

Medical Knowledge (MK) and Patient Care (PC) curricular milestones for Pulmonary and Critical Care Medicine

This combines the curricular milestones listed separately for Pulmonary Medicine and Critical Care Medicine; where the wording of similar milestones differed between the two fields, the broader version was used.

ACGME Core Competency: Medical Knowledge
ACGME Sub-competencies:
Clinical knowledge. (MK1)
Knowledge of diagnostic testing and procedures. (MK2)
Scholarship. (MK3)
PULMONARY AND CRITICAL CARE
Fellows must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social behavioral sciences, as well as the application of this knowledge to patient care in the following areas:
1. The scientific method of problem solving.
2. Evidence-based clinical decision making.
3. The basic sciences, with particular emphasis on: <ul style="list-style-type: none"> - genetics and molecular biology as they relate to pulmonary diseases and critical illness. - developmental biology. - physiology and pathophysiology of the lungs as well as other organ systems commonly involved in critical illness (cardiovascular, renal, neurologic, gastrointestinal and hepatic). - biochemistry, cell and molecular biology and immunology, as they relate to pulmonary disease and critical illness. - principles of pharmacology and therapeutics.
4. Microbiology, pulmonary host defense, antimicrobial resistance.
5. Management of the critically ill from disasters, including those caused by chemical and biological agents.
6. The psychosocial effects of acute and chronic illness on patients and their families.
7. The ethical, economic and legal aspects of illness.
8. Nutrition in acute and chronic illness.
9. Palliative care and end-of-life transitions.
10. Disease prevention through lifestyle and environmental modifications and vaccination.
11. Principles of screening for pulmonary disease.
12. Healthcare policy and environmental policy relevant to lung disease or critical illness.
13. Study design, statistical analysis, data presentation and interpretation in published literature.
14. Formulation of original investigative questions in medical science, patient care, medical systems performance or education.
15. Participation in a mentored or collaborative project in the medical discovery, patient care, quality improvement or education.
16. Dissemination of original findings or scholarly literature review in local, regional, or national forums, as oral presentations, abstracts, or publications.
17. Physiological effects of pregnancy, sleep, aging and obesity that relate to pulmonary disease or critical illness.

ACGME Core Competency: Patient Care

ACGME Sub-competencies:

Gathers and synthesizes essential and accurate information to define each patient's clinical problem(s). (PC1)

Develops and achieves comprehensive management plan for each patient. (PC2)

Manages patients with progressive responsibility and independence. (PC3)

Skill in performing procedures. (PC4)

Requests and provides consultative care. (PC5)

PULMONARY AND CRITICAL CARE

Fellows must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of disease and the promotion of health. They must demonstrate the application of their medical knowledge to achieve competence in the practice of health promotion, disease prevention, diagnosis, care and treatment of patients of each gender, from adolescence to old age, during health and all stages of chronic, acute, or critical illness in patients with:

1. Obstructive lung diseases including:

- asthma.
- bronchitis.
- emphysema.
- cystic fibrosis.
- bronchiectasis.

2. Anatomic, developmental, and functional disorders of the airway and lung.

3. Complications of malignancy or its treatment in the critically ill patient.

4. Primary and metastatic malignancy of the lung and thorax.

5. Benign neoplasms of the lung and airways.

6. Paraneoplastic syndromes.

<p>7. Respiratory infections of the upper and lower airway, and other infections, including:</p> <ul style="list-style-type: none"> - Community-acquired, ventilator-acquired, and health-care associated pneumonias. - Lung abscess. - Parapneumonic effusions and empyema. - Epidemic lung infections. - Pneumonia or severe opportunistic infections in immunocompromised hosts. - Mediastinitis. - Meningitis and encephalitis. - Endocarditis. - Severe infections of the kidney and collecting system, skin and soft tissue, GI, bloodstream.
<p>8. Tobacco use and smoking cessation.</p>
<p>9. Diffuse parenchymal lung diseases of known etiology or idiopathic origin, primary to the lung or occurring in association with other systemic diseases, including:</p> <ul style="list-style-type: none"> - idiopathic interstitial pneumonias. - eosinophilic lung disease. - sarcoidosis.
<p>10. Sleep-disordered breathing and non-respiratory sleep disorders, including:</p> <ul style="list-style-type: none"> - central and obstructive sleep apnea. - hypoventilation syndromes. - insomnia. - narcolepsy. - restless leg syndrome.
<p>11. Lung transplantation indications, selection, pre-and post-transplant care.</p>
<p>12. Peri-operative care of hematopoietic or solid organ transplantation.</p>
<p>13. Lung or life-threatening non-pulmonary complications in recipients of non-pulmonary organ or bone marrow transplant.</p>
<p>14. Acute and chronic venous thromboembolic disease.</p>
<p>15. Pulmonary arterial hypertension due to primary and secondary causes.</p>
<p>16. Pulmonary and critical care manifestations of hematologic diseases.</p>
<p>17. Pulmonary hemorrhage.</p>
<p>18. Occupational and environmental diseases of the airways and lung parenchyma including:</p> <ul style="list-style-type: none"> - occupational asthma. - hypersensitivity pneumonitis. - pneumoconiosis.

19. Diseases due to alterations in barometric pressure, including: <ul style="list-style-type: none"> - altitude. - diving. - applications of hyperbaric therapy.
20. Acute and chronic aspiration syndromes, including foreign bodies.
21. Pleural effusions, including: <ul style="list-style-type: none"> - transudates. - exudates. - empyemas. - malignancy. - hemothorax. - chylothorax.
22. Pneumothorax, including: <ul style="list-style-type: none"> - iatrogenic. - spontaneous. - disease-associated.
23. Diseases of the chest wall or respiratory muscles including: <ul style="list-style-type: none"> - neuropathies. - myopathies. - muscular dystrophies. - phrenic nerve dysfunction. - chest wall trauma or deformities.
24. Respiratory failure due to: <ul style="list-style-type: none"> - obstructive lung disease. - parenchymal lung disease. - neuromuscular disorders. - disorders of central drive or chest wall. - benign and malignant neoplasms of the lung and airways.
25. Need for sedative, analgesic and paralytic agents.
26. Acute respiratory distress syndrome.
27. Sepsis and septic shock.
28. Shock from hypovolemic, cardiogenic, obstructive, and distributive causes.
29. Acute coronary syndromes.
30. Recognition and management of life-threatening arrhythmias.
31. Need for resuscitation from cardiac arrest and post-arrest management.
32. Right and/or left heart failure.
33. Acute and chronic cardiac valvular disorders.
34. Hypertensive crisis.
35. Pain, delirium, or anxiety associated with critical illness.
36. Neuropathies and myopathies of critical illness.
37. Coma.
38. Status epilepticus.

39. Intracranial hemorrhage and infarction.
40. Brain death and organ donation.
41. Renal disorders in the critically ill patient.
42. Nephrotoxic drugs and drug monitoring.
43. Acid-base and electrolyte disturbances.
44. Acute and chronic liver failure.
45. Acute disorders of the biliary tree or biliary stasis.
46. Acute and chronic pancreatitis.
47. Acute abdominal conditions, including: <ul style="list-style-type: none"> - abdominal compartment syndrome. - bowel ischemia/infarction, obstruction, ileus, perforation. - peritonitis.
48. Infectious colitis and its complications.
49. Acute upper and lower GI bleeding.
50. Post-operative critical care monitoring and management.
51. Pulmonary and critical care complications of pregnancy.
52. Respiratory and critical care effects of drug abuse.
53. Disorders of thrombosis and coagulation.
54. Hemolytic syndromes.
55. Transfusion indication and management of adverse reactions.
56. Anaphylaxis, angioedema and other life-threatening allergic reactions.
57. Environmental injuries, including: <ul style="list-style-type: none"> - hyper- and hypothermia. - electrocution. - near-drowning. - carbon monoxide poisoning. - radiation injury. - inhalation injury.
58. Critical illness from disasters, including those caused by chemical and biological agents.
59. Pulmonary or life-threatening non-pulmonary complications of immunologic or rheumatologic illnesses.
60. Diagnosis and management of uni- or multi-system trauma in the ICU setting.
61. Multi-system organ failure.
62. Respiratory failure requiring long-term mechanical ventilation.
63. Sequelae of ICU care.
64. Pulmonary rehabilitation.
65. Oncologic emergencies including: <ul style="list-style-type: none"> - tumor lysis syndrome. - SVC syndrome. - hypercalcemia. - intracranial mass. - spinal cord compression.
66. Fellows must demonstrate their understanding of the indications, contraindications, limitations, risks, diagnostic reliability, and

interpretation of findings from the following procedures, **and must be able to perform them without supervision:**

- Sedation for patients undergoing procedures.
- Bag-and-mask airway management.
- Endotracheal intubation.
- Thoracentesis.
- Central venous catheterization.
- Use of ultrasound for vascular and pleural access.
- Bronchoscopy, including:
 - airway inspection.
 - bronchoalveolar lavage.
 - secretion clearance.
 - needle or forceps biopsy of airway lesions.
 - transbronchial biopsy of diffuse or localized lesions.
 - transbronchial needle aspiration of accessible lymph nodes.
- Chest tube placement and management.
- Bedside pulmonary artery catheterization.
- Arterial blood sampling.
- Arterial catheterization.
- Advanced Cardiac Life Support Protocol.
- Tracheostomy tube management and decannulation.
- Use of paralytic agents.

67. Fellows must demonstrate their understanding of the indications, contraindications, limitations, risks, diagnostic reliability, clinical utilization, and **independent interpretation** of findings from the following therapies, technologies, or diagnostic procedures:

- Arterial blood gases.
- Pulmonary function testing, including bronchoprovocation.
- Cardiopulmonary and functional exercise testing.
- Chest radiographs.
- Chest computed tomograms.
- Bedside hemodynamic monitoring systems.
- Non-invasive mechanical ventilation.
- Invasive mechanical ventilation and withdrawal of ventilatory support.
- Respiratory therapy techniques, including:
 - inhaled medication delivery.
 - chest physiotherapy.
- Oxygen delivery techniques, including:
 - nasal cannula and mask systems.
 - storage and delivery systems for domiciliary oxygen.
- Brain death determination.

68. Fellows must demonstrate their understanding of the indications, contraindications, limitations, risks, diagnostic reliability, and interpretation of findings from the following procedures, **but need not be capable of performing them or interpreting findings independently:**

- Percutaneous needle biopsy of lung lesions.
- Thoracoscopy.
- Open lung biopsy.
- Transcutaneous pacemakers.
- Percutaneous and operative tracheostomy.

[Fessler HE, Addrizzo-Harris D, Beck JM, Buckley JD, Pastores SM, Piquette CA, Rowley JA, Spevitz A. Entrustable Professional Activities and Curricular Milestones for Fellowship Training in Pulmonary and Critical Care Medicine: Report of a multi-society working group. CHEST;146\(3\):813-834, 2014](#)