Iron-Deficiency Anemia

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FAST FACTS

2.4 million
children worldwide are iron deficient

9 months to 3 years
The highest risk groups for iron deficiency are children ages 9 months to 3 years and menstruating females

25%
Follow-up is key, but 25% of patients who screened positive for anemia have no documented follow-up testing

WHEN TO REFER

Consider a consult with a pediatric hematologist if:

- Anemia is of uncertain etiology
- Anemia is unresponsive to oral iron therapy
- Patient cannot take oral iron

If iron deficiency is refractory or recurrent, consider sources of chronic blood loss that may require a specialty referral (GI or Gynecology).

If you have clinical questions about patients with iron-deficiency anemia, call the Physician Priority Link® at 513-636-7997.

Iron deficiency is the most prevalent nutritional deficiency worldwide and the leading cause of anemia. Long-lasting neurocognitive effects such as decreased academic performance and attention deficit hyperactivity disorder have been linked to iron deficiency. Most cases are treatable in the primary care setting. The American Academy of Pediatrics recommends routine complete blood count (CBC) screening of hemoglobin (Hgb) measurement by 12 months, with selective screening at any age depending on risk factors.

ASSESSMENT

Perform a physical exam and standard dietary and health history, paying particular attention to the following risk factors, which can vary by age group.

- Small for gestational age
- History of prematurity
- Exclusive breastfeeding beyond age 6 months
- Increased or chronic blood loss (including heavy menstrual bleeding) or frequent blood draws
- Poor dietary iron (especially associated with early introduction and/or excessive consumption of cow's milk)
- Restricted diet ("picky" eater, texture issues, strict vegan)
- Periods of growth spurts

Recommended lab tests include:

- CBC
- Serum ferritin, total iron binding capacity (ferritin/TIBC)
- Reticulocyte count
- Transferrin saturation

Inclusion criteria: decreased Hb greater than two standard deviations below mean Hb for age, sex and race with some combination of decreased ferritin and decreased or elevated TIBC (total iron binding capacity)

When results are conflicting, a short-term (one- to two-month) trial of iron can be instituted.

HPE (HISTORY AND PHYSICAL EXAM) RED FLAGS

History

- Dyspnea, dizziness, palpitations, syncope
- Headaches
- Irritability
- Pica
- Poor feeding, poor growth

Physical Exam

- Cardiac flow murmur
- Hepatomegaly (severe anemia/ impending heart failure)
- Pallor
- Tachycardia

MANAGEMENT/TREATMENT

- Prescribe at least three months of oral iron supplementation (2–6 mg/kg/day). A multivitamin with iron is insufficient.
- Address and identify source of blood loss (menses, GI bleeding).
- Recommend dietary changes. Patient should eat foods that are rich in iron and limit cow's milk to less than 16 to 24 oz. per day.
- To replace iron stores, patient should continue oral iron supplementation for at least one to two months after the anemia has resolved.
- For information on follow-up, see more detail on the back page algorithm

If you would like additional copies of this tool, or would like more information, please contact the Physician Outreach and Engagement team at Cincinnati Children's.

Tool developed by Cincinnati Children's physician-hospital organization (known as Tri-State Child Health Services, Inc.) and staff in the James M. Anderson Center for Health Systems Excellence. Developed using expert consensus and informed by Best Evidence Statements, Care Practice Guidelines, and other evidence-based documents as available. For Evidence-Based Care Guidelines and references, see www.cincinnatichildrens.org/evidence.

Iron-Deficiency Anemia

Patient Presents

HPE (HISTORY AND PHYSICAL EXAM) RED FLAGS

History
- Dyspnea, dizziness, palpitations, syncope
- Headaches, Irritability
- Poor feeding/poor growth
- Easy fatigue
- Pica

Physical Exam
- Cardiac flow murmur
- Hepatomegaly
- Pallor
- Tachycardia

HPE Risk Factors
- Small for gestational age
- History of prematurity
- Exclusive, prolonged breastfeeding
- Frequent blood draws
- Increased or chronic blood loss (heavy menstrual bleeding, bleeding disorders)
- Poor dietary iron
- Early introduction of cow's milk (before 1 year)
- Excessive cow's milk intake
- Periods of growth spurts
- Unusually restricted diet ("very picky eater," texture issues, strict vegan)

Any Red Flags?

- No → Evaluate further
- Yes → Initiate lab evaluation

Lab Evaluation
- CBC
- Reticulocyte count
- Serum ferritin, total iron binding capacity (TIBC), transferrin saturation

Inclusion Criteria
Criteria for Education and Therapy (Outpatient)
Decreased Hb <2 standard deviations below mean Hb for age, sex and race with some combination of:
- Decreased ferritin
- Decreased iron saturation (elevated TIBC, low transferrin saturation)

Met Inclusion Criteria?

- No → Evaluate further
- Yes → Education and Therapy

Education and Therapy
- Prioritize education regarding age-appropriate diet and iron-containing foods, including limiting cow's milk intake.
- Identify and address source of blood loss (menses, diet, occult blood loss, etc.).
- Prescribe oral iron supplementation 2–6 mg/kg/day. Oral iron therapy should continue for at least one to two months after the anemia has resolved to replace iron stores.

Follow-Up
Serial lab monitoring:
- Reticulocyte count should increase in four to five days.
- Hb should rise by at least 1 g/dl in one week and should normalize by four to six weeks.

Consider rechecking labs about three months after stopping the iron supplement.

When to Consider Hospital Admission
- Uncontrolled bleeding
- Severe anemia with severe symptoms or hemodynamic instability
- Signs concerning for congestive heart failure

When to Refer to a Pediatric Hematologist
- Uncertain etiology of anemia
- Anemia unresponsive to oral iron
- Patient cannot take oral iron

If iron deficiency is refractory or recurrent, consider sources of chronic blood loss that may require a specialty referral (GI or Gynecology).

For urgent issues, or to speak with the specialist on call 24/7, call the Physician Priority Link® at 1-888-987-7997.