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>

|                                           | 100%      |

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>
</tr>
<tr>
<td>Anemia of chronic inflammation</td>
<td></td>
</tr>
<tr>
<td>Red cell aplasia and hypoplasia</td>
<td></td>
</tr>
<tr>
<td>Sideroblastic anemia</td>
<td></td>
</tr>
<tr>
<td>Red blood cell destruction disorders</td>
<td>15%</td>
</tr>
<tr>
<td>Thalassemias</td>
<td></td>
</tr>
<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-β⁰ and sickle cell-β⁰-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>
<tbody>
<tr>
<td><strong>Platelet and megakaryocyte disorders</strong></td>
<td>7%</td>
</tr>
<tr>
<td>Inherited disorders of platelet function</td>
<td></td>
</tr>
<tr>
<td>Acquired disorders of platelet function</td>
<td></td>
</tr>
<tr>
<td>Drug-induced disorders</td>
<td></td>
</tr>
<tr>
<td>Non-drug-induced disorders</td>
<td></td>
</tr>
</tbody>
</table>
Thrombocytopenia  4.5%
  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  10%
  Molecular basis of coagulation and hemostatic agents
    Normal hemostasis
    Laboratory evaluation
    Hemostatic drugs
  Inherited bleeding disorders (non-platelet)  6%
    Von Willebrand disease
      Types 1, 2A, 2M, 2N, and 3
      Type 2B
      Modifiers of von Willebrand factor levels
    Hemophilia A and B
      Hemophilia A
      Hemophilia B
    Factor XI deficiency
    Factor deficiencies other than factor XI
  Acquired bleeding disorders (non-platelet)
    Factor inhibitors
    Disseminated intravascular coagulation (DIC)
    Acquired vascular abnormalities
    Secondary acquired factor deficiencies

Thrombosis  10%
  Molecular basis of natural anticoagulants, fibrinolytic pathway, and anticoagulant therapy  5.5%
    Normal anticoagulant and fibrinolytic mechanisms
    Laboratory evaluation
    Anticoagulant drugs
  Thrombotic disorders  4.5%
    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>Myeloproliferative neoplasms</td>
<td>4.5%</td>
</tr>
<tr>
<td>Chronic myeloid leukemia</td>
<td></td>
</tr>
<tr>
<td>Polycythemia vera and secondary erythrocytosis</td>
<td></td>
</tr>
<tr>
<td>Primary myelofibrosis</td>
<td></td>
</tr>
<tr>
<td>Essential thrombocythemia</td>
<td></td>
</tr>
<tr>
<td>Mastocytosis</td>
<td></td>
</tr>
<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>
<td></td>
</tr>
<tr>
<td>Therapy-related myeloid neoplasms</td>
<td></td>
</tr>
<tr>
<td>Myeloid sarcoma/extramedullary leukemia</td>
<td></td>
</tr>
<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>
</tr>
<tr>
<td>Chronic lymphocytic leukemia/small lymphocytic lymphoma</td>
<td></td>
</tr>
<tr>
<td>Monoclonal B-cell lymphocytosis</td>
<td></td>
</tr>
<tr>
<td>Hairy cell leukemia</td>
<td></td>
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<tr>
<td>Plasma cell neoplasms</td>
<td></td>
</tr>
<tr>
<td>Multiple myeloma</td>
<td></td>
</tr>
<tr>
<td>Plasmacytommas</td>
<td></td>
</tr>
<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 lymphoma
Primary central nervous system lymphoma
Lymphoplasmacytic lymphoma (including Waldenström
macroglobulinemia)
General lymphoma issues (not specific to lymphoma type)
Immunodeficiency-associated lymphoproliferative disorders <2%
Post-transplantation lymphoproliferative disorders (solid organ transplant)
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 PDGFR A, PDGFR B, or FGFR1 <2%
Complications of hematologic malignancies <2%
Tumor lysis syndrome
Spinal cord compression
Paraneoplastic disorders
Pharmacology

Toxicities and complications, including
cytopenic complications
Drug dosing and dose modifications

Clinical trial design and interpretation

Transfusion Medicine

Clinical indications for the use of blood products

Red blood cell preparations
Platelet preparations
Fresh frozen plasma
Cryoprecipitate

Risks associated with blood products

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

Hematopoietic Cell Transplantation (HCT)

Hematopoietic cell biology and engraftment

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

Hematopoietic cell transplantation in the management of
hematologic diseases

Autologous HCT
Allogeneic HCT
  Donor selection
  Stem cell source

**Conditioning regimens**  <2%
  Regimen intensity
  Toxicities

**Supportive care**  <2%
  Preventing infectious disease
  Transfusion support, including graft compatibility and blood product issues

**Graft-versus-host disease (GVHD)**  <2%
  Acute GVHD
  Chronic GVHD

**Other complications after hematopoietic cell transplantation**  <2%
  Engraftment failure or rejection
  Infections
  Organ toxicity
  Transplant-associated thrombotic microangiopathy
  Post-transplant lymphoproliferative disorder
  Late effects

**Disease relapse**  <2%

July 2019