## Health Professionals’ Notes

### Boys New Zealand – World Health Organization Growth Chart 0–5 Years

This information is based on original materials developed by and copyright © 2009 Royal College of Paediatrics and Child Health, United Kingdom. It was adapted by the New Zealand Ministry of Health in July 2010.

### 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.rcpch.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 gestation weeks) 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 clinical 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 1 piece, a stadimeter; 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 hat or bonnet should be removed.

Be aware of cultural dress around touching heads.

### When to weigh

Children 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, these weights can be too close together are often misleading, so babies should not be routinely weighed more frequently than at each Well Child/Tamaki 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 of age. Careful clinical assessment and evaluation of feeding technique is indicated when weight loss exceeds 10% or recovery of birth weight is slow.

**Percentage weight loss can be calculated as follows:**

% Weight loss = current weight – birth weight  
% Birth Weight

For example, a child born at 3.5kg who drops to 3.15kg at 5 days has lost 350g or 10%, in a baby born at 3.0kg, a 300g 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 centiles on the chart show the expected range of weights and heights (or lengths), each describes the number of children expected to be below that line (eg, 50% below 50th, 91% 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.

**What is a normal rate of weight gain and growth?**

Babies do 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 normal centile range within a few weeks. However, sustained growth 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 stable 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 two or more centile spaces 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. If a child is measured standing up at age 2, there is a small error because their height is slightly less than their length; the centile lines shift down slightly at age 2 to allow for this. It is important that this difference does not worry parents, unless the child continues to follow the same centile after the change.

### Weight-height to BMI conversion chart

BMI indicates how heavy 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. **Read off the height and weight centiles from the growth chart.**
2. **Plot the weight centile (left axis) against the height centile (bottom axis) on the chart below.**
3. **If between centiles, read across in this position.**
4. **Read off the corresponding BMI centile from the slanting lines.**
5. **Record the centile with the date 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 above the 98th centile is very overweight (clinically obese). BMI below the 2nd centile is unusual and may reflect undernutrition.

### References

For preterm infants:

- Use this chart for infants with gestational age less than 37 weeks.
- Plot actual age and mark the spot with an X.
- Use the gestational correction chart to identify babies who are growth restricted.
- From 42 weeks, plot on the weight loss chart in the early days.

- Infants there may be some weight loss in the early days. Some degree of weight loss is a useful way to identify babies who are growth restricted.
- Loss is common after birth. Growth restriction may not be obvious until later in the first year.

- All infants requiring follow-up will be enlisted in the program.

- Use the chart to identify babies who are growth restricted.
- Adult height for average male numbers show above; the black lines show adult height for this centile; 50% of children will be within ±2.5 cm of this value.

- Measuring height:
  - Measure length until age 2; measure height after age 2.
  - A child’s height is usually tighter than their length.