Study Guide - Drug Dosages

These exercises are intended to help you become familiar with some basic and necessary calculations and considerations. Solutions to the practice exercises are located at the end of this guide.

Calculating Drug Dosages

Accurate calculation of the dose is required for proper use of any pharmaceuticals in wildlife rehabilitation.

Drug dosage calculation is relatively easy and requires very basic knowledge of mathematics. To determine the correct dosage of the drug, you will need to know the body weight of the animal, the recommended dosage of the drug in question for the species you are treating, and the concentration of the drug. The body weight of the animal and the recommended dosage must be expressed in the same units. That is, if the recommended dosage is in grams or kilograms, the animal's weight must be expressed in grams or kilograms.

The following formula is used for calculating the dose of drug to be administered to the patient:

Dose = Body Weight x Dose Rate -:- Concentration

Example 1

A 75 lb deer is prescribed penicillin at a dose of 10,000 IU/lb BID.
The concentration of the penicillin is 100,000 IU *Icc.*

Dose = 75 lb X 10,000 IU /lb / 100,000 IU /cc
Dose= 7.5 cc

Daily dose is 7.5 cc x 2 = 15 cc

Example 2

A 3 lb. Great horned owl is prescribed Baytril injections at the rate of 10 mg/kg SID.
The Baytril concentration is 22.7 mg/ml.

First convert owl's weight to kg:
3 lb x 1 kg/2.2lb = 1.36 kg

Dose= 1.36 kg x 10 mg/kg / 22.7 mg/ml
Dose = 0. 60ml

Daily dose is 0.6 ml

The operation of dividing by any number will produce the same result as multiplying by one over the same number or the inverse of the number. The inverse of 1OOmg/1 cc is 1 cell OOmg.

Rounding

When rounding consider the instrument used for measuring. For example a **1**cc syringe is calibrated to hundredths (two decimal places), so the calculated dosage should be rounded to no more than 2 decimal places. In general, it is a good idea to figure any dose to two decimal places, and then round to the most appropriate number based on the instrument you have for administering the medication.

If the number at the third decimal place is 5 or greater, then round the second decimal place up. If the number at the third decimal place is lower than 5, then leave the second decimal place number as is. If the number at the second decimal place is a 9, then it rounds up as well.

Examples:

1.254 cc rounds to 1.25 cc
1.255 cc rounds to 1.26 cc
1.295 cc rounds to 1.30 cc

Do not round off until you have determined the final answer.

References for Drug Dose Calculations:

Clinical Textbook for Veterinary Technicians by Dennis M. McCurnin and Joanna M. Bassert; W B Saunders, 5th edition, July 2001. pg 548.

Principles of Humane Animal Care and Use; Dose Calculations and Administrations of Drugs; Institutional
Animal Care and Use Committee; University of Alaska Fairbanks online class. December 2004.

EXAMPLE DRUG DOSAGE CALCULATION PROBLEM

The veterinarian instructs you to administer Chloramphenicol at a rate of 30 mg/lb TID to a three pound raccoon. The concentration of the product prescribed is 100 mg/cc.

WEIGHT x DOSE RATE / CONCENTRATION = ONE DOSE

3lbs x 30 mg/lb / 100 mg/lcc = One Dose

The operation of dividing by any number will produce the same result as multiplying by one over the same number or the inverse of the number. The inverse of l00 mg/1 cc is 1 cc/l00mg.

= 3~~lbs~~/ x 30~~mg~~/ x 1 cc/
1 animal ~~lb~~ l00 ~~mg~~

= 3 x 30 x 1 cc/ = 90cc/
100 100

= 90cc / = 0.9cc
l00cc

Give this dose three times: 0.9 cc TID= 0.9 cc x 3 = 2.70 cc total, daily dose

If the dosage was given as 66 mg/kg, then the animal's weight would have to be converted to kg. This would be done adding a conversion factor to the equation.

In this case 2.2lbs = 1 kg

WEIGHT x DOSE RATE / CONCENTRATION = ONE DOSE

Remember, the operation of **dividing by any number** will produce the same result as multiplying by one over the same number or the inverse of the number. The inverse of 100 mg/1 cc is 1 cc/100mg.

Weight x Dose Rate X 1/CONCENTRATION = ONE DOSE

(3 lbs x 1 kg/2.2lbs) x 66 mg/1 kg x 1 cc/100 mg

1.36 kg x 66 mg/1 kg x 1 cc/100 mg

89.76 mg x 1 cc/100 mg = 0.90 cc

International units are set up in the same manner:

A 75 pound deer is to be dosed on a penicillin product with a strength of 100,000 IU/cc at a dosage of 10,000/lb BID.

WEIGHT x DOSE RATE / CONCENTRATION = ONE DOSE

Remember, the operation of dividing by any number will produce the same result as multiplying by one over the same number or the inverse of the number. The inverse of 100,000 IU/cc is 1 cell 00,000 IU.

Weight	x	Dose Rate	x	1/Concentration	= One Dose
75 lbs	x	10,000 IU/lb	x	1 cc/100,000 IU =	
750,000 IU	x	1 cell 00,000 IU			= 7.5 cc
7.5 cc BID dose	=	7.5 cc	x	2	15 cc daily

Or

75 ~~lbs~~	x	10,000 ~~IU~~ / ~~lb~~	x	1 ~~cc~~/ 10,000 ~~IU~~	=
		750,000 cc / 100,000			= 7.5 cc
7.5 BID	=	7.5	x	2	= 15 cc daily dose

PRACTICE EXERCISES

1. weight - 400 g
   dose rate - 20 mg/kg
   concentration- 30 mg/cc

one dose = _____

2. weight- 100 g
   dose rate - 25 mg/lb
   concentration -20 mg/cc

one dose = _____

3. weight- 6.5 lb
   dose rate- 2 mg/lb
   concentration -50 mg/cc

one dose = _____

4. weight -5 lb
   dose rate - 1 mg/lb
   concentration- 40 mg/cc

one dose = _____

5. weight- 2 kg
   dose rate- 30 mg/lb
   concentration - 100 mg/cc

one dose = _____

6. weight - 2.5 kg

dose rate - 10 mg/lb
concentration- 100 mg/cc

one dose = _____

7. weight- 50 g
dose rate - 1 mg/lb
concentration- 2 mg/cc

one dose = _____

8. weight -1.5 kg
dose rate - 4 mg/lb
concentration- 4 mg/cc

one dose = _____

9. weight - 28 lb
dose rate - 8 mg/kg
concentration- 4 mg/cc

one dose = _____

10. A jackrabbit in shock:

weight - 450 g
dose rate - 2 mg/lb
Azium (steroid)- 2 mg/ml (concentration)

Amount of Azium given = _____

11. A great homed owl in shock with a fractured humerus:

weight- 1125 g
dose rate- 2 mg/lb
Azium (steroid)- 2 mg/ml

Amount of Azium given = _____

dose rate - 25 mg/lb TID
Ampicillin (antibiotic) - 50 mg tablets

Amount of Ampicillin given = _____

12. A bam owl in dire straits; severely shocky:

weight - 400 g
dose rate - 4 mg/lb
Azium (steroid)- 2 mg/ml

Amount of Azium given = _____

13. Sick raccoon - as per vet:

weight -15 lb
dose rate - 1 mg/lb TID
Gentocin (antibiotic)- 50 mg/ml

Amount of Gentocin given = _____

Total daily dose of Gentocin = _____

14. Seagull with fractured radius/ulna and in shock:

weight - 600 g
dose rate - 2 mg/lb
Azium (steroid)- 2 mg/ml

Amount of Azium given = _____

dose rate- 25 mg/lb TID
Keflex (antibiotic)- 100 mg/cc

Amount of Keflex given = _____
Total daily dose of Keflex = _____

15. A deer in shock with a gunshot wound in the leg:

weight - 501b
dose rate - 2 mg/lb BID
Azium - 2 mg/ml

Amount of Azium (steroid) given = _____
Total daily dose of Azium = _____

dose rate - 33,333 IU/lb BID Penicillin
(antibiotic) -100,000 IU/ml

Amount of Penicillin given = _____
Total daily dose of Penicillin = _____

16. Rabbit with abscess:

weight - 900 g
dose rate - 2.5 mg/lb BID Kanomycin
(antibiotic) - 200 mg/ml

Amount of Kanomycin given = _____
Total daily dose of Kanomycin = _____

17. A Brewer's blackbird with CNS signs:

weight - 65 g
dose rate -1 mg/lb BID
Azium (steroid)- 2 mg/ml

Amount of Azium given = _____
Total daily dose of Azium = _____

dose rate - orally 10 mg Trimethoprirn/lb BID
TMP-SMZ (antibiotic)- 40 mg/ml

Amount of TMP-SMZ given = _____
Total daily dose of TMP-SMZ = _____

PRACTICE EXERCISE SOLUTIONS

1. animal weight x dose rate / concentration = one dose

(400 g x 1 Kg/1000g) x 20 mg/Kg x lcc/30 mg =one dose

0.4 Kg x 20 mg/Kg x 1 cc/30 mg =one dose

8.0 mg x 1 cc/30 mg = one dose

0.27 cc =one dose

2. animal weight x dose rate / concentration = one dose

(100 g x 1lb/454 g) x 25 mg/lb x 1 cc/20 mg =one dose

0.22lb x 25 mg/lb x 1 cc/20 mg =one dose

5.51 mg x 1 cc/20 mg =one dose

0.28 cc =one dose

3. animal weight x dose rate / concentration = one dose

6.5 lb x 2 mg/lb x 1 cc/50 mg =one dose

13 mg x 1 cc/50 mg =one dose

0.26 cc =one dose

4. animal weight x dose rate / concentration = one dose

5 lb x 1 mg/lb x 1 cc/40 mg = one dose

5 mg x 1 cc/40 mg =one dose

0.13 cc =one dose

5. animal weight x dose rate / concentration = one dose

(2 Kg x 2.2 lb/Kg) x 30 mg/lb x 1 cc/100 mg = one dose

4.4 lb x 30 mg/lb x 1 cell 00 mg = one dose

132.0 mg x 1 cc/100 mg =one dose

1.32 cc = one dose

6. animal weight x dose rate / concentration = one dose

(2.5 Kg x 2.2lb/Kg) x 10 mg/lb x 1 cc/100 mg =one dose

5.5 lb x 10 mg/lb x 1 cc/100 mg = one dose

55 mg x 1 cc/100 mg = one dose

0.55 cc =one dose

7. animal weight x dose rate / concentration= one dose

(50 g x 1lb/454 g) x 1 mg/lb x 1 cc/2 mg =one dose

0.11 lb x 1 mg/lb x 1 cc/2 mg = one dose

0.11 mg x 1 cc/2 mg =one dose

0.06 cc =one dose

8. animal weight x dose rate / concentration = one dose

(1.5 Kg x 2.2 lb/Kg) x 4 mg/lb x lcc/4 mg = one dose

3.3 lb x 4 mg/lb x 1 cc/4 mg =one dose

13.20 mg x 1cc/4 mg =one dose

3.3 cc = one dose

9. animal weight x dose rate / concentration = one dose

(28 lbs x 1 Kg/2.2lb) x 8 mg/Kg x 1 cc/4 mg =one dose

12.72 Kg x 8 mg/Kg x 1 cc/4 mg =one dose

102 mg x 1 cc/4 mg =one dose

25.45 cc =one dose

10. animal weight x dose rate / concentration = one dose

(450 g x 1 lb/454 g) x 2 mg/lb x 1 ml/2 mg = one dose

1 lb x 2 mg/lb x 1 ml/2 mg = one dose

2 mg x 1 ml/2 mg = one dose

.99 ml = one dose

11. animal weight x dose rate / concentration = one dose

(1125 g x 1lb/454 g) x 2 mg/lb x 1 ml/2 mg =one dose

2.48 lb x 2 mg/lb x 1 ml/2 mg =one dose

4.96 mg x 1 ml/2 mg =one dose

2.48 ml =one dose Azium

animal weight x dose rate / concentration = one dose

(1125 g x 1 lb/454 g) x 25 mg/lb x 1 tab/50 mg =one dose

2.48 lb x 25 mg/lb x 1 tab/50 mg = one dose

62 mg x 1 tab/50 mg = one dose

1.24 tab = one dose Ampicillin

1.24 tab TID= 1.24 tab x 3 = 3.75 tab = daily dose

12. animal weight x dose rate / concentration = one dose

(400 g x 1lb/454 g) x 4 mg/lb x 1 ml/2 mg =one dose

0.88 lb x 4 mg/lb x 1 ml/2 mg =one dose

3.52 mg x 1 ml/2 mg =one dose

1.76 ml =one dose

13. animal weight x dose rate / concentration = one dose

15 lb x 1 mg/lb x 1 m1/50 mg = one dose

15 mg x 1 ml/50 mg =one dose 0.30 ml =one dose

0.30 ml TID= 0.30 ml x 3 = 0.90 ml =daily dose

14. animal weight x dose rate / concentration = one dose

(600 g x 1 lb/454 g) x 2 mg/lb x 1 ml/2 mg =one dose

1.32lb x 2 mg/lb x 1 ml/2 mg =one dose

. 2.64 mg x 1 ml/2 mg =one dose

1.32 ml =one dose Azium

animal weight x dose rate / concentration = one dose

(600 g x 1lb/454 g) x 25 mg/lb x 1 ml/100 mg =one dose

1.32 lb x 25 mg/lb x 1 ml/100 mg = one dose

33.04 mg x 1 ml/100 mg =one dose

0.33 ml =one dose Keflex

0.33 ml TID= 0.33 ml x 3 = 0.99 ml =daily dose

15. **animal weight x dose rate / concentration = one dose**

50 lb x 2 mg/lb x 1 ml/2 mg = one dose

100 mg x 1 ml/2 mg = one dose

50 ml =one dose Azium

50 ml BID= 50 ml x 2 = 100 ml =daily dose

animal weight x dose rate / concentration = one dose

50 lb x 33,333 IU/lb x 1 ml/100,000 IU =one dose

1,666,666 IU x 1 ml/100,000 IU =one dose (ml)

16.7 ml = one dose Penicillin

16.7 ml BID =16.7 ml x2=33.4 ml=daily dose

16. animal weight x dose rate / concentration = one dose

(900 g x 1 lb/454 g) x 2.5 mg/lb x 1 ml/200 mg = one dose

1.98 lb x 2.5 mg/lb x 1 ml/200 mg =one dose

4.96 mg x 1 ml/200 mg =one dose

0.03 ml = one dose

0.03 ml BID =0.03 ml x2=0.06 ml= total dose

17. animal weight x dose rate / concentration = one dose

(65 g x 1lb/454 g) x 1 mg/lb x 1 ml/2 mg =one dose

0.14 lb x 1 mg/lb x 1 ml/2 mg = one dose

0.14 mg x 1 ml/2 mg =one dose

0.07 ml =one dose Azium

0.07 ml BID = 0.07 ml x 2 = 0.14 ml = daily dose

animal weight x dose rate / concentration = one dose

(65 g x 1lb/454 g) x 10 mg/lb x 1 ml/40 mg =one. Dose

0.14lb x 10 mg/lb x 1 ml/40 mg =one dose

1.4 mg x 1 ml/40 mg = one dose

0.04 ml = one dose Tribrissen

0.03 ml BID = 0.04 ml x2=0.08 ml = daily dose