134 Failure to Thrive

Definition/Cut-off Value

Presence of failure to thrive (FTT) diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self-reported by applicant/participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Note: For premature infants with a diagnosis of FTT please see risk #142 Preterm or Early Term Delivery for instructions on adjusting for gestational age when plotting anthropometric measurements on growth charts.

Participant Category and Priority Level

Category	Priority
Infants	I
Children	III

Justification

Failure to thrive (FTT) describes an inadequate growth pattern where growth is significantly lower than what is expected for age and sex (1, 2, 3, 4, 5). Typically a sign of undernutrition, the cause of FTT is often complex and includes many factors. FTT in infants and children can increase the risk of long-term growth and cognitive problems, among other concerns (4, 5).

Some of the indicators that a health care provider might use to diagnose FTT include the following:

- Weight-for-age repeatedly below the 2.3rd percentile for infants/children younger than 2 years or repeatedly below the 5th percentile for children 2 years and older (2, 3, 5)
- Weight-for-length repeatedly below the 2.3rd percentile for infants/children younger than 2 years or Body Mass Index (BMI) repeatedly below the 5th percentile for children 2 years and older (2, 3, 5)
- Stature-for-age consistently below the 2.3rd percentile for infants/children younger than 2 years or repeatedly below 5th percentile for children 2 years and older (3, 5)
- Weight less than 75% of median ("typical") weight-for-age (3)
- Weight less than 80% of median weight-for-stature (3)
- Progressive fall-off in weight-for-age, weight-for-stature, and/or stature-for-age, that crosses down two major percentile lines (2, 3, 4)
- Rate of weight gain less than the 5th percentile based on World Health Organization velocity standards (3)

It is recommended that a combination of growth criteria be considered and that growth be assessed over time, rather than using a single measurement (4). It is useful to note that reduced weight-for-stature can be a strong indicator of recent undernutrition, while low weight-for-age can represent both current and long-term nutrition concerns. Stature takes a longer time to be impacted by malnutrition; therefore, reduced stature may indicate the cumulative effects of chronic malnutrition (5).

In the United States, FTT is diagnosed in about 5-10% of infants and children in outpatient settings and about 3-5% of those in hospitals. Highest rates are found among lower income rural and urban communities. Failure to thrive often manifests early in life; most infants and children with FTT are diagnosed before 18 months of age. (4)

Several stressors may interact with each other to eventually lead to FTT. Undernutrition, as a result of a variety of medical, nutritional or developmental issues, is a major cause and includes the infant/child not being offered adequate calories/nutrients, the infant/child not taking the offered foods/beverages, inadequate calorie/nutrient absorption, and/or excessive calorie expenditure. (4, 5)

The following table includes factors that can contribute to undernutrition and increase the risk for FTT in infants and children (2, 3, 4, 5):

Medical/Nutritional/Developmental	Behavioral/ Feeding Practices*	Environmental/ Psychosocial
General conditions: • Prematurity†, low birth weight‡, and small for gestational age • Exposure to substances in utero • Any chronic medical condition Inadequate intake, which can be caused by: • Neurological disorders • Developmental delays, including autism spectrum disorders • Dental problems including cleft lip, cleft palate, and dental caries • Enlarged tonsils or adenoids • Feeding problems including insufficient or ineffective breast milk transfer, weak suck, swallowing problems, and poor appetite • Gastrointestinal problems, including gastroesophageal reflux, frequent vomiting, and constipation • Chronic or frequent infections (These can lead to reduced intake, which can further compromise the immune system, thus contributing to additional infections and FTT.) • Lead poisoning (This can lead to anorexia, constipation, and abdominal pain. Reduced intake can then lead to calcium and iron	• Infrequent feeding or not appropriately responding to hunger cues • Poor caregiver-infant/child interactions, especially when feeding • Inappropriate feeding based on infant/child's stage of development • Improper breastfeeding positioning or technique • Incorrect preparation of infant formula • Excessive fluids other than breastmilk/formula for infants • Once foods are started, not providing appropriate support (such as a high chair) while eating • For children, inconsistent timing of feeding or allowing to graze on food/beverages throughout day	• Poverty, food insecurity, and homelessness • Caregiver's lack of knowledge about appropriate nutrition and feeding • Caregiver with limited ability to make appropriate feeding decisions/prepare food, including those with a mental health disorder, intellectual disability, or substance use disorder§ • Family stressors such as unemployment, separation, or incarceration • Inadequate access to appropriate foods, including culturally preferred foods

Medical/Nutritional/Developmental	Behavioral/ Feeding Practices*	Environmental/ Psychosocial
deficiencies, further exacerbating the lead poisoning and FTT.) Inadequate absorption, which can be caused by: • Food allergies and lactose intolerance • Celiac disease • Gastrointestinal problems, including chronic diarrhea or vomiting and malformations • Protein-losing enteropathy • Pancreatic conditions, including cystic fibrosis • Inborn errors of metabolism Excessive caloric expenditure, which can be caused by: • Congenital heart disease or heart failure • Chronic pulmonary disease • Hyperthyroidism • Chronic or frequent infections • Inflammatory diseases, including asthma and inflammatory bowel diseases • Malignancy • Renal disease	• Restrictive diet, including vegan, low-fat, or food allergy-related • Feeding in a chaotic household with multiple caregivers • Neglect or abuse	

*See risk #411 *Inappropriate Nutrition Practices for Infants* and risk #425 *Inappropriate Nutrition Practices for Children* for more information about nutrition and feeding practices.

†See risk #142 *Preterm or Early Term Delivery* for more information about preterm delivery.

‡See risk #141 *Low Birth Weight and Very Low Birth Weight* for more information about low birth weight.

§See risk #902 *Woman or Infant/Child of Primary Caregiver with Limited Ability to Make Appropriate Feeding Decisions and/or Prepare Food* for more information.

Failure to thrive in infants/children, especially when severe or prolonged, can have several harmful effects, including the following:

- Dehydration and nutrient deficiencies
- Compromised immune system and increased risk of infections (5)
- Increased susceptibility to lead poisoning (when calcium and iron deficiencies are present) (5)

- Long-term impaired cognitive development, including learning difficulties (4, 5)
- Long-term problems with socioemotional development (4, 5)
- Long-term lower than average weight and/or height (4)

Treatment

The goal of FTT treatment is to achieve optimal growth while also addressing whatever factors may be contributing to the FTT. Catch-up growth (growth at a faster rate than normal for age) is usually necessary; according to the American Academy of Pediatrics, a typical catch-up rate is 2-3 times the average weight gain for age (2, 3, 5). As treatment progresses, the rate of catch-up growth is continually adjusted as needed until growth is deemed appropriate. Thus, growth must be measured frequently and assessed over time (5). It is also important to watch for relapse, as a history of FTT is associated with reoccurrence of FTT in the future (2).

During treatment, close follow-up by the health care provider and other health professionals is crucial. A multidisciplinary approach is often used, including collaboration among the family, pediatrician, dietitian, developmental therapist, and others.

Nutrition therapy is a core component of treatment, starting with nutrition assessment. A comprehensive assessment should take the following into account: feeding history, current intake, breastfeeding/formula-feeding, the caregiver-infant/child feeding relationship, feeding timing/environment, and nutrition knowledge/beliefs. Nutrition and breastfeeding counseling are individualized to the infant/child and typically focus on increasing consumption of calories, protein, and micronutrients (5). The health care provider may also suggest providing a multivitamin that includes the Recommended Dietary Allowance for all vitamins, iron, and zinc during the period of rapid growth, as well as additional iron or vitamin D if there are deficiencies (5).

If behavioral interventions are not effective, treatment providers may recommend nutritional/caloric supplements be given for a limited time to achieve catch-up growth. These include supplemental formula for breastfed infants, high calorie/concentrated formulas for infants, and high calorie beverage supplements for children. If treatment is not effective, hospitalization may be needed, though this is rare. This may occur if the infant/child has a severe safety or health risk, including having a serious infection, medical condition, malnourishment, or dehydration (2, 5).

Implications for WIC Nutrition Services

WIC staff can provide the following nutrition services to infants and children with failure to thrive:

- Learn about and reinforce the health care team's plan of care for treating the participant's FTT. Encourage caregivers to keep all health care appointments.
- Offer breastfeeding support to breastfeeding dyads. Refer to the WIC Designated Breastfeeding Expert, if available, or other professional breastfeeding support when needed.
- Offer participant-centered nutrition counseling based on a thorough assessment and on caregiver's concerns and interests. Suggestions to caregivers may include the following, based on the situation:
    - Increasing children's intake of calorically-dense food
    - Correctly preparing infant formula

  - Reducing volume of fluids consumed, if excessive, to appropriate amounts (other than breastmilk or formula for infants)
  - Allowing children to choose how much and which foods to eat (from what is offered)
  - Feeding children at consistent times and not allowing child to graze on foods and beverages throughout the day
  - Feeding in a supportive setting (such as a table or highchair) and in a distraction-free environment

- Provide individualized food packages, tailored to meet the increased nutritional needs of the infant/child.
- Reinforce the importance of following recommended vaccination schedules, as FTT is sometimes associated with a compromised immunize system.
- Offer individualized referrals based on the household's needs and interests, including referrals to financial assistance, food assistance, cooking classes, housing, transportation, childcare, adult education/career services, and substance use services. Consider referrals that promote a nurturing, responsive caregiver-infant/child relationship, including those to local home visiting programs, parenting programs, and early intervention services.

References

1. Larson-Nath C, Mavis A, Duesing L, Van Hoorn M, et al. Defining Pediatric failure to thrive in the developed world: validation of a semi-objective diagnosis tool. Clinical Pediatrics. 2019 [cited 2019 Jun 25];58(4): 446-452. Available from: https://www.ncbi.nlm.nih.gov/pubmed/30596256.
2. Homan GJ. Failure to thrive: a practical guide. American Family Physician. 2016 [cited 2019 Jun 25];94(4):296-300. Available from: https://www.ncbi.nlm.nih.gov/pubmed/27548594.
3. Larson-Nath C, Biank VF. Clinic review of failure to thrive in pediatric patients. Pediatric Annals. 2016 [cited 2019 Jun 25];45(2):e46-e49. Available from: https://www.ncbi.nlm.nih.gov/pubmed/26878182.
4. Ross E, Munoz FM, Edem B, Nan C, et al. Failure to thrive: Case definition & guidelines for data collection, analysis, and presentation of maternal immunization safety data. Brighton Collaboration Failure to Thrive Working Group. Vaccine. 2017 [cited 2020 Jul 24];35(48 Pt A), 6483–6491. Available from: https://doi.org/10.1016/j.vaccine.2017.01.051
5. American Academy of Pediatrics Committee on Nutrition. Failure to Thrive. In: Kleinman RE, Greer FR, eds. Pediatric Nutrition. 8th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2019.

Clarification

Self-reporting of a diagnosis by a health care provider should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.