Respiratory System

United States Medical Licensing Examination (USMLE) Step 1

5 to 10% of Step 2 CK · 9 sections · content outline and specifications

The respiratory system is 5 to 10% of Step 2 CK. Questions ask for the most likely diagnosis, the best test, the next step in management and the first-line drug. Common themes are asthma and COPD step care and attacks, pneumonia and tuberculosis, pulmonary embolism, lung cancer screening and nodules, interstitial lung disease, pleural disease and pneumothorax, sleep apnea, ARDS and ventilator settings, and childhood illness such as bronchiolitis and croup. Many items test what to do first in an unstable patient, and when not to order a test or a drug.

You should be able to: After this guide, you should be able to read a respiratory vignette, name the most likely diagnosis, choose the best test, and pick the next step in management or the first-line drug, including what to do first in an unstable patient.

Every section: the key point and the trap

1 Asthma: diagnosis, step therapy and attacks

Confirm asthma with spirometry: an FEV1 rise of 12% and 200 mL after a bronchodilator shows reversible obstruction. If spirometry is normal, a methacholine challenge can help.

Trap: A silent chest with little wheeze is not improvement. It can mean almost no air is moving.

2 COPD: diagnosis, stable care and exacerbations

Spirometry confirms COPD: a post-bronchodilator FEV1/FVC below 0.70. FEV1 grades severity. Check alpha-1 antitrypsin once in every patient with COPD.

Trap: High-flow oxygen to 100% in COPD can raise PaCO2. Give enough oxygen, not the most oxygen.

3 Pneumonia and tuberculosis

Diagnose community-acquired pneumonia with symptoms plus a new infiltrate on chest x-ray. Use CURB-65 or the pneumonia severity index to choose home, ward or ICU.

Trap: Do not treat a positive IGRA before a chest x-ray. If active disease is missed and one drug is given, resistance follows.

4 Pulmonary embolism

Estimate pretest probability first (Wells score). Low probability: apply PERC; if any item fails, check D-dimer. High probability: go straight to imaging.

Trap: A negative D-dimer rules out embolism only when pretest probability is low or intermediate. In a high-risk patient, image.

5 Lung nodules and lung cancer

USPSTF: yearly low-dose CT for adults 50 to 80 years with 20 pack-years who smoke or quit within 15 years. Chest x-ray is not a screening test.

Trap: A former smoker who quit 10 years ago still qualifies for screening. The 15-year clock counts from the date of quitting.

6 Interstitial lung disease

Suspect it with slow exertional dyspnea, dry cough and fine basal crackles. Pulmonary function shows restriction with a low diffusing capacity.

Trap: Do not order a lung biopsy when the CT pattern is typical and no cause is found. The CT is enough.

7 Pleural effusion and pneumothorax

Tap a new effusion unless heart failure explains it. Light's criteria call it an exudate if the protein ratio is above 0.5, the LDH ratio is above 0.6, or the LDH is above two thirds of the upper normal serum level.

Trap: Do not order a chest x-ray before treating a suspected tension pneumothorax. The delay can kill.

8 Sleep apnea, ARDS and ventilation basics

Obstructive sleep apnea: snoring, witnessed apneas, daytime sleepiness, obesity and resistant hypertension. Confirm with polysomnography or, in uncomplicated adults, a home sleep apnea test.

Trap: Set tidal volume by height, not by actual weight. An obese patient needs no larger breaths than a lean one of the same height.

9 Pediatric respiratory illness

Bronchiolitis: an infant under 2 years with cold symptoms, then wheeze and crackles. It is clinical. Give supportive care: suction, fluids and oxygen if saturation stays below 90%.

Trap: Do not examine the throat of a child with suspected epiglottitis outside a controlled setting. It can trigger complete obstruction.

Key terms

FEV1/FVC ratio: The part of the total breath that is blown out in the first second; below 0.70 means obstruction.

Hypercapnia: Too much carbon dioxide in the blood.

CURB-65: A pneumonia severity score: confusion, urea, respiratory rate, blood pressure and age 65 or older.

Exudate: Protein-rich fluid caused by inflammation, infection or cancer.

Light's criteria: Rules that use protein and LDH to tell an exudate from a transudate.

Predicted body weight: A weight calculated from height and sex, used to set ventilator breath size.

PEEP: Positive end-expiratory pressure: pressure kept in the lungs at the end of each breath to stop alveoli collapsing.

Honeycombing: Clusters of small air cysts in scarred lung, a sign of advanced fibrosis.

Stridor: A harsh, high-pitched sound on breathing in, from a narrowed upper airway.

IGRA: Interferon-gamma release assay: a blood test for tuberculosis infection.

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