

# Drug Calculations

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Drug calculations can be worrisome. This is because we learn the formulas in paramedic school then learn the 'street math' when we get into the field. More drugs are supplied in prefilled syringes and drug dosages are getting a little easier. Like any other skill, you lose it if you don't use it. Here are the formulas I teach in paramedic school. If you have a different way of calculating drugs, don't change it. As long as you get the correct answer, stick with what works for you.

## BOLUS DRUG ADMINISTRATION

Desired Dose  
Concentration

The desired dose is the amount of drug you want to administer (e.g. give 4mg of morphine)  
The concentration is the amount of drug you have in 1cc. You have 10mg of morphine in 2cc's.

10mg ÷ 2cc gives you a concentration of 5mg per cc.

**ORDER:** You are ordered to administer 4mg of morphine IVP. On hand you have 10mg of the drug in 2cc's.

Desired Dose = 4mg

$$\frac{4mg}{5mg} = 4 \div 5 = 0.8$$

Concentration = 5mg per cc

**ANSWER:** 0.8cc

## MEDICATION DRIP

Amount to be infused X Drip Chamber  
Concentration

**ORDER:** You are ordered to initiate a Lidocaine drip and infuse 2mg/min. On hand you have 2g of the drug in a 500cc bag.

First you have to convert grams to milligrams. 2 grams = 2000 milligrams.

Now we can find the concentration. 2000 milligrams ÷ 500cc = 4mg per cc

Amount to be infused (2mg) X Drip chamber (60gtt)    2 X 60 = 120 → 120 ÷ 4 = 30

Concentration = 4mg/cc

4

**ANSWER:** 30gtts/min

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Now let's tackle the dreaded Dopamine drip!

Dopamine can be intimidating because when we first about dopamine in paramedic school it was a nightmare. You felt you had to be a mathematician to figure it out. Actually a dopamine drip is quite simple. All you have to do is estimate the patient's weight in kilograms, the rest of the math is already done for you.

We carry a vial that contains 400mg of dopamine, when injected into a 500cc bag of saline we get a concentration of 800mcg/cc. You will spike the bag with a 60gtt chamber so all you need to know is the amount to be infused. The amount will be given to you by the ER physician or you can request a specific amount. If you are using dopamine for cardiogenic shock you may want to request orders for 5mcg/kg/min. once you receive your order the rest is easy.

**ORDER:** You are ordered to infuse dopamine at 5mcg/kg/min. your patient weighs 220lbs.

The only math you have to do is convert the patient's weigh to kilograms.

$$220 \div 2.2 = 100\text{kg}$$

Or you can use the "3AM Rule"

Divide the weight by 2 then subtract 10%

$$220 \div 2 = 110, 110 - 10\% = 100$$

Now take the kg's and multiply by 5 = 500mcg/min, this is the amount we want to infuse.

If you use the formula the equation would look like this:

$$\frac{500\text{mcg}/\text{min} \times 60\text{gtt}}{800} \rightarrow \frac{500 \times 60 = 30,000}{800} = 37.5$$

800mcg/cc (concentration)

800

This can be difficult in the back of an ambulance with a critical patient. It's much easier and faster if you use the clock method.

15 drops = 200mcg/min

30 drops = 400mcg/min

45 drops = 600mcg/min

60 drops = 800mcg/min

Using the clock method you may have guessed 35 drops per minute. This is acceptable because you're guessing the patient's weigh to begin with and dopamine is titrated to effect.