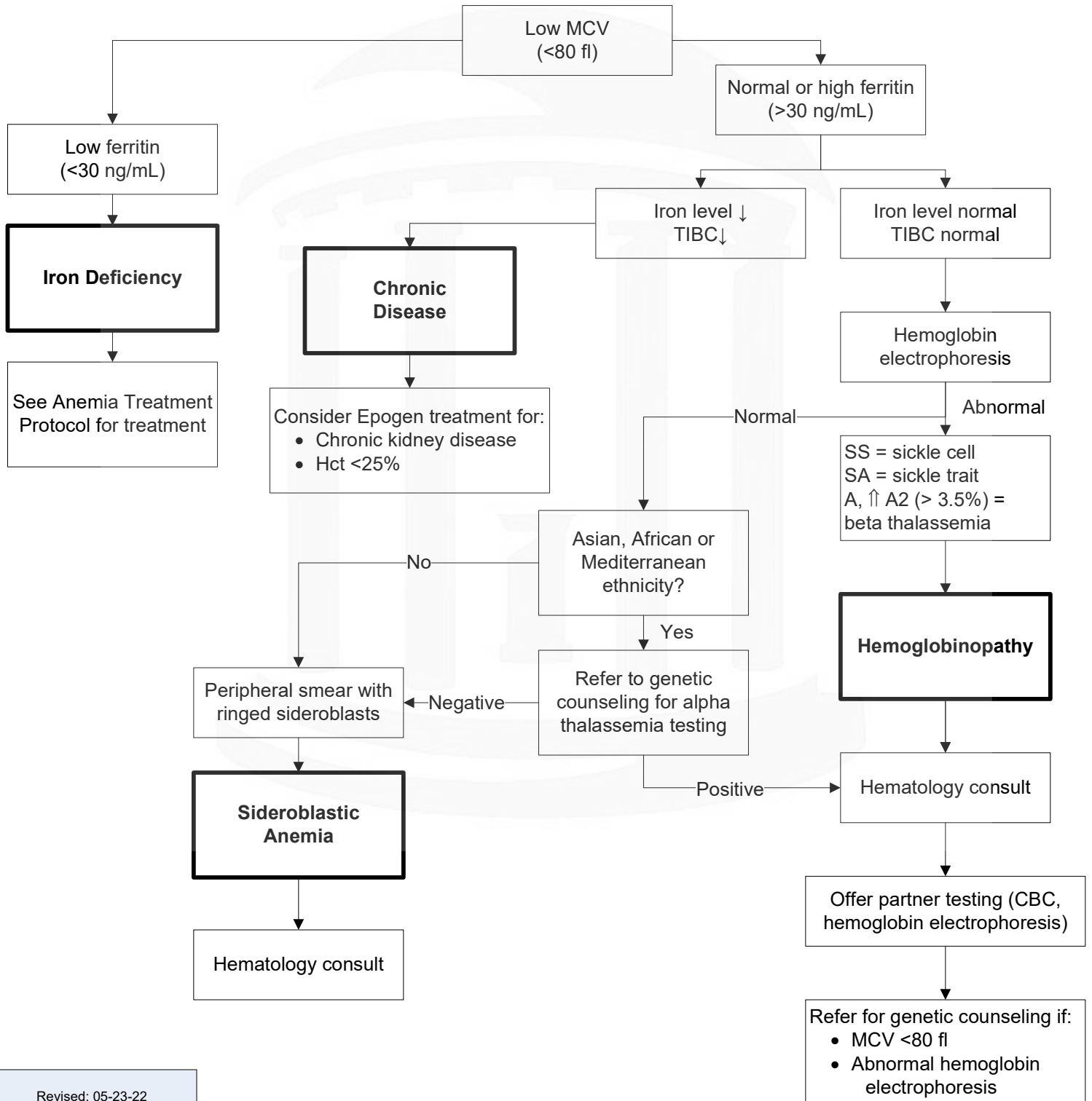# Anemia: Diagnosis
(Microcytic)

Algorithms for diagnosing anemia generally fail in
the presence of more than one cause.

Definitions:
- First and third trimesters: hematocrit < 33% OR hemoglobin <11.0 g/dL
- Second trimester: hematocrit < 32% OR Hgb <10.5 g/dL

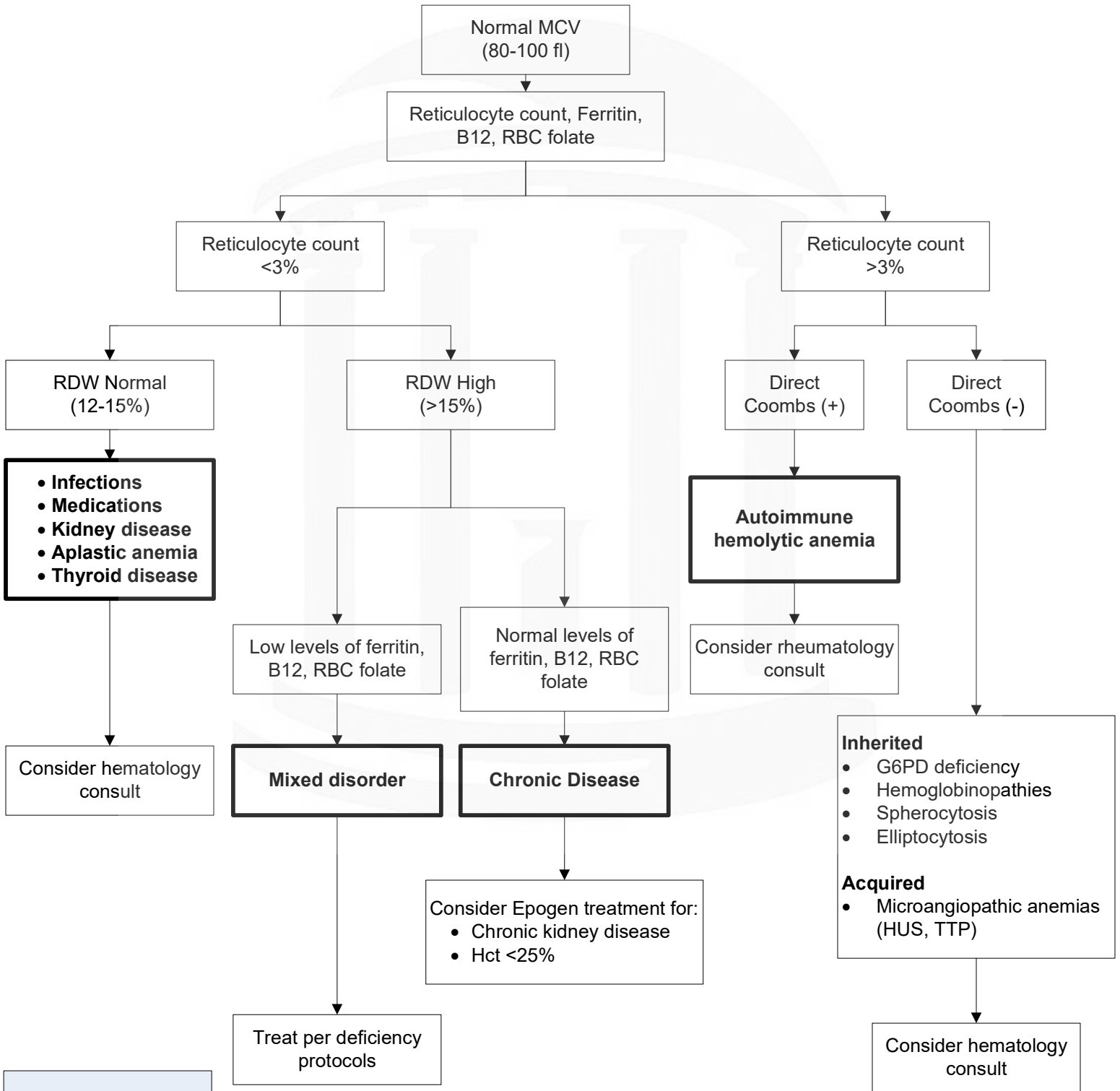Choose algorithm based on the MCV (located in the CBC result)

Low MCV
(<80 fl)

Normal or high ferritin
(>30 ng/mL)

Low ferritin
(<30 ng/mL)

Iron level ↓
TIBC↓

Iron level normal
TIBC normal

Iron Deficiency

**Chronic
Disease**

Hemoglobin
electrophoresis

See Anemia Treatment
Protocol for treatment

Consider Epogen treatment for:
- Chronic kidney disease
- Hct <25%

Normal

Abnormal

SS = sickle cell
SA = sickle trait
A, ⇑ A2 (> 3.5%) =
beta thalassemia

Asian, African or
Mediterranean
ethnicity?

No

Yes

Hemoglobinopathy

Peripheral smear with
ringed sideroblasts

Negative

Refer to genetic
counseling for alpha
thalassemia testing

Positive

Hematology consult

**Sideroblastic
Anemia**

Hematology consult

Offer partner testing (CBC,
hemoglobin electrophoresis)

Refer for genetic counseling if:
- MCV <80 fl
- Abnormal hemoglobin
  electrophoresis

Anemia: Diagnosis
(Normocytic)

Algorithms for diagnosing anemia generally fail in
the presence of more than one cause.

Definitions:
- First and third trimesters: hematocrit < 33% OR hemoglobin <11.0 g/dL
- Second trimester: hematocrit < 32% OR Hgb <10.5 g/dL

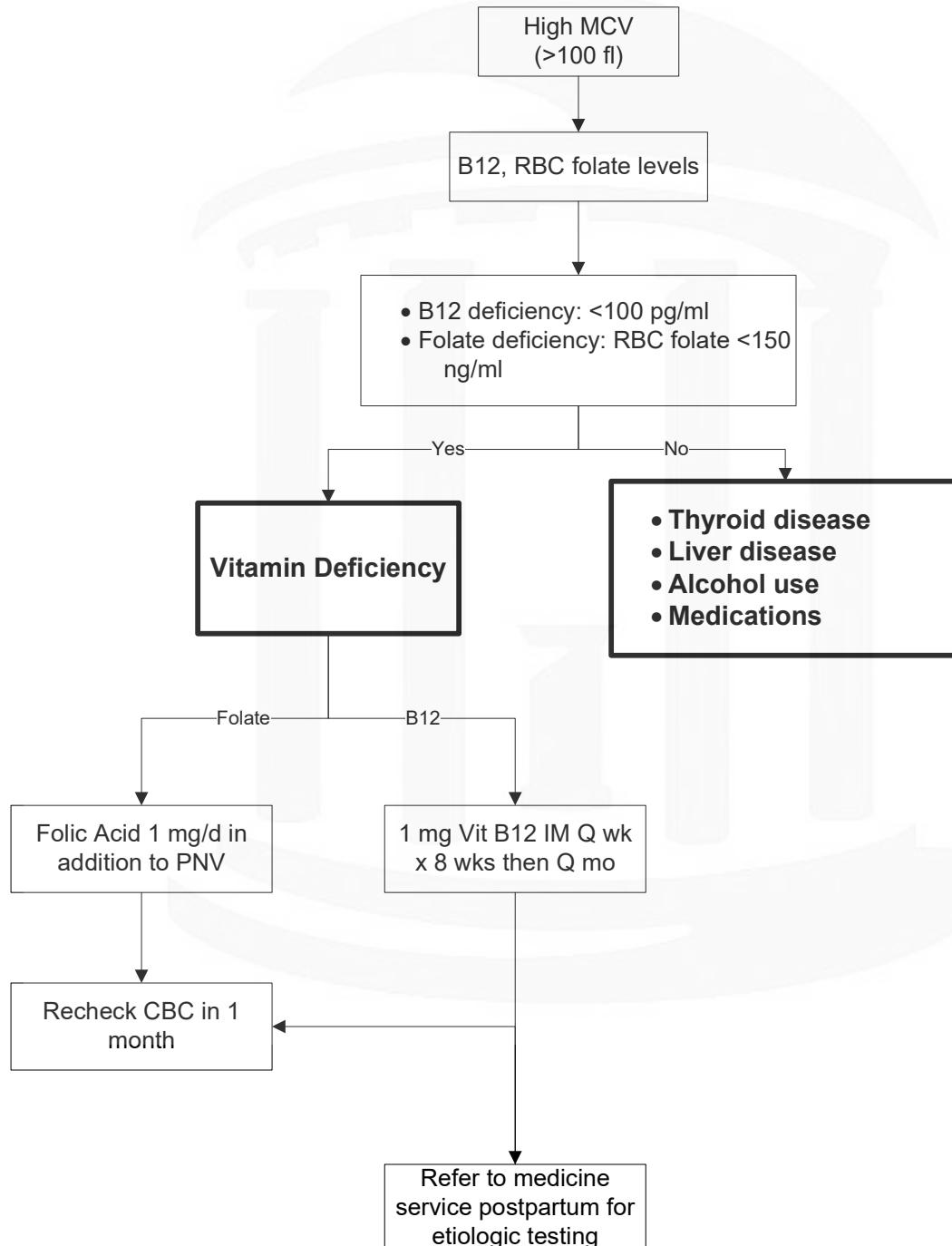Choose algorithm based on the MCV (located in the CBC result)

Normal MCV
(80-100 fl)

Reticulocyte count, Ferritin,
B12, RBC folate

Reticulocyte count
<3%

Reticulocyte count
>3%

RDW Normal
(12-15%)

RDW High
(>15%)

Direct
Coombs (+)

Direct
Coombs (-)

- **Infections**
- **Medications**
- **Kidney disease**
- **Aplastic anemia**
- **Thyroid disease**

Low levels of ferritin,
B12, RBC folate

Normal levels of
ferritin, B12, RBC
folate

**Autoimmune
hemolytic anemia**

Consider hematology
consult

Consider rheumatology
consult

Mixed disorder

Chronic Disease

Inherited
- G6PD deficiency
- Hemoglobinopathies
- Spherocytosis
- Elliptocytosis

Acquired
- Microangiopathic anemias
  (HUS, TTP)

Consider Epogen treatment for:
- Chronic kidney disease
- Hct <25%

Treat per deficiency
protocols

Consider hematology
consult

Anemia: Diagnosis
(Macrocytic)
Algorithms for diagnosing anemia generally fail in
the presence of more than one cause.

Definitions:
- First and third trimesters: hematocrit < 33% OR hemoglobin <11.0 g/dL
- Second trimester: hematocrit < 32% OR Hgb <10.5 g/dL

Choose algorithm based on the MCV (located in the CBC result)

High MCV
(>100 fl)

B12, RBC folate levels

- B12 deficiency: <100 pg/ml
- Folate deficiency: RBC folate <150 ng/ml

Yes → **Vitamin Deficiency**

No →
- **Thyroid disease**
- **Liver disease**
- **Alcohol use**
- **Medications**

Folate → Folic Acid 1 mg/d in addition to PNV

B12 → 1 mg Vit B12 IM Q wk x 8 wks then Q mo

Recheck CBC in 1 month

Refer to medicine service postpartum for etiologic testing

Anemia References:

- Anemia in Pregnancy. ACOG Practice Bulletin No. 233. American College of Obstetricians and Gynecologists. **Obstet Gynecol** 2021; 138:e55-64.

- Hemoglobinopathies in Pregnancy. ACOG Practice Bulletin No. 78. American College of Obstetricians and Gynecologists. **Obstet Gynecol** 2007; 108:229-37.

- James AH. Iron Deficiency Anemia in Pregnancy. **Obstet Gynecol** 2021; 138(4):663-674.

- Sifakis S, Angelakis E, Vardaki E, Koumantaki Y, Matalliotakis I, Koumantakis E. Erythropoetin in the treatment of iron deficiency anemia during pregnancy" **Gynecol Obstet Invest** 2001; 51; 150-6. rHuEPO combined with parental iron is an effective treatment for moderate and severe anemia during pregnancy, with minimal adverse side effects.

- Braunwald E, Fauci AS, Isselbacher KJ, Kasper DL, Hauser SL, Longo DL, Jameson JL, editors. Ch 107: Megaloblastic anemia IN: Harrison's Online. The McGraw Hill Publishers; 2001-2004. Available from: http://accessmedicine.com/resourceTOC.aspx?resourceID=4. Measurement of the RBC folate level provides useful information because it is not subject to short-term fluctuations in folate intake and is better than serum folate as an index of folate stores.

- Campbell BA. Megaloblastic anemia in pregnancy. **Clin Obstet Gynecol** 1995; 38: 460. If folate deficiency is determined to be the cause of the megaloblastic anemia, then oral replacement is generally sufficient with 1 mg per day.

- Campbell BA. Megaloblastic anemia in pregnancy. **Clin Obstet Gynecol** 1995; 38: 460. If vitamin B12 deficiency is confirmed, parenteral therapy should begin with 1000 ug cyanocobalamin given once a week for 8 weeks followed by monthly injections.

- Means RT et al. Diagnostic Approach to Anemia in Adults, in UptoDate® May, 2022.

NOTIFICATION TO USERS