

بسم الله الرحمن الرحيم

دارودرمانی آنمی فقر آهن در گروه های جمعیتی خاص

دکتر مرتضی نبیئی

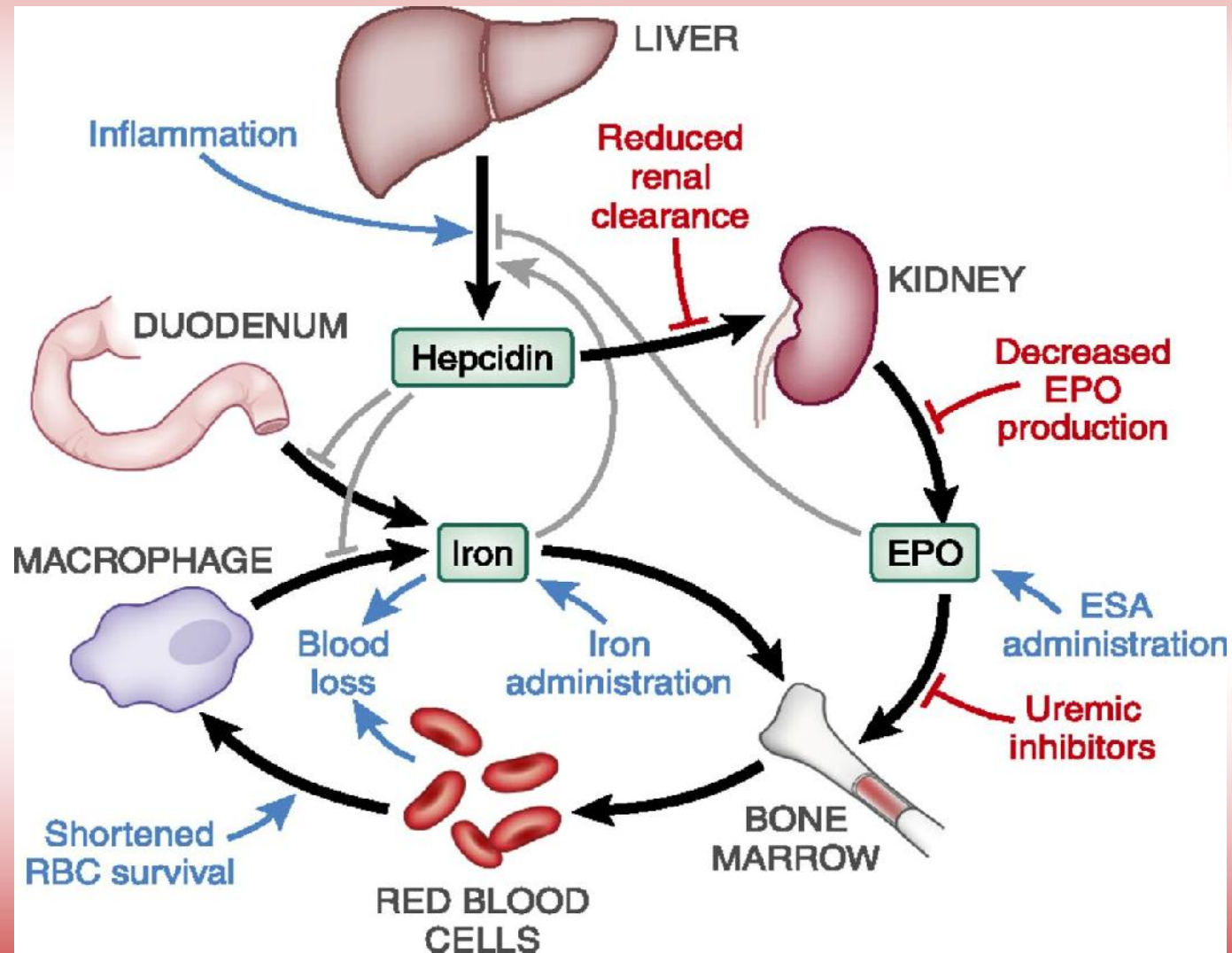
متخصص داروسازی بالینی

سوپروایزر مرکز اطلاعات داروها و سموم ۱۳ آبان

Elderly

- ❑ Older individuals may also have a higher incidence of intolerance to oral iron supplementation, especially with **constipation**, as well as **reduced absorption of oral iron**, especially if they are taking antacids or have impaired gastric acid production.
- ❑ There is a lack of high-quality evidence guiding dosing and administration in older adults
 - Threshold is lower for administering iron intravenously in older adults.
 - Oral iron should be administered no more frequently than once daily, and every-other-day therapy may be equivalent and likely more effective than once-daily dosing.
 - Lower doses of oral iron may be effective and at the same time cause less gastrointestinal toxicity.

Chronic Kidney Disease



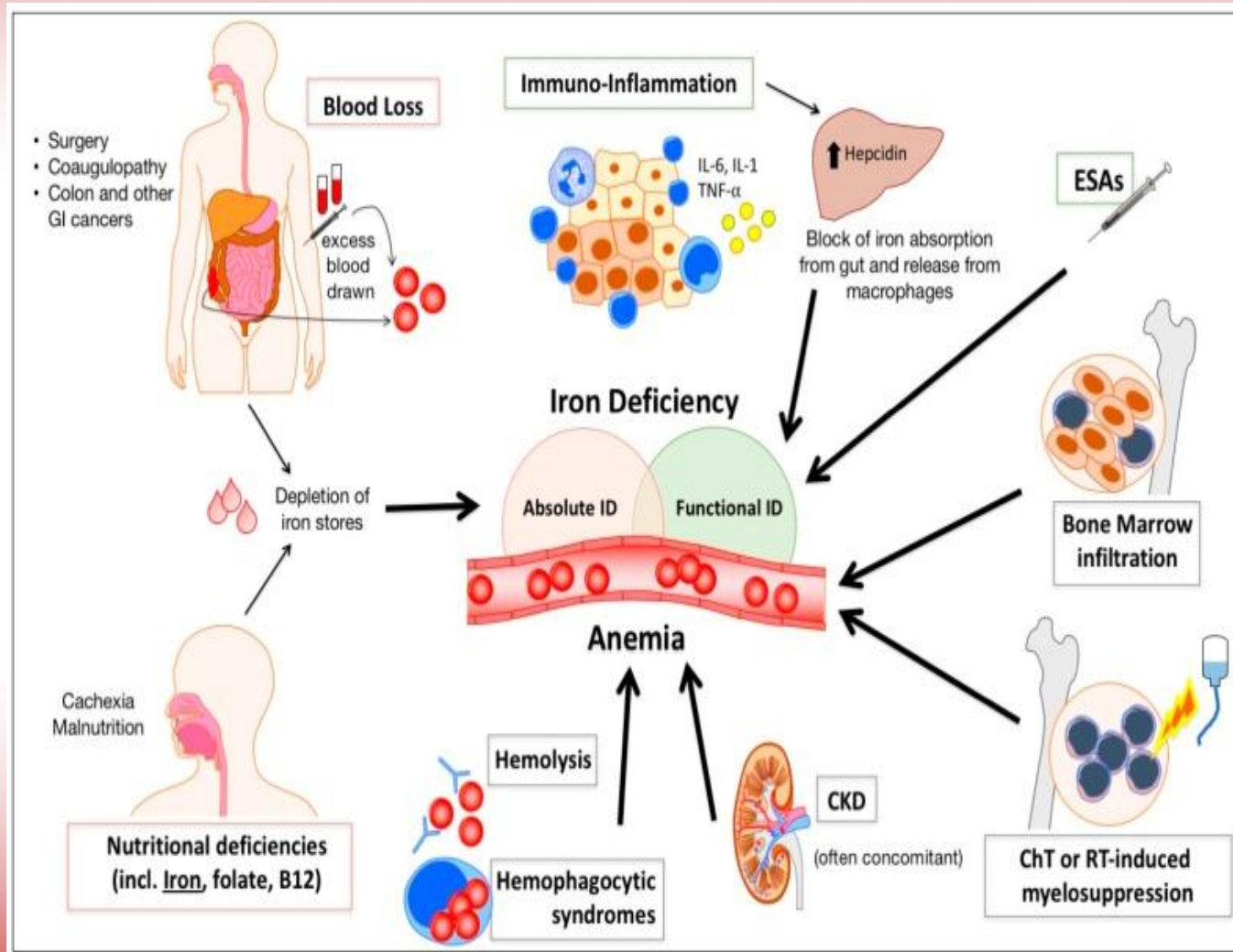
Chronic Kidney Disease

- ✓ Given the poor bioavailability of oral iron and patient noncompliance, oral iron is usually inadequate for repletion of iron in patients receiving HD who experience chronic blood loss.
- ✓ Current recommendations support reserving IV iron for patients in whom oral iron has failed.
- ✓ Oral iron supplementation with 200 mg/day of elemental iron should be started to address iron deficiency, if present, and this regimen should be continued to maintain sufficient iron status while receiving ESA therapy.

Chronic Kidney Disease

- ✓ If patient doesn't respond to oral iron or patient is HD dependent ESRD, IV preparations are the choice.
- ✓ Iron sucrose (Venofer) is a polynuclear iron hydroxide sucrose complex. The recommended dose of iron sucrose is 100 mg (5 mL) during 10 consecutive HD sessions to provide the total dose of 1 g. The dose can be administered by a slow IV injection for 5 minutes or diluted in 100 mL of normal saline and infused for at least 15 minutes.
- ✓ Iron carboxymaltose (Ferinject) is a new preparation that has 500 mg elemental iron in 10 ml that is the good choice for non-HD dependent CKD patients because in every session for HD patients only 200 mg can be used.

Cancer



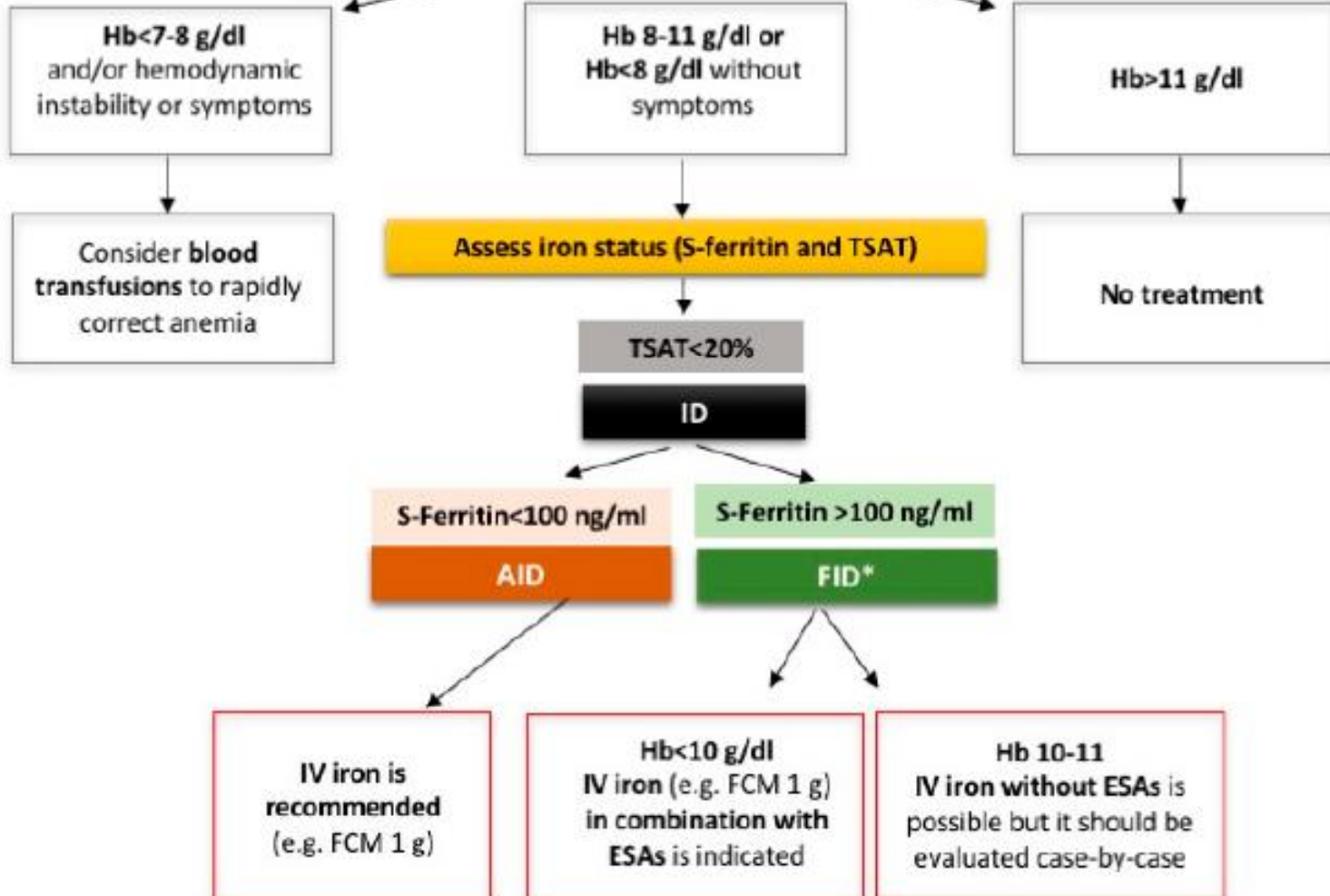
Cancer

- There are numerous causes of anemia in patients with cancer. Iron deficiency (ID) often being a major and potentially treatable contributor
- Effective therapies for cancer-associated anemia include treatment of the malignancy, blood transfusion, and erythropoiesis-stimulating agents (ESAs).
- For individuals with cancer who have iron deficiency and are receiving an ESA, we generally use IV iron due to its greater synergy with ESAs compared with oral iron . This practice is supported by a 2012 National Comprehensive Cancer Network (NCCN) practice guideline for cancer- and chemotherapy-induced anemia

Patients with hematological or solid tumors receiving ChT



Assess hemoglobin level

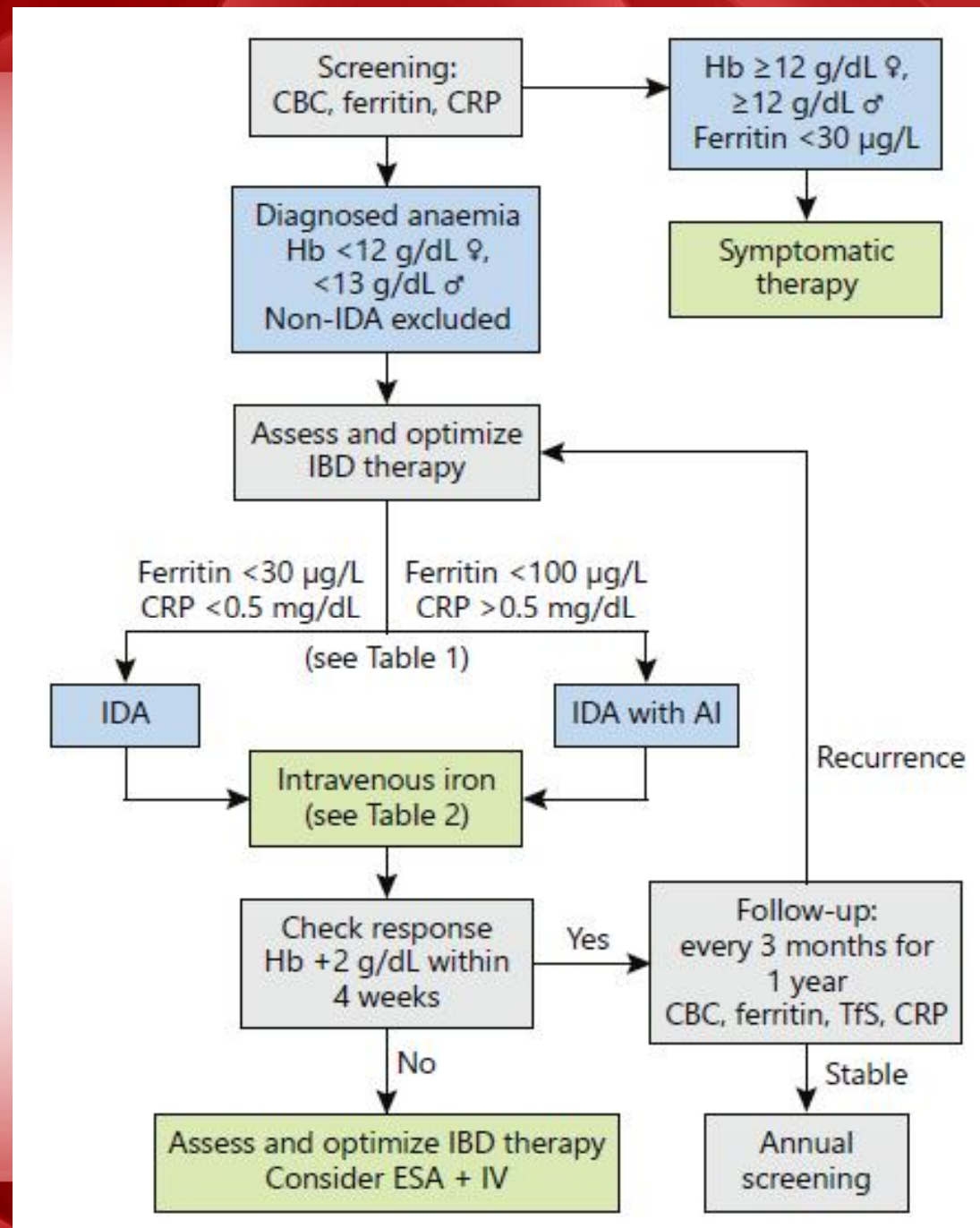


Inflammatory Bowel Disease

- Multiple factors in IBD contribute to iron deficiency: **intestinal blood loss, diminished dietary iron intake, as well as duodenal disease involvement or surgical removal of the duodenum** causing diminished iron absorption
- Chronic inflammation also leads to anaemia of inflammation (AI), the second most common cause of Iron Deficiency Anaemia in IBD.
- In our view, it is best to avoid oral iron therapy in IBD to relieve the intestinal site of inflammation from potential harm and reduce the risk of triggering a flare. Oral iron alters the microbiota profile and metabolism, which likely influences the underlying intestinal disease

Inflammatory Bowel Disease

- If oral iron must be used, it should be limited to IBD patients with mild anaemia (Hb ≥ 11.0 g/dL), with no active disease and no prior intolerance to oral iron. The ECCO recommends a dose no higher than 100 mg elemental iron per day.
- In IBD patients with moderate to severe anaemia, or with active disease, or where oral iron is not tolerated or ineffective, intravenous (IV) iron is the therapy of choice. IV iron bypasses the inflammation-induced blockade of intestinal iron absorption and allows for faster iron repletion.
- Blood transfusions should only be used in patients who are critically anaemic (≤ 7 g/dL Hb) and haemodynamically unstable or have concomitant coronary heart disease or chronic pulmonary disease



Heart Failure

- Iron deficiency anemia is widely present in patients with heart failure with an estimated prevalence of over 50% in ambulatory patients. It is an independent predictor of worse functional capacity and survival.
- To date, no clinical trial has proven the efficacy of oral iron in patients with heart failure with reduced ejection fraction. Furthermore, oral iron preparations are associated with a high incidence of adverse effects (in up to 40% of patients), are poorly absorbed due to gut wall edema, and can take up to 6 months to replenish iron stores.
- At present, intravenous (IV) iron is the preferred route for treatment in heart failure patients. Most studies have used IV iron sucrose (maximum dose of 200 mg per setting) or ferric carboxymaltose (maximum dose of 1000 mg per week).

Perioperative

- Perioperative patients may have anemia from blood loss, and others may have undiagnosed iron deficiency that becomes apparent during the perioperative evaluation.
- Perioperative iron administration has been demonstrated to reduce the degree of anemia and in some cases to reduce transfusions in a variety of other types of surgery.
- The reduction in transfusions appears to be greatest in those with preoperative anemia, and we would administer IV iron to individuals with preoperative anemia if the estimated surgical blood loss is likely to be significant and iron deficiency is demonstrated to be the cause (or likely cause).

Iron deficiency anemia in children

- Iron deficiency is the most common nutritional deficiency in children. If iron deficiency is unrecognized, it can result in iron deficiency anemia (IDA). Children with IDA have poorer neurocognitive outcomes compared with those without IDA

Table 3. Lower limits for hemoglobin and hematocrit values specified by the World Health Organization by age and gender

Groups by age and gender	Hemoglobin (g/dL)	Hematocrit (%)
Children aged between 6-59 months	11	33
Children aged between 5-11 years	11.5	34
Children aged between 12-14 years	12	36
Girls aged >15 years	12	36
Boys aged >15 years	13	39

Table 4. Laboratory findings in iron deficiency

Complete blood count:

RDW>14

RBC: low

Hb, Hct: low according to age and gender

MCV: low according to age and gender

When specifying the lower limit of MCV: $70 + \text{age}$
(for >10 years)

(if MCV is <72, generally abnormal)

Upper limit of MCV: $84 + \text{age} \times 0,6$ (for >6 months)

Prevention

- The RDA for iron in children under 12 years of age are;

Infants

- **Full-term infants** – Start an iron supplement **at four months** of age (elemental iron 1 mg/kg daily, maximum 15 mg). Continue the supplement until the infant is taking sufficient quantities of iron-rich complementary foods.
- **Premature infants** – Start an iron supplement by **two weeks of age** (elemental iron 2 to 4 mg/kg daily, maximum 15 mg). Continue to provide iron at a dose of at least 2 mg/kg per day, via supplements or fortified formula, through the first year of life.

Children

- 1 to 3 years old – 7 mg daily
- 4 to 8 years old – 10 mg daily
- 9 to 13 years old – 8 mg daily

Oral Iron Therapy

Dose and scheduling

- Standard recommended dosing is 3 to 6 mg/kg elemental iron per day
- we suggest initiating treatment with oral [ferrous sulfate](#), 3 mg/kg elemental iron, administered once daily.
- For optimal absorption, the iron should be given between meals and with water or juice, and milk products should be avoided for approximately one hour before and two hours after each dose .

Dietary changes

- For infants six months and older, especially breastfed infants, ensure adequate consumption of iron in complementary foods including iron-fortified infant cereals, foods rich in vitamin C, and pureed meats.
- For all children 12 months of age and older, intake of cow's milk (or other milk such as almond or soy) should be limited to less than 20 oz per day.
- Higher intake of cow's milk in toddlers has been associated with increased risk for iron deficiency

Follow-up assessment

- The timing of follow-up testing depends on the severity of the IDA:
- Children with mild anemia (Hgb ≥ 9 g/dL) should be reevaluated by checking Hgb or complete blood count (CBC) approximately four weeks after treatment initiation.
 - Children with moderate or severe anemia (Hgb < 9 g/dL) should be retested 7 to 10 days after treatment initiation to assess initial response to therapy

Treatment Responders

- An adequate initial response to therapeutic iron is reflected by the following results:
 - **Mild anemia** (Hgb ≥ 9 g/dL) – The Hgb should rise at least 1 g/dL within four weeks of treatment initiation.
 - **Moderate or severe anemia** (Hgb < 9 g/dL) – The Hgb should rise at least 1 g/dL within the first two weeks of treatment initiation. If testing is performed earlier, a reticulocyte response peaks at seven days but may be seen as soon as 72 hours after treatment initiation.
- For patients who respond to treatment ,therapeutic iron should be continued.
- Additional testing should be performed approximately three months after initiation of iron therapy.
- Continue iron therapy for approximately one month after all CBC parameters have normalized to permit replenishment of iron stores.
- Early discontinuation of iron therapy frequently leads to recurrent IDA.
- **Total duration of therapy is a minimum of three months.**

Nonresponders

Patients who do not demonstrate an adequate rise in should be reevaluated.

Potential causes of recurrent or refractory IDA include:

- ineffective treatment (nonadherence or incorrect dosing)
- an incorrect diagnosis
- persistent low-iron diet
- or ongoing blood loss or malabsorption

The clinician should interview the parent to determine whether the supplement has been given at the appropriate dose and timing, whether the appropriate diet modifications have been made, and if there has been any significant intercurrent illness (which might cause a transient decrease in Hgb).

IV Iron Therapy

Indications for IV iron therapy include:

- ❖ persistent anemia with oral iron intolerance, malabsorption, or nonadherence to oral iron therapy despite attempts at family education and support.
- ❖ Children with ongoing or poorly controlled blood loss such as dysfunctional uterine bleeding may benefit from IV iron therapy.
- ❖ Those with underlying gastrointestinal disease, including conditions causing intestinal failure (eg, short bowel syndrome) or inflammatory bowel disease, may have particular difficulty tolerating oral iron and require early initiation of IV iron therapy.
- ❖ IV iron therapy may also benefit patients with other chronic conditions such as heart failure.

