Who should use this chart?

Anyone who measures a child, and/or plots or interprets charts, should be suitably trained or be supervised by someone qualified to do so. For further information and training materials see www.moh.govt.nz/wellchild and www.growthcharts.rcpcc.ac.uk

A growth chart for all children

This chart, which is suitable for use with New Zealand children up to age 5 years, combines World Health Organization (WHO) standards with United Kingdom preterm and birth data. The chart from 2 weeks to 5 years of age is based on the WHO growth standard, derived from measurements of healthy, non-deprived, breastfed children of mothers who did not smoke. The chart for birth measurements (32–42 weeks gestation) is based on British children measured around 1990. The charts depict a healthy pattern of growth that is desirable for all children, whether breastfed or formula fed, and of whatever ethnic origin.

Weighing and measuring

Weight: use only electronic scales in metric setting. For children up to 2 years, remove all clothes and nappy; children older than 2 years should wear minimal clothing only. Always remove shoes.

Length: (before 2 years of age): proper equipment is essential (length board or mat). Measurers should be trained.

Height: (from 2 years): use a rigid rule with T piece, or stadiometer; the child’s shoes should be removed.

Head circumference: use a narrow plastic or paper tape to measure where the head circumference is greatest. Any hair band should be removed. Be aware of cultural issues around touching heads.

When to weigh

Babies should be weighed in the first week as part of the assessment of feeding. Recovery of birthweight usually occurs by 10 to 14 days, and indicates that feeding is effective and that the child is well. Once feeding is established, babies should usually be weighed at the time of routine checks. If there is concern, weigh more often; however, weights measured too close together are often misleading. The child’s weight should not be routinely measured more frequently than at each Well Child/Tamariki Ora check.

Interpreting the chart

Assessing weight loss after birth

Most babies lose some weight after birth, but 80% will have regained this by 2 weeks. Careful clinical assessment and evaluation of feeding techniques is indicated when weight loss exceeds 10% or recovery of birth weight is slow.

Percentage weight loss can be calculated as follows:

\[
\text{Percentage weight loss} = \frac{\text{weight loss (kg)}}{\text{birth weight (kg)}} \times 100\%
\]

For example, a child born at 3.5kg who drops to 3.15kg at 5 days has lost 0.35kg or, in a baby born at 3.0kg, a 30% loss is 10%.

What do the centiles mean?

A single point on these charts indicates a child’s size compared with children of the same age and maturity who have shown optimum growth. When there is more than one point on the chart shows how quickly a child is growing. The centile lines on the chart show the expected range of weights and heights [or length], each describes the number of children expected to be below that line (eg, 50% below 50th, 91st below the 91st). Children come in all shapes and sizes, but 99 out of 100 children who are growing optimally will be between the two outer lines (0.4th and 99.6th centiles); half will lie between the 25th and 75th centile lines.

Being very small or very big can sometimes be associated with underlying illness. There is no single threshold below which a child’s weight or height is definitely abnormal, but only 4 per 1000 children who are growing optimally are below the 0.4th centile, so these children should be assessed at some point to exclude any problems. Those above the 99.4th centile for height are almost always healthy. Also calculate BMI for children over 2 if weight and height centiles appear very different (more than two centile lines different)

What is a normal rate of weight gain and growth?

Babies do not all grow at the same rate, so a baby’s weight often does not follow a particular centile line, especially in the first year. Weight is most likely to track within one centile space (the gap between two centile lines, see diagram). In infancy acute illness can lead to sudden weight loss and a weight centile fall, but on recovery the child’s weight usually returns to its normal centile within 2–3 weeks. However, a sustained drop through two or more weight centile spaces is unusual (fewer than 2% of infants) and should be carefully assessed by the primary care team, including measuring length/height.

Because it is difficult to measure length and height accurately in pre-school children, successive measurements commonly show wide variation. If there are worries about growth, it is useful to measure on a few occasions over time, most healthy children will show a small average position over time. Head circumference centiles usually track within a range of one centile space. After the first few weeks, a drop or rise through more centile lines is unusual (fewer than 1% of infants) and should be carefully assessed.

Why do the length/height centiles change at 2 years?

The growth standards show length data up to 2 years of age, and height from age 2 onwards. When a child is measured standing up, the child’s weight appears slightly smaller. The child’s height is slightly less than their length; the centile lines shift slowly at age 2 to allow for this. It is important that this difference does not worry parents, because whatever the child continues to follow the same centile after the transition.

Predicting adult height

(Note that this is in the Health Professionals’ Notes, but not the Well Child/Tamariki Ora Healthbook.)

Parents like to know how tall their child will be as an adult. The child’s most recent height centile (aged 2–5 years) gives a good idea of this for healthy children. Plot this centile on the adult height predictor to the right of the height chart to find the average adult height for children on this centile. Four out of five children will have adult heights that are within ±cm above or below this value.

Weight-height to BMI conversion chart

BMI indicates how healthy a child is relative to his or her height and is the simplest measure of overweight or underweight from the age of 2, when height can be measured fairly accurately. This chart provides an approximate BMI centile, accurate to a quarter of a centile space.

Instructions for use

1. Plot the weight centile (left axis) against the height centile (bottom axis) on the chart.
2. If between centiles, read across in this position.
3. Plot the corresponding BMI centile from the starting lines.
4. Record the centile with the data and child’s age in the data box.

Interpretation

In a child over 2 years of age, the BMI centile is a better indicator of overweight or underweight than the weight centile; a child whose weight is average for their height will have a BMI between the 25th and 75th centiles, whatever their height. BMI above the 91st centile suggests that the child is overweight; a child below the 9th centile is very overweight (clinically obese). BMI below the 2nd centile is unusual and may reflect underlying illness.

References

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