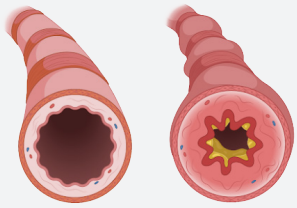
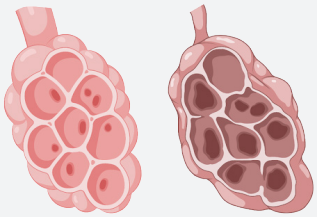
Table of Contents:

Chronic Obstructive Pulmonary Disease (COPD)

TABLE 1. PATHOPHYSIOLOGY

Chronic Bronchitis (Blue Bloater)	**Emphysema** (Pink Puffer)
	
PATHOPHYSIOLOGY Inflammation and damage → Excess mucus + Airway inflammation → **Hypoxemia**	**PATHOPHYSIOLOGY** Alveolar destruction → Loss of elastic recoil → **Air trapping**
FINDINGS ★ **"Blue"** from **cyanosis** and **polycythemia** (compensatory increase in RBC production) • Hypoxia → Pulmonary vasoconstriction → ↑ pulmonary pressures → Right heart failure (**cor pulmonale**) (**"bloater"**)	**FINDINGS** ★ ↑ anteroposterior (AP) diameter (**"barrel chest"**) and **hyperresonance** on percussion • Can overcome air-trapping with **pursed-lip breathing** (**"pink puffer"**)

1. Pathophysiology & Assessment

COPD

- Chronic airflow limitation
- ★ #1 risk factor = **smoking**
- Features of both **chronic bronchitis** and **emphysema** (**TABLE 1**)

Manifestations of hypoxemia and air trapping

- Dyspnea (worse with exertion)
- Intercostal muscle use, **tripod position**
- **Wheezes,** crackles, diminished breath sounds
- **Anorexia**, weight loss
- Fingernail clubbing

2. Diagnostic Studies

- Spirometry: COPD severity graded by forced expiratory volume in 1 sec (FEV1)
- ★ ABG: Hypoxemia and **chronic, compensated respiratory acidosis** (pH normal)
- Chest X-ray: **Lung hyperinflation,** flattened diaphragm

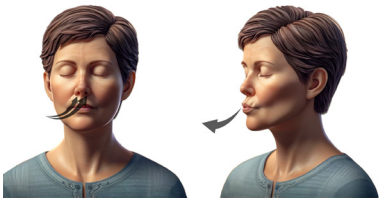
3. Interventions & Teaching

Oxygen

- Give **only low-flow oxygen** to prevent respiratory depression (2-4 L/min or 40% Venturi mask).
- ★ Titrate to **keep pulse oximetry 88-92%**.

Pulmonary hygiene

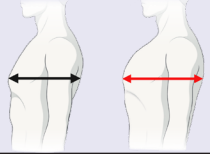
- ★ **Pursed-lip breathing:** Inhale through nose; exhale (twice as long) through lips **without puffing cheeks** (like whistling or blowing bubbles).



- **Huff coughing:** Inhale deeply, hold breath 2-3 sec, and forcefully exhale by saying "huff" (as if fogging up a mirror). Repeat and cough once you feel mucus.

NCLEX Star Points

❶ **Barrel chest** and **hyperresonance** are seen with **emphysema** due to air trapping.



❷ In COPD, the **pulse oximetry** target for oxygen therapy is **88-92%**.

3. Interventions & Teaching, Continued

Prevention

- **Smoking cessation** is the only way to stop disease progression.
- ★ To prevent respiratory infections and hospitalizations: Strict hand hygiene; mask in public; and **vaccinate for influenza, pneumonia, and COVID-19** as indicated.

Activity and energy conservation

- **Alternate** periods of **activity and rest**.
- **Sit during ADLs** when possible (shower chair).
- Pulmonary rehabilitation improves activity tolerance.

4. Nutrition

In COPD, **eating and breathing become exercise**. Consult dietitian and teach how to **maximize calorie intake** and **reduce dyspnea**:

Nutrition Teaching
Meal Timing: • **Small, frequent meals** ★ **Rest for 30 min** before eating. • **Use bronchodilator** 30 min before eating; rinse mouth after use (improves taste). • Eat **highest calorie foods first**. • **Nasal cannula** while eating
Food Selection: • **≥2 L fluid/day** to thin secretions (but *not during* meals) ★ **High-protein, high-calorie** foods (peanut butter, mayonnaise) ★ **Soft diet** (easy to chew) • **Cold foods** (less filling than hot foods)
AVOID: • **Gas-forming foods** (beans, broccoli), which increase satiety • **Liquids** during meals

5. Medications

Mechanism	Drugs & Considerations
Oxygen treats hypoxemia (prevents cor pulmonale).	• Low-flow for target **pulse oximetry 88-92%** • 2-4 L/min or 40% Venturi mask
Bronchodilators treat air trapping.	• Short- and long-acting beta agonists (SABA/LABA): Albuterol, formoterol, salmeterol • Short- and long-acting muscarinic antagonists (SAMA/LAMA) bronchodilate and reduce secretions: Tiotropium, ipratropium ★ **Only SABAs treat acute symptoms (albuterol).**
Anti-inflammatories treat inflammation.	• Inhaled corticosteroids (ICS): Fluticasone, budesonide

6. Acute Exacerbation

In **acute exacerbation**:

- **Noninvasive ventilation (NIV) (e.g., BiPAP)** is safer than invasive intubation.
- **Warning signs** indicating NIV has failed and intubation is required:
  - **Uncompensated** respiratory acidosis (pH is low)
  - ★ **Paradoxical respirations** (chest wall moves in on inhalation and out on exhalation; inverse of normal)

Medications for exacerbation:

- Combination SABA/SAMA: **Albuterol/ipratropium**
- **Systemic steroids** (PO/IV): Prednisone, methylprednisolone
- **Antibiotics** for infection
- ★ Anxiety is common, but **no benzodiazepines** or **opioids** (depress respirations)

NCLEX Star Points

❸ To maximize calorie intake, **rest for 30 min** before meals and eat **high-calorie** foods that are **easy to chew**.

❹ **Paradoxical respirations** are a warning sign of **respiratory fatigue**. Notify HCP and prepare for intubation.

❺ **Benzodiazepines and opioids** depress the respiratory drive and should **not** be used in acute exacerbation.

NCLEX Top 5 Targets

1. **Barrel chest** and **hyperresonance** on percussion are seen with **(emphysema or chronic bronchitis?)** due to air trapping.
2. In COPD, the **pulse oximetry** target for oxygen therapy is ___ **-** ___ **%**.
3. To maximize **calorie intake**, rest for ___ **min** before meals and eat high-calorie foods that are easy to chew.
4. _____ **respirations** are a **warning sign** of respiratory fatigue. Notify HCP and prepare for intubation.
5. _____ **and** _____ medications are contraindicated during acute COPD exacerbation.

Answers: 1. Emphysema 2. 88-92 3. 30 4. Paradoxical 5. Opioid, benzodiazepine

References:

Harding, M. M., Kwong, J., Hagler, D., & Reinisch, C. (Eds.). (2023). *Lewis's medical-surgical nursing: Assessment and management of clinical problems* (12th ed.). Elsevier.

Ignatavicius, D., Heimgartner, N., & Rebar, C. (Eds.). (2024). *Medical-surgical nursing: Concepts for clinical judgment and collaborative care* (11th ed.). Elsevier.

Tyerman, J., Cobbett, S., Harding, M. M., Kwong, J., Roberts, D., Hagler, D., Reinisch, C. (Eds.). (2023). *Lewis's medical-surgical nursing in Canada: Assessment and management of clinical problems*. (5th ed.). Elsevier.

Attributions:

- COPD pathophysiology: Created with BioRender.com
- Barrel chest: Modified from BioRender.com