

Use of World Health Organization and CDC Growth Charts for Children Aged 0–59 Months in the United States (Excerpt)

In 2006, the Centers for Disease Control and Prevention (CDC), the National Institutes of Health, and the American Academy of Pediatrics convened an expert panel to review scientific evidence and discuss the potential use of the new WHO growth charts in clinical settings in the United States. On the basis of input from this expert panel, CDC recommends that clinicians in the United States use the 2006 WHO international growth charts, rather than the CDC growth charts, for children aged <24 months (available at <https://www.cdc.gov/growthcharts>). The CDC growth charts should continue to be used for the assessment of growth in persons aged 2–19 years.

Editor's Note: The following is an excerpt from an article prepared by L.M. Grummer-Strawn, C. Reinold, N.C. Krebs, and the Centers for Disease Control and Prevention. [[Click here to read the full report](#)].

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Introduction

The physical growth of infants and children has long been recognized as an important indicator of health and wellness (Cole, 2000; Garcia & de Onis, 2004). Growth charts have been used for at least a century to assess whether a child is receiving adequate nutrition and to screen for potentially inadequate growth that might be indicative of adverse health conditions. Traditionally, attention has focused on undernutrition. However, in the past few decades, concerns about excessive weight gain have increased, and growth charts have been used to screen for overweight, including obesity.

In April 2006, the World Health Organization (WHO) released a new international growth standard for children aged 0–59 months (WHO, 2006). Similar to the 2000 CDC growth reference (Kuczmarski et al., 2000; 2002), these growth charts describe weight for age, length (or stature) for age, weight for length (or stature), and body mass index (BMI) for age. WHO growth curves include BMI for age starting at birth, and CDC growth curves include BMI for age beginning at age 2 years. CDC and WHO growth charts also include a curve for head circumference for age; CDC provides values for children

aged <36 months, and WHO charts include a head circumference curve for those aged <60 months.

Because two sets of growth curves exist for assessing child growth, clinicians in the United States need guidelines indicating which curves should be used and for which children. This report provides guidance on the use of the WHO and CDC growth charts and is intended for health care providers and others who measure and assess child growth.

Creation of the WHO and CDC Growth Curves

Growth Reference Versus Growth Standard

The CDC and WHO growth charts differ in their overall conceptual approach to describing growth. The WHO charts are growth standards that describe how healthy children should grow under optimal environmental and health conditions. The curves were created based on data from selected communities worldwide, which were chosen according to specific inclusion and exclusion criteria. Deviation from the WHO growth standard should prompt clinicians to determine whether sub-

optimal environmental conditions exist, and if so, whether they can be corrected.

Whereas the WHO charts describe growth of healthy children in optimal conditions, the 2000 CDC growth charts are a growth reference, not a standard, and describe how certain children grew in a particular place and time. The CDC charts describe the growth of children in the United States during a span of approximately 30 years (1963–1994).

The recommendation to use the 2006 WHO international growth charts for children aged <24 months is based on several considerations, including the recognition that breastfeeding is the recommended standard for infant feeding.

Rationale for Recommendations

Use of Growth Reference or Growth Standard in Clinical Settings

Opinions of the participants varied about whether the use of a growth standard or a growth reference would be best for clinical settings in the United States. Several participants explained that identification of growth that is unhealthy (i.e., indicates an underlying adverse health condition) or abnormal first requires a definition of healthy growth, thus a standard is needed. Other participants countered that because many children do not live in ideal environmental conditions, interpreting their growth by comparing them to a growth standard might not be appropriate. Likewise, some children who live in optimal conditions deviate from the normal growth curve but are not unhealthy. Participants acknowledged that adoption of a standard for assessing growth in children would create a substantial need for the education of clinicians but would also create an opportunity for clinicians to identify and address environmental conditions that might be negatively affecting growth. Meeting participants agreed that in practice, clinicians often use growth references, such as the CDC growth charts, as a standard to evaluate healthy growth rather than a reference as intended.

Recommendations

Use of WHO Growth Charts for Children Aged <24 Months

Use of the 2006 WHO international growth standard for the assessment of growth among all children aged <24

months, regardless of type of feeding, is recommended. (The charts are available at <https://www.cdc.gov/growthcharts>.) When using the WHO growth charts, values of 2 standard deviations above and below the median, or the 2.3rd and 97.7th percentiles (labeled as the 2nd and 98th percentiles on the growth charts), 24 months is most feasible because measurements switch from recumbent length to standing height at the this age, necessitating use of new printed charts.

Continued Use of CDC Growth Charts for Children Aged 24–59 Months

Use of the CDC growth charts for children aged 24–59 months is recommended. The CDC charts also should be used for older children because the charts extend up to age 20 years, whereas the WHO standards described in this report apply only to children aged 0–59 months. The rationale for continuing to use CDC growth charts includes the following: 1) the methods used to create the WHO and CDC charts are similar after age 24 months, 2) the CDC charts can be used continuously through age 19 years, and 3) transitioning at age 24 months is most feasible because measurements switch from recumbent length to standing height at the this age, necessitating use of new printed charts.

When using the WHO growth charts to screen for possible abnormal or unhealthy growth, use of the 2.3rd and 97.7th percentiles (or ± 2 standard deviations) are recommended, rather than the 5th and 95th percentiles.

Use of Recommended Growth Charts in Clinical Settings

CDC recommends the use of modified versions of the WHO curves for children aged <24 months that include the 2.3rd and 97.7th percentiles and are appropriate for clinicians. These curves have been developed and are available at <http://www.cdc.gov/growthcharts>. Training tools for clinicians are being developed and also will be available at this website.

Clinicians should recognize that the WHO charts are intended to reflect optimal growth of infants and children. Although many children in the United States have not experienced the optimal environmental, behavioral, or health conditions specified in the WHO study, the charts are intended for use with all children aged <24 months. Therefore, their growth might not always follow the patterns shown in the WHO curves. For

example, formula-fed infants tend to gain weight more rapidly after approximately age 3 months and therefore cross upward in percentiles, perhaps becoming classified as overweight. Although no evidence-based guidelines for treating overweight in infancy exist, early recognition of a tendency toward obesity might appropriately trigger interventions to slow the rate of weight gain.

For the first 3 months of age, the WHO charts show a somewhat faster rate of weight gain than the CDC charts, leading to the identification of more infants who appear to be growing slowly. Clinicians should recognize that this slower rate of weight gain is typical for formula-fed infants. For breastfed infants identified as growing slowly, clinicians need to carefully assess general health issues and ensure appropriate management of lactation. Only if there is evidence of lactation inadequacy should they consider supplementation with formula.

Clinicians should be aware that fewer U.S. children will be identified as underweight using the WHO charts, slower growth among breastfed infants during ages 3–18 months is normal, and gaining weight more rapidly than is indicated on the WHO charts might signal early signs of overweight.

Differences in the length-for-age WHO and CDC charts are small, and clinical differences based on these charts are expected to be insignificant. In contrast, when the WHO charts are used to assess the growth of U.S. children, fewer children aged 6–23 months

will be identified as having inadequate weight for age. Some assert that this might be beneficial because overdiagnosis of underweight might damage the parent-child interaction, subjecting families to unnecessary interventions and possibly unintentionally creating an eating disorder (Wright et al., 1994). However, children who are identified as having low weight for age on the WHO charts will be more likely to have a substantial deficiency. Clinicians need to seek out the causes for poor growth and propose changes accordingly. For example, poor weight gain might result from neglect, substantial morbidities, or other medical problems that require immediate attention.

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