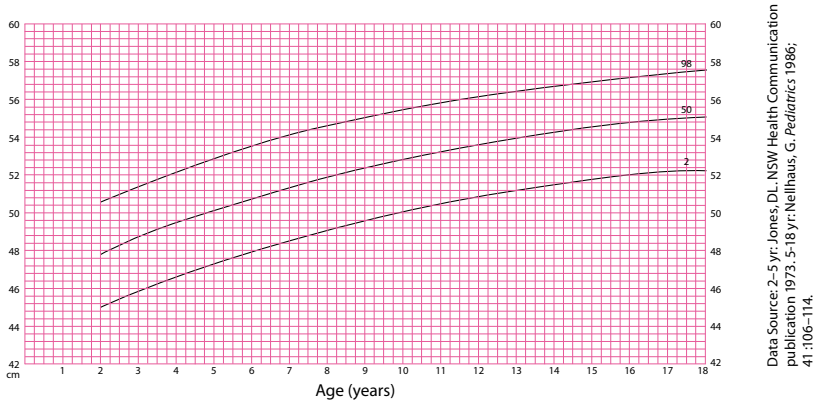


## Head Circumference

**Measuring Technique:** The tape should be placed over the eyebrows, above the ears and over the most prominent part of the occiput taking a direct route. A paper tape is preferable to plastic, which stretches unacceptably under tension. The maximum measurement should be recorded to the nearest 0.1 cm.



## Height Velocity

The standards are appropriate for velocity calculated over a whole year period, not less, since a smaller period requires wider limits (the 3rd and 97th centiles for a whole year being roughly appropriate for the 10th and 90th centiles over six months). The yearly velocity should be plotted at the mid-point of a year. The centiles given in black are appropriate to children of average maturational tempo, who have their peak velocity at the average age for this event. The red line is the 50th centile line for the child who is two years early in maturity and age at peak height velocity, and the green line refers to a child who is 50th centile in velocity but two years late. The arrows mark the 3rd and 97th centiles at peak velocity for early and late maturers.

Centiles for girls maturing at average time

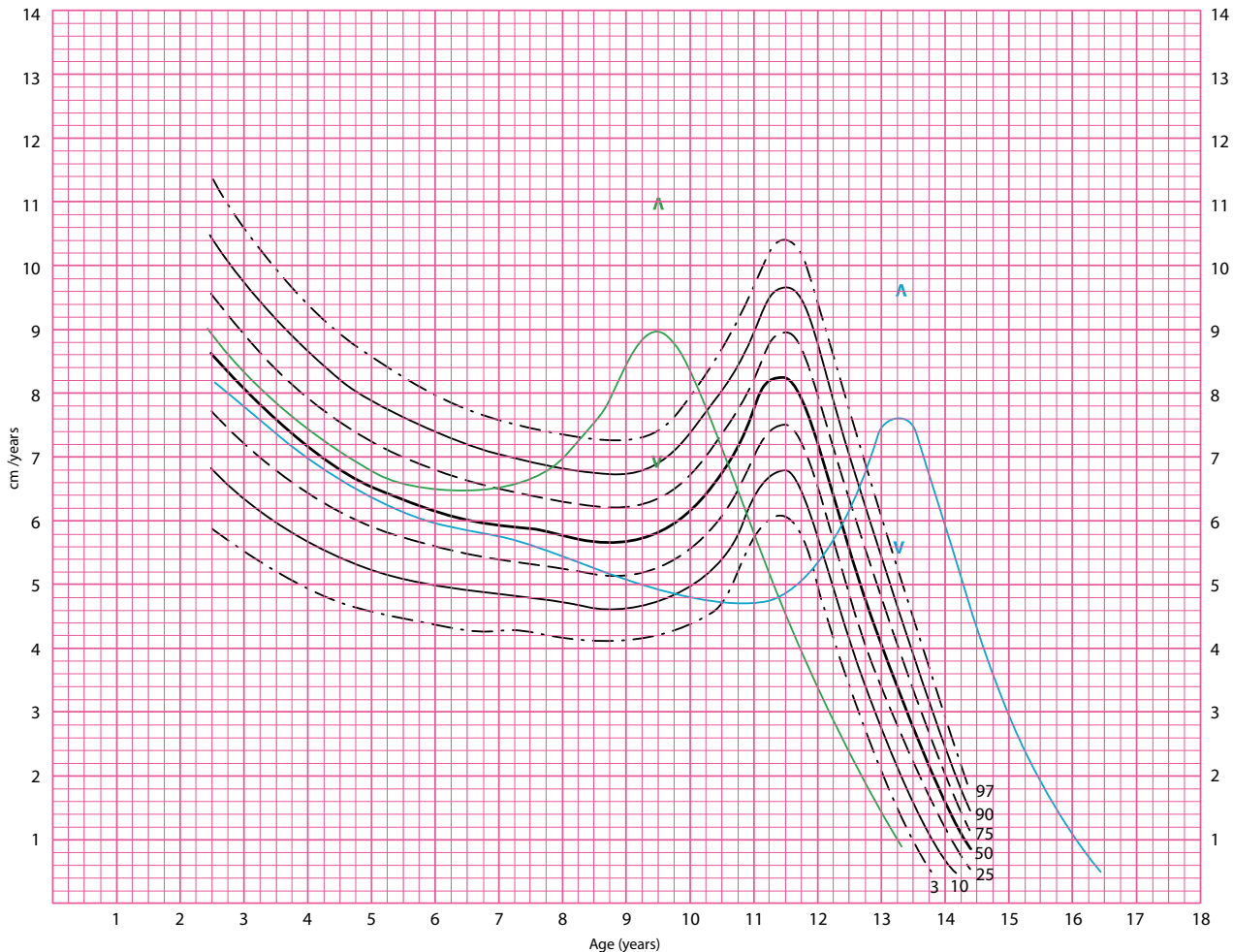
97th  
90th  
75th  
50th  
25th  
10th  
3rd

Early (+2SD) maturers

97th centile peak  
50th  
3rd centile peak

Late (-2SD) maturers

97th centile peak  
50th  
3rd centile peak



Height Percentile

Mother's Height

Father's Height

Simplified Calculation of Body Surface Area (BSA)

BSA (m²) = √ (Ht (cm) x Wt (kg) / 3600)

Reference: Mosteller, RD, Simplified calculation of body surface area, N. Engl. J. Med 1987;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 her 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.

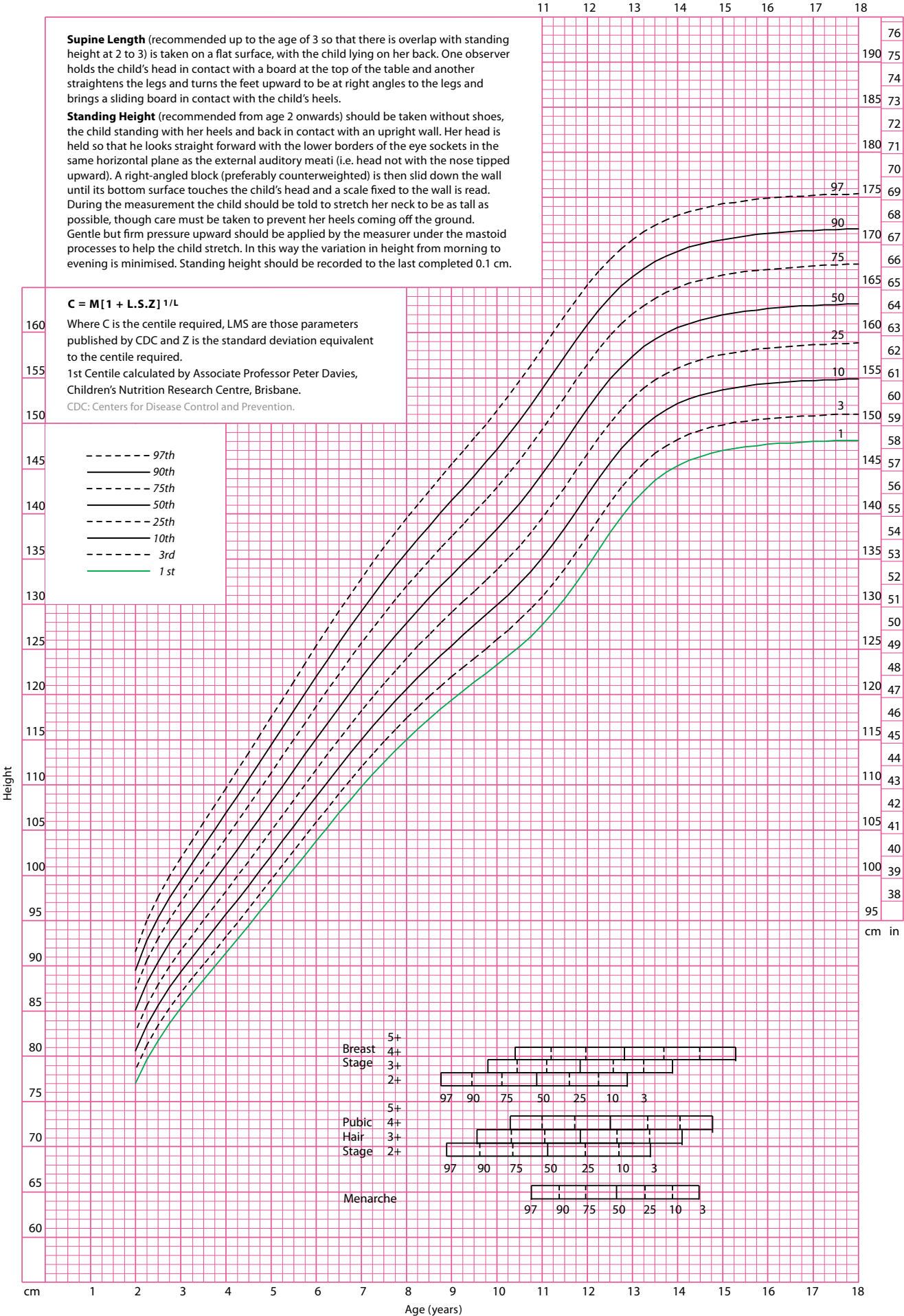
**Standing Height** (recommended from age 2 onwards) should be taken without shoes, the child standing with her heels and back in contact with an upright wall. Her head is held so that she looks straight forward with the lower borders of the eye sockets in the same horizontal plane as the external auditory 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 her neck to be as tall as possible, though care must be taken to prevent her 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.

CDC: Centers for Disease Control and Prevention.

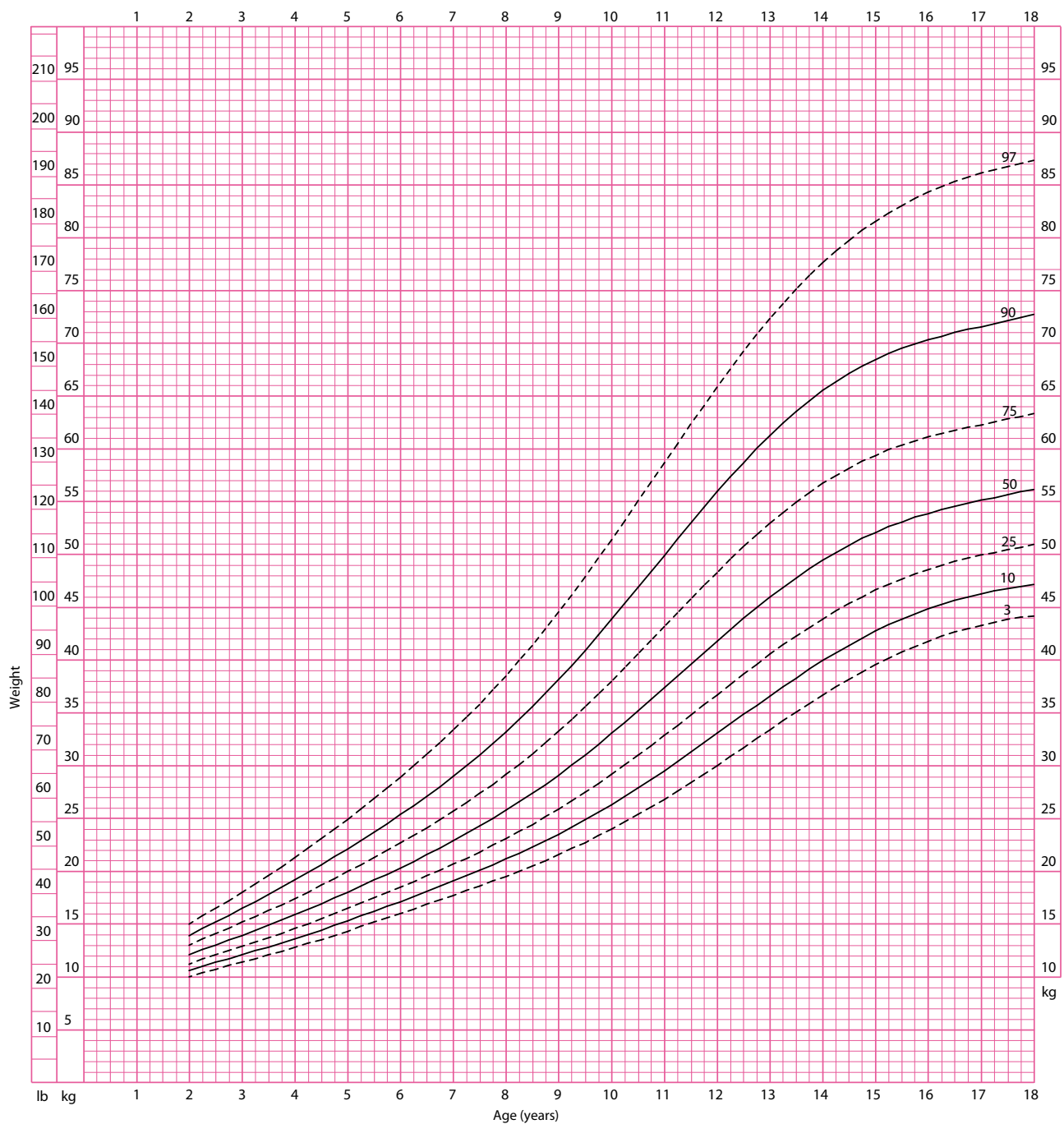


Weight should be taken in the nude, or as near thereto as possible. If a surgical gown or minimum underclothing (vest and pants) is worn, then its estimated weight (about 0.1 kg) must be subtracted before weight is recorded. Weights are conventionally recorded to the last completed 0.1 kg above the age of six months. The bladder should be empty.

The graph displays four curves representing different BMI percentiles. The 95th percentile curve starts at approximately 18.5 kg/m² at age 2 and rises to about 29.5 kg/m² at age 18. The 85th percentile curve starts at approximately 17.5 kg/m² at age 2 and rises to about 25.0 kg/m² at age 18. The 50th percentile curve starts at approximately 15.5 kg/m² at age 2 and rises to about 20.5 kg/m² at age 18. The 5th percentile curve starts at approximately 13.5 kg/m² at age 2 and rises to about 17.0 kg/m² at age 18. All curves show a slight dip between ages 2 and 6 before rising more steeply.

Age (years)	95th Percentile (kg/m²)	85th Percentile (kg/m²)	50th Percentile (kg/m²)	5th Percentile (kg/m²)
2	18.5	17.5	15.5	13.5
4	17.5	16.5	14.5	12.5
6	18.0	16.0	14.5	12.5
8	20.0	17.5	15.0	13.0
10	22.0	19.0	16.0	13.5
12	24.0	20.5	17.0	14.0
14	26.0	22.0	18.0	15.0
16	28.0	24.0	19.0	16.0
18	29.5	25.0	20.5	17.0

Data Source: <https://www.cdc.gov/growthcharts/data/set1clinical/cj411024.pdf>

[illegible]

Data Source: <https://www.cdc.gov/growthcharts/data/set1clinical/cj41022.pdf>

# Girls 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. *Growth at Adolescence*, 2nd edn, 1962).

### 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, chiefly along labia.

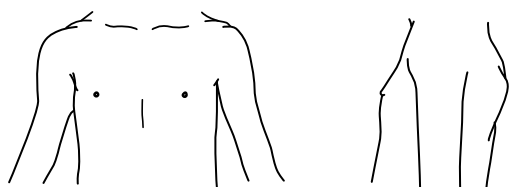
**Stage 3.** Considerably darker, coarser and more curled. The hair spreads sparsely over the junction of the pubes.

**Stage 4.** Hair now adult in type, but area covered is still considerably smaller than in the adult. No spread to the medial surface of thighs.

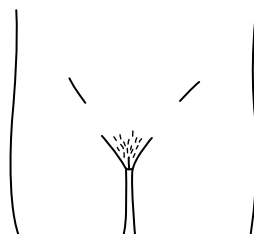
**Stage 5.** Adult in quantity and type with distribution of the horizontal (or classically 'feminine') pattern. Spread to medial surface of thighs but not up linea alba or elsewhere above the base of the inverse triangle (spread up linea alba occurs late and is rated stage 6).

### Breast Development Stages

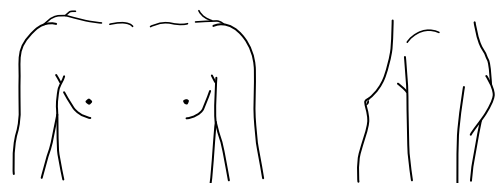
### Pubic Hair Stages



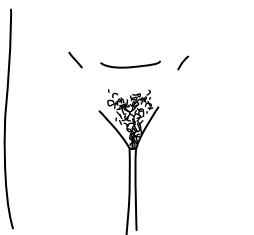
**Stage 1.** Prepubertal



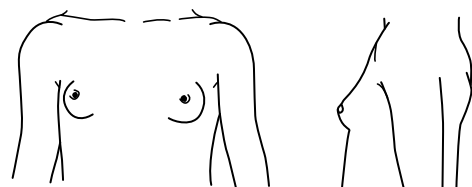
**Stage 2.**



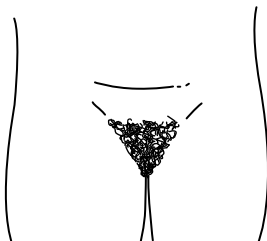
**Stage 2.** Elevation of breasts and papilla



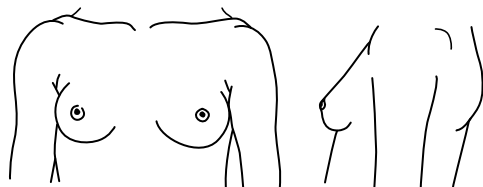
**Stage 3.**



**Stage 3.** Further elevation and areola but no separation of contours



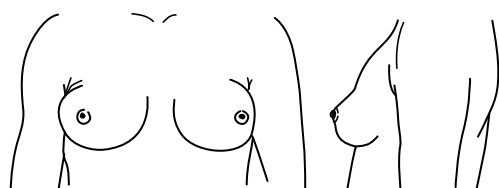
**Stage 4.**



**Stage 4.** Areola and papilla form a secondary mound above level of the breast



**Stage 5.**



**Stage 5.** Areola recesses to the general contour of the breast

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