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Formulary 2009-2011



**An Essential Medicines Dosing Guide
Based on the WHO Model Formulary**

APPENDIX I

GENERAL INFORMATION ON PRESCRIBING IN CHILDREN

Many drugs used in children are used outside the recommendations of the Summary of Product Characteristic (Data Sheet) i.e. manufacturer's license. Prescribers must therefore take full responsibility for prescribing outside any licensed dosage, indication & age range.

- Calculating Paediatric Doses (some parts edited from WHO Formulary notes):

Body weight may be used to calculate doses expressed in mg/kg. Young children may require a higher dose per kilogram than adults because of their proportionately higher metabolic capacity. Other problems need to be considered. For example, calculation by body weight in an obese child may result in much higher doses being administered than necessary; in such cases, dose should be calculated from an ideal weight, related to height and age.

Body surface area (BSA) estimates are more accurate for calculation of paediatric doses than body weight because many physiological phenomena correlate better with body surface area. The average body surface area of a 70-kilogram human is about 1.8 m². Thus, to calculate the dose for a child the following formula may be used:

$$\text{Approximate dose for patient} = \frac{\text{surface area of child (m}^2\text{)} \times \text{adult dose}}{1.8}$$

Nomograms are available to allow more precise body surface values to be calculated from a child's height and weight (see next page).

Where the dose for children is not readily available, prescribers should seek specialist advice before prescribing for a child.

Definitions of Age (as a guideline only):

Premature baby	Born before 37 weeks gestation
Term baby	Born at 37-42 weeks gestation
Neonate	First 4 weeks of life
Infant	Up to 1 year of age
Child	From 1-12 to 16 years of age

AGE	MEAN WEIGHT (KG)	MEAN HEIGHT (CM)	MEAN SURFACE AREA (M ²)	% OF ADULT DOSE
Newborn (full term)	3.5	50	0.23	12
1 month	4.2	55	0.26	14.5
3 months	5.6	59	0.32	18
6 months	7.7	67	0.40	22
1 year	10	76	0.47	25
3 years	15	94	0.62	33
5 years	18	108	0.73	40
7 years	23	120	0.88	50
10 years	30	143	1.10	60
12 years	39	148	1.25	75
14 years	50	160	1.50	80
Adult - female	56	163	1.60	100
Adult - male	68	173	1.80	100

Note: Estimated Surface Area (m²)
= Squared Root [Height (cm) x (Weight (kg) /3600)]

NOTE: The figures above are from European statistics, it is recommended to use weight instead of age as a calculation basis for application in African patients. The figures relate to full term and not preterm (premature) infants who may need reduced dosage according to clinical condition.

Drug Administration and Prescribing in Children:

- Parents must be warned to keep all medicines out of the reach of children.
- **STATE DOSAGE STRENGTH AND DOSE CLEARLY** to avoid over- or under-dosage. For example, paracetamol oral liquid may come in two strengths: 120mg/5ml or 250mg/5ml. Prescribing in volume (e.g. 5ml tds) can thus lead to paracetamol toxicity in young children.
- The parenteral route for children is the most reliable to obtain predictable blood levels. The painful intramuscular route should be avoided in children wherever possible.
- Parenteral doses must be prepared with care, with small volumes measured using graduated syringes or by dilution of injection. When reconstituting freeze-dried injections, the displacement value (i.e. volume of fluid displaced by powder) must be taken into account, especially if part vials are used, otherwise significant errors in the dose drawn up may result.

- The oral route is usually the easiest and most convenient, especially in long-term treatment. Dosage forms (e.g. liquid or tablet) appropriate for administration to different age ranges should be prescribed where possible.
- Oral syringes should be used with liquid oral preparations esp. for doses of less than 5ml.
- Do not mix medications with milk or other oral fluids unless otherwise directed, as there may be drug interactions, dosing errors or wastage if the child does not drink all the contents.
- Some liquid preparations contain sugar – to avoid dental decay teach the child to rinse orally with water after dosing, or wipe the child’s mouth with a clean wet cloth.
- Some flexibility should be allowed in children for drugs with frequent dosing intervals (such as more often than every 6 hourly) to avoid waking them during the night. E.g. night-time dose may be given at parent’s bedtime.
- **Adult Fingertip units (FTU) for topical corticosteroids used in children:**
 - One FTU is equivalent to the amount of ointment expressed from a tube with a 5mm nozzle, applied from the distal crease to the tip, of the palm side of the index finger.

	Face & Neck	Arm & Hand	Leg & Foot	Trunk (Front)	Trunk (Back) inc. Buttocks
AGE	Number of FTUs				
3-6 mth	1	1	1.5	1	1.5
1-2 yrs	1.5	1.5	2	2	3
3-5 yrs	1.5	2	3	3	3.5
6-10 yrs	2	2.5	4.5	3.5	5

NOTE. Adapted from the University of Wales College of Medicine Dermatology Guidelines (1998).

WHO MODEL FORMULARY 2008 NOTES – Inhaler Technique:

INHALER USAGE. Main advantage - high concentrations can be delivered more effectively and rapidly to the airways and systemic adverse effects avoided or minimized. It is important that patients receive careful instruction in the use of pressurized (aerosol) inhalation (using a metered-dose inhaler) to obtain optimum results. Before use, the inhaler should be shaken well. After exhaling as completely as possible, the mouthpiece of the inhaler should be placed well into the mouth and the lips firmly closed around it. The patient should inhale deeply through the mouth while actuating the inhaler. After holding the breath for 10 seconds or as long as is comfortable, the mouthpiece should be removed and the patient should exhale slowly.

It is important to check that patients continue to use their inhalers correctly as inadequate technique may be mistaken for drug failure. Spacing devices provide a space between the inhaler and the mouth. They may be of benefit for patients such as the elderly, small children and the asthmatic who find inhalers difficult to use or for those who have difficulty synchronizing their breathing with administration of the aerosol. A large volume spacing device is also recommended for inhalation of high doses of corticosteroids to reduce oropharyngeal deposition which can cause candidosis. The use of metered-dose inhalers with spacers is less expensive and may be as effective as use of nebulizers, although drug delivery may be affected by choice of spacing device. Breath-actuated devices including dry powder inhalers are also available.

- **Choice of Inhaler Devices for Children:**

	1-2 years of age	3-5 years	> 5 years
MDI + Large volume spacer + mask	1 st Choice	2 nd Choice	-
MDI + Large volume spacer	2 nd Choice	1 st Choice	2 nd Choice
Dry Powder Inhaler (e.g. Turbohaler)	Inappropriate	Occasionally useful	1 st Choice

NOTE. Adapted from the British Thoracic Society Guidelines on Asthma Management (1997).