AAP Reports on Diagnosis and Prevention of Iron Deficiency Anemia

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Iron is the most common single-nutrient deficiency among children in developing countries and is a common cause of anemia in industrialized nations. Evidence shows that iron deficiency and iron deficiency anemia during infancy and childhood may have long-lasting detrimental effects on neurodevelopment that may not be reversible.

Approximately 80 percent of the iron in newborn infants is accumulated during the third trimester of pregnancy; therefore, infants born prematurely may be iron deficient. Maternal conditions such as anemia, hypertension with intrauterine growth restriction, or diabetes mellitus can also result in low fetal iron stores.

Full-term healthy infants have sufficient iron for at least the first four months of life. Because human milk contains little iron, infants who are breastfed exclusively are at risk of iron deficiency after four months of age and should receive 1 mg of supplemental iron daily per kg of body weight. Supplementation should continue until iron-containing foods are introduced in the diet. Starting at four months of age, infants who are breastfed for more than one-half of their feedings should also receive 1 mg of supplemental iron daily per kg of body weight.

In formula-fed infants, iron needs can be met for the first 12 months of life by using formula that contains 12 mg of iron per dL and by introducing iron-containing foods after four to six months of age. Whole milk should not be given before 12 months of age.

Iron intake in infants between six and 12 months of age should be 11 mg per day. Liquid iron supplements are appropriate if iron needs are not being met.

Iron intake in children one to three years of age should be 7 mg per day. Liquid supplements are suitable in those who do not receive this intake. Chewable multivitamins can be used in children three years and older.

Iron intake in preterm infants should be at least 2 mg per day through 12 months of age. Preterm infants who are breastfed should receive 2 mg of supplemental iron per kg of body weight each day by one month of age, and supplementation should continue until the infant is weaned to iron-fortified formula or begins to eat foods that supply 2 mg of iron per kg of body weight. Supplementation is not required in infants who have received an iron load from multiple transfusions of packed red blood cells.

Universal screening for anemia should be performed at 12 months of age, with measurement of hemoglobin levels and an assessment of risk factors associated with iron deficiency and iron deficiency anemia. Additional screening can be performed in children one to three years of age who have risk factors for iron deficiency or iron deficiency anemia.

Further evaluation is required in children with hemoglobin levels less than 11 g per dL (110 g per L) at 12 months of age. If the child is at high dietary risk of iron deficiency, testing should be performed because of potential adverse effects on neurodevelopmental outcomes. Additional screening tests should include measurement of serum ferritin and C-reactive protein levels, or measurement of reticulocyte hemoglobin concentration.

Children with mild anemia (hemoglobin level of 10 to 11 g per dL [100 to 110 g per L]) who can be monitored closely can be diagnosed by documenting an increase of 1 g per dL in plasma hemoglobin concentration after one month of iron-replacement therapy. ■

Answers to This Issue's CME Quiz

Q1. B	**Q6.** A, C, D	**Q11.** C
Q2. A	**Q7.** B	**Q12.** A, B, D
Q3. A, C, D	**Q8.** D	**Q13.** C
Q4. C	**Q9.** A, B, D	
Q5. B	**Q10.** B	