

# 103 Underweight or At Risk of Underweight (Infants and Children)

## Definition/Cut-off Value

Underweight and at risk of underweight are defined as follows:

Weight Classification	Age	Cut-off Value
Underweight	Birth to < 24 months	$\leq 2.3^{\text{rd}}$ percentile weight-for-length as plotted on the Centers for Disease Control and Prevention (CDC) Birth to 24 months gender specific growth charts (1).*
	2-5 years	$\leq 5^{\text{th}}$ percentile Body Mass Index (BMI)-for-age as plotted on the 2000 CDC age/gender specific growth charts (2).
At Risk of Underweight	Birth to < 24 months	$> 2.3^{\text{rd}}$ percentile and $\leq 5^{\text{th}}$ percentile weight-for-length as plotted on the CDC Birth to 24 months gender specific growth charts (1).*
	2-5 years	$> 5^{\text{th}}$ percentile and $\leq 10^{\text{th}}$ percentile BMI-for-age as plotted on the 2000 CDC age/gender specific growth charts (2).
<p><i>*Based on 2006 World Health Organization international growth standards (3). For the Birth to &lt;24 months "underweight" definition, CDC labels the 2.3<sup>rd</sup> percentile as the 2<sup>nd</sup> percentile on the Birth to 24 months gender specific growth charts. For more information about the percentile cut-off, please see Clarification.</i></p> <p>Note: The Birth to 24 months and the 2000 CDC growth charts are available at: <a href="http://www.cdc.gov/growthcharts">www.cdc.gov/growthcharts</a>.</p>		

## Participant Category and Priority Level

Category	Priority
Infants	I
Children	III

## Justification

The CDC uses the 2.3rd percentile weight-for-length (for birth to 24 months of age) and the 5th percentile BMI-for-age (for 2-5 years of age), as the cut-offs to define underweight in its Pediatric Nutrition Surveillance System (1, 2). However, CDC does not have a position regarding the cut-off percentile, which should be used to determine at risk of underweight as a nutrition risk in the WIC Program. At risk of underweight is included in this criterion to reflect the preventative emphasis of the WIC Program.

A review of literature on weight-for-length or stature cut-off percentiles indicates that: a) many children at or below the 5th percentile for weight are in need of nutritional intervention, and b) those at or below the 10th percentile may be at nutritional risk and in need of preventative nutritional intervention, or at least further evaluation (4).

Weight-for-length/stature describes body proportionality and is sensitive to acute undernutrition, but can also reflect long-term status (5). Physical growth delay is used as a proxy for the deleterious effects undernutrition can have on immune function, organ development, hormonal function and brain development (6).

## Implications for WIC Nutrition Services

Participation in WIC has been associated with improved growth in both weight and height in children (7). An infant or child determined to be underweight at WIC certification should be monitored at regular intervals during the certification period, as appropriate. Through client-centered counseling, WIC staff can assist families in making nutritionally balanced food choices to promote adequate weight gain. Also, the foods provided by the WIC Program are scientifically-based and intended to address the supplemental nutritional needs of the Program's target population, and can be tailored to meet the needs of individual participants.

In addition, WIC staff can greatly assist families by providing referrals to medical providers and other services, in available, in their community. Such resources may provide the recommended medical assessments, in order to rule out or confirm medical conditions, and offer treatment when necessary and/or in cases where growth improvement is slow to respond to dietary interventions.

## References

1. Centers for Disease Control and Prevention. Use of World Health Organization and CDC growth charts for children aged 0-59 months in the United States. MMWR 2010; 59(No. RR-9). Available at: [http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5909a1.htm?s\\_cid=rr5909a1\\_w](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5909a1.htm?s_cid=rr5909a1_w). Accessed September 2010.
2. Kuczumarski RJ, Ogden CL, Grummer-Strawn LM, et al. GDC growth charts: United States. Advance data from vital and health statistics; no. 314. Hyattsville, Maryland: National Center for Health Statistics. 2000.
3. World Health Organization. WHO child growth standards: Length/height-for-age, weight-for-age, weight for height and body mass index-for-age: Methods and development. Geneva, Switzerland: World Health Organization; 2006. Available at: [http://www.who.int/childgrowth/publications/technical\\_report\\_pub/en/index.html](http://www.who.int/childgrowth/publications/technical_report_pub/en/index.html). Accessed September 2010.

4. Food and Nutrition Information Center, National Agriculture Library. Update of analysis of literature regarding cut-off percentiles for low weight for length in infants. Washington, D.C.; February 5, 1991.
5. Sherry B. Epidemiology of inadequate growth. In: Kessler DB, Dawson P, editors. Failure to thrive and pediatric undernutrition: A transdisciplinary approach. Baltimore: Paul H. Brooks Publishing Company, Inc.; 1999.
6. Metallinos-Katsaras E, Gorman KS. Effects of undernutrition on growth and development. In: Kessler DB, Dawson P, editors. Failure to thrive and pediatric undernutrition: A transdisciplinary approach. Baltimore: Paul H. Brooks Publishing Company, Inc.; 1999. p. 38.
7. Disbrow DD. The costs of benefits of nutrition services: a literature review. J Am Diet Assoc. 1989; 89:53-66.

### Clarification

The cut-off for underweight for infants and children <24 months is 2.3; however, for ease of use, CDC labels it as the 2<sup>nd</sup> percentile on the hard copy Birth to 24 months growth charts. Electronic charts should use the 2.3<sup>rd</sup> percentile as the cut-off.