Laboratory Evaluation of Anemia in Adults
Washington State Clinical Laboratory Advisory Council

Establish that anemia is present after correlation with history and physical exam:

<table>
<thead>
<tr>
<th>Hemoglobin</th>
<th>Hematocrit</th>
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<tbody>
<tr>
<td>Female:</td>
<td>Male:</td>
</tr>
<tr>
<td>&lt;12 gm/dl</td>
<td>&lt;13 gm/dl</td>
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<tr>
<td>&lt;35 L/L</td>
<td>&lt;40 L/L</td>
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If peripheral smear is not available OR No specific definitive diagnostic findings present

Peripheral Smear Review

Erythrocyte Indicies

Specific definitive diagnostic findings/clues present, e.g. HgbS, C crystals, schistocytes, evidence of myeloproliferative disorders, myelofibrosis, early release of reticulocytes.

Perform appropriate confirmatory tests

Ferritin

normal/high

Serum Iron

normal/high

normal/low

TIBC

normal

low

% Saturation

normal

low

FEP (optional)

normal

high

MCV <80 fL

MCV (80 - 100 fL)

MCV >100 fL (see reverse side)

Reticulocytes

Increased

Normal or Decreased

Hemolytic Anemia

Post-hemorrhagic Anemia

Screen for renal, hepatic and endocrine disease

Serum Iron

Normal or High

Low

Endocrine Disease

Anemia of Renal Disease

Anemia of Liver Disease

Negative Screens

Bone Marrow Aspiration & Biopsy

Anemia of chronic disorders

Early iron deficiency

Hypoplastic Anemia

Infiltration

Dyserythropoietic Anemia

Masked Megaloblastic Anemia

Myelodysplastic Anemia

-Leukemia

-Myeloma

-Myelofibrosis

-Metastases

Heterozygous Thalassemia (perform hemoglobin electrophoresis, BCB & Hgb A2)

Suspect inflammation - corroborate by patient history

Iron deficiency anemia (look for source of bleeding)

Consider bone marrow examination

Hemoglobinopathy or Thalassemia (perform hemoglobin electrophoresis, BCB & Hgb A2)

FOR EDUCATIONAL PURPOSES ONLY

The individual clinician is in the best position to determine which tests are most appropriate for a particular patient.
Artifactual macrocytosis, determined by automated counters, may be caused by cold agglutinins, hyperglycemia, marked leukocytosis, RBC clumping, intracellular hypersensitivity.

Some drugs that may cause macrocytosis: alcohol, chemotherapy drugs, zidovudine, anticonvulsants, oral contraceptives, triamterene, sulfasalazine, sulfamethoxazole, trimethoprim, colchicine, PASA, neomycin, nitrous oxide.

Rule out drug exposure

Reticulocyte Count

Normal or Increased

Suspect early release of reticulocytes as in hemolysis, bleeding or hematologic malignancy.

Normal or Decreased

B₁₂ / Folate

Normal

Consider bone marrow aspirate / biopsy, cytogenetics

Low

Evaluate appropriately

Consider:
- Alcoholism
- Hypothyroidism
- Pernicious Anemia
- Dietary Deficiency
- Malabsorption
- Pregnancy
- Drugs

Primary marrow disorders - Myelodysplasia, Aplastic Anemia

If marrow is normal, consider rarer causes

Abbreviations:
FEP: Free Erythrocyte Protoporphyrin
MCV: Mean Corpuscular Volume
BCB: Brilliant Cresyl Blue

MCV >100 fL **
(continued from reverse side)

References:

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