Pharmacology

Pharmacological Therapies NCLEX expectations:

- Pharmacological Therapies – the LPN/VN provides care related to the administration of medications and monitors clients who are receiving parenteral therapies.
- This list is what NCLEX expects you to know about Pharmacology (NCLEX test plan, ncsbn.org).

- Perform calculations needed for medication administration
- Reinforce education to client regarding medications
- Evaluate client response to medication (e.g., adverse reactions, interactions, therapeutic effects)
- Follow the rights of medication administration
- Maintain medication safety practices (e.g., storage, checking for expiration dates, compatibility)
- Reconcile and maintain medication list or medication administration record (e.g., prescribed medications, herbal supplements, over-the-counter medications)
- Collect required data prior to medication administration (e.g., contraindications, desired therapeutic effects, current medications)
- Administer medication by oral route
- Administer intravenous piggyback (secondary) medications
- Administer medication by gastrointestinal tube (e.g., g-tube, nasogastric (NG) tube, g-button, j-tube)
- Administer a subcutaneous, intradermal or intramuscular medication
- Administer medication by ear, eye, nose, inhalation, rectum, vagina or skin route
- Count narcotics/controlled substances and report discrepancies
- Calculate and monitor intravenous (IV) flow rate
- Monitor transfusion of blood product
- Maintain pain control devices (e.g., epidural, patient control analgesia, peripheral nerve catheter)

Reinforce education to client regarding medications:
Remember to always teach patients about foods, alcohol, activities that don't mix with meds!

- Foods to avoid= green leafy veggies with Coumadin
- Pain meds= avoid ETOH
- MAOI's = wine, cheese, Processed foods (Tyramine), Asian foods
- Most meds= no grapefruit or grapefruit juice
- Take iron with OJ/straw & high fiber diet
- No Viagra (Sildenafil) with NTG

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Evaluate client response to medication (e.g., adverse reactions, interactions, therapeutic effects)

Identify potential and actual incompatibilities of client medications: cloudy and crystalizing in tubing means not compatible; Midzolam, hydrocortisone, and vancomycin (need own IV line and site)
Identify a contraindication to the administration of a prescribed or over-the-counter medication to the client: St. John's Wort not compatible with anything, decreases effectiveness of OC's. Birth control

Identify symptoms of an allergic reaction (e.g., to medication): itching, rash, tingling around mouth/tongue, whelps, redness, blotchy, itchy throat

Implement procedures to counteract adverse effects of medications: anti-histamine (Benadryl or diphenhydramine) and Epinephrine injection, monitor closely Resp status and Vitals, do not leave patient, report to provider, do not give another dose!

Withhold medication dose if client experiences adverse effect to medication: always hold if pt states is allergic or reacted, check records and report to HCP

Allergic reaction to meds:

- Signs/symptoms:
- Swelling around mouth/lips, eyes edematous, red spots, blotches on skin, redness, itchy throat, cough, itchy all over, hives/whelps, wheezing, difficulty breathing, stridor, add in any other s/s you can think of

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*Monitor and document client response to actions taken to counteract adverse effects of medications- Did it work? Ausc. Lungs, decreased edema and redness, less itchy, Vital signs improving? O2 sat? Status improving? Feeling better?

*Monitor client for actual and potential adverse effects of medications (e.g., prescribed, over- the-counter and/or herbal supplements) what would you monitor if the case of an adverse reaction in your patient?

*Monitor anticipated interactions among client prescribed medications and fluids (e.g., oral, IV, subcutaneous, IM, topical) antifungals may slow down liver function and cause other meds to not be as effective check LFT's before give any antifungals.

*Monitor and document client-side effects to medications: "patient c/o throat itching, and skin "crawling" after taking prn med morphine 4 mg po, no redness noted on skin, resp 18/min, BBS clear to auscultation at this time, MD notified, will continue to monitor"

*Monitor and document client response to management of medication side effects including prescribed, over-the-counter and herbal supplements

*Reinforce client teaching on possible effects of medications (common side effects or adverse effects, when to notify primary health care provider)

*Notify primary health care provider of actual/potential adverse effects of client medication

Classes of Drugs

A-"pril" = Ace Inhibitors HR/BP- ending in "pril" cause a cough
Arbs- Angiotensin2Receptor Blockers – HR/BP end in "sartans" use these if patient cannot tolerate Ace's

Beta Blockers – HR/BP- end in "LOL"- Laughing Out Loud blocks stress and is good for your heart!

Calcium Channel Blockers- HR/BP - ending in "pine" Very Nice Drugs – Amlodipine (Norvasc) Nifedipine (Procardia)

Corticosteroids- suppress inflammatory response, resp. and systemic but S/E is raises blood sugar, they usually end in "sone"

Diuretics- urination, watch I&O, and K+ levels, Furosemide, Thiazide even with K+ sparing Spironolactone

Anti-Platelet and Thinners- ASA (antidote is Sodium Bicarb), Coumadin(antidote Vit K), Heparin(antidote is Protamine Sulfate)- watch for easy bruising, bleeding gums, blood in urine (cola colored) blood in stool.

Tylenol (Acetaminophen) hard on liver antidote is Mucomyst (stinks like sulfur)

NSAid's is tough on liver-will make your hands swell if taking too much Aminoglycoside- strong antibiotics, end in micin/mycin have ototoxicity!!! "Mice" have big ears so remember these could damage hearing or cause tinnitus

H2 antagonists- reduce stomach acid drugs- end in "mine" and "dine"- famotidine (Pepcid), nizatidine (Axid), cimetidine (Tagamet)

Antihistamines- Benadryl (diphenhydramine) will run up BP, dehydrate, and cause Urinary retention in BPH males

Expected Actions/Outcomes:
Identify client expected response to medication

Use resources to check on purposes and actions of pharmacological agents, drug book, drug apps on phone, pharmacist, MD, Physician's Desk Reference (PDR)

Apply knowledge of pathophysiology when addressing client pharmacological agents- elderly patients do not process medications as fast, will build up in their system, Start with LOW dose and go SLOW!!!! Children are dosed according to weight.

Monitor client use of medications over time (e.g., prescription, over-the-counter, home remedies) have they built up a tolerance to this pain med or Blood pressure med? Are their SQ sites used up?

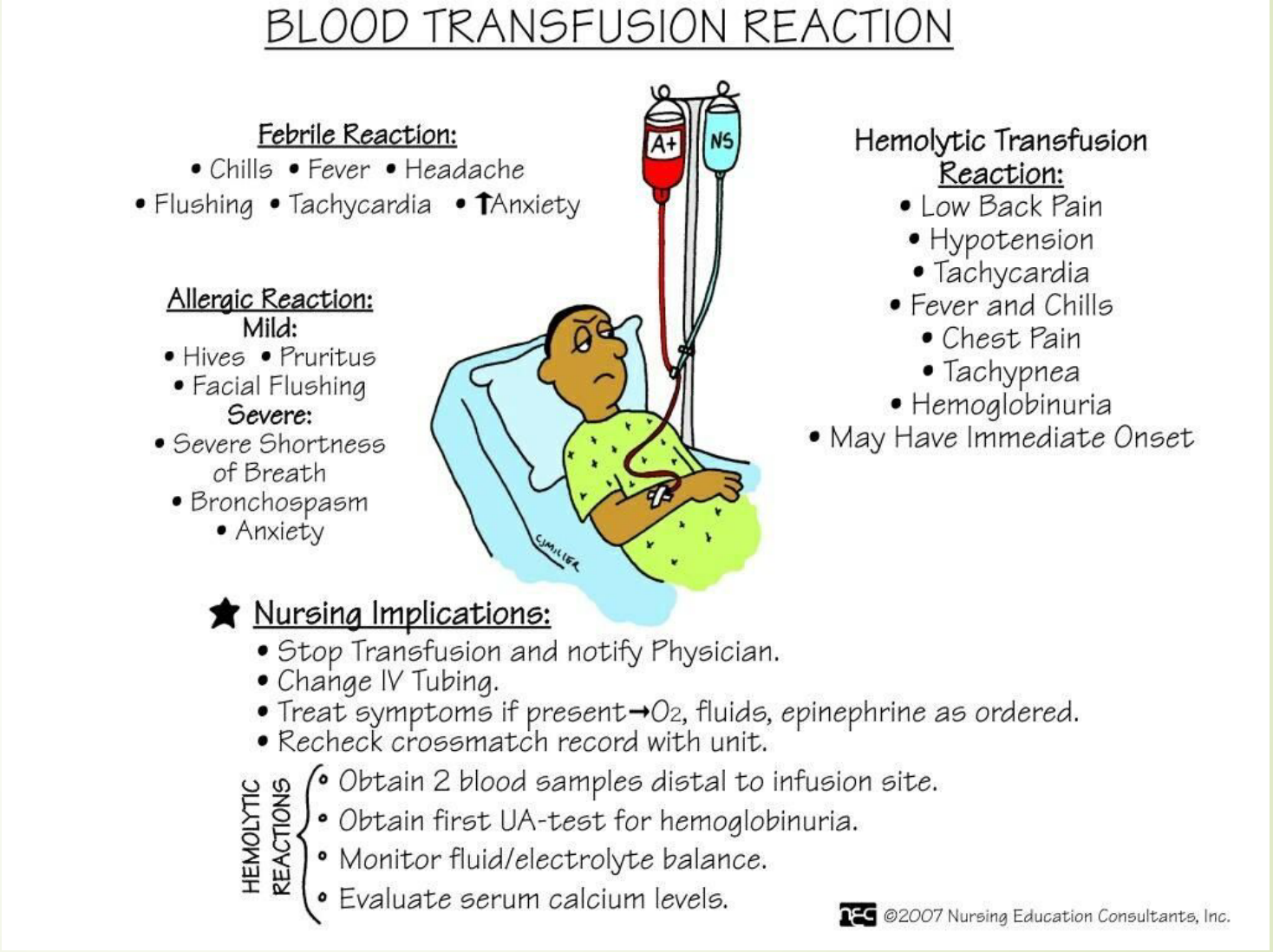
Reinforce education to client regarding medications- ACE inhibitors can cause a cough, report to provider, may need to change to ARB class.

Reinforce client teaching on actions and therapeutic effects of medications and pharmacological interactions - is headache better? Is BP lower? Is BG lower? Is urine output more after diuretic? etc

Evaluate client response to medication (e.g., adverse reactions, interactions, therapeutic effects) tolerating well? Too washed out? Too fatigued? Bruising too easily? etc

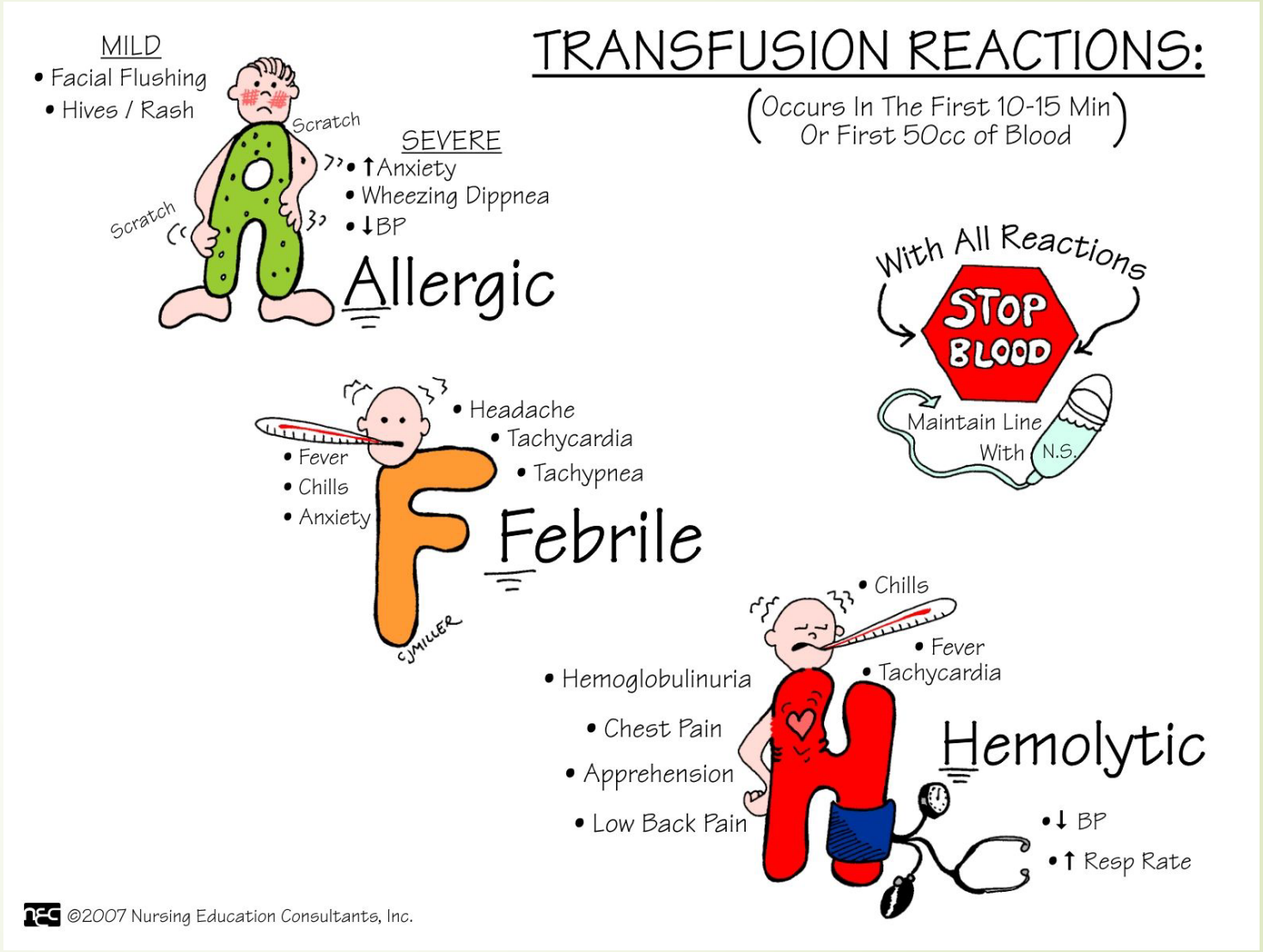
Monitor transfusion of blood product

- Always check the blood to be infused with lab technician and another nurse.
- Be sure it matches the patient, the order, check for expiration, can only hang with NS
- remember it can not hang longer than 4 hours or will grow bacteria and make patient sick.
- Use special filter tubing
- Stay with the patient first 15 minutes after infusion starts



Blood transfusions

- Low back pain is a LATE sign of reaction- always stay with the patient,and watch for reaction symptoms.
- If having a reaction, stop/clamp off the blood immediately and open the Normal Saline line wide open to flush out blood. NOTIFY PROVIDER!!



Follow the rights of medication administration:

Medication Administration

*Identify client need for PRN medications

*Mix client medication from two vials as necessary (e.g., insulin)

*Follow the rights of medication administration (see slide)

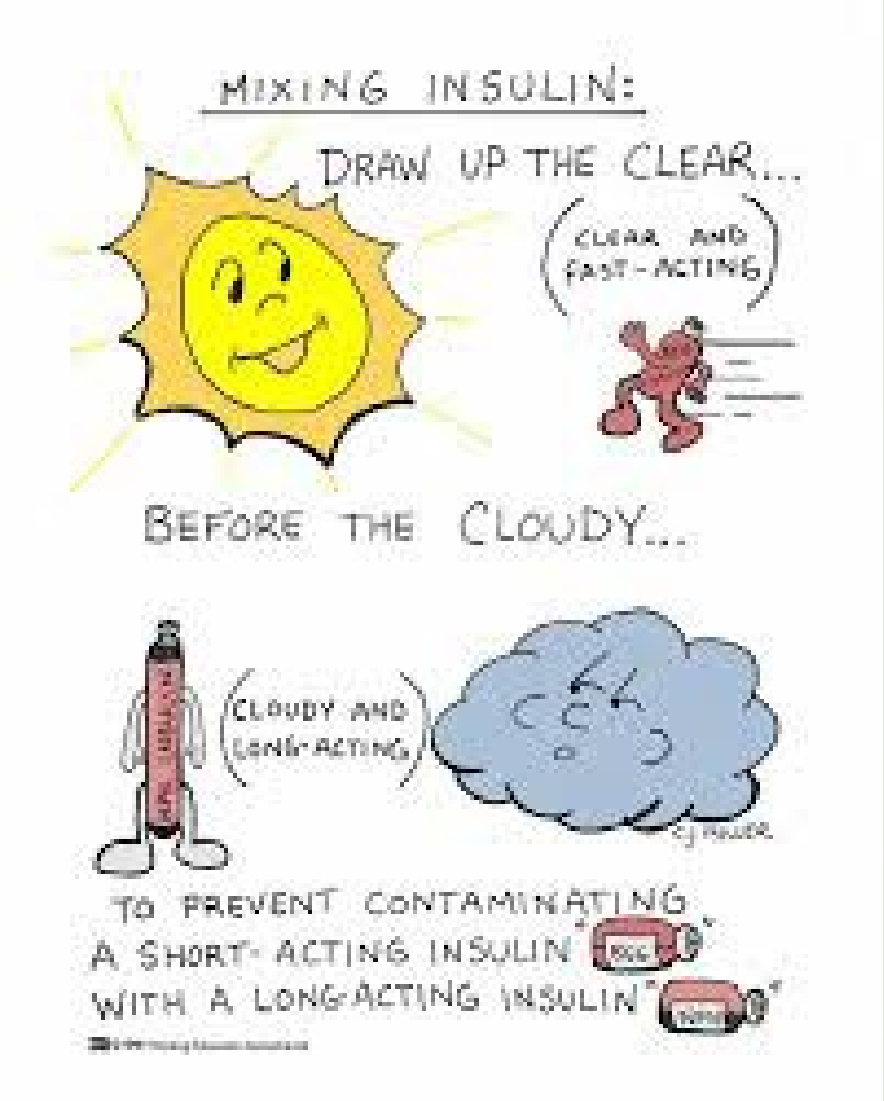
Maintain medication safety practices (e.g., storage, checking for expiration dates, compatibility)

Reconcile and maintain medication list or medication administration record (e.g., prescribed medications, herbal supplements, over-the-counter medications)

*Collect required data prior to medication administration (e.g., contraindications, desired therapeutic effects, current medications)

Reinforce client teaching on client self administration of medications (e.g., insulin, subcutaneous insulin pump

- Insulin- when mixing always start with clear then go to cloudy
- Rapid- Humalog, Novolog
- Short/fast acting insulin: R, Novolin
- Intermediate insulin: NPH, Lente
- Long/slow acting insulin: Lantus, Glargine
- Mixed: Humulin 70/30 Novolog 70/30



Maintain medication safety practices (e.g., storage, checking for expiration dates, compatibility)

- Remember some meds have sensitivity to light, must be in dark bottle NTG SL or have a dark bag slipped over the IVPB while infusing to avoid sunlight or light damaging the medication. Store in room temp or refrigerate as directed. Insulin can now be room temp, dispose of any unused medications per facility policy.

Reconcile and maintain medication list or medication administration record (e.g., prescribed medications, herbal supplements, over-the-counter medications)

- Be sure to record all prescription meds as on bottle, all vitamins, all herbal supplements, any samples they have, and when the last time they took them was. This is part of the history that will be on the patients record and the MAR may reflect these. Also, may need lab for some meds.

Pharmacological Pain Management

Identify client need for pain medication, how? Vital signs, pain is subjective what the patient says, pain scale 1-10, facial grimacing

Monitor and document client response to pharmacological interventions (e.g., pain rating scale, verbal reports) always monitor respiratory status with pain meds.

Maintain pain control devices (e.g., epidural, patient control analgesia, peripheral nerve catheter) remember must be able to feel feet and wiggle toes before letting up after epidural, always remind family members not to push the PCA button, even the nurse can not push it, why? Overdose the patient! They are violating pts rights/laws

Administer medication by oral route

- The nurse is caring for a client who has a prescription for ampicillin 375 mg, p.o., every 6 hours. The nurse has ampicillin 250 mg per 5 mL of solution available. How many mL should the nurse administer to the client with each dose? Record your answer using 1 decimal place. 7.5 mL

Administer intravenous piggyback (secondary) medications

- Always be sure tubing is fresh- change every 24 hours- label your tubing with date/time/initials
- Always be sure compatible with the primary fluids and the bag is labeled and patients rights checked
- Always open the vent if glass container NTG acetaminophen come in glass bottles
- Always assess the IV site to ensure patent and not infiltrated
- NEVER administer Vancomycin fast, it will cause red man syndrome

Vancomycin

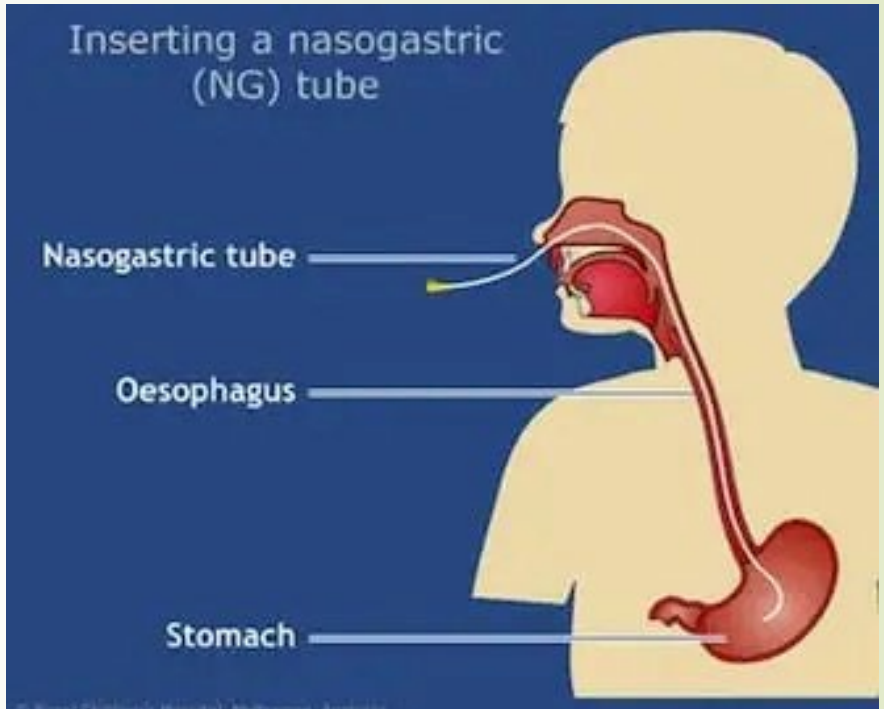
- Strong IVPB antibiotic can not be administered fast, must be administered slowly, over 1 hour or more. Assess for severe reaction- stop immediately and notify provider. Maintain patent airway, breathing, circulation (heart beat) and follow protocol.

*Administer medication by gastrointestinal tube (e.g., g-tube, nasogastric (NG) tube, g-button, j-tube)

*Can not crush EC, ER, capsules, or slow-release meds to put through a tube. Ask for alternative

*Always check for placement- stomach contents, x-ray, pH strip, before administering meds

*Flush with 30 ml water before and after each med



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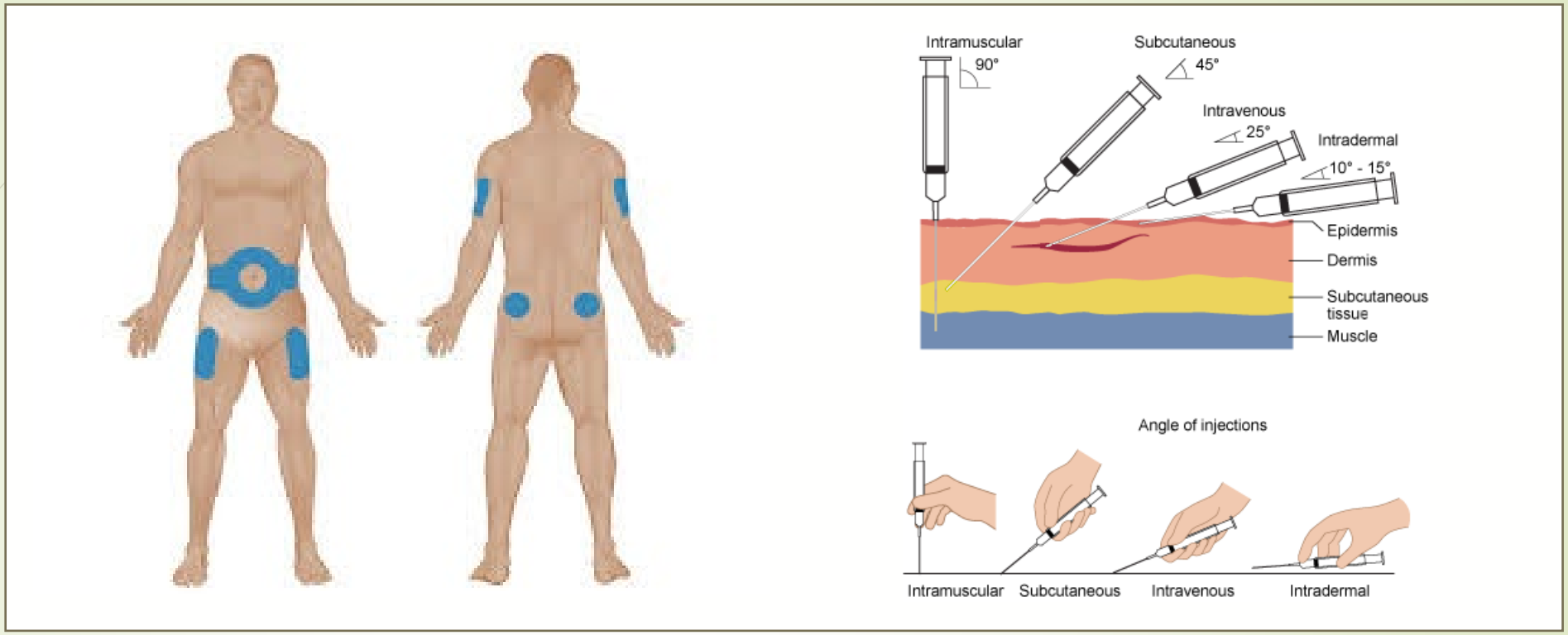
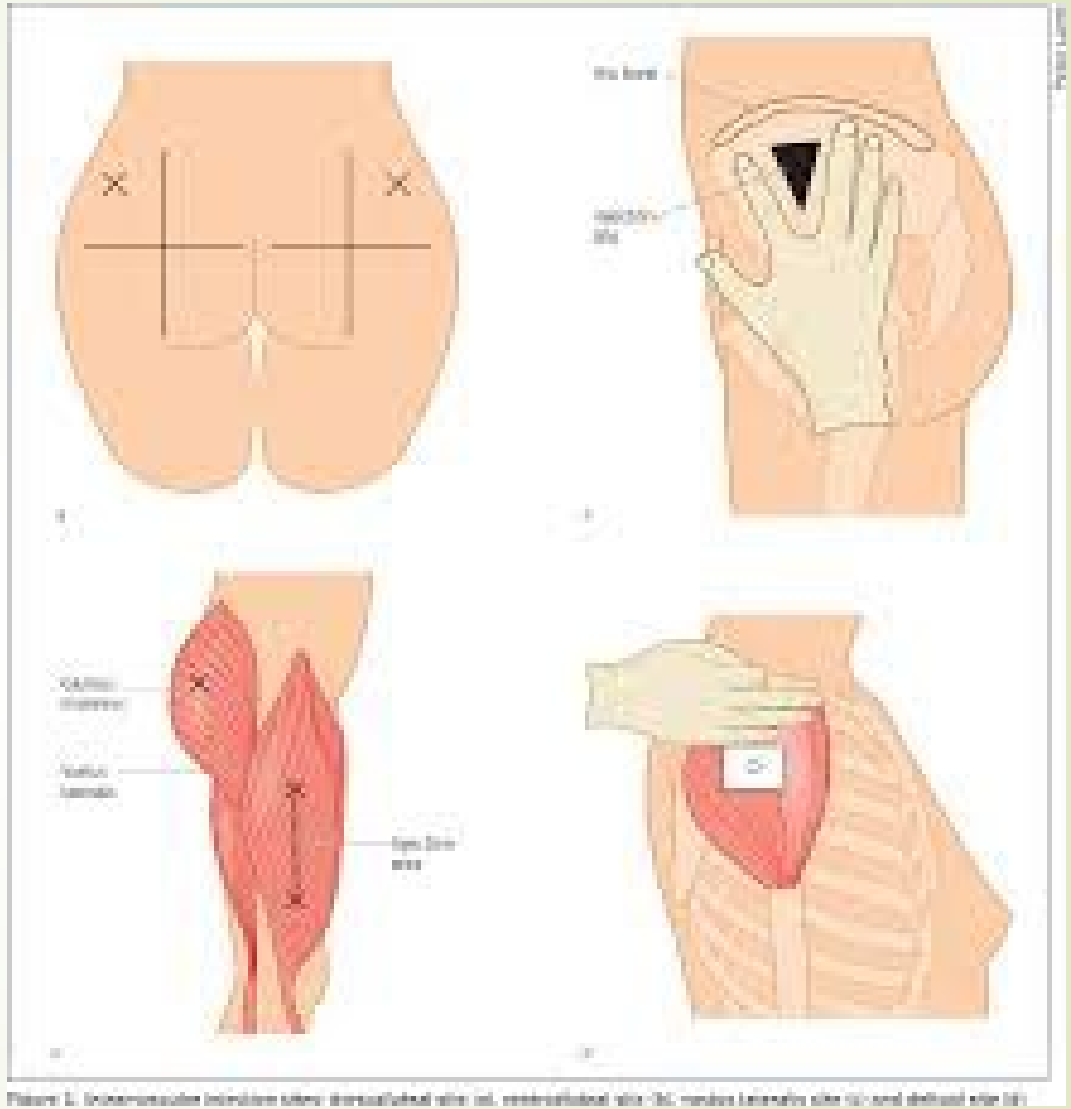


Administer a subcutaneous, intradermal or intramuscular medication

IM injection sites

- Arm- Deltoid muscle, 3 fingerbreadths from acromion process (end of collarbone) at top of arm
- Hips- gluteus medius muscle top of rear end, avoiding the sciatic nerve (dorsogluteal site)
- Ventrogluteal site – closer to front of hip or iliac crest of pelvic bone



Count narcotics/controlled substances and report discrepancies

Always count narcs before you take possession of the narc keys! If you sign the narcotic count without verifying that all are correct, then you discover the count is incorrect later in your shift, you are still responsible!!!

Report any discrepancies immediately and do not sign off! Notify charge nurse, DON, administrator or TBON if needed! Do not lose your license over someone else's mistake!!!

*Administer medication by ear, eye, nose, inhalation, rectum, vagina or skin route:

Ear drops:
child younger than 3 yo: pull down and back
older than 3: pull up and back,
adults: pull up and back
pump triangle tragus 5-6 times to ensure all meds go into canal. Wait 5-10 minutes between each ear.

Eye drops:
drop into lower lid, conjunctiva, wait a few minutes to allow absorption wipe inner to outer canthus

Nose inhalation: ensure both nares are patent and cleared first, and easily insert into one nare pressing on other side, breathe quickly, repeat, and notify provider if bleeding. Some nasal sprays are addictive and can also cause elevated BP due to vasoconstriction systemically.

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Rectum: make sure rectal vault is free of stool before administration. Check for hemorrhoids Lubricate, insert bullet end first, then Ask patient to hold as long as possible. For enema's- keep on left lying side –Sims position during administration.

Vaginal route- assess for drainage or tenderness, discharge. Provide dignity

Skin transdermal is medication embedding into a patch, rotate each time new one applied, wipe off excess, and if it is a topical crème being administered onto the top of the skin, make sure you wear gloves to avoid cross-contamination but also avoid absorbing it yourself- example Nitroglycerine paste, hormone cremes, hemorrhoid cremes

Calculate and monitor intravenous (IV) flow rate

Order : NS 1000mL bolus to infuse over 6 hours. What should the rate be set for?

$$\frac{1000\text{mL}}{6\text{ hrs}} = 166.6 \text{ ot } 167\text{mL/hr}$$

Perform calculations: Refresh on your conversions!!!

1. The provider prescribed: 0.45% NS at 45 mL/hr. The tubing available has a drip factor of 10 drops/mL. How many drops/min should the fluids infuse? *Round to the nearest drop.*

__ drops/minute

1. The provider prescribed: 0.45% NS at 45 mL/hr. The tubing available has a drip factor of 10 drops/mL. How many drops/min should the fluids infuse? *Round to the nearest drop.*

__8_ drops/minute

$$\frac{10 \text{ drops}}{1 \text{ mL}} \; / \; \frac{45 \text{ mL}}{1 \text{ hour}} \; / \; \frac{1 \text{ hour}}{60 \text{ minutes}} = \frac{10 \times 45 \times 1}{1 \times 1 \times 60} = \frac{450}{60} = 7.5 \text{ or } 8 \text{ drops}$$

Med calculations practice #2

2. During change of shift report, the off-going nurse states that Dopamine is infusing as prescribed at 10 mL/hr. The concentration of the Dopamine is 400 mg in 250 mL D5W. The patient weighs 56 kg. What is the dose of Dopamine at this rate?

___mcg/kg/min

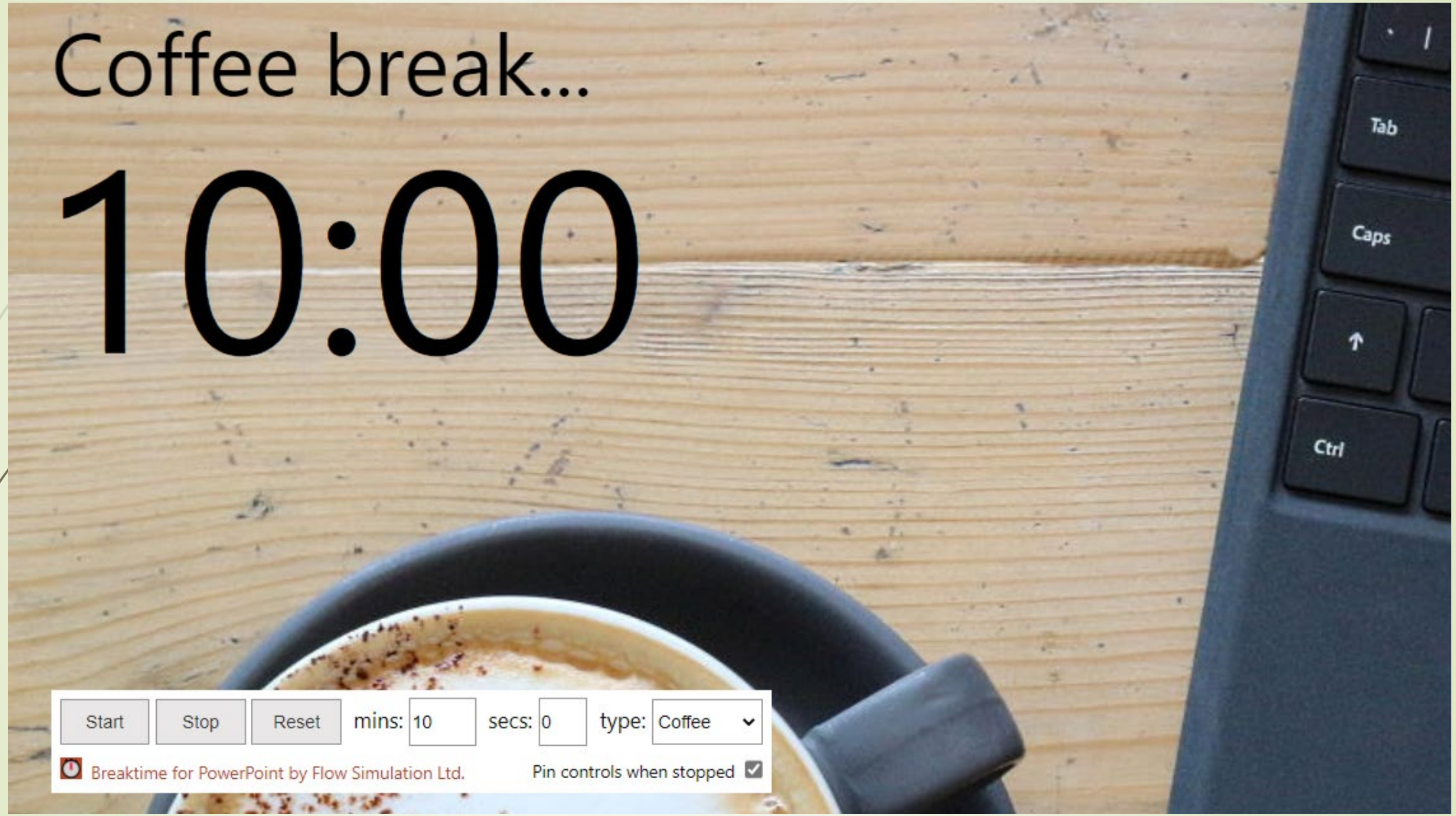
Med calculations practice #2

2. During change of shift report, the off-going nurse states that Dopamine is infusing as prescribed at 10 mL/hr. The concentration of the Dopamine is 400 mg in 250 mL D5W. The patient weighs 56 kg. What is the dose of Dopamine at this rate?

__48_mcg/kg/min

1000mcg / 400 mg / 10 mL / 1 hour /1 patient = 1000 x 400 x 10 x 1 x 1 = 4,000,000
1mg / 250 mL / 1 hour / 60 minutes / 56 kg = 1 x 250 x 1 x 60 x 56 = 84,000 = 47.61 or 48 mcg/kg/min

USE CRITICAL THINKING AND DECISION MAKING WHEN CALCULATING DOSES!! IF IT SEEMS LIKE A WEIRD ANSWER, RE-CALCULATE! IF IT DOESN'T MAKE SENSE OR SEEMS LIKE TOO MUCH- RE-CALCULATE!!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