

# Iron Deficiency Anemia

## QUICK REFERENCE GUIDE:

### Causes of Iron Deficiency Anemia (IDA)

- Diets low in iron
  - Excessive cow's milk consumption in toddlers
- Blood loss (usually from heavy menses but may be occult gastrointestinal bleeding)
- Gastrointestinal/malabsorption problems

### Evaluation for IDA

- Complete blood count (CBC)
- Serum ferritin
  - Less helpful: Transferrin, transferrin saturation, total iron binding capacity, and/or serum iron
- +/- evaluation for occult blood loss, if high clinical suspicion as may be low-yield

### Treatment for IDA

- Increase iron rich foods in diet (information for patients [here](#) or [here](#) or [here](#))
- Decrease milk intake to <16 ounces daily, if applicable
- Address ongoing blood loss, if applicable
- Ferrous sulfate 3 mg/kg dosed once daily (for infants and young children)
- Ferrous sulfate 325 mg (65 mg elemental iron) once daily (for older children and adolescents)

### Who should be sent to the emergency room?

- Any patient with hemodynamic instability
- Any patient with a hemoglobin <5 gm/dL
- A patient with a hemoglobin <7 gm/dL and ongoing blood loss
- A patient that may have barriers to obtaining appropriate therapy at home

### When should a patient be referred to Hematology?

- Severe anemia
- Persistent or recurrent IDA
- IDA present with concomitant anemia of inflammation
- Consideration of intravenous iron therapy

## DETAILED INFORMATION:

Iron deficiency is most common type of anemia in the world. Hemoglobin is the protein that allows red blood cell carry oxygen to other cells in the body, and iron is required to form hemoglobin.

### Who should be screened for iron deficiency?

- Infants exclusively receiving breast milk without an iron supplement
- Toddlers with excessive cow's milk intake
- Patients with dietary restrictions (oral aversion, vegetarian diets, etc)
- Patients at high risk of gastrointestinal bleeding (inflammatory bowel disease, gastric ulcers, etc)
- Patients with high risk of poor nutrient absorption (short gut syndrome, celiac disease, etc)
- Adolescents with heavy menstrual bleeding
- Adolescent athletes with poor nutritional/caloric intake
- Anyone with pica behaviors

### Testing for Iron Deficiency

If iron deficiency is suspected or for screening, a complete blood count (CBC) *and* iron testing, preferably with a serum ferritin, are recommended. A hemoglobin below the normal range along with a ferritin level of <20 ng/mL is consistent with *iron deficiency anemia*. Iron deficiency may be present even without anemia. A ferritin <20 ng/mL even with a normal CBC is consistent with *iron deficiency* and may eventually progress to *iron deficiency anemia*. Iron deficiency anemia frequently causes small red blood cells (microcytosis) but occasionally the mean corpuscular volume (MCV) may remain normal. The serum iron level will not accurately identify iron deficiency as this value is reflective of recently ingested iron from food or supplements and may be normal even in the setting of iron deficiency. It is important to remember that ferritin is an acute phase reactant and can be falsely elevated during infections or inflammation. If iron deficiency is suspected, repeating the ferritin when health has returned to baseline is recommended.

As per the AAP recommendations, infants born prior to 37-weeks gestational age who are exclusively breast fed should be started on an iron supplement by 2 weeks of age, 2 mg/kg/day and continued through 12 months of age. Full term infants exclusively or partially breastfed need to be given an iron supplement, 1 mg/kg/day, starting by at least 6 months of age until they begin eating solid foods that are iron rich. Infants receiving most of their nutrition by formula do not require iron supplements because there is an adequate amount of iron added.

Whole cow milk (or other non-breast/non-formula milk products) should not be given until age 12 months. When cow milk is started, toddlers should be given no more than 16 ounces per day. Higher milk intake greater results in poor solid food intake and can result in severe iron deficiency.

The American Academy of Pediatrics (AAP) recommends screening for IDA at 12 months of age in all children or sooner if any risk factors such as low iron diet, poor growth or feeding problems. A link to the AAP recommendations referenced above can be found [here](#). Newer recommendations will recommend universal laboratory screening for all adolescent females at least once after onset of menarche. Ideal screening includes a CBC and serum ferritin to assess for iron deficiency, with or without anemia. However, a CBC alone, or a POC hemoglobin or hematocrit is better than no screening at all.

## Treating Iron Deficiency

Counseling should be given on iron rich food. Patients should be offered foods high in iron including red/dark meats, green leafy vegetables, grains, and beans. An iron-rich diet handout for families is available [here](#). Incorporating iron rich foods in the diet is essential to long-term prevention of iron deficiency. If blood loss is suspected as a cause of iron deficiency, this must be addressed for long-term iron homeostasis.

Iron drops or pills should be taken for a minimum of 12-weeks to improve anemia and allow for replenishment of iron storage. Many patients require ongoing iron therapy after 3 months.

Iron can be taken with water or orange juice (or vitamin C containing food/drink), or on an empty stomach. Common side effects of oral iron include abdominal pain and constipation. Liquid iron may be difficult to administer due to taste. Some patients experience less gastrointestinal side effects when taken with a small amount of food. However, iron supplements should not be given with calcium containing products and should never be mixed with milk or formula.

Insurance may not cover iron as all products may be purchased over-the-counter.

Ferrous sulfate is the best absorbed form of iron. Children should be started on 3 mg/kg dosed once daily. Older children or adolescents should start ferrous sulfate 325 mg (65 mg elemental iron) dosed once daily. If anemia is severe, higher doses may be given but should still be administered altogether once daily to maximize absorption.

Iron polysaccharide is a different formulation of iron that is not absorbed as well as ferrous sulfate. However, it may have less side effects and taste better. Dosing for infants and young children is 3 mg/kg once daily. Capsules of iron polysaccharide come in a variety of doses, usually 100-150 mg per capsule. Older children and adolescents may take one of these capsules daily. We recommend patients search for iron polysaccharide online, as pharmacies and stores rarely have the liquid or capsules in stock.

If oral iron is not tolerated or there is no improvement in hemoglobin after a month of therapy, then a referral to Hematology is recommended. We recommend rechecking the ferritin level prior to discontinuing iron supplementation and continuing iron supplementation until the ferritin is >20 ng/mL.

Patients who have demonstrated inability to tolerate or lack of response to oral iron may be able to receive intravenous iron. This is determined on a case-by-case basis and requires referral to hematology.

More information for health professionals on iron deficiency from the National Institutes of Health (NIH) can be found [here](#) with the full citation below.

### **AAP Clinical Report:**

Robert D. Baker, Frank R. Greer, The Committee on Nutrition; Diagnosis and Prevention of Iron Deficiency and Iron-Deficiency Anemia in Infants and Young Children (0–3 Years of Age). *Pediatrics* November 2010; 126 (5): 1040–1050. 10.1542/peds.2010-2576.