

Core Module 2 Exam Blue Print

Infection and Infections Control

Transmission Based Precautions (6)

Transmission based precautions are used when the route of transmission can't be stopped by the use of standard precautions alone. Sometimes more than one precaution may need to be used.

- Airborne Precautions

- Used for clients with an infection transmitted by air-borne droplets smaller than 5 microns.
- **Examples** include measles, varicella, and TB
- **Methods**
 - Place client in a private, negative air pressure room or with someone that has the same illness
 - Wear respiratory device (N95) when dealing with TB, be sure to be fitted for it
 - Susceptible people should not enter room of chicken pox or measles without mask
 - Limit movement of clients outside the room

- Droplet Precautions

- Used for clients with an illness transmitted by droplets larger than 5 microns
- **Examples** include diphtheria, Mycoplasma pneumonia, pertussis, mumps, rubella, flu, pneumonia, and scarlet fever
- **Methods**
 - Place client in private room or with someone that has the same illness
 - Wear a mask when working within 3 feet of client
 - Limit movement of clients outside the room
 - Need a mask, gown, and gloves

- Contact Precautions-direct or indirect contact with the patient or patient's environment

- Used for clients with an illness that is easily transmitted by contact with the client and items.
- **Examples** include, GI, respiratory, skin, and wound. Bodily fluids. MRSA and C. diff
- **Methods**
 - Place client in private room or with someone that has the same illness
 - Wear gloves and cleanse when leaving room, C. diff requires soap and water and clean surfaces with bleach
 - Wear a gown when there is possibility of contact with infected surfaces. Remove in room
 - Limit movement outside room and sharing of equipment

Disease Prevention, infections (4)

1. Giving a bed bath? (generally none)
2. Suctioning oral secretions? (gloves and mask/goggles or a face shield) (Respondents may correctly note that this may depend on whether open or closed suction is being used)
3. Transporting a patient in a wheelchair? (generally none)
4. Responding to an emergency where blood is spurting? (gloves, fluid-resistant gown, mask/goggles or a face shield)
5. Drawing blood from a vein? (gloves)
6. Cleaning an incontinent patient with diarrhea? (gloves and generally a gown)
7. Irrigating a wound? (gloves, gown, and mask/goggles or a face shield)
8. Taking vital signs? (generally none)
 - a. **Six links in the chain of infection** (WHAT CAN NURSES DO TO BREAK THE CHAIN?): (Handwashing, Environmental cleaning, Wear PPE, Antibiotics (when indicated), Contain contaminated waste)

- b. Infectious Agent
 - c. Reservoir
 - d. Mode of Exit
 - e. Mode of Transmission
 - f. Mode of Entry
 - g. Susceptible Host
9. Use of antibiotics must be used with caution as antibiotics can suppress or kill the endogenous (“friendly”) flora that provides protection against drug-resistant microorganisms
- a. **The patient should not be “isolated” from social interactions more than absolutely necessary to prevent the spread of disease.**
 - b. **Visitors can be allowed in most cases**
 - i. **Visitors need to check in with nurse / nurse’s station**
 - ii. **Visitors will be required to wear appropriate PPE**
 - iii. **Visitors will be required to follow transmission based precaution guidelines**

- The most effective way to prevent infections is hand hygiene

- Education on immunizations (older adults, children, immunocompromised)
- Good oral hygiene, adequate rest/ nutrition, adequate fluid intake.
- Immobile clients: pulmonary hygiene (cough, incentive spirometer), Prevent skin breakdown
- Use of aseptic technique/ proper PPE, respiratory hygiene/cough etiquette
- Healthcare worker precautions
 - Disinfecting and sterilizing, isolation precautions, isolation practices, PPE

Illness Management, Infections (1)

- Identify the body system and the effects the infection has on that body system
- Observe the manor of presentation
- Identify causative agent and treat accordingly

Laboratory Tests, Infections (1)

- **WBC count**
 - **Provides clues about the infecting organism and the body’s immune response to it (>10,000)**
 - **Number one indication of infection because your body is fighting something off**
- WBC differential
 - Assess number of circulating neutrophils. Increase indicates infections, while decrease indicates a problem in the bone marrow. Immature neutrophils indicate an acute infection
- **Cultures**
 - **Used to identify probable microorganisms by their characteristics. After culture, microorganism is tested with different antibiotics to determine which one is most effective (sensitivity testing), and it takes 24-28 hours.**
- Serological testing
 - Indirect way of identifying infection by looking at our antibodies (hep b, HIV)
- Antibiotic peak and trough levels
 - Measuring the blood levels of the prescribed medication. Making sure that it reaches it therapeutic range, and a range high enough to kill the microorganism
- Radiology, Lumbar puncture, Ultrasound, Urinalysis

Potential Complications from Surgical Procedures (1)

- Wrong person surgery
- Right person, wrong site
- Right person, wrong surgery

- Right person, right site, wrong surgery

Medical and Surgical Asepsis

Medical/ Surgical Asepsis (2)

- **Asepsis**: the absence of illness producing microorganism. **Hand hygiene** is the primary behavior
- **Medical Asepsis**: the use of precise practices to **reduce** the number, growth, and spread of microorganisms (**the clean technique**). It applies to administering oral medication, managing NG tubes, providing personal hygiene, and any other common nursing tasks
- **Surgical asepsis**: the use of precise practice to **eliminate all** microorganisms, from an object or an area to prevent contamination (**sterile technique**). It applies to parenteral medication administration, insertion of catheters, surgical procedures, sterile dressing changes, and many other common nursing practices.

-ALWAYS CHECK FOR LATEX ALLERGIES

-Personal Hygiene measures:

Respiratory hygiene, keep hair short/pulled back, keep nails short/clean; **NO GAIL GELS/ACRYLIC NAILS**, Remove jewelry from hands and wrists

- Physical Environment:

- Don't place items on floor,
- Don't shake linens/keep soiled linens away from clothing
- Clean from **LEAST SOILED TO MOST SOILED**
- Use plastic bags for moist/soiled items per protocol
- Place all laboratory specimens in biohazard containers or bags for transport

-Maintaining Sterile Field:

- Avoid cough/sneeze, talk directly over sterile field
- Only sterile items may be in a sterile field**
 - Outer wrapping and 1 inch edges (border) of packaging are not sterile
 - Tough "sterile to sterile" only (Sterile gloves to tough sterile supplies)
 - Items below the waist or above the chest are not sterile
 - Any nonsterile item** touching a sterile field **contaminates** the sterile field, no matter how short the contact
 - Do not reach** across sterile field
 - Do not turn your back** on sterile field
 - Hold items to add to a sterile field at a **minimum of 6 inches above** the field
 - Any sterile, non-waterproof wrapper that comes in **contact with moisture becomes non-sterile** (by wicking action)
 - Inspect all packages: dry, intact, not expired

WHEN IN DOUBT, THROW IT OUT

-Practices that promote medical asepsis

- Hand hygiene (soap, running water, friction)
- Changing linens daily, cleaning room
- Using masks, gloves, gowns, and protective eye ware
- Cough and sneeze etiquette

- Practices that maintain a sterile field

- Prolonged exposure to airborne microorganism can make items non-sterile
- Only sterile items may be in a sterile field
 - o The outer wrappings and linch edges of packaging that contains sterile items are not sterile
 - o Touch sterile materials with only sterile gloves and other sterile materials
 - o Consider any object below the waist level contaminated
- Microbes can move by gravity from a sterile to non-sterile field

- o Do not reach across or turn back on field, and hold items 6 inches above
- Any sterile non-waterproof wrapper that comes in contact with moisture becomes non sterile
- Nursing interventions
 - Equipment
 - o Select a clean and sterile field above the waist line, check expiration dates, & waste place
 - Procedure
 - o Unfold the top flap away from body, open side flaps with corresponding hands, open last flap and turn down towards body
 - o Once sterile field is set up, don sterile gloves

Inflammation

Pathophysiology, Inflammation (4)

- **Inflammation:** is an adaptive response to injury or illness that brings fluid (plasma), dissolved substances, and blood cells into the interstitial tissues where the invasion or damage occurred

-itis means inflammation of something

- Nonspecific response because same events occur regardless of the cause
- Invader is neutralized, eliminated, destroyed tissue is removed, and healing begins
- Inflammation is the first phase of the healing process

- 5 signs characterize inflammation

- Pain (nerves)
- Swelling (larger blood vessels more permeability)
- Redness (blood vessels dilate)
- Heat (get more heat from the vessels dilating)
- Impaired function of the body part
- Common symptoms; Pain, edema, warmth
- **KNOW FIVE SIGNS OF INFLAMMATION**

- Know difference between local and systemic inflammation

- Can be chemical (acids poisons), physical (object causes trauma), or a microorganism

- The inflammation processes

- Isolation of damaged area and promoting repair of surrounding tissue promotes healing
- Acute inflammation can occur within minutes, where response to bacteria can take hours. This is where you see the classic signs and they continue until healing occurs.

- Stages of Inflammation

• Stage 1: Vascular and Cellular response

- o Histamines serve as chemical mediators to indicate injury and increase blood flow
- o Fluid, proteins, and leukocytes leak into the interstitial space and cause inflammation
- o Basically 5 signs of inflammation

• Stage 2: Exudation production

- o Oozing of fluid, dead phagocytic cells, and tissue cells
- o Purulence which is yellow pus. It is always an indication of infection
- o Serous is clear, it's what is in a blister
- o Sanguineous is blood build up, RBCs
- o Serosanguinous is pink and it's a mixture of serous and RBC's

• Stage 3: Reparative process

- o Repairing of the wound
- o Regeneration of fibrous tissues (scar formation)
- o Can take up to a year

- o Epithelial cells, digestive, and respiratory have a good regeneration capacity while nervous, muscular, and elastic tissues don't.
- o When regeneration isn't possible, scars form

- Steps in acute dilation

- Vasodilation (redness and heat)
- Vascular permeability (edema)
- Cellular infiltration (pus)
- Thrombosis (clots)
- Stimulation of nerve endings (pain)

Medication Administration, Inflammation (1)

- NSAIDS, ibuprofen, aspirin, acetaminophen, steroids, analgesics
- Antipyretics are used to treat fever. Acetaminophen or aspirin
- Antibiotics if infection is present
- Surgery for situations like gallbladder and appendicitis

Illness management, Inflammation (2)

- Nursing interventions aim to prevent further injury, take medications as prescribed, and maintain adequate fluid intake and nutrition
- Reduce inflammation by positioning, heat, and
- Reduce mobility of inflamed area and elevate to reduce edema.
- RICE Rest, Ice, Compress, and Elevate
- Consuming anti-inflammatory diet and decreasing pro-inflammatory foods
 - List 5 diagnostic tests for inflammation
 - WBC-greater than 12000, body sends out attack invaders
 - ESR- (Erythrocyte sedimentation rate – how fast the sedimentation in your blood settles in a tube) less expensive test to prove or indicate inflammation. If its greater than 30, it shows inflammation. Leaves plasma at the top of the tube and RBC fall to the bottom
 - CRP- (C reactive protein) Released from liver into blood flow a few hours after inflammation has started with acute phase
 - SPEP- (serum protein electrophoresis) Determine how many proteins have been released.
 - CMP/BMP-look at kidney and liver function
- Diagnostic tests
 - ESR (erythrocyte sedimentation rate)-Measures how far the erythrocyte sedimentation rate settles in a tube over a given period of time active usually an hour
 - An inflammatory process is, the increased portion of fibrinogen causes the red blood cells to stick to one another and settle fast, causing a higher reading.
Normal for women = 0-20 Men = 0-15
 - CRP=C-reactive protein: CRP is a protein found in the blood that is produced by the liver and fat cells in response to the inflammatory process. The rise of CRP level indicates inflammatory process in the body. It can be used to evaluate the effectiveness of treatment for inflammation and assess risk for cardiac disease as it elevates in response to arterial damage.

Alterations in Body Systems, Inflammation (1)

- Inflammation can occur in virtually any tissue, organ, or system
- Pain
 - Acute or chronic, location, intensity, etiology, all described by client
- Edema
 - Welling caused by fluid in the bodies tissues. Creates puffiness of the skin, stretched skin, shortness of breath in pulmonary edema, decreased mobility, and dimple in skin after pressure

- Heat
 - Oral temp > 100.4 or less than 96.8
- Altered oxygenation
 - Inadequate oxygen intake, decreased ability to expel CO₂, inadequate delivery of O₂ to tissues
 - Cyanosis, labored breathing, dyspnea, changes in ABG, abnormal lung sounds, chest tightness, inability to clear sputum from lungs, hypotension, heart arrhythmias, fatigue
 - Respirations >20
- Infection
 - Inflammation, pain, mucus production, purulent drainage, hyperthermia, malaise, nausea, vomiting, headache.
 - WBC >12,000
- Erythema
 - Pulse >90
 - ERYTHEMA MEANS REDNESS
 - ECCHYMOSIS MEANS BRUISING

Intracranial Regulation

Alterations in Body Systems, Neurological (7)

- Can occur because of illness or injury
- Any systemic condition that affects delivery of blood, oxygen, and glucose to the brain or that alters membranes may alter LOC
 - Metabolic alterations – monitor sodium levels (135-145)
 - Drugs that suppress the CNS
 - Ischemia
 - Increased ICP (above 15)
 - Seizures
- Alterations in LOC are early signs of deterioration of the functions of the cerebral hemispheres
- Alteration of function in the mid brain and brain stem are characterized by LOC, RR, pulse pressure, pupillary response, ocular motor response, and motor function changes
- Terms used to describe LOC
 - **Full consciousness:**
 - alert, oriented to time, place, person, comprehends words
 - **Confusion:**
 - unable to think rapidly and clearly, easily bewildered, poor memory, attention span, misinterprets stimuli, and judgment is impaired
 - **Disorientation:**
 - not oriented to time, place, or person
 - **Obtundation:**
 - Lethargic, fatigued, somnolent, responsive to verbal or tactile stimuli, but falls asleep quick
 - **Stupor:**
 - mostly unresponsive, may be aroused by painful stimuli by grabbing or moving from it. Can feel and react to pain but wouldn't respond otherwise
 - **Semicomatose:**
 - doesn't move spontaneously, unresponsive to stimuli, but they may moan or stir from it, without actual arousal. They will make noises in response to thinks but won't move show arousal
 - **Coma:**

- unarousable, will not respond to stimuli, may show non-purposeful response (slight movement) without making any attempt to move away from it. Non-purposeful movement
- **Deep coma:**
 - completely unarousable and unresponsive to any stimuli, absence of brain stem reflexes, corneal, papillary, and pharyngeal reflexes, tendon and plantar reflexes.
- Decorticate – when arms are towards the body
- Decerebrate – when arms are away from your body

- Independent interventions

- Airway protection (assess and monitor), monitoring of ICP
- Assess LOC and Intake and output
- Reduce environmental stimuli
- Comfortable positioning, seizure precautions
- PERRLA, vital signs, administer fluids
 - Pupils are equal, round, and reactive to light, accommodation
- These are all things the nurse can do without a physician

Techniques of Physical Assessment, Neurological (1)

- Neurological assessment is important and should be done as soon as possible
- The interview is the first step.

1. Do you have any problems with dizziness or headaches? Do you ever have seizures?
2. Do you have a history of head trauma, any loss of consciousness?
3. Have you noticed any change in your speech, ability to think clearly, loss of or change in memory?
4. Do you have any weaknesses, numbness, tremors or tingling? If so, where?
 - It is always important to note the developmental age/stage that the pt is in
 - Always explain the procedure to pt before proceeding

System Specific Assessments, Neurological (1)

- Pearson 698-705
- Start with interview questions
- **LOC**
- Move to the assessment of the cranial nerves (seen below)
- Motor function
 - Coordination, Gait, Balance, Muscle strength
- Deep tendon reflexes
 - Graded on a 0 to 4+ scale
 - Biceps, Triceps, Patellar
- Sensory function
 - Pain, temp, light touch
- Diagnostic tests: used to test specific injury or disease
 - X-rays, cerebral angiography, nerve conduction studies, ICP monitoring, therapeutic drug levels, serum electrolytes.

- Glasgow coma scale

System Specific Assessments, Mental Status (1)

- The whole assessment typically begins with considering your patients mental status

- Evaluate the LOC

- If patient is not alert, assess LOC by observing his reaction to stimuli (start with verbal)
- AVPU (alert, verbal stimulus response, pain stimulus response, unresponsive)

- Reporting mental status includes a statement about the patient's mood or affect.
- Tests of memory (immediate, recent, remote)

Intracranial Regulation, Neurosensory System

System Specific Assessments, Cranial Nerves (2)

- Olfactory I: sensory, sense of smell
 - Have the patient close eye, occlude one nostril and identify the sent offered, do other side
- Optic II: sensory, vision
 - Distance test using Snellen chart (20 feet), Rosenbaum for near sided check (14 in). Test each eye then both together
- Oculomotor III: motor, pupillary reflex, extrinsic muscle movement of the eye (PERLA)
 - PERLA check and eye lid findings
- Trochlear IV: motor, eye muscle movement
 - Pupillary response to accommodation (changing focus from near to far)
- Trigeminal V: mixed
 - Ophthalmic branch: Sensory impulses from scalp, under eyelid, nose, cornea, and lacrimal gland
 - Touch cotton ball to eye
 - Maxillary branch: sensory impulses from lower eye lid, nasal cavity, upper teeth/lip, alate
 - Ask patient to close eyes and run a cotton all on the cheek
 - Mandibular branch: sensory impulses from tongue, lower teeth, skin of chin, lower lip, motor action includes teeth clenching and movement of mandible
 - Ask patient to clench and release the jaw while palpating over the muscles
- Abducens VI: mixed, extrinsic movement of eye, smiling closing of eye, frowning, tears and saliva
- Facial VII: Taste, facial movements, such as smiling, closing eyes, frowning, tears and saliva.
 - Ask patient to smile, frown, puff cheeks, raise eyebrows
- Vestibulocochlear (acoustic) VIII: sensory
 - Vestibular branch: sense of balance or equilibrium
 - Cochlear branch: sense of hearing
 - Whisper test
- Glossopharyngeal IX: mixed, produces the gag and swallowing reflex and taste
 - Gag reflex response
- Vagus X: mixed, innervates muscles of the throat and mouth for swallowing and talking, other branches responsible for pressoreceptros and chemoreceptor activity
 - With a penlight and tongue depressor, ask patient to say ahh.
- Spinal accessory XI: motor, movement of the trapezius and sternocleidomastoid muscles, and some movement of the larynx, pharynx, and soft palate.
 - Ask patient to turn head while you provide resistance. Ask pt to touch cheek to shoulder and then ask patient to shrug shoulders while you provide resistance
- Hypoglossal XII: motor, movement of the tongue for swallowing, movement of food during chewing and speech.
 - Ask patient to stick tongue out and check to see if it protrudes midline
 - Light tight dynamite

Thermoregulation

Illness Management, Thermoregulation (3)

- Hypothermia
 - Assess for lowered body temperature, cool skin, hypertension, and tachycardia.
 - Removing the client from the cold and rewarming the body.
 - Hyperthermia blanket: an electronically controlled blanket that provides a specific temp.
 - Warm infants slowly

- For severe hypothermia hemodialysis, peritoneal dialysis, colonic irrigation

- Hyperthermia

- Assess vital signs, hydration status, comfort, appetite, seizure and toxic appearance signs
- Clients temperature should approach normal limits within 60 minutes of an antipyretic
- Apply ice bag to groin, clover client with only a sheet
- Decrease the room temperature, give cool baths
- Know when to use an antipyretic – only when a patient is sick

Pathophysiology, Thermoregulation (1)

-Thermoregulation: the process that balances heat production and heat loss. It maintains a relatively constant core temp, but surface temp fluctuates.

- Hypothermia

- Condition where the core body temp falls below 95 degrees
- Main goal is to warm patient up slowly
- More heat is lost than produced
- Induced Hypothermia
 - Reduced metabolic rates
 - Lower cellular demand for O₂ in tissues
 - Used to reduce neurological damage
 - Sequelae from post cardiac arrest lessen
- Accidental Hypothermia
 - Infants and older adults
 - Frost bite and risk factors
- Signs include fatigue, slurred speech, poor coordination, clumsiness, confusion, shivering, tachycardia and tachypnea
- Mild hypothermia
 - Fatigue, slurred speech, poor coordination, confusion, poor judgment
- Moderate hypothermia
 - Decreased mental status, lack of shivering, depressed RR and HR, pallor, hallucinations
- Profound hypothermia
 - No respirations, no pulse, unresponsive pupils, coma

- Hyperthermia

- Hydration status is the most important
- The patient's body temperature is too hot
- Apply ice packs on groin, armpits, and neck
- Malignant hyperthermia
 - Potential fatal inherited disorder
 - Serious reaction to volatile inhalation of anesthetic gasses
- Heat exhaustion: results from excessive heat exposure and dehydration, **not a fever**
- Heat stroke: more serious form of heat exhaustion that can become life threatening, **not a fever.**
- Signs include flushing, warm skin, tachycardia, tachypnea, increased fluid requirement, elevated temperature, febrile seizures, and insensible fluid loss (through breath and sweat).
- No inherently harmful until fever reaches 105.9. Postpone treatment if under 102

Sensory Perception & Head and Neck

Alterations in Body Systems, Sensory Perception (3) (come mostly from lab)

- Sensory: the ability to receive and interpret sensory impressions

- Vertigo: the feeling of rotation or imbalance. It can be acute or chronic and can range from being merely distracting to completely debilitating. Romberg test

- **Color blindness:** affect approximately 1 in 10 men but very few women. It occurs when one or more pigments are missing within the cones in the retina. Most commonly and distinguish red and green.

Ishihara test.

- Impaired sense of smell: can occur for a number of reasons. It is commonly associated with respiratory illness such as the common cold.
- Taste disturbances: they are an often-overlooked abnormality. Although a decrease in the sense of taste is a normal part of ageing, it can be associated with medication, smoking, and infection.
- Eye alterations
 - Cataracts: break down of proteins within the lenses
 - Eye injuries: damage to structure of the eye
 - Glaucoma: increase of intraocular pressure causes gradual loss of peripheral vision
 - Age related macular degeneration (AMD): loss of central vision due to damaged retina
 - Peripheral neuropathy: trauma or diseases interfere with peripheral nerves.
- Genetic risk factors
 - Infants who were premature or who's mothers were infected with certain viruses
 - 50% of hearing loss at birth can be associated with genetic abnormalities
 - Auditory processing disorder: difficulty differentiating individual sounds and words
 - In older adults, open angle glaucoma has high prevalence in African Americas and Latinos
 - Visual impairment due to refraction error is high in American Indians
- Illnesses such as hypertension can contribute to sensory function loss

Techniques of Physical Assessment, Sensory Perception (3)

- Be sure to gather all the right equipment for the assessment
- **For clients that are hearing impaired**
 - Sit face to face, avoid covering mouth while speaking, encourage the use of hearing aids, speak slow and clear, do not shout, lower vocal pitch, write down what clients do not understand and show them that way
- **For clients who are visually impaired**
 - Call clients by name before approaching to avoid startling them
 - Identify yourself, explain intervention before touching
- Determine which assistive devices the client needs, and plan for their procurement
- Consult with rehabilitation therapists and refer clients to community based support groups

Illness Management (3)

- Many therapies involve assessing the individuals understanding of both the alteration and the treatment
- Promoting healthy sensory function
 - Healthy sensory function can be promoted with environmental stimuli that provide appropriate sensory input that varies and is neither too excessive nor too limited
- **Preventing sensory overload**
 - For at risk clients the nurse should assist with reducing the number and type of stimuli
- **Preventing sensory deprivation**
 - For at risk clients, newspapers, books, music, and television can provide appropriate stimuli
- Managing acute sensory deficits
 - Care of clients with deficits include
 - Encouraging the use of sensory aids to support residual sensory function
 - Promoting the use of other senses
 - Communicating effectively
 - Ensuring client safety
- Promoting effective communication

- o Moderate to acute sensory deficits can impact the client's quality of life (such as ADLs)
- Collaborative
 - o Clients are referred to specialists (neurologists, ophthalmologists, otolaryngologists) and ancillary services (PT, OT)
 - o Pharmacological treatment is especially important for glaucoma and macular degeneration

System Specific Assessments (1)

- Page 1296 of Pearson

- There are many sensory function tests but most are used rarely if at all. Sensory testing is commonly limited to checking for light touch and sometime sharp/dull discrimination.

- **Vision assessment**

Snellen (distance 20ft. **myopia** (impaired far vision; nearsightedness), **Rosenbaum** (near 14in, **presbyopia /Hyperopia** (impaired near vision or farsightedness), **Ishihara Test (for color blindness/color vision) – red and green are the most common color blindness**

- Eye movement assessment

- Cardinal fields of vision, cover uncover test, convergence,

- Pupillary assessment

- PERRLA

- External eye assessment

- Eyelids (color, discharge, drooping), Cornea (clear and has reflex to touch), iris

- Internal eye assessment

- Use the ophthalmoscope

- Hearing assessment

- **Weber (fork on head, equal hearing),**
- **Rinne (fork behind ear (mastoid bone), tell when there's no sound)** Place the stem of the vibrating **Tuning Fork** on the person's mastoid process and ask him or her to signal when the sound goes away. Quickly invert the fork so the vibrating end is near the ear canal; the person should still hear a sound. Normally the sound is heard twice as long by air conduction (next to the ear canal) as by bone conduction (through the mastoid process.) A normal response is a positive Rinne Test, or "AC > BC." Repeat with the other ear.
- whisper

- External ear assessment

- Inspect using an auto scope

- Smell/ tactile senses

- Internal mucosa inspection, CN1 test
- Sharp and dull touch senses, stereognosis

- Assess kinesthesia

- Sense of position

- Assess ability to discriminate fine touch

- Localization of touch, stereognosis

-Assess taste

- **Glasgow Coma Scale**

Altered levels of consciousness can be measured more objectively using the Glasgow Coma Scale. Eyes, verbal, and motor

Cranial Nerve Function

Cranial Nerve (CN)	Function of the nerve	System
I (Olfactory)	Sensory-smell	Ears, nose, mouth, and throat
II (Optic)	Sensory-visual acuity, visual fields	Eyes
III (Oculomotor), IV (Trochlear), and VI (Abducens)	Sensory-PERRLA, six cardinal positions of gaze	Eyes
V (Trigeminal)	Sensory-light touch sensation to face (forehead, cheek, jaw) Motor-jaw opening, clenching, chewing	Head and neck
VII (Facial)	Sensory-taste (salt/sweet) on anterior 2/3's of tongue Motor-facial movements	Head and neck
VIII (Auditory)	Sensory-hearing and balance	Ears, nose, mouth, and throat
IX (Glossopharyngeal)	Sensory-taste (sour/bitter) on posterior 1/3 of tongue Motor-swallowing, speech sounds and gag reflex	Ears, nose, mouth, throat, neurological
X (Vagus)	Motor-swallowing, speech sounds and gag reflex	Ears, nose, mouth, and throat
XI (Spinal assessor)	Motor-turn head, shrug shoulders	Head and neck
XII (Hypoglossal)	Motor-tongue movement	Ears, nose, mouth, and throat

Transmission Based Precautions

Transmission precautions are used when the route of transmission cannot be stopped by the use of standard precautions alone. Sometimes more than one precaution may need to be used.

Standard- **Washing hands and gloves** (HIV)

Contact- direct or indirect contact with the patient or patient's environment

- **gown and gloves** (c.diff and MRSA)

Droplet- illness transmitted by droplets larger than 5 microns.

- **surgical mask, gown, and gloves** (pneumonia, flu and pertussis)
- diphtheria, mycoplasma pneumonia, pertussis, mumps, rubella, flu, pneumonia, and scarlet fever, meningococcal meningitis

Airborne- infections transmitted by air-borne droplets smaller than 5 microns.

- **N95 respirator** (TB, chicken pox, herpes zoster), **negative pressure room**
- If patient needs to be transported, they only need to wear a surgical mask
- Measles, varicella, and TB

Bacterial Pneumonia

- Droplet
- Mask, goggles, gloves and gown
- Have a private room, or share room with someone of the same disease process
- Have them wash their hands
- Avoid close contact with others

Influenza

- Droplet
- Mask, goggles, gloves and gown
- Private room, or same disease process
- Use mask for transportation
- Use correct hand hygiene

Pertussis

- Droplet
- Same PPE
- Same teaching as flu

Respiratory Syncytial virus

- Contact or droplet
- Same PPE
- Private room

- Mask on patient
- Nurse: hand hygiene, dedicate equipment to patient as much as possible, and disinfect

C.Diff

- Contact, Face shield, gown and gloves
- Special room: private room
- Cleanse bed rails with bleach
- Hands must be washed with soap and water (everyone)
- After discharged, clean entire room with bleach.

MRSA

- Contact
- Gown gloves and mask
- Private room
- Limit transport of patients outside room
- Strict hand hygiene
- Keep skin injuries covered
- Keep equipment dedicated to patient

Rodda Virus

- Contact
- Gown, gloves and mask
- Private room
- Soap and water if hands are visibly soiled
- Strict hand hygiene
- Dedicate equipment

Herpes Zoster

- Contact until lesions are crusted, then it becomes standard
- Gloves, gown, and mask
- Private room
- Keep rash covered

TB

- Airborne
- Nurse: n95 resp, gloves and mask
- Private room
- Negative air pressure, door closed at all times
- Minimum of 6 exchanges per hour
- Proper disposal of used tissues
- If transported: only use surgical mask
- Strict hand hygiene, dedicate equipment

HIV/AIDS

- Standard
- Needle stick precautions

Disease Prevention

- Number one way to prevent disease: **hand washing**
- Educate on immunizations
- Most at risk: older adults, young children and immunocompromised
- Oral hygiene, adequate rest, adequate fluid intake

6 links in the chain of infection (what can nurses do to break the chain? *Handwashing, Environmental cleaning, wear PPE, antibiotics (when indicated), contain contaminated waste*)

- Causative agent (infectious agent)
- Reservoir
- Portal of exit
- Portal of entry
- Mode of transmission
- Susceptible host

If a patient is isolated, they shouldn't be isolated from interactions. ***

Use of antibiotics must be used with caution as antibiotics can suppress or kill the endogenous "friendly" flora that provides protection against drug-resistant microorganisms.

Illness Management

- Identify the body system and the effects the infection has on the body system
- Identify the causative agent and treat accordingly

Lab Tests, Infections

- Labs, what does it mean when you have an infection
- Leukocytosis: greater than 10
- WBC: 4-11
- Neutrophil: left shift= inflammation and infection
 - Right shift= suppression of bone marrow activity
 - Increase in neutrophils indicates infection
 - Decrease indicates a problem in the bone marrow.
 - Immature neutrophils indicate an acute infection
- ESR: over 20
- Culture: know type of bacteria, sensitivity testing takes 24-28 hours

Potential complication from Surgical

- **Why is someone at risk during surgery? We are cutting them open (portal of entry)**
- Wrong person surgery

- Right person, wrong site
- Right person, wrong surgery
- Right person, right site, wrong surgery

Medical and Surgical Asepsis

- Asepsis: absence of illness producing microorganism. Hand hygiene is the primary behavior.
- Medical Asepsis: **reduce number** in growth and spread of microorganisms (gloves)
- Surgical asepsis: **eliminate all** micros from an area or surface
- Hand hygiene, 3-5 mL of soap ***
- Keep hair pulled back
- Nails short and clean
- Remove all jewelry
- Physical environment:
 - **Always check for latex allergies, people who have latex allergies schedule their surgeries first thing in the morning**
 - Don't place items on floor
 - Don't shake linens/ keep soiled linens away from clothing
 - **Clean least soiled areas to most soiled areas**
 - **Sterile to sterile, nonsterile to nonsterile**
 - **Avoid coughing, sneezing and talking around sterile**
 - **1 in border around sterile field is NOT sterile**
 - **Unfold flap away, to the sides, then towards you**
 - Cannot lift anything greater than **6 inches above the field**
 - **Can't reach across or turn back to sterile field**
 - Any sterile non-waterproof wrapper that comes in contact with water becomes non-sterile
 - **Don't turn back on the sterile field.**
 - **When in doubt, through it out**
- **Medical asepsis (static)**
 - **Hand hygiene**
 - PPE PRN
- **Surgical asepsis (cidal)**
 - **Always sterile**

Inflammation

- Adaptive response that brings fluid into the IF space
- Local: topical
- Systemic: PO, IV
- Pain
- Swelling
- Redness

- Heat
- Impaired function of body part
- **Symptoms: pain, edema, warmth, restriction of mobility**
- **Stages of Inflammation**
- **Vascular and cellular phase:**
 - Histamines indicate injury and increase BF to space
- **Exudation**
 - Dead phagocytic cells and tissue cells ooze.
 - Sanguineous: bloody
 - Serosanguineous: pinkish, mix of blood and clear liquid
 - Serous: clear liquid
 - Purulent: puss, creamy yellow and even greenish liquid (indicates infection)
- **Reparative**
 - Scar formation
 - When regeneration isn't possible, scars form

Steps in acute dilation

- Vasodilation (redness and heat)
- Vascular permeability (edema)
- Cellular infiltration (puss)
- Thrombosis (clots)
- Stimulation of nerve endings (pain)

Medication Administration

- **Relief pain: NSAIDs, and Acetaminophen (fever)**
- Steroids to decrease inflammation
- **5 diagnostic tests for Inflammation**
 - WBC- if high its an indication
 - ESR- greater than 30, indicates significant inflammation
 - CRPC reactive protein- goes with inflammation
 - CMP, BMP- Kidneys and Liver (vital organs)
- **Vitals**
 - Temp: greater than 100.4
 - Pulse: greater than 90
 - RR: greater than 20
 - WBC: greater than 12
 - 10% bands: specific type of WBC
 - **Antipyretics are for fever**
 - **Antibiotics are for infection**
 - **Surgery is for situations such as gallbladder and appendicitis**

- **Illness management, Inflammation**
- **Nonpharmacological interventions**
- **RICE:**
 - **Rest**
 - **Ice**
 - **Compression**
 - **Elevation**
- **Alterations in the body systems**
 - Pain: PQRST, acute or chronic and location
 - Edema: swelling in body caused by body tissues
 - Heat: running a temperature
 - Altered Oxygenation: RR greater than 20
 - Infection: WBC greater than 12, Pulse greater than 90, nausea and vomiting, pain and fever

Neurological

- Changes in LOC
 - **Confusion:** judgement is impaired, poor attention span
 - **Disorientation:** AOx0
 - **Obtundation:** blackout, lethargic
 - **Stupor:** only reacting to painful stimuli
 - **Semi-comatose:** moan and stir, won't wake up, slight reaction to pain
 - **Coma:** have reflexes, but don't do anything
 - **Deep coma:** completely unarousable, no reflexes
 - Airway protection
 - GCS is less than 8, intubate
 - ABC, airway protection
 - LOC intake and output
 - Reduce environmental stimuli
 - Assess PEERLA, vital signs and admin fluids
 - Keep in comfortable position
- Techniques of physical assessment
 - PEERLA: normal- direct and consensual dilation
 - Neuro: talking to them
 - Know person developmental stage
 - LOC
 - Assess motor functions (gait)
 - GCS
 - Mental status: LOC and GCS
 - Alert
 - A verbal stimulus response
 - A painful stimulus response

- Unresponsive
- Test memory
- Orientation: date, time, place

Intercranial Nerves

- Olfactory: 1st, sensory, sense of smell
- Optic 2: sensory and vision (Snellen chart)
- Oculomotor 3rd: peerla, motor, pupillary reflex, extrinsic muscle movement of the eye
- Trochlear: motor and eye movement, near too far, six cardinal points
- Trigeminal: ophthalmic, (cotton to eye)
 - Maxillary branch (cotton up and down check)
 - Mandibular branch (cotton to jaw)
- Abductans: outwards gaze
- Facial VII: smiling, frowning, puffing cheeks, use sugar, salt and lemon juice
- Stibulary cobclear: vestibular branch (Romberg, whisper test)
- **Glossopharyngeal: gag reflex (move tongue from side to side and up and down)**
- Vagus: tongue depressor, use pen light and swallow
- **Hipoglossool: light, tight, dynamite**
- **Accessory: Move head side to side, shrug shoulder**

Thermoregulation

- Hypothermia: low body temp, less than 95 degrees
 - **Remove all cold clothes, or wet clothes, and put a warm blanket on them and admin warm IV fluids**
 - Severe: dialysis
 - Induced: reduce metabolic rate, reduce neurological damage
 - Accidental: infants, older adults; fatigue, slurred speech, confusion, shivering, and tachycardia and tachypnea
 - Mild: slurred speech, poor judgement, worse confusion
 - **Moderate: decrease mental status, no more shivering, decrease RR and HR, hallucinations**
 - **Profound: no RR, unresponsive pupil, coma**
- Hyperthermia: above 100.4 but not a fever
 - Assess vitals, hydration status, dehydration or not
 - Antipyretic
 - **Apply ice bags to groin, armpits and back of neck**
 - Only cover with sheet
 - Do cool backs
 - Decrease room temperature
 - **Malignant: bad reaction to anesthetic (inherited disorder) during surgery, or procedure**
 - Heat exhaustion: excessive heat exposure and dehydration (not a Fever)

- Heat stroke: flushing, warm skin, tachycardia, tachypnea, seizures. Worse version of exhaustion, if fever reaches 104-106 it is severely dangerous
- Heat transfers:
 - **conduction** (physical contact with another surface)
 - **Convection**: motion of air and water against the skin
 - **Evaporation**: sweat to vapor
- **Alterations of Body of Body System: sensory and perception**
 - **Vertigo: feeling of imbalance**
 - Color blindness: usually happens with males, can't see certain colors (red and green)
 - Impaired olfactory function: smoked for so long and can't taste anything
 - Impaired sense of smell: common cold
 - Eye altercations
 - Cataracts: break down of protein within the lenses
 - Eye injury: damage to structure of the eye
 - **Glaucoma: increase in ICP, increase of intra ocular pressure that cause a gradual loss of peripheral vision**
 - **Age related macular degeneration: loss of central vision due to damaged retina**
- **Techniques of physical assessment**
 - Hearing impairment: avoid covering mouth, speak slow and clear, lower vocal pitch, write down things if they cannot hear
 - Visually impaired: call clients by name before approaching them, identify self and explain intervention
 - Sensory: have a support group (anything)
- **Illness management**
 - Healthy sensory function
 - Have environmental stimuli that is appropriate
 - **Prevent sensory overload- make environment calm, turn down lights, not many people in the room, don't have the tv on all the time**
 - **Prevent sensory deprivation: provide books, newspapers, tv, radio, keep them preoccupied**
- **System specific assessment**
 - **Snellen- 20 feet, near sighted**
 - **Rosenbloom- presbyopia (hyperopia) far sighted ness 14 inches**
 - **Ishihara test: color blindness**
 - **Cardinal fields vision- nerves 3, 4, 6**
 - **Pupillary assessment- peerla**
 - **Assess cornea**
 - Internal eye assessment: ophthalmoscopes
 - **Weber: tuning fork (on top of head)**

- **Rinne: fork on mastoid bone, normal response is a positive (hear longer than they feel) negative (feel it longer than they hear it)**
- External ear assessment: otoscope

Core Module 2 Exam Blue Print

Infection (Pearson Ch. 9) - Infections Control (ATI Ch. 11)

Transmission Based Precautions (6)

Transmission based precautions are used when the route of transmission cant be stopped by the use of standard precautions alone. Sometimes more than one precaution may need to be used.

- Airborne Precautions

- Used for clients with infections transmitted by air-borne droplets smaller than 5 microns.
- Examples include measles, varicella, and TB
- Methods
 - Place client in a private, negative air pressure room or with someone that has the same illness
 - Wear respiratory device (N95) when dealing with TB, be sure to be fitted for it
 - Susceptible people should not enter room of chickenpox or measles without mask
 - Limit movement of clients outside the room

- Droplet Precautions

- Used for clients with an illness transmitted by droplets larger than 5 microns
- Examples include diphtheria, Mycoplasma pneumonia, pertussis, mumps, rubella, flu, pneumonia, and scarlet fever
- Methods
 - Place client in private room or with someone that has the same illness
 - Wear a mask when working within 3 feet of client
 - Limit movement of clients outside the room

- Contact Precautions-direct or indirect contact with the patient or patients environment

- Used for clients with an illness that is easily transmitted by contact with the client and items.
- Examples include, GI, respiratory, skin, and wound.
- Methods
 - Place client in private room or with someone that has the same illness
 - Wear gloves and cleanse when leaving room, C.diff requires soap and water
 - Wear a gown when there is possibility of contact with infected surfaces. Remove in room
 - Limit movement outside room and sharing of equipment

Disease Prevention, infections (4)

1. Giving a bed bath? (generally none)
2. Suctioning oral secretions? (gloves and mask/goggles or a face shield) (Respondents may correctly note that this may depend on whether open or closed suction is being used)
3. Transporting a patient in a wheelchair? (generally none)
4. Responding to an emergency where blood is spurting? (gloves, fluid-resistant gown, mask/goggles or a face shield)
5. Drawing blood from a vein? (gloves)
6. Cleaning an incontinent patient with diarrhea? (gloves and generally a gown)
7. Irrigating a wound? (gloves, gown, and mask/goggles or a face shield)
8. Taking vital signs? (generally none)

- a. six links in the chain of infection (WHAT CAN NURSES DO TO BREAK THE CHAIN?):
(Handwashing, Environmental cleaning, Wear PPE, Antibiotics (when indicated), Contain contaminated waste)
- b. Infectious Agent

- c. Reservoir
 - d. Mode of Exit
 - e. Mode of Transmission
 - f. Mode of Entry
 - g. Susceptible Host
9. Use of antibiotics must be used with caution as antibiotics can suppress or kill the endogenous (“friendly”) flora that provides protection against drug-resistant microorganisms
- a. **The patient should not be “isolated” from social interactions more than absolutely necessary to prevent the spread of disease.**
 - b. **Visitors can be allowed in most cases**
 - i. **Visitors need to check in with nurse / nurse’s station**
 - ii. **Visitors will be required to wear appropriate PPE**
 - iii. **Visitors will be required to follow transmission based precaution guidelines**

- The most effective way to prevent infections is **hand hygiene**
- Education on immunizations (older adults, children, immunocompromised)
- Good oral hygiene, adequate rest/ nutrition, adequate fluid intake.
- Immobile clients: pulmonary hygiene (cough, incentive spirometer), Prevent skin breakdown
- Use of aseptic technique/ proper PPE, respiratory hygiene/cough etiquette
- Healthcare worker precautions
 - Disinfecting and sterilizing, isolation precautions, isolation practices, PPE

Illness Management, Infections (1)

- Identify the body system and the effects the infection has on that body system
- Observe the manner of presentation
- Identify causative agent and treat accordingly

Laboratory Tests, Infections (1)

- WBC count
 - Provides clues about the infecting organism and the body's immune response to it (>10,000)
- WBC differential
 - Assess number of circulating neutrophils. Increase indicates infections, while decrease indicates a problem in the bone marrow. Immature neutrophils indicate an acute infection
- Cultures
 - Used to identify probable microorganisms by their characteristics. After culture, microorganism is tested with different antibiotics to determine which one is most effective (sensitivity testing), and it takes 24-28 hours.
- Serological testing
 - Indirect way of identifying infection by looking at our antibodies (hep b, HIV)
- Antibiotic peak and trough levels
 - Measuring the blood levels of the prescribed medication. Making sure that it reaches its therapeutic range, and a range high enough to kill the microorganism
- Radiology, Lumbar puncture, Ultrasound, Urinalysis

Potential Complications from Surgical Procedures (1)

- Wrong person surgery
- Right person, wrong site
- Right person, wrong surgery
- Right person, right site, wrong surgery

Medical and Surgical Asepsis (ATI Ch. 10)

Medical/ Surgical Asepsis (2)

- **Asepsis**: the absence of illness producing microorganisms. Hand hygiene is the primary behavior
- **Medical Asepsis**: the use of precise practices to **reduce** the number, growth, and spread of microorganisms (the clean technique). It applies to administering oral medication, managing NG tubes, providing personal hygiene, and any other common nursing tasks
- **Surgical asepsis**: the use of precise practice to **eliminate all** microorganisms, from an object or an area to prevent contamination (sterile technique). It applies to parenteral medication administration, insertion of catheters, surgical procedures, sterile dressing changes, and many other common nursing practices.

-ALWAYS CHECK FOR LATEX ALLERGIES

-Personal Hygiene measures:

Respiratory hygiene, Keep hair short/pulled back, Keep nails short/clean; **NO GAIL GELS/ACRYLIC NAILS**, Remove jewelry from hands and wrists

- Physical Environment:

- Don't place items on floor,
- Don't shake linens/keep soiled linens away from clothing
- Clean from **LEAST SOILED TO MOST SOILED**
- Use plastic bags for moist/soiled items per protocol
- Place all laboratory specimens in biohazard containers or bags for transport

-Maintaining Sterile Field:

- Avoid cough/sneeze, talk directly over sterile field
- Only sterile items may be in a sterile field
 - Outer wrapping and 1 inch edges (border) of packaging are not sterile
 - Tough "sterile to sterile" only (Sterile gloves to touch sterile supplies)
 - Items below the waist or above the chest are not sterile
 - Any non sterile item** touching a sterile field **contaminates** the sterile field, no matter how short the contact
 - Do not reach** across sterile field
 - Do not turn your back** on sterile field
 - Hold items to add to a sterile field at a **minimum of 6 inches above** the field
 - Any sterile, non-waterproof wrapper that comes in **contact with moisture becomes non-sterile** (by wicking action)
- Inspect all packages: dry, intact, not expired

WHEN IN DOUBT, THROW IT OUT

-Practices that promote medical asepsis

- Hand hygiene (soap, running water, friction)
- Changing linens daily, cleaning room
- Using masks, gloves, gowns, and protective eye ware
- Cough and sneeze etiquette

- Practices that maintain a sterile field

- Prolonged exposure to airborne microorganism can make items non sterile
- Only sterile items may be in a sterile field
 - The outer wrappings and 1 inch edges of packaging that contains sterile items are not sterile
 - Touch sterile materials with only sterile gloves and other sterile materials
 - Consider any object below the waist level contaminated
- Microbes can move by gravity from a sterile to non sterile field

- Do not reach across or turn back on field, and hold items 6 inches above
- Any sterile non waterproof wrapper that comes in contact with moisture becomes non sterile
- Nursing interventions
 - Equipment
 - Select a clean and sterile field above the waistline, check expiration dates, & waste place
 - Procedure
 - Unfold the top flap away from body, open side flaps with corresponding hands, open last flap and turn down towards body
 - Once sterile field is set up, don sterile gloves

Inflammation (Pearson Ch. 10)

Pathophysiology, Inflammation (4)

- **Inflammation:** is an adaptive response to injury or illness that brings fluid (plasma), dissolved substances, and blood cells into the interstitial tissues where the invasion or damage occurred
 - Nonspecific response because same events occur regardless of the cause
 - Invader is neutralized, eliminated, destroyed tissue is removed, and healing begins
 - Inflammation is the first phase of the healing process
- 5 signs characterize inflammation
 - Pain
 - Swelling
 - Redness
 - Heat
 - Impaired function of the body part
 - Common symptoms; Pain, edema, warmth
- Can be chemical (acids poisons), physical (object causes trauma), or a microorganism
- The inflammation process
 - Isolation of damaged area and promoting repair of surrounding tissue promotes healing
 - Acute inflammation can occur within minutes, where response to bacteria can take hours. This is where you see the classic signs and they continue until healing occurs.

Stages of Inflammation

- Vascular and Cellular response
 - Histamines serve as chemical mediators to indicate injury and increase blood flow
 - Fluid, proteins, and leukocytes leak into the interstitial space and cause inflammation
- Exudation production
 - Oozing of fluid, dead phagocytic cells, and tissue cells
- Reparative process
 - Regeneration of fibrous tissues (scar formation)
 - Epithelial cells, digestive, and respiratory cells have a good regeneration capacity while nervous, muscular, and elastic tissues don't.
 - When regeneration isn't possible, scars form
- Steps in acute dilation
 - Vasodilation (redness and heat)
 - Vascular permeability (edema)
 - Cellular infiltration (puss)
 - Thrombosis (clots)
 - Stimulation of nerve endings (pain)

Medication Administration, Inflammation (1)

- NSAIDS, ibuprofen, aspirin, acetaminophen, steroids, analgesics
- Antipyretics are used to treat fever.
- Antibiotics if infection is present
- Surgery for situations like gallbladder and appendicitis

Illness management, Inflammation (2)

- Nursing interventions aim to prevent further injury, take medications as prescribed, and maintain adequate fluid intake and nutrition
- Reduce inflammation by positioning, heat, and
- Reduce mobility of inflamed area and elevate to reduce edema.
- Consuming anti-inflammatory diet and decreasing proinflammatory foods
 - List 5 diagnostic tests for inflammation
 - WBC-greater than 12000, body sends out attack invaders
 - ESR-less expensive test for inflammation. If it's greater than 30, it indicates significant inflammation. Leaves plasma at the top of the tube and RBC fall to the bottom
 - CRP-C reactive protein. Released from liver into blood flow a few hours after inflammation has started with acute phase
 - SPEP-serum protein electrophoresis. Determine how many proteins have been released.
 - CMP/BMP-look at kidney and liver function
- Diagnostic tests
 - ESR (erythrocyte sedimentation rate)-Measures how far the erythrocyte sedimentation rate settles in a tube over a given period of time active usually an hour
 - An inflammatory process is, the increased portion of fibrinogen causes the red blood cells to stick to one another and settle fast, causing a higher reading.
Normal for women = 0-20 Men = 0-15
 - CRP=C-reactive protein: CRP is a protein found in the blood that is produced by the liver and fat cells in response to the inflammatory process. The rise of CRP level indicates inflammatory process in the body. It can be used to evaluate the effectiveness of treatment for inflammation and assess risk for cardiac disease as it elevates in response to arterial damage.

Alterations in Body Systems, Inflammation (1)

- Inflammation can occur in virtually any tissue, organ, or system
- Pain
 - Acute or chronic, location, intensity, etiology, all described by client
- Edema
 - Welling caused by fluid in the bodies tissues. Creates puffiness of the skin, stretched skin, shortness of breath in pulmonary edema, decreased mobility, and dimple in skin after pressure
- Heat
 - Oral temp > 100.4 or less than 96.8
- Altered oxygenation
 - Inadequate oxygen intake, decreased ability to expel CO₂, inadequate delivery of O₂ to tissues
 - Cyanosis, labored breathing, dyspnea, changes in ABG, abnormal lung sounds, chest tightness, inability to clear sputum from lungs, hypotension, heart arrhythmias, fatigue
 - Respirations >20
- Infection
 - Inflammation, pain, mucus production, purulent drainage, hyperthermia, malaise, nausea, vomiting, headache.
 - WBC >12,000
- Erythema
 - Pulse >90

Alterations in Body Systems, Neurological (7)

- Can occur because of illness or injury
- Any systemic condition that affects delivery of blood, oxygen, and glucose to the brain or that alters membranes may alter LOC
 - Metabolic alterations
 - Drugs that suppress the CNS
 - Ischemia
 - Increased ICP (above 15)
 - Seizures
- Alterations in LOC are early signs of deterioration of the functions of the cerebral hemispheres
- Alteration of function in the mid brain and brain stem are characterized by LOC, RR, pulse pressure, pupillary response, ocular motor response, and motor function changes
- Terms used to describe LOC
 - Full consciousness: alert, oriented to time, place, person, comprehends words
 - Confusion: unable to think rapidly and clearly, easily bewildered, poor memory, attention span, misinterprets stimuli, and judgment is impaired
 - Disorientation: not oriented to time, place, or person
 - Obtundation: lethargic, somnolent, responsive to verbal or tactile stimuli, but falls asleep quick
 - Stupor: mostly unresponsive, may be aroused by painful stimuli by grabbing or moving from it.
 - Semicomatose: doesn't move spontaneously, unresponsive to stimuli, but they may moan or stir from it, without actual arousal
 - Coma: unarousable, will not respond to stimuli, may show nonpurposeful response (slight movement) without making any attempt to move away from it.
 - Deep coma: completely unarousable and unresponsive to any stimuli, absence of brain stem reflexes, corneal, papillary, and pharyngeal reflexes, tendon and plantar reflexes.
- Independent interventions
 - Airway protection (assess and monitor), monitoring of ICP
 - Assess LOC and Intake and output
 - Reduce environmental stimuli
 - Comfortable positioning (respiratory distress? raise head of head),
 - Seizure precautions (pads on sides of bed) during active position patient should be in lateral position
 - PERRLA, vital signs, administer fluids

Techniques of Physical Assessment, Neurological (1)

- Neurological assessment is important and should be done as soon as possible
- The interview is the first step.
- 1. Do you have any problems with dizziness or headaches? Do you ever have seizures?
- 2. Do you have a history of head trauma, any loss of consciousness?
- 3. Have you noticed any change in your speech, ability to think clearly, loss of or change in memory?
- 4. Do you have any weaknesses, numbness, tremors or tingling? If so, where?
- It is always important to note the developmental age/stage that the pt is in
- Always explain the procedure to pt before proceeding

System Specific Assessments, Neurological (1)

- Pearson 698-705
- Start with interview questions
- LOC
- Move to the assessment of the cranial nerves (seen below)
- Motor function
 - Coordination, Gait, Balance, Muscle strength

- Deep tendon reflexes
 - Graded on a 0 to 4+ scale
 - Biceps, Triceps, Patellar
- Sensory function
 - Pain, temp, light touch
- Diagnostic tests: used to test specific injury or disease
 - X-rays, cerebral angiography, nerve conduction studies, ICP monitoring, therapeutic drug levels, serum electrolytes.
- Glasgow coma scale

System Specific Assessments, Mental Status (1)

- The whole assessment typically begins with considering your patient's mental status
- Evaluate the LOC
 - If patient is not alert, assess LOC by observing his reaction to stimuli (start with verbal)
 - AVUP (alert, verbal stimulus response, pain stimulus response, unresponsive)
- Reporting mental status includes a statement about the patient's mood or affect.
- Tests of memory (immediate, recent, remote)

Intracranial Regulation (Pearson Ch. 11) Neurosensory System (ATI Ch. 31)

System Specific Assessments, Cranial Nerves (2)

External stimuli:

- visual
- auditory
- olfactory
- tactile
- gustatory (we can taste food)

Internal stimuli:

- gustatory (tastebuds)
- kinesthetic (awareness to position and movement of body parts) proprioception
 - stereognosis
- visceral (awareness of internal organs; feeling chest pain, stomach cramps)
- Olfactory I: sensory, sense of smell
 - Have the pt close eye, occlude one nostril and identify the scent offered, do other side
- Optic II: sensory, vision
 - Distance test using Snellen chart (20 feet), Rosenbaum for nearsighted check (14 in). Test each eye then both together
- Oculomotor III: motor, pupillary reflex, extrinsic muscle movement of the eye (PERLA)
 - PERLA check and eye lid findings
- Trochlear IV: motor, eye muscle movement
 - Pupillary response to accommodation (changing focus from near to far)
- Trigeminal V: mixed
 - Ophthalmic branch: Sensory impulses from scalp, under eyelid, nose, cornea, and lacrimal gland
 - Touch cotton ball to eye
 - Maxillary branch: sensory impulses from lower eye lid, nasal cavity, upper teeth/lip, alate
 - Ask pt to close eyes and run a cotton ball on the cheek
 - Mandibular branch: sensory impulses from tongue, lower teeth, skin of chin, lower lip, motor action includes teeth clenching and movement of mandible
 - Ask pt to clench and release the jaw while palpating over the muscles

- Abducens VI: mixed, extrinsic movement of eye, smiling closing of eye, frowning, tears and saliva
- Facial VII: Taste, facial movements, such as smiling, closing eyes, frowning, tears and saliva.
 - o Ask pt to smile, frown, puff cheeks, raise eyebrows
- Vestibulocochlear (acoustic) VIII: sensory
 - Vestibular branch: sense of balance or equilibrium
 - Cochlear branch: sense of hearing
 - o Whisper test
- Glossopharyngeal IX: mixed, produces the gag and swallowing reflex and taste
 - Gag reflex response
- Vagus X: mixed, innervates muscles of the throat and mouth for swallowing and talking, other branches responsible for pressoreceptors and chemoreceptor activity
 - With a penlight and tongue depressor, ask the patient to say ahh.
- Spinal accessory XI: motor, movement of the trapezius and sternocleidomastoid muscles, and some movement of the larynx, pharynx, and soft palate.
 - Ask pt to turn head while you provide resistance. Ask pt to touch cheek to shoulder and then ask pt to shrug shoulders while you provide resistance
- Hypoglossal XII: motor, movement of the tongue for swallowing, movement of food during chewing and speech.
 - Ask pt to stick tongue out and check to see if it protrudes midline
 - Light tight dynamite

Thermoregulation (Pearson Ch. 30)

Illness Management, Thermoregulation (3)

- Hypothermia
 - Assess for lowered body temperature, cool skin, hypertension, and tachycardia.
 - Removing the client from the cold and rewarming the body.
 - o Hyperthermia blanket: an electronically controlled blanket that provides a specific temp.
 - Warm infants slowly
 - For severe hypothermia hemodialysis, peritoneal dialysis, colonic irrigation
- Hyperthermia
 - Assess vital signs, hydration status, comfort, appetite, seizure and toxic appearance signs
 - Clients temperature should approach normal limits within 60 minutes of an antipyretic
 - Apply ice bag to groin, clover client with only a sheet
 - Decrease the room temperature, give cool baths

Pathophysiology, Thermoregulation (1)

- Thermoregulation: the process that balances heat production and heat loss. It maintains a relatively constant core temp, but surface temp fluctuates.
- Hypothermia
 - Condition where the core body temp falls below 95 degrees
 - More heat is lost than produced
 - Induced Hypothermia
 - o Reduced metabolic rates
 - o Lower cellular demand for O₂ in tissues
 - o Used to reduce neurological damage
 - o Sequelae from post cardiac arrest lessen
 - Accidental Hypothermia
 - o Infants and older adults
 - o Frostbite and risk factors

- Signs include fatigue, slurred speech, poor coordination, clumsiness, confusion, shivering, tachycardia and tachypnea
- Mild hypothermia
 - Fatigue, slurred speech, poor coordination, confusion, poor judgment
- Moderate hypothermia
 - Decreased mental status, lack of shivering, depressed RR and HR, pallor, hallucinations
- Profound hypothermia
 - No respirations, no pulse, unresponsive pupils, coma
- Hyperthermia
 - Malignant hyperthermia
 - Potential fatal inherited disorder
 - Serious reaction to volatile inhalation of anesthetic gasses
 - Heat exhaustion: results from excessive heat exposure and dehydration, not a fever
 - Heat stroke: more serious form of heat exhaustion that can become life threatening, not a fever.
 - Signs include flushing, warm skin, tachycardia, tachypnea, increased fluid requirement, elevated temperature, febrile seizures, and insensible fluid loss (through breath and sweat).
 - Not inherently harmful until fever reaches 105.9. Postpone treatment if under 102

Sensory Perception - ATI Ch. 45 & Pearson Ch. 18 Head and Neck - ATI Ch. 28

Alterations in Body Systems, Sensory Perception (4)

- Sensory: the ability to receive and interpret sensory impressions
- Vertigo: the feeling of rotation or imbalance. It can be acute or chronic and can range from being merely distracting to completely debilitating
- Color blindness: affects approximately 1 in 10 men but very few women. It occurs when one or more pigments are missing within the cones in the retina. Most commonly and distinguish red and green.
- Impaired sense of smell: can occur for a number of reasons. It is commonly associated with respiratory illness such as the common cold.
- Taste disturbances: they are an often overlooked abnormality. Although a decrease in the sense of taste is a normal part of ageing, it can be associated with medication, smoking, and infection.
- Eye alterations
 - Cataracts: break down of proteins within the lenses
 - Eye injuries: damage to structure of the eye
 - Glaucoma: increase of intraocular pressure causes gradual loss of peripheral vision
 - Age related macular degeneration (AMD): loss of central vision due to damaged retina
 - Peripheral neuropathy: trauma or diseases interfere with peripheral nerves.
- Genetic risk factors
 - Infants who were premature or who's mothers were infected with certain viruses
 - 50% of hearing loss at birth can be associated with genetic abnormalities
 - Auditory processing disorder: difficulty differentiating individual sounds and words
 - In older adults, open angle glaucoma has high prevalence in African Americans and Latinos
 - Visual impairment due to refraction error is high in American Indians
- Illnesses such as hypertension can contribute to sensory function loss

Techniques of Physical Assessment, Sensory Perception (3)

- Be sure to gather all the right equipment for the assessment
- For clients that are hearing impaired

- Sit face to face, avoid covering mouth while speaking, encourage the use of hearing aids, speak slow and clear, do not shout, lower vocal pitch, write down what clients do not understand
- For clients who are visually impaired
 - Call clients by name before approaching to avoid startling them
 - Identify yourself, explain intervention before touching
- Determine which assistive device the client needs, and plan for their procurement
- Consult with rehabilitation therapists and refer clients to community based support groups

Illness Management, Sensory Preception (3)

- Many therapies involve assessing the individuals understanding of both the alteration and the treatment
- Promoting healthy sensory function
 - Healthy sensory function can be promoted with environmental stimuli that provide appropriate sensory input that varies and is neither too excessive nor too limited
- Preventing sensory overload
 - For at risk clients the nurse should assist with reducing the number and type of stimuli
- Preventing sensory deprivation
 - For at risk clients, newspapers, books, music, and television can provide appropriate stimuli
- Managing acute sensory deficits
 - Care of clients with deficits include
 - Encouraging the use of sensory aids to support residual sensory function
 - Promoting the use of other senses
 - Communicating effectively
 - Ensuring client safety
- Promoting effective communication
 - Moderate to acute sensory deficits can impact the clients quality of life (such as ADLs)
- Collaborative
 - Clients are referred to specialists (neurologists, ophthalmologists, otolaryngologists) and ancillary services (PT, OT)
 - Pharmacological treatment is especially important for glaucoma and macular degeneration

System Specific Assessments, Sensory Perception (1)

- Page 1296 of Pearson
- There are many sensory function tests but most are used rarely at all. Sensory testing is commonly limited to checking for light touch and sometime sharp/dull discrimination.
- Vision assessment
Snellen (distance 20ft. **myopia** (impaired far vision; nearsightedness), Rosenbaum (near 14in, **presbyopia/Hyperopia** (impaired near vision or farsightedness), **Ishihara Test (for color blindness/color vision)**)
- Eye movement assessment
 - Cardinal fields of vision, cover uncover test, convergence,
- Pupillary assessment
 - PERRLA
- External eye assessment
 - Eyelids (color, discharge, drooping), Cornea (clear and has reflex to touch), iris
- Internal eye assessment
 - Use the ophthalmoscope
- Hearing assessment
 - Weber Test (fork on head, equal hearing)
 - Rinne Test (fork behind ear(mastoid bone), tell when there's no sound) Place the stem of the vibrating **Tuning Fork** on the person's mastoid process and ask him or her to signal when the sound

goes away. Quickly invert the fork so the vibrating end is near the ear canal; the person should still hear a sound. Normally the sound is heard twice as long by air conduction (next to the ear canal) as by bone conduction (through the mastoid process.) A normal response is a positive Rinne Test, or “AC > BC.” Repeat with the other ear.

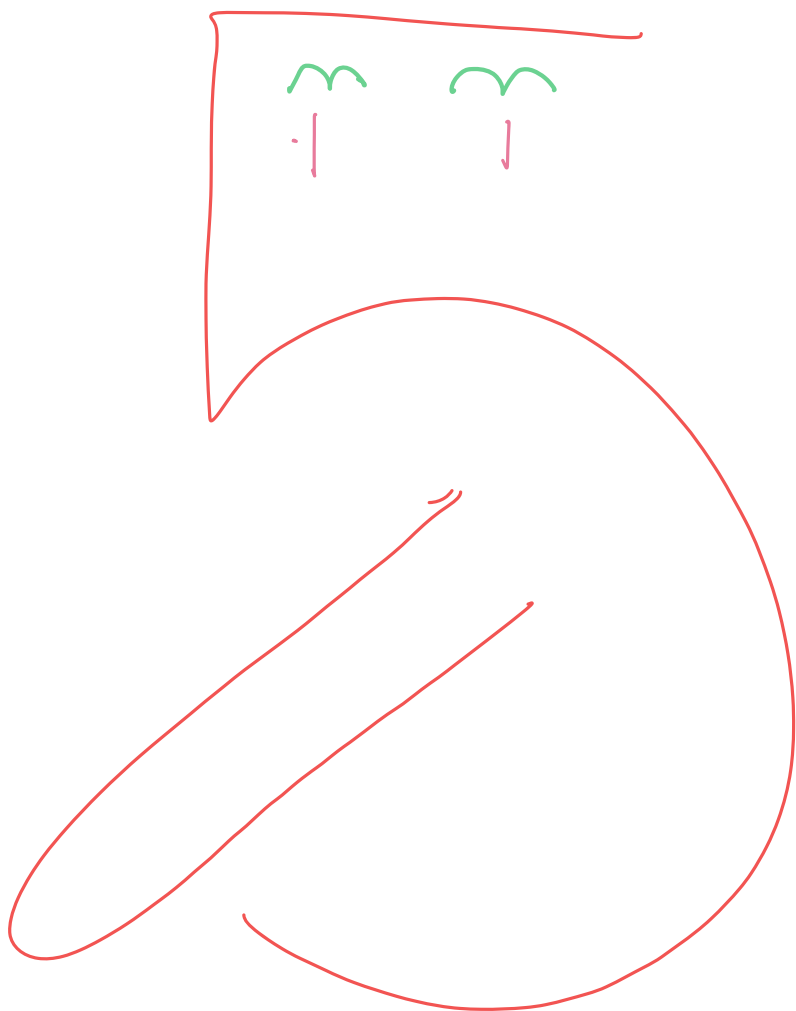
- whisper
- External ear assessment
 - Inspect using an auto scope
- Smell/ tactile senses
 - Internal mucosa inspection, CN1 test
 - Sharp and dull touch senses, stereognosis
- Assess kinesthesia
 - Sense of position
- Assess ability to discriminate fine touch
 - Localization of touch, stereognosis
- Assess taste

- Glasgow Coma Scale

Altered levels of consciousness can be measured more objectively using the Glasgow Coma Scale.

Eye vision motor

Cranial Nerve Function		
Cranial Nerve (CN)	Function of the nerve	System
I (Olfactory)	Sensory-smell	Ears, nose, mouth, and throat
II (Optic)	Sensory-visual acuity, visual fields	Eyes
III (Oculomotor), IV (Trochlear), and VI (Abducens)	Sensory-PERRLA, six cardinal positions of gaze	Eyes
V (Trigeminal)	Sensory-light touch sensation to face (forehead, cheek, jaw) Motor-jaw opening, clenching, chewing	Head and neck
VII (Facial)	Sensory-taste (salt/sweet) on anterior 2/3's of tongue Motor-facial movements	Head and neck
VIII (Auditory)	Sensory-hearing and balance	Ears, nose, mouth, and throat
IX (Glossopharyngeal)	Sensory-taste (sour/bitter) on posterior 1/3 of tongue Motor-swallowing, speech sounds and gag reflex	Ears, nose, mouth, throat, neurological
X (Vagus)	Motor-swallowing, speech sounds and gag reflex	Ears, nose, mouth, and throat
XI (Spinal assessor)	Motor-turn head, shrug shoulders	Head and neck
XII (Hypoglossal)	Motor-tongue movement	Ears, nose, mouth, and throat



Old - Olfactory

Open - Optic

Oceans - Oculomotor

Try - Trochlear

To - Trigeminal

Abuse - abducens

Families - Facial

Very - Vestibulocochlear

Good - Glossopharyngeal

Vibes - Vagus

Across - Accessory

Here - Hypoglossal

Some - sensory

Say - sensory

Many - motor

Money - motor

But - Both

My - motor

Brother - Both

Says - sensory

Big - Both

Brains - Both

Matter - motor

More - motor