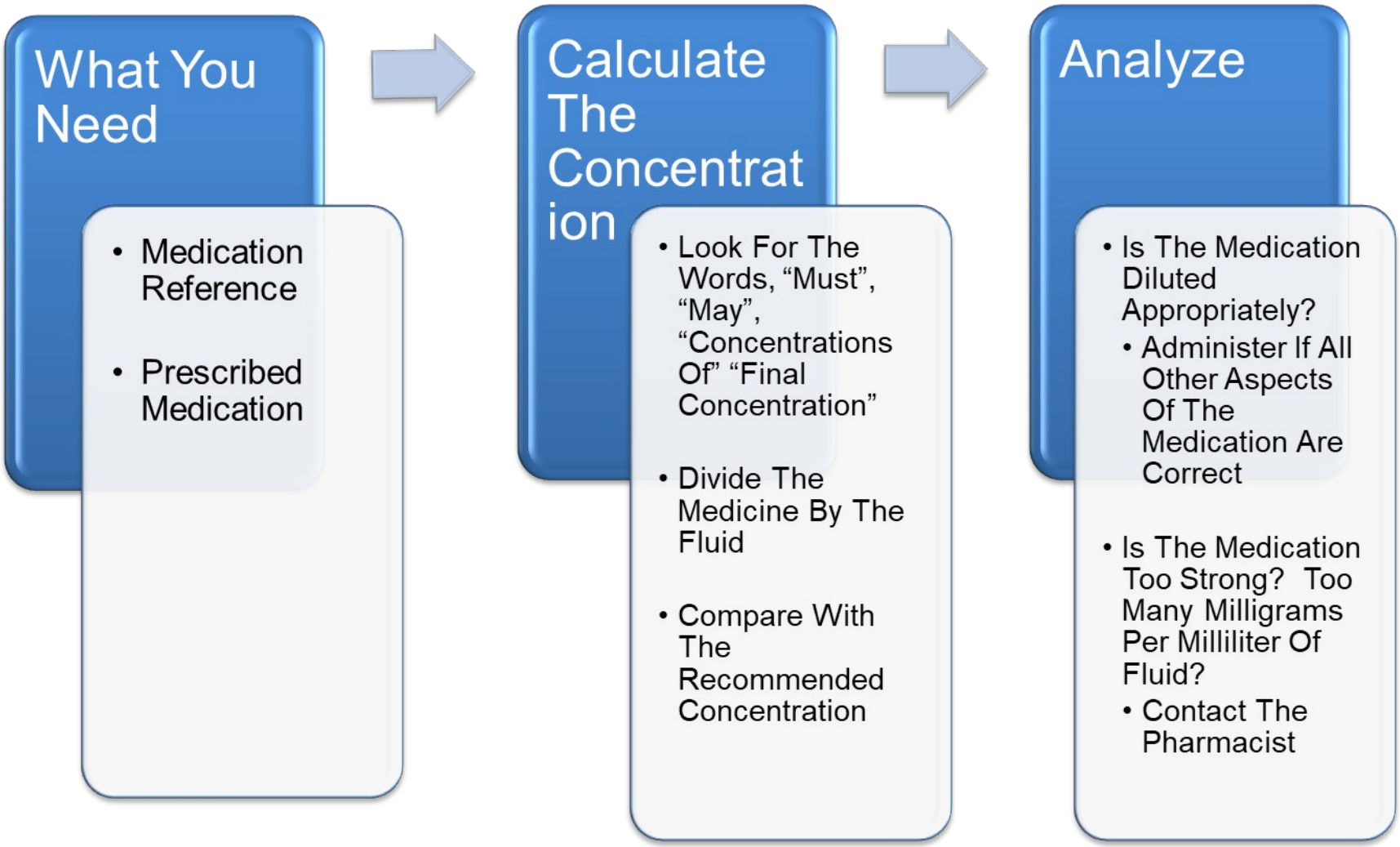
Med Exam – things to remember

- Read the question carefully. What is the question asking?
- Identify if the patient's weight is given in kilograms.
- Generally pediatric medications are based on kilograms. Convert pounds to kilograms if needed.
- PO, IV, etc. all have recommended dose ranges
- Remember the gtt factor for electronic pumps is 60
- Concentration is the amount of medication per milliliter of fluid administered IV. Usually this concentration is in milligrams per milliliter but may be in units, micrograms, etc. per milliliter.
- Exam questions may be fill in the blank as well as multiple choice

Dilution / Concentration

- The Concept
  - The Amount Of A Substance In A Mixture Or Solution
- Ultimately, We Need To Know How Much Medicine Is Mixed In One Milliliter Of Fluid
  - Milligrams
  - Units
  - Mg PE (Phenytoin Equivalents)

Summary: Calculating Dilution/Concentration



Must, May, & Concentration

- Watch For Key Words
  - **May** Be Further Diluted
  - **Must** Be Further Diluted
  - **Concentration** Of
  - **Final Concentration** Of

Ceftriaxone

"DILUTION"

Initially reconstitute each 250 mg of sterile powder with 2.4 mL (500 mg with 4.8 mL, 1 Gm with 9.6 mL, 2 Gm with 19.2 mL) of SWFI, NS, D5W, D10W, D5NS, or D5½ NS for injection. Each mL will contain 100 mg. A single dose must be further diluted to the desired concentration with the same solution and given as an intermittent infusion. Shake well. Concentrations of 10 mg/mL to 40 mg/mL are recommended for intermittent infusion."

Gahart, B. & Nazareno, N. (2017). Intravenous Medications (33rd ed.)(p 286). St. Louis: Mosby Elsevier.

Look For Must, May & Concentration

- The First Sentence “Initially reconstitute…” Explains How To Reconstitute The Powder Form Of Ceftriaxone.
  - In Institutions That Use Unit Dose This Step Is Done In The Pharmacy
- The Sentence “Each mL will contain…” Tells The Pharmacist Or Nurse How Many Milligrams Of Ceftriaxone Are In Each Milliliter After Reconstitution

Must Be

- "A Single Dose **Must** Be Further Diluted With 50 to 100 mL Of The Same Solution And Be Given As An Intermittent Infusion."
  - Important Information For The Nurse Administering The Medication
  - Is The Patient's IVPB Mixed In 50 to 100 mL?
  - If Yes, Great!
  - What If…The Patient's Ceftriaxone Is Mixed In 10 mL?
  - What Does The Prudent Nurse Do At This Point?

Concentrations Of

- Look For The Words “Concentrations Of” Or “Final Concentration” In The Medication Reference

- “**Concentrations Of** 10 mg/mL To 40 mg/mL Are Recommended For Intermittent Infusion.”
  - Important Information For The Nurse Administering The Medication

The Next Step

- The Next Step Is To Calculate The Concentration Of The Medication Received From The Pharmacy
  - Divide The Medication By The Fluid
  - 100 mg of Ceftriaxone Is Mixed In 10 mL Of Normal Saline

$$\frac{100\ \text{mg}}{10\ \text{mL}} = 10\ \text{mg of ceftriaxone in each mL}$$

- Compare With The Recommended Concentration

- “Concentrations Of” Directions Take Precedence Over “Must” Directions

Practice question #1

The IVPB you are to administer contains 350 mg of ceftriaxone mixed in 25 mL of Normal Saline.

The recommended range is 10mg to 40 mg per mL.

Does the dilution fall in the recommended range?

Practice question #2

Medication: Ranitidine 18 mg

Mixed in: 10 mL normal saline

What is the concentration of this medication?

Recommended Range

Recommended Dose Consists Of:

- Age Or Age Range Of Patient
- Dose
  - The Recommended Dose For Adults Is Usually Expressed In A Stated Dose
    - “1 to 2 Gm”
  - The Recommended Dose For Children Is Usually Based On The Child’s Weight
    - “50 to 75 mg/kg”
- Frequency of Dose
  - How Often The Dose Can Be Administered

Practice question #3

The pediatric dose for piperacillin sodium is 200 mg to 300 mg/kg/24 hours in equally divided doses every 4 to 6 hours. The patient weighs 30 kg. Which of the following is within the recommended range?

A. 2,000 mg every 4 hours

B. 1,200 mg every 4 hours

C. 1,450 mg every 6 hours

D. 6,000 mg every 6 hours

Practice question #4

Calculation based on once a day dose.

Patient: 20 kg, 5-year-old

Prescribed Medication: 1,000 mg of ceftriaxone daily

Medication Reference

Recommended Dose: 50 to 75 mg/kg of body weight in 24 hours as a single dose or in equally divided doses every 12 hours. Do not exceed a total dose of 2 gm in 24 hours.

Is the prescribed medication in the recommended range?

Practice question #5

Calculation based on BID dose.

Patient: 20 kg, 5-year-old

Prescribed Medication: 700 mg of ceftriaxone, BID.

Medication Reference

Recommended Dose: 50 to 75 mg/kg of body weight in 24 hours as a single dose or in equally divided doses every 12 hours. Do not exceed a total dose of 2 gm in 24 hours.

Is the prescribed medication in the recommended range?

Practice question #6

Which of the following is a recommended dose for a 30 kg child? The medication is vancomycin (Vancocin).

Medication Reference

Recommended Dose for Pediatric Patient:
40 mg/kg/24 hours equally divided and given every 6, 8, or 12 hours. Do not exceed 2 gm in 24 hours.

A. 200 mg every 6 hours
B. 400 mg every 8 hours
C. 100 mg every 12 hours
D. 1,200 mg every 24 hours

A Review - Tubing Drop Factor

- Microdrip Infusion Set
  - 60 Drops (gtts) = 1 mL
  - 60 Minutes = 1 Hour, Therefore
  - gtts/minute = mL/hr

- IV Pumps Are Microdrip

- Macrodrip Infusion Set Drop Factor Will Vary. Check The Package!

VOLUME TO BE INFUSED X TUBING DROP FACTOR

= DROPS/MINUTE

INFUSION TIME IN MINUTES

For A Microdrip System: Drops/Minute = mL/Hour

Memorize

Practice question #7

- What Is The Recommended Rate Of Administration For A 25 mL IVPB To Be Given Over 30 Minutes?

- The IVPB Will Be Administered By IV Pump