

Anemia Testing

[Click here for topics associated with this algorithm](#)

INDICATIONS FOR TESTING
Fatigue, weakness, pallor, dizziness, fainting

ORDER

- CBC with Platelet Count and Automated Differential (including RBC indices and morphology on manual differential)
- Reticulocytes, Percent & Number

Anemia present on CBC (males Hgb <13g/dL, females Hgb <12g/dL)
AND
Corrected reticulocyte index ≥2.5

No Yes

Classify by RBC indices

Fragmented cells on peripheral smear

Normocytic, normochromic (normal MCV, MCHC) (suggests hypoproliferation)

Microcytic, hypochromic (low MCV, MCHC) (suggests maturation defects)

Macrocytic (high MCV) (suggests maturation defects)

No

Yes (suggests hemolysis)

- Bone marrow disorder (eg, infiltration, aplasia)
- Inflammation
- Autoimmune disease
- Chronic renal disease
- Critical illness
- Chronic endocrine disorders
- Aplastic anemia, pure red cell aplasia

- Iron deficiency
- Chronic disease
- Thalassemia – see Hemoglobinopathies topic
- Sideroblastic anemia
- Lead toxicity

- B₁₂ deficiency, (rarely folate deficiency) – see Megaloblastic Anemia Testing Algorithm
- Drugs
- Excessive alcohol use
- Hypothyroidism
- Myelodysplasia – see Myelodysplastic Syndromes Consult topic

Suggests acute blood loss (eg, hemorrhage)

- See the following Consult topics based on presentation
- Hemolytic Anemias
 - Thrombotic Microangiopathies
 - HELLP Syndrome
 - Cold Agglutinin Disease
 - Paroxysmal Nocturnal Hemoglobinuria
 - Unstable Hemoglobinopathies
 - Disseminated Intravascular Coagulation

Abnormal peripheral smear

Abnormal peripheral smear

ORDER

- Iron and Iron Binding Capacity
- Ferritin

No

Yes

No

High TIBC
Low iron
Low ferritin

Low/normal TIBC
Normal/high ferritin
Low/normal iron

Workup based on smear characteristics

Vitamin B₁₂ & Folate

Iron deficiency anemia

- Suggests
- Inflammation
 - Chronic disease
 - Thalassemia

Bone marrow biopsy may be necessary

If no obvious chronic disease present, consider bone marrow biopsy; for Thalassemia suspicion, consider hemoglobin electrophoresis

Abbreviations and Formula

MCV = mean cell volume
MCHC = mean cell hemoglobin concentration
TIBC = total iron binding capacity

Reticulocyte correction for anemia:

$$\text{ReticCount\%} \times \frac{\text{Hgb}}{\text{Htc}} \times \frac{1}{\text{Maturation time correction (use 2\% for most patients)}}$$