Pulmonary Disease
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 pulmonologist 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 pulmonologist.

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>Obstructive Lung Disease</td>
<td>17.5%</td>
</tr>
<tr>
<td>Critical Care Medicine</td>
<td>15%</td>
</tr>
<tr>
<td>Diffuse Parenchymal Lung Disease (DPLD)</td>
<td>10%</td>
</tr>
<tr>
<td>Sleep Medicine, Neuromuscular and Skeletal</td>
<td>10%</td>
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<tr>
<td>Epidemiology</td>
<td>2%</td>
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<tr>
<td>Infections</td>
<td>12%</td>
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<tr>
<td>Neoplasia</td>
<td>9.5%</td>
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<tr>
<td>Pleural Disease</td>
<td>5%</td>
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<tr>
<td>Quality, Safety, and Complications</td>
<td>5%</td>
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<tr>
<td>Transplantation</td>
<td>2%</td>
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<tr>
<td>Vascular Diseases</td>
<td>6%</td>
</tr>
<tr>
<td>Respiratory Physiology and Pulmonary Symptoms</td>
<td>4%</td>
</tr>
<tr>
<td>Occupational and Environmental Diseases</td>
<td>2%</td>
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<td></td>
<td>100%</td>
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</tbody>
</table>
Exam questions in the content areas above may also address clinical topics in general internal medicine that are relevant to the practice of pulmonary medicine.

**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, electrocardiograms, recordings of heart or lung sounds, video, and other media to illustrate relevant patient findings. It is possible to enlarge (“zoom”) most radiographic and histologic images.


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>Obstructive Lung Disease</th>
<th>17.5% of Exam</th>
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<tbody>
<tr>
<td><strong>Asthma</strong></td>
<td>9%</td>
</tr>
<tr>
<td>Pathophysiology and diagnosis of asthma</td>
<td></td>
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<tr>
<td>Genetics</td>
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<tr>
<td>Epidemiology</td>
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<tr>
<td>Biology</td>
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<tr>
<td>Evaluation (bronchodilator responses and provocative challenge)</td>
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<tr>
<td>Severity and stepped care</td>
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<tr>
<td>Mild to moderate</td>
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<tr>
<td>Severe</td>
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</tbody>
</table>
Asthma in pregnancy
Perioperative care
Complications of care
Special types and phenotypes of asthma
Aspirin-sensitive asthma
Exercise-induced asthma
Eosinophilic TH2-high asthma
Cough variant asthma and other special types
Asthma mimics
Paradoxical vocal fold motion (Inducible laryngeal obstruction)
Genetic (cystic fibrosis, alpha-1 antitrypsin disease, primary ciliary dyskinesia) and nongenetic
Hypereosinophilic Löffler's syndrome and other parasitic infections
Infiltrative airway processes (granulomatous, amyloidosis, and other processes)
Heart failure
Central airway obstruction
Exacerbation
Status asthmaticus
Viral infections, allergens, and other causes
Allergic bronchopulmonary aspergillosis and fungosis
Eosinophilic granulomatosis with polyangiitis

**Chronic obstructive pulmonary disease (COPD)**

6.5%

Pathophysiology and diagnosis of COPD
Genetics
Epidemiology
Biology
Evaluation (guidelines, physiology of airflow, and imaging)

Management of chronic stable disease
Pharmaceutical therapies
Nonpharmaceutical therapies (rehabilitation, oxygen, palliation, and other therapies)
Operative and bronchoscopic procedures
Preoperative assessment and perioperative management
Comorbidities (vascular disease, lung cancer, and other conditions)

Exacerbation of COPD
Pharmaceutical therapies
Nonpharmaceutical therapies (noninvasive positive-pressure ventilation [NIPPV] and mucociliary clearance)
Prevention of exacerbations
Mimics (heart failure and pulmonary embolism)

**Obstructive, other than asthma and COPD 2%**
- Cystic fibrosis (CF)
  - Pathophysiology
  - Airway clearance
- Non-CF bronchiectasis and issues other than infection
- Central airway obstruction

<table>
<thead>
<tr>
<th>Critical Care Medicine</th>
<th>15% of Exam</th>
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<tbody>
<tr>
<td><strong>Assessment and monitoring</strong></td>
<td>2%</td>
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<tr>
<td>Outcomes prediction including prognostic scoring systems</td>
<td></td>
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<tr>
<td>Assessment for agitation, cognitive impairment, and delirium</td>
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<tr>
<td>Cardiovascular assessment and monitoring</td>
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<tr>
<td>Critical care ultrasound</td>
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<tr>
<td>Determination of brain death</td>
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<tr>
<td><strong>Therapeutics</strong></td>
<td>4%</td>
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<tr>
<td>Airway management in respiratory failure</td>
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<tr>
<td>Assisted ventilation</td>
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</tbody>
</table>
  - Invasive mechanical ventilation |
  - Noninvasive mechanical ventilation |
  - Extracorporeal membrane oxygenation and CO₂ removal |
  - Weaning from mechanical ventilator support |
| Sedation, analgesia, and neuromuscular blockade |
| Blood component replacement |
| Enteral and parenteral nutrition (including feeding tubes) |
| Early mobilization and rehabilitation |
| Cardiopulmonary resuscitation and brain protective strategies |
| Indications for renal replacement therapy |
| Management of potential organ donors |
| **Prevention and management of complications** | 2.5% |
| Catheter-associated complications |
| Ventilator-associated complications |
| Acquired coagulation disorders |
| Acquired gastroduodenal stress ulcers, ileus, and diarrhea |
| Aspiration |
| Acquired neuromuscular weakness |
Respiratory Failure 4%

Acute respiratory distress syndrome
Other hypoxemic respiratory failure (e.g., e-cigarette and vaping-associated lung injury
Respiratory failure complicating airway obstruction
  Asthma
  COPD
  Central airway obstruction
Hypercapnic respiratory failure
Massive hemoptysis and diffuse alveolar hemorrhage
Respiratory failure related to COVID-19

Nonrespiratory critical care 2.5%

Shock
  Septic shock
  Cardiogenic shock
  Hypovolemic and distributive shock
    Hypovolemic shock
    Anaphylaxis and drug-induced shock
    Hemorrhagic shock (non-pulmonary hemorrhage)
Cardiovascular critical care
  Acute coronary syndromes
  Acute heart failure
  Tachyarrhythmias and bradyarrhythmias
  Hypertensive and other vascular emergencies
Neurologic critical care
  Acute liver failure and other acute abdominal processes
  Acute renal failure
  Severe, acute endocrine and metabolic disorders
  Coagulopathies
  Hypothermia and hyperthermia
Toxicology

Diffuse Parenchymal Lung Disease (DPLD) 10% of Exam

Interstitial lung disease (ILD) associated with systemic inflammatory disease 2.5%
  Connective tissue disease (CTD)—associated ILD
    Rheumatoid arthritis
    Systemic sclerosis
    Polymyositis, dermatomyositis, and anti-synthetase syndromes
    Sjogren syndrome


Systemic lupus erythematosus
Other connective tissue diseases
Inflammatory bowel disease–associated ILD
IgG4-related disease and other diseases

**Idiopathic interstitial pneumonias** 3.5%
- Acute interstitial pneumonia
- Cryptogenic organizing pneumonia
- Desquamative interstitial pneumonia
- Idiopathic pulmonary fibrosis
- Lymphocytic interstitial pneumonia (LIP)
- Nonspecific interstitial pneumonia
- Respiratory bronchiolitis–associated ILD
- Acute and chronic eosinophilic pneumonias
- Idiopathic pleuropulmonary fibroelastosis and other conditions

**Granulomatous interstitial lung diseases** 2%
- Sarcoidosis
  - Pulmonary
  - Extrapulmonary
- Hypersensitivity pneumonitis
- Granulomatous lymphocytic ILD and other

**Diffuse cystic lung diseases (DCLDs)** <2%
- Lymphangioleiomyomatosis
- Langerhans cell histiocytosis
- Birt-Hogg-Dube syndrome
- Follicular bronchiolitis and cystic LIP
- Light-chain deposition disease, neurofibromatosis, Marfan syndrome, and other DCLDs

**Radiation induced pneumonitis and fibrosis** <2%

**Drug-induced interstitial lung disease**

**Pulmonary alveolar proteinosis**

**Constrictive bronchiolitis (idiopathic and toxic exposure-induced)**

**Genetic and other rare interstitial lung diseases**

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**Sleep Medicine, Neuromuscular and Skeletal** 10% of Exam

**Sleep, Respiratory** 6.5%
- Central sleep apnea
- Altitude
- Cheyne-Stokes breathing
Other sleep, respiratory topics (idiopathic, pathophysiology)
Evaluation
Normal Physiology, sleep and respiration
Obstructive sleep apnea
Pathophysiology
Evaluation
Therapy
Outcomes
Procedures
Polysomnography
Home sleep apnea testing
Multiple Sleep Latency Test (MSLT) and Maintenance of Wakefulness Test (MWT)

Sleep, Nonrespiratory <2%
Insomnia
Narcolepsy
Periodic limb movement disorder
Restless legs syndrome
Interactions of cardiopulmonary disease and sleep

Hypoventilation 2.5%
Chest wall and skeletal
Obesity
Neuromuscular disease
Ventilatory control

<table>
<thead>
<tr>
<th>Epidemiology</th>
<th>2% of Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretation of clinical studies</td>
<td>&lt;2%</td>
</tr>
<tr>
<td>Study design</td>
<td></td>
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<tr>
<td>Causal inference</td>
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<tr>
<td>Sources of error</td>
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<tr>
<td>Analytic issues</td>
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<tr>
<td>Screening studies</td>
<td></td>
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<tr>
<td>Diagnostic studies</td>
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<tr>
<td>Pandemic response</td>
<td>&lt;2%</td>
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<thead>
<tr>
<th>Infections</th>
<th>12% of Exam</th>
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<tbody>
<tr>
<td>Host defense mechanisms</td>
<td>&lt;2%</td>
</tr>
<tr>
<td>Nonimmune mechanisms</td>
<td></td>
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<tr>
<td>Innate immunity</td>
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<tr>
<td>Adaptive immunity</td>
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</tbody>
</table>
Vaccination

- Pneumococcus and other bacteria (HIB, Pertussis)
- Influenza and other respiratory viruses

Common syndromes of pulmonary infection

- Upper respiratory tract infections
- Acute bronchitis
- Community-acquired pneumonia
- Aspiration, lung abscess, and anaerobic infections
- Empyema
- Nosocomial pneumonia (hospital-acquired pneumonia [HAP], healthcare-acquired pneumonia [HCAP], ventilator-associated pneumonia [VAP])
- Bronchiectasis
  - CF-related
  - Non-CF-related
- Mediastinitis

The Immunocompromised Host

- Chemotherapy-related, post-transplantation, and drug-induced
- HIV and AIDS
- Congenital and acquired immune system disorders

Major pathogens in pulmonary infection

- Pneumonia due to gram-positive bacteria
  - Pneumococcus
  - *Staphylococcus aureus*, including methicillin-resistant
  - *S. aureus* (MRSA) and community-associated
  - MRSA (CA-MRSA)
  - Other gram-positive bacteria (*Nocardia*, enterococci)
- Pneumonia due to gram-negative bacteria
  - *Pseudomonas*
  - Enterobacteriaceae
  - Other gram-negative bacteria (*Burkholderia, Legionella*)

Viruses

- Influenza
- COVID-19/SARS-CoV-2
- Cytomegalovirus infection, herpes, and varicella

- *Aspergillus* and other opportunistic fungi (*Mucor*)
- Endemic fungoses (histoplasmosis, blastomycosis, coccidioidomycosis) and cryptococcosis

Parasitic infections

- Tuberculosis (TB)
- Non-TB mycobacterial infection

Extrapulmonary Infections in the ICU

- <2%
Neoplasia

Lung cancer

- Non-small cell lung cancer
  - Diagnostic evaluation
  - Staging
    - TNM staging and noninvasive staging
    - Invasive mediastinal staging
  - Molecular markers
- Small cell lung cancer

Treatments for lung cancer

- Lung cancer requiring surgical treatment
- Lung cancer requiring nonsurgical treatment
  - (chemotherapy, radiation therapy, palliative therapy)

Other intrathoracic tumors

- Other primary lung tumors
  - Carcinoid tumors
  - Hamartoma
  - Adenoid cystic carcinoma and other primary lung tumors
- Tumors of the mediastinum
  - Thymoma
  - Lymphoma
  - Other mediastinal tumors
  - Plasmacytoma, sarcoma, and other thoracic tumors
- Metastatic disease

Malignant pleural disease

- Mesothelioma
- Malignant pleural effusion or pleural metastasis

Complications

- Paraneoplastic syndromes
- Superior vena cava syndrome

Pulmonary nodules

- Solitary pulmonary nodule
- Multiple pulmonary nodules
- Mimics of pulmonary nodules and masses

Physiologic assessment for thoracic surgery

Interventional pulmonary medicine and thoracic surgery

- Bronchoscopy, EBUS, and other interventional airway procedures
- Palliative interventions
- Video-assisted thoracoscopic surgery (VATS) and other surgery
## Lung cancer screening

<2%

### Pleural Disease

<table>
<thead>
<tr>
<th>Structure and physiology</th>
<th>&lt;2%</th>
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<tbody>
<tr>
<td>Fibrosis</td>
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<tr>
<td>Calcification</td>
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<tr>
<td>Thickening</td>
<td></td>
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<tr>
<td>Fluid dynamics</td>
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<tr>
<td>Trapped lung and lung entrapment</td>
<td></td>
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</tbody>
</table>

#### Pneumothorax

<2%

- Primary spontaneous
- Secondary
  - Parenchymal disease-related
  - Iatrogenic
  - Traumatic
  - Catamenial, familial, and other types

### Effusions and pleural pathology

2%

#### Transudative

- Hemodynamic and oncotic
- Hydrothorax
- Urinothorax and other types

#### Exudative

- Infectious
- Occupational
- Noninfectious inflammatory
- Hemorrhagic
- Chylous
- Drug-induced
- Eosinophilic

### Diagnostic and therapeutic procedures

<2%

- Thoracentesis and pleuroscopy
- Chest tubes and tunneled pleural catheters

### Quality, Safety, and Complications

5% of Exam

#### Methods of assessing quality, safety, and patient satisfaction

<2%

- Benchmarking
- Adverse event reporting
- Patient satisfaction surveys
- Root cause analysis
Failure mode and effects analysis

**Methods for improving quality and safety** <2%

**Complications of medical care** 2%
- Adverse drug effects and drug interactions
- Complications of bronchoscopy and pleural procedures
- Adverse outcomes of thoracic surgery
- Adverse effects of thoracic radiation therapy
- Complications of translaryngeal intubation and tracheostomy
- Infection control

**Ethics and professionalism (advance directives, end of life, decision-making capacity, etc.)** <2%

### Transplantation 2% of Exam

**Lung transplantation** <2%
- Patient selection
- Complications of lung transplantation
- Transplantation outcomes

**Pulmonary complications of transplantation other than lung** <2%
- Infections
- Neoplastic complications
- Other complications of organ transplantation (graft-versus-host disease)

### Vascular Diseases 6% of Exam

**Pulmonary thromboembolic disease** 2.5%
- Deep venous thrombosis
- Pulmonary thromboembolism
- Nonthrombotic pulmonary embolism
- Infectious thrombophlebitis

**Pulmonary hypertension** <2%
- Pulmonary arterial hypertension
- Chronic thromboembolic disease
- Other pulmonary hypertension related to heart or lung disease
- Right ventricular failure

**Pulmonary vasculitis and capillaritis** <2%
- Granulomatosis with polyangiitis
- Anti-glomerular basement membrane disease
- Microscopic polyangiitis and other pulmonary vasculitides

**Pulmonary vascular malformations** <2%
- Pulmonary arteriovenous malformation
<table>
<thead>
<tr>
<th>Hepatopulmonary syndrome</th>
<th>Sickle cell disease &lt;2%</th>
</tr>
</thead>
</table>

### Respiratory Physiology and Pulmonary Symptoms 4% of Exam

**Respiratory physiology** 2%
- Pulmonary mechanics
- Oxygenation
- Cardiovascular physiology
- Cardiopulmonary exercise testing
- Acid-base interpretation
- Hypercapnia and hypocapnia
- Pulmonary function testing

**Special situations** <2%
- Pregnancy
- Obesity
- Neuromuscular disease
- Preoperative evaluation (nonthoracic surgery)
- Barometric pressure-related (high altitude, diving, and other special situations)

**Approach to pulmonary symptoms** <2%
- Dyspnea
- Cough
- Chest pain
- Hemoptysis

### Occupational and Environmental Diseases 2% of Exam

**Tobacco use treatment and smoking cessation**

**Occupational asthma and work-exacerbated asthma**

**Indoor and outdoor air pollution**

**Barometric- or thermal-related disorders**

**Pneumoconioses**
- Asbestosis
- Berylliosis
- Coal-workers’ pneumoconiosis
- Hard metal pneumoconiosis
- Silicosis

**Toxic inhalations**
- E-cigarette and vaping-associated lung injury
- Carbon monoxide
- Smoke inhalation
Other toxic exposures (cobalt, dust, endotoxin, metal fume fever, organic agents)

Environmental cancer risk

July 2021