Hematology
Certification Examination Blueprint

Purpose of the exam

The exam is designed to evaluate the knowledge, diagnostic reasoning, and clinical judgment skills expected of the certified hematologist in the broad domain of the discipline. The ability to make appropriate diagnostic and management decisions that have important consequences for patients will be assessed. The exam may require recognition of common as well as rare clinical problems for which patients may consult a certified hematologist.

Exam content

Exam content is determined by a pre-established blueprint, or table of specifications. The blueprint is developed by ABIM and is reviewed annually and updated as needed for currency. Trainees, training program directors, and certified practitioners in the discipline are surveyed periodically to provide feedback and inform the blueprinting process.

The primary medical content categories of the blueprint are shown below, with the percentage assigned to each for a typical exam:

<table>
<thead>
<tr>
<th>Medical Content Category</th>
<th>% of Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematopoietic System</td>
<td>25%</td>
</tr>
<tr>
<td>Coagulation</td>
<td>27%</td>
</tr>
<tr>
<td>Hematologic Neoplastic Disorders</td>
<td>35%</td>
</tr>
<tr>
<td>Transfusion Medicine</td>
<td>5%</td>
</tr>
<tr>
<td>Hematopoietic Cell Transplantation (HCT)</td>
<td>8%</td>
</tr>
</tbody>
</table>

Exam questions in the content areas above may also address topics related to pregnancy and contraception that are important to the practice of hematology (approximately 4% of the exam).
Exam format

The exam is composed of multiple-choice questions with a single best answer, predominantly describing patient scenarios. Questions ask about the work done (that is, tasks performed) by physicians in the course of practice:

- Making a diagnosis
- Ordering and interpreting results of tests
- Recommending treatment or other patient care
- Assessing risk, determining prognosis, and applying principles from epidemiologic studies
- Understanding the underlying pathophysiology of disease and basic science knowledge applicable to patient care

Clinical information presented may include patient photographs, radiographs, photomicrographs, and other media to illustrate relevant patient findings.

A tutorial including examples of ABIM exam question format can be found at [http://www.abim.org/certification/exam-information/hematology/exam-tutorial.aspx](http://www.abim.org/certification/exam-information/hematology/exam-tutorial.aspx).

The blueprint can be expanded for additional detail as shown below. Each of the medical content categories is listed there, and below each major category are the content subsections and specific topics that may appear in the exam. Please note: actual exam content may vary.

<table>
<thead>
<tr>
<th>Hematopoietic System</th>
<th>25% of Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal hematopoiesis</td>
<td>&lt;2%</td>
</tr>
<tr>
<td>Disorders of red blood cells or iron</td>
<td>21%</td>
</tr>
<tr>
<td>Red blood cell production disorders</td>
<td>4%</td>
</tr>
<tr>
<td>Nutritional deficiencies</td>
<td></td>
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<tr>
<td>Anemia of chronic inflammation</td>
<td></td>
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<tr>
<td>Red cell aplasia and hypoplasia</td>
<td></td>
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<tr>
<td>Sideroblastic anemia</td>
<td></td>
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<tr>
<td>Red blood cell destruction disorders</td>
<td>15%</td>
</tr>
<tr>
<td>Thalassemias</td>
<td></td>
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<tr>
<td>Alpha thalassemia</td>
<td></td>
</tr>
<tr>
<td>Beta thalassemia</td>
<td></td>
</tr>
<tr>
<td>Hemoglobin E disorders</td>
<td></td>
</tr>
<tr>
<td>Sickle cell disorders</td>
<td>4.5%</td>
</tr>
<tr>
<td>Sickle cell trait</td>
<td></td>
</tr>
</tbody>
</table>
Sickle cell anemia (hemoglobin SS disease)
Hemoglobin SC disease and C hemoglobinopathy
Sickle cell-β<sup>0</sup> and sickle cell-β<sup>+</sup>-thalassemias
Non-sickle hemoglobinopathies
Autoimmune hemolytic anemias (AIHA)
  Warm antibody-mediated autoimmune hemolytic anemia
  Cold antibody-mediated autoimmune hemolytic anemia
  Drug-induced hemolysis
Metabolic abnormalities and enzyme deficiency hemolytic anemias
  Oxidant hemolysis, including glucose-6-phosphate dehydrogenase (G6PD) deficiency
  Pyruvate kinase deficiency and other metabolic deficiencies
Paroxysmal nocturnal hemoglobinuria
Red blood cell membrane disorders
Microangiopathic hemolytic anemias
  (other than TTP, HUS, or DIC)
Non-autoimmune, acquired hemolytic anemias
  Erythrocytosis
  Porphyrias
  Hemochromatosis

**White blood cell disorders**  
  <2%
  Granulocyte disorders
    Quantitative granulocyte disorders
    Qualitative granulocyte disorders
  Lymphocytopenia and lymphocyte dysfunction syndromes
  Leukocytosis
  Eosinophilia
  Hemophagocytic syndromes

**Bone marrow failure syndromes**  
  2%
  Aplastic anemia
    Inherited aplastic anemia
    Acquired aplastic anemia
  Pancytopenia

<table>
<thead>
<tr>
<th>Coagulation</th>
<th>27% of Exam</th>
</tr>
</thead>
</table>
| **Platelet and megakaryocyte disorders** | 7%
  Inherited disorders of platelet function
  Acquired disorders of platelet function
    Drug-induced disorders
    Non-drug-induced disorders |
Thrombocytopenia
   - Inherited thrombocytopenia
   - Acquired thrombocytopenia
      - Immune thrombocytopenic purpura (ITP)
      - Drug-induced thrombocytopenia
      - Thrombotic thrombocytopenic purpura (TTP)
      - Hemolytic uremic syndrome (HUS)
      - Thrombocytopenia secondary to liver Disease and splenic disorders

Thrombocytosis

Hemostasis
   - Molecular basis of coagulation and hemostatic agents
      - Normal hemostasis
      - Laboratory evaluation
      - Hemostatic drugs
   - Inherited bleeding disorders (non-platelet)
      - Von Willebrand disease
         - Types 1, 2A, 2M, 2N, and 3
         - Type 2B
         - Modifiers of von Willebrand factor levels
      - Hemophilias A and B
         - Hemophilia A
         - Hemophilia B
      - Factor XI deficiency
      - Factor deficiencies other than factor XI
   - Inherited vascular abnormalities
   - Acquired bleeding disorders (non-platelet)
      - Factor inhibitors
      - Disseminated intravascular coagulation (DIC)
      - Acquired vascular abnormalities
      - Secondary acquired factor deficiencies

Thrombosis
   - Molecular basis of natural anticoagulants, fibrinolytic pathway, and anticoagulant therapy
      - Normal anticoagulant and fibrinolytic mechanisms
      - Laboratory evaluation
      - Anticoagulant drugs
   - Thrombotic disorders
      - Inherited thrombotic disorders
         - Factor V Leiden and prothrombin G20210A
Deficiencies of natural anticoagulants (antithrombin, proteins C and S)
Hyperhomocysteinemia
Acquired thrombotic disorders
Heparin-induced thrombocytopenia (HIT)
Anti-phospholipid antibody syndrome (APS)
Cancer-related thrombotic disorders
Thromboembolism at unusual sites
Thrombosis management (non-disease-specific)
Complications of thrombotic disorders

<table>
<thead>
<tr>
<th>Hematologic Neoplastic Disorders</th>
<th>35% of Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Myeloproliferative neoplasms</strong></td>
<td>4.5%</td>
</tr>
<tr>
<td>Chronic myeloid leukemia</td>
<td></td>
</tr>
<tr>
<td>Polycythemia vera and secondary erythrocytosis</td>
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<tr>
<td>Primary myelofibrosis</td>
<td></td>
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<tr>
<td>Essential thrombocythemia</td>
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<tr>
<td>Mastocytosis</td>
<td></td>
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<tr>
<td>Chronic neutrophilic leukemia</td>
<td></td>
</tr>
<tr>
<td><strong>Acute leukemias and myelodysplasia</strong></td>
<td>8%</td>
</tr>
<tr>
<td>Acute promyelocytic leukemia</td>
<td></td>
</tr>
<tr>
<td>Acute myeloid leukemia (non-promyelocytic)</td>
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<tr>
<td>Therapy-related myeloid neoplasms</td>
<td></td>
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<tr>
<td>Myeloid sarcoma/extramedullary leukemia</td>
<td></td>
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<tr>
<td>Myelodysplastic syndromes</td>
<td></td>
</tr>
<tr>
<td>Chronic myelomonocytic leukemia and myelodysplastic/myeloproliferative neoplasm overlap syndromes</td>
<td></td>
</tr>
<tr>
<td>B-cell acute lymphoblastic leukemia/lymphoma (B-ALL)</td>
<td></td>
</tr>
<tr>
<td>T-cell acute lymphoblastic leukemia/lymphoma (T-ALL)</td>
<td></td>
</tr>
<tr>
<td><strong>B-cell neoplasms</strong></td>
<td>13%</td>
</tr>
<tr>
<td>Chronic lymphoid leukemias</td>
<td></td>
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<tr>
<td>Chronic lymphocytic leukemia/small lymphocytic lymphoma</td>
<td></td>
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<tr>
<td>Monoclonal B-cell lymphocytosis</td>
<td></td>
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<tr>
<td>Hairy cell leukemia</td>
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<tr>
<td>Plasma cell neoplasms</td>
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<tr>
<td>Multiple myeloma</td>
<td></td>
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<tr>
<td>Plasmacytomas</td>
<td></td>
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<tr>
<td>Amyloidosis</td>
<td></td>
</tr>
</tbody>
</table>
Castleman disease and POEMS syndrome
   (polyneuropathy, organ enlargement, endocrinopathy,
   Monoclonal plasma-proliferative disorder, skin changes)
Monoclonal gammopathy of undetermined
   significance (MGUS)
Non-Hodgkin lymphomas, B-cell
   7%
   Diffuse large B-cell lymphoma
   Follicular lymphoma
   Mantle cell lymphoma
   Marginal zone B-cell and mucosa-associated
   lymphoid tissue (MALT) lymphomas
   Burkitt and Burkitt-like lymphomas
   Primary central nervous system lymphoma
   Lymphoplasmacytic lymphoma
General lymphoma issues (not specific to lymphoma type)
Immunodeficiency-associated lymphoproliferative disorders <2%
   Post-transplantation lymphoproliferative disorders
   Lymphomas associated with human immunodeficiency
   virus (HIV) infection or primary immune disorders
   Lymphoproliferative disorders associated with iatrogenic
   immunodeficiency
T-cell and NK-cell neoplasms <2%
   Cutaneous T-cell lymphoma (mycosis fungoides and
   Sézary syndrome)
   T-cell lymphomas
   Adult T-cell leukemia/lymphoma
   Large granular lymphocyte leukemia
   Prolymphocytic leukemia
Hodgkin lymphoma 2%
   Classical Hodgkin lymphoma
   Nodular lymphocyte-predominant Hodgkin lymphoma
Histiocytic and dendritic cell neoplasms <2%
Myeloid and lymphoid neoplasms with eosinophilia and
   Abnormalities of PDGFRA, PDGFRB, or FGFR1 <2%
Complications of hematologic malignancies <2%
   Tumor lysis syndrome
   Spinal cord compression
   Paraneoplastic disorders
Pharmacology 2.5%
   Toxicities and complications, including
cytopenic complications
Drug dosing and dose modifications

**Clinical trial design and interpretation**

<2%

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### Transfusion Medicine

5% of Exam

**Clinical indications for the use of blood products**

<2%

- Red blood cell preparations
- Platelet preparations
- Fresh frozen plasma
- Cryoprecipitate

**Risks associated with blood products**

4%

- Risks associated with administration
  - Allergic reactions
    - Nonanaphylactic allergic reactions
    - IgA deficiency
    - Anaphylactic reactions
  - Graft-versus-host disease
  - Electrolyte disturbances
  - Infectious organisms
  - Alloimmunizations
  - Transfusion reactions
    - Hemolytic reactions
    - Febrile reactions
    - Transfusion-related acute lung injury (TRALI)
    - Transfusion-associated circulatory overload (TACO)
  - Post-transfusion purpura and other risks associated with administration

**Management of patients who refuse transfusion**

<2%

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### Hematopoietic Cell Transplantation (HCT)

8% of Exam

**Hematopoietic cell biology and engraftment**

<2%

- Biology of hematopoietic cell transplantation
- Biologic and immunologic relationship between donor and host

**Hematopoietic cell transplantation in the management of hematologic diseases**

2%

- Autologous HCT
- Allogeneic HCT
  - Donor selection
  - Stem cell source
Conditioning regimens
   Regimen intensity
   Toxicities

Supportive care
   Preventing infectious disease
   Transfusion support, including graft compatibility and blood product issues

Graft-versus-host disease (GVHD)
   Acute GVHD
   Chronic GVHD

Other complications after hematopoietic cell transplantation
   Engraftment failure or rejection
   Infections
   Organ toxicity
   Transplant-associated thrombotic microangiopathy
   Post-transplant lymphoproliferative disorder
   Late effects

Disease relapse

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