We turn our attention to finding the amount of time and the amount of liquid that should be infused through an IV.

Technical Math for Allied Health
Class notes
IV Calculations Continued (Module 10)

We are again working with intravenous injections. These terms from the last section are useful to review.

Definition: Flow rate: This is the rate that the IV fluid enters the vein, given in a specific period of time. The units are *usually* given in drops per minute (gtt/min).

An example would be 15 gtt/min. This will vary.

Definition: Infusion time: This is the amount of total time that it will take for the prescribed amount of fluids to be delivered. The units will typically be minutes or hours.

Definition: Infusion volume: This is the total amount of fluid to be administered. The units are typically units (as with blood; Units are discrete bags of a specific blood product.) or milliliters (as with medication).

Definition: Calibration drop factor: This is the amount of flow allowed by the tubing used. There are two main sizes of drop factors in infusion sets, **macrodrop** and **microdrop** (also called **minidrop**). **Macrodrop** sets deliver between 10 gtt/mL and 20 gtt/mL, depending on the manufacturer. **Microdrop** sets deliver 60 gtt/mL.

Flash Card Fact Number 23 says that 15 gtt = 1 mL. That is given as a general conversion *but will not be used in modules 9 and 10*.

Important Abbreviations:
As always, we will be interpreting many abbreviations. Here are a few specific to these problems.

D: dextrose
W: water
S: saline
NS: normal saline (0.9% NaCl)
RL or LR: Lactated Ringer's

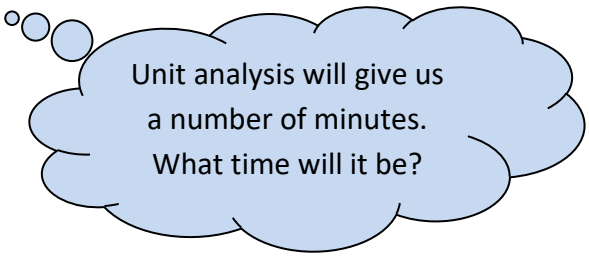
This font makes it hard to distinguish a 5 from an S. Be you careful.

Examples: D5W: 5% dextrose in water
D5 ¼ NS: 5% dextrose in 0.225% saline solution

Calculating Infusion Time:

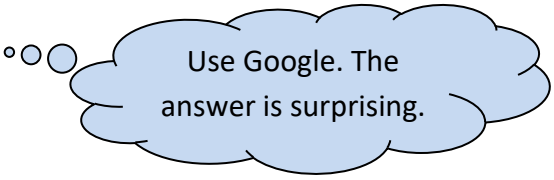
We will be given the volume of IV fluid needed and an infusion rate. We might also be given a calibrated drop factor. We will use unit analysis to find the amount of time (in minutes or hours) that the infusion will take.

example 1: There are 450 mL left in an IV bag at 10:00 am. The flow rate is set at 20 gtt/min and the calibration drop factor is 10 gtt/mL. When will the IV bag need to be changed?



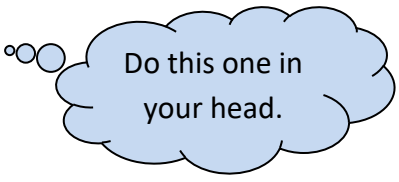
example 2: A 1000 mL IV of ½ NS is started at 1800 hours. The pump is set at 100 mL/hr. Answer the following questions.

a.) Explain the abbreviations "mL IV of ½ NS".



b.) What time is 1800 hours according to the 12-hour clock?

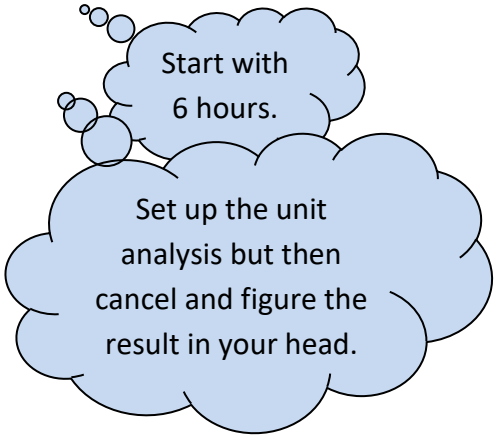
c.) What time (12-hour clock) will the IV bag be drained?



Calculating Infusion Volume:

We will be given the required time for an IV drip and an infusion rate. We might also be given a calibrated drop rate. We will use unit analysis to find the amount of volume (in mL) that the infusion will use.

example 3: A patient's IV has a flow rate of 20 gtt/min and the infusion set has a calibration drop factor of 20 gtt/mL. How much fluid is required if the infusion time is 6 hours?



example 4: The Initial 15-Minute Start Rule says you should transfuse blood slowly for the first 15 minutes so that you can monitor adverse reactions. It is recommended that the pediatric rate during the first 15 minutes is 1 mL/kg/hr, not to exceed 50 mL/hr. (source: Canadian Blood Services) A 14-year-old patient is 120 pounds.

a.) How many milliliters of blood are needed for the first 15 minutes of this infusion?

b.) A unit of packed red blood cells contains 300 mL. The maximum window allowed to infuse one unit of blood is 4 hours. What is the minimum rate, in mL/min, that should be used after the first 15 minutes?