

Height Percentile

Mother's Height

Father's Height

Simplified Calculation of Body Surface Area (BSA)

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

Reference: Mosteller, R.D. 1987, 'Simplified calculation of body surface area', *N. Engl. J. Med.*, 317:1098.

Supine Length (recommended up to the age of 3 so that there is overlap with standing height at 2 to 3) is taken on a flat surface, with the child lying on his back. One observer holds the child's head in contact with a board at the top of the table and another straightens the legs and turns the feet upward to be at right angles to the legs and brings a sliding board in contact with the child's heels.

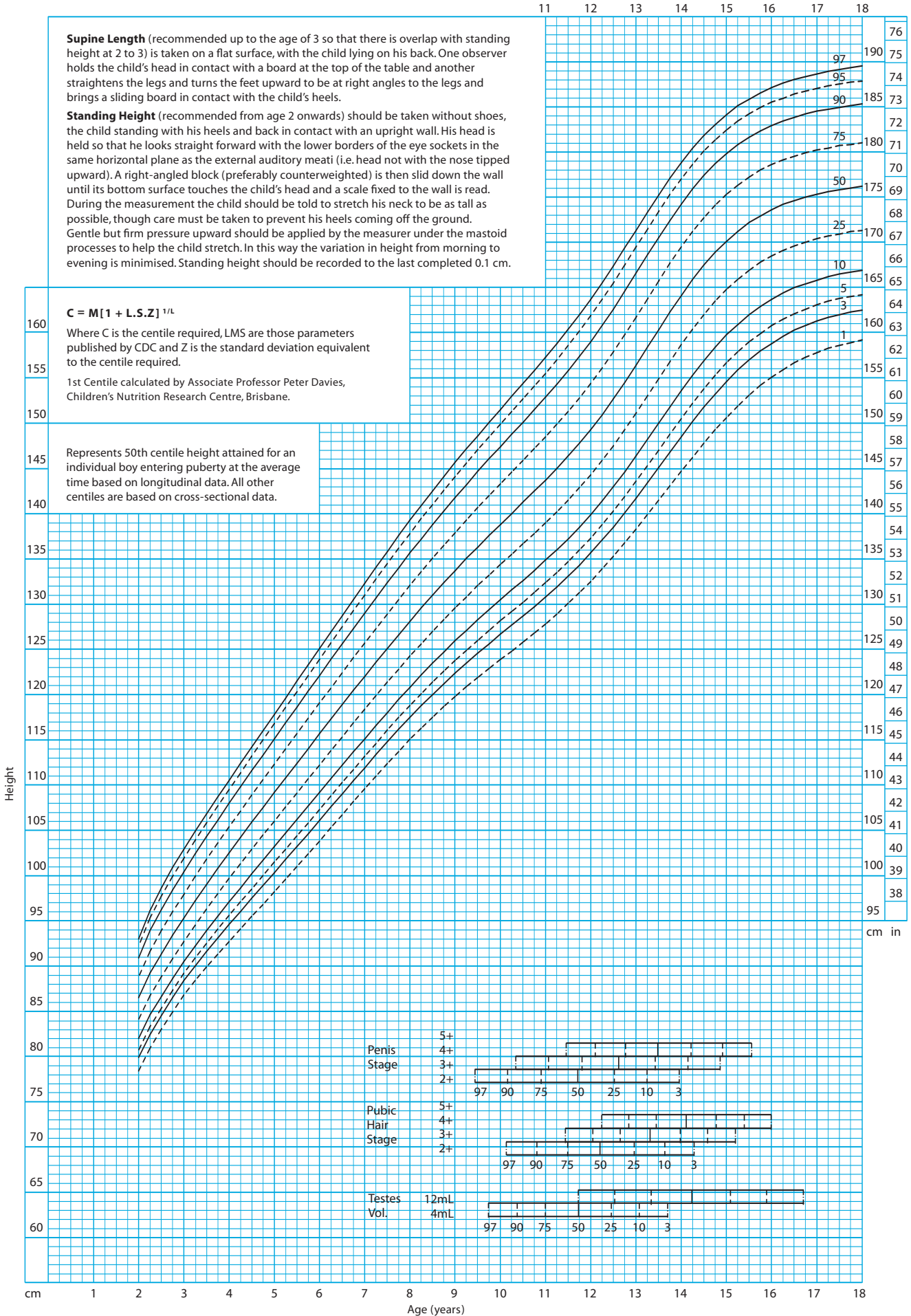
Standing Height (recommended from age 2 onwards) should be taken without shoes, the child standing with his heels and back in contact with an upright wall. His head is held so that he looks straight forward with the lower borders of the eye sockets in the same horizontal plane as the external auditory meati (i.e. head not with the nose tipped upward). A right-angled block (preferably counterweighted) is then slid down the wall until its bottom surface touches the child's head and a scale fixed to the wall is read. During the measurement the child should be told to stretch his neck to be as tall as possible, though care must be taken to prevent his heels coming off the ground. Gentle but firm pressure upward should be applied by the measurer under the mastoid processes to help the child stretch. In this way the variation in height from morning to evening is minimised. Standing height should be recorded to the last completed 0.1 cm.

$$C = M [1 + L.S.Z]^{1/L}$$

Where C is the centile required, LMS are those parameters published by CDC and Z is the standard deviation equivalent to the centile required.

1st Centile calculated by Associate Professor Peter Davies, Children's Nutrition Research Centre, Brisbane.

Represents 50th centile height attained for an individual boy entering puberty at the average time based on longitudinal data. All other centiles are based on cross-sectional data.



Boys 2-18 years

Stages of Puberty

Ages of attainment of successive stages of pubertal sexual development are given in the Height Percentile chart.

The stage Pubic Hair 2+ represents the state of a child who shows the pubic hair appearance stage 2 but not stage 3 (see below).

The centiles for age at which this state is normally seen are given, the 97th centile being considered as the early limit, the 3rd centile as the late limit. The child's puberty stages may be plotted at successive ages (Tanner. 1962, *Growth at Adolescence*, 2nd edn). Testis sizes are judged by comparison with the Prader orchidometer (Zachmann, Prader, Kind, Haflinger & Budliger. 1974, *Helv. Paed. Acta.* 29, 61-72).

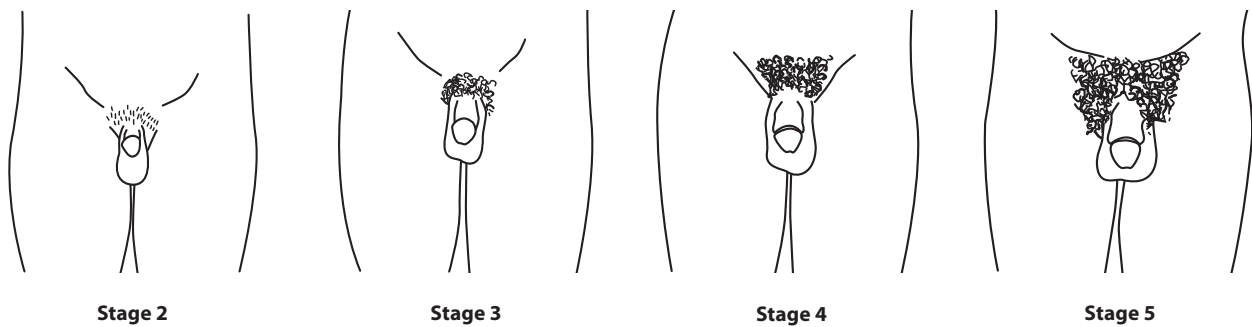
Genital (Penis) Development

- Stage 1.** Pre-adolescent. Testes, scrotum and penis are of about the same size and proportion as in early childhood.
- Stage 2.** Enlargement of scrotum and testes. Skin of scrotum reddens and changes in texture. Little or no enlargement of penis at this stage.
- Stage 3.** Enlargement of the penis which occurs at first mainly in length. Further growth of the testes and scrotum.
- Stage 4.** Increased size of penis with growth in breadth and development of glans. Testes and scrotum larger; scrotal skin darkened.
- Stage 5.** Genitalia adult in size and shape.

Pubic Hair Development

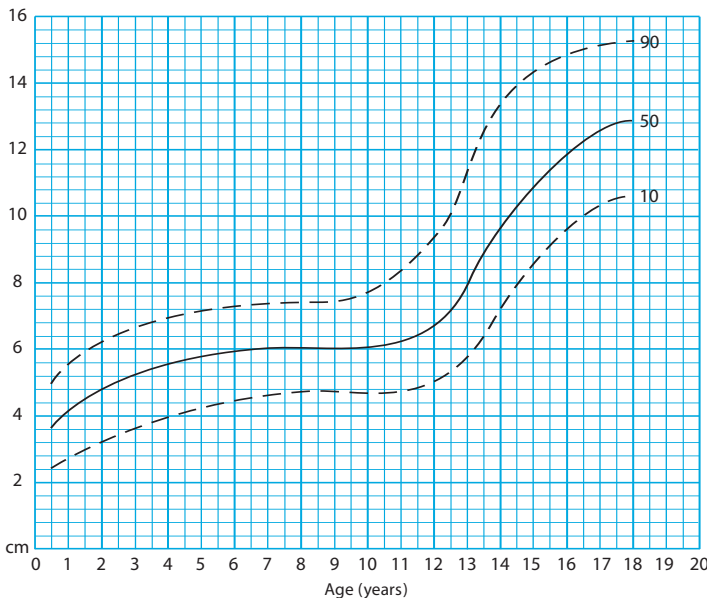
- Stage 1.** Pre-adolescent. The vellus over the pubes is not further developed than that over the abdominal wall, i.e. no pubic hair.
- Stage 2.** Sparse growth of long, slightly pigmented downy hair, straight or slightly curled at the base of the penis.
- Stage 3.** Considerably darker, coarser and more curled. The hair spreads sparsely over the junction of the pubes.
- Stage 4.** Hair now in adult in type, but area covered is still considerably smaller than in the adult. No spread to the medial surface of thighs.
- Stage 5.** Adult in quantity and type with distribution of the horizontal (or classically 'feminine') pattern. Spread to medial surface of thighs but not up linea alba or elsewhere above the base of the inverse triangle (spread up linea alba occurs late and is rated stage 6).

Genital and Pubic Hair Development Stages



Stretched Penile Length

Measured from the pubo-penile skin junction to the tip of the glans (Shonfeld & Beebe. 1942, *Journal of Urology*, 48, 759-777).



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