

PRACTICE PROBLEMS

Calculations Based on Body Weight

1. The dose of a drug is 500 mcg/kg of body weight. How many milligrams should be given to a child weighing 55 lb.?
2. The dose of gentamicin for premature and full-term neonates is 2.5 mg/kg administered every 12 hours. What would be the daily dose for a newborn weighing 5.6 lb.?
3. The dose of gentamicin for patients with impaired renal function is adjusted to ensure therapeutically optimal dosage. If the normal daily dose of the drug for adults is 3 mg/kg/day, administered in three divided doses, what would be the single (8-hour) dose for a patient weighing 165 lb. and scheduled to receive only 40% of the usual dose, based on renal impairment?
4. A patient weighing 120 lb. was administered 2.1 g of a drug supposed to be dosed at 30 mg/kg. Was the dose administered *correct*, or was it an *overdose*, or was it an *underdose*?
5. In a clinical trial of ciprofloxacin (CIPRO), pediatric patients were initiated on 6 to 10 mg/kg intravenously every 8 hours and converted to oral therapy, 10 to 20 mg/kg, every 12 hours. Calculate the ranges of the total daily amounts of ciprofloxacin that would have been administered intravenously and orally to a 40-lb. child.
6. \mathcal{R} Erythromycin 400 mg/5 mL
Ethylsuccinate
Disp. 100 mL
Sig. _____ tsp. q.i.d. until all medication is taken.

If the dose of erythromycin ethylsuccinate is given as 40 mg/kg per day,
 - (a) What would be the proper dose of the medication in the Signa, if the prescription is for a 44-lb. child?
 - (b) How many days will the prescribed medication last?
7. If the pediatric dosage of chlorothiazide (DIURIL) is 10 to 20 mg/kg of body weight per day in a single dose or two divided doses, not to exceed 375 mg per day, calculate the *daily dosage range* of an oral suspension containing 250 mg chlorothiazide per 5 mL that should be administered to a 48-lb child.
8. Cyclosporine is an immunosuppressive agent administered before and after organ transplantation at a single dose of 15 mg/kg. How many milliliters of a 50-mL bottle containing 100 mg of cyclosporine per milliliter would be administered to a 140-lb. kidney transplant patient?

9. The adult dose of a liquid medication is 0.1 mL/kg of body weight. How many teaspoonfuls should be administered to a person weighing 220 lb.?
10. A hospitalist prescribed dimenhydrinate to treat a 48-lb child. The labeled dose of the drug is 1.125 mg/kg. The available oral solution contains dimenhydrinate, 12.5 mg/5 mL. Prior to administering the solution, the floor nurse decides to check her calculated dose of 9.8 mL with the hospital pharmacist. Were her calculations correct?
11. **R** Fluconazole tabs 100 mg
Disp. ___ tabs
Sig: tab ii stat, then 3 mg/kg b.i.d. × 7 d thereafter.
Calculate the number of tablets to dispense to a patient weighing 147 lb.
12. A physician desires a dose of 40 mcg/kg of digoxin for an 8-lb. newborn child. How many milliliters of an injection containing 0.25 mg of digoxin per milliliter should be given?
13. Intravenous digitalizing doses of digoxin in children are 80% of oral digitalizing doses. Calculate the intravenous dose for a 5-year-old child weighing 40 lb. if the oral dose is determined to be 20 mcg/kg.
14. An intratracheal suspension for breathing enhancement in premature infants is dosed at 2.5 mL/kg of birth weight. How many milliliters of the suspension should be administered to a neonate weighing 3 lb.?
15. A 142-lb. patient was receiving filgrastim (NEUPOGEN) in doses of 10 mcg/kg/day when, as a result of successful blood tests, the dose was lowered to 6 mcg/kg/day. Using an injection containing 0.3 mg filgrastim per 0.5 mL, calculate the previous and new dose to be administered.
- (a) 17.7 mL and 64.6 mL
(b) 5.23 mL and 3.14 mL
(c) 1.08 mL and 0.65 mL
(d) 3.87 mL and 2.3 mL
16. A 25-lb. child is to receive 4 mg of phenytoin per kilogram of body weight daily as an anticonvulsant. How many milliliters of pediatric phenytoin suspension containing 30 mg per 5 mL should the child receive?
17. The loading dose of digoxin in premature infants with a birth weight of less than 1.5 kg is 20 mcg/kg administered in three *unequally* divided doses ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{4}$) at 8-hour intervals. What would be the initial dose for an infant weighing 1.2 kg?
18. The pediatric dose of cefadroxil is 30 mg/kg/day. If a child was given a daily dose of 2 teaspoonfuls of a pediatric suspension containing 125 mg of cefadroxil per 5 mL, what was the weight, in pounds, of the child?
19. How many milliliters of an injection containing 1 mg of drug per milliliter of injection should be administered to a 6-month-old child weighing 16 lb. to achieve a dose of 0.01 mg/kg?
20. Prior to hip replacement surgery, a patient receives an injection of an anticoagulant-drug at a dose of 30 mg. Following the patient's surgery, the drug is injected at 1 mg/kg. For a 140-lb. patient, calculate the total of the pre- and postsurgical doses.
21. Using Table 8.2 and a daily dose of 2 mg/kg, how many 20-mg capsules would a 176-lb. patient be instructed to take per dose if the daily dose is to be taken in divided doses, q.i.d.?
22. For a 22-lb pediatric patient, the dose of cefdinir (OMNICEF) was determined to be 7 mg/kg. What quantity of an oral suspension containing

- 125 mg of cefdinir in each 5 mL should be administered?
- 2.8 mL
 - 5.6 mL
 - 8.9 mL
 - 13.6 mL
- How many capsules, each containing 250 mg of clarithromycin, are needed to provide 50 mg/kg/day for 10 days for a person weighing 176 lb.?
 - If the pediatric dose of dactinomycin is 15 mcg/kg/day for 5 days, how many micrograms should be administered to a 40-lb. child over the course of treatment?
 - If the administration of gentamicin at a dose of 1.75 mg/kg is determined to result in peak blood serum levels of 4 mcg/mL, calculate the dose, in milligrams, for a 120-lb. patient that may be expected to result in a blood serum gentamicin level of 4.5 mcg/mL.
 - A medication order calls for tobramycin sulfate, 1 mg/kg of body weight, to be administered by IM injection to a patient weighing 220 lb. Tobramycin sulfate is available in a vial containing 80 mg per 2 mL. How many milliliters of the injection should the patient receive?
 - The usual pediatric dose of acyclovir is 20 mg/kg administered by infusion and repeated every 8 hours. What would be the single dose, in milligrams, for a child weighing 33 lb.?
 - If the recommended dose of tobramycin for a premature infant is 4 mg/kg/day, divided into two equal doses administered every 12 hours, how many milligrams of the drug should be given every 12 hours to a 2.2-lb. infant?
 - If a 3-year-old child weighing 35 lb. accidentally ingested twenty 81-mg aspirin tablets, how much aspirin did the child ingest on a milligram per kilogram basis?
 - The recommended pediatric dose of epinephrine for allergic emergencies is 0.01 mg/kg. If a physician, utilizing this dose, administered 0.15 mg, what was the weight of the patient in pounds?
 - The initial maintenance dose of vancomycin for infants less than 1 week old is 15 mg/kg every 18 hours.
 - What would be the dose, in milligrams, for an infant weighing 2500 g?
 - How many milliliters of an injection containing 500 mg per 25 mL should be administered to obtain this dose?
 - The loading dose of indomethacin in neonates is 0.2 mg/kg of body weight by intravenous infusion.
 - What would be the dose for a neonate weighing 6 lb., 4 oz.?
 - How many milliliters of an injection containing 1 mg of indomethacin per 0.5 mL should be administered to obtain this dose?
 - ℞¹³ Jimmy Jones Age: 8 years
 Wt: 88 pounds
 Metronidazole Suspension
 7.5 mg/kg/day
 M.ft. dose = 5 mL
 Sig: 5 mL bid × 10 days
 - How many milligrams of metronidazole will the patient receive per dose?
 - How many milliliters of the prescription should be prepared and dispensed?
 - If metronidazole is available in 250-mg tablets, how many tablets will be needed to fill the prescription?

34. R¹³ Betty Smith Age: 4 years
 Weight: 52.8 pounds
 Erythromycin Ethyl Succinate (EES) 200 mg/5 mL
 Disp. 300 mL
 Sig: _____ mL qid until gone
- (a) If the dose of EES is 50 mg/kg/day, how many milliliters would provide each dose?
- (b) How many days would the prescription last the patient?

Calculations Based on Body Surface Area

Note: As needed, refer to the BSA nomograms, Mosteller Formula, and/or tables in this chapter.

35. If the daily dose of a drug is given in the literature as 8 mg/kg of body weight or 350 mg/m², calculate the dose on each basis for a patient weighing 150 lb. and measuring 5 ft. 8 in. in height.
36. If the dose of a drug is 10 mg/m² per day, what would be the daily dose, in milligrams, for a child weighing 30 lb. and measuring 26 in. in height?
37. The dose of mitomycin injection is 20 mg/m² per day. Determine the daily dose for a patient who weighs 144 lb. and measures 68 in. in height.
38. The pediatric starting dose of ritonavir (NORVIR) is 250 mg/m² by mouth twice daily. The available oral solution contains 600 mg of ritonavir in each 7.5 mL of solution. The correct volume and corresponding quantity of ritonavir to be administered to a child with a body surface area of 0.75 m² per dose is:
- (a) 5.6 mL (450.4 mg)
 (b) 2.8 mL (450.4 mg)
 (c) 2.8 mL (225.2 mg)
 (d) 2.3 mL (187.5 mg)

39. Calculate the dose for a child 4 years of age, 39 in. in height, and weighing 32 lb. for a drug with an adult dose of 100 mg, using the following: (a) Young's rule, (b) Cowling's rule, (c) Clark's rule, and (d) BSA (use the BSA equation).
40. The daily dose of diphenhydramine HCl for a child may be determined on the basis of 5 mg/kg of body weight or on the basis of 150 mg/m². Calculate the dose on each basis for a child weighing 55 lb. and measuring 40 in. in height.

Calculations of Chemotherapeutic Regimens

41. The drug cabazitaxel is used treating prostate cancer in doses of 25 mg/m². Calculate the dose for a patient measuring 73 in. in height and weighing 190 lb.
42. Calculate the quantities of each drug administered to a patient on day 2 of the ELF protocol if the patient's BSA is 1.64 m².
43. If the dose of etoposide for a patient on the CAE protocol is increased to 120 mg/m², calculate the increase in the dose, in milligrams, if the patient measures 150 cm and weighs 48 kg.
44. The drug carboplatin for ovarian carcinoma is administered intravenously at a dose of 360 mg/m² except in patients with impaired kidney function, in which case the dose is reduced by 30%. How many milligrams of the drug should be administered to a renally impaired patient measuring 5 ft. 2 in. and weighing 110 lb.?
45. A high-dose treatment of osteosarcoma includes the use of methotrexate at a starting dose of 12 g/m² as

a 4-hour intravenous infusion. For a patient having a BSA of 1.7 m^2 and weighing 162 lb., calculate the dose on the basis of mg/kg/min.

46. A two-agent dosage regimen, termed MP, for the treatment of multiple myeloma is as follows:¹¹

Melphalan 0.25 mg/kg, PO,
D1-4/week \times 6 weeks
Prednisone 2 mg/kg, PO,
D1-4/week \times 6 weeks

- (a) Calculate the total milligrams each of melphalan and prednisone taken per week by a patient who weighs 165 lb.
(b) If melphalan is available in 2-mg tablets, how many tablets are required to dose this patient for the entire treatment cycle?
(c) If the patient prefers prednisone oral solution to prednisone tablets, how many milliliters of the solution (5 mg/mL) should be dispensed weekly?
47. A three-agent dosage regimen, termed VAD, for the treatment of multiple myeloma includes the following drugs taken over a 28-day cycle:¹¹

Vincristine 0.4 mg/d, CIVI,
D 1-4
Doxorubicin 9 mg/m²/d, CIVI,
D 1-4
Dexamethasone 40 mg/d, PO, D
1-4, 9-12, 17-20

Calculate the total quantity of each drug administered over the course of the treatment cycle for a patient with a BSA of 1.65 m^2 .

48. A four-agent dosage regimen, termed MOPP, for the treatment of Hodgkin lymphoma includes the following drugs taken over a 28-day cycle:¹¹

Mechlorethamine 6 mg/m², I.V.,
D 1,8
Vincristine 1.4 mg/m², I.V.,
D 1,8
Procarbazine 100 mg/m²/d,
p.o., D 1-14
Prednisone 40 mg/m²/d,
p.o., D 1-14

Calculate the total number of 20-mg tablets of prednisone and 50-mg tablets of procarbazine to dispense to treat a patient with a BSA of 1.5 m^2 during the course of one treatment cycle.

49. The oncolytic agent lapatinib (TYKERB) is administered in the treatment of breast cancer in daily doses of 1250 mg for 21 consecutive days in combination with the drug capecitabine (XELODA), which is administered in doses of 1000 mg/m²/day during days 1 to 14 of the 21-day treatment cycle. Calculate the total quantity of *each drug* to be administered during the treatment cycle to a 5'2" woman weighing 110 pounds.
50. Among the single chemotherapeutic agents for breast cancer is docetaxel (TAXOTERE), which is administered @ 60 mg/m² IV every 3 weeks. Calculate the dose for a 5 ft 4 in. patient who weighs 160 lb.
51. Based on the dose calculated in the above problem, how many milliliters of an injection containing 80 mg/2 mL docetaxel would be administered per dose?
52. The chemotherapy regimen "CAF" during a 21-day cycle is:¹¹
- Cyclophosphamide 500 mg/m², D-1
Doxorubicin 50 mg/m², D-1
(Adriamycin)
5-Fluorouracil 500 mg/m²,
D-1, 8
- Calculate the dose of each drug/cycle for a patient with a BSA of 1.9 m^2 .

Then the oral dose may be calculated:

$$\frac{100 \text{ mcg}}{1 \text{ kg}} \times 11 \text{ kg} = 1100 \text{ mcg} = 1.1 \text{ mg}$$

By crushing and mixing the 2.5-mg enalapril tablet with sterile water to make 12.5 mL, the oral dose may be calculated:

$$\frac{2.5 \text{ mg}}{12.5 \text{ mL}} = \frac{1.1 \text{ mg}}{x \text{ mL}}; x = 5.5 \text{ mL, answer.}$$

Case in Point 8.3

Daily dose: $15 \text{ mg/kg} \times 10 \text{ kg} = 150 \text{ mg}$

Single dose: $150 \text{ mg} \div 3 = 50 \text{ mg}$

Quantity of injection: $50 \text{ mg} \times \frac{1 \text{ mL}}{5 \text{ mg}} = 10 \text{ mL, answer.}$

Case in Point 8.4

To calculate the dose for the patient, the pharmacist must first determine the patient's body surface area. The pharmacist elects to use the following equation:

$$\text{BSA, m}^2 = \sqrt{\frac{\text{Ht (cm)} \times \text{Wt (kg)}}{3600}}$$

To use this equation, the patient's weight and height are converted to metric units:

$$\begin{aligned} \text{Height} &= 5 \text{ ft.} = 60 \text{ in.} \times 2.54 \text{ cm/in.} \\ &= 152.4 \text{ cm} \end{aligned}$$

$$\text{Weight} = 117 \text{ lb.} \div 2.2 \text{ lb./kg} = 53.2 \text{ kg}$$

Solving the equation:

$$\text{BSA, (m}^2) = \sqrt{\frac{152.4 \times 53.2}{3600}} = 1.50 \text{ m}^2$$

The daily dose is calculated as $150 \text{ mg/m}^2 \times 1.50 \text{ m}^2 = 225 \text{ mg}$

To obtain 225 mg, the patient may take two 100-mg capsules, one 20-mg capsule, and one 5-mg capsule daily, *answer.*

Practice Problems

- 12.5 mg
- 12.73 mg gentamicin
- 30 mg gentamicin

- overdose
- I.V.: 327.3–545.5 mg ciprofloxacin
Oral: 363.6–727.3 mg ciprofloxacin
- (a) $\frac{1}{2}$ tsp. (2.5 mL) erythromycin ethylsuccinate
(b) 10 days
- 4.4–7.5 mL chlorothiazide oral suspension
- 9.55 mL cyclosporin
- 2 tsp.
- Yes, calculations were correct.
- 30 tablets
- 0.58 mL digoxin injection
- 290.9 or 291 mcg digoxin
- 3.41 mL
- (c) 1.08 mL and 0.65 mL filgrastim injection
- 7.58 mL phenytoin suspension
- 12 mcg digoxin
- 18.33 lb.
- 0.073 mL
- 93.64 or 94 mg
- 2 capsules
- (a) 2.8 mL cefdinir oral suspension
- 160 clarithromycin capsules
- 1364 mcg dactinomycin
- 107.39 mg gentamicin
- 2.5 mL tobramycin injection
- 300 mg acyclovir
- 2 mg tobramycin
- 101.83 mg/kg aspirin
- 33 pounds
- (a) 37.5 g vancomycin
(b) 1.875 mL vancomycin injection
- (a) 0.57 mg indomethacin
(b) 0.28 mL indomethacin injection
- (a) 150 mg metronidazole
(b) 100 mL
(c) 12 metronidazole tablets
- (a) 7.5 mL
(b) 10 days
- 545.5 mg and 630 mg

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36. 4.5 mg
37. 35.4 mg mitomycin
38. 2.3 mL (187.5 mg) ritonavir
39. (a) 25 mg
(b) 20.83 mg
(c) 21.33 mg
(d) 36.57 mg
40. (a) 125 mg diphenhydramine HCl
(b) 120 mg diphenhydramine HCl
41. 52.7 mg cabazitaxel
42. 196.8 mg etoposide
246 mg leucovorin
820 mg 5-fluorouracil
43. 29.7 mg etoposide
44. 372.96 mg carboplatin
45. 1.15 mg/kg/min methotrexate
46. (a) 75 mg melphalan and 600 mg prednisone
(b) 225 tablets
(c) 120 mL prednisone oral solution
47. 1.6 mg vincristine
59.4 mg doxorubicin
480 mg dexamethasone
48. 42 procarbazine tablets
42 prednisone tablets
49. 26.25 g lapatinib and 20.72 g capecitabine
50. 108.7 mg docetaxel
51. 2.7 mL docetaxel injection
52. 1900 mg 5-fluorouracil
95 mg doxorubicin
950 mg cyclophosphamide