What every medical professional needs to know about...

**hemochromatosis**

...early detection and treatment saves lives.

According to the U.S. Centers for Disease Control and Prevention: “More than one million people in the United States have the gene mutations for hemochromatosis, a leading cause of iron overload disease.”
To determine iron overload

**Methods to determine iron overload**

**Bloodwork**
- Fasting serum iron
- Total iron binding capacity
- Serum ferritin: See ranges below

**Procedures**
- Liver biopsy with quantitative iron stain (used in some cases; especially those with normal TS% with elevated serum ferritin)
- Quantitative phlebotomy

For details, see diagnosis algorithm next page

TS% = transferrin-iron saturation percentage

### Comparing disorders of iron

<table>
<thead>
<tr>
<th>Iron Panel</th>
<th>Serum Iron</th>
<th>Serum Ferritin</th>
<th>Transferin Iron Saturation Percentage</th>
<th>Total Iron Binding Capacity (TIBC)</th>
<th>Ferritin</th>
<th>Hemoglobin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemochromatosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NORMAL</td>
</tr>
<tr>
<td>Iron Deficiency Anemia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NORMAL</td>
</tr>
<tr>
<td>Sideroblastic Anemia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NORMAL</td>
</tr>
<tr>
<td>Thalassemia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NORMAL</td>
</tr>
<tr>
<td>Perphyria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NORMAL</td>
</tr>
<tr>
<td>Cutaneous Tarda (PCT)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NORMAL</td>
</tr>
<tr>
<td>Anemia of Chronic Disease (ACD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NORMAL</td>
</tr>
<tr>
<td>African Siderosis (AS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NORMAL</td>
</tr>
<tr>
<td>Vitamin B12 Deficiency (pernicious anemia)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NORMAL</td>
</tr>
</tbody>
</table>

### Ferritin

<table>
<thead>
<tr>
<th>Ferritin</th>
<th>Adult Males</th>
<th>Adult Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Range</td>
<td>up to 300 ng/mL</td>
<td>up to 200 ng/mL</td>
</tr>
<tr>
<td>In de-ironing treatment</td>
<td>below 100 ng/mL</td>
<td>below 100 ng/mL</td>
</tr>
<tr>
<td>Ideal maintenance</td>
<td>25-75 ng/mL</td>
<td>25-75 ng/mL</td>
</tr>
</tbody>
</table>

### Adolescents, Juveniles, Infants & Newborns

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male ages 10-19 years</td>
<td>23-70 ng/mL</td>
</tr>
<tr>
<td>Female ages 10-19 years</td>
<td>6-40 ng/mL</td>
</tr>
<tr>
<td>Children ages 6-9 years</td>
<td>10-55 ng/mL</td>
</tr>
<tr>
<td>Children ages 1-5 years</td>
<td>10-55 ng/mL</td>
</tr>
<tr>
<td>Infants 7-12 months</td>
<td>60-80 ng/mL</td>
</tr>
<tr>
<td>Newborn 1-6 months</td>
<td>6-410 ng/mL</td>
</tr>
<tr>
<td>Newborn 1-30 days</td>
<td>6-400 ng/mL</td>
</tr>
</tbody>
</table>

### Mean Corpuscular Volume (MCV) Reference Ranges

- Newborn: 95 to 121 fl
- Ages 6 months to 2 years: 70 to 86 fl
- Ages 12 to 18 years: 80 - 98 fl
- Boys: 78 - 96 fl
- Girls: 78 - 102 fl
- Age over 18 years: 78 to 98 fl

### Hemoglobin

<table>
<thead>
<tr>
<th>Hemoglobin</th>
<th>Adult Males</th>
<th>Adult Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Range</td>
<td>13.5-17.5 g/dL</td>
<td>12.0-16.0 g/dL</td>
</tr>
</tbody>
</table>

### Resources


**Clinical Features of Patients with Hemochromatosis**

There is a broad spectrum of features, ranging from total lack of symptoms to advanced liver, heart, joint or endocrine disease.

Following is a list of possible ways of identifying hemochromatosis in the asymptomatic patient:

- Abnormal serum iron studies on routine screening chemistry panel
- Evaluation of abnormal liver tests
- Identified by family screening
- Identified by population screening

Non-specific, systemic symptoms or complaints by the patient:

- Weakness
- Fatigue
- Lethargy
- Apathy
- Weight loss

Specific Organ-related symptoms or diseases:

- Abdominal pain secondary to hepatomegaly
- Arthralgia (...especially reports of pain in the 2nd and 3rd metacarpophalangeal joints)
- Diabetes
- Amenorrhea
- Loss of libido, impotence
- Congestive heart failure, arrhythmias

Signs in the asymptomatic patient:

- Hepatomegaly
- Signs in the symptomatic patient by system:
  - Liver/Spleen/Gastrointestinal
  - Hepatomegaly
  - Cutaneous stigmata of chronic liver disease
  - Splenomegaly
  - Portal hypertension
  - Ascites
  - Esophageal varices
  - Brain
  - Encephalopathy
  - Joints
  - Arthritis (especially 2nd and 3rd metacarpophalangeal joints, knees, shoulders, and wrists)
  - Joint swelling
  - Heart
  - Dilated cardiomyopathy
  - Congestive heart failure
  - Skin
  - Increased pigmentation (bronze, ashen-gray)
  - Endocrine
  - Testicular atrophy
  - Hypogonadism
  - Hypothyroidism

Adapted with permission: Journal of Hepatology


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**www.irondisorders.org**
HEMOCHROMATOSIS
Diagnostic Algorithm
Clinical Evaluation & Management Protocol

Adults ≥ 18 years of age & ≥ 100 lbs

**KEY ABBREVIATIONS:**
- TS% = transferrin-iron saturation percentage = serum iron/TIBC × 100%
- SF = serum ferritin
- TIBC = total iron binding capacity
- HHC = hereditary hemochromatosis
- HIC = hepatic iron content (or concentration)
- HII = hepatic iron index

**CLINICAL EVALUATION**
ALT or AST elevated or SF > 1,000 ng/mL.

- NO to ALL
- Consider trial phlebotomy; removal of >2 grams of iron without producing iron deficiency is diagnostic of non-classical HHC. In those with suspicion for other liver pathology or hepatic cirrhosis, consider liver biopsy.

- YES
  - Advise liver biopsy with quantitative iron and iron stain.
  - Patient declines liver biopsy
  - HIC ≥ 4500 mcg (80 mcmol) per gram of dry weight; HII ≥ 2 or 3–4+ iron stain
  - NO
  - NO
  - Iron overload absent. Evaluate/Manage other clinical conditions.

**Initial TS% > 55%**
No iron supplements or vitamin C for at least one week. Retest fasting TS% + SF

**Fasting TS% > 45% and SF elevated:**
- adult male > 300 ng/mL
- adult female > 200 ng/mL

- YES
  - Explain dangers of elevated iron to patient
  - Consider HFE gene test

**Positive HFE gene test**
C282Y homozygote or C282Y/H63D compound heterozygote

- NO
  - Diagnosis of classical hemochromatosis (HHC) established; consider liver biopsy to assess fibrosis if ALT or AST elevated or SF > 1000 ng/mL.
  - YES

**Start iron reduction therapy**
- Do evaluation of the liver, heart, endocrine function

**Non-classical HHC iron overload established**

- *Therapy*
  - Bi-weekly or weekly phlebotomy
  - Check hemoglobin/hematocrit prior to each phlebotomy.
  - Check SF and TS% periodically (see Phlebotomy Frequency Chart for suggestions).
  - Hydrate patient orally prior to phlebotomy.
  - Avoid overbleeding: Do not perform phlebotomy if hemoglobin is <12.5 g/dL.

**Serum Ferritin < 50 ng/mL**

- NO
  - Begin maintenance: 1 unit every 2–6 months. Maintain a SF 25–75 ng/mL and hemoglobin ≥12.5 g/dL.

- YES

**Exceptions** to pre-treatment hemoglobin of 12.5 g/dL include females, whose normal hemoglobin range begins at 12.0 g/dL. Other exceptions include patients with cirrhosis or other disorders such as sideroblastic anemia. The intent is to avoid unnecessary over-bleeding and symptoms of iron deficiency anemia. Serum ferritin should be maintained within normal limits. There is no known health benefit to below normal SF.

This algorithm is designed to be a general guideline only. Specific clinical circumstances may require modifications at the discretion of the clinician.

www.irondisorders.org
### Phlebotomy Frequency Guidelines

**For iron overload in adults without anemia**

<table>
<thead>
<tr>
<th>Hgb/Hct (hemoglobin/hematocrit)</th>
<th>SF (serum ferritin)</th>
<th>TS% (transferrin saturation percentage)</th>
<th>MCV (mean corpuscular volume of red blood cells)</th>
<th>Iron Reduction &amp; Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Elevated 1,000 ng/mL or greater</td>
<td>Elevated greater than 45%</td>
<td>Normal</td>
<td>Aggressive</td>
</tr>
<tr>
<td>Important: serum ferritin (SF) &gt; 1,000 ng/mL increases the risk of cirrhosis and liver cancer. The risk of cirrhosis is &lt;1% in patients whose SF has not been elevated above 1,000 ng/mL.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hgb/Hct (hemoglobin/hematocrit) | SF (serum ferritin) | TS% (transferrin saturation percentage) | MCV (mean corpuscular volume of red blood cells) | Management |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Elevated above Normal see ferritin reference</td>
<td>Elevated</td>
<td>Normal</td>
<td>Aggressive to Moderate</td>
</tr>
<tr>
<td>One unit (500cc) per week depending upon patient, may need to adjust to one unit every other week. Check SF &amp; TS% initially in 4-6 weeks; thereafter 3-6 mos.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>High Normal see ferritin reference</td>
<td>Elevated greater than 45%</td>
<td>Normal</td>
<td>Moderate</td>
</tr>
<tr>
<td>One unit (500cc) monthly. Check SF &amp; TS% 3-6 mos.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>Normal see ferritin reference</td>
<td>Normal 25-35%</td>
<td>Normal</td>
<td>Maintenance</td>
</tr>
<tr>
<td>Rule out non-alcoholic steatohepatitis (NASH), chronic liver disease (alcohol, hepatitis) or hyperferritinemia cataract syndrome (HFC). NASH diagnosis includes: hyperinsulinemia + hepatic iron index &gt;1.9. HFC diagnosis: ophthalmologist confirms early onset cataracts. HFC is not a condition of iron overload.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>Elevated see ferritin reference</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal or slightly Decreased</td>
</tr>
<tr>
<td>Iron avidity is a common phenomenon for hereditary hemochromatosis patient, possibly caused by abnormal shuttling of iron into plasma due to genetic makeup of the patient or a physiological response to chronic blood loss and diet modifications. Discontinue phlebotomies, check SF &amp; TS% in 3-6 mos. resume phlebotomy when SF &gt; 55 ng/mL.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below or Low Normal (10.5 to 12.0g/dL)</td>
<td>Normal or below Normal</td>
<td>Normal or slightly Decreased</td>
<td>Normal</td>
<td>Rule out Anemia of Chronic Disease (ACD). Treat underlying condition: i.e., infection, arthritis, inflammatory bowel disease, etc. Check for fever.</td>
</tr>
<tr>
<td>Below or Low Normal (10.5 to 12.0g/dL)</td>
<td>Elevated or Normal</td>
<td>Normal or slightly Decreased</td>
<td>Elevated</td>
<td>Rule out B12/folic acid deficiency with serum B12, folate and/or serum or urine methylmalonic acid (MMA &amp; UMMA) and homocysteine</td>
</tr>
</tbody>
</table>

### Resources:


### Charts provide general guidelines only.

Specific clinical circumstances may require modifications at the discretion of the clinician.
Phlebotomy Options

Charts provide general guidelines only. Specific clinical circumstances may require modifications at the discretion of the clinician.

Treatment for iron overload in those who do not have concurrent anemia is therapeutic phlebotomy. Patients should have a pre-treatment hemoglobin ≥12.5g/dL. Quantities removed by phlebotomy can vary from minimal extraction of 250cc up to large volume extraction of 600cc. Extraction continues until serum ferritin reaches 25ng/mL on one occasion but hemoglobin does not drop below normal range for age, weight or gender.

### Type of Phlebotomy

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Standard</th>
<th>Minimal Volume</th>
<th>Large Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extracted from a vein, typically the arm, using a 16 gauge needle (same as volunteer blood donation; except order is required)</td>
<td>Extracted from a vein typically the arm using a 20-22 gauge butterfly needle &amp; vacuum bag</td>
<td>Chest port surgically implanted near collar bone area</td>
<td>Double red cell apheresis (DRCA)</td>
</tr>
</tbody>
</table>

### Patient Profile & Eligibility

- Most patients who weighs more than 110 lbs and whose hemoglobin is ≥ 12.5g/dL.
- For youths, persons who are frail, small in stature or weight (less than 100 lbs) or who have coexistent illness such as heart problems.
- Uncommon; used in rare cases for adults of normal weight with vein access problems or other medical complications.
- Hemochromatosis patients who meet eligibility requirements: hemoglobin 13.5g/dL and body proportions: Males: 5’1”; 130 lbs Females: 5’5”; 150 lbs

### Duration of Procedure

- ~15-20 minutes
- ~15-20 minutes
- ~15-20 minutes
- ~40 minutes

### Volume Blood Removed

- ~450-500 cc of blood
- ~200-250 cc of blood
- ~600 cc of blood
- ~360 mL Packed Red Cells

### Iron Removed

- ~250 mgs
- ~125 mgs
- ~300 mgs
- ~410 mgs

### Comments

- Most common problems reported are underbleeding or overbleeding the patient. To lower the risk of these consequences, refer to the Phlebotomy Frequency Guidelines Chart.
- Frequency may be increased depending on patient tolerance.
- *patient may have small, inaccessible, scared or rolling veins
- *patient may be unable to tolerate standard volume of blood removal
- Serious procedure not to be considered a routine option
- DRCA is a nice option to offer HHC subjects, since it halves the number of visits to the blood center, while accomplishing nearly the same degree of iron removal. DRCA is well tolerated with few side effects, such as tingling sensation as plasma and citrate anticoagulant are returned to the body.

### TSB% = Transferrin-Iron Saturation Percentage - Serum iron/TIBC X 100%

### SF = Serum Ferritin

### TIBC = Total Iron Binding Capacity

### IMPORTANT NOTES:

1. Pre-treatment Hgb ≥12.5g/dL for most.
2. Serum ferritin (SF) and transferrin iron saturation percentage (TS%) should be checked periodically; see Phlebotomy Frequency Chart for suggestions. A complete blood count (CBC) may be done at this time to determine MCV, etc.
3. MCV will drop by 3% of baseline without causing anemia when de-ironing is achieved.
4. Some patients undergoing phlebotomy may need fluid replacement.
5. DRCA requirements: Women have smaller circulating blood volumes than men. However, the machine removes the same volume no matter what the donor gender. Therefore, to increase safety to donors, women have to be larger. Larger women have the same circulating blood volume as smaller men.
6. For patients whose initial serum ferritin is ≥1,000 ng/mL, SF should be evaluated in 4-6 weeks until SF is lowered to <750ng/mL. Thereafter, SF can be checked in 3-6 months to determine the patient’s unloading pattern. A complete blood count is also recommended during these routine evaluations.
7. Pharmacological removal of iron with desferrioxamine or deferasirox may be considered in cases where phlebotomy cannot be tolerated or may be used as an adjunct to phlebotomy. This would currently be off-label use of these drugs.
8. Treatment Centers: The US FDA has granted variances to private blood centers and The American Red Cross that allows hemochromatosis (HHC) blood to be used for transfusional purposes. The HHC blood is screened in exactly the same way as routine donor blood. Most centers with this special variance offer treatment free of charge to HHC patients; a physician’s order is required. See sample order on this page.

For a Double Red Blood Cell Apheresis order suggestions visit:
www.irondisorders.org

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**Examples of HFE Genotypes in Families with Hemochromatosis**

**Homozygote**: inherits two copies of the same mutated HFE gene.

**Heterozygote**: inherits one copy of a mutated HFE gene. Also called a carrier.

**Compound Heterozygote**: inherits two different mutated copies of the HFE gene.

### IMPORTANT NOTES:

- The inheritance pattern of classical (Type I) Hemochromatosis is autosomal, recessive.
- Everyone inherits two copies of HFE.
- Mutated copies of HFE are found primarily in Caucasians.
- Only the mutated copies C282Y and H63D are represented in this chart because these are the most important known mutations to date.
- When one parent has two mutated copies of HFE, all offspring are at least obligate carriers.
- HFE mutations are present in about 85% of Caucasians in the USA with hereditary hemochromatosis.
- HFE related iron overload is an adult onset disorder. Other genes that can cause iron overload in children are not included in this chart.
- The risk of iron loading is presently known to be greatest in men who are C282Y homozygotes.
- Heterozygotes, especially compound heterozygotes are also at increased risk of iron loading, but likelihood and severity are lower.
- Informed consent: Anyone considering genetic testing should be made aware of the potential consequences, such as possible insurance and employer discrimination or paternity identification.
- Genetic status provides no information about tissue iron levels. Clinical evaluation of serum ferritin and transferrin iron saturation percentage is one way to estimate tissue iron status.
- For more information about prevalence and penetrance of HFE, contact Iron Disorders Institute: info@irondisorders.org

<table>
<thead>
<tr>
<th>Both Parents Heterozygous for C282Y Mutation</th>
<th>Both Parents Homozygous for C282Y Mutation</th>
<th>One parent normal Other Heterozygous C282Y Mutation</th>
<th>One Parent is Heterozygous for H63D Mutation. One is a Homozygous for C282Y Mutation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children</strong></td>
<td><strong>Children</strong></td>
<td><strong>Children</strong></td>
<td><strong>Children</strong></td>
</tr>
<tr>
<td>25% chance: Normal</td>
<td>100% chance: C282Y Homozygote</td>
<td>50% chance: Normal</td>
<td>50% chance: C282Y Carrier</td>
</tr>
<tr>
<td>50% chance: C282Y Carrier</td>
<td></td>
<td>50% chance: C282Y Carrier</td>
<td>50% chance: Compound Heterozygote</td>
</tr>
<tr>
<td>25% chance: C282Y Homozygote</td>
<td></td>
<td>25% chance: Compound Heterozygote</td>
<td>50% chance: Compound Heterozygote</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Both Parents are Heterozygous for Different Mutations</th>
<th>Both Parents Homozygous for Different Mutations</th>
<th>Both Parents Compound Heterozygotes</th>
<th>One Parent Normal One Parent Compound Heterozygote</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children</strong></td>
<td><strong>Children</strong></td>
<td><strong>Children</strong></td>
<td><strong>Children</strong></td>
</tr>
<tr>
<td>25% chance: Normal</td>
<td>100% chance: Compound Heterozygote</td>
<td>50% chance: H63D Homozygote</td>
<td>50% chance: Compound Heterozygote</td>
</tr>
<tr>
<td>25% chance: H63D Carrier</td>
<td></td>
<td>50% chance: Compound Heterozygote</td>
<td>50% chance: C382Y Carrier</td>
</tr>
<tr>
<td>25% chance: C282Y Carrier</td>
<td></td>
<td>25% chance: C282Y Homozygote</td>
<td>50% chance: C382Y Carrier</td>
</tr>
<tr>
<td>25% chance: Compound Homozygote</td>
<td></td>
<td>50% chance: Compound Heterozygote</td>
<td>50% chance: C382Y Carrier</td>
</tr>
</tbody>
</table>

**GENotypes**

- **Homozygote**
- **Heterozygote**
- **Compound Heterozygote**

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Diet Recommendations for Hemochromatosis

Normally people absorb about 1 milligram of iron per day to meet body needs. Individuals with hemochromatosis can absorb from the small intestines as much as four times that amount. The body has no way of ridding itself of the extra iron. Over time the extra iron accumulates in vital organ such as the liver, joints, heart, pancreas and the pituitary resulting in disease.

For this reason, individuals with hemochromatosis must take steps to reduce the level of body iron with therapeutic phlebotomy and control iron absorption with diet modifications.

We consume two types of iron from the diet: iron in heme contained in meat and non-heme iron contained in plants and supplements. Heme iron is most easily absorbed, whereas non-heme is absorbed less well. Calcium is the only known substance that can impair the absorption of both heme and non-heme iron. Tannin (coffee, tea, chocolate), fiber, eggs and oxalates impair absorption of non-heme iron.

The following recommendations are suggestions to modify the diet for individuals with hemochromatosis. Every person is unique, which must be taken into consideration before using some of these suggested diet modifications. People with liver disease especially need to be cautious about consumption of certain foods or substances.

- Reduce consumption of red meat
  Red meat contains the most easily absorbable form of iron called heme iron.
- Avoid foods high in animal fats
  Fats (lipids) when in combination with unbound iron can generate free radical activity, which is destructive to cells and can damage DNA.
- Limit supplemental vitamin C to 200 milligrams/dose
  Vitamin C enhances iron absorption.
- If alcoholic beverages are allowed, consume in moderation
  Alcohol enhances the absorption of iron
  Too much alcohol can damage the liver
  Red wine can be of benefit when consumed in moderation because of the tannins it contains.
  Patients with elevated liver enzymes or liver damage such as cirrhosis should avoid alcohol completely.
- Avoid sugary foods or beverages
  Sugar enhances the absorption of iron.
- Consume plenty of fruits and vegetables, including spinach
  These foods contain fiber and antioxidants, which inhibit free radical production. Spinach contains oxalates which impair absorption of iron contained in this plant. Fruits and vegetables contain non-heme iron which is not absorbed well.
- Eat nuts, grains, rice and beans
  These foods are high in fiber, which impairs the absorption of non-heme iron and promote healthy digestion.
- Avoid raw shellfish if iron levels are elevated
  Shellfish can contain a bacterium called Vibrio vulnificus, which can be fatal to people with high body iron levels. Take care when walking barefoot on beaches where contaminated shells may be present.
- Tea or coffee with meals can reduce the absorption of iron
  These beverages contain tannins which inhibit the absorption of non-heme iron. Excessive consumption of tannins is not recommended for individuals with liver damage.

For a complete list of iron content in foods visit www.irondisorders.org

Meat contains about 40-50% heme iron; the balance is non-heme. The iron in plant-based foods is nearly all non-heme iron, but some plants do have traces of heme iron. These plants are not commonly consumed by humans.

Resources:
USDA National Nutrient Database
“Early detection of iron overload disease represents a major chronic disease prevention opportunity. Detection and treatment (phlebotomy) of iron overload, early in the course of the illness, can substantially reduce the severity of symptoms, organ damage, and death from associated chronic diseases.”

David Satcher, M.D., Ph.D.,
Former Assistant Secretary for Health and US Surgeon General

Physicians
Contact us for information about participating in our Physician’s Registry

Direct your patients to our website
www.irondisorders.org

and to our book
Iron Disorders Institute Guide to Hemochromatosis
Cumberland House Publishing 2001

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