

141 Low Birth Weight and Very Low Birth Weight

Definition/Cut-off Value

Low birth weight and very low birth weight are defined as follows:

Weight Classification	Cut-off Value
Low Birth Weight (LBW)	Birth weight defined as ≤ 2500 g (≤ 5 pounds 8 ounces*), for infants and children less than 24 months.
Very Low Birth Weight (VLBW)	Birth weight defined as ≤ 1500 g (≤ 3 pounds 5 ounces *), for infants and children less than 24 months.

*Metric weight converted to pound and ounces for WIC clinic use.

See Clarification section for information on plotting growth measurements for preterm infants Risk 142 Preterm or Early Term Delivery.

Participant Category and Priority Level

Category	Priority
Infants	I
Children < 24 months	III

Justification

Low birth weight (LBW) has been defined by the World Health Organization (WHO) as weight at birth of less than 2500 grams (5 pounds 8 ounces) regardless of gestational age (1, 2, 3, 4). This is based on epidemiological observations that infants weighing less than 2500 grams are at higher risk of neonatal mortality when compared with heavier infants (5, 6). LBW is further categorized into very low birth weight (VLBW, <1500 gm or 3.3 pounds) and extremely low birth weight (ELBW, <1000 gm or 2.2 pounds) (1). LBW is considered the single most important predictor of infant mortality, especially within the first months of life (6). Neonates with LBW have a 20 times greater risk of dying compared to infants of normal birth weight (3, 5). LBW contributes to a range of poor health outcomes including fetal and neonatal mortality and morbidity, and inhibited growth (1, 3, 4).

LBW is usually caused by intrauterine growth restriction (IUGR), preterm birth (PTB) or both (3, 4, 6). Preterm birth (an infant born at fewer than 37 weeks' gestational age) is the most common cause of LBW (1). In the U.S., the rates of preterm births have increased from 10% to 12.5% in the past 25 years likely as a result of higher survival rates due to advances in perinatal medical care (4). LBW is more common in developing than developed countries. However, data on LBW in developing countries is often limited because a significant portion of births occur in homes or small health facilities, where cases of infants with

LBW often go unreported leading to an underestimation of the prevalence of LBW (2). It is estimated that 20% of all births worldwide are LBW, representing more than 20 million births a year (7). In the U.S., approximately 1 in 12 infants (8%) is born with LBW (8, 9). The percentage of LBW infants has increased 4% among all racial groups from 2016-2021 in the U.S. (8). Since 2016, LBW rates increased a total of 1% for non-Hispanic White women, 7% for non-Hispanic Black women and 7.3% for Hispanic women (8). The rates of LBW among different racial and ethnic groups in the U.S. are (9):

- 1 in 7 Black infants (14%)
- 1 in 12 Asian infants (8%)
- 1 in 13 Native American or Alaska Native infants (8%)
- 1 in 14 Latinx infants (7%)
- 1 in 14 White infants (7%)

Black infants are more than twice as likely to be born with a LBW or to die in their first year of life as White infants (9). Rates of very low birthweight (VLBW) infants comprise only 1.0% of live births in the U.S. but Black mothers are 2.6 times more likely to have a VLBW infant than White mothers (10, 11). The increased likelihood of LBW in Black infants has been associated with mothers who are unmarried, unemployed, lower income, younger, and receive federal government assistance to pay for rent (10, 12, 13, 14, 15, 16). Yet even with the presence of traditional protective factors such as marriage, education, and being non-smokers, Black women still experience LBW at higher rates than Whites (12, 14, 15, 16). Institutional racism (differences in access to resources by race as well as differences in policies, laws and practices that reinforce racial inequity) may explain racial disparities in LBW between Black and White women (12, 14, 15, 16). Black women are at a higher risk of chronic stress due to adverse social determinants including low socioeconomic status, housing insecurity, and experience racism as a stressor and weathering (discrimination that worsens with age) (12, 14, 15, 16). Black mothers, when compared to other racial or ethnic groups, have the highest rate of LBW babies despite whether they were born in the U.S. or in another country (12, 17, 18). However, multiple studies have shown Black infants born to mothers who are immigrants experience LBW at rates similar to infants born to White mothers, suggesting the presence of other factors affecting birth weight for non-immigrant Black mothers (12, 17, 18). U.S. born Black women have more exposure to racism as a major stressor that negatively impacts maternal health while foreign born Black women do not report perceiving racism in the same way (12, 17). In addition, foreign-born Black women may have more positive social determinants such as higher levels of education and income, and access to better health care (12, 17, 18). This issue is very complex and continued research is needed focusing on the factors contributing to the inequitable racial gap in LBW.

LBW infants are more likely than infants whose weight is normal to have medical problems that may include (1, 3, 4, 9):

- **Respiratory:** Respiratory Distress Syndrome (RDS). Infants with RDS do not have a protein called surfactant that keeps small air sacs in an infant's lungs from collapsing. Treatment with surfactant helps these infants breathe more easily. Infants who have RDS also may need oxygen and other medical support to help their lungs work.
- **Neurological:** Intraventricular Hemorrhage (IVH). Bleeding in the brain.
- **Cardiovascular:** Patent ductus arteriosus. Patent ductus arteriosus is when an opening between 2 major blood vessels leading from the heart does not close properly. This can cause

extra blood to flow to the lungs. In many infants who have patent ductus arteriosus, the opening closes on its own within a few days after birth. Some infants need medicine or surgery to close the opening.

- **Gastrointestinal:** Necrotizing enterocolitis (NEC) is a gastrointestinal disease that involves infection and inflammation that causes damage and the death of cells in some or all the intestines.
- **Jaundice:** An excess of bilirubin due to the infant's liver not adequately removing it from the bloodstream.
- **Retinopathy of prematurity:** When an infant's retinas do not fully develop in the weeks after birth.
- **Immunological:** Sepsis, pneumonia, or meningitis. In an infant who is born prematurely, the immune system may not be fully developed and may not be able to fight off infection.

When LBW infants become children, they tend to have lower neurodevelopmental scores in the areas of language, cognition, and motor skills compared to term normal birth weight infants (19). There is also evidence that LBW infants have a higher risk of developing chronic health conditions later in life including (4, 9):

- Diabetes
- Heart disease
- High blood pressure
- Metabolic syndrome
- Obesity
- Stroke

Nutrition for Infants with LBW and VLBW

The LBW or VLBW infant may begin life with a compromised nutritional status and require a form of nutrition support (human milk fortifier, special infant formula, tube feeding) (1). Some of these infants, especially ones with VLBW, will need supplemental feedings because they have limited nutrient reserves at birth and are subject to physiological and metabolic stresses that increase their nutrient needs (1, 20). Providing breast milk to these infants in the first month of life has been linked to improved growth and development (1). While infant formula can be used to offer higher amounts of macronutrients than breast milk, it can be harder to digest for LBW and VLBW infants (21). Breast milk contains beneficial biological components, including immunoglobulins, cytokines, growth factors, hormones, antimicrobial agents, immune cells, stem cells, prebiotic oligosaccharides, and probiotic bacteria (1). Mother's own milk has been associated with multiple health benefits for LBW and VLBW infants, including lower incidences of necrotizing enterocolitis (NEC), late-onset sepsis, chronic lung disease, retinopathy of prematurity, and neurodevelopmental impairment (20, 21, 22, 23). Pasteurized donor breast milk is recommended when mother's own milk is not available or sufficient (23). LBW infants that are supplemented with fortified pasteurized donor milk have a greater risk of growth failure than those fed mother's own milk (23).

For VLBW infants, breast milk often requires fortification with human milk fortifiers in order to meet their nutritional needs (23). Assistance in early milk expression should be available to mothers within 6 to 8 hours of birth of any VLBW infant because of the need for early and frequent milk expression to maintain milk

supply (23). The use of breast milk is lower among VLBW infants with non-Hispanic Black mothers, compared with those with non-Hispanic White mothers. Approaches that have been shown to reduce Black and White disparities in breastfeeding in the NICU setting, include peer counselor programs and support groups, assistance with breast pump acquisition, and transportation for mothers to visit the hospital (23).

Implication for WIC Nutrition Services

WIC services can directly support LBW and VLBW infants and their caregivers, as they may have unique feeding difficulties. LBW and VLBW infants may be born preterm so their delivery is often unexpected, and a mother may not have made decisions about how to feed her infant yet. These infants may require additional calories, extra breastfeeding support, and/or the use of a human milk fortifier or special infant formula. WIC can support LBW and VLBW infants and their caregivers through:

- Providing breastfeeding education to mothers. This has been shown to increase breastfeeding intent and decrease maternal anxiety. Education may include information on the health benefits of mother's own milk, the need for early and frequent milk expression, the role of skin-to-skin contact, nonnutritive suckling, direct breastfeeding when physiologically appropriate, and technical information on proper milk handling, storage, and transport (23).
- Referring to a WIC breastfeeding peer counseling program, if available.
- Promoting and supporting breastfeeding as the normative standard for infant nutrition and providing early and frequent breastfeeding support.
- Recommending the use of a hospital grade electric breast pump for expressing milk if the infant is in the NICU or the infant is unable to breastfeed directly from the breast.
- Providing anticipatory guidance about potential feeding challenges.
- Monitoring the child's growth to ensure healthy weight gain.
- Providing nutrition education for mothers/caregivers and appropriate referrals as necessary for growth, feeding, health, and/or infant developmental issues.
- Discouraging families from direct milk sharing and the purchase of breast milk from Internet-based sources as both practices are associated with risks of bacterial or viral contamination of non-pasteurized milk and the possibility of exposure to medications, other substances, and unsafe handling practices (23).

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