

Out with the old, in with the “new” WHO growth charts

Growth monitoring and promotion of optimal growth can improve the nutritional status and health outcomes of Canadian infants, children, and adolescents. Interpretation of measurements of weight and length or height for all children and head circumference for infants in relation to a standard growth chart is essential to confirm a child’s healthy growth and development. Recent changes regarding recommendations for implementation of the 2006 World Health Organization (WHO) Child Growth Standards Growth Charts for birth to 5 years and the WHO Reference 2007 Growth Charts for older children 5 to 19 years are significant.

Four leading national health professional associations have collectively recommended the adoption of the WHO Growth Charts^{1,2} for monitoring the growth of Canadian children in all primary health care and clinical settings. The collaborative statement—*Promoting Optimal Monitoring of Child Growth in Canada—Using the New WHO Growth Charts*³—is supported by Dietitians of Canada (DC), Canadian Paediatric Society (CPS), the College of Family Physicians of Canada (CFPC), and Community Health Nurses of Canada (CHNC).

2006 WHO Child Growth Standards Growth Charts

In 2006, the WHO released international growth charts depicting the growth of children from birth to 5 years who had been raised in six different countries (Brazil, Ghana, India, Norway, Oman, and USA) according to recommended nutritional and health practices. The optimal growth displayed in these WHO growth charts represents the prescribed gold stan-

Table. Suggested growth charts for the primary care setting.

Parameters	Age range	Percentile
Weight-for-age	Birth–2 years; 2–5 years; 5–10 years	0.1st, 3rd, 15th, 50th, 85th, 97th, 99.9th for all sets
Length- or height-for-age	Birth–2 years; 2–5 years; 5–19 years	
Weight-for-length	Birth–2 years	
Body mass index (BMI)-for-age	2–5 years; 5–19 years	
Head circumference	Birth–5 years	

dard for children’s growth or the way all healthy children should grow.

Breastfed infants were used as the normative model for growth and development so the growth patterns will align with current recommended feeding practices. The WHO charts address the growth of a multi-ethnic international population and are reflective of our Canadian ethnic makeup. These charts also provide a wider range of available charts, allowing more detailed assessment of growth parameters when necessary. They emphasize the use of BMI-for-age as the index of weight relative to height starting at 2 years of age.

WHO Reference 2007 Growth Charts

In 2007, the WHO also released charts for monitoring the growth of older children and adolescents. These charts had been updated and improved to better address the growing epidemic of childhood obesity (**Table**).

Assessing growth³

Children should be weighed and measured by their health care provider within 1 to 2 weeks of birth, at 2, 4, 6,

9, 12, 18, and 24 months, then once per year for children over 2 years and for adolescents. For those children who do not visit their care provider regularly, growth assessment should also occur at acute care visits when a child is ill, keeping in mind that illness may affect weight.

Red flags when monitoring growth³

- With the exception of the first 2 to 3 years of life when crossing percentile curves may be normal, and again in puberty, when the age of onset is variable, a sharp incline or decline in growth, or a growth line that remains flat is potentially a sign of growth disturbance.
- A child who crosses two major percentiles on the WHO growth charts would experience a greater loss or gain of weight or length/height before being identified as a problem because the inner curves of the WHO growth charts (3rd, 15th, 50th, 85th, 97th) are farther apart. Changes in weight or length/height should be investigated before a child crosses two percentile lines.

Using BMI-for-age³

- BMI = Wt (kg), (HT (m)²).
- BMI correlates with body fat; pediatric BMI has been linked to future obesity and adverse health outcomes.
- BMI-for-age is the recommended nutritional indicator for screening children 2 years and older to identify individuals who are potentially wasted, overweight, or obese.
- BMI remains relatively stable from ages 2 to 5 years then increases through teen years and adulthood. The point of maximal leanness or minimal BMI has been called the *adiposity rebound* and is reflected in the BMI-for-age charts. Early adiposity rebound before the age of 5.5 years is associated with an increased risk for obesity later in life.
- There is a lack of convincing evidence that BMI-for-age is better than weight-for-age or weight-for-length at assessing adequacy of feeding, and under- and overweight in children under 2 years of age.
- The BMI-for-age cutoffs recommended by the WHO charts for overweight differ slightly from the previous CDC cutoffs.
- The classification of overweight in 2- to 5-year-olds is >97 percentile compared with overweight being >85 percentile in children between ages 5 to 19 years.
- WHO charts take a cautious approach in their recommended cutoffs to avoid the risk of health professionals or parents putting young children on diets. Toddlers > 85 percentile are classified “at risk of overweight.”

Frequently asked questions

How will growth of the breastfed vs non-breastfed infant differ when plotted on the WHO growth charts?³

- Since the WHO Child Growth Standards charts have been constructed based on the growth of infants who have been primarily breastfed,

breastfed infants will no longer look as though they are growing too rapidly during the first 6 months, nor will they look as though they are failing to grow sufficiently from 6 to 12 months.

- Non-breastfed infants may now appear to be growing on a lower percentile during the first 6 months and more rapidly during the second 6 months of life.
- Overall the WHO growth charts will result in higher rates of children classified as underweight or wasted/thin in the first 6 months of life and higher rates of children classified as stunted, overweight, and obese after that time.

Is there any harm in classifying children as overweight or obese using BMI?

- A decision about whether a child with a given BMI is truly overweight requires additional information such as their state of pubertal maturation, comorbidities, family history and ethnic background, level of physical activity, somatotype and frame size, and use of good clinical judgment.^{4,5} Care must be taken not to confuse heavy musculature with obesity in a minority of children.⁶
- Concerns about screening and classifying children as overweight or obese centre around issues of labeling that may lead to stigmatization, poor self-concept, disordered eating, or negative impact from parental concerns.⁷ Health providers are encouraged to be supportive, empathetic, and nonjudgmental.⁸ Discussing the condition of excess weight in the context of a health problem helps to set the proper frame.
- It has been suggested that the clinical terms *overweight* and *obesity* be used for documentation and risk assessment but that more-neutral terms, such as *weight*, *excess weight*, and BMI be used in discussing the problem with individual children and families.⁹

How should I approach the discussion of an abnormal growth pattern over- or underweight when a problem with a child’s growth is identified, without being judgmental or instilling guilt?⁶

- Start by explaining the purpose of growth monitoring. If the child is growing well, be sure to say so and compliment the caregiver. If you identify problems, it is still important to keep the conversation positive and build trust by communicating that together you and the caregiver can determine what the cause of the problem is and make a plan to correct it.
- Many social and environmental factors can affect a child’s feeding, care, and resulting growth either under- or overweight. One needs to determine if there are direct causes such as illness, or underlying causes such as insufficient household food security, inadequate maternal and child care, insufficient health services, or an unhealthy environment.

Links to growth charts (www.dietitians.ca/growthcharts) and supplemental information on weighing and measuring techniques, parent resources, and family supports are available at www.bcmj.org.

—Kathleen Cadenhead, MD
Chair, Nutrition Committee
—Shefali Raja, BSc, RD

References

1. World Health Organization Multicentre Study Group. WHO Child Growth Standards based on length/height, weight and age. *Acta Paediatr* 2006;Suppl 450:76-85. www.who.int/childgrowth/standards/Growth_standard.pdf (accessed 20 March 2009).
2. de Onis M, Onyango A, Van den Broeck J, et al., for the WHO Multicentre Growth Reference Study Group. Measurement and standardization protocols for anthropometric used in the construction of a new international growth reference. *Food Nutrition Bull* 2004;25:S27-36.

Continued on page 154

Continued from page 123

- nonoperative measures; however, relatively rapid and substantial pain and impairment relief seem to be reliably achieved.
- Cervical disc arthroplasty for radicular symptoms shows similar early outcomes to anterior discectomy and fusion surgery; however, long-term viability has not been demonstrated. No evidence supports cervical disc arthroplasty for patients without primary radicular pain.
 - Surgical intervention for possible upper cervical ligamentous injury after whiplash exposure is not supported.

For more information, contact Kuku Noertjojo, MD, at kukuh.noertjojo@worksafebc.com or 604 232-5883. www.worksafebc.com/evidence.

—Peter Rothfels, MD

—Craig Martin, MD

—Kukuh Noertjojo, MD

WorkSafeBC Evidence Based Practice Group

Continued from page 153

3. Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses Association of Canada. Promoting Optimal Monitoring of Child Growth in Canada: Using the New WHO Growth Charts. 2009. www.dietitians.ca/growthcharts (accessed 25 February 2010).
4. de Onis M, Onyango AW. WHO child growth standards. *Lancet* 2008;371:204.
5. Prentice AM. Body mass index standards for children. *BMJ*;317:1401-02. www.bmj.com/cgi/content/extract/317/7170/1401 (accessed 20 March 2009).
6. World Health Organization. Training Course on Child Growth Assessment. 2006. www.who.int/childgrowth/training/en (accessed 25 February 2010).
7. Grimmer C, Croke H, Carnell S, et al. Telling parents their child's weight status: Psychological impact of a weight-screening program. *Pediatrics* 2008;122:e682-8. <http://pediatrics.aappublications.org/cgi/reprint/122/3/e682> (accessed 1 May 2009).
8. Health Canada. Canadian Community Health Survey 2.2 Nutrition Focus. Data Releases. www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/cchs_focus-volet_esc-eng.php (accessed 25 February 2010).
9. Barlow SE and the Expert Committee. Expert Committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. *Pediatrics* 2007;120(suppl 4):S164-92. http://pediatrics.aappublications.org/cgi/content/full/120/Supplement_4/S164 (accessed 1 May 2009).

Life is better in the Southern Interior of BC



betterhere.ca

Whether you are looking to improve your golf game, hike endless trails or ski perfect powder, we have the lifestyle and opportunity waiting for you.

We have positions for Rural Family Practitioners in many of our communities and require a GPA and GPS in Fernie BC.

Rural Physicians in the Southern Interior area of BC are eligible for highly competitive recruitment and retention allowances as well as generous on-call packages.

Contact us today and find out why it's better here.

Castelgar Fernie Grand Forks Nakusp Oliver/Osoyoos Princeton

betterhere.ca | 1-877-522-9722 | physicianrecruitment@interiorhealth.ca  Interior Health