Children's growth assessment
Questions and answers for health professionals

The Royal Children's Hospital Melbourne

Why monitor children's growth?

Growth monitoring assists child health practitioners assess whether a child is growing as expected or if there are potential growth problems. Disturbances in health and nutrition in infants and young children, almost always affect their growth. Growth measurements are plotted on an age and gender-appropriate growth chart to show how the child is growing. Monitoring a child's growth also provides opportunities to give parents anticipatory guidance to support the development of healthy lifestyles to promote healthy growth and development.

Which charts should be used to monitor the growth of infants and children?

In 2012, all Australian States and Territories agreed to adopt the World Health Organization (WHO) Growth Standards (2006) for all children aged 0 to 2 years. The Centers for Disease Control (CDC) charts remain in use in most jurisdictions for children and adolescents aged 2-18 years; the Northern Territory has adopted the WHO charts for this group. The WHO growth charts recognise breastfeeding as the biological norm. The WHO charts show the growth of children who were exclusively or predominantly breastfed for at least 4 months and still breastfeeding at 12 months. This is consistent with the current Australian Dietary Guidelines (NHMRC 2013) which recommend exclusive breastfeeding until around 6 months with continued breastfeeding while solid foods are introduced and until 12 months of age and beyond for as long as the mother and infant wish. The CDC charts are based on health surveys from the US and provide a 'snapshot' of the population of children measured for the surveys.

When should discussion take place about changes in a child's growth pattern?

Discussion about a child's growth pattern should occur at every child health visit as a routine part of care. This approach helps build rapport and trust between the parent and health professional.

How do the growth patterns of breastfed and non-breastfed infants differ?

In general, breastfed infants gain weight more quickly in the first 1 to 6 months than non-breastfed infants and more slowly from 6 months to 2 years of age. Health professionals need to understand this difference, and carefully consider before suggesting a change in feeding for either breastfed or non-breastfed infants, irrespective of the growth chart used.

How much growth percentile change is normal?

Children do not always grow along the same percentile for height and weight, but they generally 'track' along or between percentile curves. At any age, rapid increases or decreases in the growth curves, or a flat line on the growth chart suggest a growth problem. Poor growth should be considered when serial growth measurements track downwards on the percentiles. Similarly, risk of overweight should be considered when growth measurements track upwards on growth percentile lines. Historically, crossing over 2 percentile lines was considered an indicator of poor growth, but this definition cannot be used for the WHO or the CDC growth charts as the percentile spaces are not even.

What are the main differences between the CDC chart and the WHO chart?

For most children, growth assessment is the same irrespective of the chart used. For a small number of children who grow near the upper and lower percentiles on the growth curves, plotting growth on the WHO growth charts may result in a change in the pattern of their growth, compared to when they were plotted on CDC charts. For example infants growing along the 3rd centile of the CDC weight for age growth chart between 3 – 6 months may dip below the 3rd centile of the WHO weight for age growth chart. Similarly, infants growing along

the 97th centile of the CDC weight for age growth chart between 6 – 24 months may cross above the 97th centile of the WHO weight for age growth chart. Health professionals should be aware of the underlying differences between the CDC and WHO charts, and compare the patterns of weight and length before suggesting a change in feeding for either breastfed or formula-fed infants. In practice, direct comparison between WHO and CDC growth charts is made only at 2 years of age in transition from WHO 0 - 2 year old charts to CDC over 2 year old. Small differences between weight or length /height centiles may emerge at this time.

When should BMI be used to assess children's growth?

BMI is used to identify overweight (> 85th BMI centile for age) and obesity (>95th BMI centile for age) and may be linked to adverse health and weight outcomes. BMI-for-age is an effective screening tool in children over 2 years of age, but it is not a diagnostic tool. It should be used as guidance for further assessment, referral, or intervention, rather than as a diagnostic criterion for classifying children. International cut-offs for BMI to define "thinness" in children older than 2 years have also recently been developed based on adult cut-offs, but still need to be validated. Correlation between BMI and body fat has been shown, but no correlation between BMI and lean body mass has been demonstrated. To date, most of the studies of paediatric BMI has been in children 2 years and older. Although BMI charts for children under 2 years of age have been available in the United Kingdom and several European countries for a number of years, reported experience in using BMI in this young population is very limited. Therefore in Australia use of BMI less than 2 years of age is not recommended.

The shape of the BMI-for-age curves is different to other growth charts as BMI-for-age begins to drop after about 1 year of age and continues falling until it reaches a minimum around 4-6 years of age. BMI-for-age increases after 4-6 years of age, and continues to increase through childhood and adolescence. The rebound or increase in BMI that occurs after it reaches its lowest point is referred to as "adiposity" rebound. This is a normal pattern of growth occurring in all children. Research has shown that an early "adiposity" rebound, (i.e. an increase in BMI before 4-6 years old) is associated with obesity in adulthood. Early adiposity rebound is indicated by a child's BMI moving upwards on the BMI-for-age curves before age 4-6 years.

What are the problems associated with classifying children as overweight, obese, and healthy weight using BMI?

BMI is an important screening tool, but it must be included with other information in a child health assessment. A decision about whether a child with BMI >85th centile is truly overweight requires additional information such as their state of pubertal maturation, co-morbidities, family history and ethnic background, level of physical activity, and overall clinical assessment. As with other growth measures, serial measurements of BMI and the trend of BMI-for-age on the growth chart is more useful than the actual BMI number.

'Labelling' children as overweight or obese is not helpful, and may lead to stigmatising and poor self-esteem. Health practitioners are encouraged to be supportive, empathetic, and nonjudgmental. Discussing issues of excessive weight or weight gain in context with family lifestyle changes is most helpful.

How should health professionals approach discussions about growth concerns?

Child growth is an important indicator of overall health and development and should always be interpreted in context with other information about the child's health and wellbeing. It is

helpful to start discussion with an explanation about the purpose of growth monitoring, i.e. to see if the child is growing as expected, or if there are any growth concerns.
A brief explanation about the role of growth charts comparing individual children's growth with the growth of other children their age can highlight the wide range of expected heights and weights for a given age of child.
Show the parent their own child's growth plots on the growth chart. Discuss both the weight and the length/height plots, show the comparison between weight and length/height; and discuss how weight and length /height are tracking over time. Reassure the parent their child is growing well.
If there are concerns about the child's growth, and more information is needed, engage the parent in discussion about their child's growth, development, health and feeding patterns, with open-ended questions and a partnership approach. A wide range of medical, environmental, genetic, nutritional and social factors can influence a child's feeding and growth; each of these factors need to be considered in child growth assessment.

Resources
Growth charts to download and training resources are available at www.rch.org.au/childgrowth
Electronic plotting tools showing growth over time are starting to become available in health service settings.