

142 Preterm or Early Term Delivery

Definition/Cut-off Value

Preterm and early term delivery are defined as follows (1, 2):

- Preterm: Delivery of an infant born $\leq 36\ 6/7$ weeks gestation.
- Early Term: Delivery of an infant born $\geq 37\ 0/7$ and $\leq 38\ 6/7$ weeks gestation.

Note: See Clarification section for information on plotting growth measurements for preterm infants.

Participant Category and Priority Level

Category	Priority
Infants	I
Children < 24 months	III

Justification

Preterm birth is a significant cause of newborn morbidity and mortality. Preterm and early term deliveries strain society's healthcare resources due to the longer hospital stays for the infant and the long-term effects on the health of the newborn (3, 4).

Typically, a pregnancy lasts about 40 weeks. Premature or preterm birth, however, is defined as a birth that occurs between 20 and 37 weeks of pregnancy, according to the American College of Obstetricians and Gynecologists (ACOG) (5). In the past, the period from 3 weeks before until 2 weeks after the estimated date of delivery was considered a "term" pregnancy, with the expectation that a baby would have similar health outcomes if they were born any time during this interval. In 2013, ACOG released a committee opinion that the label "term" should be replaced with the designations *early term* ($\geq 37\ 0/7$ weeks and $\leq 38\ 6/7$ weeks gestation) and *full term* ($\geq 39\ 0/7$ weeks and $\leq 40\ 6/7$ weeks gestation) to more accurately describe these groups of infants (1).

Preterm Delivery

Prematurity affects about 12% of all live births in the U.S., and about 50% of these preterm births were preceded by preterm labor (6). In 2011, the annual rate of premature births in the United States reached 11.7%, nearly two times the rate in European nations (6). Preterm births also account for approximately 70% of newborn deaths and 36% of infant deaths (5).

Several factors have been found to increase the risk of preterm delivery. Epidemiological studies have consistently reported low socioeconomic status, nonwhite race, maternal age of ≤ 18 years or ≥ 40 years, and low pre-pregnancy weight as risk factors. A history of one previous preterm birth is associated with a recurrent risk of 17-37%; the risk increases with the number of prior preterm births and decreases with the number of term deliveries. Other maternal factors associated with a risk of preterm birth may include low weight gain during pregnancy, maternal obesity, hypertension, diabetes, or sexually transmitted diseases (7). (See risk 311 *History of Preterm or Early Term Delivery* for more details.)

Despite advances in neonatal care, preterm birth remains a leading cause of infant death in the United States (8). Preterm infants may have health problems because their organs did not have enough time to develop in the womb. Babies that are born too early may have a number of health conditions, including:

- Low or very low birth weight (9)
- Increased caloric needs (9)
- Feeding difficulties due to a lack of reflexes for sucking and swallowing (9)
- Immature digestion and impaired absorption of carbohydrates and lipids (10, 11)
- Breathing problems like chronic lung disease/ bronchopulmonary dysplasia and apnea (9, 12, 13)
- Cerebral palsy, an impairment of the brain that controls movement and muscle tone (10, 14)
- Developmental delay and poorer cognitive function(12, 15, 16, 17)
- Vision problems like retinopathy of prematurity (ROP), which may cause blindness (12, 15)
- Hearing problems (12)
- Behavioral problems and psychiatric disorders (16, 17)
- Increased risk for necrotizing enterocolitis (NEC) due to their immature gastrointestinal systems (10, 12)
- Increased risk for Sudden Infant Death Syndrome (SIDS) (10)
- Temperature control problems (9, 10)
- Heart problems like patent ductus arteriosus and low blood pressure (hypotension) (10, 12)
- Blood problems like anemia and jaundice (10, 13)
- Hypoglycemia (9, 10)
- Immature immune systems, which may result in infections (9)

Preterm infants often need special medical care in a neonatal intensive care unit (NICU) and may need to stay there for days or even months. Breastfeeding is recommended as the normative standard for infant feeding and nutrition for all infants, especially preterm babies. Breastfeeding preterm infants has been associated with positive health outcomes for these infants, including:

- Improved motor maturity and cognitive ability (18, 19, 20)
- Reduced risk of NEC (21, 22)
- Reduced risk of ROP and retinal detachment (23)

Additionally, mothers of preterm infants produce milk that is designed to meet the baby's particular nutritional needs during the first few weeks of life. It is higher in protein and minerals, such as salt, and contains different types of fat that are easier to digest and absorb compared to fats in the milk of mothers of full term babies. The fat in human milk also helps to enhance the development of the baby's brain and neurologic tissues, which is especially important for premature infants. Human milk is also easier for babies to digest than infant formula and avoids exposing the baby's immature intestinal lining to the cow's milk proteins found in premature infant formula. Preterm infants who are breastfed are less likely to develop

intestinal infections than babies who are formula fed, and the colostrum produced in the first few days contains high concentrations of antibodies that will help the baby fight infection (22).

Breastfeeding preterm infants, especially if they are in the NICU, may present unique challenges for breastfeeding dyads. These mothers will benefit from extra breastfeeding support due to the delay of direct breastfeeding, reliance on breast pumps, and the stress of having a sick newborn. Even if the baby cannot breastfeed directly from the breast at first, the mother can be encouraged to express her milk to ensure that her supply is maintained. Supportive care for infants in the NICU may include the use of a feeding tube. Expressed human milk can be passed through the tube, therefore, it is important for the mother to discuss her feeding decisions with her baby's doctor. Preterm infants sometimes need additional calories and nutrients to facilitate adequate growth, and in such cases a human milk fortifier may be prescribed by a health care provider (22).

Preterm infants who are not breastfed may require the use of a formula higher in calories and nutrients to support their growth. According to the American Academy of Pediatrics (AAP), soy formulas are typically not recommended for low birth weight preterm infants, as their use may result in less weight gain and lower serum albumin and phosphorus levels than cow's milk-based formulas (24).

In addition to breastfeeding, skin-to-skin care or kangaroo care (holding your baby naked or in just a diaper on your bare chest), can help preterm infants breathe better, gain weight, keep their body at the right temperature, and prepare them for breastfeeding (25). All caregivers can provide skin-to-skin care, not just the mother.

Infants born at 34 0/7 through 36 6/7 weeks gestation, called late preterm infants, are sometimes mistaken for term infants since their size and weight may be similar (10). However, caregivers, healthcare providers, nutritionists, and lactation consultants must be aware that these babies are physiologically and metabolically immature (9). In addition to the health conditions previously mentioned for preterm infants, it is important to be aware that late preterm babies have an increased risk of morbidity and mortality which is often related to feeding problems. Due to their immaturity, late preterm infants may have more challenges with breastfeeding because they tire easily and have less stamina, which results in greater difficulty with latching, sucking, and swallowing. Mothers of late preterm infants will benefit greatly from timely lactation assessment and support since feeding difficulties, slow weight gain, failure to thrive, hypoglycemia, and jaundice are very common in these babies (26).

Preterm infants have different patterns of growth compared to term infants. Plotting the growth of preterm infants using their adjusted gestational age is an essential component of care until they reach 24 to 36 months of age (27). (See the *Clarification* section for more information on how to determine adjusted gestational age.) Most preterm infants, however, show catch-up growth in weight, length, and head circumference after their initial postnatal growth failure. If catch-up growth occurs, it usually starts early in the first months of life and is often achieved within the first years of life (28).

The effects of preterm birth can continue beyond infancy. Children who were born prematurely are at an increased risk for the following:

- Neurodevelopmental problems (29)
- Intellectual/cognitive impairments, which can lead to learning disabilities and the need for special education services (29, 30, 31)
- Motor problems (31)

- Feeding difficulties such as problems with chewing and swallowing, late development of feeding skills, food refusal, eating behavior problems, and poor appetite (32)
- Emotional problems such as anxiety and depression (31)
- Behavioral concerns such as attention problems and hyperactivity (31)

Early Term Delivery

Up to 10% of babies in the United States are scheduled for early term deliveries via labor-inducing medication or cesarean section before 39 weeks of gestation despite neither the mother nor the baby being at risk if the pregnancy continues (4). Elective deliveries like this are sometimes requested for reasons such as wanting to schedule the date of the infant's birth, physician preference, or for relief of symptoms at the end of the pregnancy (4).

Research shows that a fetus will experience a significant amount of development and growth of the lungs, brain, and liver between 37 and 39 weeks of gestation. The brain develops at its fastest rate at the end of the pregnancy, at a rate of up to one third between weeks 35 and 39. Additionally, layers of fat are added under the infant's skin during the last few weeks of pregnancy which helps them keep warm after birth. According to ACOG, non-medically warranted deliveries prior to 39 weeks should be avoided (33). Early term delivery puts an additional strain on society as the early term infant will likely require a longer hospital stay and may have long term healthcare needs (4).

Implications for WIC Nutrition Services

WIC services can directly support preterm and early term infants and their caregivers, as these babies may have unique feeding difficulties. Preterm delivery is often unexpected and a mother may not have made decisions about how to feed her baby 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 preterm and early term infants and their caregivers through:

- 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 baby is in the NICU or the baby is unable to breastfeed directly from the breast.
- Providing anticipatory guidance about potential feeding challenges.
- Encouraging caregivers to provide skin-to-skin contact.
- Providing education on safe preparation, handling, and storage of breast milk and/or formula.
- Educating pregnant women about the importance of carrying a baby to term, unless medically contraindicated.
- 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.

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Clarification

All preterm infants and children (up to 2 years of age) who have reached the equivalent age of 40 weeks gestation, shall be assessed for growth using the Centers for Disease Control and Prevention (CDC) Birth to 24 Months gender specific growth charts adjusting for gestational age as follows:

1. Document the infant/child's gestational age (at delivery) in weeks. (Mother/caregiver can self-report, or referral information from the medical provider may be used.)
2. Subtract the child's gestational age in weeks from 40 weeks (gestational age of term infant) to determine the adjustment for prematurity in weeks.
3. Subtract the adjustment for prematurity in weeks from the child's chronological postnatal age in weeks to determine the child's gestation-adjusted age.

Example:

Randy was born prematurely on March 19, 2011. His gestational age at birth was determined to be 30 weeks based on ultrasonographic examination. At the time of the June 11, 2011, clinic visit, his chronological postnatal age is 12 weeks. What is his gestation-adjusted age?

- 30 = gestational age in weeks
- 40 - 30 = 10 weeks adjustment for prematurity
- 12 - 10 = 2 weeks gestation-adjusted age

His measurements would be plotted on a growth chart as a 2-week-old infant.

Note: Preterm infants ($\leq 36 \frac{6}{7}$ weeks gestation) who have not reached the equivalent age of 40 weeks gestation may be assessed for growth using a growth chart for low birth weight (LBW) or very low birth weight (VLBW) infants (e.g., Infant Health and Development Program [IHDP]) consistent with the protocols of the local medical community in which the WIC clinic operates. The CDC does not recommend the use of the CDC Growth Charts for preterm infants who have not reached the equivalent age of 40 weeks gestation.