering memories, nightmares, and symptoms that interfere with daily functioning.

Recognize Cues (Medical Diagnosis Types):

- Traumatic event (e.g., war, accidents, 9/11, violent or sexual assaults)
- Symptoms grouped into 4 types: Intrusive, avoidance, negative thought/mood, and changes in physical/emotional reactions
- PTSD diagnosis when symptoms persist for longer than 4 weeks

Analyze Cues:

- Assess the severity and duration of symptoms
- Identify the impact of ptsd symptoms on daily functioning and relationships

Prioritize Hypotheses:

- Primary concerns: Manage ptsd symptoms, improve coping strategies, address co-occurring mental health issues or risk factors (suicide risk)

Generate Solutions:

- Cognitive behavioral therapy (cbt)
- Exposure therapy: safely face memories or situations
- Stress management skills
- Medications: Antidepressants, anxiolytics, prazosin (for nightmares)
- Nursing interventions: monitor suicide risk

Take Action:

- Implement a tailored treatment plan addressing the patient's unique needs and symptoms
- Collaborate with interdisciplinary team members to ensure comprehensive care
- Encourage the patient to engage in therapy and utilize coping strategies

- Monitor patient progress and adjust interventions as needed

Evaluate outcomes:

- Assess the patient's ability to manage PTSD symptoms and improve daily functioning
- Evaluate the effectiveness of therapeutic interventions and medications
- Adjust treatment plans based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

Eating Disorders

Eating disorders are mental health conditions characterized by unhealthy eating habits and attitudes towards food, which may include anorexia nervosa, bulimia nervosa, and binge eating disorder.

Recognize Cues:

- Unhealthy eating habits and behaviors
- Risk factors: Family history, emotional trauma, depression/anxiety, sociocultural factors, and peer pressure
- Different types of eating disorders: Anorexia nervosa, bulimia nervosa, binge eating disorder

Analyze Cues:

- Assess severity and duration of symptoms
- Identify co-occurring mental health issues or risk factors (e.g., depression, anxiety, low self-esteem)

Prioritize Hypotheses:

- Primary concerns: Restore healthy eating habits, address underlying emotional issues, treat co-occurring mental health conditions

Generate Solutions:

- Inpatient or intensive outpatient treatment
- Weight restoration and rebalancing of electrolytes
- Psychotherapy (e.g., CBT, interpersonal, dialectical)
- Nutrition counseling
- Medications for co-occurring mental health conditions
- Family involvement and support

Take Action:

- Implement a tailored treatment plan addressing the patient's unique needs and

symptoms

- Monitor weight, eating habits, and risk factors
- Encourage healthy body image and size
- Collaborate with interdisciplinary team members to ensure comprehensive care

Evaluate Outcomes:

- Assess the patient's ability to maintain healthy eating habits and develop a positive relationship with food
- Evaluate the effectiveness of therapeutic interventions and medications
- Adjust treatment plans based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

By understanding and addressing the specific needs of individuals with eating disorders, healthcare professionals can provide tailored interventions and support to help patients develop healthy eating habits and improve their overall well-being.

Substance Abuse And Addiction

Conditions characterized by the misuse of substances, including alcohol, opioids, caffeine, sedatives, hypnotics, tobacco, prescription drugs, and others. Substance abuse refers to using a substance outside of medical necessity or social acceptance, while substance addiction involves physical dependence and loss of control over substance use.

Recognize Cues:

- Signs of addiction: Regular use, intense urges, needing more to gain effect, spending money on substances despite financial constraints, troubled personal/social relationships, withdrawal symptoms
- Substance types and risks: Environmental factors, genetics, social situations, peer pressure, early exposure

Analyze Cues:

- Evaluate severity and duration of substance use
- Identify co-occurring mental health issues or risk factors

Prioritize Hypotheses:

- Primary concerns: safety, withdrawal management, addressing underlying emotional issues, preventing relapse

Generate Solutions:

- Inpatient or outpatient treatment programs
- Individual or group therapy
- Detoxification under supervision
- Psychotherapy (e.g., behavioral therapy, relaxation techniques, guided imagery, coping strategies)
- Self-help groups (e.g., alcoholics anonymous or narcotics anonymous)

Take Action:

- Assess self-harm potential and implement safety measures as needed

- Monitor for signs of overdose and withdrawal
- Provide therapeutic communication in a caring, nonjudgmental manner
- Create a quiet, relaxed environment for the patient
- Collaborate with interdisciplinary team members to ensure comprehensive care

Evaluate Outcomes:

- Assess the patient's ability to maintain sobriety and develop healthy coping mechanisms
- Evaluate the effectiveness of therapeutic interventions and support systems
- Adjust treatment plans based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

Alcohol Addiction Treatment

Integrating the NCSBN clinical judgment model, we address medication management for alcohol addiction treatment and withdrawal symptom management.

Recognize Cues:

- Alcohol addiction medications: Naltrexone, acamprosate, topiramate, disulfiram
- Alcohol withdrawal medications: benzodiazepines, anticonvulsants, beta blockers, magnesium sulfate, thiamine (B1), folic acid
- Withdrawal symptoms: Tremors, vomiting, anxiety, irritability, high blood pressure, increased heart rate, confusion
- Seizure symptoms: Extreme confusion and agitation, increased heart rate, fever, sweating, loss of consciousness, aura, headache

Analyze Cues:

- Evaluate the severity of alcohol addiction and withdrawal symptoms
- Identify appropriate medications based on patient's specific needs

Prioritize Hypotheses:

- Primary concerns: managing alcohol cravings, ensuring patient safety, managing withdrawal symptoms, and preventing seizures

Generate Solutions:

- Prescribe appropriate medications to manage alcohol cravings (e.g., naltrexone, acamprosate, topiramate, disulfiram)
- Administer medications to manage withdrawal symptoms and reduce the risk of seizures (e.g., benzodiazepines, anticonvulsants, beta blockers, magnesium sulfate, thiamine, folic acid)

Take Action:

- Monitor the patient's response to medications and adjust doses as needed
- Observe for potential side effects or adverse reactions

- Provide education on the purpose and potential side effects of medications
- Assess the patient's understanding and compliance with the prescribed medication regimen

Evaluate Outcomes:

- Assess the effectiveness of medications in managing alcohol cravings and withdrawal symptoms
- Evaluate patient's progress towards sobriety and overall well-being
- Adjust treatment plans based on patient response and progress
- Collaborate with the interdisciplinary team to optimize patient outcomes and provide comprehensive care

By understanding and addressing the unique needs of individuals with alcohol addiction, healthcare professionals can provide tailored interventions and support to help patients achieve sobriety and improve their overall well-being.

Mental Health In Children

Integrating the NCSBN clinical judgment model, we address intellectual Disability and Autism Spectrum Disorder in children.

Recognize Cues:

- **Intellectual Disability severity:** Mild, moderate, severe, or profound
- **Causes:** Fetal alcohol syndrome, genetic or chromosomal conditions, fetal infections, hypoxia, prematurity, trauma
- **Types:** Fragile X Syndrome, Down Syndrome, Tay Sachs, Prader Willi, Developmental Delay, Fetal Alcohol Spectrum Disorder
- **Symptoms:** Deficits in reasoning, problem-solving, judgment, planning, academic learning, communication, personal independence
- **Autism Spectrum Disorder severity:** High-functioning autism, autism, severe autism
- **Diagnosis criteria:** Stereotyped or repetitive speech, motor movements, or use of objects; excessive adherence to routines or rituals; fixated interests in unusual objects; hypo or hyper-reactivity to sensory aspects of the environment; deficits in communicative behavior and emotional reciprocity; resistance to change

Analyze Cues:

- Evaluate the severity and specific characteristics of intellectual disability or autism spectrum disorder
- Determine appropriate interventions based on the child's specific needs

Prioritize Hypotheses:

- **Primary concerns:** Identifying appropriate interventions, ensuring adequate support and resources, promoting optimal development, and fostering social and emotional well-being

Generate Solutions:

- Develop individualized intervention plans, including educational, behavioral, and therapeutic supports

- Collaborate with interdisciplinary teams, including teachers, therapists, and healthcare professionals
- Provide family education and support

Take Action:

- Implement tailored interventions to address the unique needs of children with intellectual disabilities or autism spectrum disorders
- Monitor progress and adjust intervention plans as needed
- Encourage and support families in advocating for their child's needs

Evaluate Outcomes:

- Assess the effectiveness of interventions in promoting the child's development and well-being
- Evaluate progress in academic, social, and emotional domains
- Adjust intervention plans based on the child's progress and evolving needs

By understanding and addressing the unique needs of children with intellectual disabilities and autism spectrum disorders, healthcare professionals can provide tailored interventions and support to help these children reach their full potential and improve their overall well-being.

Dementia and Delirium

Dementia

Dementia is a progressive, chronic neurodegenerative disorder that affects memory, thinking, behavior, and the ability to perform everyday tasks. The most common form of dementia is Alzheimer's disease, followed by vascular dementia, Lewy body dementia, and frontotemporal dementia. Dementia is more common in older individuals, but it is not a normal part of aging. The underlying causes of dementia are usually irreversible, but some forms of dementia can be managed with medication, therapy, and lifestyle changes.

Delirium

Delirium, on the other hand, is an acute and usually temporary disturbance in cognitive function, attention, and awareness. It often occurs suddenly and can fluctuate throughout the day. Delirium is commonly triggered by an underlying medical condition, such as infection, medication side effects, substance withdrawal, or metabolic imbalances. Unlike dementia, delirium can be reversible if the underlying cause is promptly identified and treated. Delirium often affects hospitalized or institutionalized patients, particularly older adults or those with pre-existing cognitive impairment.

Integrating the NCSBN Clinical Judgment Model, we address dementia and delirium in older adults.

Recognize Cues:

- Dementia: Gradual onset, attention mostly preserved in early stages, no fluctuations, common in people >65, irreversible in many cases
- Delirium: Acute onset, fluctuating symptoms, trouble focusing, worse with age, often reversible, associated with underlying causes

Analyze Cues:

- Determine whether the patient has dementia, delirium, or both
- Identify underlying causes for delirium, if present

Prioritize Hypotheses:

- Primary concerns: Identifying the appropriate diagnosis, ensuring adequate support and resources, managing symptoms, addressing underlying causes (for delirium)

Generate Solutions:

- Dementia: Mental and social stimulation, simplified tasks, healthy lifestyle, medications (cholinesterase inhibitors, memantine, sleep aids)
- Delirium: Treat underlying causes, manage symptoms, provide a supportive environment, ensure proper nutrition and hydration

Take Action:

- Implement tailored interventions for dementia or delirium based on the patient's unique needs and circumstances
- Monitor progress and adjust care plans as needed

Evaluate Outcomes:

- Assess the effectiveness of interventions in managing symptoms and improving the patient's overall well-being
- Reevaluate the patient's condition and adjust care plans based on their progress and evolving needs

By understanding the differences between dementia and delirium and addressing the unique needs of older adults experiencing cognitive decline, healthcare professionals can provide tailored interventions and support to improve their overall well-being and quality of life.

Patient Restraints

Patient restraints are a controversial yet sometimes necessary intervention in healthcare settings to protect patients and staff from harm. Their use requires careful consideration, adherence to ethical guidelines, and ongoing assessment to ensure the safety, dignity, and well-being of patients.

Recognize Cues:

- Identify the patient's behaviors that are potentially harmful to themselves or others.
- Determine if alternative measures have been insufficient in protecting the patient.

Analyze Cues:

- Assess the patient's physical and mental condition and the risks associated with using restraints.
- Consider the ethical and legal implications of using restraints.

Prioritize Hypotheses:

- Determine the necessity of restraints in relation to other potential interventions or strategies.
- Prioritize alternative approaches and attempt them before using restraints.

Generate Solutions:

- If restraints are necessary, choose the appropriate type (physical or chemical) and method.
- Obtain a physician order, which should be reviewed and reordered every 24 hours.
- Ensure restraints are time-limited (e.g., 2 hours, 4 hours).

Take Action:

- In an emergency, a nurse may place the patient in restraints but must obtain a written or verbal order first.
- A telephone order is acceptable but must be followed by a written order with physician follow-up.

- Document the behavior leading to the use of restraints.
- Apply the chosen restraints safely and correctly, ensuring the patient's comfort and safety.

Evaluate Outcomes:

- Assess the patient at 15–30 minute intervals for physical needs, safety, and comfort. Document assessments.
- Monitor the effectiveness of the restraints and any potential complications.
- Continuously reevaluate the need for restraints and remove them as soon as it is safe to do so.

By integrating the NCSBN Clinical Judgment Model, nursing professionals can ensure they make well-informed and ethically sound decisions when considering the use of restraints.



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