

Prescriptions and Dose Calculations

Objectives

- Calculate the dose for a patient based on weight and body surface area (BSA)
- Calculate the BSA for a child and adult
- Calculate the dose for Chemotherapeutic agents

Extra problem

Camphor	20 g
Anise oil	5 mL
Alcohol	qs ad 125 mL
Dispense	175 mL

- How much of each ingredient would you need to dispense the prescription?
- What about if I ask you to count for 10% extra to make up for any lost solution/ingredients during preparation?

mg/mL

- Many of the medication concentrations are expressed in mg/mL.
- A patient needs 5 mg of NaCl, the available ampoule concentration is 10 mg/mL how many mL the patient needs?

Directions for the patient:

- How much drug is to administer?
- How frequently? what time?
- The pharmacist should check if the dose is in the right range?
- The Pharmacist needs to translate the Latin abbreviations:
- qd, h., q, q8h, bid, tid, qid, hs, stat...

Latin Abbreviations

- C meal
- A. C. before meal
- P. C. after meal
- C, cum with
- S sine without
- Rep. Repeat
- P. O by mouth
- e. m. p. in the prescribed manner
- p. r. n as needed for

Translate

- i tab q6h po lh ac
- Chart stat, chart 1 q6h
- 2 tab cum aqua tid pc

Drops

Eye, ear or nose

- Translate
 - Gtt drop Guttae
 - o.d. right eye
 - o.s. left eye
 - o.u. both eyes
 - 3 gtt o.u. tid

Dose calculation:

1-Based on age

- Children (birth –adolescence)
- Geriatrics >65 years
- Why do they have different dose ranges?
 - Excretion, distribution, metabolism
 - Impaired / undeveloped functions.
- Pediatrics should never be treated as little adults.
- According to the use of OTC , most medications divide pediatrics dosing based on 3 groups: 2–6 years, 6–12 years, and >12 years.

1-Based on Age

- There are some rules, based on age, (Young's, Cowlings, and Fried's) that have been used to calculate drug dose.
- Age alone is no longer considered valid criterion in determination of dose.

Young's: $\text{age} \times \text{Adult dose} / (\text{age} + 12) = \text{child dose}$

Cowling's rule: $\text{Age next birthday} \times \text{adult dose} / 24$

2-Based on weight

- For adult (Average weight 70 kg, o 150 Ib)
- For kids:
 - Dose table for some drugs
 - Clark's rule to calculate dose based on weight

Clark's rule = $Wt \text{ (Ib)} \times \text{adult dose} / 150 = \text{child dose}$

Dose calculation

- For potent drugs dose may be based on both age and weight.

Pediatric Digoxin dose based on age and weight

Age	µg/kg
Premature	15- 25
Full term	20-30
1- 24 months	30-50
2-5 years	25-35
5- 10 years	15-30
Over 10 years	8-12

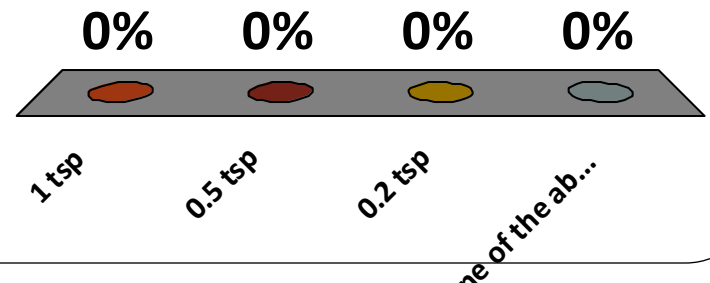
Calculate the digoxin dose (in mL) for
3 months old, 15 lb child, and 2.5 years old 30
lb child.

Digoxin Oral Solution USP, 50 mcg (0.05 mg)
/mL.

Age	dose
Newborn	20–30 µg/kg
1–24 month	30–50 µg/kg
2–3 years	25–35µg/kg

How many milliliters of acetaminophen elixir would a 22 lb child need? The recommended dose is 10 mg/kg and the available concentration is 100 mg/ half tsp.

1. 1 tsp
2. 0.5 tsp
3. 0.2 tsp
4. None of the above



3-Based on BSA

- The dose based on BSA is mainly for children and for chemotherapy treatments

I. Determination of BSA by equation or nomogram.

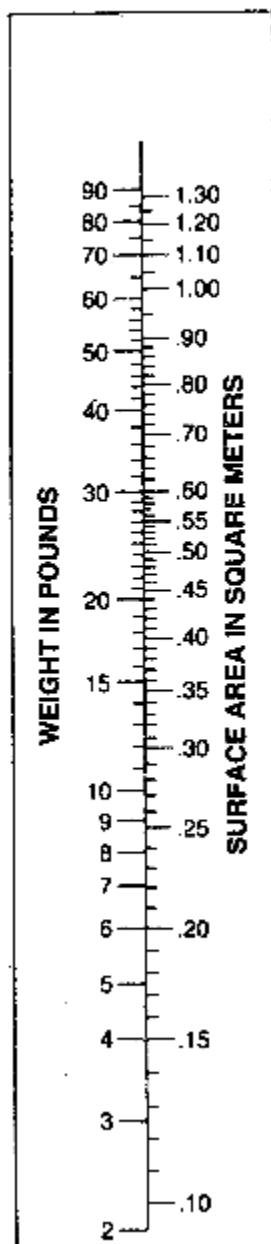
- 1- equation:

- $$\text{BSA m}^2 = \frac{(\text{height cm} \times \text{weight kg})^{1/2}}{60}$$

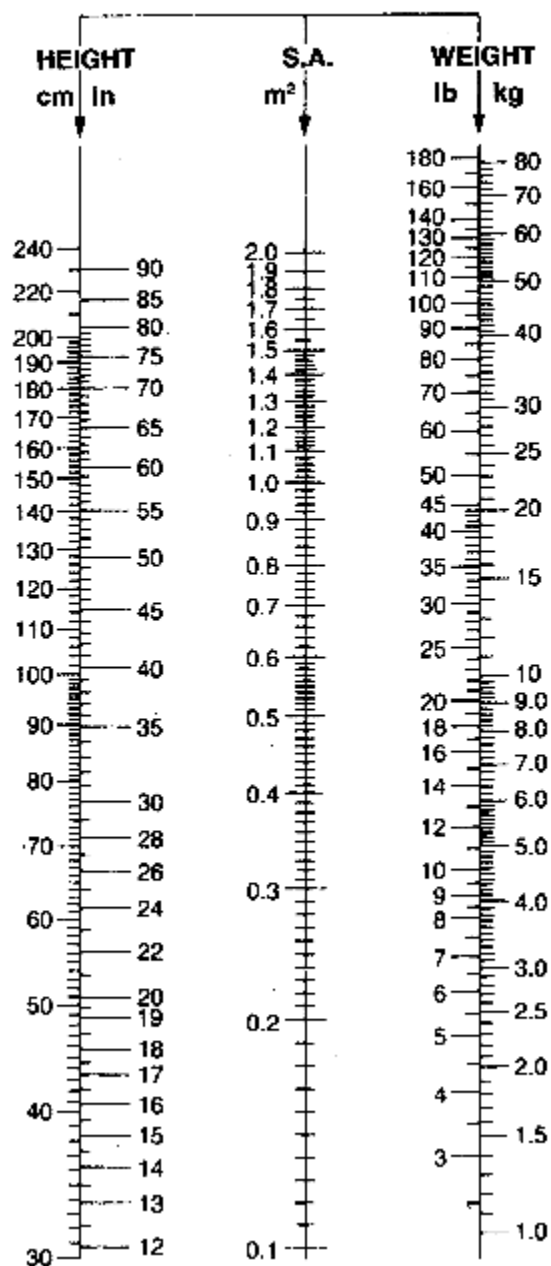
- 2- based on nomogram

- remember : the kids nomograms are different from the adult one.

**FOR CHILDREN OF
NORMAL HEIGHT
AND WEIGHT**



**NOMOGRAM
FOR OTHER
CHILDREN**



3-Based on BSA

- Child dose = $\frac{\text{BSA (m}^2\text{)} \times \text{usual Adult dose}}{1.73 \text{ m}^2}$
- If the dose is indicated per m^2 , use simple proportions.
 - Example: Drug A is given as 50 mg/ m^2 , a patient with $\text{BSA} = 0.9 \text{ m}^2$. What would be the needed dose.

3-Based on BSA

- The doctor has ordered an antibiotic with average adult dose of 500 mg per day. Calculate the dose for a child who is 100cm, 25 kg based on BSA.
- Use both BSA methods

Few important points

- Correct conversions: from lb to kg, and from inches to centimeters are crucial.
- The adult BSA is usually 1.4 to 2.4 m² (rounded to the nearest tenth), while the children older than 3 month are 0.27–1.35 m², newborns are equal or less than 0.22 m² (rounded to the nearest hundredth).

BSA problem

- Calculate the dose of a drug for a 40 lb, 32 inches child, with usual pediatric dose of 150 mg/m². use both methods of calculating BSA.

Problem O page 130 in Zatz book

BSA problem

- What would be the correct dose for a child who is 66 lb, 3 ft. of a drug with an adult dose of 450 mg? What about if the child dose is 450 mg/m²?

Practice Problems

- **A child weighing 30 lb needs an anticonvulsant in a dose of 5 mg/kg. How many mL of a pediatric suspension of the drug, containing 20 mg/mL, should the child receive?

Rx

Drug A	3 mg/mL
Excipient 1	1.2 g
Excipient 2	1.2 % w/v
ascorbic acid	1: 60 w/v
Flavor	3 mL
Sterile water qs ad	45 mL

How much of each ingredient do you need to prepare 100 mL solution?