
Mass casualty patient tagging:

- Class 1 Resuscitation/Red: airway/cardiovascular
- Class 2 Emergent/Yellow: immediate tx but not life threatening (fracture)
- Class 3 Urgent/Green: minor/not immediate (laceration)
- Class 4 Less Urgent/Black: expected to die so divert attention to red and yellow tags (penetrating head wound)
- Patient unresponsive without suspicion of head trauma the airway should be opened with the head-tilt/chin-lift maneuver
- Patient unresponsive with suspected head trauma the airway should be opened with modified jaw thrust maneuver
- Prevent hypothermia by removing wet clothing, cover with warm blankets, increase room temp, heat lamp, warm IV fluids
- Tx poisoning with activated charcoal, gastric lavage (if done within 1 hour of ingestion), and aspiration
 - Syrup of ipecac no longer used (induces vomiting)
- BLS uses hands-on approach to restore ABC's
- VF or pulseless VT tx with CPR, IV access, dysrhythmics (epi or vasopressin), consider amiodarone, lidocaine, or magnesium
- Alpha-1 drugs= vasoconstriction
- Beta-1 drugs= increases HR and conduction through AV node
- Beta-2 drugs= bronchodilation
- Dopamine= renal blood vessel dilation
- Cerebral angiography: visualization of cerebral blood vessels
 - Uses contrast dye
 - Inform pregnant women dye can be harmful to fetus
 - No food or water 4-6 hours prior
 - History of bleeding or anti-coagulation meds requires further considerations for monitoring after procedure for possible bleeding
 - Assess BUN and Creatinine to determine kidney's ability to excrete dye
- **EEG:**
 - Determine seizure activity, sleep disorder, behavioral changes
 - No prior fasting required
 - Wash hair prior
 - Instruct patient to be sleep deprived for procedure because it promotes cranial stress and can induce seizures

- Increased electrical activity can be induced by flashing lights or hyperventilation for 3-4 minutes

• **Glasgow Coma Scale: (not on exam)**

- Best possible score is 15
- Score < 8 associated with comatose and severe head injuries
- Eye opening: best eye response (ranges 4-1)
- Verbal: best verbal response (ranges 5-1)
- Motor: best motor response (ranges 6-1)

• **ICP Monitoring:**

- Placed by surgeon for patients with low Glasgow Score
- Biggest risk is infection
- Intraventricular catheter aka ventriculostomy
- Subarachnoid screw or bolt
- Epidural or subdural sensor
- Increased ICP S/S: severe headache, decreased LOC, irritability, dilated/pinpoint pupils, Cheyne-Stokes respirations, abnormal posturing (decerebrate, decorticate, flaccidity)
- Normal ICP= 10-15

• **Lumbar puncture:**

- Tests for MS, Meningitis, Syphilis
- Patient should void prior to procedure
- Patient should be in cannon ball position while on side or stretched over an overbed table
- Patient should remain lying flat for several hours after procedure to ensure clots and to decrease risk of headache
- Increase fluids after procedure

- PET scan determines tumor activity and response to tx

- Somatic pain occurs in bones, joints, muscles, skin, or connective tissues

- Visceral pain occurs in organs

• **NSAIDs/Acetaminophen:**

- Patients with healthy liver should take no more than 4g/day
- Monitor for salicylism (tinnitus, vertigo, decreased hearing acuity)
- Prevent GI upset by taking them with food or antacids
- Monitor for bleeding with long-term use

- **Opioid A/E**: constipation, orthostatic hypotension, retention, nausea, vomiting, sedation, respiratory depression

• **Meningitis:**

- Prevention: Haemophilus Influenzae Type B vaccine and Meningococcal vaccine
- Viral Meningitis: no vaccine

- S/S: excruciating constant headache, nuchal rigidity (neck stiffness), photophobia, fever, chills, N/V, altered LOC, positive Kernig's and Brudzinski's signs, hyperactive deep tendon reflexes, tachycardia, seizures, red macular rash
 - Kernig's Sign: resistance and pain with extension of leg from flexed position (think Kernig's= Knee)
 - Brudzinski's Sign: flexion of knees and hips occurring with deliberate flexion of patient's neck
 - Cloudy CSF= bacterial meningitis
 - Clear CSF= viral meningitis
 - Labs: Elevated WBC and elevated protein; Decreased Glucose (bacterial)
 - Isolate patient as soon as Meningitis is suspected (contact precaution until antibiotics have been administered for 24 hours and oral/nasal secretions are no longer infectious. Patients with bacterial meningitis might need to remain on droplet precautions continuously)
 - Mgmt: Provide quiet environment and minimize exposure to bright lights; maintain bed rest with HOB elevated to 30 degrees, monitor for increased ICP; avoid coughing and sneezing to avoid increased ICP; seizure precautions
 - Tx: Antibiotics (vancomycin with ceftriaxone or cefotaxime), anticonvulsants (phenytoin)
 - Complications: increased ICP, SIADH (dilute blood or concentrated urine), septic emboli
- **Seizures:**
 - Seizures: abrupt and abnormal
 - Epilepsy: chronic and reoccurring
 - Risk factors: genetics, acute febrile state especially with children under 2 years old, head trauma, cerebral edema, infection, metabolic disorder (hypoglycemia or hyponatremia), exposure to toxins, brain tumor, hypoxia, acute substance withdrawal, fluid and electrolyte imbalances
 - Generalized seizures usually begin with aura (alteration in smell, vision, hearing, or emotions)
 - Tonic-Clonic: few seconds of stiffening of muscles and loss of consciousness followed by rhythmic jerking of extremities. Postictal phase follows tonic-clonic and is characterized by confusion and sleepiness
 - Atonic Seizure: few seconds where muscle tone is lost which frequently results with falls
 - Seizure Dx Tests: EEG (identifies origin of seizure activity), MRI, CAT scan, CSF analysis
 - During a seizure: if standing help the patient to the floor and hold head in lap, move furniture out of the way, turn patient to side, loosen restrictive clothing, do not restrain patient, do not attempt to open mouth or insert object into mouth, do not use padded tongue blade, document onset and duration
- **After a seizure**: maintain patient in side-lying position, check vitals, perform neuro checks, reorient and calm the patient, try to determine triggers
 - Phenytoin: (anti-epileptic)
 - Blood tests determine therapeutic level
 - A/E: gingival hyperplasia
 - Decreases effectiveness of birth control and Warfarin
 - Status Epilepticus:
 - Repeated seizure activity within 30-minute time frame
 - Maintain airway, provide O2, establish IV access, EKG monitoring, monitor pulse oximetry and ABG's
 - Administer Diazepam or Lorazepam IV push followed by IV Phenytoin
- **Parkinson's:**
 - Excess acetylcholine causes a decrease in Dopamine
 - S/S: stooped posture, shuffling gait, tremors, muscle rigidity, bradykinesia, mask-like expression, difficulty chewing and swallowing, progressive difficulty with ADL's, mood swings, cognitive impairment
 - Mgmt: monitor swallowing and maintain adequate nutrition; use thickened liquids; encourage exercise such as yoga; encourage ROM exercises; teach patient to stop occasionally when walking to slow down speed and reduce risk for injury; encourage patient to speak slowly and to pause frequently
 - Levodopa: Increases Dopamine levels and is usually combined with Carbidopa because it allows for a smaller required dose and decreases A/E. "Wearing off" phenomenon occurs which can indicate a need for a change in dose or time of administration or the need for a "medication holiday".
 - Anticholinergics can be used as well
 - Complications: Aspiration Pneumonia (have a nurse present when patient is eating, feed patient upright, and have suction equipment nearby)
- **Alzheimer's:**
 - S/S: memory loss, judgement problems, and changes in personality
 - Risk Factors: family history, environmental agents (herpes, metal, toxic waste)
 - Dx: No definitive Dx until death (autopsy)
 - Mgmt: Use calendar; short directions; be consistent and repetitive; reminisce with patient about the past; keep noise to a minimum; minimize clutter; avoid crowds; provide toileting schedule; remove scatter rugs; install door locks; provide good lighting especially on stairs; install railings on stairs and mark edge of steps with colored tape; place mattress on floor
 - Donepezil: increases amount of Ach available
 - Moderate cognitive decline: characterized by personality changes and obvious memory loss
 - Moderately severe cognitive decline: characterized by assistance needed with ADL's

- Severe cognitive decline: increased episodes of urinary and fecal incontinence
 - Very severe cognitive decline: characterized by loss of ability to respond to environment, speak, and control movement is lost; inability to eat without assistance and impaired swallowing; unrecognizable speech; gradual loss of ability to move extremities (ataxia)
 - Brain tumor complications: SIADH (caused by damage to hypothalamus) and DI
- **Multiple Sclerosis:**
 - Characterized by plaques of white matter that damage myelin sheath
 - Risk Factors: viruses, cold climate, physical injury, emotional stress, pregnancy, fatigue, hot shower/bath
 - S/S: diplopia, decreased visual acuity, tinnitus, decreased hearing acuity, dysphagia, dysarthria (slurred and nasal speech), muscle spasticity, ataxia, muscle weakness, nystagmus, bowel and bladder dysfunction, memory loss, impaired judgement, sexual dysfunction
 - Dx: MRI shows plaques on brain and spine
 - Tx: Cyclosporine (immunosuppressive agent), Prednisone (steroid), Dantrolene and Baclofen (muscle relaxers)
- **ALS:**
 - Degenerative disorder of upper and lower motor neurons
 - Progressive paralysis; starts in extremity and moves toward center of body; affects respiratory system which eventually causes respiratory failure/death; muscle weakness/atrophy; dysphagia
 - Death within 3-5 years of onset
 - Mgmt: keep patent airway, suction and intubate as necessary
 - Riluzole: helps deterioration of neurons
 - Complication: pneumonia
- **Myasthenia Gravis:**
 - Autoimmune disorder that causes muscle weakness
 - Associated with antibodies that affect Acetylcholine uptake
 - Periods of exacerbation and remission
 - Can be triggered by fatigue, illness, pregnancy, hot baths/showers, infection
 - Hyperplasia of thymus occurs
 - Exacerbation S/S: weakness, diplopia, impaired respiratory function, bowel/bladder dysfunction, and **drooping eyelids** (ptosis)
 - Exacerbations can mimic a cholinergic crisis
 - Dx: Administer Tensilon (Edrophonium) which increases Acetylcholine so if a patient's s/s improve then they are positive for Myasthenia Gravis
 - Atropine is antidote for Tensilon

- Mgmt: maintain patent airway; have O2, suction, and intubation equipment nearby; encourage periods of rest; small, frequent, high calorie meals; food thickeners; lubricating eye drops; tape/patch eyes at night
 - Pyridostigmine and Neostigmine: improve strength and prevent Acetylcholine breakdown
 - Plasmaphoresis: removes antibodies and decreases s/s
 - Thymectomy: removes thymus to improve s/s and possibly cause remission
- **Headaches:**
 - Triggered by environmental allergies, intense odors, lights, fatigue, anxiety, menstrual cycles, tyramine foods, nitrates, and milk products
 - S/S: photophobia, phonophobia (sensitivity to sound), N/V, unilateral pain usually behind one eye or ear
 - Migraines:
 - S/S: preceded with aura stage that can include numbness/tingling of mouth, lips, face, hands, light flashes, or bright spots
 - Can last 4-72 hours
 - Often occurs early morning, during periods of stress, or with premenstrual tension
 - Tx: NSAIDs, antiemetics, Triptans preparations (vasoconstricts), Ergotamine with caffeine (vasoconstricts)
 - Cool, dark, quiet environment with HOB elevated as desired
 - Tyramine foods include pickles, caffeine, beer, wine, aged cheese, artificial sweeteners
 - Cluster Headaches:
 - S/S: unilateral, non-throbbing, lasts 30 minutes-2 hours, occurs around same time daily for 4-12 weeks, possible tearing of eye with runny nose or congestion, facial sweating, ptosis (eyelid drooping)
 - More common during spring and fall, no warning signs, more common in men
 - Tx: Triptans and Ergotamine preparations
- **Macular Degeneration:**
 - S/S: blurred vision, loss of central vision, blindness
 - Patients should eat foods high in antioxidants, carotene, vitamins E and B12
 - Refer patients to community organizations that can help with transportation, reading devices, and large-print books
- **Cataracts:**
 - S/S: painless, decreased visual acuity, blurred vision, diplopia, glare, photophobia, halos
 - Dx: eye exam will show the absence of the "red reflex"
 - Use magnifying lens and large-print books
 - Tx: anticholinergics such as Atropine or surgical removal of the lense
 - Post-Op:

- Wear sunglasses while outside
- Report yellow/green drainage
- Avoid activities that increase IOP (bending over at the waist, sneezing, coughing, straining, neck hyperflexion)
- Limit tilting head back to wash hair, driving, sports
- Best vision is not expected until 4-6 weeks after the surgery
- **Glaucoma:**
 - Normal IOP= 10-21
 - Open-Angle:
 - S/S: gradual increase in IOP, IOP= 22-32, mild pain, loss of peripheral vision
 - Closed-Angle:
 - S/S: rapid increase of IOP, IOP= 30 or greater, decreased/blurred vision, colored halos around lights, severe pain and nausea, photophobia
 - Dx: Tonometry (measures IOP)
 - Eye medication beneficial if used every 12 hours
 - Wait 5-10 between drops if using more than one medication
 - Apply pressure using punctal occlusion technique (inner corner of eye)
 - Tx: Pilocarpine ophthalmic solution, beta blockers (“-lol”; decreases IOP), Acetazolamide, IV Mannitol (osmotic diuretic used in emergency situations to decrease IOP), glaucoma surgery
 - Post-Op: same considerations as cataract surgery
- **Meniere’s Disease:**
 - Inner ear condition
 - S/S: vertigo, tinnitus, fluctuating sensorineural hearing loss
 - Tx: Meclizine, Droperidol (antiemetic with A/E of orthostatic hypotension); Diphenhydramine and Scopolamine (antihistamines with A/E of retention and sedation); Labyrinthectomy (vertigo)
 - Mgmt: avoid caffeine and alcohol; rest in quiet/dark room; space intake of fluids throughout the day; decrease salt intake and sodium-containing foods such as processed meats and MSG
- **Ear Disorders:**
 - Inner Ear Risks: viral/bacterial infection, damage from ototoxic medications
 - Middle Ear Risks: recurrent colds and otitis media, enlarged adenoids
 - S/S: red/inflamed ear canal and tympanic membrane, bulging tympanic membrane, fluid/bubbles behind tympanic membrane
 - Otoscopy Exam:
 - Pull auricle up and back for adults and down and back for children
 - Light reflex should be visible from center if TM anteriorly (5 o’clock in right ear and 7 o’clock in left ear)
 - Ototoxic meds: gentamicin, erythromycin, furosemide, NSAIDs, cisplatin (chemo agent)

- Tx: anticholinergic meds such as Diphenhydramine (A/E of retention and drowsiness), and Meclizine/Scopolamine (A/E of retention and sedation)
- **Head Injury:**
 - Normal ICP= 10-15
 - S/S of increased ICP: severe headache, decreasing LOC, **irritability**, dilated or pinpoint nonreactive pupils, Cheyne-Stokes respirations, apnea, and **Cushing’s Triad (severe HTN with a widening pulse pressure [systolic-diastolic] and bradycardia)**
 - Always suspect cervical spine injury with any head injury and stabilize cervical spine until ruled out
 - Respiratory assessment is priority
 - ICP increase can be caused by hypercarbia (the increase in CO2 leads to cerebral vasodilation), coughing, increasing intra-abdominal pressure (tight clothing/Valsalva maneuver)
 - Prevent increased CO2 with hyperventilation (keep CO2 35-38)
 - For increased ICP: raise HOB to at least 30 degrees; avoid extreme flexion, extension, and rotation of head; hyperventilation on mechanical vent; stool softeners to avoid Valsalva maneuver
 - Meds: IV Mannitol (monitor electrolytes and osmolality); Pentobarbital (induces coma to decrease metabolic demand); Phenytoin (prevent seizures); Morphine
 - Craniotomy:
 - For supratentorial surgery keep HOB at least 30 degrees
 - For infratentorial surgery keep patient flat and on either side for 24-48 hours to prevent pressure on neck incision site
 - Complications of a craniotomy:
 - Brain Herniation: fixed dilated pupils, decreasing LOC, Cheyne-Stokes, abnormal posturing (decerebrate/decorticate)
 - SIADH or Diabetes Insipidus
 - Cerebral salt wasting: decreased osmolality, hyponatremia, hypovolemia
- **Stroke:**
 - Hemorrhagic: ruptured artery or aneurysm
 - Thrombotic: blood clot on an atherosclerotic plaque in cerebral artery
 - Embolic: embolus from another part of body travels to cerebral artery
 - Risk Factors: Diabetes, obesity, HTN, smoking
 - General S/S: visual disturbances, dizziness, slurred speech, weak extremity
 - Left-Sided S/S: **aphasia**, **alexia** (difficulty reading), **agraphia** (difficulty writing), right extremity hemiplegia, hemianopsia (loss of visual field in one or both eyes) **Left hemisphere responsible for language, math skills, analytical thinking**
 - Right-Sided S/S: altered perception of deficits (overestimation of abilities), unilateral neglect syndrome, **poor impulse control and judgement**, left hemiplegia, hemianopsia (visual changes)

Right hemisphere responsible for visual and spatial awareness

- **Mgmt:** monitor VS q 1-2 hours and notify HCP if systolic < 180 or diastolic < 110 (means client is experiencing an ischemic stroke); assess gag reflex before feeding; swallow with head and neck flexed slightly forward and have suction on standby; if patient has hemianopsia (loss of same visual field in both eyes) have them use scanning technique (turn head from affected side to unaffected side) when eating and ambulating
- Give thrombolytic (Reteplase) within 4.5 hours of s/s
- **Spinal Cord Injury:**
 - Injuries to cervical= quadriplegia, injuries below T1= paraplegia of lower extremities
 - Injury at C4 or above have increased risk for impaired spontaneous ventilation due to damage of phrenic nerve
 - S/S: can't feel light touch with cotton ball, can't discriminate between sharp and dull when touched with safety pin, absent deep tendon reflexes, muscle flaccidity, hypotension
 - Monitoring respiratory status is priority
 - Neurogenic Shock: hypotension, dependent edema, loss of temp regulation
 - Injuries above L1 and L2 will convert to spastic muscle tone after neurogenic shock; this includes spastic bladder
 - Injuries below L1 and L2 will convert to a flaccid type of paralysis after neurogenic shock; this includes flaccid bladder
 - Develop toilet schedule for bladder and bowel training
 - Methylprednisone (decreases spinal edema/spinal shock)
 - Vasopressin (tx hypotension, especially during neurogenic shock)
 - Baclofen and Dantrolene (muscle relaxers)
 - Docusate Sodium (stool softeners)
 - Prevent orthostatic hypotension with thigh-high elastic hose or wraps to increase venous return and use wheelchair that reclines
 - Autonomic Dysreflexia:
 - Injuries above T6
 - S/S: extreme HTN, sudden severe headache, pallor below level of spinal cord dermatome, blurred vision, diaphoresis
 - Sit patient up to decrease HTN (secondary to orthostatic hypotension)
 - Determine/tx cause (distended bladder, fecal impaction, tight clothing, undiagnosed injury or illness)
 - Nitrates or hydralazine
- **Arterial Puncture:**
 - Before Procedure: Perform Allen's Test to verify patent radial and ulnar circulation (compress radial and ulnar arteries while patient makes a fist, tell patient to relax hand, assess palm and fingers for blanching)
 - Post-Procedure: hold direct pressure over site for 5 minutes (20 minutes if patient is on anticoagulants)
 - Air Embolism (complication): place patient on their left side in reverse Trendelenburg and monitor for SOB, decreased O2 %, chest pain, anxiety, and air hunger
- **Bronchoscopy:**
 - Used for biopsy or deep sputum aspiration
 - NPO 4-8 hours prior to procedure
 - Before Procedure: administer Atropine, Lidocaine, or local anesthetic throat spray
 - Post-Procedure: assess gag reflex prior to feeding, once gag reflex returns start with ice chips and then fluids, small amount of blood-tinged sputum expected
- **Thoracentesis:**
 - Before Procedure: position patient upright with arms and shoulders raised and supported on pillows or on an overbed table with legs and feet supported
 - Only 1 liter of fluid removed at a time
 - Post-Procedure: monitor respiratory status every hour for first several hours
 - Pneumothorax (complication): deviated trachea to affected side; affected side not moving in and out with inhalation and exhalation; increased HR; rapid shallow respirations
- **Chest Tubes:**
 - Drain fluid, blood, or air
 - First chamber: Drainage collection
 - Second chamber: Water seal
 - Minimum amount of sterile fluid to add is up to 2 cm line
 - Allows air to exit from pleural space on exhalation and stop air from entering with inhalation
 - Tidaling normal
 - Bubbling sign of leakage
 - Cessation of tidaling= lung re-expansion or an obstruction
 - Third seal: Suction:
 - Suction pressure of -20 cm H2O is commonly used
 - Continuous bubbling normal
 - Post-Procedure:
 - Cough and deep breath q 2 hours
 - Check water seal and add fluid as needed q 2 hours
 - Document amount and color of drainage hourly for first 24 hours and then q 8 hours**
 - Mark the date, hour, and drainage level on the container at the end of each shift**
 - Report excessive drainage > 70mL/hour**

- Semi-fowler's or high-fowler's
- CXR to verify placement
- Keep two enclosed hemostats, sterile water, and an occlusive dressing at the bedside at all times
- Chest tubes are clamped only when prescribed in certain circumstances
- Do not strip or milk tubing
- If the chest tube system is compromised: immerse end of chest tube in sterile water to restore water seal
- If chest tube is accidentally removed from pt: dress area with dry sterile gauze and **tape only three sides**
- Chest Tube Removal:
 - Patient should take a deep breath, exhale, and bear down (Valsalva)
 - Apply airtight sterile petroleum gauze dressing
- **Oxygen Therapy:**
 - Nasal cannula= 1-6L/min
 - Simple face mask= 5-8L/min
 - Partial rebreather= 6-11L/min (keep reservoir bag from deflating by adjusting oxygen flow rate to keep it inflated)
 - Non-rebreather= 10-15L/min (keep reservoir bag 2/3 full and perform hourly assessment of valve and flap)
 - Venturi mask= 4-10L/min (**delivers most precise oxygen concentration**)
 - Aerosol mask/face tent= useful for facial trauma, burns, or thick secretions
 - Early s/s of hypoxia: (vitals increase) tachypnea, tachycardia, restlessness, pale skin and mucous membranes, HTN, use of accessory muscles, nasal flaring, adventitious breath sounds
 - Late s/s of hypoxia: (vitals decrease) confusion/stupor, cyanotic skin and mucous membranes, bradypnea, bradycardia, hypotension, dysrhythmias
 - Oxygen Toxicity:
 - S/S: nonproductive cough, substernal pain, nasal stuffiness, N/V, headache, sore throat, hypoventilation
 - Prevention: use lowest O2 necessary to maintain adequate O2 %
 - 92% O2 is expected/okay for COPD patients
 - Patient should wear cotton gown
 - No alcohol or acetone near patient on O2 therapy
- **Mechanical Ventilation Mgmt:**
 - Suction oral and tracheal secretions to maintain patency
 - Low pressure alarms (volume): disconnection, cuff leak, or tube displacement
 - High pressure alarms (pressure): excess secretions, patient biting tubing, kinks, patient coughing, pulmonary edema, bronchospasm, or pneumothorax
 - Will receive morphine, fentanyl, propofol, diazepam, lorazepam, or haloperidol
 - Frequent and gentle skin and oral care

- Have manual resuscitation bag with face mask and O2 available at bedside
- Encourage turning, deep breathing, coughing, and incentive spirometer use
- Frequent turning promotes mobility of secretions
- **Rhinitis:**
 - Increase fluids to at least 2,000 mL/day
 - Encourage use of at home humidifier
 - Cough etiquette
 - Tx: antihistamines and decongestants (phenylephrine)
- **Pneumonia:**
 - S/S: confusion from hypoxia (most common s/s in older adults), fever chills, SOB, tachypnea, sharp pleuritic chest pain, crackles, wheezing, coughing
 - Dx: sputum culture (obtain specimen before giving antibiotics) and chest x-ray (will show consolidation/density of lung tissue)
 - Mgmt: high-fowler's, incentive spirometer, increase fluids to 2-3L/day to thin secretions; increased workload of breathing requires additional calories
 - Tx: antibiotics (PCN or cephalosporins), albuterol, and anti-inflammatories (prednisone or fluticasone- monitor for decreased immune function, hyperglycemia, black tarry stools, fluid retention, weight gain, and canker sores)
- **Asthma:**
 - Intermittent and reversible
 - Triggered by environmental factors and air pollutants
 - S/S: coughing, wheezing, prolonged exhalation, low O2 %, barrel chest
 - Dx: pulmonary function tests (peak expiratory flow is fastest airflow rate reached during exhalation)
 - Mgmt: high-fowler's, O2 therapy, rest periods
 - Medications:
 - Albuterol (rapid relief of acute s/s)
 - Ipratropium (long-acting anticholinergic used to prevent bronchospasms)
 - Theophylline (use only when other meds are ineffective; requires close monitoring because of narrow therapeutic range)
 - Prednisone/Fluticasone (monitor for decreased immunity, hyperglycemia, and tarry black stools)
 - Montelukast (monitor for decreased immunity, hyperglycemia, and tarry black stools)
 - Status Asthmaticus:
 - Life-threatening airway obstruction that is unresponsive to common tx
 - Prepare for emergency intubation
 - Administer IV fluids, O2, bronchodilators, and epi
- **COPD:**
 - Loss of lung elasticity and destruction of alveoli which results in CO2 retention
 - Risks: increased age, air pollution, smoking is the primary risk factor

- S/S: dyspnea upon exertion, crackles, wheezes, rapid/shallow respirations, accessory muscle use, barrel chest, hyperresonance upon percussion, dependent edema secondary to right-sided HF, clubbing of fingers and toes (late s/s), decreased O₂ % (92% is expected/okay)
- Labs: increased Hct (due to low O₂), hypercarbia (excess CO₂ retention- PaCO₂ > 45)
- Mgmt: high-flowers, cough/deep breathe, incentive spirometer, increased workload of breathing increases caloric demands so soft/high-calorie foods are best, refer older adults to assistance programs that can help with food delivery/portable oxygen services
- Diaphragmatic (abdominal) breathing: lie on back with knees bent, rest hand over abdomen to create resistance
- Pursed-lip breathing
- Medications: Prednisone/fluticasone, montelukast, acetylcysteine (mucolytic nebulizer tx), guaifenesin (mucolytic)
- Chest PT: uses percussion and vibration to mobilize secretions
- Complications: right-sided heart failure (s/s= hepatomegaly, JVD, and dependent edema)
- **Tuberculosis:**
 - Risks: lower socioeconomic status, homelessness, long-term care facilities, prisons
 - S/S: persistent cough lasting < three weeks, purulent possibly blood-tinged sputum, fatigue, lethargy, weight loss, anorexia, night sweats, low-grade fever
 - Family members should be screened
 - Dx: Quantiferon-Gold (blood test); Mantoux test (skin test; palpable, raised, hardened area of 10mm or > is positive; **5mm is considered positive for an immunocompromised patient**); Acid-fast bacilli smear/culture (obtain 3 early-morning sputum samples)
 - Airborne precautions, N95 mask, negative-airflow room
 - Patient should wear surgical mask if transfer necessary
 - Medications: “RIPE”
 - Must be taken for 6-12 months
 - Isonazid** (monitor for hepatotoxicity and neurotoxicity-tingling of hands and feet; B12 is used to prevent neurotoxicity)
 - Rifampin** (will turn urine and other secretions orange; can interfere with birth control; can cause hepatotoxicity)
 - Pyrazinimide** (can cause hepatotoxicity)
 - Ethambutol** (can cause ocular toxicity; obtain baseline visual acuity tests; remember that “E= eyes”)
 - Streptomycin sulfate (for drug resistant TB; can cause ototoxicity)

- Inform patient that sputum samples will be needed every 2-4 weeks to monitor therapy effectiveness
- Patients no longer infectious after 3 consecutive sputum cultures
- **Pulmonary Embolism:**
 - DVT is most common cause
 - Risks: birth control, estrogen therapy, smoking, obesity, surgery, chronic a-fib, long bone fx
 - S/S: anxiety, feeling of impending doom, pain with inspiration, chest wall tenderness, dyspnea, air hunger, **tachycardia, hypotension, tachypnea**, petechiae on chest/axillae
 - Dx: elevated D-Dimer (normal range= 0.43-2.33mcg/mL)
 - Medications:
 - Anticoagulants: thins blood to prevent clot from growing and future clots from forming---**heparin (monitor PTT/CBC)**, enoxaparin, **warfarin (monitor PT and INR)**
 - Thrombolytics: actually dissolve the clot--- alteplase, reteplase
 - Embolectomy, vena cava filter
 - Mgmt: if patient is homebound, set up home care services for weekly blood draws; smoking cessation, avoid immobility; avoid crossing legs, compression stockings; limit intake of vitamin K (green, leafy veggies) because it decreases anticoagulant effects of warfarin; no aspirin; electric razor and soft-bristled toothbrush; avoid blowing nose too hard; if bleeding occurs gently apply pressure
- **Pneumothorax/Hemothorax, Flail Chest:**
 - Air, gas, or blood in pleural space
 - Tension pneumothorax occurs when air enters pleural space during inspiration through one-way valve and is unable to exit upon exhalation
 - Flail chest occurs when at least 2 neighboring ribs, usually on one side of chest, sustain multiple fx causing instability of chest wall
 - S/S of Pneumothorax/Hemothorax: **tachypnea, tachycardia, dyspnea, accessory muscle use, tracheal deviation to unaffected side (tension pneumothorax), decreased/absent breath sounds on affected side, asymmetrical chest wall movement, hyperresonance upon percussion on affected side (pneumothorax), dull percussion (hemothorax)**
 - Medications:
 - Lorazepam/Diazepam
 - Morphine/Fentanyl
 - Tx: chest tube
- **Severe Acute Respiratory Syndrome:**
 - S/S: rapid/shallow breathing, cyanotic/mottled/dusky skin, tachycardia, hypotension, sub/supra-sternal retractions, O₂ % < 90%, wheezing, rales, dysrhythmias

- Maintain patent airway and monitor respiratory status q 1 hour
- **Cardiac Enzymes/Testing:**
 - Troponin I: < 0.03; elevated 2-3 hours after and stays elevated for a week
 - Troponin T: < 0.01; elevated 2-3 hours after and stays elevated 2-3 weeks
 - Myoglobin: elevates 2-3 hours after and stays elevated for 24 hours
 - Total cholesterol: < 200
 - LDL: < 130
 - HDL: 35-70
 - Triglycerides: < 150
 - Echocardiogram: measures EF of heart
 - Stress testing: treadmill or chemical; patient should fast 2-4 hours prior and avoid alcohol, tobacco, and caffeine
 - Line Insertion:
 - Level transducer with phlebostatic axis (4th intercostal, mid-axillary line) which corresponds with right atrium
 - Zero system with atmospheric pressure
 - Verify placement with x-ray
 - CVP normal range: 2-6 mmHg
 - Increased CVP, pulmonary artery systolic/diastolic, PAWP, and SVO2 with decreased CO= heart failure
 - Angiography:
 - Inserted into femoral or brachial artery and threaded up to right or left side of the heart
 - Pre-Procedure: NPO 8 hours prior; assess shellfish allergy; assess renal function
 - Post Procedure: assess vitals q 15 minutes x4, q 30 minutes x2, q 1 hour x4, and then every 4 hours; document pedal pulse/color/temp; administer aspirin/clopidogrel/ticlodipine/heparin/enoxaparin; monitor output and administer IV fluids for hydration
 - Patients who have stent placed will be on anticoagulation meds 6-8 weeks (will need to have regular lab tests done to check levels)
 - Cardiac Tamponade: (potential complication)
 - Fluid accumulation in pericardial sac
 - S/S: hypotension, JVD, muffled heart sounds, paradoxical pulse (variance of 10 mmHg or > in systolic BP between inspiration and exhalation)
 - Prepare for paracentesis
- **PICC Line:**
 - Can be used for 12 months
 - Used for administration of blood; long-term chemo agents, TPN, antibiotics
 - Catheter should be advanced until tip is positioned in the lower 1/3 of SVC
 - Post-Procedure: flush PICC line with 10mL syringe (do not force if resistance is met); flush with 10mL of 0.9% NS before, between, and after meds

- **Implanted Port:**
 - Long-term use (> 1 year) for vascular access
 - Inserted into subclavian vein with the tip in the SVC
 - Chemo
 - Access port w/ non-coring (Huber) needle—read up on this. I chose this as my answer and my report said I got it wrong... so I'm not sure if this is wrong or maybe I misread the Q
- **Phlebitis**: erythema at site, pain/burning at site and length of vein, warmth over site, edema at site, vein indurated (hard), red streak, cord-like vein
- **Occlusion**: do not force fluid if resistance occurs (will dislodge clot)
- **Dysrhythmias**:
 - Symptomatic Bradycardia: atropine, temporary pacemaker
 - A-fib, SVT, V-tach with pulse: amiodarone, adenosine, verapamil, cardioversion
 - Pulseless V-tach, V-fib: amiodarone, lidocaine, epi, defibrillation
 - Complications: PE, CVA, MI
- **Pacemakers**:
 - Fixed rate mode: fires at constant rate without regard for heart's electrical activity
 - Demand mode: detects heart's electrical impulses and fires at preset rate only if intrinsic rate is below certain level
 - Used for symptomatic bradycardia, complete heart block, sick sinus syndrome, asystole, atrial/ventricular tachydysrhythmias
 - Do not raise arm above shoulder for 1-2 weeks after insertion and wear a sling out of bed (prevents wire dislodgement)
 - Take pulse at same time daily
 - Report s/s of hiccupping, palpitations, difficulty breathing, weight gain
 - No heavy lifting or contact sports for 2 months
 - Never place garage door openers, burglar alarms, strong magnets, generators, or large stereo speakers directly over pacemaker
 - Will set off airport security detectors
- **Percutaneous Coronary Intervention (PCI):**
 - Places stent or removes plaques
 - Must be done within 90 minutes of onset of s/s on MI
 - Pre-Procedure:
 - NPO 8 hours prior if possible
 - Assess shellfish allergy and renal function
 - Post-Procedure:
 - Assess vitals q 15 minutes x4, q 30 minutes x2, q 1 hour x4, and then every 4 hours
 - Document pedal pulse, color, temp

- Older adults might have arthritis which makes lying in bed for 4-6 hours after the procedure painful
- Admin aspirin, clopidogrel, heparin, enoxaparin
- Monitor output and administer fluids
- Patient should avoid strenuous exercise for prescribed amount of time
- Restrict lifting (less than 5lbs) for prescribed amount of time
- Patient with stent placed will be on anticoagulants for 6-8 weeks
- **Artery dissection (complication):** severe hypotension, tachycardia
- **CABG:**
 - Inform patient/family about what to expect post-op such as ET tube and mechanical ventilation for several hours, sternal incision with possible leg incision, one or two chest tubes, arterial line
 - Patient's core temp might be lowered during procedure to decrease O2 demand
 - **Post-Procedure:**
 - Encourage patient to splint incision while deep breathing/coughing
 - Monitor BP because hypotension can cause graft collapse and HTN can cause bleeding from graft/sutures
 - Chest tube drainage > 150 mL/hr is a sign of a hemorrhage and should be reported to HCP
 - Monitor fluids/electrolytes (especially K)
 - Monitor for infection
 - Nitroglycerin for angina
 - Low fat, low cholesterol, low salt, high fiber diet
- **Peripheral Bypass Grafts:**
 - Sutured graft material or saphenous veins proximal and distal to occluded area of the artery
 - **S/S for indication:** numbness/burning of leg with exercise that stops with rest (intermittent claudication) or numbness/burning of leg at rest that might wake client up at night and is relieved by lowering leg below level of heart; decreased/absent pulses on feet; dry, shiny, hairless skin on legs; cold and darker skin tone, thick toenails, mottled/dusky toes
 - **Pre-Procedure:**
 - NPO 8 hours prior
 - Don't cross legs
 - **Post-Procedure:**
 - Assess vitals q 15 minutes for the first hour
 - Maintain BP within prescribed range
 - Admin anticoagulants/antiplatelets
 - Bed rest for 18-24 hours and leg must be kept straight during this time
 - Anti-embolic stockings

- Monitor for s/s of compartment syndrome (worsening pain, swelling, and tense/taut skin)
- **Angina/MI:**
 - MI is unrelieved by rest or Nitro for more than 15 minutes differentiates an MI from angina
 - **Angina Types:**
 - Stable (exertional):** occurs with exercise or stress and gets better with rest
 - Unstable (pre-infarction):** occurs with exercise or at rest, but increases in occurrence, severity, and duration over time
 - Variant (prinzmetal's):** occurs during rest; caused by coronary artery spasm
 - **Risks:** male, post-menopausal women, HTN, tobacco, hyperlipidemia, diabetes
 - **Nitro:** reduces preload/afterload decreasing myocardial O2 demand; HA and orthostatic hypo tension are A/E
 - **Beta Blockers:** slows HR; hold if apical HR < 60; avoid asthma patients
 - **Thrombolytics:** Alteplase; break up clots; monitor bleeding times; admin. Streptokinase to prevent hypotension; **CI w/ active bleeding, PUD, history of stroke, recent trauma**
 - **Antiplatelets:** aspirin/clopidogrel; prevents clot formation; can cause GI upset; use cautiously in pts w/ GI ulcers; s/s of aspirin toxicity is tinnitus
- **Heart Failure:**
 - **Left-sided:** pink-frothy sputum
 - **Right-sided:** JVD, dependent edema, abdominal distention/ascites, nausea, anorexia, weight gain, hepatomegaly
 - BNP will be > 100
 - Increased CVP, PAP, and PAWP= decreased CO
 - **Normal EF=** 50-70%
 - **Mgmt:** high-fowler's, O2, conserve pt energy by helping with ADL's, restrict salt, restrict fluids (< 2L/day)
 - **Loop Diuretics:** furosemide; **monitor for hypokalemia; tell pt to increase K intake**
 - **ACE Inhibitors:** captopril; enalapril; **A/E: angioedema, cough, elevated K levels ("A.C.E")**
 - **Inotropic agents:** digoxin, dopamine, dobutamine, milrinone; increase contractility; monitor apical pulse for full min before admin (hold if HR < 60); take at same time every day; don't take at the same time as antacids (separate by 2 hours); >2 = digoxin toxicity (muscle weakness, visual changes, decreased appetite)
 - **Heart Transplant:** immunosuppressive meds required after transplant to prevent rejection

- **Pulmonary Edema:**
 - Caused by LHF
 - S/S: persistent cough w/ pink frothy sputum, orthopnea, dyspnea, tachypnea, crackles
 - Mgmt: high-fowler's w/ legs dependent or sitting on side of bed to decrease preload; high-flow O2 rebreather mask; restrict fluids; monitor urine output hourly and watch for input > output or output < 30mL/hr
 - Meds: furosemide, morphine, nitroglycerin, digoxin, dobutamine, ACE inhibitors, beta blockers
 - Notify MD of gain of more than 2lbs in a day or 5lbs in a week.
- **Valvular Heart Disease:**
 - Caused by rheumatic fever/endocarditis (strep related), HTN, marfan's
 - Tx: (same as HF), furosemide; increase K foods (**dried fruits, nuts, spinach, citrus, potatoes**); CCB, ACE inhibitors, ARBs to decrease afterload; Digoxin; **prophylactic antibiotics prior to invasive/dental procedures**
- **Endocarditis:**
 - Preceded by strep and causes lesions on the heart
 - S/S: fever, chest/joint pain, SOB, rash on trunk/extremities, friction rub, murmur
 - Infective Endocarditis: caused by strep/staph; common with substance abuse
 - Infective Endocarditis S/S: fever, flu-like s/s, murmur, petechiae, splinter hemorrhages
 - Labs: increased ESR and CRP, throat cultures
 - Tx: PCN, ibuprofen, prednisone, amphotericin B
- **PAD:**
 - S/S: burning, cramping w/ exercise (intermittent claudication), pain relieved w/ rest and placing legs in dependent position, decreased cap refill, decreased/non-palpable pulses, decreased/absent hair on legs, dry scaly mottled skin, thick nails, pallor of extremity w/ elevation, dependent rubor
 - Mgmt: exercise to increase collateral circulation; walk to point of pain, stop and rest, and walk a little further; warm environment and insulated socks; avoid stress, caffeine, and nicotine; no crossing legs/tight clothes
 - Tx: aspirin/clopidogrel (decreases viscosity); simvastatin
 - Mechanical rotational abrasive atherectomy: bed rest w/ leg straight 2-6 hours
 - Arterial revascularization: priority is maintaining circulation to repaired artery; mark pedal/dorsalis pulse and compare strengths w/ contralateral leg w/ doppler; monitor BP (decreased BP= increased clot risk or graft collapse and increased BP=bleeding suture risk)
 - Graft occlusion (complication): s/s are decreased/absent pedal pulses; increased pain; change in color/temp in extremities
- **Compartment syndrome (complication)**: s/s are tingling; numbness; worsening pain; edema; pain on passive movement; unequal pulses
- **Peripheral Venous Disorders:**
 - VTE: associated with Virchow's Triad (hypercoagulability, impaired blood flow, vessel damage)
 - Varicose veins risks: female gender, > 30 years, pregnancy, obesity, family history
 - DVT S/S: calf or groin pain; tenderness; sudden onset of edema of extremity; warmth; induration or hardness (SOB and chest pain is s/s of PE)
 - **DVT/Phlebitis mgmt: bed rest w/ leg elevated above heart (avoid using knee gatch or pillow under knees; intermittent continuous warm moist compresses; thigh-high stockings, Trendelenburg (supine w/ legs elevated)**
 - Venous insufficiency S/S: stasis dermatitis (brown discoloration along ankles that extends up calf); edema; stasis ulcers around ankles
 - Venous insufficiency mgmt: elevate legs at least 20 minutes 4-5x/day and wear stockings after legs have been elevated when swelling is at a minimum
 - Heparin (monitor PTT and platelets; protamine sulfate is antidote)
 - Warfarin (takes 3-4 days to take effect so Warfarin is given while pt is still on Heparin; monitor PT and INR; vitamin K is antidote)
- **HTN:**
 - SBP > 140 or DBP > 90 for 2 or more assessments of BP
 - Pre-HTN= 120-139/80-89
 - Stage 1= 140-159/90-99
 - Stage 2= > 160/100
 - Primarily affects heart, brain, eyes, and kidneys
 - Secondary HTN causes: kidney disease, cushing's, pheochromocytoma (excessive catecholamine)
 - S/S: dizziness, visual disturbances, HA
 - Meds: hydrochlorothiazide; furosemide; spironolactone; CCB (common A/E is orthostatic hypotension; no grapefruit juice); ACE inhibitors; ARBs (used for pts who report cough from ACE inhibitors; monitor for A/E of angioedema and HF); Beta Blockers (can mask hypoglycemia; A/E: sexual dysfunction); Clonidine (A/E: sedation orthostatic hypotension)
 - Grapefruit juice and St. John's Wart increase A/E of most meds
 - Monitor for hyperkalemia w/ salt substitute use
 - Pt Edu: consume < 2.3 grams/day of sodium; consume diet low in saturated fat and cholesterol; limit alcohol to 2 servings/day for men and 1 serving/day for women; DASH diet (high in fruits, veggies, and low-fat dairy); lose weight, stop smoking, decrease stress
 - HTN crisis: severe HA, blurred vision, dizziness; IV nitroprusside/nicardipine/abetalol

- **Shock:**
 - S/S: hypoxia, tachypnea, angioedema (anaphylactic shock), wheezing, decreased BP, tachycardia, decreased urine output
 - General labs: increased lactic acid
 - Cardiogenic shock labs: increased creatinine, increased troponin
 - Hypovolemic: decreased w/ hemorrhage and increased w/ dehydration
 - Septic shock must have blood cultures done ASAP
 - Mgmt: oxygenation status is priority; hourly urine output (report if < 20mL/hour); monitor LOC; high-flow O2 w/ NRB mask at 100%; be prepared to intubate (have resuscitation equipment nearby; for hypotension place pt flat w/ legs elevated to increase venous return)
 - Meds: dobutamine (inotropic), norepinephrine (vasopressor), vasopressin, 0.9% NS or LR (isotonic crystalloids/colloids), vancomycin (septic shock)
 - Use vasopressors only if BP remains low after volume replacement (hypovolemic)
 - DIC: pt at increased risk for hemorrhage; blood transfusion; administer platelets and clotting factors; monitor PT/PTT
- **Aneurysms:**
 - Widening/ballooning in wall of blood vessel
 - Risks: male, atherosclerosis, uncontrolled HTN, older age
 - Abdominal aortic aneurysm S/S: most common; flank/back pain; pulsating abdominal mass (never palpate)
 - Thoracic abdominal aortic S/S: severe back pain; cough; SOB; difficulty swallowing
 - Aortic dissection S/S: sudden onset of "tearing/ripping/stabbing"; abdominal/back pain; diaphoresis; N/V; decreased/absent/peripheral pulses; hypotension and tachycardia (initial); oliguria
 - Mgmt: take VS q 15 minutes until stable and then every hour; continuously monitor cardiac rhythm; monitor ABG's and urine output (> 30mL/hr is adequate kidney perfusion); obtain/maintain IV access
 - Primary intervention is to decrease SBP 100-120 during emergency and administer anti-hypertensives
- **Hematologic Labs/Dx Tests:**
 - RBC: 4-6 million
 - WBC: 5,000-10,000
 - Platelets: 150,000-400,000
 - Hgb: 12-18
 - Hct: 37-52 (usually equivalent to Hgb x3)
 - PTT: 30-40 seconds (1.5-2.5x control value if on heparin)
 - PT: 11-12.5 seconds
 - INR: 2-3 on warfarin
- Bone Marrow Biopsy: place pt in a prone or supine position to expose iliac crest; afterwards pt must lie still 30-60 minutes
- **Blood Transfusions:**
 - Autologous Transfusion: pt's blood collected prior to procedure in anticipation of future transfusions; can donate up to 6 weeks prior to scheduled surgery
 - AB blood can receive A, B, AB, and O
 - Rh positive cannot be given to Rh negative blood types
 - Two RN's must ID correct blood product and pt
 - Prime tubing w/ 0.9% NS
 - Initiate transfusion within 30 minutes of obtaining blood product
 - Stay with patient for 1st 15 minutes after infusion
 - Acute Hemolytic Reaction: s/s= chills, fever, LBP, tachycardia, hypotension, flushing; initiate infusion of 0.9% NS using new tubing
 - Febrile Reaction: s/s= chills; increase of 1-degree Fahrenheit, flushing; administer antipyretic and initiate infusion of 0.9% NS using new tubing
 - Allergic reaction: s/s= itching, urticaria, flushing, bronchospasm, laryngeal edema; initiate infusion of 0.9% NS using new tubing; administer antihistamine; if needed administer epi, O2, and CPR
 - Circulatory Overload: caused by too rapid of an infusion rate; older adults and those w/ increased circulatory volume are at increased risk; s/s= crackles, dyspnea, JVD, tachycardia, pulmonary edema; slow/stop infusion depending on severity of s/s
- **Anemia:**
 - Iron-rich foods= cereal, bread, fish, poultry, dried peas and beans
 - Pts should increase folate intake (spinach, lentils, bananas) and folic acid fortified grains and juices
 - Pica (eating non-nutritive/non-food substances)
 - S/S: pallor, fatigue, numbness tingling of extremities, dyspnea on exertion, tachycardia, syncope, spoon shaped nails, smooth sore bright-red tongue (B12 deficiency)
 - Vitamin C increases iron absorption
 - Epo-Alpha (monitor Hgb/Hct 2x/week)
 - Cyanocobalamin (B12 supplement; pts who lack intrinsic factor will require these injections on monthly basis)
 - Large doses of folic acid can mask B12 deficiency
- **Idiopathic Thrombocytopenic Purpura (ITP) and DIC:**
 - ITP: autoimmune disease where life span of platelets is decreased by antiplatelet antibodies although platelet production is normal
 - DIC: clotting and anti-clotting mechanisms occur at the same time

- S/S: bleeding from gums and nose (epistaxis); oozing/trickling of blood from incisions or lacerations; petechiae and ecchymoses; tachycardia; hypotension; Hgb decreased with both; platelets decreased w/ DIC
 - DIC: watch for s/s of microemboli (cyanotic nail beds and pain)
 - DIC/ITP: transfuse blood products; no NSAIDs; avoid injury; bleeding precautions (avoid use of needles)
 - ITP meds: steroids and immunosuppressants
 - DIC meds: heparin
- **Fluid Imbalances:**
 - Hypovolemia S/S: tachycardia, thready pulse, hypotension, tachypnea, dizziness, thirst, oliguria, decreased cap refill, cool/clammy skin, sunken eyes, skin tenting
 - Hypovolemia Labs: increased Hct, BUN, specific gravity, sodium, osmolality
 - Hypovolemic Shock Mgmt: oxygen; colloids (whole blood, RBCs, plasma) and LR or NS (crystalloids); vasoconstrictors (dopamine, norepinephrine, phenylephrine)
 - Hypervolemia S/S: tachycardia, bounding pulse, HTN, crackles, cough, dyspnea, distended neck veins, increased urine output
 - Hypervolemia Labs: decreased Hct, Hgb, osmolality, sodium, specific gravity, BUN
 - Hypervolemia Mgmt: sodium and possible fluid restriction; semi-fowler's; daily weights (**notify HCP of 1-2lb weight gain in one day or 3lb in one week**)
 - Pulmonary Edema: cough w/ frothy pink-tinged sputum
- **Electrolyte Imbalances:**
 - Calcium= 9.0-10.5 (think Ca- California has earthquakes and the Richter scale is around 9-10.5)
 - Magnesium= 1.3-2.1 (Mg is a type of a tiny car that only fits 1-2 people)
 - Chloride= 98-106 (think chlorine is used in hot tubs and hot tub temps are usually 98-106 degrees Fahrenheit)
 - Phosphorus=3.0-4.5 (Phosphorus is .5 below K)
 - Hyponatremia: decreased osmolality (< 270); replacement of sodium should not exceed 12 mEq/L in 24 hours; if pt can't tolerate PO fluids then administer 0.9% NS or LR
 - Acute Hyponatremia: administer 3% NaCl slowly and encourage food/fluids high in sodium (beef broth and tomato juice); seizure precautions
 - Hypernatremia: risk factors are DI, kidney failure, and cushing's; s/s= hyperthermia, tachycardia, orthostatic hypotension, irritability, muscle twitching, dry mucous membranes; increased osmolality and specific gravity; administer D5W and 0.45% NaCl; encourage water intake and decrease sodium intake

- Hypokalemia: s/s= constipation, paralytic ileus, shallow breathing; assess for phlebitis; never give K via IM or SQ because it can cause tissue necrosis; increases risk of Digoxin toxicity; encourage K intake (avocado, broccoli, dairy, dried fruit, melons, juice, lean meats, whole grain, citrus fruit)
 - Hyperkalemia: s/s= EKG changes (PVCs, v-fib, peak T-waves, wide QRS complexes) increased motility/diarrhea; can be caused by salt substitutes and DKA; combo of glucose and insulin results in decreased K levels; kayexalate promotes intestinal excretion of K; sodium bicarb to reverse acidosis; furosemide
 - Hypocalcemia: risk factors include **thyroidectomy**, hypoparathyroidism, vitamin D deficiency, pancreatitis; s/s= tetany, muscle twitches, charley horses, positive Chvostek's and Trousseau's signs; calcium has inverse relationship w/ phosphorus
 - Hypomagnesia: risk factors are malnutrition, ethanol ingestion; s/s= hyperactive DTRs, paresthesia, tetany, seizures, positive Chvostek/Trousseau signs, hypoactive bowel sounds, paralytic ileus; encourage foods rich in Mg (dark green veggies, nuts, whole grains, seafood, peanut butter, cocoa; low Mg levels increased risk of Digoxin toxicity)
- **Respiratory Acidosis:**
 - Hypoventilation; shallow rapid respirations
 - Causes: pneumothorax, airway obstruction
 - CO₂ > 45
 - Tx: administer O₂, patent airway, vent support, bronchodilators
- **Respiratory Alkalosis:**
 - Hyperventilation
 - Causes: fear, anxiety, salicylate toxicity
 - CO₂ < 35
 - Rapid deep respirations
 - Tx: administer O₂, reduce anxiety, rebreathing techniques (paper bag)
- **Metabolic Acidosis:**
 - Causes: DKA, aspirin, kidney failure, diarrhea
 - HCO₃ < 22
 - Increased K present causing hyperkalemia s/s
 - "You lose your base out of your butt"
 - S/S: dysrhythmias, bradycardia, weak peripheral pulses, hypotension, rapid deep respirations (kussmaul), dry pink warm skin
 - Tx: if DKA related admin insulin; if GI related provide rehydration; if HCO₃ low admin HCO₃
- **Metabolic Alkalosis:**
 - Causes: excess antacids, vomiting, NG suction
 - HCO₃ > 26
 - Tx: antiemetics, fluids, and electrolyte replacements

- **GI Labs/Procedures:**
 - AST/ALT= < 40
 - Amylase/Lipase= < 100 (increased w/ pancreatitis)
 - Total Bilirubin= < 1 (increased with impaired liver fx)
 - Albumin= 3.5-5.0 (decreased w/ liver disease)
 - Ammonia= < 100 (increased w/ liver disease)
 - Colonoscopy:
 - Moderate sedation w/ midazolam/fentanyl
 - Left side w/ knees to chest
 - Before: bowel prep used; clear liquid diet (avoid red/purple/orange fluids) and NPO after midnight
 - After: resume normal diet
- **EGD:**
 - Moderate sedation per IV access
 - Before: NPO 6-8 hours prior
 - After: hold fluids until return of gag reflex
- **Sigmoidoscopy:**
 - No anesthesia required
 - Position on left side
 - Before: bowel prep; clear liquid diet 24 hours prior and NPO after midnight
- **GI Series:**
 - Done w/ or w/o contrast to determine structural abnormalities
 - Before: clear liquid/low residue diet and then NPO after midnight; avoid smoking or chewing gum prior b/c it stimulates peristalsis
 - After: increase fluids to flush dye
 - Stools will be white for 24-72 hours until barium clears
- **Enteral Feedings:**
 - For pts who are comatose, intubated, have stroke, Parkinson's, MS, cancer, burns, sepsis
 - Check residual q 4-6 hours
 - Withhold feedings for residual volumes of 100-200mL and then restart at lower rate after period of rest
- **TPN:**
 - Hypertonic IV bolus solution done through central/PICC line
 - Contains dextrose, lipids, protein, electrolytes, vitamins
 - For pt who can't absorb nutrition/in a hypermetabolic state/has chronic malnutrition
 - Obtain daily lab values, including electrolytes, b/c solutions are customized for pt according to daily labs
 - Change tubing/solution q 24 hours (even if not empty)
- Filter is added to tubing to collect particles from solution]
- Check capillary glucose q 2-4 hours for 1st 24 hours
- **Keep D10W at bedside in case solution is unexpectedly ruined or next bag isn't available**
- **Air embolism (complication): place pt on left side in Trendelenburg, administer O2, and notify HCP**
- Infection (complication): concentrated glucose is medium for bacteria so observe central line site for s/s of infection; don't use TPN line for other IV bolus fluids/meds
- Fluid imbalance (complication): use controlled infusion pump to infuse at correct rate; never speed up infusion to catch up; gradually increase flow rate until prescribed rate is achieved
- **Paracentesis:**
 - Before: informed consent signed; have pt void or insert catheter; upright position either on edge of bed with feet supported or high fowler's (ascites pts are more comfortable sitting up); obtain baseline vitals, weight; measure abdominal girth
 - After: check vitals, weight, abdominal girth and compare to previous measurements; administer IV bolus fluids or albumin
- **Bariatric Surgeries:**
 - For BMI > 40 or > 30 w/ comorbidities
 - After: limit fluids to 30 mL; 6 small meals a day when pt can resume oral nutrients; observe for s/s of dumping syndrome (cramps, diarrhea, tachycardia, dizziness, fatigue)
- **NG Decompression:**
 - For pt with intestinal obstruction
 - S/S of obstruction: vomiting, absent or hyperactive bowel sounds, intermittent colicky abdominal pain and distention
 - After: assess bowel sounds, abdominal girth, and return of gas; monitor for tube displacement (decreased drainage, N/V, distention)
- **Ostomies:**
 - Ileostomy (frequent/liquid stools)
 - Colostomy (more formed stools)
 - After: stoma should be pink and moist; empty bag when ¼ to ½ full
- **GERD:**
 - Risks: obesity and older age
 - Caused by fatty/fried foods, chocolate, caffeine, coffee, peppermint, spicy foods, citrus, alcohol
 - S/S: feeling of having heart attack; pain worsens w/ bending, straining, laying down; pain occurs after eating and lasts 20 minutes to 2 hours; throat irritation

- Tx: PPI's, antacids; ranitidine/famotidine (take 1 hr before/after antacids); metoclopramide (monitor for extrapyramidal A/E)
 - Mgmt: avoid large meals; remain upright after eating; avoid eating before bed; avoid tight clothes; lose weight; **elevate HOB 6-8 inches w/ blocks; sleep on right side**
- **Esophageal Varices:**
 - Caused by portal HTN; when they hemorrhage it's a medical emergency w/ high mortality rate
 - S/S: hypotension, tachycardia
 - Labs: Increased LFT's, increased Hgb/Hct; increased ammonia
 - If bleed suspected establish IV access and type and cross match for possible blood transfusion
 - Tx: propranolol; octreotide (vasoconstrictor); vasopressin; band therapy; sclerotherapy; shunt; balloon
 - Suggest alcohol recovery program
- **PUD:**
 - Caused by H. pylori, NSAID and steroid use
 - **Gastric ulcer S/S**: pain 30-60 min after meal; pain worse w/ food; hematemesis
 - **Duodenal ulcer S/S**: pain 1.5-3 hours after meal; awakened at night by pain; pain better w/ food; melena
 - Tx: combo of 2-3 antibiotics prescribed (metronidazole, amoxicillin, clarithromycin, tetracycline); ranitidine/famotidine; PPI's; antacids (can be given 7x/day, 1-2 hours after meals and at bedtime); sucralfate (take on empty stomach 1 hr before meals and at bedtime)
 - Perforation/Hemorrhage (complication): severe epigastric pain across abdomen; tender/rigid abdomen (board-like); rebound tenderness; s/s of shock; requires surgery ASAP
 - Dumping Syndrome (complication): prevention- no liquids w/ meals, 1 hour before or after meals; high-protein, high-fat, low-fiber, and low-moderate carb diet; avoid milk/sugars (juice, milkshakes, honey, syrup, jelly)
- **Acute/Chronic Gastritis:**
 - Caused by H. pylori and pernicious anemia
 - Risks: family history, NSAIDs, steroids, excess alcohol, radiation therapy, smoking, caffeine, stress
 - S/S: upper abdominal pain that can increase or decrease after meals, N/V, bloating/distention, hematemesis or positive occult test
 - Small/frequent meals; eat slowly; avoid irritants; monitor for s/s of gastric bleeding

- Tx: ranitidine/famotidine (take w/ meals); antacids (take on empty stomach); PPI's (wait 1 hr to eat after taking); misoprostol (don't take if chance of becoming pregnant-- think "no miso soup for pregnant ladies"; sucralfate; clarithromycin, amoxicillin, tetracycline, metronidazole)
- **Hernia:**
 - Risks: male, older age, pregnancy/obesity (increased abdominal pressure)
 - Before and after surgery: avoid coughing, straining, and lifting objected > 10lbs for 2-3 weeks
- **IBS:**
 - Mgmt: avoid dairy, wheat, corn, alcohol, spicy foods, aspartame, caffeine; consume 2-3L of fluid a day from food/fluid sources; have pt keep food diary to record intake and bowel patterns
 - Increase fiber to 30-40 g/day (constipation IBS)
 - S/S: nausea w/ meals or passing stool, belching, diarrhea or constipation, feeling of defecation not being complete; mucus in stool
 - Meds: Alosteron (for diarrhea-predominant IBS); Lubiprostone (for constipation-predominant IBS)
- **Intestinal Obstruction:**
 - Causes: post-surgical adhesions, diverticulitis, tumors, hernias, neurogenic disorders, hypokalemia, paralytic ileus
 - **Small Obstruction S/S**: profuse, sudden projectile vomiting w/ fecal odor
 - **Large Obstruction S/S**: diarrhea or ribbon-like stools
 - Both small/large will have high-pitched bowel sounds above site (borboygmi) with hypoactive sounds below site
 - NPO for bowel rest; NG tube (oral care q 2 hours)
 - Exploratory Laparotomy: clamp NG tube prior to assess pt's tolerance prior to removal; advance DAT starting w/ clear liquids; clamp tube after eating for 1-2 hours
- **Ulcerative Colitis:**
 - S/S: Edema primarily in rectum and sigmoid colon; continuous lesions; LLQ pain, fever; diarrhea 15-20 times a day; stools contain blood, mucous, or pus; abdominal distention and tenderness
 - Labs: decreased Hgb/Hct, decreased albumin, increased ESR, increased WBC
 - Educate pts on long NPO status that TPN provide nutrition and rest for bowels; eat high-protein, high-calorie, low-fiber foods; small/frequent meals; monitor for K imbalance
- **Crohn's:**
 - S/S: Inflammation and ulceration of GI tract often at distal ileum w/ possible involvement of all bowel layers; sporadic lesions; fistulas are common, RLQ pain; 5 loose stools a day w/ mucus or pus; abdominal distention/tenderness; steatorrhea

- Labs: decreased Hgb/Hct; decreased albumin; increased ESR, increased WBC, increased CRP
 - Care is same as UC
- **Diverticulitis:**
 - Bacteria, food, or fecal matter trapped in one or more diverticula
 - S/S: LLQ pain; N/V; fever; chills
 - Clear liquid diet until s/s subside and then progress to low-fiber diet as tolerated; add fiber once stools solid foods are tolerated and only advance to high-fiber diet when inflammation resolves; avoid popcorn, nuts, and seeds
 - Long-term diet= high-fiber
 - Acute diet= low-fiber
 - Tx: Sulfasalazine; steroids (monitor electrolytes and glucose); cyclosporine/methotrexate (immunosuppressant); infliximab (immunomodulator); diphenoxylate/atropine/loperamide (anti-diarrheal); ciprofloxacin, metronidazole, sulfamethoxazole-trimethoprim (antimicrobial)
 - Peritonitis (complication of UC/crohn's/diverticulitis):
 - S/S: rigid board-like abdomen (hallmark sign); N/V; rebound tenderness; fever
 - Mgmt: semi-fowler's; administer O₂; maintain/monitor gastric suction; NPO status
- **Cholecystitis/Cholelithiasis:**
 - Risks: female, high-fat diet, obesity, genetics, old age
 - S/S: sharp pain in RUQ that radiates to right shoulder, pain w/ deep inspiration during right subcostal palpation (murphy's sign), N/V after ingestion of high-fat food, dyspepsia, eructation (belching), flatulence, jaundice, clay-colored stools, steatorrhea, dark urine, pruritus (due to bile salt accumulation on skin)
 - Labs: increased WBC's increased bilirubin (norm= < 1), amylase/lipase increased w/ pancreatic involvement
 - Cholecystectomy:
 - Shoulder pain post-op common because air inflated in stomach during surgery
 - If open approach used, at T-tube will be needed
 - T-tube care: elevate tube above level of abdomen to prevent total loss of bile; clamp tube 1 hour before and after meals to provide bile necessary for digestion; empty bag q 8 hours; 400mL of drainage in 1st 24 hours normal and then it should decrease; if drainage is > 1000mL/day call HCP;
 - Pt Edu: tell pt that the stool should return to normal color in a week and that diarrhea is common; diet should be low-fat (reduce dairy, avoid fried foods, chocolate, nuts, and gravies); avoid gas-forming foods such as beans, cabbage, cauliflower, broccoli; lose weight if needed
- **Pancreatitis:**
 - Risks: biliary tract disease, gallstones, alcohol, GI surgery, hyperlipidemia, hyperparathyroidism, hypercalcemia, trauma, gastric/duodenal ulcer

- S/S: sudden severe epigastric pain that radiates to back, left flank, or left shoulder that is worse when lying down; pain somewhat relieved by fetal position or sitting upright and bending forward, N/V, pain not relieved by vomiting, weight loss, **turner/cullen sign**, hyperglycemia (A/E by warm, moist skin and fruity breath), ascites, tetany (hypocalcemia), trousseau/Chvostek sign
 - Labs: increased amylase and lipase, increased WBC's, increased LFT's and bilirubin, increased glucose, decreased calcium and mg
 - Mgmt: NPO until pain free; TPN; when diet resumes eat bland, high-protein, low-fat w/ no caffeine, small frequent meals; antiemetics; NG tube; no alcohol/smoking; pain mgmt.; limit stress; monitor glucose and administer insulin; IV fluids and electrolyte replacement
 - Meds: Administer pancrelipase (take w/ every meal and snack)
- **Hepatitis:**
 - Hepatitis A- fecal/oral route often via contaminated food/water, especially shellfish
 - Hepatitis B- blood route (infants born to infected mothers)
 - Hepatitis C- blood route
 - S/S: flu-like s/s; fever; vomiting; dark urine; clay-colored stool; jaundice
 - Labs: AST/ALT increased (norm= < 40), bilirubin increased (norm= < 1)
 - Liver biopsy
 - Meds for chronic infection: adefovir, interferon
 - Complications: liver failure, liver cancer, and cirrhosis
- **Cirrhosis:**
 - Laennec's Cirrhosis: type of cirrhosis caused by chronic alcohol use
 - S/S: abdominal pain; distention; pruritus; confusion/difficulty thinking (due to build up of ammonia); esophageal varices; ascites; jaundice; petechiae; palmar erythema; spider angiomas; peripheral edema; asterixis (coarse tremor w/ rapid non-rhythmic extension/flexion of wrists and fingers); fetor hepaticus (fruity/musty breath)
 - Labs: increased LFT's; increased bilirubin; increased ammonia; decreased protein; decreased albumin; decreased RBC, Hgb, Hct, and platelets
 - Dx: Liver biopsy is most definitive dx
 - Mgmt: Have pt sit in chair or elevate HOB to 30 degrees w/ feet elevated; wash skin with cold water and use lotion to decrease itching; fluid/sodium restriction; strict I/O; monitor for deteriorating mental status b/c it's a sign of hepatic encephalopathy; use lactulose to help excrete ammonia; measure abdominal girth daily
 - High-carb, high-protein, moderate-fat, low-sodium diet (if hepatic encephalopathy present, avoid protein)
 - Tx: diuretics; beta blockers (prevents varices from bleeding); lactulose (to decrease ammonia-can cause hypokalemia)

- Paracentesis:
 - before: vitals and weight; patient should void
 - pt supine w/ HOB elevated for procedure
 - after: measure fluid and document amount/color; weight pt
- **Renal Dx Tests:**
 - Cystography/Voiding Cystourethrogram: uses dye
 - Cystoscopy/Cystourethroscopy: NPO after midnight; bowel prep
- **Hemodialysis:**
 - Before: assess patency of access site (presence of a bruit, palpable thrill, distal pulses); don't use that arm for BP, injections, or IV's; assess VS, BUN, creatinine, electrolytes, Hct, and weight)
 - Administer Heparin during and monitor PTT; have protamine sulfate nearby
 - After: decreased BP and changes in labs are expected; compare before weight with current weight
 - Because dialysis depletes protein, pts will need to increase protein over pre-dialysis limitations
 - No carrying objects w/ arm; void sleeping on arm; perform hand exercises that promote fistula maturation
 - Hypotension is a common A/E so when it occurs carefully replace fluid volume by infusing fluids or colloids and lower HOB
 - Disequilibrium Syndrome (complication): caused by too rapid of a decrease of BUN and volume and can result in cerebral edema and increased ICP; s/s= N/V, decreased LOC, seizures, agitation; to prevent this be sure to use a slow dialysis exchange rate; admin anticonvulsants/barbiturates if necessary
- **Peritoneal Dialysis:**
 - Treatment of choice for older adults and pts who have difficulty w/ vascular access
 - Pt will feel fullness when dialysate dwelling
 - Record amount of inflow vs outflow; **outflow should be clear/light yellow and inflow amount should equal outflow amount**, warm dialysate before instilling; keep outflow bag lower than abdomen
 - Peritonitis (complication): s/s= fever, purulent drainage, redness, swelling, cloudy/discolored outflow solution
 - Hyperglycemia (complication): monitor glucose and admin insulin as needed
 - Poor inflow/outflow (complication): caused by kinked/obstructed tubing or constipation; milk tubing to break up fibrin clots; pt should increase fiber and use stool softeners
- **Kidney Transplant: (post-procedure)**
 - urine output should be > 30mL/hr (if less notify HCP)
 - monitor for s/s of rejection (fever, HTN, pain at site)
 - encourage turning and deep breathing
- urinary catheter care/continuous bladder irrigation
 - immunosuppressive meds (prednisone/cyclosporine) and monoclonal antibodies (basiliximab/daclizumab)
 - low-fat, high-fiber, increased protein, avoid concentrated sugars and carbs to control glycemic factors when on prednisone
 - no contact sports
 - Organ Rejection: (complication)
 - hyperacute: occurs within 48 hours of surgery; antibody-mediated response caused small clots to form in kidney; irreversible; requires immediate removal
 - acute: occurs 1 week- years after surgery; tx requires increasing doses of immunosuppressants
 - chronic: occurs gradually over months to years
- **Acute Kidney Injury:**
 - Onset phase: starts w/ onset of event and ends when oliguria develops; lasts hours-days
 - Oliguria phase: output= 100-400 mL/24 hrs; lasts 1-3 weeks
 - Diuresis phase: begins when kidneys start to recover; lasts 2-6 weeks
 - Recovery phase: continues until kidney fx restored; can take up to 12 months
 - Prerenal: reduction of blood flow to kidneys causing volume depletion
 - Intrarenal: direct damage to kidney from lack of O₂
 - Postrenal: bilateral obstruction of structures leaving the kidney
 - Labs: creatinine will gradually increase; BUN increased
 - Restrict K, Na, P, Mg (dependent on stage); high-protein diet
- **Chronic Kidney Disease:**
 - Stage 1: GFR > 90
 - Stage 2: GFR= 60-90
 - Stage 3: GFR= 30-59
 - Stage 4: GFR= 15-29
 - Stage 5: GFR < 15
 - Prevention: drink at least 2L water/day, stop smoking, limit alcohol, manage weight w/ diet and exercise and prevent/manage HTN and DM
 - S/S: (most RT FVO); slurred speech, lethargy, tremors/jerky movements, JVD, HF, HTN, SOB, tachypnea, crackles, anemia (pallor, weakness, dizziness), vomiting, pruritis, urea crystal in skin (uremic frost)
 - Labs: hematuria; proteinuria; gradual increase of BUN/creatinine; **decreased sodium and calcium; increased K, P, and Mg;** decreased Hgb/Hct
 - 2.2lb daily weight increase= 1L of fluid retained
 - Restrict sodium, K, P, and Mg; diet w/ high-carb and moderate-fat
 - Meticulous skin care
 - Avoid aminoglycosides/amphotericin B, NSAIDs, ACE/ARBs, and contrast dye

- Meds: digoxin; sodium polystyrene (helps decrease K); epo-alfa; ferrous sulfate; furosemide
 - Pts should avoid antacids containing Mg and take rest periods from activity
- **UTI:**
 - Untreated UTI's can lead to pyelonephritis and urosepsis
 - Risks: sex, pregnancy, females, synthetic underwear/pantyhose, wet bathing suits, frequent submersion into baths/hot tubs, catheters, stool incontinence, DM, neurogenic bladder
 - S/S: lower back/abdominal pain; nausea; frequency/urgency; feeling of incomplete emptying/retention; hematuria; fever; nocturia; cloudy/foul-smelling urine
 - Older adult S/S: confusion, hypotension, tachycardia, tachypnea, fever (indications of urosepsis)
 - Labs: **bacteria, WBC, RBC, positive leukocyte esterase and nitrates**
 - Meds: fluoroquinolones, nitrofurantoin, sulfonamides, phenazopyridine (relieves discomfort; will turn urine orange)
 - Mgmt: Pt should drink at least 3L fluid a day; bathe daily for good hygiene; empty bladder q 3-4 hours instead of waiting until its full; urinate before and after sex; avoid bubble baths/feminine products/toilet paper that contain perfumes; don't sit in wet bathing suit; avoid tight clothing/pantyhose

- **Pyelonephritis:**
 - S/S: costovertebral tenderness, N/V, fever, tachycardia, tachypnea, HTN
 - Labs: positive leukocyte esterase and nitrates, increased WBC and bacteria, CRP increased during exacerbation, ESR increased
 - Tx: mild-moderate cases usually tx at home for 2 weeks; morphine; sulfamethoxazole-trimethoprim; ciprofloxacin
 - Complications: septic shock, CKD, HTN
- **Glomerulonephritis:**
 - Risks: recent infection of upper respiratory tract (strep) or of skin
 - S/S: oliguria, HTN, dyspnea, crackles, S3 heart sound, weight gain, reddish-brown/cola colored urine
 - Labs: positive for RBC and protein; increased BUN and creatinine; increased anti-streptolysin-O titers after strep
 - Dx: Throat culture and 24-hour urine collection for protein assay
 - Mgmt: Fluid restriction may or may not be needed; monitor respiratory and F/E; restrict protein if azotemia occurs (increased nitrogen waste)
 - Meds: PCN, erythromycin, azithromycin, anti-HTN
 - Monitor daily weight; dialysis or plasmapheresis might be necessary

- **Renal Calculi:**

- Risks: males, increased GI absorption, decreased renal excretion, high acidity/alkalinity of urine, urinary stasis/retention, dehydration\
 - S/S: severe pain (renal colic); flank pain that may radiate to abdomen; urinary frequency; fever, diaphoresis; N/V; tachycardia; oliguria/anuria (occurs when calculi obstruct urinary flow and is a medical emergency); hematuria
 - Strain all urine and save calculi for analysis; increased fluids to 3L/day; encourage ambulation to promote passage of calculi, I&O
 - Meds: morphine; ketorolac (NSAID); oxybutynin (anti-spasmodic)
 - Extracorporeal shock therapy: moderate-conscious sedation w/ EKG monitoring; strain urine after procedure; bruising normal; hematuria expected after procedure
 - Limit foods high in animal protein (decreases calcium precipitation); limit sodium, decrease sodium, avoid calcium oxalate foods (spinach, black tea, rhubarb, cocoa, beets, pecans, peanuts, okra, chocolate, wheat germ, lime peel, swiss chard), decrease foods w/ uric acid/purine (organ meat, poultry, red wine, fish, gravies, sardines)
 - Complications: hydronephrosis (calculi blocks portion of urinary tract) and urosepsis

- **Female Reproductive Exams:**

- Pelvic Exam: should be scheduled when pt is not on their period; vaginal meds, douching, and sex within 24 hours of the test can alter results; empty bladder prior; minimal bleeding from cervix is expected after exam
 - Women ages 21-29 should have pap smear every 3 years
 - Cervical Biopsy (post-care): rest for first 24 hours after procedure; no sex, douching, vaginal creams, or tampons until all discharge stops (usually takes 2 weeks); no lifting heavy objects for 2 weeks so cervix can heal; best time for cervical biopsy is early phase of menstrual cycle b/c cervix is less vascular
 - Endometrial Biopsy:
 - Before: inform pt that it is done with them awake and that cramping/discomfort is expected; empty bladder prior
 - After: spotting normal for 1-2 days; no sex, douching, vaginal creams, or tampons until all discharge has stopped (usually 1-2 days)
 - HIV Testing: if enzyme immunoassay (EIA) is positive, the western blot test is used to confirm dx of HIV
 - Mammogram: start at age 40; avoid deodorant/lotion/powders in axillary area or on breasts before procedure; CI w/ pregnancy

- Hysterectomy (post-care): if ovaries are removed menopause s/s can occur; restrict heavy lifting, driving, stairs, and sex for 6 weeks; avoid use of tampons
- **Menstrual Disorders/Menopause:**
 - Ovulation occurs around day 14
 - Menstruation usually lasts 4-6 days but can last up to 9 days
 - Amenorrhea: absence of menses; common in women w/ low body fat % who play sports
 - PMS: caused by imbalance of estrogen and progesterone; S/S= irritability, impaired memory, depression, poor concentration, mood swings, binge eating, breast tenderness, bloating, weight gain, headache, and back pain
 - CA-125: an immunodiagnostic test in which findings are elevated w/ ovarian cancer
 - Meds: spironolactone (used for bloating/weight gain for PMS); leuprolide (tx for endometriosis, but can cause birth defects so pt needs to be on birth control); iron supplements; sertraline/fluoxetine (SSRI's)
 - Menopause:
 - Considered complete when no menses occurs for 12 months
 - S/S: hot flashes, atrophic vaginitis, vaginal dryness, mood swings, decreased bone density
 - Menopausal hormone therapy: used to suppress A/E of menopause; no smoking while on it; teach pt how to prevent and assess development of DVT
- **Disorders of Female Reproductive Tissue:**
 - Cystocele:
 - Protrusion of posterior bladder through anterior vaginal wall
 - Risks: advanced age (loss of estrogen) and obesity
 - S/S: urinary frequency/urgency, stress incontinence
 - Tx: vaginal pessary (remover device inserted into vagina to support/block protrusion of other organs into vagina); kegel exercises (contract circumvaginal and perirectal muscles, gradually increase contraction period to 10 seconds, follow each contraction w/ relaxation period of 10 seconds)
 - Fibrocystic Breast Condition:
 - Tender lumps common in upper, outer quadrant
 - Palpable rubber-like lumps
 - Does NOT increase risk for breast cancer
- **Male Reproductive Exams**
 - Annual PSA and digital rectal exam (DRE) recommended for men > 50 years old (African American men and men who have family hx of prostate cancer should screen at earlier age)
 - An enlarged prostate press' on urethra causing diminished flow, retention, and possible blood in urine
- Increased PSA indicative of prostate cancer (norm range for male < 50 years old is 2.5)
 - DRE abnormal findings include abnormally large and hard prostate w/ irregular shape/lumps
- **BPH:**
 - S/S: frequency, urgency, hesitancy, incontinence, incomplete emptying, dribbling post-voiding, nocturia, diminished force of stream, hematuria
 - DRE will reveal enlarged but smooth prostate
 - Finasteride: decreases testosterone in prostate which decrease size; A/E can include decreased libido and impotence; women who are/could become pregnant should avoid contact w/ broken or crushed tabs and the pt's semen
 - Tamsulosin: causes relaxation of bladder outlet and prostate; A/E is orthostatic hypotension
 - TURP Procedure (post-op):
 - Place 3 way indwelling catheter (drains urine and allows for continuous bladder irrigation-CBI)
 - CBI rate is adjusted to keep irrigation return pink or lighter. If bright red/ketchup appearing w/ clots occurs, the rate needs to be increased**
 - If catheter becomes obstructed, turn off CBI and irrigate w/ 50 mL of irrigation solution using a large piston syringe**
 - Catheter is taped to leg and has a large balloon which creates traction so the balloon will apply firm pressure to prostatic fossa to prevent bleeding; also makes pt feel continuous need to urinate
 - Administer analgesics, antispasmodics, prophylactic antibiotics, and stool softeners to avoid straining
 - Pt should drink 12 or more 8 oz glasses of water a day; avoid bladder stimulants such as caffeine/alcohol; if urine becomes bloody pt should stop activity, rest, and increase fluid intake
- **Musculoskeletal Dx Procedures:**
 - Arthroscopy: allows visualization of structures inside a joint; CI w/ lack of joint mobility and infection of joint; after procedure pt should apply ice for first 24 hours and elevate extremity for 12-24 hours
 - Bone Scan: radioactive isotope injected 2-3 hours before scan; detects fx, tumors, and diseases of bone)
 - Gallium and Thallium Scan: more sensitive version of bone scan; radionuclide injection 4-6 hours before scan; scan takes 30-60 minutes and may require sedation to help pt lie still; repeat scanning occurs 24, 48, and 72 hours
 - Dual Energy X-Ray Absorptiometry: estimate density of bone mass and presence/extent of osteoporosis; pt should stay dressed and removed metal objects

- Electromyography & Nerve Conduction Study: determines presence and cause of muscle weakness; surface or needle electrodes attached to skin and low electrical currents produce current through electrodes and record muscle response to stimulus; tell pt they may need to flex muscle during needle insertion
- **Arthroplasty:**
 - CI: recent/active infection (such as UTI) because it can cause prosthesis to fail; arterial impairment to affected extremity
 - Pre-op: epo-alpha may be prescribed a few weeks prior; teach pt about autologous blood donation; pt should scrub site with prescribed antiseptic soap the night before and morning of surgery; pt should take anti-HTN meds and other meds HCP allowed with a sip of water the morning of the surgery
 - Knee (post-op):
 - Usually prescribed a "continuous passive ROM machine" that's usually placed and initiated after surgery (should be turned off during meals)
 - Avoid knee gatch and pillows under knees; instead place one pillow under lower calf and foot to cause slight extension of knee joint and prevent contractures or knee can rest flat on bed
 - Place small blanket/pillow slightly above ankle area to keep heels off bed and prevent pressure ulcers on heels
 - Meds: opioids, peripheral nerve blockade, prophylactic antibiotics, warfarin/enoxaparin
 - Ice/cold therapy; monitor neurovascular status q 2-4 hours
 - Hip (post-op):
 - Hgb/Hct can continue dropping for 48 hours post-op, so blood may be used transfused if Hgb < 9**
 - Early ambulation; opioids, prophylactic antibiotics, warfarin, enoxaparin
 - Place pillow or abduction device between legs when turning to unaffected side; pt should never be turned onto affected side b/c it can cause dislocation (s/s of dislocation= acute onset of pain, pt reports hearing a "pop", internal rotation/shortening of affected extremity
 - Pt Edu: use elevated toilet seat; use abduction pillow between legs while in bed; externally rotate the toes; use extended handles on shoe horns and dressing sticks to prevent flexion > 90 degrees; avoid low chairs; don't cross legs; don't internally rotate toes; avoid turning to operative side
- **Amputations:**
 - Expected findings: altered peripheral pulses (use doppler); differences in temp of extremities (level of leg at which temp becomes cool); altered color of extremities; lack of sensation in extremity

- Traumatic Amputation Mgmt: wrap severed extremity in dry sterile gauze or clean cloth and put it in a dry sealed plastic bag and submerge it in ice water and send w/ pt
- Administer propranolol (relieves continuous dull burning sensation); gabapentin (epileptic that relieve phantom limb pain); baclofen (antispasmodic); antidepressants
- Prosthesis Fitting: limb must be shaped and shrunk in preparation for fitting; **wrap stump using elastic bandages (figure-8 wrap) to prevent restriction of blood flow and decrease edema**; use stump shrinker sock; use air splint; **do NOT elevate**;
- Flexion Contractures (prevention): perform ROM exercises; do not elevate stump on pillow; **prone position 20-30 minutes several times/day**; no prolonged sitting
- **Osteoporosis:**
 - Low bone density; osteopenia is precursor
 - Prevention: adequate vitamin D (fish, egg yolks, fortified milk, cereal), calcium (dairy, green veggies, fortified OJ and cereals, red and white beans, figs); limit carbonated drinks b/c they contain phosphate which can cause calcium loss; expose areas of skin to sunlight 5-30 minutes 2x/week; weight-bearing exercises (walking/lifting weights)
 - Risks: female, family hx, thin/lean body, age > 60 years, post-menopausal women; history of smoking/drinking; excess caffeine consumption (increases calcium excretion), sedentary lifestyle; secondary osteoporosis is caused by hyperparathyroidism/long-term use of steroids and anti-convulsants
 - Expected findings: reduced height, acute back pain, hx of fractures, kyphosis
 - Dx: dual energy x-ray absorptiometry to determine bone density
 - Clearly mark thresholds/doorways/steps; encourage weight-bearing exercises; pt should avoid inclement weather b/c it increases fall risk
 - Meds:
 - Calcitonin Human/Calcitonin Salmon (thyroid hormone that decreases bone reabsorption by inhibiting osteoclast activity)
 - Estrogen/Medroxyprogesterone
 - Raloxifene (estrogen receptor modulator)
 - Alendronate (increases risk for esophagitis/esophageal ulcers; take w/ 8 oz water early morning before eating; remain upright for 30 minutes after taking)
 - Teach pt to use orthotic devices and log roll when getting out of bed
- **Fractures:**
 - Closed: doesn't break skin
 - Open/compound fx: disrupts integrity of skin which increases infection risk
 - Complete: divides bone into 2 distinct parts
 - Simple: one fx line
 - Comminuted: multiple fx lines splitting bone into multiple pieces

- Spiral: occurs from twisting motion (common w/ abuse)
- Risks: menopause/osteoporosis, long-term steroid therapy, falls, MVA, bone cancer, Paget's disease
- Expected findings: crepitus, internal rotation of extremity, shortened extremity, edema, ecchymosis
- Mgmt: Stabilize area, maintain proper alignment, elevate limb above heart and apply ice, neurovascular check q 1 hour
- Neurovascular Check: Perform q 1 hour for 1st 24 hours and then q 1-4 hours; assess pain, sensation, temp, cap refill, pulses, movement
- Handle plaster cast w/ palms (not fingertips) until cast is dry to prevent denting the cast; elevate cast above heart during 1st 24-48 hours
- Pt Edu: Do not stick any foreign objects down inside cast and instead relieve itching with cool air from hair dryer; report s/s of infection such as areas under cast that are painful, have a "hot spot", increased drainage, warm to touch, odor present
- **Traction:**
 - Avoid lifting/removing weights; ensure weights hang freely and are not resting on floor; notify HCP if pt experiences severe pain from muscle spasms unrelieved w/ meds or repositioning; move pt in halo traction as a unit without applying pressure to rods
 - Pin site care: monitor for s/s of infection such as tenting at the pin site (skin "rising up" the pin); chlorhexidine is used to clean pins w/ one cotton swab per pin; pin care usually done 1x/shift or 1-2x/day; leave the crusting
 - Halo traction device: always have wrench nearby
- **Compartment Syndrome:**
 - Assessment using the 5 P's (pain, paralysis, paresthesia, pallor, pulselessness)
 - Increased pain is unrelieved w/ elevation or medication
 - Paresthesia, numbness, and burning are early s/s
 - Palpated muscles are hard/swollen from edema
 - Tx: surgical fasciotomy
- **Fat Embolism:**
 - Usually occurs 12-48 hours after a long bone fx or total joint arthroplasty
 - Early S/S: dyspnea, decreased mental acuity, respiratory distress, tachycardia, confusion
 - Late S/S: cutaneous petechiae on neck, chest, upper arms, abdomen (this is a discriminating finding from a PE)
- **Osteomyelitis:**
 - S/S: bone pain, erythema, fever, leukocytosis
 - Tx: 3 months of IV (PICC line) and oral antibiotics; hyperbaric O2 treatments
- **Osteoarthritis:**
 - Progressive degeneration of cartilage; non-inflammatory and non-systemic

- Risks: Age > 60 years, repetitive stress on joints, obesity
- S/S: joint pain/stiffness, crepitus, Heberden's nodes (distal finger joints), Bouchard's nodes (proximal finger joints), **pain occurs w/ activity and improves w/ rest**
- Use heat for pain and ice for inflammation; balance rest and activity; encourage splinting for joint protection; use assistive devices
- Limit acetaminophen to max of 4,000 mg/24 hours; glucosamine; steroid and hyaluronic acid used for intra-articular injections
- Capsaicin: (what makes peppers hot- so think about what you would/would not do after peppers on hands) Used for topical pain relief; use gloves to apply; pt should wash hands immediately after applying and avoid touching eyes and applying over areas of broken skin; burning sensation is normal after applying and should subside
- Physical therapy helps; TENS unit may also be prescribed
- **Skin Dx Procedures:**
 - Cultures should be done prior to starting antimicrobial therapy
 - Tzanck smear: used for viral specimen culture
 - KOH test: used for fungal specimen culture
 - Post-Bacterial Culture: bathe daily using antibacterial soap; don't squeeze lesions but do remove crusted lesions so topical antibiotic can penetrate lesion
 - Post-Viral Culture: apply compress of Burow's solution (aluminum acetate in water) for 20 minutes 3x/day to promote formation of a crust and healing
 - Fungal infection meds: clotrimazole applied 2x/day and for 1-2 weeks after the lesions are no longer present
- **Psoriasis:**
 - Scaly dermal patches caused by overproduction of keratin; autoimmune
 - S/S: scaly patches, bleeding stimulated by removal of scales
 - Topical Meds:
 - Triamcinolone/Betamethasone (steroids): after applying cream pt should use warm, moist, occlusive dressing of plastic wrap over cream; pt should avoid using med on face or in skin folds but scalp is okay
 - Tar Preparations: can cause staining of skin and hair
 - Systemic Meds: methotrexate (for severe cases; A/E= bone marrow suppression and liver toxicity); cyclosporine (immunosuppressant; causes nephrotoxicity)
 - Photochemotherapy and Ultraviolet Light (PUVA): methoxsalen given orally 2 hours before tx; pt must wear eye protection; inform pt it can cause skin cancer
- **Burns:**
 - **Rule of 9's: (method to assess extent of burns)**
 - entire head= 9%
 - 1 side of head= 4.5%
 - entire arm= 9%

- 1 side of arm= 4.5%
- torso front= 18%
- torso back= 18%
- entire leg= 18%
- 1 side of leg= 9%
- perineum= 1%

▪ 3 Phases of Burn Care:

1. Emergent (Resuscitative): starts w/ injury and lasts 24-48 hours; priorities focus on airway, supporting circulation and organ perfusion by fluid replacement, pain mgmt., wound care to prevent infection---initial fluid shift occurs in 1st 12 hours and can last 36 hours; Hct/Hgb increased due to fluid shift into interstitial space (3rd spacing); sodium decreased due to 3rd spacing; K increased due to cell destruction
 2. Acute: 36-48 hours after injury when fluid shift resolves and ends w/ closure of wound
 3. Rehabilitative: starts when most of the burn area has healed; priorities include psychosocial support, scar prevention, and resumption of activities
- Inhalation damage findings: Singed nasal hair/eyebrows/eyelashes; sooty sputum; hoarseness; wheezing; edema of nasal septum; smoky smelling breath (indications of impending loss of airway)
 - Fluid Remobilization starts around 24 hours; diuretic stage starts 48-72 hours after injury-----Hgb/Hct decreased due to fluid shifting from interstitial spaces back into vascular fluid; sodium still decreased due to renal/wound loss; K decreased due to renal loss and movement back into cells
 - Depth of Injury:
 - Superficial Thickness: pink to red, no blisters, painful/tender, sunburn
 - Superficial Partial Thickness: damage to entire epidermis and some dermis, pink to red, blisters, no eschar
 - Deep Partial Thickness: damage to entire dermis and deep into dermis, red to white, no blisters, eschar soft and dry
 - Full Thickness: damage to entire epidermis and dermis and can extend into subcutaneous tissue, nerve damage, red/yellow/black/brown/white, no blisters, severe edema, eschar hard and elastic, sensation minimal or absent
 - Deep Full Thickness: damage to all layers of skin, extends into muscle/tendon/bone, black, no blisters, no edema, eschar hard and inelastic
 - Minor burns care: stop burning process; remove clothing or jewelry that might conduct heat; flush chemical burns w/ large volumes of water; provide warmth; educate family to avoid greasy lotions/butter on burn; determine need for tetanus vaccination

- Moderate-Major Burn Care: provided humidified supplemental O₂; cough/deep breathe/spirometer q 1 hour; administer half of total 24 hour IV fluid volume within 1st 8 hours and remaining volume over the next 16 hours; infuse isotonic solution or colloid solutions (0.9 NS, LR, albumin) after 1st 24 hours of burn recovery; maintain urine output of 30mL/hour; monitor for shock
- Pain Mgmt: avoid routes other than IV during resuscitation phase due to decreased absorption of other routes; use opioids
- Infection Prevention: restrict fresh flowers/plants/fruits/veggies; limit visitors
- Nutrition: 5,000 calories/day due to hypermetabolic state; increase protein for wounds; possible TPN
- Topical Meds:
 - Silver Nitrate 0.5%: doesn't penetrate eschar
 - Silver Sulfadiazine 1%: can cause transient neutropenia
 - Mafenide Acetate: penetrates eschar; can cause metabolic acidosis
- Skin Grafts:
 - Allograft: human cadavers
 - Xenograft: animal skin
 - Artificial Skin: made w/ beef collagen and shark cartilage
 - Maintain immobilization of graft sites; elevate extremities
- Thermal injuries to the airway might not manifest for 24-48 hours (altered respiratory sounds, hoarseness, drooling)

• Endocrine Dx Procedures:

- DI (Water Deprivation Test): fluids are withheld for a number of hours; pt's weight and urine osmolality taken hourly until urine osmolality shows an increase of < 30
- SIADH: increased ADH; decreased serum osmolality w/ increased urine osmolality; decreased urine output w/ increased gravity
- Cushing's (Dexamethasone Suppression Test): positive dx for Cushing's occurs when ACTH and Cortisol production doesn't decrease after being given Dexamethasone
- Addison's (ACTH Stimulation Test): normally cortisol increases after admin of ACTH, but pts with Addison's the cortisol won't increase after Cosyntropin admin
- Pheochromocytoma (Clonidine Suppression Test): pheochromocytoma is a disorder of adrenal medulla commonly caused by hypersecretion of catecholamines which causes HTN, tachycardia, and diaphoresis; a positive dx occurs when catecholamine is given to pt and it does not decrease their BP
- Fasting Glucose Test: no food/drinks other than water for 8 hours prior
- Oral Glucose Tolerance Test: pt must fast 10-12 hours prior; pt consumes specific amount of glucose and their blood glucose is taken 30 min, 1 hour, and 2 hours; level > 200 at 2 hours= DM; normal range= < 140 after 2 hours

- Fasting Blood Glucose: > 126 on 2 separate occasions is positive for DM; normal range= 70-110
 - HbA1c: best indicator for glucose control level for past 120 days; < 7%= good DM control
- **Diabetes Insipidus:**
 - S/S: polyuria, polydipsia, polyphagia, sunken eyes, tachycardia, hypotension, loss/absence of skin turgor, dry mucous membranes
 - Labs: (common SATA question)
 - Urine Chemistry: **(think DILUTE) decreased specific gravity (< 1.005), decreased urine osmolality (< 200)**
 - *as urine volume increases, urine osmolality decreases**
 - Serum Chemistry: **(think CONCENTRATED) increased serum osmolality (> 300), increased serum Na, increased serum K**
 - *as serum volume decreases, serum osmolality increases**
 - Dx: water deprivation test (ADH stimulation test)= positive when kidneys are unable to concentrate urine despite increased plasma osmolality; vasopressin test= positive when injection of vasopressin produces urine output w/ increased gravity if pt has central DI (this differentiates central DI from nephrogenic DI)
 - Tx: DDAVP, vasopressin
 - Monitor daily weight and report gain > 2lb in 24 hours to HCP; encourage high-fiber diet
- **SIADH:**
 - Excessive release of ADH causes renal excretion of Na leading to water intoxication, cellular edema, and dilutional hyponatremia (**hyponatremic due to dilution from fluid retention**)
 - S/S: confusion, lethargy, seizures, coma, tachycardia, HTN, crackles, distended neck veins (s/s of FVO)
 - Labs: (common SATA question)
 - Urine Chemistry: **(think CONCENTRATED) increased urine Na, increased urine osmolality**
 - Blood Chemistry: **(think DILUTE) decreased serum Na (dilutional hyponatremia), decreased serum osmolality (< 270)**
 - Restrict fluids to 500-1,000 mL/day; monitor weight and I&O
 - Admin furosemide; admin hypertonic solution (3% NaCl or 5% NaCl)
 - Water intoxication/cerebral & pulmonary edema (complication): monitor for early s/s such as crackles, distended neck veins, changes in neuro; seizure precautions
- **Hyperthyroidism:**
 - Grave's disease is most common cause

- S/S: nervousness, irritable, heat intolerance, weight loss, insomnia, warm/sweaty/flushed skin, exophthalmos, increased SBP, tachycardia, dysrhythmias
 - Labs: TSH decreased; T3/T4 increased
 - Dx: Radioactive iodine uptake
 - Increase calories and protein; **eye protection (patches, eye lubricant, tape closed eyelids)**; avoid excess palpation of thyroid
 - Meds: Propylthiouracil (monitor CBC for leukopenia and thrombocytopenia and s/s of hepatotoxicity); Propranolol (tx tachycardia and palpitations); Iodine solutions (mix w/ juice or other liquid to mask taste and use straw to avoid teeth staining)
 - Radioactive Iodine Therapy:
 - Pt should stay away from pregnant women, infants, and children for a week
 - Don't use the same toilet as anyone else for 2 weeks
 - Take laxative 2-3 days after tx to help get rid of contaminated stool
 - Don't share toothbrush
 - Use disposable food service items (paper plates)
 - Thyroidectomy (pre-op):
 - If total thyroidectomy done, thyroid replacement therapy
 - Pt should receive iodine 10-14 days prior to surgery to decrease the size of the thyroid and decrease bleeding
 - Thyroidectomy (post-op):
 - Semi-fowler's w/ head and neck supported w/ pillows or sandbags; avoid neck extension
 - Check surgical dressing on back of neck for bleeding
 - Keep tracheostomy supplies nearby
 - Check for laryngeal nerve damage by asking pt to speak as soon as they awaken from anesthesia
 - Hypocalcemia and tetany can occur if parathyroid damaged so monitor for tingling/numbness of toes and around mouth as well as muscle twitching; Chvostek's and Trousseau's signs (always keep IV calcium gluconate or calcium chloride nearby)
 - Thyroid Storm/Crisis:
 - High mortality rate
 - Caused by stress, trauma, DKA
 - S/S: hyperthermia, HTN, delirium, vomiting, abdominal pain, tachydysrhythmias, chest pain, dyspnea, palpitations
 - Acetaminophen for fever; cool sponge baths/ice packs; admin propylthiouracil and propranolol
- **Hypothyroidism:**

- S/S: fatigue, cold intolerance, weight gain, pale skin, thick/brittle nails, depression, periorbital edema, anemia, bradycardia, hypotension, thinning hair, swelling in hands/feet/face, myxedema (non-pitting edema)
- Labs: T3/T4 decreased; TSH increased
 - Normal T3= 70-205
 - Normal T4= 4-12
- Mgmt: Frequent rest periods; low-calorie/high-bulk diet; avoid fiber laxatives b/c they interfere w/ absorption of levothyroxine; meticulous skin care; extra clothing/blankets; avoid electric blankets b/c the combo of vasodilation and decreased sensation
- Levothyroxine: tx starts slowly and dose increases q 2-3 weeks until desired response; serum TSH is monitored to ensure correct dosage; should be taken on empty stomach 30-60 minutes before breakfast; tx is lifelong
- Myxedema Coma (complication):
 - S/S: respiratory failure, hypotension, hypothermia, bradycardia
 - Maintain airway, continuous EKG monitoring, cover w/ warm blankets
 - Meds: IV bolus Levothyroxine
- **Cushing's**:
 - Causes: long-term steroid use due to asthma or RA
 - Increased cortisol
 - S/S: (common SATA question) **fatigue, joint pain, depression, decreased immune, thin/fragile skin, HTN (Na and water retention), tachycardia, gastric ulcers, weight gain, moon face, truncal obesity, buffalo hump, fractures (osteoporosis), bone pain, hyperglycemia, hirsutism, acne**
 - Labs: (common SATA question) **increased cortisol, increased glucose, increased Na, Ca and K decreased**
 - Dx: Dexamethasone suppression test
 - Mgmt: Maintain safe environment to decrease risk of fractures and skin trauma; frequent hand hygiene; meticulous skin care; decrease Na intake but increased intake of K/protein/Ca/vitamin D
 - Meds: Ketoconazole (antifungal that inhibits adrenal steroid synthesis); spironolactone (to decrease fluid but preserve K since its already decreased)
 - Hypophysectomy:
 - Removal of pituitary gland
 - Assess drainage for presence of glucose or halo sign for CSF leakage
 - Avoid coughing/sneezing/nose blowing
 - Diminished sense of smell common for 3-4 months after
 - Avoid bending over at waste to prevent increased ICP
 - No teeth brushing for 2 weeks (flossing and rinsing okay)
 - Notify HCP if pt tastes sweet drainage (indicates glucose and CSF leak)
 - High-fiber diet and docusate to avoid constipation (increased ICP)

- Adrenalectomy: pt will need to take glucocorticoids and hormone replacements
- **Addison's**:
 - S/S: (common SATA question) **weight loss, salt craving, hyperpigmentation (bronzing), weakness, fatigue, N/V**; symptoms develop slowly
 - Labs: (common SATA question) **increased Ca and K; decreased Na and glucose**
 - Dx: ACTH stimulation test (positive dx when cortisol doesn't increase)
 - Mgmt: Monitor F&E; hydrocortisone IV bolus and continuous infusion; tx hyperkalemia w/ sodium polystyrene, insulin & glucose, calcium, or sodium bicarbonate; monitor and tx hypoglycemia (give food/supplemental glucose)
 - Meds: hydrocortisone/prednisone; can be life long
 - Adrenal Crisis (aka Addisonian Crisis): admin glucocorticoids; insulin w/ dextrose, sodium polystyrene, or diuretic to tx hyperkalemia; IV bolus of glucose
- **Diabetes**:
 - Type 1: autoimmune dysfunction involving destruction of beta cells
 - Type 2: insulin resistance
 - Hyperglycemia S/S: (common SATA question) **glucose > 250; polyuria; polydipsia; polyphagia; skin warm/dry; dry mucous membranes; rapid/weak pulse; hypotension; ketones; kussmaul's respirations (caused by body trying to compensate for metabolic acidosis); acetone/fruity breath; headache, N/V; abdominal pain; poor concentration; vision changes; slow healing wounds; decreased LOC; seizures; coma**
 - *"Hot and dry, sugar high"*
 - Dx: two findings on separate days of at least one of the following—casual blood glucose > 200; FBG > 126; 2-hour oral glucose tolerance > 200; A1C > 6.5%
 - Hypoglycemia S/S: (common SATA question) **glucose < 70, shakiness, confusion, sweating, palpitations, headache, decreased coordination, blurred vision, seizures, coma**
 - *"Cold and clammy, need some candy"*
 - Hypoglycemia mgmt: take 15-20 grams of readily absorbable carb (4-6 oz of juice/soft drink, glucose tabs/gel, 6-10 hard candies, or 1 tbsp of honey) and recheck glucose in 15 minutes; recheck glucose and if its not in normal range consume carbs again; if glucose within normal range have a snack with carbs and protein if next meal is more than 1 hour away; if pt is unconscious or can't swallow admin glucagon SQ/IM; once pt is conscious/able to swallow have pt ingest oral carbs
 - Infusion pump: needles should be changed q 2-3 days to prevent infection
 - Rapid-acting insulin:
 - Lispro/aspart/gulisine
 - Onset occurs within 15 minutes so administer when food is in front of pt
 - Peak: 30 min-1 hour
 - Duration: 3-4 hours

- Short-acting insulin:
 - Regular/humulin
 - Administer 30-60 minutes before meals
 - Onset: 30-60 min
 - Peak: 2-3 hours
 - Duration: 5-7 hours
- Intermediate-acting insulin:
 - NPH
 - Given for glycemic control between meals and at night (not before meals)
 - Only insulin that can be mixed with short-acting insulin ("clear before cloudy"= short 1st then intermediate 2nd)
 - Onset: 1-2 hours
 - Peak: 4-12 hours
 - Duration: 18-24 hours
- Long-acting insulin:
 - Glargine/detemir
 - Administered 1x/day anytime during the day but always at same time each day
 - No peak
 - Duration: 24 hours
- Pt Edu: rotate injection sites; inject at 90 degree angle (45 degree angle if pt thin)
- Oral hypoglycemics: metformin (also used for gestational diabetes); glipizide; repaglinide; pioglitazone; acarbose
- Foot Care:
 - inspect/wash daily w/ mild soap and warm water (test water temp w/ hands)
 - pat feet dry especially between toes and avoid lotion between toes
 - use foot powder w/ cornstarch on sweaty feet
 - don't use commercial remedies for callouses/corns
 - consult podiatrist
 - perform nail care after bath/shower when nails are softer and easier to trim
 - separate overlapping toes w/ cotton or lamb's wool
 - avoid open-toe shoes; leather shoes preferred over plastic; wear slippers w/ soles; never go barefoot
 - wear clean absorbent stockings made of cotton/wool
 - don't use hot water bottles or heating pads
- Don't skip meals; 15 grams of carbs= 1 carb exchange; restrict calories and increase activity for weight loss
- Sick Days:
 - Check glucose q 3-4 hours
 - Continue taking insulin/meds

- Meet carb needs w/ soft foods (custard, cream soup, gelatin, graham crackers) 6-8x/day; if that's not possible drink sports drinks
- Call HCP if BG > 240, fever > 101.5 degrees that doesn't respond to acetaminophen or lasts over 24 hours, experience rapid breathing; ketones in urine > 24 hours
- Encourage yearly cholesterol checks; monitoring of BP and HbA1c q 3 months; yearly eye exams
- Encourage diet of low-fat meals that are high in fruits, veggies, and whole grains
- Diabetic Nephropathy Complication: report urine output < 30mL/hour; encourage yearly urine analysis, BUN, creatinine, and microalbumin; avoid soda, alcohol, and toxic levels of NSAIDs; consume 2-3 L/day of fluids
- **DKA:**
 - Glucose > 300 w/ metabolic acidosis; rapid onset
 - **Infection is #1 cause**
 - S/S: 3 P's, weight loss, N/V, abdominal pain, blurred vision, headache, weakness, orthostatic hypotension, fruity breath, kussmaul's, metabolic acidosis, mental change
- **HHS:**
 - Glucose > 600; gradual onset
 - S/S: 3 P's, weight loss, N/V, abdominal pain, blurred vision, headache, weakness, orthostatic hypotension, mental change, seizures/myoclonic jerking, reversible paralysis
 - Caused by poor fluid intake, poor kidney function, infection, stress; common in older adult pts
- **Mgmt for DKA/HHS:**
 - Tx underlying cause
 - Rapid isotonic fluids (NS)
 - IV bolus regular insulin
 - Monitor K levels (initially increased but insulin can cause decrease)
 - Sodium bicarbonate for severe metabolic acidosis (pH < 7.0)
- **WBC:**
 - Normal range= 5,000-10,000
 - Leukopenia= < 4,000
 - Leukocytosis= > 10,000
 - Neutropenia= neutrophils < 2,000 (viral/bacterial infection or radiation/chemo)
 - Left shift: an increase in immature neutrophils (bands/stabs) that occurs with acute infection; neutrophil production increases allowing release of immature neutrophils that aren't capable of phagocytosis (can't ingest/destroy bacteria)
 - Neutrophils: 55-70%; increased w/ acute bacterial infection, RA, trauma, myelocytic leukemia

- Lymphocytes (T & B Cells): 20-40%; cell-mediated immunity; increased w/ chronic bacterial/viral infection and viruses such as mono, mumps, and measles
 - Monocytes: 2-8%; increased w/ protozoal infections, TB, and mono
 - Eosinophils: 1-4%; increased w/ allergic reactions and parasitic infections
 - Basophils: 0.5-1%; increased w/ leukemia
- **Skin Test for Allergies:**
 - Intradermal injection or scratching of superficial layer of skin (scratch/prick test) of the skin w/ small amounts of potential allergens
 - Have equipment nearby for possible anaphylaxis
 - Apply control drops (substances that shouldn't cause reaction such as NS) and substances that should produce a reaction such as histamine and assess for reaction after 15 minutes
 - Use antihistamine or topical steroid if itching occurs
- **Vaccines:**
 - Active-natural immunity: antibodies made in response in exposure to live pathogen that enters body naturally
 - Active-artificial: vaccine
 - Passive-natural: mother-fetus via placenta and breast milk
 - Passive-artificial: immune globulins that are given to pt who requires immediate protection against disease where exposure has already occurred such as a snake bite
 - Tetanus, diphtheria (Td) booster: every 10 years
 - Varicella: 2 doses to adults who don't have evidence of previous infection (pregnant women should wait until post-partum period)
 - Pneumococcal: recommended for immunocompromised, chronic diseases, smokers, and pts in long-term care facilities
 - Hepatitis A: 2 doses for high-risk pts
 - Hepatitis B: 3 doses for high-risk pts
 - Flu: inactive vaccine approved for pregnant women; live vaccine (nasal spray) is only for adults who aren't immunocompromised/pregnant
 - HPV: 3 doses for women up to 26 years old who weren't immunized as kids
 - Zoster: 1x dose for adults > 60 years old
 - General vaccine CI: anaphylactic reaction, live viruses w/ pregnant/immunocompromised pts; **common cold is not CI**
 - TDAP: common A/E= redness, swelling, tenderness, low fever
 - MMR: CI in pts w/ anaphylactic reactions to eggs, gelatin, or neomycin
 - Varicella: CI in pts w/ anaphylactic reaction to gelatin or neomycin
 - Flu: CI in pts w/ anaphylactic reaction to eggs
 - Zoster: CI in pts w/ anaphylactic reaction to latex

- Administer antipyretic for fever, apply cool compress for localized tenderness, and mobilize the affected extremity
- **HIV/AIDS:**
 - 1st stage: marked by rapid increase in HIV viral load, decreased CD4 cells (500 +), and increased CD8 cells; flu-like s/s occur within 2-4 weeks on infection
 - 2nd stage: chronic asymptomatic infection that can last 10+ years; CD4 cells decreased even more (200-499)
 - 3rd stage (AIDS): CD4 cells are now < 200; one or more of the following opportunistic infections also present (candidiasis, **kaposi's sarcoma**, herpes, TB, recurrent pneumonia, wasting syndrome)
 - S/S: chills, rash, nausea, weight loss, weakness/fatigue, headache, sore throat, night sweats (all flu-like)
 - Dx: ELISA test used to determine presence of HIV antibody; confirmed w/ western blot test
 - Mgmt: monitor I&O; daily weights to monitor weight loss; monitor nutrition; assess skin (rashes, open areas, bruises); monitor temp; assess lungs/respiratory (diminished lung sounds); assess neuro (confusion/dementia/vision changes); encourage activity w/ rest periods; supplemental O2; skin care; analgesia
 - Meds: involves 3-4 antiretroviral meds (Enfuvirtide, Maraviroc, Zidovudine, Atazanavir, Nelfinavir, Raltegravir, Interleukin); monitor LFT's (meds cause increase); will also cause increased in cholesterol/HDL/triglycerides; doses should never be skipped b/c can cause resistance to meds
 - Pt Edu: frequent hand hygiene; avoid crowded areas and third world countries; avoid raw fruits and veggies as well as undercooked meats/eggs; no cleaning litterbox b/c increases risk of toxoplasmosis; avoid family/friends w/ colds; wash dishes in hot water or dishwasher; bathe daily w/ antimicrobial soap; frequent follow-ups to check CD4 and viral load counts; encourage coping mechanisms
 - Wasting Syndrome (complication): maintain nutrition w/ TPN; use meal supplements/snacks; decrease fat content of foods to prevent complications w/ fat intolerance; rinse mouth several times a day w/ sterile water; 6 small meals/day w/ high protein values
- **Lupus:**
 - Periods of exacerbation and remission
 - S/S: malaise; alopecia; pleuritic pain; joint pain/tenderness/swelling; fever; anemia; lymphadenopathy; pericarditis; raynaud's; erythematous "butterfly" rash over nose and cheeks (raised, dry, and scaly)
 - Dx: positive ANA titer; C3/C4 decreased
 - Labs: BUN and creatinine increased w/ kidney involvement; pancytopenia (decreased RBC, WBC, and platelets)
 - Meds: **hydroxychloroquine** (antimalarial drug); steroids; NSAIDS; methotrexate

- Pt Edu: avoid UV and prolonged sun exposure; use steroid creams for skin rash; avoid crowds/sick individuals
 - Lupus nephritis (complication): CKD can occur and results in possible kidney transplant
- **Gout:**
 - Meds: colchicine; indomethacin; prednisone; allopurinol (chronic); probenecid
- **Fibromyalgia:**
 - Chronic pain syndrome w/ certain trigger points of burning/gnawing pain
 - S/S: mild/severe fatigue; sleep issues; numbness/tingling of extremities; sensitivity to noxious smells, loud noises, and bright lights; headache; jaw pain; depression; concentration/memory difficulties; GI issues; urinary issues (frequency/dysuria/pelvic pain); visual changes
 - Meds: pregabalin (anti-convulsant); duloxetine (SNRI); amitriptyline/nortriptyline/trazadone (tricyclic antidepressants)
 - Mgmt: support groups; stress coping mechanisms; PT; sleep routine
- **Rheumatoid Arthritis:**
 - Affects joints bilaterally and symmetrically; usually several joints at a time; synovial tissue thickened and inflamed
 - Risks: females; ages 20-50 years
 - S/S: (common SATA question) **pain at rest and w/ movement; morning stiffness; joint pain; joint swelling/deformity; warmth/erythema of joints; fingers/hands/wrists/knees/feet generally affected; ulnar deviation; swan hands; boutonniere deformities; subcutaneous nodules; low-grade fever; reddened sclera/abnormal pupil shape; enlarged lymph nodes**
 - Labs: increased RF factor; increased ESR; positive CRP; positive ANA titer; increased WBC
 - Dx: arthrocentesis (increased WBC and RF present in fluid)
 - Mgmt:
 - Morning stiffness (hot shower)
 - Edema (cold therapy)
 - Encourage physical activity to maintain joint mobility
 - Space out activities w/ rest periods
 - PT/OT
 - Use assistive devices
 - Plasmapheresis
 - Meds: hydroxychloroquine, sulfasalazine, infliximab, and methotrexate (all DMARDs); prednisone
 - Sjogren's syndrome (complication): s/s= dry eyes, dry mouth, dry vagina
- **Cancer:**
 - Risks: age; Caucasian; genetics; exposure to chemicals/tobacco/alcohol; diet high in fat/red meat and low in fiber; sun/UV/radiation exposure

- Staging:
 - T= size/extent of tumor (T1, T2, T3, T4)
 - N= number of nodes involved/extent of spread (N1, N2, N3)
 - M= presence of metastasis (M0- none, M1- presence of metastasis)
- Malnutrition: Carcinoma in body increases amount of energy required for metabolic fx and can also impair body's ability to ingest, digest, and absorb nutrients; avoid early satiety by limiting liquids during meals
- Warning signs: "CAUTION" (Change in bowel/bladder habits, A sore that doesn't heal, Unusual bleeding or discharge, Thickening or lump in breast or elsewhere, Indigestion or difficulty swallowing, Obvious change in wart or mole, Nagging cough or hoarseness)
- Central catheter or implanted port used for chemo
- Mgmt: monitor temp/WBC/absolute neutrophil count (ANC); report fever > 100 degrees; ANC < 1000 requires neutropenic precautions (private room) b/c immune system is very weak; pt must remain in room unless for a procedure; visitor hand hygiene; keep dedicated equipment (BP cuff, thermometer, stethoscope) in pt's room; administer filgrastim to stimulate WBC production
- Pt Edu: take daily temp; avoid raw foods (includes pepper and paprika); avoid yard work/gardening/changing litterbox; avoid food/drink that's been sitting out over an hour; wash all dishes w/ hot water or dishwasher; wash glasses after each use; wash tooth brush in dishwasher or bleach; don't share toiletry or personal hygiene items
- N/V Mgmt: admin antiemetics before chemo and several days after each tx even when N/V seems to be under control; remove vomiting cues such as odor; admin megestrol to increase appetite; mouth care before meals; avoid drinking liquids during meals; pt should opt for food served cold and don't require cooking (cooking odors can cause nausea); high-protein, high-calorie, and nutrient dense foods; meal supplements
- Alopecia: tell pt hair loss occurs 7-10 days after tx starts and will start to return 1 month after chemo is stopped; encourage them to cut hair short and to pick out wig before tx starts; after hair loss occurs pt should protect scalp from sun and use diaper rash cream for itching
- Oral A/E: mucositis/stomatitis is common; avoid glycerin-based mouthwashes/mouth swabs; non-alcoholic anesthetic mouthwashes recommended; avoid salty/spicy/acidic foods; oral hygiene before and after meals; lubricating agents to counteract dry mouth; rinse w/ NS and room-temp tap water or salt and soda water; soft bristled toothbrush; encourage soft bland foods and supplements that are high in calories (mashed potatoes, scrambled eggs, cooked cereal, milk shakes, ice cream, frozen yogurt, bananas, breakfast mixes)

- Anemia A/E: monitor for fatigue, pallor, SOB, dizziness; schedule rest periods; admin ferrous sulfate
- Thrombocytopenia A/E: monitor for petechiae, ecchymosis, bleeding gums/nose, blood in stool/urine/vomit; avoid IV/IM injections; apply pressure for 10 min after blood draws; use electric razor and soft toothbrush; avoid blowing nose too hard; ensure dentures fit correctly; avoid NSAIDs; prevent injury when ambulating w/ close-toed shoes and remove tripping hazards
- External Radiation: skin over targeted areas marked with “tattoos”; monitor for injury to mucous membranes; gently wash over area w/ mild soap and water; dry using patting motions; don’t wash off tattoos; don’t use lotion/ointment/powders/perfumes/deodorants on area; wear soft non-constricting clothing; don’t expose area to heat source
- Meds: tamoxifen (estrogen antagonist); interleukins/interferons
- Pain Mgmt: NSAIDs, opioids, antidepressants, anticonvulsants (gabapentin, valproic acid, pregabalin, carbamazepine), steroids, muscle relaxants (baclofen), local anesthetics (lidocaine), regional nerve blocks, TENS therapy, relaxation techniques/imagery, heat/cold/pressure/massage, acupuncture, hypnosis
- Skin Cancer:
 - Sunlight is #1 cause
 - Squamous cell (epidermis): rough, scaly lesion w/ possible bleeding and crusting
 - Basal cell: small waxy nodule w/ superficial blood vessels and well-defined borders
 - Malignant Melanoma (melanocytes): irregular shape and borders w/ multiple colors; itching, cracks, ulcerations, or bleeding
 - “ABCDE” system of evaluation moles= asymmetry, borders, color, diameter, evolving
 - Tx: topical chemo w/ 5-fluorouracil cream; cryosurgery w/ liquid nitrogen; excision
- Leukemia/Lymphoma:
 - Leukemias invade and destroy bone marrow and can metastasize to liver, spleen, lymph nodes, testes, and brain; overgrowth of leukemic cells prevents growth of platelets, erythrocytes, and mature leukocytes; the lack of mature leukocytes causes immunosuppression; lack of platelets increases bleeding risk
 - Mgmt: prevent injury; monitor platelets; avoid injections and venipunctures; apply firm pressure; increase vitamin K intake
 - Bone Marrow Transplant: bone marrow destroyed using radiation or chemo and later replaced w/ healthy stem cells
- Thyroid Cancer:
 - Risks: female; diet low in iodine; radiation exposure
 - S/S: change in size/shape of thyroid; palpable nodules; hoarse voice; dysphagia
 - Mgmt: airway patency; assess swallowing

- Tx: radioactive iodine therapy; thyroidectomy
- Lung Cancer:
 - Poor prognosis b/c not diagnosed until later stage
 - Risks: smoking (including secondhand)
 - S/S: chronic cough w/ or w/o hemoptysis (rust-tinged sputum), chronic dyspnea, hoarseness
 - Mgmt: determine pack-year history (# of packs smoked per day x # of years smoked); eval use of other tobacco products such as cigars, pipes, and chewing tobacco
- Colorectal Cancer:
 - Tumor starts as polyp and is benign in early stages; if untreated the polyp will grow and the risk of malignancy increases
 - S/S: blood in stool (sometimes only sign)
 - Fecal occult blood test: recommended 1x year for pts ages 50-75
 - Colonoscopy: recommended q 10 years for pts ages 50-75
- Breast Cancer:
 - Risks: genetics, early menarche, late menopause, early/prolonged use of birth control, smoking, hormone replacement therapy, obesity
 - S/S: peau d’ orange skin changes; dimpling; firm/non-tender/non-mobile tumors; nipple discharge; nipple retraction/ulcerations
 - Meds: Leuprolide (hormone therapy); tamoxifen (estrogen receptor modulator)
 - Lumpectomy/Mastectomy (post-op): pt should wear sling when ambulating; no injections/BP/obtaining blood from affected arm and place sign above pts bed w/ these precautions; encourage early arm/hand exercises; no constrictive clothing on affected arm
- Cervical Cancer:
 - Risks: high-risk HPV (types 16 and 18); history of STD’s; sexual activity before 18 years of age; pt or male partner who had multiple sexual partners; male partner who had female partner w/ cervical cancer; African americans
 - Pap Smear: should start screening by 21 years of age or 3 years following 1st sexual intercourse
- Prostate Cancer:
 - Risks: African Americans; over 65 years old; high-fat diet
 - S/S: urinary hesitancy/weak stream/urgency/frequency/nocturia; recurrent bladder infections; urinary retention; blood in urine/semen (late); residual urine after voiding only small amount of urine
 - Dx: PSA 1st (will be > 4); digital rectal exam 2nd (will be hard w/ irregularities)
- Anesthesia/Moderate Sedation:
 - Phases of general anesthesia: induction (initiation of IV access/admin of pre-op meds/securing airway patency; maintenance (performance of surgery/airway

maintenance); emergence (surgery completed/removal of assistive airway devices)

- Meds: opioids, benzos, antiemetics, anticholinergics, sedatives, neuromuscular blocking agents
- **Malignant Hyperthermia (complication)**:
 - S/S: increased CO₂ level; decreased O₂ %; tachycardia occurs first; dysrhythmias; muscle rigidity; hypotension; tachypnea; skin mottling; cyanosis; myoglobinuria (muscle-cell protein in urine)
 - Tx: terminate surgery; IV dantrolene (muscle relaxant); admin 100% O₂; obtain ABG's; infused iced 0.9% NS; apply cooling blanket and ice to axillae/groin/neck/head and iced lavage
- Moderate sedation:
 - Pt is relaxed but can respond to verbal stimuli, retains protective reflexes (gag reflex), is easily arousable, and maintains own airway patency;
 - Before: NPO 6 hours prior; clear liquids okay up to 2 hours prior; verify signed informed consent; remove dentures in case intubation needed; continuously assess LOC/cardiac rhythm/respiratory/vitals during procedure
 - After: monitor and doc VS/LOC until pt is fully awake and all assessment criteria return to pre-sedation levels; discharge criteria= LOC same as on admission, VS stable for 30-90 min, can tolerate oral fluids, can urinate, no N/V/SOB/dizziness

- **Pre-Op Assessment:**

- Verify informed consent is signed/witnessed
- Meds for CV/pulmonary/seizures/DM/some HTN/glaucoma drops may be taken prior to procedure
- Prophylactic antibiotics given 1 hour before procedure
- Informed consent: provider must obtain consent and nurse never can obtain consent in any circumstance; nurse can clarify unclear info after HCP explanation but cannot provide any new info or additional info not provided by HCP; nurse should notify HCP if pt has more questions/doesn't appear to understand info provided and then HCP will give pt clarification; nurse must witness, confirm pt is 18 years old, mentally capable, not under influence of med that could alter decision

- **Post-Op Care:**

- Assess O₂ % continuously (> 95% or at pre-op status); assess for symmetry of breath sounds/chest movement; listen to lung sounds; admin humidified O₂; suction secretions
- Observe for internal bleeding; assess for hyper/hypovolemia; assess skin color/temp/sensation/cap refill; peripheral pulses; monitor EKG
- VS q 15 min until stable
- Observe color/odor/amount of urine (<30mL/hr is s/s of hypovolemia); admin isotonic fluids (0.9% NS, LR, D5LR)

- Criteria for PACU Discharge: stable vitals; no evidence of bleeding; return of gag/cough/swallow reflexes; minimal/absent N/V; minimal-mod wound drainage; urine output > 30mL/hr
- Thromboembolism Prevention: apply pneumatic compression stockings/antiembolism stockings; admin anticoagulants
- Incision/Drain Sites: expected findings should be pink wound edges, slight swelling under sutures, slight crusting of drainage; encourage splinting w/ position changes/coughing/deep breathing