

Screening for Iron Deficiency Anemia in Young Children: Recommendation Statement

► See related Putting Prevention into Practice on page 1103.

As published by the U.S. Preventive Services Task Force.

This summary is one in a series excerpted from the Recommendation Statements released by the USPSTF. These statements address preventive health services for use in primary care clinical settings, including screening tests, counseling, and preventive medications.

The complete version of this statement, including supporting scientific evidence, evidence tables, grading system, members of the USPSTF at the time this recommendation was finalized, and references, is available on the USPSTF website at <http://www.uspreventiveservicestaskforce.org/>.

This series is coordinated by Sumi Sexton, MD, Associate Deputy Editor.

A collection of USPSTF recommendation statements published in *AFP* is available at <http://www.aafp.org/afp/uspstf>.

Summary of Recommendation and Evidence

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for iron deficiency anemia in children ages 6 to 24 months (*Table 1*). **I statement.**

Go to the Clinical Considerations section for suggestions for practice regarding the I statement.

Rationale

IMPORTANCE

The estimated prevalence of iron deficiency anemia in children ages 1 to 5 years in the United States is about 1% to 2%.^{1,2}

DETECTION

There is convincing (older) evidence that hemoglobin measurement has high sensitivity but low specificity for detecting iron deficiency anemia because the majority of cases of childhood anemia are not caused by iron deficiency.

BENEFITS OF EARLY DETECTION AND TREATMENT

The USPSTF found inadequate evidence on the effect of routine screening for iron deficiency anemia in asymptomatic children ages 6 to 24 months on growth or child cognitive, psychomotor, or neurodevelopmental outcomes. The USPSTF found no studies that evaluated the direct effect of routine screening programs on child health outcomes. The USPSTF found inadequate evidence (i.e., no recent studies that are generalizable to the current U.S. population) on the effects of treatment of iron deficiency anemia in children ages 6 to 24 months on growth or child cognitive or neurodevelopmental outcomes. No studies directly assessed the association between change in iron status as a result

of intervention and improvement in child health outcomes. This represents a critical gap in the evidence.

HARMS OF EARLY DETECTION AND TREATMENT

The USPSTF found inadequate evidence on the harms of routine screening for iron deficiency anemia in asymptomatic children ages 6 to 24 months. The USPSTF identified no studies that evaluated the direct harms of routine screening on child health outcomes. The USPSTF found inadequate evidence on the harms of treatment of iron deficiency anemia in children ages 6 to 24 months. The USPSTF found no recent studies that are generalizable to the current U.S. population and reported on the harms of treatment of iron deficiency anemia with iron.

USPSTF ASSESSMENT

The USPSTF concludes that the evidence on screening for iron deficiency anemia in asymptomatic children ages 6 to 24 months to prevent adverse growth, cognitive, or neurodevelopmental outcomes is lacking, and that the balance of benefits and harms cannot be determined.

Clinical Considerations

PATIENT POPULATION UNDER CONSIDERATION

This recommendation applies to children ages 6 to 24 months living in the United States who are asymptomatic for iron deficiency anemia. It does not apply to children younger than age 6 months or older than 24 months, children who are severely malnourished, children who were born prematurely or with low birth weight, or children who have symptoms of iron deficiency anemia. Recommendations regarding screening for iron deficiency anemia in pregnant women and iron supplementation during pregnancy are addressed in a separate recommendation statement

Table 1. Screening for Iron Deficiency Anemia in Young Children: Clinical Summary of the USPSTF Recommendation

Population	Asymptomatic U.S. children ages 6 to 24 months
Recommendation	No recommendation Grade: I statement (insufficient evidence)
Risk assessment	No studies assessed the performance of risk assessment tools to identify children who are at increased risk for iron deficiency anemia.
Screening tests	Although the evidence is insufficient to recommend specific tests for screening, measurement of serum hemoglobin or hematocrit is often the first step.
Treatment and interventions	Iron deficiency anemia in children is usually treated with oral iron; the usual dose in infants and young children is 3 to 6 mg/kg of elemental iron per day in 2 to 3 divided doses.
Balance of benefits and harms	The current evidence is insufficient to assess the balance of benefits and harms of screening for iron deficiency anemia in young children.
Other relevant USPSTF recommendations	The USPSTF addresses screening for iron deficiency anemia in pregnant women and iron supplementation during pregnancy in a separate recommendation statement (available at http://www.uspreventiveservicestaskforce.org).

NOTE: For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, go to <http://www.uspreventiveservicestaskforce.org/>.

USPSTF = U.S. Preventive Services Task Force.

(available at <http://www.uspreventiveservices taskforce.org>).

SUGGESTIONS FOR PRACTICE REGARDING THE I STATEMENT

Potential Preventable Burden. Estimates of the prevalence of iron deficiency in children ages 1 to 3 years in the United States range from 8% to 14%, and approximately one-third of these children also have anemia.³ Based on 1999 to 2002 National Health and Nutrition Examination Survey (NHANES) data, the estimated prevalence of iron deficiency anemia in children ages 12 to 35 months is 2.1%.¹ Several factors have been identified that may increase a child’s risk for iron deficiency anemia, including prematurity or low birth weight, use of non-iron-fortified formula or introduction to cow’s milk in the first year of life, and exclusive breastfeeding without regular intake of iron-fortified food after age 6 months. Demographic factors associated with increased risk for iron deficiency anemia include low socioeconomic status and having parents who are migrant workers or recent immigrants. Additional factors that may be associated with increased risk for iron

deficiency in children include weight and height in the 95th percentile or greater, bottle feeding beyond the first year of life, having a mother who is currently pregnant, or living in an urban area. Evidence on whether Hispanic ethnicity increases children’s risk for iron deficiency has been mixed, with some studies showing an increased risk and others showing no increased risk. Older data from NHANES (1988-1994) showed that Mexican American children were nearly 3 times more likely than white children to have iron deficiency, whereas more recent NHANES data from 1999-2002 found no increased risk in Hispanic children.³ The USPSTF found no studies that assessed the performance of risk assessment tools to identify children who are at increased risk for iron deficiency anemia.

Some observational studies suggest that iron deficiency anemia in early childhood may be associated with neurodevelopmental and behavioral delays and poorer performance on cognitive tests. However, concluding that there is a direct causal link between iron deficiency anemia and these outcomes is difficult because of the methodological flaws in these studies and

potential confounding due to underlying nutritional and socioeconomic differences between groups.³ The aim of screening for iron deficiency anemia in young children is to identify and treat anemia before it leads to poor child health outcomes.

Potential Harms. The harms of screening for iron deficiency anemia have not been well studied. Potential harms of screening include false-positive results, anxiety, and cost. Reported adverse events of treatment with iron include limited gastrointestinal symptoms, darkening color of stool, staining of teeth and gums, and drug interactions with other medications. The previous USPSTF recommendation also noted that accidental iron overdose can occur in children receiving treatment or supplementation with iron.

Current Practice. No recent nationally representative data on the current rate of screening are available.

SCREENING TESTS

Although the evidence is insufficient to recommend specific tests for screening, measurement of serum hemoglobin or hematocrit is often the first step.

TREATMENT AND INTERVENTIONS

In the United States, iron deficiency anemia in children is usually treated with oral iron. The usual dose in infants and young children is 3 to 6 mg/kg of elemental iron per day in 2 to 3 divided doses.³

OTHER APPROACHES TO PREVENTION

According to the Institute of Medicine, the Recommended Dietary Allowance for iron in infants ages 7 to 12 months is 11 mg per day. In children ages 1 to 3 years, the Recommended Dietary Allowance is 7 mg per day. Natural food sources of iron include certain fruits, vegetables, meat, and poultry. The Institute of Medicine also notes that nonheme iron, which is found in vegetarian diets, may be less well absorbed than heme iron, which is found in diets containing meat; therefore, the iron requirement may be almost twice as much in children who eat a purely vegetarian diet.⁴ Fortified breads and grain products (such as cereal) are also

good sources of iron for young children eating solid foods.⁵ Iron-fortified formula is another source of iron for infants. Federally regulated iron fortification of food products in the United States began in 1941, and the iron content in enriched grain products has increased over the years.⁶ More than 50% of the iron in the U.S. food supply comes from iron-fortified cereal grain products.⁵

USEFUL RESOURCES

The USPSTF has published a separate recommendation statement on screening for iron deficiency anemia and iron supplementation in pregnant women (available at <http://www.uspreventiveservicestaskforce.org>).

This recommendation statement was first published in *Pediatrics*. 2015;136(4):746-752.

The "Other Considerations," "Discussion," "Update of Previous USPSTF Recommendation," and "Recommendations of Others" sections of this recommendation statement are available at <http://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/iron-deficiency-anemia-in-young-children-screening>.

The USPSTF recommendations are independent of the U.S. government. They do not represent the views of the Agency for Healthcare Research and Quality, the U.S. Department of Health and Human Services, or the U.S. Public Health Service.

REFERENCES

1. Baker RD, Greer FR; Committee on Nutrition, American Academy of Pediatrics. Diagnosis and prevention of iron deficiency and iron-deficiency anemia in infants and young children (0-3 years of age). *Pediatrics*. 2010; 126(5):1040-1050.
2. Cusick SE, Mei Z, Freedman DS, et al. Unexplained decline in the prevalence of anemia among US children and women between 1988-1994 and 1999-2002. *Am J Clin Nutr*. 2008;88(6):1611-1617.
3. McDonagh M, Blazina I, Dana T, Cantor A, Bougatsos C. Routine iron supplementation and screening for iron deficiency anemia in children ages 6 to 24 months: a systematic review to update the U.S. Preventive Services Task Force recommendation. Evidence synthesis no. 122. AHRQ publication no. 13-05187-EF-1. Rockville, Md.: Agency for Healthcare Research and Quality; 2015.
4. Otten JJ, Hellwig JP, Meyers LD, eds. *Dietary Reference Intakes: The Essential Guide to Nutrient Requirements*. Washington, DC: National Academies Press; 2006.
5. Gerrior S, Bente L, Hiza H. *Nutrient Content of the U.S. Food Supply, 1909-2000*. Washington, DC: U.S. Department of Agriculture, Center for Nutrition Policy and Promotion; 2004.
6. Backstrand JR. The history and future of food fortification in the United States: a public health perspective. *Nutr Rev*. 2002;60(1):15-26. ■