Pass the NCLEX – Study Guide

A compilation of high-yield NCLEX topics presented in a simple and easy-to-learn manner

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- Start preparing as soon as you finish school. Starting your studying too early/while you are still in school (and studying for exams) may cause burn out and lead to a more stressful NCLEX studying experience. On the other hand, if you take off a large amount of time in between school and NCLEX studying, you'll start to forget key information you learned in nursing school that's needed for the NCLEX.
- Order your study material during the last couple of weeks of school to ensure you have all your resources ready for the upcoming weeks of studying (my favorite resources are listed below).
- Read over the National Council of State Boards of Nursing detailed test plan (there is an overview of what you'll be tested on and what percentage of the test is made up of what topics; e.g. 12% of the test will cover Safety and Infection Prevention + Control).
- Create a study schedule and stick to it – my study calendar is found on the next page.
- Learn about the various alternate format questions and tips/tricks on how to answer them (e.g. Select All That Apply [SATA], hot spot questions, fill in the blank questions, chart/audio/graphic questions, and drag-and-drop/ordered questions).
- Find a study space that works for you. Personally, I studied at a library every single day and found it to be very beneficial as I was able to focus without distractions and could also separate my study space and personal space.
- Remain positive and confident! If you find yourself over-worked, know that it's okay to take a day off for self-care… it'll benefit you in the long run.

The following are resources I personally used while studying for the NCLEX and would highly recommend:

- Test-bank: uWorld
  - This is the #1 resource I recommend
  - The layout of uWorld is essentially identical to the NCLEX
  - The test bank questions are slightly more difficult than the real NCLEX, which I believe will help prepare you best for the test. It will also have you thinking more critically!
  - You can go through the questions in a random order or system by system (which is what I chose to do) and once you're finished with the test bank, you can write a mock NCLEX with results that show you the likelihood of you passing the NCLEX
- Book: Saunders Comprehensive Review for the NCLEX-RN
  - This book includes everything you need to know for the NCLEX
  - Not necessary to read every single page, but it's a great resource to refer to when you are struggling with a particular system or concept. If I got a uWorld question wrong, not only would I read the rationale, but I would also read up on that particular information in my Saunders book

Study Material:

- Cue cards: I wrote out all my lab values on cue cards and reviewed all lab values every single day before my study session began
- Binder split into sections: writing out uWorld rationales and keeping them in a binder for you to review weekly is a great way to ensure that you don't forget what you learned the previous week(s)
- Calculator, pens, highlighter, sticky notes/tabs, and earplugs

Study Schedule

- I set aside 2 months for my NCLEX studying, however, 1.5 months would have been enough for me personally
- Monday – Saturday:
    1. Review lab value cue cards
    2. 10 uWorld questions
    3. Read rationales, write out every single rationale in binder (unless you're 100% confident in the topic)
    4. Read extra information from Saunders book and add into the binder
    5. 15 minute break
    6. Repeat steps 2-5 for a total of 30-50 questions per day
- Sunday:
    1. Read over all the rationales in my binder
    2. RELAX!
- I started off my NCLEX studying with the section I was least confident in: maternity. I had the most energy and determination at the beginning (obviously), so I knew that I could tackle and conquer my weakest section with ease. If you don't have a particular "weak section" I suggest the following schedule:

Month 1						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
ADULT HEALTH	----------	----------	----------	----------	----------	----------
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PEDIATRICS	----------	----------	----------	----------	----------	----------→

Month 2						
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
MATERNITY	----------	----------	----------	----------	----------	----------→
CRITICAL CARE	----------→	PHARMACOLOC	----------	----------	----------→	----------
MENTAL HEALTH	----------→	DELEGATION/ LEADERSHIP	----------→	REVIEW	REVIEW	BREAK
TEST DAY						

Vital Signs	
BP	120/80
HR	60-100 bpm
SPO2	95-100% or 88-92% for COPD
T	36.5-37.5 C or 96.8 F - 100.4
RR	12-20 rpm

Therapeutic Medication Levels	
Acetaminophen	10-30 mcg/mL
Carbamazepine	5-12 mcg/mL
Digoxin	0.5-2 ng/mL
Gentamicin	5-10 mcg/mL
Lithium	0.5-1.2 mEq/L
Magnesium Sulfate	4-7 mg/dL
Phenobarbital	10-30 mcg/mL
Phenytoin	10-20 mcg/mL
Salicylate	100-250 mcg/mL
Valproic acid	50-100 mcg/mL

BURNS: Rule of 9s	
Head	9%
Arms	18% (9% each)
Back	18%
Chest	18%
Legs	36% (18% each)
Genitalia	1%

Parkland Formula: used to determine amount of fluid resuscitation needed in 24hrs after a burn

- 4 mL x BSA (% of body burned) x kg
  - Give half of this in the first 8 hours
  - Remaining half is given over 16 hours

Lab Values	
K	3.5-5.0 mEq/L
Na	135-145 mEq/L
Ca	8.5-10.5 mg/L
Cl	95-105 mEq/L
Mg	1.5-2.5 mEq/L
Phos	2.5-4.5 mg/dL
RBC	4.5-5.0 million
WBC	5K-10K
Plt	200K-400K
Hgb	12-16 g (female) 14-18 g (male)
pH	7.35-7.45
CO2	35-45 mEq/L
HCO3	24-26 mEq/L
PaO2	80-100%
Glucose	70-110 mg/dL or 4-6 mmol/L
HBA1C	<7%
Specific Gravity	1.010-1.030
BUN	7-22 mg/dL
Creatinine	0.6-1.35 mg/dL
LDH	100-190 U/L
Triglycerides	40-50 mg/dL
Total chol	130-200 mg/dL
Bilirubin	<1.0 mg/dL
Protein	6.2-8.1 g/dL
Albumin	3.4-5.0 g/dL
PTT	20-36 seconds If on heparin: 1.5-2.5x normal
PT	9-11 s
INR	0.9-1.8 2-3 if on warfarin

Fluids and Electrolytes:

Intravascular: fluid inside a blood vessel

Intracellular: fluid inside a cell (most bodily fluids are inside the cells)

Extracellular: fluid outside the cells (includes interstitial fluid [fluid in between cells], blood, bone, connective tissue, water)

Isotonic	0.9% NS, D5W, Lactated Ringers	No osmotic force = cells neither swell nor shrink
Hypotonic	0.45% NS, 0.33% NS	More dilute solutions (more water than solute) = causes water to enter cells *watch for edema
Hypertonic	3% NS, 5% NS, D10W, D5W with ½ NS, D5LR	More concentrated solution (more solute than water) = water is removed from cells
Colloid	Dextran, Albumin	Fluid moves from interstitial to intravascular compartment *given in severe hypovolemia

Monitor your patients with severe diarrhea and vomiting for electrolyte imbalance*

Electrolyte	Foods that will increase the electrolyte	ECG changes	Notes
Sodium	bacon, butter, canned food, cheese, milk, condiments, salt, bread		Low Na = Low H20 (dry mucous membranes High Na = High H20
Potassium	avocado, banana, carrots, fish, oranges, potatoes, pork/beef, spinach, tomato	Low: ST dep., shallow/flat/ inverted T wave, U wave High: tall peaked T wave, flat P wave, wide QRS	Potassium is never given by IV push (IVP)!! It is always diluted in a minibag!! *never given greater than 10meq/hr
Calcium	cheese, milk, spinach, yogurt, tofu, sardines, greens	Low: prolonged ST + QT High: shortened ST, wide T wave	Low calcium = Positive Trousseau's and Chvostek's
Magnesium	avocado, leafy greens, milk, wheat, peanut butter, pork/beef/chicken, potatoes, yogurt	Low: tall T wave, depressed ST High: prolonged ST, wide QRS	Antidote for magnesium toxicity = calcium gluconate
Phosphorus	fish, pumpkin, nuts, pork/beef/chicken, whole grain, dairy		Decrease in phosphorus levels results in increase in calcium lvls

Sodium/Potassium – inverse relationship; high Na = low K
Calcium/Phosphorus – inverse relationship; high Ca = low Phos
Calcium/Vit D – similar relationship; high Ca = high Vit D
Magnesium/Calcium – similar relationship; low Mg = low Ca
Magnesium/Potassium – similar relationship; low Mg = low K
Magnesium/Phosphorus – inverse relationship; low Mg = high Phos

Acid and Base Balance:

1. Look at pH – is it too low or too high?
   - Too low = acidosis
   - Too high = alkalosis
2. Look at CO2 and see if it's an opposite relationship from the pH (e.g. if pH was low and CO2 was high, or if pH was high and CO2 was low)
   - If YES, you have a respiratory imbalance
   - If NO (pH and CO2 have same relationship – either both are high or both are low) move to #3
3. Look at HCO3 and see if it has the same relationship as pH (both pH + bicarb are high both pH + bicarb are low)
   - If YES, you have a metabolic imbalance
4. COMPENSATED: pH will be within the normal range (body has corrected the problem)
5. PARTIALLY COMPENSATED: pH is not normal. Look at the system that is supposed to fix the problem (if you have a respiratory problem, the metabolic system will try to compensate and vice versa) and see if it is abnormal, which means it is trying to compensate
   - If YES, then you have PARTIAL compensation
   - If NO, then you have UNCOMPENSATION

Low pH + high CO2 = respiratory acidosis
- Any condition causing airway obstruction or depression

Low pH + low HCO3 = metabolic acidosis
- Insufficient insulin in pt w DM = DKA
- Severe diarrhea can cause metabolic acidosis

High pH + low CO2 = respiratory alkalosis
- Any condition causing overstimulation of the respiratory system (e.g. hyperventilation, hysteria, overventilation, etc.)

Acidosis: RR increases to try and exhale acids
Alkalosis: RR decreases to try and retain CO2 in order to neutralize + decrease the strength of excess bicarb

High pH + high HCO3 = metabolic alkalosis
- GI suctioning or severe vomiting can cause metabolic alkalosis

Lungs control carbonic acid lvls (CO2 will either be retained or blown off)
Kidneys control bicarb concentration (will retain or excrete bicarb) - Correcting acid/base balance by the kidneys takes hours to days

Conversions		
1 teaspoon (t) = 5 ml	1 oz = 30 ml	1 quart = 2 pints
1 tablespoon (T) = 3 t = 15 ml	1 cup = 8oz	1 pint = 2cups
1 gram (g) = 1,000 mg	1 kilogram (kg) = 2.2 lbs	1 lb = 16oz
1 mcg = 0.000001 g	1 mg = 1000 mcg or 0.001 g	

Medication Calculations:
* Remember to convert your units first*
Standard formula for medication dosage: Desired (dose prescribed) Available (dose available) x Quantity

E.g. There is an order for 18,000,000 mcg of Ampicillin. Ampicillin is available as 0.012 kg tablets. What should the nurse administer?
1. 0.012 kg = 12,000,000 mcg
2. 18,000,000 mcg 12,000,000 mcg x 1 tablet
3. 1.5 tablets

Flow rate: [total volume x drop factor] time in minutes = drops per minute

E.g. Calculate the IV flow rate for 0.61 L of 0.9% NaCl IV over 21.5 hr. Infusion set has drop factor of 62 gtts/mL. What is the IV flow rate in gtts/min?
1. Convert 0.61L to 610 mL and 21.5 hrs = 1290 minutes
2. 610 mL x 62 = 37,820 gtts
3. 37,820 gtts 1290 minutes = 29 gtts/minute

mL per hour: total V in mL number of hours = mL per hour

E.g. Ordered 49 mL NS IV to infuse in 12.5 hr by infusion pump. What is the IV flow rate in mL/hr?
1. 49 mL 12.5 hrs = 3.92 mL/hr

Infusion time: total volume to infuse mL per hour being infused = infusion time

ABC's:
ABC's are ALWAYS the priority
Airway – Is it clear?
Breathing – If this isn't possible, O2 won't reach the lungs and be circulated around the body
Circulation – Without circulation = hypoxia and cardiac arrest will ensue

Nursing Process:
1. Assessing – Collecting data.
2. Diagnosing – Figuring out what is the problem.
3. Planning – How to best manage the problem.
4. Implementing – Putting the plan into action.
5. Evaluating – Did the plan work?

Blood Transfusions:
Universal donor = O neg Universal recipient = AB pos *Rh neg pt should not receive Rh pos blood
Transfusion Reactions: 1. Hemolytic 2. Allergic 3. Febrile
S/S: SOB, chest pain/tightness, fever, back pain, anxiety, tachycardia, hypotension

IF REACTION OCCURS = Stop transfusion, change IV tubing down to IV site and keep IV open with NS, notify MD + blood bank, stay with pt to monitor S/S, return blood bag/tubing/labels to blood bank, document
*First 15 minutes of transfusion = stay with pt

Adventitious Lung Sounds		
Crackles	Fine crackles - High pitched crackling/popping noise heard @ end of inspiration Coarse crackles (worse than fine crackles) – low pitched gurgling sound during inspiration and expiration	Pneumonia, heart failure, pulmonary edema
Wheeze	High pitched musical sound similar to a squeak Priority: 1. Relieve bronchoconstriction (give short acting bronchodilator – Albuterol)	Asthma
Ronchi	Low pitched, coarse, loud, snoring tone during expiration	Chronic bronchitis
Pleural friction rub	Low pitched coarse grating sound during inspiration and expiration	
Stridor	Harsh high pitched breathing due to obstruction in upper airway *Life threatening	Aspiration of foreign object, anaphylaxis, epiglottitis

Positioning	
NGT placement High Fowlers	Shortness of Breath High Fowlers
Hypotension Trendelenburg	Myocardial Infarction Semi-Fowlers
Air/Pulmonary Embolism Left lateral + lower the head of bed (Trendelenburg)	Head Injury elevate HOB 30 degrees to decrease intracranial pressure
Woman in Labor w/ Un-reassuring FHR Left lateral	After Total Hip Replacement don't sleep on operated side, don't flex hip more than 45- 60 degrees, don't elevate HOB more than 45 degrees. Maintain hip abduction by separating thighs with pillows
Tube Feeding w/ Decreased LOC Right lateral + elevated HOB	Infant w/ Spina Bifida Prone (to avoid sac rupture)
During Epidural Puncture Lateral	Prolapsed Cord Trendelenburg or knee-chest position
During Lumbar Puncture aide lying with head, back, and knees flexed	After Lumbar Puncture Supine (prevents CSF leakage)
After Myringotomy Position on side of affected ear after surgery (allows drainage of secretions)	Infant w/ Cleft Lip Supine to prevent trauma to suture line
After Cataract Surgery Pt will sleep on unaffected side with a night shield for 1-4 weeks	To Prevent Dumping Syndrome Eat in low Fowlers position, lie supine after meals for 20-30 minutes
After Thyroidectomy Low or semi-Fowler's	Above Knee Amputation elevate amputation for first 24 hours on pillow, position prone daily for hip extension
Detached Retina area of detachment should be in the dependent (lower) position	Below Knee Amputation foot of bed elevated for first 24 hours, position prone daily to provide for hip extension
Administration of Enema Sim's	After Supratentorial Surgery (incision behind hairline) semi Fowlers
Autonomic Dysreflexia/Hyperreflexia High Fowlers	After Infratentorial Surgery (incision at nape of neck) Lateral
Paracentesis high Fowlers + empty bladder	Chest tube insertion arm raised above head
After liver biopsy lie on R side for 2 hrs and then supine	

Neutropenic Precautions:
Used for immunocompromised pts
Hand hygiene, visitors should be free of illness, private room if possible, avoid sources of potential infection (crowds, raw fruit/vegetables, flowers/plants)

Infection Control		
Contact	Droplet	Airborne
Gloves, gown, *water + soap for c.diff	Gloves, gown, face mask + eye shield	Gloves, N95 mask
Mrs. WEE 1. M - multidrug resistant organism 2. R - respiratory infection 3. S - skin infections (varicella zoster, cutaneous diphtheria, herpes simplex, impetigo, pediculosis, scabies) 4. W - wound infection 5. E - enteric infection - clostridium difficile 6. E - eye infection - conjunctivitis	SPIDERMAN 1. Sepsis 2. Scarlet fever 3. Streptococcal pharyngitis 4. P - parvovirus B19 5. P – pneumonia 6. P – pertussis 7. I – influenza 8. D - diphtheria (pharyngeal) 9. E – epiglottitis 10. R – rubella 11. M – mumps 12. M – meningitis 13. M - mycoplasma or meningeal pneumonia 14. An - Adenovirus	MTV 1. Measles 2. Tuberculosis 3. Varicella Zoster

*Pts with suspected infections (increased secretions/excretions) should NOT be in the same room as pts with fresh wounds or immunocompromised pts

Fall Prevention:
Orient to room, teach how to use call bell and when to use call bell, keep bed in lowest position, raise 3 of 4 side rails, lock wheels on all equipment, keep floor dry and free of cords, wear slip resistant footwear, stay with pt during shower

Fire Safety:
RACE – rescue pts in danger, activate alarm, contain fire (close windows/doors), extinguish fire if small

Pulse Grades:
1+ weak & barely palpable, 2+ normal & easily palpable, 3+ full pulse & increased, 4+ strong & bounding

Glasgow Coma Scale		
Eye Opening Response	Verbal Response	Motor Response
4 = Spontaneous 3 = To verbal stimuli 2 = To pain 1 = None	5 = Oriented 4 = Confused 3 = Inappropriate words 2 = Incoherent 1 = None	6 = Obeys commands 5 = Localizes to pain 4 = Withdraws from pain 3 = Flexion to pain (decorticate) 2 = Extension to pain (decerebrate) 1 = None

Deep Tendon Reflexes:
0 = no response, 1+ = diminished, 2+ = active/expected response, 3+ = slightly hyperactive, 4+ = brisk/hyperactive with intermittent clonus

Ambulating with cane:
Going up stairs: 1. Strong leg 2. Cane 3. Weak leg
Going down stairs: 1. Cane 2. Weak leg 3. Strong leg
*Cane always moves before the weak leg

Peripherally Inserted Central Catheter:
Usage: long term IV ABX, chemotherapy treatment, nutritional support/TPN
Priority: 1. Monitor for infection, embolism, and occlusion 2. Sterile dressing changes 3. Have pt hold breath during tube change 4. Have pt turn head away from PICC during PICC line use 5. If air embolism suspected = Trendelenburg + L side lying

Visually Impaired Patient:
Knock on door, introduce self, use clear and simple sentences, stay within pt's field of vision, orient pt to room + call bell, explain unusual noises, inform of location of food on meal tray using numbers on a clock, when ambulating the pt walk slightly in front of pt while pt holds your arm

Injections		
Intradermal	Subcutaneous	Intramuscular
Inner forearm, chest, and back	Outer upper arm, anterior thigh, and abdomen	Gluteus, thigh, and deltoid
27-30 G	25-28 G	23 G
10-15 degree angle	90 degree angle	90 degree angle
0.1-0.2 mL injected	0.5-1 mL injected	Up to 3 mL (in deltoid, no more than 1 mL)

5 P's of fractures: pain, pallor, pulselessness, paresthesia, polar (cold)

Antidotes:
Warfarin → Vitamin K
Heparin → Protamine sulfate
Opioid overdose → Naloxone
Digoxin → Digibind
Magnesium → calcium gluconate
Tylenol → N-acetylcysteine
Benzodiazepine → Flumazenil
Insulin → Glucose
Cholinergic crisis → Atropine sulfate

Nutrition	
Carbohydrates	Milk, grains, fruits, veggies
Fats	Beef, pork, lamb, dark chicken, diary, lard
Protein	Lean meat, seafood, bean, soy, eggs, nuts, seeds
Clear liquid	Water, bouillon, clear broth, carbonated beverage, gelatin, hard candy, lemonade, ice pop
Full fluid	Plain ice cream, sherbet, milk, pudding/custard, fruit juice
Mechanical soft	Pureed, mashed, ground, chopped. Avoid nuts, fruit + veg, and tough meat

Pressure Ulcer Staging	
1	Skin intact, non-blanchable with local redness
2	Open, shallow, red/pink colour, no slough, intact or open blister
3	Full thickness skin loss, possible visible fat, NO bone/muscle showing
4	Full thickness skin loss with bone, tendon, or muscle showing
Unstageable	Full thickness with slough (scabbing) or eschar (necrotic tissue)

Wound Exudate:
Serous – clear/straw; part of normal healing process
Serosanguineous – pink (mix of blood and serous drainage); part of normal healing process
Sanguineous – red (blood vessel trauma); uncommon in wounds
Hemorrhage – frank blood from leaking blood vessel; uncommon
Purulent – yellow, gray, or green; due to infection

Shingles:
Also known as Herpes Zoster. Due to reactivation of varicella-zoster in a pt with a history of chicken pox.
Eruption occurs in a unilateral segmental distribution on the skin along the infected nerve
Shingles is contagious to people who have never had chickenpox and to those who haven't been vaccinated against the disease
S/S: unilateral clustered skin vesicles, fever, burning/pain, pruritis
Priority: 1. Pt should be on contact precautions 2. Pt should avoid scratching the area

MRSA:
Can appear as folliculitis or furuncles (C+S of skin will confirm presence of MRSA)
Priority: 1. Contact precautions 2. Monitor pt for S/S of injection

Burns:
Superficial-thickness burn – damage to epidermis; pink/red with no blisters; heals in 3-6 days
Superficial partial-thickness burn – damage into the dermis; pink/red with blisters and edema; heals in 10-21 days
Deep partial-thickness burn – deeper into the dermis, red skin with white dry areas + no blisters due to dead tissue; heals in 3-6 wks
Full-thickness burn – destruction of epidermis + dermis; waxy white, deep red, brown or black dry + hard skin; healing takes weeks-months (involves skin grafting)
Deep full-thickness burn – injury extends to muscle/bone/tendons; skin is black and hard; healing takes months (involves skin grafting)
Priority: 1. Airway patency (suction, ET tube, mechanical ventilation) 2. O2 3. VS 4. IV fluid replacement (prevents shock) 5. Keep pt warm 6. NPO 7. Assess for S/S of infx (fever, high WBC, purulent drainage, redness)

Carbon Monoxide Poisoning	
Blood Level	S/S
1-10%	Normal level
11-20%	Headache, flushing, decreased vision, decreased cerebral function, slight breathlessness
21-40%	Headache, nausea/vomiting, drowsy, vertigo, confusion, pale skin, hypotension, tachycardia
41-60%	Coma, seizures
61-80%	Death

TED Stockings:
Graduated compression that promotes venous return and decreases risk of VTE
Priority: 1. Proper size 2. No folds/wrinkles 3. Wounds are covered with dressings

Psoriasis:
Autoimmune disease, causing rapid turnover of cells; no cure
S/S: silver plaques on reddened skin
Priority: 1. Avoid triggers (stress, trauma, infection) 2. Topical corticosteroids 3. Phototherapy 4. Medication (methotrexate) 5. Avoid alcohol

Endocrine System

Hypoglycemia	Hyperglycemia
Cold, clammy, irritable, pale, weak, diaphoretic	Polyphagia, polyuria, polydipsia, blurred vision, fruity breath, hot + dry

Insulin			
Type	Onset	Peak	Duration
Rapid acting (Lispro, Aspart, Glulisine)	<15 minutes	1-2 hrs	3-6 hrs
Short acting (Regular)	30-60 minutes	2-4 hrs	6-10 hrs
Intermediate acting (NPH)	2-4 hrs	4-8 hrs	10-18 hrs
Long acting (Glargine, Detemir)	1-2 hrs	NO PEAK	Up to 24 hrs

Hormone Imbalance		
Hormone	Hypo-	Hyper-
Cortisol – adrenal gland	Addison's Lethargy, fatigue, muscle weakness, weight loss, impotence, hypoglycemia, hypotension, hyperpigmentation of skin Addisonian Crisis Caused by stress, infection, trauma, surgery. Can lead to hyponatremia, hyperkalemia, hypoglycemia, and shock *Lifelong glucocorticoid therapy Priority: Follow 5 S's (salt replacement, sugar/ dextrose replacement, steroid replacement, support physiologic function, search for + treat cause)	Cushing's Muscle weakness + wasting, moon face, truncal obesity, hirsutism (masculine features in F), hyperglycemia, HTN, fragile skin bruises easily, striae on abdomen Priority: 1. Strict intake + output monitoring 2. Daily weights
Thyroid	T4 is low, TSH is high Lethargy, fatigue, weakness, cold intolerance, weight gain, dry skin, bradycardia, constipation, edema (myxedema), cardiac enlargement, goiter Myxedema Coma Due to persistently low thyroid production	T3 + T4 are high, TSH is low Irritability, fine tremors, heat intolerance, weight loss, smooth skin, palpitations + cardiac dysrhythmias, diarrhea, exophthalmos, HTN, goiter Thyroid Storm Due to uncontrollable hyperthyroidism

	S/S: hypotension, bradycardia, hypothermia, hyponatremia, hypoglycemia, edema, resp failure, coma *Levothyroxine is most commonly prescribed	S/S: fever, tachycardia, HTN, agitation + tremors, confusion, seizures, delirium, coma
Parathyroid	Hypocalcemia, hyperphosphatemia, tingling, muscle cramps, positive Trousseau's + Chvostek's sign, tetany, hypotension *Calcium gluconate IV, Vit D for enhancing absorption of Ca	Hypercalcemia, hypophosphatemia, fatigue, muscle weakness, bone deformities, anorexia, nausea/vomiting, weight loss, constipation, HTN *Calcitonin will decrease Ca release and increase Ca excretion
ADH – posterior pituitary	Diabetes Insipidus Large amount of urine excretion, polydipsia, dehydration, low urine specific gravity, fatigue, postural hypotension Priority: 1. Monitor electrolytes 2. Maintain fluid intake 3. Monitor intake + output, weight, serum osmolality, and urine specific gravity	Syndrome of inappropriate antidiuretic hormone secretion (SIADH) Leads to water intoxication and hyponatremia Fluid overload, change in LOC, weight gain, HTN, tachycardia Priority: 1. Monitor neuro status 2. Monitor intake + output, weight, serum osmolality, and urine specific gravity 3. Restrict fluid intake 4. Administer diuretics 5. Seizure precautions
Insulin - Pancreas	Type 1 DM -Insulin deficiency (beta cells are destroyed). If insulin is not given, fats are metabolized for energy (which results in ketone production → acidosis) Type 2 DM -Lack or resistance to insulin Diabetic Ketoacidosis (DKA) -CBG 14-28 -Sudden onset, due to inadequate insulin dose -Hyperglycemia, high ketones in urine, confusion, fruity breath, ++ thirst, urination, Kussmaul's respiration Hyperglycemic Hyperosmolar Nonketotic Syndrome (HHNS) -CBG >33 -Gradual onset, due to poor fluid intake. -Altered CNS function, ++ thirst, urination, lethargy, coma, no ketones in urine *For DKA + HHNS – give IV NS first, then when CBG is 250-300 mg/dL dextrose is added to IV fluids. K+ levels may be elevated due to acidosis and dehydration Dawn Phenomenon -Reduced tissue sensitivity to insulin (between 5-8am) causing pre-breakfast hyperglycemia Somogyi Phenomenon -Normal or elevated glucose level @ hs, hypoglycemia @ 2-3am causing increase in counterregulatory hormone, and by 7 am glucose levels are increased	

Metabolic Syndrome:
3 or more of the following factors are present, which increase pt's risk for stroke, diabetes, and cardiovascular disease → abdomen obesity (male > 40 inches, female > 35 inches), high triglyceride level (> 150 mg/dL) , low HDL (male <40, female <50), HTN, or fasting blood sugar > 5.6

Cancer – uncontrolled cell growth leading to potentially serious health problems

Cancer Grading + Staging		
	Grade	Stage
1	Cells differ slightly from normal cells + are well differentiated	Carcinoma in situ
2	Cells more abnormal and moderately differentiated	Tumor limited to tissue of origin
3	Cells very abnormal and poorly differentiated	Limited local spread
4	Cells are immature, undifferentiated, and cell of origin is difficult to determine	Local and regional spread
5		Distant metastasis

Warning signs of ca: sore that doesn't heal, indigestion, hoarseness, obvious change in wart/mole (ABCD), lump in breast, unusual bleeding
Tests: Mammogram, Pap smear, rectal exam, colonoscopy, BSE, TSE, skin inspection
Biopsy: definitive means of diagnosing cancer (surgical incision is made in the tissue which is then examined under a microscope)
Chemotherapy: kills or inhibits reproduction of neoplastic cells and also kills normal cells (skin, hair, GI lining most affected)
Radiation: destroys cancer cells with minimal exposure to normal cells. Effective only for tissues in direct path of radiation beam

- Wash irradiated area with water + soap daily, do not remove the markings for the radiation beam, do not use powders/lotions/creams on skin @ radiation site, avoid any clothing or binding that will rub the skin too much @ the radiation site, avoid exposure to sun

*Infection is a major cause of death in an immunosuppressed pt

Sickle Cell Crisis:
Sickled blood cell shape = RBC cannot carry oxygen
Inadequate O2 or hydration worsens the sickling by making the RBCs clump together → vaso-occlusion
Priority: 1. IV fluids (decreased blood viscosity) 2. Supplemental O2

Breast cancer:
Non-modifiable risk factors: female > 50 yrs, 1st degree relative of person with breast ca, BRCA1 + BRCA2 mutations, hx of endometrial or ovarian ca, menarche before 12 yrs or menopause after 55 yrs
Modifiable risk factors: smoker, alcohol consumption, high fat intake, sedentary life, hormone therapy post-menopause

Breast Self Exam:
Perform in shower when skin is slippery, use R hand to examine L breast (and vice versa), use small circular motions in a spiral motion to examine entire breast, check for lumps/hard knots/thickening of tissue
In the mirror with hands at side: raise arms overhead and assess for any changes in shape of breasts/dimpling/change in nipple. Next, place hands on hip + press firmly (tightens pectoral muscles) and observe for changes in symmetry. When lying down, feel breasts in spiral motion

Testicular Self Exam:
Best to assess right after a shower (scrotal skin is relaxed/moist). Gently lift each testicle (should feel like an egg with no lumps), roll each testicle between thumb and middle finger to feel for lumps/swelling/mass. Notify physician if any changes are noted from one month to the next

Post-Mastectomy:

Avoid overusing the affected arm during the first few months, keep affected arm elevated to avoid lymphedema, avoid strong sunlight on affected arm, do not let affected arm hang dependently, avoid constricting clothing + blood work + blood pressure assessment on affected arm

Immune System

HIV:
Standard precautions are used; HIV is spread only when nonintact skin is in contact with pts blood, breast milk, semen, vaginal secretions
Priority: 1. Protect pt from infection 2. Aseptic technique for all procedures

AIDS:
Viral disease due to HIV (T cells are destroyed → pt is at high risk for infection and malignancy)
Incubation period can be up to 10 yrs
S/S: low WBC, low plt, low CD4, high CD8, high IgG + IgA, weakness, fever, weight loss, leukopenia, night sweats, infections, neoplasms (Kaposi's sarcoma), fungal infections, vital infections, bacterial infections
High risk: hetero or homosexuals involved with high risk person, IV drug user, pt receiving blood products, healthcare workers, babies born to infected mom
Priority: 1. O2 as needed 2. Monitor for infx 3. Standard precautions 4. Meticulous skin care

Anaphylaxis:
Immediate hypersensitivity reaction with release of histamine
S/S: dizzy, paresthesia, pruritis, angioedema, urticaria, narrowing airway, wheezing, stridor, SOB, respiratory arrest, hypotension, tachycardia, cardiac arrest, abdo pain, nausea + vomiting
Priority: 1. Patent airway 2. O2 administration 3. IV normal saline infusion 4. Prepare diphenhydramine and epinephrine

SLE:
S/S: butterfly rash, dry rash on upper body, fever, weakness, weight loss, photosensitivity, joint pain, red palms, anemia
Priority: 1. Mild soap on skin 2. Frequent oral care 3. High vitamin and iron diet 4. Conserve energy and avoid direct sunlight exposure 5. Topical corticosteroids

Scleroderma:
Inflammation, fibrosis, and sclerosis of connective tissue; no cure
S/S: pain, stiff muscles, pitting edema, tight, shiny, thick, and hard skin, dysphagia, contractures
Renal crisis is a life-threatening complication → causes HTN due to narrowing of blood vessels going to kidney

Lyme Disease:
Due to Borrelia burgdorferi from tick bites
S/S: ring shaped rash (can occur anywhere on body, not only @ site of bite)
Priority: 1. Remove tick 2. ABX administration 3. Have pt avoid woody areas 4. Have pt wear long sleeved tops and long pants when outside 5. Use tick repellent

Immunoglobulins
IgA – viral protection IgD – unknown function IgE – allergy + parasitic infestation
IgG – secondary antibody protection IgM – primary antibody protection

Neuro Exam:
GCS, PERRLA, CSMT (colour, sensory, motor, temperature), VS

Cerebellum:
2 major functions: voluntary movement (test: finger tapping, finger to nose, heel to shin) + balance/posture (test: gait, heal to toe)

Basilar Skull #:
S/S: battle sign (bruise behind ear), periorbital hematoma (racoon eyes), CSF leakage from nose/ear
Priority: 1. Support ABC 2. C-spine immobilization 3. Neuro monitoring

Posture:
Decorticate indicates non-functioning cortex
Decerebrate indicates brainstem lesion

LOC:
*Most sensitive indicator of neuro status

Pupils:
Normal size: 3-5 mm

Seizures	
Tonic Clonic	Tonic: Stiffening of muscles followed by loss of consciousness Clonic: hyperventilation + jerking of extremities
Absence	Brief, no loss or change in muscle tone Appears as though pt is daydreaming More common in children
Myoclonic	Generalized jerking
Atonic	Sudden loss of muscle tone; pt may fall to floor as a result
Status Epilepticus	Succession of seizures without intervals of consciousness (can result in brain damage)
Chronic seizures = epilepsy	
Priority: 1. Assist pt to lie down 2. Position on side (maintains patent airway, allows for drainage of secretions, and prevents tongue from occluding airway) 3. Loosen restrictive clothing 4. O2 as needed 5. Record time + duration of seizure 6. Never abruptly stop antiseizure meds 7. Good oral care to prevent gingival hyperplasia (from Phenytoin) 8. Use suction after seizure	

Increased ICP:
Impedes on circulation to brain + functioning of nerve cells (→ can lead to brainstem compression + death)
Cushing's Triad (sign of increased ICP) = HTN, bradycardia, wide pulse pressure
S/S: change in LOC*, headache, increased BP with widening pulse pressure, bradycardia, fever, pupil changes
Priority: 1. Keep HOB @ 30 degrees (promotes venous drainage) but not more than 30 degrees (causes decreased cerebral perfusion) 2. Keep body midline/straight (flexion decreases drainage) 3. Stool softeners (prevents straining) 4. Calm environment (dim lights, low noise, etc. to prevent stress on body) 5. Suction if needed 6. Treat fever and body temp (shivering can increase ICP) 7. Teach pt about avoiding Valsalva maneuver

CSF Assessment:
Colour: normal – clear + colourless
Content: normal – little protein + glucose, no WBC, no RBC, no microorganism
Pressure: normal – 60-150 mmH2O

Volume: normal – 125-150 mL
CSF appears as concentric rings (bloody fluid surrounded by yellow stain – Halo sign) when placed on a white background. It will test positive for glucose if a strip test is done

Ischemic Stroke	Hemorrhagic
Due to blockage of blood flow → causes issue with brain tissue perfusion	Due to bleed in brain (blood vessel ruptures)
HTN is common (in order to maintain brain perfusion distal to the area of blockage) Avoid suctioning for > 10s to avoid increased ICP	Seizure can occur due to high ICP, dysphagia
Priority: TPA to be given 3-4 hours from onset of S/S (contraindicated in thrombocytopenia, uncontrolled HTN, head trauma within past 3 months, major surgery within past 14 days)	Priority: 1. NPO 2. Neuro assessment 3. Prevent activities that increase ICP or BP 4. Stool softeners 5. Bed rest with body midline *Anticoagulants are contraindicated

Cranial Nerve Assessments/Tests	
1 Olfactory	Smell test
2 Optic	Inspect pupils, visual acuity (Snellen chart) + visual fields
3 Oculomotor	Pupil constriction + extraocular movement
4 Trochlear	Extraocular movement (inferior adduction)
5 Trigeminal	Clench teeth + light touch
6 Abducens	Extraocular movement (lateral abduction)
7 Facial	Facial movement (close eyes, smile, etc.)
8 Acoustic	Hearing + Romberg test
9 Glossopharyngeal	Gag reflex
10 Vagus	Say "ahhh"
11 Spinal accessory	Turn head + lift shoulders
12 Hypoglossal	Stick out tongue

Autonomic Dysreflexia/Hyperreflexia:
Due to SNS stimulation after injury @ T6 or higher. Most commonly caused by a noxious stimulus (usually distended bladder or constipation)
It is a neurological emergency (can lead to hypertensive stroke)
S/S: severe HTN, headache, diaphoresis above level of injury, bradycardia, piloerection, flushing, nausea
Priority: 1. Monitor BP and provide antihypertensives if needed 2. Monitor bladder distention 3. Assess for bowel impaction 4. Remove restrictive clothing 5. HOB @ 45 degrees

Cerebral Cortex	
Frontal	Broca's area for speech Emotions, reasoning + judgment, concentration
Parietal	Interpreting senses (taste, pain, touch, temp, pressure) Spatial perception
Temporal	Auditory Wernicke's area for sensory + speech
Occipital	Visual

Unconscious pt:
S/S: unarousable, no response to pain, altered respirations, decreased response to cranial nerve test and reflex tests
Priority: 1. Emergency airway equipment @ bedside 2. Assess circulation 3. Suction as needed 4. Semi Fowlers and avoid Trendelenburg 5. Reposition q2h 6. Keep NPO and assess for gag reflex before resuming diet

Wernicke's encephalopathy:
Can be due to low thiamine intake (Vit B1). Severe alcoholism can cause low absorption of B1
S/S: altered mental status, oculomotor dysfunction, ataxia

Meningitis:
Inflammation of arachnoid + pia mater of brain + spinal cord; bacterial or viral cause
S/S: irritability, nuchal rigidity, headache, muscle pain, fever, tachycardia, photophobia, abnormal pupil assessment, Brudzinski's (involuntary flexion of hip + knee when neck is flexed), Kernig's (pt unable to straighten leg when it is flexed at the knee + hip), decreased muscle tone, CSF is cloudy with high protein + high WBC + low glucose
Priority: 1. Droplet/contact precautions 2. Assess for signs of increased ICP 3. Keep HOB @ 30 degrees and avoid flexion of body 4. Seizure precautions 5. Prepare for lumbar puncture
*Droplet precautions are not needed for viral meningitis (only for bacterial and meningococcal)

Head Injuries	
Concussion	Jarring of brain, no loss of consciousness Retrograde amnesia can occur (amnesia regarding the event) Rest + light diet are encouraged
Contusion	Bruising to brain, can occur with subdural or extradural blood collection
Skull Fractures	(e.g. linear, depressed, compound, comminuted)
Epidural Hematoma	*Most serious hematoma; hematoma forms quickly Due to arterial bleed (middle meningeal artery) Forms between skull and dura mater Loss of consciousness and then pt feels better quickly "lucid interval" followed by quick decline in mental function
Subdural Hematoma	Slow bleed from venous injury
Intracerebral hemorrhage	Blood vessel in brain ruptures, causing blood to leak inside brain

Spinal Cord Injury:
Total transection of cord = total loss of sensation, movement, and reflex below the level of injury (If injury is between C1-C8; quadriplegia. If injury is between T1-L4; paraplegia)
C2-C3 injury is usually fatal
Any injury @ C4 or above = respiratory difficulty
Priority: 1. Always assume spinal cord injury with traumas until it's ruled out 2. Immobilize pt on backboard 3. Body midline with head in neutral position 4. Maintain patent airway 5. Logroll pt if needed 6. Monitor ABGs to assess respiratory status

Spinal Immobilization:
C spine is needed if: concerning neuro exam, significant trauma, decreased LOC, intoxication, pt has another injury along with spinal injury, concerning spinal exam

Cerebral Aneurysm:
Can lead to rupture*
S/S: headache, irritable, vision changes, tinnitus, nuchal rigidity, seizures
Priority: 1. Bed rest 2. Calm + dark environment 3. Avoid any straining activities 4. Prevent HTN and pain

Multiple Sclerosis:
Demyelination of neurons which causes CNS degeneration
S/S: weakness, ataxia, tremors/spasms, paresthesia, vision changes, dysphasia, bladder/bowel disturbances, hyperreflexia + positive Babinski, confusion, decreased perception to pain/touch/temperature

Priority: 1. Protect from injury 2. Assist with frequent bladder/bowel elimination 3. Regular exercise and rest 4. PT and SLP involvement 5. Fluid intake + low fat high fiber diet

Myasthenia Gravis:
Weakness + fatigue of voluntary muscles due to defective nerve impulses (due to insufficient ACh, increased cholinesterase [breaks down ACh], or muscles don't respond to ACh)
S/S: weakness, dysphagia, vision changes, difficulty breathing, potential respiratory paralysis/failure
Priority: 1. Deep breathing + coughing 2. Suction + emergency equipment @ bedside 3. Prevent aspiration (high fowlers when eating) 4. Time exercise/activities for when pt has maximal muscle strength (muscles are stronger in the am and weaker in the pm) 5. Administer anticholinesterase 6. Avoid stress

Myasthenia crisis	Cholinergic crisis
Acute exacerbation of MG	Too much Ach due to overmedication with anticholinesterase
S/S: tachycardia, increased RR, HTN, SOB, cyanosis, bowel/bladder incontinence, decreased urine output, no cough/swallow reflex	S/S: cramps, nausea/vomiting, vision changes, pallor, muscle twitching, hypotension
Priority: 1. Increase anticholinesterase meds	Priority: 1. Hold anticholinesterase meds 2. Provide antidote = atropine sulfate
Edrophonium test: used to diagnose MG + differentiate between myasthenia crisis and cholinergic crisis To diagnose MG: edrophonium will cause muscle strength improvement. Negative for MG = no improvement in muscle strength/deterioration in muscle strength To differentiate between MC and CC: If after edrophonium, muscle strength improves = MC; pt will need more medication. If after administration, weakness worsens = CC; pt is overmedicated with anticholinesterase and needs atropine sulfate given *Pt is at risk for Vfib/cardiac arrest during this test	

Parkinson's Disease:
Dysfunction of extrapyramidal system due to low dopamine levels
S/S: bradykinesia (slow movement), monotone speech, tremors + pill rolling, jerky movements, restlessness, blank facial expression, drooling, difficulty swallowing/speaking, lack of balance + shuffling gait
Priority: 1. Soft diet high in calories, protein, and fiber 2. Increase fluid intake 3. Safety measures 4. PT and rehab 5. Avoid food high in B6 (blocks effect of antiparkinsonian meds) 6. Avoid MAOIs (can cause hypertensive crisis)

Bell's Palsy (Facial Paralysis):
Lower motor neuron lesion of CN 7 resulting in paralysis of one side of face; recovery usually in a couple weeks. Does not affect vision, balance, or extremity motor function
S/S: flaccid facial muscles
Priority: 1. Facial muscle exercises 2. Protect eyes from becoming dry (artificial tears, wear patch @ night) 3. Provide oral care 4. Have pt chew on unaffected side

Guillain Barré:
Acute infection (respiratory infx, gastroenteritis) causing neuronitis of cranial and peripheral nerves (leads to myelin sheath destruction)
S/S: potential respiratory failure, pain/hypersensitivity, weakness of lower extremities, progressive weakness of upper extremities, high protein in CSF
Priority: 1. Monitor respiratory status (prepare for resp support)

Amyotrophic Lateral Sclerosis:
Degeneration of motor system (no changes in sensory, autonomic, or mental status); no cure
S/S: respiratory difficulty (at the end of the disease, resp muscles are affected leading to death), muscle weakness, dysphagia

Strain	Sprain
Stretching of muscle or tendon Priority: 1. Cold + heat application 2. Exercise 3. anti-inflammatory + muscle relaxant meds	Stretching of ligament (twisting motion or stepping on uneven surface); S/S: pain + swelling Priority: 1. Rest 2. Ice 3. Compression 4. Elevation 5. Cast

Fractures:
Closed/Simple – skin over # is intact
Open – bone is exposed to air (break in skin) *watch for infection; cover the wound with a sterile dressing
Comminuted – bone is crushing into several fragments
Complete – bone is completely separated into 2 parts
Compression – # bone is compressed by other bone
Depressed – bone fragments are pushed inward
Greenstick – one side of bone is broken, and other side is bent (common in children)
Impacted – part of # bone is driven into another bone
Incomplete - # line does not extend the entire width of bone
Oblique - # line runs on an angle
Pathological - # due to weakness of bone structure
Transverse – bone # is straight across
S/S: pain, decreased muscle strength, obvious deformity, crepitation + edema, muscle spasms
Interventions: open or closed reduction, internal or external fixation, traction, or cast
Buck's Traction: ensure proper body alignment, that weights hang freely and don't touch floor, do not remove/lift weights without MD order, ensure that pulleys are not obstructed, elevate foot of bed, and check ropes for fraying
Complications of #: fat emboli, pulmonary emboli, compartment syndrome, infection, avascular necrosis
Priority: 1. Immobilize extremity 2. Monitor neurovascular status

Cast care:
Keep cast elevated, allow 24-72 hrs for cast to dry, handle a wet cast with palms of hands, turn the extremity q1-2hrs to allow air circulation, use hair dryer on cool setting to help with drying process (do NOT use heat), do not insert any objects into cast to relieve itching, monitor for S/S of infection, keep cast clean + dry

Fat Embolism:
Can occur after a fracture (long bone fractures are greatest risk)
S/S: hypoxemia, change in LOC, tachycardia, hypotension, SOB
Priority: 1. O2 as needed 2. IV fluids 3. Monitor respiratory status 4. Bed rest

Compartment Syndrome:
Pressure increases in a muscle group (usually after cast being put on) → decreased blood flow, tissue ischemia, neurovascular impairment
After 4-6 hours of this syndrome, neurovascular damage is irreversible
S/S: paresthesia, limb pain, pressure, pallor, pulselessness distal to area, paralysis
Priority: 1. Notify doctor 2. Fasciotomy to relieve pressure buildup 3. Loosen restrictive cast

Crutches:
Priority: 1. Proper measurement (2-3 finger widths between axillae and arm piece, elbows flexed 20-30 degrees) 2. Stand on pts affected side when ambulating 3. Do not rest axillae on axillary bars 4. Stop ambulation if numbness/tingling occurs in hands/arms

Avascular necrosis:
When a # disrupts blood supply to bone → bone death

Hip post-op:
Hip fractures commonly hemorrhage, whereas femur fractures are at risk for fat emboli
Priority: 1. Avoid internal + external rotation and hip flexion that's greater than 90 degrees 2. Monitor for delirium 3. Keep HOB 30-45 degrees for meals only 4. Avoid weight bearing on affected leg 5. Keep post-op leg extended, supported, and elevated when standing up 6. Monitor neurovascular status of extremity 7. Avoid crossing legs and any activity that requires bending

Amputation post-op:
Priority: 1. Monitor for bleeding/drainage 2. Explain phantom limb pain 3. Do not elevate residual limb on pillow 4. First 24 hrs = elevate food of bed (reduces edema), after 24 hrs = keep bed flat (prevents flexion contracture) 5. After 24-48 hrs = prone position (stretches muscles)

Rheumatoid Arthritis	Osteoarthritis
Chronic systemic inflammation leading to destruction of connective tissue + synovial membrane in joints. Ultimately leads to dislocation and permanent deformity of joint	Deterioration of articular cartilage in peripheral and axial joints; mostly on weight-bearing joints (hips, knees, hands)
S/S: inflammation of joints, pain + stiffness in the morning, muscle atrophy, spongy joints, weight loss	S/S: pain that increases with activity and decreases with rest, pain increases with temp change, Heberden's or Bouchard's nodes, joint swelling may be minimal, crepitus
Priority: 1. Rheumatoid factor blood test confirms diagnosis 2. ROM exercises 3. Balance between rest + activity 4. Prevent flexion contractures 5. Avoid weight bearing on inflamed joints 6. PT and OT 7. Use chairs with high backs 8. Use a small pillow when laying down	Priority: 1. Pain + corticosteroid meds 2. Avoid flexion of knees + hips 3. Avoid large pillows when laying 4. Apply cold pack when joint is inflamed 5. Rest 6. Balance activity + rest 7. Limit activity when in pain

Osteoporosis:
Risk factors – smoking, early menopause, alcohol use, family hx, female, increasing age, low calcium intake, sedentary life, thin/small frame, European or Asian race
Pts with osteoporosis are at an increased risk for pathological fractures

Gout:
Build up of urate crystals in joints (due to high uric acid in body)
S/S: painful joints, tophi (hard nodules), pruritis, renal stones
Priority: 1. Low purine diet (avoid organ meats, wine, and aged cheese) 2. High fluid intake 3. Avoid alcohol 4. Bed rest during painful attacks 5. Heat or cold application during pain

Respiratory System

Supplemental O2 Delivery:

Nasal cannula	1-6 L/min; FiO2 24-44%	For pt with airflow limitation + long term O2 use
Face mask	5-8 L/min; FiO2 40-60% *Monitor for risk of aspiration	For short term O2 therapy + for emergencies
Venturi mask	4-10L/min; FiO2 24-55%	For pts in acute respiratory failure
Partial rebreather mask	6-15 L/min; FiO2 70-90%	
Nonrebreather mask	Rate of flow needs to keep the bag full; FiO2 60-100%	For pt with deteriorating resp status

Chest Tube		
	Wet Suction	Dry Suction
Description	Suction regulated by height of water in the suction control chamber	Suction monitor bellow controls amount of suction
Drainage chamber	Monitors drainage (colour + amt – normal is <100 cc/hr). Located right below the tube that comes from the patient	
Water seal chamber	Water fluctuates with inspiration + expiration (if NO fluctuation = lung has re-expanded or there is a kink)	
Air leak monitor	Excessive bubbling indicates an air leak. If your patient has a pneumothorax (air in pleural cavity), intermittent bubbling may be seen and is OK	
Suction control chamber	Filled with water (amt of suction depends on height of water). Bubbling = good This chamber is right below the tube connected to suction	Amt of suction is controlled by moving the dial on this area
Dislodgment	Cover area with sterile dressing; tape 3 sides so that air can escape but not enter	
Tubing	Keep free from kinks, clots, and stagnant fluid; keep the entire system below pts chest	
Removal	Position in semi-fowlers, perform Valsalva maneuver and hold breath	

Tuberculosis:
Skin is assessed 48-72 hrs post administration of TB
Negative: redness without induration
Positive: induration > 15 mm in healthy individuals, OR induration > 10 mm in immunocompromised pts (e.g. children under 4, IV drug users, recent immigrant from high prevalence TB country, homeless), OR induration > 5 mm in high risk pts (e.g. HIV, organ transplant pts, recent contact with TB person)

- Positive and NO SYMPTOMS OF TB → CXR to be done
- Positive and SYMPTOMATIC OF TB → sputum culture to be collected

Latent	Active
Asymptomatic, no TB transmission, normal CXR, no sputum needed to be collected	Cough, fever, chills, weight loss, anorexia, fatigue, TB can be transmitted, abnormal CXR, positive sputum culture

S/S: fatigue, lethargy, anorexia, weight loss, chills, fever, chest pain
Priority: 1. Droplet precautions (N95 mask) 2. 6 air exchanges per hour 3. Pt to wear mask if leaving room

Ventilator Alarms:
High pressure: increased secretions, tube kink, pt biting on tube or coughing
Low pressure: tube disconnected, pt stopped breathing

Flail Chest:
S/S: paradoxical respirations (chest moves in with inspiration and out with expiration; opposite of normal), severe pain, SOB, cyanosis, tachycardia, hypotension, increased RR, decreased lung sounds
Priority: 1. Fowlers position 2. Provide supplemental O2 3. Coughing + deep breathing 4. Analgesics 5. Bed rest 6. Prep for intubation

Influenza:
Viral respiratory infection
S/S: acute fever, headache, fatigue, sore throat, cough
Priority: 1. Monitor lung sounds 2. Rest 3. Fluid intake 4. Administer antivirals, antipyretics

Pneumothorax:
Air in pleural space = lung collapses and can push heart + great vessels towards other lung
Open pneumo: opening in chest wall allows air into pleural space
Tension pneumo: blunt chest injury
S/S: no breath sounds on affected side, cyanosis, SOB, hypotension, chest pain, subcutaneous emphysema (crepitus on palpation), sucking sound (with open chest wound), tachycardia, increased RR, tracheal deviation to unaffected side (with tension pneumo)
Priority: 1. Chest wound dressing 2. Apply O2 3. Fowlers position 4. Prep for chest tube insertion

Asthma:
Airway inflammation + hyperresponsiveness to stimuli (e.g. allergens, exercise, irritants) leading to smooth muscle constriction, mucus secretion, obstruction of airways, air trapping, respiratory acidosis, and hypoxemia
S/S: wheezing, SOB, coughing, chest tightness
*Status asthmaticus → life threatening emergency
Priority: 1. Keep airway patent 2. Administer systemic corticosteroids (e.g. prednisone, methylprednisolone)

COPD:
Airflow limitation resulting from small-airway disease and parenchymal destruction
Includes emphysema (damaged alveoli) and bronchitis (airway swollen + filled with mucous)
S/S: cough, SOB, wheezing + crackles, weight loss, barrel chest, orthopnea, hyperinflation of chest, ABG shows respiratory acidosis + hypoxemia
Remember that a normal SPO2 is 88-92%; do not try to raise the SPO2 level higher than this (a lower SPO2 level is what stimulates a COPD patient to breathe!)
*short acting bronchodilator (Ventolin) to be given

Pneumonia:
Acute inflammation of lungs due to bacterial, viral, fungal infection
Inflammation → stiffening of lungs → low lung compliance → hypoxia
Sputum C+S will confirm the organism
Aspiration pneumonia: can occur in a community or health care facility setting and results from inhalation of foreign matter, such as vomitus or food particles, into the bronchi (most common in older patients, patients with a decreased level of consciousness, and those receiving nasogastric tube feedings)
S/S: fever, pleuritic pain (pain that is sharp and increases during inspiration), tachypnea, wheeze, accessory muscle use with breathing, change in LOC, sputum production
Priority: 1. Droplet precautions 2. Supplemental O2 3. Monitor LOC 4. Deep breathing + coughing 5. Semi-fowlers to assist with breathing 6. Chest physiotherapy to mobilize secretions 7. Fluid intake to thin the secretions 8. ABX administration

Pleural Effusion:
Collection of fluid in pleural space preventing lung from fully expanding
S/S: pleuritic pain, SOB, dry cough, tachycardia, fever, decreased breath sounds over area
Priority: 1. Prep pt for thoracentesis 2. Keep pt in Fowlers 3. Monitor breath sounds

Empyema:
Priority: 1. Treat infection 2. High Fowler's 3. Coughing and deep breathing 4. Thoracentesis or chest tube for drainage

Pulmonary Embolism:
Thrombus lodges into branch of pulmonary artery (can also be due to fat emboli from fracture of a long bone)

S/S: blood tinged sputum, chest pain, cough, cyanosis, JVD, SOB, feeling of impending doom, hypotension, tachypnea, tachycardia
Priority: 1. HOB elevated 2. Administer O2 3. ABG 4. Anticoagulants

Gastrointestinal System

Retroperitoneal Hemorrhage:
S/S: hypoT, back pain, Grey-Turner sign, hematoma, decreased distal pulses

Colostomy:
Priority: 1. Keep liquid stool from leaking out (causes skin irritation due to the digestive enzymes) 2. Change bag q5-10 days 3. Increase fluid intake to prevent dehydration 4. Empty bag when 1/3 full

Ulcerative Colitis	Chron's
Chronic inflammation leading to poor absorption of nutrients Begins in rectum and spreads upward Colon is edematous + bleeding lesions form S/S: frequent bloody diarrhea, abdo pain, fever, fatigue, weight loss Priority: 1. NPO 2. IV fluids 3. Monitor stools 4. Low fiber diet with vitamin supplements	Inflammation that can occur anywhere in GI tract S/S: fever, cramps, diarrhea, weight loss, dehydration During acute episode, priorities are same as UC

Bowel Perforation:
S/S: abdo guarding + pain + distention, fever, pale, tachycardia + tachypnea

Paracentesis:
Removal of fluid from peritoneal cavity, performed @ bedside (pt is in upright position @ edge of bed)
Priority: 1. VS + weight pre-procedure 2. Have pt void 3. Upright position 4. Dry sterile dressing @ puncture site 5. Measure fluid removed

GERD:
Heartburn, epigastric pain, dyspepsia, nausea + vomiting, pain with swallowing
Have pt avoid peppermint, chocolate, coffee, fried foods, carbonated drinks, and alcohol (irritants)
*Antacids, H2 receptor antagonists, or PPIs are given as medication

Colonoscopy:
Lining of large intestine is examined (biopsies can be performed) with the pt in a L side lying position (knees to chest)
Prep: clear liquid diet day before with colon cleansing meds given, NPO @ midnight

Diverticulosis:
Usually discovered during colonoscopy; asymptomatic and no treatment needed
Can develop into diverticulitis → treated with ABX and clear liquid diet

ERCP:
Examination of hepatobiliary system with endoscope down the esophagus
Prep: NPO before procedure
Post procedure: monitor for return of gag reflex and for signs of perforation

Peptic Ulcer Disease:
IF PUD is gastric → hematemesis, if PUD is duodenal → melena stool

Esophageal Varices:
Monitor for rupture and hemorrhage – life threatening*

Enteral Feeding:
Abdo cramping can occur if feed is too fast or too cold
Priority: 1. HOB @ 30-45 degrees pre+post feed 2. Tube flushes pre+post feed 3. Assess bowel function

Dysphagia:
Pt is at an increased risk of aspiration pneumonia
Priority: 1. Thickened liquids 2. HOB in high fowlers 30 mins post-meal 3. Swallow twice before another bite 4. Avoid OTC cold medications (they have anticholinergic effects – decrease saliva)

Gastritis:
Acute gastritis = Stomach inflammation due to contaminated food
S/S: abdo discomfort, nausea, vomiting, headache, reflux
Chronic gastritis = due to H. pylori
S/S: nausea, vomiting, heartburn, sour taste in mouth, Vit B12 deficiency
Priority: 1. NPO 2. Avoid irritating foods (spicy food, caffeine, alcohol) 3. Take antibiotics and antacids

Dumping Syndrome:
Rapid emptying of gastric content into S.I after a gastric resection
S/S will occur 30 mins after eating: nausea, vomiting, abdo cramps, diarrhea, tachycardia, weakness/dizzy, borborygmic (loud gurgling abdo sound)
Priority: 1. Eat small meals and avoid fluids while eating 2. Lie down after meals 3. Avoid sugar, salt, and milk 4. Eat high protein, high fat, and low carbs

Cholecystitis:
Acute (associated with gallstones) or chronic (due to inefficient bile emptying) inflammation of gallbladder
S/S: nausea, vomiting, flatulence, *epigastric pain radiating to R scapula 2-4 hrs after fatty food, RUQ pain, guarding, rebound tenderness, mass in RUQ, *Murphy's sign (cannot take deep breath because of pain when fingers are pressed on hepatic margin), tachycardia
Obstruction in gallbladder = jaundice, orange urine, steatorrhea + clay coloured stool, pruritis
Priority: 1. NPO 2. NG decompression 3. Eat small, low fat meals

Cirrhosis:
Destruction of hepatocytes = scar tissue formation
Complications: portal HTN (due to flow obstruction), ascites (due to congested hepatic capillaries that leads to plasma leakage), bleeding esophageal varices, jaundice (liver cannot metabolize bilirubin), portal systemic encephalopathy (change in LOC due to failure of liver to detoxify ammonia - a neurotoxic agent)
Priority: 1. Provide vitamin supplements 2. Restrict sodium and fluid intake 3. Enteral or parenteral feeds 4. Diuretic medications for ascites 5. Weigh pt daily 6. Monitor LOC 7. Administer lactulose (facilitates excretion of ammonia) 8. Administer ABX (inhibits synthesis in bacteria and decreases ammonia production) 9. Avoid opioids and sedatives 10. Teach importance of alcohol abstinence 11. Monitor ammonia levels 12. To help with pruritis: cut nails short, calamine lotion, cool/wet cloths, cholestyramine, avoid hot showers

Appendicitis:
*Rupture can occur quickly = leads to peritonitis and sepsis
S/S: pain in periumbilical area radiating to RLQ, abdo pain @ McBurney's point, abdo rigidity, fever, nausea + vomiting, abdo guarding
Priority: 1. NPO 2. IV fluids to prevent dehydration 3. Do not palpate or apply heat to abdo (increases risk of rupture = peritonitis) 4. Apply ice packs 5. Avoid laxatives/enemas

Hepatitis Goal: rest the inflamed liver to reduce demands and increase blood supply Pre-icteric – flu-like symptoms (fever, malaise) Icteric – jaundice, elevated bilirubin, dark urine, clay coloured stool Post-icteric – jaundice decreases, urine and stool colour return to normal		
	Transmission	Notes
Hep A	Fecal-oral (contaminated food, water, poorly washed utensils)	Common in young children Incubation period – 2-6 wks Infectious period – 2-3 wks before and 1 wk after jaundice HAV antibodies found in blood Priority: 1. Hand hygiene* 2. Stool + needle precautions 3. Hep A vaccine
Hep B	Blood/body fluid (IV drug users + healthcare workers)	Common in all age groups Incubation period – 6-24 wks Hep B surface antigen (HBsAg) will disappear in 6 wks.. if not = pt is a carrier
Hep C	Same as Hep B	Incubation – 5-10 wks HCV antibody found in blood
Hep D	Only occurs with presence of Hep B	Common in Mediterranean + Middle East areas Incubation – 7-8wks Hep D antigen (HDAg) found in blood
Hep E	Fecal-oral (waterborne virus)	Incubation – 2-9 wks IgM + IgG antibodies to Hep E (anti-HEV) found in blood
Priority: 1. Strict hand hygiene 2. Pt not to share bathroom 3. Pt to use their own towels, utensils, razors, etc. 4. Avoid alcohol 5. Small, frequent high carb low fat meals 6. Pt is not to donate blood		

Constipation:
Priority: 1. Ambulate as tolerated (increases peristalsis) 2. High fiber diet (softens stool) 3. Drink 2-3 L/day 4. Bowel regimen 5. Avoid caffeine (promotes diuresis which causes dehydration)

Irritable Bowel Syndrome:
Chronic uncontrolled inflammation causing edema, ulcers, bleeding, and extreme fluid loss
S/S: abdo cramps, pain, diarrhea, dehydration, weight loss/cachexia, anemia (due to active bleeding), 5-10 diarrhea BM/day
Priority: 1. Monitor hgb 2. Monitor intake + output

Acute Pancreatitis:
Sudden inflammation causing mild-severe discomfort
S/S: Cullen's sign (discoloured abdo + periumbilical area), Turner's sign (blue discolouring of flanks)
Priority: 1. NPO 2. NG tube to suction 3. Parenteral nutrition 4. Avoid alcohol

Total Parenteral Nutrition:
Avoid stopping it abruptly as it can lead to hypoglycemia
Priority: 1. Monitor CBG (glucose is main component of TPN) 2. Monitor S/S of hyperglycemia (polyphagia, polydipsia, polyuria)

ALT and AST:
Enzymes released when hepatic cells are inured

Small Bowel Obstruction	Large Bowel Obstruction
Rapid onset nausea + vomiting, intermittent abdo pain, abdo distention	Gradual onset of S/S, cramping abdo pain, abdo distention, complete constipation, no flatus
Priority: 1. NPO 2. NG tube insertion 3. IV fluids 4. Manage pain	

Paralytic Ileus:
Temporary halting of peristalsis for 24-48 hrs after a bowel procedure (no bowel sounds will be auscultated)

Stool Type:
Small, dry, hard → constipation
Light gray/clay colour → biliary obstruction
Mucus in stool → ulcerative colitis
Greasy, fatty, foamy → pancreatitis
Black, tarry → upper GI bleed
Bright red (melena) → lower GI bleed
Blood on surface of stool → hemorrhoids

Cardiovascular System

Angina:
Stable – chest pain with exertion/activity, relieved with rest or nitro
Unstable – chest pain that is unpredictable, may or may not be relieved with nitro
Variant/Prinzmetal's – chest pain due to coronary artery spasm, may occur @ rest

Myocardial Infarction:
S/S: chest pain/pressure, diaphoresis, dyspnea, anxiety
Female-specific S/S: fatigue, indigestion, shoulder or jaw pain
Acute MI = ST elevation in localized leads
Priority: 1. ABC, VS assessment 2. ECG + cardiac marker bloodwork 3. O2 if needed 4. Nitroglycerin, morphine

Percutaneous Coronary Intervention:
Catheter inserted into femoral or radial vein and advanced into the pulmonary artery to obtain information about the structure and performance of the chambers, valves, and coronary circulation
Procedure will improve coronary artery patency + increase cardiac perfusion
Complications: thrombosis, stent occlusion, hematoma, limb ischemia

Peripheral Arterial Disease	Coronary Artery Disease
Decreased blood flow to lower extremities due to atherosclerosis	Obstruction/narrowing of a coronary artery due to atherosclerosis
Intermittent claudication (muscle pain), hair loss, decreased peripheral pulses, cool + dry skin, gangrene, thick nails, ulcers	Chest pain, palpitations, SOB, syncope, fatigue, cough

Mechanical Valves:
Pt needs to be on lifetime anticoagulant therapy to avoid thromboembolism

Cardiac Electrical Activity:

SA node	Main pacemaker initiating every heartbeat Generates impulses 60-100 beats per minute
AV node	Receives impulse from SA node If SA node does not work, then AV node will take over and sustain a HR of 40-60 beats per minute
Bundle of His	Separates into left and right bundle branches, located in the ventricles Can act as the pacemaker of the heart if SA and AV node fail; HR between 20-40 beats per minute

Pacemaker:
Device that provides electrical stimulation to maintain HR when pts intrinsic pacemaker (SA node) fails to provide a rhythm
Vertical spike will appear on ECG indicating a pacing stimulus (spike before p wave = atrial pacing, spike before QRS complex= ventricular pacing)
Priority: 1. Report swelling/redness/drainage 2. Teach pt how to take pulse; tell them to notify MD if pulse is too low 3. No cellphone over the site 4. No MRIs 5. Microwaves are safe 6. Avoid heavy lifting after surgery

Congestive Heart Failure:
Heart unable to meet metabolic needs of the body due to pumping issue → blood backs up into lungs (left sided HF) and/or body (R sided HF)

L sided	R sided
Pulmonary congestion, SOB, tachypnea, crackles, cough, HTN	Edema, JVD, abdo distension, weight gain, HTN

Priority: 1. High Fowlers 2. Supplemental O2 3. Administer diuretics 4. Monitor output 5. Fluid and sodium restriction 6. Monitor weight daily 7. Monitor number of pillows used to facilitate breathing while sleeping

Mean Arterial Pressure (MAP):
Average pressure in systemic circulation; calculated by: SBP + (DBP x 2) /3
Normal MAP = between 60-70 for proper organ perfusion
Low MAP = organs are underperfused and can become ischemic

Central Venous Pressure (CVP):
Measurement of R ventricular preload
Normal CVP = 2-8 mmHg
High CVP = volume over load (S/S: edema, weight gain, tachypnea, crackles, bounding pulse)

Cardiac Tamponade:
Fluid accumulation in the pericardium
S/S: pulsus paradoxus, high CVP, JVD with clear lungs, muffled heart sounds, low cardiac output, narrow pulse pressure
Priority: 1. IV fluids 2. Pericardiocentesis

Cardiac Inflammation:

Pericarditis	Myocarditis	Endocarditis
Inflammation of pericardium, causing compression of the heart	Inflammation of myocardium	Inflammation of lining of heart + valves
S/S: sharp pleuritic chest pain that's worse during inspiration + coughing (and relieved when leaning forward), pericardial friction rub, fever, fatigue Acute pericarditis = ST elevation in all leads	S/S: Fever, pericardial friction rub, murmur, S/S of CHF, fatigue, tachycardia, chest pain	S/S: Fever, weight loss, fatigue, murmur, CHF, petechiae + splinter hemorrhages in nail beds, clubbing of fingers

Priority: 1. High Fowlers 2. Pain meds, NSAIDS, ABX administration 3. Monitor for tamponade (pulsus paradoxus, JVD, narrow pulse pressure, tachycardia, muffled heart sounds)	Priority: 1. O2 if needed 2. Periods of rest 3. Avoid overexertion 4. Pain meds, anti-dysrhythmics, ABX	Priority: 1. Rest 2. TEDs 3. Monitor for S/S of emboli/thrombus 4.ABX

Thrombus Formation:
Venous stasis, hypercoagulability, injury to venous wall, pregnancy, ulcerative colitis, oral contraceptive use, fractures

BNP:
BNP > 100 = pt is in heart failure
BNP is produced when ventricles stretch from high blood volume, and when there are high levels of extracellular fluid

Shock:
Hypotension, tachycardia, weak/thread pulse

Blood Pressure	
Normal	120-80
Pre-hypertension	SBP 120-139 DBP 80-89
Stage 1 HTN	SBP 140-159 DBP 90-99
Stage 2 HTN	SBP > 160 DBP >100
Hypertensive Crisis	SBP > 180 DBP > 120

Hypertensive Crisis can cause organ damage and is to be treated immediately
S/S: headache, confusion, change in vision, change in LOC, tachycardia, tachypnea, cyanosis

DVT:
Presents as warm skin + calf or groin pain with or without swelling
Risk factors → Virchow's Triad (decreased flow/stasis, endothelial damage, hypercoagulable state)
Priority: 1. Elevate extremity 2. Avoid pillow under knees 3. Do not massage the area 4. Apply anti embolism stockings 5. Measure circumference of thigh or calf 5. Apply warm, moist compress as needed 6. Antithrombolytics 7. Avoid prolonged sitting

Defibrillation:
Synchronizer switch must be turned on
Cardioversion shock must be delivered on R wave (if delivered on T wave = can lead to a lethal arrhythmia)

Rhythm	Rate	P wave	PR Interval	QRS	Notes
Sinus Tachycardia					
Regular	100-60 bpm	Sinus (1 P before each QRS, all P waves same morphology)	0.12-0.20 s	10 s	Treat underlying cause (stimulants, withdrawal, hypoxia, MI)
Sinus Bradycardia					
Regular	40-60 bpm	Sinus	0.12-0.20 s	10 s	No treatment unless symptomatic (Low BP, LOC)
Paroxysmal Atrial Tachy (PAT) or SVT					

Regular	140-250 bpm	TP waves	Not measurable	10 s	Unstable PAT (low BP/LOC/urine output/chest pain): cardioversion Stable PAT: sedation, vagal maneuver, bolus adenosine
Atrial Flutter (Aflutter)					
Regular	Atrial: 250-400 bpm Ventricular: less than atrial	Sawtooth (F waves)	Not measurable	10 s	No isoelectric line Control ventricular rate: diltiazem A flutter < 48 hrs long: cardioversion A flutter > 48 hrs long: anticoagulate before attempting cardioversion
Atrial Fibrillation (Afib)					
Irregular	Atrial: 400 + bpm Ventricular: less than atrial	Fibrillatory (f waves)	Not measurable	10 s	Control rate first (CCB – diltiazem) A fib < 48 hrs long: cardioversion or anticoagulate A fib > 48 hrs long: anticoagulate before attempting cardioversion Unstable A fib: cardioversion STAT
First degree block					
Regular	That of underlying rhythm	Sinus	Prolonged (0.20 s)	10 s	Produced no symptoms and requires no treatment
Second degree (Type 1) block					
Atrial: regular Ventr: irregular	Atrial: That of underlying rhythm Ventricular: less than atrial rate	Sinus	PR lengthens progressively until a QRS drops	10 s	Also called Wenckebach To differentiate b/w nonconducted PAC: NPAC will have abnormal P wave and is premature Usually asymptomatic because ventricular rate is often normal
Second degree (Type 2) block					
Regular	Atrial: That of underlying rhythm Ventricular: less than atrial rate	Sinus (2 or 3 P waves before each QRS)	Normal or prolonged. PR is consistent	10 s	Usually ventricular rate is slow Stokes-Adams syncope is caused by sudden slowing of the heartbeat Treatment is usually a pacemaker
Third degree block					
Atrial: regular Ventr: regular	Atrial: That of underlying rhythm Ventricular: 40-60 bpm	Sinus (P wave has no relationship with QRS) Some P waves may be hidden	Varies greatly	10 s	Atria and ventricles beat independently of each other Symptoms: hypotension, dyspnea, heart failure, chest pain, Stokes-Adams syncope Treatment: pacemaker
Idioventricular Rhythm					
Regular	30-40 bpm	Absent	Not measurable	Wide (0.12s)	A very slow rhythm originating in the ventricles If continuous, treat immediately (atropine, pacing, vasopressor) IVR < 20 bpm: agonal rhythm
Ventricular Tachycardia					
Regular	140-250 bpm	Absent	Not measurable	Wide (0.12s)	Stable + Pulse: amiodarone bolus over 10 mins, once rhythm converts: amiodarone infusion. If amio is unsuccessful = cardioversion Unstable + Pulse: Sedate the pt, cardioversion, maintenance infusion of amiodarone
Ventricular Fibrillation					

None	None	Absent	Not measurable	Absent	No pulse + unconscious: defibrillate at 200 J. If arrest is unwitnessed, CPR for 2 minutes before initial shock If unsuccessful, start CPR, establish IV line, and intubate when possible Epinephrine 1mg IVP q3-5 min CPR for 2 minutes Defibrillate at 200 J
Asystole					
None	None	Absent	Not measurable	Absent	Start CPR, establish IV line, intubate when possible Epinephrine 1 mg IVP q3-5 mins

Atrial Fibrillation:
Increases the risk of stroke → pt needs to be on anticoagulants (e.g. warfarin)
Priority: 1. Monitor INR if on warfarin 2. Monitor change in heart rate 3. Monitor circulation

Renal System

Creatinine Level:
Will only increase once at least 50% of kidney function is lost

Acute Kidney Injury:
S/S (occur due to retention of nitrogenous wastes, fluids, and inability to regulate electrolytes): decreased UO, increased fluid volume (HTN, edema, CHF), changes in LOC, uremia (anorexia, nausea, vomiting, pruritus)
Priority: 1. Monitor electrolytes 2. Monitor BP 3. Monitor intake + output along with daily weight 4. Renal diet (low protein, high carb) 5. Dialysis if needed

Chronic Kidney Disease:
Normal – GFR > 90
Mild CKD – GFR 60-89
Moderate CKD – GFR 30-59
Severe CKD – GFR 15-29
End stage KD – GFR < 15
*Requires dialysis (process of filtering pt's blood; removes wastes and maintains buffer system of body)
Pt's are @ risk for fluid overload and hyperkalemia
Priority during dialysis: 1. Monitor for hypovolemia/shock (due to blood loss) 2. Monitor for bleeding 3. Hold antihypertensives and meds that could be removed during dialysis (e.g. water-soluble vitamins, ABX, digoxin) 4. Monitor for arterial steal syndrome in pts with internal AV fistula (too much blood is sent to vein that arterial perfusion to hand is compromised) 5. Palpating a thrill or auscultating a bruit ensures that a fistula is patent

UTI:
Lower UTI – urethritis, cystitis (due to ascending pathogens such as E. coli); S/S: frequency, urgency, burning
Upper UTI – pyelonephritis (due to urine reflux from bladder into ureters or obstruction causing inflammation); S/S: calculi, stricture, enlarged prostate

Continuous Bladder Irrigation:
Removes clotted blood from bladder post-TURP (3-way catheter is used)
S/S to report: pain/spasm (indicates obstruction), output < input (indicates clot or kink)
*Titrate irrigation rate so that urine is light pink

HPV:
Females should have Pap smear @ 21 years old

Pubic Lice:
Priority: 1. Lice shampoo 2. Remove nits with fine tooth comb 3. Wash belongings separately from others 4. Sexual partners to be treated as well

Urinary Tract Infection:
Common kidney infection due to lack of proper hygiene and indwelling catheters
Priority: 1. ABX administration 2. Monitor for confusion in the elderly

Inserting a Foley Catheter:
1. Gather equipment.
2. Explain procedure to the patient
3. Assist patient into supine position with legs spread and feet together
4. Open catheterization kit and catheter
5. Prepare sterile field, apply sterile gloves
6. Check balloon for patency.
7. Generously coat the distal portion (2-5 cm) of the catheter with lubricant
8. Apply sterile drape
9. If female, separate labia using non-dominant hand. If male, hold the penis with the non-dominant hand. Maintain hand position until preparing to inflate balloon.
10. Using dominant hand to handle forceps, cleanse peri-urethral mucosa with cleansing solution. Cleanse anterior to posterior, inner to outer, one swipe per swab, discard swab away from sterile field.
11. Pick up catheter with gloved (and still sterile) dominant hand. Hold end of catheter loosely coiled in palm of dominant hand.
12. In the male, lift the penis to a position perpendicular to patient's body and apply light upward traction (with non-dominant hand)
13. Identify the urinary meatus and gently insert until 1 to 2 inches beyond where urine is noted
14. Inflate balloon, using correct amount of sterile liquid (usually 10 cc but check actual balloon size)
15. Gently pull catheter until inflation balloon is snug against bladder neck
16. Connect catheter to drainage system
17. Secure catheter to abdomen or thigh, without tension on tubing
18. Place drainage bag below level of bladder
19. Evaluate catheter function and amount, color, odor, and quality of urine
20. Remove gloves, dispose of equipment appropriately, wash hands
21. Document size of Foley and amount of cc inserted into balloon

Diagnostic Tests/Treatments

- Wood's light exam
- Biopsy (definitive means of diagnosing cancer)
- MRI
- Chemotherapy
- Radiation therapy
- ERCP
- Endoscopy
- Barium swallow study
- CXR
- Sputum collection
- Pulmonary Function Test
- ECG
- Holter monitor
- Echocardiogram
- Cardiac catheterization
- Urinalysis
- 24-hour urine collection
- CT scan
- Lumbar puncture
- Bone scan

Procedures:

- Chest tube
- Blood transfusion
- Thoracentesis
- Catheter insertion
- NG insertion
- Paracentesis
- Foley catheter insertion

Infant (birth-1 year)	Toddlerhood (1-3)	Preschooler (3-5)	School age (6-12)	Adolescent (13-18)
Biological: Weight: doubles @ 6 mos, triples @ 1 year Length: 2.5cm/month until 6 mos, @ 1 year length by 50% Fontanelles: posterior close @ 6-8 wks, anterior @ 12-18 mos Vision: can focus @ 4 wks Fine motor: grasp Gross motor: head control, sitting, crawling	Biological: Growth slows Weight: birth weight quadrupled @ 2.5 yrs Height: 7.5cm/yr Vision: 20/40 is acceptable Fine motor: improved manual dexterity @ 12-15 mos, throw ball @ 18 mos Gross motor: walk @ 12 mos, run @ 18 mos, walk upstairs @ 2 yrs, jump @ 2.5 yrs	Biological: Growth slows + stabilizes Weight: 2-3kg/yr Height: by 6-9cm Slender and erect posture Gross motor: skip + hop on 1 foot @ 4, skip on alternative feet, jump rope, swim, and skate @ 5 Gross to fine motor refinement: tricycle → bicycle, jumping → skipping, catching ball more consistently, refined drawing	Biological: Weight gain is slower: 2-3 kg/yr Height: 5cm/yr Loss of temporary teeth! *dental health is important bc permanent teeth are now growing	Biological: Predictable sexual maturation + physical growth but highly variable Growth spurt; begins earlier in girls *Tanner stages
Psychosocial: Trust v Mistrust: having needs met (when hungry get fed, when dirty get changed) As nurse: offer comfort after needles	Psychosocial: Autonomy v Shame/Doubt: giving autonomy leads to no shame Ritualization provides comfort Differentiate self from others, withstand delayed gratification, control bodily fx, communication, and negativism (say no to everything) As nurse: give choices and be assertive	Psychosocial: Initiative v Guilt: pt wants to be independent and be praised for this Development of conscience Appreciate right v wrong d/t parent's reaction (rewards or punishment), not d/t moral thinking Magical thinking* As nurse: ensure pt knows they didn't cause sickness on themselves or sibling	Psychosocial: Industry v Inferiority: pts want to gain new skills and knowledge to feel confident; competition Growing sense of independence (take on new responsibilities) Peer approval is strong motivator	Psychosocial: Identity v Confusion: developing sense of self and personal identity Developing autonomy (emotional, cognitive, behavioural) Peer support is very important Sexual identity
Cognitive: Sensorimotor (birth-2yrs) Uses reflexes and moves voluntarily using senses to interact with env	Cognitive: Pre-operational (2-7 yrs); pre conceptual phase (2-4 yrs) Symbolic thought, cant perform mental operations (no	Cognitive: Pre-operational (2-7 yrs): intuitive thought phase (4-7 yrs) More reasoning, but not quite logical	Cognitive: Concrete operational (7-11 yrs): Conservation + decentration (understand multiple	Cognitive: Formal operational: Abstract thinking (can think of past experiences + future consequences) symbolism, and formal logic

Reflexive beh→ simple repetitive acts→imitate activity *object permanence = acquiring memory* @ 6-8mos	conservation skill), egocentric, intuitive	Centration (focus on 1 aspect of situation), time is abstract, magical thinking (ghosts), social awareness No conservation understanding	perspective and parts of problem) Know right v wrong d/t understanding standards of acceptable behaviour Use numerical pain scale @ 7	decision making skills egocentric (look deeper into themselves and see what they desire + how to achieve it)
Nutrition: Milk for first 6 mos Solids @ 6 mos (iron fortified cereals – rice, barley, oatmeal, multigrain) Veggies and fruits introduced 1 at a time Honey delayed until 1 yr (d/t botulism) 400 IU of Vit D (prevents rickets)	Language: 1 yr = 4 words 2 yrs = 300 words 3 yrs = simple sentances Toilet training: sphincter control @ 18-24 mos. Ensure motor readiness (undoing button/zipper)	Nutrition: 90 kcal/kg, fluid 100 ml/kg, begin proper diet Play is more social = chance of abduction Awareness of racial identity Stutter is normal for < 6 mos Speech delay is not normal	Social Development: Peer pressure (can be + or -) Stress w extracurricular activites Social media Cyberbullying Efficient language skills = nurse can use detailed explanations	Social Development: Family and parental relationship Peer groups Romantic relationships Social env (school, work, community) *MH: eating disorders, ADHD, anger, suicide
Injuries: Choking, MVA d/t car seat, drowning (bathtub and pool), mechanical suffocation*	Injuries: Falls*, choking, playing with electrical outlets	Injuries: Drowning, MVA* (d/t running on street, and reversing)	Injuries: Sporting injuries* (concussion), head injuries d/t not wearing helmet; big risk taking group	
Nursing Interventions: Encourage parents to hold + remain with pt Provide opportunities for non-nutritive sucking Provide pt with toys (comfort + stimulation)	Nursing Interventions: Maintain toilet training procedure Encourage independent beh Short explanations Provide rewards for good beh	Nursing Interventions: Encourage parent involvement in care of pt Give clear explanations to relieve fears (use toys to make explanations clear)	Nursing Interventions: Provide privacy Explain treatments clearly Encourage continuation of school work	Nursing Interventions: Privacy + confidentiality Quiet + nonthreatening env HEADSSS (health risk Qs) SAFE TIMES (health screening interview) Encourage participation in making treatment decisions

Developmental Skills

Age	Gross Motor	Fine Motor	Language	Social
3	Walk up stairs with alt. feet Pedals tricycle Jumps forward	Draws circle Feeds self Grips crayon	3-4 word sentences Asks why Qs Says own age	Associative play Toilet trained
4	Walks down stairs with alt. feet Balances on 1 food Catches ball	Draws square Cuts with scissors Ties knot	Names 2+ colour Tells stories	Imaginative + group play Focused on self
5	Skips Walks backwards Jumps rope	Draws triangle Ties shoelaces Prints letter + numbers	Counts to 10 Full sentences Knows days of week	Dresses independently Differentiates real from pretend

INTEGUMENTARY

Impetigo:
Bacterial infx of skin due to poor hygiene or infected bite/rash. Mostly occurring during hot/humid months and will appear most commonly on face/mouth, neck, and extremities
S/S: vesicle/pustule that progresses to an exudative lesion with honey-coloured crusts, burning, pruritis
Priority: 1. Contact precautions (*highly contagious) 2. Keep lesion open to air; let it dry out 3. Daily bathing 4. Warm saline compress to lesion 2-3/day 5. Topic and oral ABX 6. Proper hand hygiene 7. Use separate towels/linens for pt

Lice:
S/S: scratching scalp, nits in hair
Priority: 1. Pediculicide 2. Fine tooth comb to remove nits 3. Change + clean clothing and linen daily 4. No sharing of clothing, hats, or brushes

HEMATOLOGY

Iron Deficiency Anemia:
Low iron = low supply of hemoglobin
S/S: pale, weakness, low hgb + hct, microcytic + hypochromic RBC
Priority: 1. Oral iron intake 2. Iron supplements (give between meals and with fruit juice for max absorption; avoid giving with milk or antacids – decreases absorption) 3. Teach parents about expected dark stool colour + constipation

Hemophilia:
X linked recessive disorder; Bleeding due to deficiency in coagulation protein
Hemophilia A – due to deficiency in Factor 8; Hemophilia B – due to deficiency in factor 9
S/S: abnormal bleeding, epistaxis, joint bleeding, easily bruised
Priority: 1. Monitor for bleeding 2. Replace missing clothing factor 3. Assess LOC (increased risk of intracranial hemorrhage) 4. Avoid contact sports

Von Willebrand's Disease:
Bleeding due to deficiency of protein von Willebrand factor, causing bleeding of mucous membranes
S/S: epistaxis, gums bleed + bruise, ++ menstrual bleeding

GASTROINTESTINAL

Vomiting:
Puts pt @ risk of dehydration, electrolyte imbalance, metabolic alkalosis, aspiration, and pneumonia
Projectile vomiting = pyloric stenosis or increased ICP
Priority: 1. NPO 2. IV fluids

Diarrhea:
Puts pt @ risk of dehydration, electrolyte imbalance, and metabolic acidosis

Constipation:
Priority: 1. High fiber and fluid intake 2. Enema, stool softeners, or laxatives as needed

Cleft Lip/Palate
Congenital anomalies due to failure of soft tissue or bone to fuse
Cleft lip will close earlier than a cleft palate; cleft lip repair = 3-6 mos, cleft palate repair = 6-24 mos
Cleft palate can lead to speech impairment and otitis media
Priority: 1. Assess ability to suck/swallow/breathe 2. Monitor fluid intake and daily weight 3. Hold infant upright and direct milk to side/back of mouth 4. Provide feeds in small amounts 5. Suction and bulb syringe @ bedside 6. ESSR feeding – enlarge nipple, simulate sucking reflex, swallow, rest

Esophageal Atresia:
Congenital defect; food/fluids enter lungs or air enters stomach (issue is with the esophagus)
S/S: 3 Cs (coughing, choking, cyanosis), frothy saliva, vomiting, abdo distention, resp distress
Priority: 1. NPO 2. IV fluids 3. Suction as needed 4. Supine 5. ABX for potential pneumonia

Hirschsprung's Disease:
No ganglion cells in rectum = mechanical obstruction due to low motility
S/S: no meconium, refusing to suck, abdo distention, delayed growth, vomiting, constipation, ribbon like stools
Priority: 1. Monitor for enterocolitis (fever, GI bleed, diarrhea) 2. Low fiber, high cal, high protein diet 3. Stool softeners 4. Rectal irrigations 5. NPO 6. Monitor weight

Intussusception:
Results in obstruction of GI content
S/S: abdo pain (pt has knees up to abdo), vomiting up bile stained emesis, currant jelly like stool, distended abdo with sausage shaped mass in RUQ
Passing of normal stool = intussusception has resolved
Priority: 1. Monitor for perforation (fever, tachycardia, resp distress) 2. ABX and IV fluids 3. NGT for decompression

Umbilical Hernia:
Bowel protrudes through opening in abdo wall (usually through umbilicus or inguinal canal)
Incarcerated hernia = medical emergency due to compromising blood supply

EYE + EAR

Conjunctivitis:
Bacterial + viral conjunctivitis is very contagious
S/S: redness, edema, discharge, burning
Priority: 1. Hand hygiene 2. ABX or antiviral eye drops 3. No sharing of towels 4. No school or daycare until 24 hrs post ABX administration 5. Avoid rubbing eyes and wearing eye makeup

Otitis Media:
Common after a respiratory infection. Common in children due to shorter, wider, and straighter eustachian tubes
To prevent: feed infant upright, breast feed for first 6 mos, avoid smoking, maintain immunizations
S/S: fever, ear pain, crying, no appetite, head rolling side to side, pulling on ear, ear drainage, red + opaque tympanic membrane
*remember to pull child under 3 yr pinna down + back when giving meds (older than 3 y = pinna up and back)

Nosebleed:
Do not put pt in laying down position = risk of aspiration

RESPIRATORY

Epiglottitis:
Bacterial form of croup
Emergency due to possibility of severe resp distress
S/S: fever, red/inflamed throat, painful swallowing, no cough, muffled voice + drooling, agitation, stridor, tachycardia, tachypnea, tripod position
Priority: 1. Patent airway 2. Do not measure oral temp 3. NPO 4. Do not leave child unattended 5. Avoid supine position 6. IV ABX, analgesics, and antipyretics 7. Cool mist O2 8. Do not attempt to visualize pharynx or take a throat culture (can lead to spasm → airway occlusion)

RSV:
Acute viral infx that is highly communicable by direct contact with resp secretions
Common cause of respiratory infection and bronchiolitis
Affects ciliated cells = bronchiolar swelling = increased mucous production
Mostly occurs in winter + spring
S/S: rhinorrhea, cough, wheezing, fever, tachypnea, retractions, cyanosis, apneic episodes
Priority: 1 Contact precautions 2. Maintain patent airway with HOB @ 30-40 degrees 3. Cool humidified O2 4. Suction if needed 5. Antiviral and antipyretic medication 6. IV fluids for dehydration 7. Palivizumab given to high risk infants

Cystic Fibrosis:
Autosomal recessive trait; no cure; protein responsible for transporting Na and Cl is defective = secretions are thicker and stickier
Mucus production is thick and copious, causing obstruction in small passageways of respiratory, GI, and reproductive systems → pancreatic fibrosis, chronic lung disease, sweat gland dysfunction
S/S: emphysema, hypoxemia, wheezing, cough, dyspnea, cyanosis, barrel chest, meconium ileus, frothy stools, rectal prolapse, very high concentration of Na + Cl in sweat, delay in female puberty, sterility in males
Priority: 1. ABX 2. Chest physiotherapy daily (do not perform after a meal) 3. Mucous removal 4. Huff cough 5. Bronchodilators 6. High cal, high protein, high fat diet 7. Monitor stools 8. Pancreatic enzyme replacement within 30 mins of eating + with all snacks 9. Salt replacement

Sudden Infant Death Syndrome (SIDS):
Most frequent in winter, during sleep, and in male infants 2-3 months of age. Incidence is lower in breastfed infants
High risk for SIDS: prone sleep position, soft bed, overheating, cosleeping, mother who smoked/abused substances while pregnant, excessive sheets in bed, exposure to smoke

CARDIOVASCULAR

Heart Defects		
Atrial Septal Defect	Opening b/w atria = oxygenated blood goes to R side = increased pulmonary blood flow = R atrial + vent enlargement	S/S: decreased peripheral pulses, feeding difficulty, hypotension, restless, oliguria, pale/cool, tachycardia
Atrioventricular canal defect	Incomplete fusion of endocardial cushions. Seen in Down Syndrome	S/S: murmur, cyanosis increases with crying, S/S of low cardiac output
Patent Ductus Arteriosus	Shunt connecting aorta + pulmonary artery does not close	S/S: murmur, wide pulse pressure, S/S of decreased cardiac output

Ventricular Septal Defect	Opening between L and R ventricles. Most close spontaneously	S/S: murmur, S/S of heart failure
Aortic stenosis	Narrowing of aortic valve = resistance to blood flow from L ventricle to aorta = L ventricular hypertrophy + pulmonary congestion	S/S: murmur, decreased cardiac output, exercise intolerance, chest pain, dizziness
Coarction of aorta	Narrowing near ductus arteriosus	S/S: BP is higher in upper extremity than lower extremity, bounding pulses in arms, cool lower extremities, signs of heart failure, decreased cardiac output, headaches, dizziness
Pulmonary stenosis	Narrowing at pulmonary artery = causes R ventricular hypertrophy (can lead to pulmonary atresia = no blood flow to lungs)	S/S: murmur, cyanosis @ birth, decreased cardiac output
Tetralogy of Fallot	VSD + pulmonary stenosis + overriding aorta + R ventricular hypertrophy	S/S: cyanosis @ birth, murmur, episodes of hypoxia + cyanosis (tet spells), clubbing, poor growth
Tricuspid atresia	Tricuspid valve fails to develop = no communication b/w R atrium and R ventricle = blood will flow through ASD or patent foramen ovale = complete mixing of unoxygenated + oxygenated blood. Usually associated with pulmonic stenosis	S/S: cyanosis, tachycardia, SOB, clubbing Clubbing = chronic hypoxia
Transposition of great arteries	Pulmonary artery leaves the L ventricle and aorta leaves the R ventricle	S/S: severe cyanosis @ birth, cardiomegaly

Rheumatic Fever
Inflammatory autoimmune disease affecting connective tissue of heart, joints, skin, blood vessels, and CNS
Most serious complication = rheumatic heart disease
RF occurs after untreated streptococcal infx of upper respiratory tract (ask about recent sore throat)
S/S: chorea (involuntary movement of extremities + face, can affect speech), fever, carditis (inflammation of mitral valve), abdo pain, erythema marginatum (red lesions on trunk), subcutaneous nodules, polyarthritis
Priority: 1. Bed rest 2. Limit activity 3. ABX, analgesics, anti-inflammatories 4. Seizure precautions if pt has chorea

Kawasaki Disease
Acute systemic inflammatory illness; no known cause
Most serious complication = aneurysms
S/S: fever, red throat, swollen hands with rash, cracked lips, peeling of skin on fingers + toes, joint pain, thrombocytosis
Priority: 1. Monitor for fever 2. Asses for edema, redness, and peeling 3. Soft food diet 4. ROM exercises 5. Aspirin

RENAL

Nephrotic Syndrome:
Proteinuria, hypoalbuminemia, edema
S/S: weight gain, edema (most prominent in morning), low urine output, ascites, HTN, lethargy

Enuresis:
Pt unable to control bladder function

Cryptorchidism:
Teste(s) fail to descend into scrotum (cannot palpate or easily guide testes into scrotum)

Epispadias + Hypospadias:
Epi = dorsal urethral opening, hypo = ventral urethral opening; can lead to bacteria entering urine
Circumcision is not performed (foreskin needs to be used for reconstruction)

NEUROLOGICAL

Cerebral Palsy:
Abnormality in extrapyramidal + pyramidal motor system = impaired movement + posture
S/S: irritability, difficulty feeding, stiff + rigid muscle tone, delayed milestones, abnormal posture, seizures
Priority: 1. PT, OT, speech therapy 2. Mobilizing devices 3. Interact with child based on developmental level rather than chronological age 4. Safe environment with seizure precautions 5. Upright position after meals

Increased ICP:
S/S: high pitch cry, buldging fontanel, increased head circumference, Macewen's sign (cracked pot sound on head), setting sun sign (sclera shows above iris), dilated scalp veins, late S/S (change in LOC, decorticate or decerebrate posture, Cheyne stokes, coma)
Priority: 1. Patent airway, O2 PRN 2. Head and body midline 3. Calm and quiet environment 4. Seizure precautions 5. NPO 6. Administer Tylenol, anticonvulsants, osmotic diuretic and ABX 7. Monitor for nose + ear drainage (test for CSF)

Brainstem Injury:
S/S: deep + rapid respirations, bradycardia, wide pulse pressure, dilated + unequal pupils

Hydrocephalus:
Increased CSF due to tumour, hemorrhage, infx, trauma = head enlargement
S/S: high shrill cry, increased head circumference, Macewen's sign, buldging anterior fontanel, dilated veins, setting sun eyes
Priority: 1. Ventriculoperitoneal or ventriculoarterial shunt to drain CSF accumulation

Neural Tube Defects:
Neural tubes fail to close = sensorimotor deficits, dislocated hips, clubfoot, and hydrocephalus
Types of neural tube defects = spina bifida, meningocele, myelomeningocele
Priority: 1. Protect the exposed sac (cover with sterile moist dressing) 2. Change sac dressing regularly 3. Monitor neuro status and ICP 4. Aseptic technique 5. Monitor for infx, give pt ABX 6. Place pt in prone position 7. Prep for surgery

Autism:
S/S: impaired social interaction, verbal impairment, intellectual deficit, altered behaviour (attachment to objects, self-injuries, repetitive routine or body movements)
Priority: 1. Safe environment 2. Maintain a consistent routine 3. Avoid placing demands on pt

MUSCULOSKELETAL

Developmental Dysplasia of the Hip:
Head of femur not in proper placement
Signs of dysplasia: asymmetry of gluteal + thigh folds, limited hip abduction, shortening of limb on affected side, Ortolani click (in pt < 4 wks)
Priority: 1. Pavlik harness continuously (maintains flexion, abduction, and external rotation)

Rubeola/Measles:
Spread by respiratory secretion, blood, and infected urine (droplet + direct contact)
S/S: fever, weakness, 3 C's (coryza, cough, conjunctivitis), rash on face turns red to brown over time, Koplik's spots
Priority: 1. Airborne, droplet + contact precautions 2. Bed rest + quiet environment 3. Cool mist for cough + coryza 4. Antipyretics

Rubella/German Measles:
Spread by nasopharyngeal secretion, blood, stool, and urine (droplet + direct contact)
S/S: fever, weakness, pink/red maculopapular rash over entire body, petechiae on soft palate
Priority: 1. Airborne, droplet + contact precautions 2. Keep away from pregnant women

Varicella (Chickenpox):
Spread by respiratory secretions and direct contact with skin lesions (droplet + direct contact)
S/S: fever, weakness, macular rash (lesions will pus, dry, and crust)
Priority: 1. Airborne, droplet + contact precautions 2. Acyclovir

Pertussis (Whooping cough):
Spread by respiratory secretions (droplet + contact precautions)
S/S: cough (with whooping inspiration), cyanosis, respiratory distress, listlessness
Priority: 1. Airborne, droplet + contact precautions 2. Antimicrobials 3. Reduce irritants (smoke, dust, etc.) 4. Suction and humidified O2 if needed 5. *Infants don't receive maternal immunity to pertussis

Immunizations	
Age	Immunization
1 month	Hep B
2 months	Inactivated polio (PIV), diphtheria + tetanus + acellular pertussis (DTaP), Haemophilus influenzae Type B (HiB), pneumococcal (PCV), rotavirus (RV)
4 months	IPV, DTaP, HiB, PCV, RV (same as 2 months)
6 months	IPV, DTaP, HiB, PCV, RV, Hep B
12-15 months	HiB, PCV, MMR, Hep A
15-18 months	DTaP
18-33 months	Hep A
4-6 yrs	IPV, DTaP, MMR, varicella
11-12 yrs	MMR, diphtheria + tetanus + acellular pertussis adolescent (Tdap), meningococcal, HPV

Normal reactions to a vaccine: tenderness, redness, swelling, low grade fever, drowsiness, decreased appetite

NUTRITION

Honey:
Don't give to pt < 1 yr due to risk of infant botulism (produces muscle paralysis)
S/S: constipation, decreased reflexes, weakness, respiratory failure

Infant Nutrition:
Birth-6 mos: exclusive breastfeeding
Start introducing solid food between 4-6 mos (start off with iron fortified cereal)
Give 5-7 days between food introductions to observe for allergies
1 year: introduce cow's milk

Gestation:
Time from fertilization until date of delivery; approximately 280 days (9 mos)
Nagele's rule: first day of last menstrual period - 3 months + 7 days + 1 year = estimated date of delivery

Gravidity + Parity:
Gravida = pregnant woman
Gravidity = number of pregnancies (e.g. nulligravida is woman who's never been pregnant, primigravida is pregnant for the first time, multigravida is in at least her 2nd pregnancy)
Parity = number of births past 20 weeks gestation (whether born alive or not) (e.g. nullipara has not had a birth more than 20 weeks gestation, primipara has had 1 birth that occurred after 20 weeks gestation)
GTPAL: gravidity, term births (longer than 37 weeks), preterm births, abortions/miscarriages, current living children

Pregnancy Signs	
Presumptive Signs	• Amenorrhea • Breast enlargement/tenderness • Fatigue • Nausea and vomiting • Quickening (first movement of fetus) • Urinary frequency
Probable Signs	• Ballottement (fetal movement in response to tapping lower uterus/cervix) • Braxton Hicks contractions • Chadwick's sign (light pink-deep violet vaginal wall colour) • Hegar's sign (softening of cervix) • Positive pregnancy test • Abdominal + uterine enlargement
Positive Signs	• Fetal heartbeat • Fetal movement • Ultrasound findings

Fundal Height:
Measured to evaluate gestational age of fetus
*In 2nd and 3rd trimester: fundal height in cm = fetal age in wks +/- 2 cm
Priority: 1. Monitor for supine hypotension when placing pt in supine position

Physiological changes when pregnant:
Cardiovascular: heart displaced upward, increased blood volume, increased resting HR, increased venous pressure, increased RBC
GI: displacement of intestines, nausea and vomiting, hemorrhoids, constipation
Endocrine: increased basal metabolic rate, increased prolactin, estrogen, and cortisol levels, decreased insulin production
Respiratory: compression of lungs, displacement of diaphragm, abdominal breathing, increased RR
Integumentary: hyperactive sweat glands, increased pigmentation, stretch marks
Genitourinary: dilated uterus, increased renal function (increased urea and creatinine clearance), decreased bladder tone, sodium retention
Nutrition: calories, protein, vitamins, minerals, and fiber intake should increase during pregnancy. *Folic acid is important to prevent fetal anomalies (e.g. neural tube defect)

Discomforts during pregnancy		
		Prevention/Interventions:
Nausea/Vomiting	occurs in 1st month, subsides by 3rd month	Eat dry crackers before arising, avoid brushing teeth right after arising, eat small frequent meals, drink in between meals, avoid fried/spicy food
Syncope	occurs in 1st trimester, supine hypotension in 2nd and 3rd trimester	Elevate feet when sitting, change positions slowly
Urinary Urgency	occurs in 1st + 3rd trimester due to uterus pushing on bladder	2L fluid restriction, void regularly, side lying sleep position, Kegel exercises
Breast tenderness	1st-3rd trimester	Wear supportive bra, avoid soap on nipples
Vaginal discharge	1st-3rd trimester	Proper cleansing, cotton underwear, avoid douching
Fatigue	1st and 3rd trimesters	Frequent rest periods, regular exercise
Heartburn	2nd and 3rd trimesters	Small frequent meals, sit up right 30 mins post-meal, drink milk between meals, avoid fatty/spicy food
Ankle edema	2nd and 3rd trimesters	Elevate legs BID, side lying sleep position, supportive stockings, avoid sitting/standing in one position for long
Varicose veins	2nd and 3rd trimesters	Wear supportive stocking, elevate legs when sitting, lay with feet elevated, avoid crossing legs
Hemorrhoids	2nd and 3rd trimesters	Soak in warm sitz bath, sit on soft pillow, high fiber foods + fluid intake, increase exercise

Pregnancy Health Care Visits:
Visit MD every 4 weeks for first 28-32 weeks, every 2 weeks from 32-36 weeks, and every week from 36-40 wks

Nonstress Test	Stress Test
Noninvasive test measuring fetal heart accelerations in response to fetal movement Done between 32-34 weeks gestation Nonreactive result = further testing is needed to determine if the result indicates fetal hypoxia or if result is due to sleep pattern, or maternal prescription drugs Reactive result = normal. Indicates that blood flow and oxygen to fetus is adequate	Test triggers contractions and predicts how baby will react during labour If fetal HR slows during contraction = positive result. Fetus may be experiencing stress during contractions (cannot tolerate contractions) Further testing may be needed If fetal HR doesn't slow down during contraction = normal result. Indicates that the fetus is reacting properly to stress of contractions

Stages of Labour	
First Stage	Onset of true labour – complete dilation of cervix Lasts anywhere from 2-18 hours 3 phases: 1. Latent phase – cervix dilated 0-3 cm, irregular contraction, cervical effacement almost complete 2. Active phase – cervix dilated 4-7 cm, contractions 5-8 minutes apart, cervical effacement complete 3. Transitional phase – cervix dilated 8-10 cm, contractions 1-2 minutes apart + lasting 60-90 seconds
Second Stage	Complete dilation of cervix – delivery Usually lasts ~40 minutes
Third Stage	Delivery – expulsion of placenta Usually lasts 5-30 minutes
Fourth Stage	Maternal-neonatal bonding period Usually lasts 1-4 hours

Presentation:
Cephalic – head first (most common), can be vertex, military, brow, or face
Breech – buttocks first (C section may be required), can be frank, full, or footling
Shoulder – transverse lie or arm/back/abdo/side can be present (C section may be required if fetus doesn't turn)

Station:
Progress of descent in cm above or below midplane
0 – at ischial spine
Minus – above ischial spine
Plus – below ischial spine

True Labor	False Labor
Regular contractions that become stronger, last longer, and occur closer together Cervical dilation + effacement progress Fetus becomes engaged in pelvis and begins to descend	Contractions are irregular, without progression No dilation, effacement, or descent Activity (e.g. walking) relieves false labor

Preterm Labor:
After 20th week but before 37th week gestation

Leopold's Maneuvers:
Palpating to determine presentation + position
Head = hard, round, movable
Buttocks = irregular shape, more difficult to move
Back = smooth, hard surface (should be felt on 1 side of abdomen)

Fetal Heart Rate:
FHR < 110 for 10 mins+ = bradycardia
FHR >160 for 10 mins+ = tachycardia
Priority: 1. Change mother's position 2. Administer O2 3. Check mother's VS
Accelerations: brief increase in FHR lasting about 15 seconds; reassuring sign showing a responsive fetus; usually occurs with fetal movement (or with contractions)
Early decelerations: decrease in FHR occurring during contractions (fetus' head pressed against mother's pelvis); not associated with any fetal compromise; no intervention needed
Late decelerations: decrease in FHR well after the contraction; indicates uteroplacental insufficiency; fetal oxygenation is a priority
Variable decelerations: due to restricted flow through umbilical cord; significant when FHR is <70 bpm for more than 60 seconds
V C V = variable decelerations; C = cord compression
E H E = early decelerations; H = head compression
A O A = accelerations; O = okay, not a problem!
L P L = late decelerations = placental insufficiency
Priority with an un-reassuring FHR: turn woman on L side, give O2, stop Pitocin, increase IV fluids

Premature Rupture of Membranes:
S/S: fluid pooling, positive nitrazine test
Priority: 1. Monitor for infection 2. Avoid vaginal exams 3. ABX if needed

Prolapsed Umbilical Cord:
Causes compression of cord and compromised fetal circulation
S/S: feeling of something coming through vagina, visible/palpable cord, slow FHR with variable decelerations, potential fetal hypoxia
Priority: 1. Elevate fetal part lying on cord 2. Place pt into Trendelenburg 3. Admin O2 (8-10 L) 4. Monitor FHR 5. IV fluids 6. Prepare for birth

APGAR:

	2 points	1 point	0 points
Appearance	All pink	Pink and blue	Blue/pale
Pulse	>100	<100	Absent
Grimace	Cough	Grimace	No response
Activity	Flexed	Flaccid	Limp
Respiration	Strong cry	Weak cry	Absent

Score of 7-10 is excellent, 4-6 indicates moderate depression, and 0-3 is severely depressed (resuscitation needed)

Placenta Previa	Abruptio Placentae
Placenta implanted low in uterus or over cervical os	Premature separation of placenta from wall
S/S: sudden painless, bright red bleeding	S/S: painful dark red bleeding, uterine pain, uterine rigidity, abdo pain
Priority: 1. Ultrasound to confirm 2. Avoid vaginal exam 3. Side lying position 4. Monitor amount of blood 5. IV fluids and blood products 6. C-section may be needed	Priority: 1. Trendelenburg 2. Monitor bleeding 3. O2, IV fluids, blood products 4. Prepare for delivery ASAP

Supine Hypotension:
S/S: pallor, dizziness, tachycardia, hypotension, cool skin, fetal distress
Priority: 1. Side lying position

Lochia:
(Postpartum)
Scant – less than 2.5 cm in 1 hr
Light – less than 10 cm in 1 hr
Moderate – less than 15 cm in 1 hr
Heavy – saturated pad in 1 hr
Excessive – saturated pad in 15 mins
Day 1-3: rubra, Day 4-10: serosa, Day 11-14: alba

Emotional Changes		
Postpartum Blue	Postpartum Depression	Postpartum Psychosis
Anger, anxiety, cries easily, let-down feeling, fatigue, headache, insomnia, restless, sad	Anxiety, change in appetite, cries, difficulty making decisions, fatigue, guilty, irritable, lacks energy, less responsive to baby, loss of pleasure in normal activities, suicidal thoughts	Break with reality, confusion, delirium, delusions, hallucinations, panic

CPR:
CAB – compressions, airway, breathing
1. Determine unconsciousness
2. Check carotid pulse
3. Chest compressions
4. Open airway using head tilt chin lift
5. Check breathing + deliver breaths

Foreign Body Airway Obstruction:
Avoid blind finger sweeps – risk of pushing object further into airway
1. Stand behind pt
2. Place arms around pt's waist
3. Make a fist
4. Place thumb side of fist above umbilicus (and below xiphoid)
5. 5 quick in + up thrusts (use chest thrusts for obese or pregnant pts)
For infant – place pt over arm or on lap with head lower than trunk; 5 back slaps with heel of hand in between shoulder blades, turn infant and perform 5 chest thrusts, check for foreign object (only remove if visible)

Tracheostomy:
Inflated cuff = used for pts at risk of aspiration (e.g. unconscious or mechanically ventilated pts); it is uncomfortable for pts who are awake because it's difficult to swallow/talk
Deflated cuff = used when pts improve and are not at risk for aspiration
When suctioning: pre-oxygenate with 100% O2, insert suction tube without suction turned on, intermittent suctioning in circular motion during withdrawal, suction no more than 10 seconds, wait 1-2 mins before suctioning again (pts will cough when suction tube is inserted – this is ok – insert until resistance is felt)

Tracheostomy Care:
Priority: 1. Keep pt in semi-fowlers 2. Wear mask, goggles, and clean gloves 3. Remove soiled dressing 4. Don sterile gloves 5. Remove old cannula + replace with new one 6. Clean around stoma with sterile water, dry, and replace sterile gauze

Blood Transfusion Administration:
1. Obtain unit of blood and verify product with type + cross results and at least 2 pt identifiers with another RN (remember to only infuse blood 1 unit at a time; also, blood must be administered within 20 mins)
2. Assess pt, VS, and teach S/S of transfusion reaction
3. Use Y tubing primed with NS; clamp NS side
4. Spike blood product and leave the clamp on the side of the blood open
5. Set infusion pump to deliver blood over 2-4 hours
6. Remain with pt for first 15 mins and observe for signs of transfusion reaction (fever, chills, nausea, vomiting, pruritis, hypotension, decreased urine output, back pain, or dyspnea
7. Take another set of VS after 15 mins. Remember to also take a final set of VS
8. Once the transfusion is done, open the saline clamp to flush all blood in the tubing

Post Mortem Care:
Wash body, change linens + gown, close eyes, place pillow under head, fold towel under chin to help close mouth, replace dentures, remove lines/tubes/dressings, place pad under perineum, straighten body/limbs, remove soiled linen

Impaled Object:
To not manipulate/remove! Stabilize the object

Triage:
Red – life threatening injury that a pt may survive if treated within next hour
- E.g.: hemothorax, tension pneumothorax, unstable chest and abdominal wounds, incomplete amputations, open fracture of long bones, and 2nd/3rd degree burn with 15%-40% of total body surface

Yellow – pt can wait 1-2 hours without loss of life or limb
- E.g.: Stable abdo wounds without evidence of hemorrhage, fracture requiring open reduction, debridement, external fixation, most eye and CNS injuries

Green – "walking wounded"
- E.g.: upper extremity fracture, minor burns, sprains, small lacerations, behavior disorders

Black – unlikely to survive
- E.g.: Unresponsive, spinal cord injuries, 2nd/3rd degree burn with 60% of body surface area , seizures, profound shock with multiple injuries, no pulse/BP, pupils fixed or dilated

Sepsis:
SIRS – inflammatory responses (fever, tachycardia, tachypnea)
Sepsis – SIRS + infectious source (e.g. pneumonia, UTI)
Septic shock – sepsis + hypotensive despite adequate IV fluids
MODS – septic shock + multiple organ damage (e.g. ARDS, AKI, low plt)

Angioedema:
Rapid swelling of lips, tongue, throat, face, and larynx → can result in airway obstruction and death

Bipolar:
Bipolar I (sustained mania with depressive episodes)
Bipolar II (at least one major depression episode with at least one hypomanic episode)
Pts with bipolar disorder experience unusually intense emotional states that occur in distinct periods called "mood episodes"

Schizophrenia:
A mental disorder where pts do not think clearly or act normally in social situations and cannot differentiate between reality and fantasy and do not have normal emotional responses. Schizophrenia is characterized by having two or more symptoms a significant portion of the time over a period of one month. Symptoms may include: delusions, hallucinations, disorganized speech, disorganized behavior, and negative symptoms (loss of pleasure, flat affect, poor grooming, poor social skills, and social withdrawal)

Delirium vs Dementia:
Delirium - an acute state of confusion that usually affects older adults following surgery or a serious illness. A longer length of stay can oftentimes be associated with an increase in mortality. Providing as much normalcy for these patients is essential. Examples of this may include maintaining a sleep/wake cycle pattern, reality orientation and maintaining a safe environment.
Dementia - a chronic state of confusion typically seen in elderly patients over time. Interventions may include providing meaningful stimuli, maintaining a safe environment, and avoiding stressful situations.

PTSD:
Stressors: natural disaster, terrorist attack, accident, rape/abuse, crime/violence

Depression:
Treatment: counseling, antidepressants, and ECT
If risk for harm exists: provide safety from suicidal actions, do not leave pt alone for extended periods, if pt has a suicidal plan have one-on-one supervision, form a “no suicide contract”
ECT: causes a brief seizure within the brain. It is an effective treatment (not cure) for depression

Personality Disorder:
Maladaptive behaviour that can impair functioning + relationships; pt lacks insight into their behaviour; can lead to a psychotic state
Cluster A: odd + eccentric (schizoid, schizotypal, and paranoid)
Cluster B: overemotional + erratic (histrionic, narcissistic, antisocial, and borderline)
Cluster C: anxious + fearful (OCD, avoidant, and dependent)

Nursing Roles:
CNA- Handles your patient's hygiene needs, ADLs, toileting, monitoring patient safety and linen changes. They can also walk your patient if there is a physician order.
LPN- Similar role as RN but cannot push or give any intravenous medications. Also is responsible for nursing interventions but not nursing assessment.
RN- Provides nursing assessments applies the nursing process and can give intravenous medications/fluids.

1. Delegate sterile skills such as dressing changes to the RN or LPN. Where nonskilled care is required, you can delegate the stable client to the nursing assistant. Choose the most critical pt to assign to the RN, such as the client who has recently returned from chest surgery. Pts who are being discharged should have final assessments done by the RN.
2. The LPN, like the RN, can monitor clients with IV therapy, insert urinary catheters and feeding tubes, apply restraints, discontinue IVs, drains, and sutures.
3. Do not delegate what you EAT (evaluate, assess, teach)
4. LPN cannot handle blood

Advanced Directives:
A written document by a competent person, regarding their health care preference. An Advance Directive may include a living will and/or a durable power of attorney for health care.
A living will is a written directive regarding the course, continuation, or discontinuation of medical treatment in the event that a person becomes incompetent.
A durable power of attorney for health care is a written designation to authorize one or more person(s) to make health care decisions in the event of a person becoming incompetent to make their own decisions.
Informed consent is the legal obligation to provide full disclosure to a patient regarding potential risks and outcomes of tests and treatments. The obligation is operative in the development of the Advance Directive because the corollary is the right not to consent to treatment.

Antacids: decrease gastric acidity, protect stomach mucosa, decrease epigastric pain			
MOA: binds with excess acid	E.g.: magnesium/aluminum hydroxide (Maalox), aluminum hydroxide	SE: aluminum causes constipation, magnesium causes diarrhea	Nursing: avoid foods that increase distress, be cautious with overuse (can cause rebound hyperacidity)
Antidiarrheals: decreases diarrhea, increases production of formed stool			
MOA: decreases motility, causing more water to be absorbed by large intestine	E.g.: diphenoxylate HCl (Lomotil), loperamide (Imodium)	SE: tachycardia, resp depression, ileus, urinary retention, dry mouth	Nursing: monitor for fluid + electrolyte imbalance
Antibiotics: destroy or decrease growth of susceptible microorganisms			
MOA: Aminoglycosides – decrease protein synthesis Cephalosporins – bind to cell wall causing cell death Fluoroquinolones – decrease DNA synthesis Macrolides – decrease protein synthesis Penicillin – bind to cell wall causing cell death Sulfonamides – decrease protein synthesis Anti-infectives – decrease protein + DNA synthesis, bactericidal, trichomonacidal, amebicidal	E.g.: Gentamicin Cefazolin (Ancef) Ciprofloxacin (Cipro) Azithromycin (Zithromax) Amoxicillin (Amoxil) Doxycycline (Vibramycin) Metronidazole (Flagyl)	SE: hypersensitivity reactions (rash, anaphylaxis)	Nursing: C&S should be done bef starting med, assess for hepatotoxicity + nephrotoxicity, te pt that entire prescription is to be completed
Anticoagulants: interfere with normal coagulation leading to decrease in thrombus formation/extension			
MOA: Thrombin inhibitors – decreases conversion of prothrombin to thrombin + conversion of fibrinogen to fibrin Low molecular weight heparin – block coagulation factor Xa Clotting factor inhibitor – interfere with Vit K synthesis Platelet inhibitors – decrease platelet aggregation	E.g.: Heparin Dalteparin (Fragmin), enoxaparin (Lovenox) Warfarin (Coumadin) Clopidogrel (Plavix)	SE: excessive bleeding (bruising, melena, epistaxis, bleeding gums, low hgb, thrombocytopenia)	Nursing: notify MD of bleeding, monitor PTT/PT/INR
Antiemetics: decrease nausea + vomiting, prevent and decrease motion sickness			
MOA: 5 HT3 antagonist – blocks serotonin @ receptor site in vagal nerve terminals + chemoreceptor trigger zone in CNS	E.g.: Ondansetron (Zofran)	SE: headache, dizziness, constipation, diarrhea	Nursing: give 30-60 mins before chemo, avoid alcohol
Antifungals: decrease fungal growth			

MOA: impair fungal plasma membrane	E.g.: clotrimazole (Mycelex), nystatin (Mycostatin)	SE: renal + liver + ototoxicity, teratogenic, nausea, vomiting, diarrhea	Nursing: complete entire regimen
Analgesics, Antipyretics, NSAIDS: decrease synthesis of prostaglandins, which decreases pain/fever/inflammation			
MOA: Analgesics – inhibit prostaglandins involved in pain + fever NSAID – inhibit prostaglandins involved in inflammation, pain, and fever	E.g.: Acetaminophen (Tylenol) Ibuprofen (Advil, Motrin), naproxen (Aleve, Naprosyn)	SE: hepatic toxicity, rash, tinnitus, flu-like S/S	Nursing: do not exceed recommended dose in 24 hrs (tyle max dose is 4g/24 hr), monitor for bleeding (anemia, melena), avoid alcohol
Antihistamines: decreases S/S of allergy + motion sickness			
MOA: blocks histamine, which decreases allergic responses and motion sickness	E.g.: diphenhydramine (Benadryl), loratadine (Claritin)	SE: dry eyes + mouth, constipation, blurred vision, sedation	Nursing: contraindicated in narrov angle glaucoma, administer with f to decrease GI irritation, gum/hard candy helps increase salivation + decrease dry mouth
Antihypertensives: decreases BP			
MOA: ACEI – decreases release of aldosterone which increases the excretion of Na and H20 CCB – increases relaxation and dilation of vascular smooth muscle of coronary arteries ARB – decreases vasoconstriction and decreases release of aldosterone BB (selective) – blocks stimulation of beta 1 (myocardial) receptors BB (nonselective) – blocks stimulation of beta1 (myocardial) and beta2 (pulmonary) receptors	E.g.: Enalapril (Vasotec), lisinopril (Prinivil), ramipril (Altace) Amlodipine (Norvasc), diltiazem (Cardizem), nifedipine (Procardia) Irbesartan (Avapro), losartan (Cozaar), valsartan (Diovan) Metoprolol (Lopressor) Carvedilol (Coreg), labetalol	SE: dizziness, weakness, flushing, bradycardia	Nursing: abrupt withdrawal can le to HTN or dysrhythmias, assess fo increased fluid volume, monitor B and HR
Antilipidemic: decreases LDL, triglycerides, and total cholesterol. Increases HDL			
MOA: HMG-CoA reductase inhibitor – inhibits enzyme HMG-CoA which is a catalyst in synthesis of cholesterol Bile acid sequestrants – binds cholesterol in GI Cholesterol absorption inhibitor – inhibits absorption of cholesterol in small intestine	E.g.: Atorvastatin (Lipitor), rosuvastatin (Crestor), simvastatin (Zocor) Cholestyramine (Questran) Ezetimibe (Zetia)	SE: nausea, vomiting, abdo cramps, diarrhea, constipation	Nursing: avoid grapefruit juice wit HMG-CoA (increases toxicity)
Antineoplastics: destroy or decrease growth of neoplastic cells			

MOA: Alkylating agent – decreases DNA synthesis + prevents replication Antimetabolite – decreases DNA synthesis + metabolism	E.g.: Carboplatin (Paraplatin), cisplatin (Platinol) Fluorouracil, methotrexate (Mexate)	SE: renal + GI + skin problems, nephrotoxic, ototoxic, alopecia	
Antituberculars: decreases cough, sputum, fever, night sweats. Produces negative culture for M. tuberculosis			
MOA: decreased mycobacterial cell wall synthesis	E.g.: isoniazid, rifampin, ethambutol	SE: peripheral neuropathy, hepatotoxicity, diarrhea, optic neuritis	Nursing: avoid aluminum containi antacids within 1 hr of isoniazid, rifampin will produce orange colo urine
Antivirals: prevents or decreases severity of viral infection (not a cure)			
MOA: Decreases entry of virus into a host or decreases viral DNA synthesis	E.g.: oseltamivir (Tamiflu) for Influenza A, acyclovir (Zovirax) for herpes simplex/genital/zoster/ varicella	SE: anorexia, nausea, vomiting, diarrhea, headache, vaginitis	Nursing: C&S needed before givir med
Bronchodilators: promote bronchial expansion, increases transfer of gases, decreases wheezing/SOB			
MOA: Xanthines – relax bronchial smooth muscle, decrease spasms Anticholinergics – decrease action of Ach receptors in bronchial smooth muscle Leukotriene receptor antagonists – decrease edema, bronchoconstriction, and inflammation Inhaled steroids – decrease local inflammatory response and edema, increase airway diameter	E.g.: Theophylline Ipratropium (Atrovent) Montelukast (Singulair) Budesonide (Pulmicort), fluticasone (Flovent)	SE: increases HR, decreases BP, palpitations, dizziness, headache, weakness, dry mouth, urinary retention	Nursing: wait 1-5 mins between inhalers (use bronchodilator first), rinse mouth after use, encourage fluid intake to avoid dry mouth
Antisecretory agents: decrease gastric acidity and pain			
MOA: H2 antagonist – decreases histamine at H2 receptors in parietal cells, leading to decreased gastric sections PPI – decreases entry of H+ ions into gastric lumen	E.g.: Famotidine (Pepcid), ranitidine (Zantac) Omeprazole (Prilosec), lansoprazole (Prevacid), pantoprazole (Protonix)	SE: confusion, dizziness, drowsiness, headache, nephrotoxicity	Nursing: may increase anticoagula effect of warfarin, administer 1-2 l before or after antacids, do not cru PPIs
Diuretics: increase urine output, decrease hypervolemia/BP/edema/ICP			
MOA: Thiazide – decreases Na and Cl resorption in distal convoluted tubule and decreases Cl resorption in loop of Henle Loop – decreases Na and Cl resorption in ascending loop of Henle and distal tubule	E.g.: Hydrochlorothiazide, metolazone (Zaroxolyn) Furosemide (Lasix), bumetanide (Bumex)	SE: dehydration, orthostatic hypotension, decrease in potassium (except in potassium sparing diuretic), fluid + electrolyte imbalance	Nursing: monitor K level, give in morning to avoid sleep disruption will be peeing after this med), cha position slowly to avoid orthostati hypotension

Potassium sparing – acts in distal tubule, decreases action of aldosterone, increases Na excretion and retains K	Spironolactone (Aldactone)		
Hypoglycemics (Oral): control blood glucose in T2DM			
MOA: Sulfonylurea – stimulates beta cells to release insulin Biguanides – increase sensitivity to insulin, increases binding of insulin to receptor Meglitinides – increase release of insulin in pancreas	E.g.: Glimepiride (Amaryl), glipizide (Glucotrol), glyburide (Micronase) Metformin (Glucophage) Repaglinide (Prandin)	SE: hypoglycemia	Nursing: contraindicated in T1DM monitor for hypoglycemia
Laxatives: decrease constipation			
MOA: Bulk-forming – increase bulk and stimulate peristalsis Stool softeners – water and fat enter feces to soften and decrease drying of stool Stimulant – irritates = rapid propulsion of contents Saline osmotic – draws water in and stimulates peristalsis	E.g.: Psyllium (Metamucil) Docusate sodium (Colace) Bisacodyl (Dulcolax), sennakot Milk of magnesia, sodium phosphate fleet	SE: cramps, fluid and electrolyte imbalance	Nursing: contraindicated in nausea vomiting, abdo pain or abdo obstruction, administer at bed time encourage an increase in fluid inta saline osmotic is most rapid acting
Opioids: decrease transmission of pain impulse			
MOA: combine with opioid receptors in CNS	E.g.: codeine, fentanyl, hydrocodone, hydromorphone, methadone, morphine, oxycodone	SE: decreased RR, sedation, constipation, nausea, drowsiness	Nursing: monitor for respiratory depression (keep naloxone availab for toxicity)
Opioid antagonist: reverses opiate induces CNS depression and decreased respiratory function			
MOA: displaces opioid at respiratory receptor site via competitive antagonism	E.g.: naloxone (Narcan)	SE: nausea, vomiting, v fib	Nursing: monitor for opioid withdrawal
Anxiolytics, sedatives, hypnotics: decrease anxiety, induce sleep, and ease alcohol withdrawal			
MOA: Benzodiazepines – increase action of GABA inhibitory neurotransmitter Nonbarbiturates – CNS depressant effect	E.g.: Short acting: alprazolam (Xanax) Medium acting: lorazepam (Ativan) Long acting: chlordiazepoxide (Librium), clonazepam, diazepam Buspirone (BuSpar), diphenhydramine (Benadryl), zolpidem (Ambien)	SE: decreased mental alertness, hypotension, dizziness, headache, euphoria	Nursing: barbiturates are rarely us due to greater dependence, avoid alcohol and caffeine
Antidepressants: lift depressed mood, decrease S/S of panic and ADD			

MOA: TCA – decrease reuptake of norepinephrine and serotonin into presynaptic nerve terminals SSRI – decrease reuptake of serotonin into presynaptic nerve terminals MAOI – decrease breakdown of norepinephrine, dopamine, and serotonin Atypicals – increase effects of dopamine, serotonin, and norepinephrine	E.g.: Amitriptyline (Elavil), nortriptyline (Pamelor) Citalopram (Celexa), fluoxetine (Prozac), paroxetine (Paxil), sertraline (Zoloft) Phenelzine (Nardil) Bupropion (Wellbutrin), mirtazapine (Remeron), venlafaxine (Effexor)	SE: anticholinergic effects, sexual dysfunction, dizziness, headache, weight gain + appetite increase	Nursing: assess for SI (especially when energy + mood increases), meds need to be used for a minimu 2-6 wks to avoid serotonin syndro do not d/c med abruptly, avoid giv TCA to narrow angle glaucoma pt avoid food containing tyramine wi MAOI
Antipsychotics: decrease agitated behaviour and psychotic symptoms			
MOA: Typical – for positive symptoms Atypical – for negative symptoms	E.g.: Haloperidol, prochlorperazine Clozapine (Clozaril), olanzapine (Zyprexa), quetiapine (Seroquel), risperidone (Risperdal)	SE: EPS (dystonia, akathisia, parkinsonism, tardive dyskinesia), sedation, hypotension, sexual dysfunction, anticholinergic effects	Nursing: effects may take 2 wks t see, increase fluid and fiber to avo anticholinergic effects, avoid caffe administer meds to decrease EPS S (benztropine, clonazepam, diazepa
Antiseizure: decreases occurrence, frequency, and severity of seizures			
	E.g.: carbamazepine (Tegretol), gabapentin (Neurontin), phenytoin (Dilantin), phenobarbital (Luminal), valproid acid (Depakote), lamotrigine (Lamictal), levtiracetam (Keppra), topiramate (Topamax)	SE: drowsiness, dizziness, nausea, vomiting, headache, hypotension, respiratory depression Phenytoin – ataxia, gingival hyperplasia	Nursing: increase dose gradually, provide oral hygiene, avoid alcoh and other CNS depressants, seizur occur with abrupt withdrawal
Antiparkinsons: restores dopamine and acetylcholine balance			
MOA: Dopaminergic – increases dopamine Anticholinergics – decreases excess cholinergic activity	E.g.: Amantadine (Symmetrel), bromocriptine (Parlodel), carbidopa-levodopa (Sinemet) Benztropine (Cogentin)	SE: hypotension, increased HR, fatigue, nausea, vomiting, dry mouth, constipation, toxicity = muscle twitching	Nursing: do not d/c abruptly (can cause Parkinsonian crisis)
Anti-Alzheimer's: decreases S/S of dementia			
MOA: increase in acetylcholine levels	E.g.: donepezil (Aricept), glantamine (Reminyl)	SE: anorexia, nausea, vomiting, headache, dizziness, insomnia	Nursing: use cautiously for pts wit COPD, teach that this med is not a cure
Antidysrhythmics: decrease abnormal electrical conduction			
MOA: Class 1 (calcium ion antagonist) – slows conduction, used for ventricular dysrhythmias	E.g.: Procainamide (Procanbid), lidocaine (Xylocaine)	SE: heart failure, hypotension, anticholinergic effects, diarrhea, new dysrhythmias	Nursing: use infusion pump if givi IV med, monitor HR before administration

Class 2 (beta adrenergic blocker) – decreases cardiac excitability, output, and workload, decreases HR + BP Class 3 (potassium channel blocker) – slows HR + conduction, used for ventricular and supraventricular dysrhythmias Class 4 (CCB) – decreases entry of Ca into myocardial cells, decreases SA and AV node conduction, used for afib and SVT	Metoprolol (Lopressor) Amiodarone (Cordarone) Verapamil (Calan), diltiazem (Cardizem)		
Cardiac Glycosides: increase force of contraction, decrease HR, increase cardiac output			
MOA: inhibits Na, K-ATP = increases cardiac intracellular Ca and increases myocardial contractility	E.g.: digoxin (Lanoxin)	SE: low HR, drowsiness, fatigue, weakness	Nursing: give loading dose first, assess apical pulse before giving n
Cardiac Stimulants: increase HR			
MOA: stimulate alpha and beta receptors to increase HR and contractility	E.g.: atropine sulfate, dobutamine, norepinephrine (Levophed), epinephrine (Adrenalin)	SE: dysrhythmias, increased HR, headache, anticholinergic effects	Nursing: continuous ECG when gi IV med
Coronary Vasodilators: dilate arteries, decrease preload + afterload, decrease myocardial O2 consumption			
MOA: blocks Ca channel or relaxes smooth muscle to treat angina and mild HTN	E.g.: amlodipine (Norvasc), nifedipine (Procardia), nitroglycerine (Nitro), verapamil (Calan)	SE: orthostatic hypotension, increased HR, headache, dizziness, nausea, vomiting, flushing	Nursing: put oral nitroglycerin und tongue and avoid sudden standing

In General:

- Identify the key word (may relate to pt, a condition, etc.), which will help you focus on exactly what the questions wants you to answer
- If 2 of the answers are opposite to one another, one of them is most likely the correct answer
- Absolute answers (answers that include the words "all", "never", and "always") are usually not the correct answer
- Imagine you are in the "NCLEX world/hospital" – you are only 1 nurse with 1 patient, have all the orders written (only time you need to speak with a doctor is if an intervention fails and there is nothing else you can do)
- Never "contact the provider" about an expected outcome/result from a disease process
- Do not focus on background information in the question, however, you still need to read every single word of the question – don't skim!!
- Words: most, first, best, primary, and initial = you must establish priorities
- Phrase: further teaching is necessary = the answer will contain incorrect information
- Phrase: patient understands the teaching = the answer will contain correct information
- For prioritization questions, remember your ABC's, Maslow's hierarchy of needs, and nursing process when choosing your answer
- Eliminate incorrect answers
- Some answers won't be the "ideal" answer.. you need to pick the best possible answer from the options you have, even if your ideal answer isn't listed
- Pick the broadest + most comprehensive answer (umbrella effect) – this answer includes all of the other answers in it
- Focus your answer on the patient
- If you MUST guess, choose an answer that looks different from the other options
- Do NOT look for patterns in your answers – if you've picked option A for the past 3 questions, do not avoid option A on your current question
- Do not second guess yourself – usually your first/gut answer is the correct answer
- With mental health questions, always promote open communication and acknowledge the pt's feelings
- Ultimately, the more you practice NCLEX style questions, the better you will get at answering them!

Select All That Apply:

- Treat each option as a true or false question (reword each answer into a statement and then determine if the answer is true or false)

Hot Spot:

- Know your anatomical landmarks for this type of question

Fill in the Blank:

- These questions are usually med calculations or calculating intake + output
- Pay close attention to the unit of measurement you need for your final answer

Drag and Drop/Ordered Response:

- These questions are usually based on steps of performing a procedure or steps for donning/doffing PPE
- Imagine yourself performing the procedure before and after you answer the question
- All options must be used when putting the answer together