

• NGN NCLEX 2026 · RESPIRATORY SYSTEM

Airway & Oxygenation

The airway is the #1 priority in every scenario. Master oxygen delivery, hypoxia recognition, and priority interventions that save lives on the exam and the floor.

 Test Plan: Physiological Adaptation Priority: ABCs · Always Airway First Framework: NCJMM Applied

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Definition & Overview

WHAT IT IS · WHY IT MATTERS

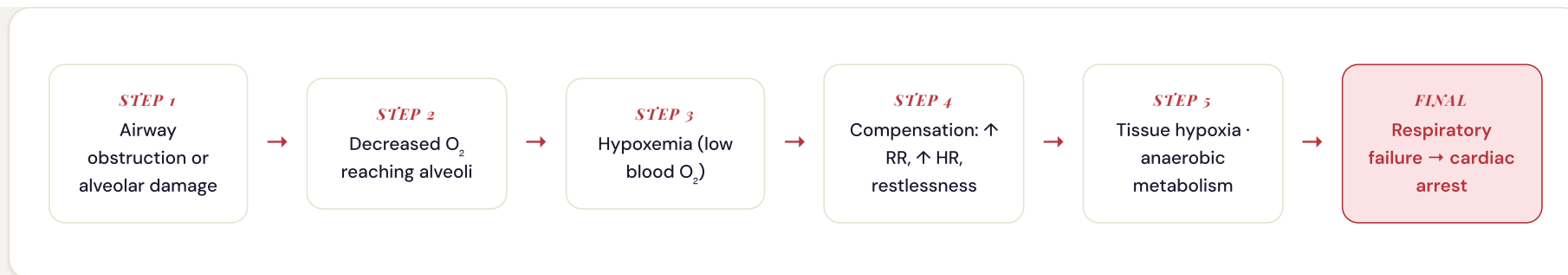
Oxygenation is the process of delivering O_2 from the atmosphere → lungs → blood → tissues. When airway is compromised, oxygen can't reach the cells — and cells begin to die within minutes.

- ♦ **Airway anatomy:** Upper (nose, pharynx, larynx) → Lower (trachea, bronchi, alveoli)
- ♦ **Gas exchange** happens at the alveolar-capillary membrane — O_2 in, CO_2 out
- ♦ **NCLEX priority:** Airway always comes first — before circulation, before pain, before anything
- ♦ **Normal SpO_2 :** 95–100% · COPD target: 88–92% (lower is intentional)

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Pathophysiology

SIMPLIFIED MECHANISM OF HYPOXIA



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Signs & Symptoms

EARLY VS LATE HYPOXIA · RED FLAGS

Early Hypoxia

R · A · T

- R** **Restlessness** — the #1 earliest sign. Agitation, fidgeting.
- A** **Anxiety** — air hunger feeling; feeling of doom
- T** **Tachycardia & Tachypnea** — body compensating for low O₂
- + **Pale skin**, cool extremities, mild confusion

Late Hypoxia

B · E · D

- B** **Bradycardia & Bradypnea** — decompensation; body failing
- E** **Extreme restlessness** → lethargy, confusion, unconscious
- D** **Dyspnea & cyanosis** — blue lips/nail beds (LATE sign!)
- + **Hypotension**, dysrhythmias, use of accessory muscles

Red Flags — Call Rapid Response

Stridor (partial obstruction)

Cyanosis of lips / nail beds

Absent or diminished breath sounds

Nasal flaring + retractions

SpO₂ < 90% on room air

Altered LOC / confusion

Tripod positioning + silent chest

Sudden bradycardia during distress

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Priority Nursing Interventions

ABCS · SAFETY · ACTION VERBS

A

AIRWAY

- Position: **High Fowler's** (30–90°)
- Suction PRN — max 10–15 sec
- Head-tilt / chin-lift if unconscious
- Remove visible obstruction
- Assess for stridor, gurgling, snoring

B

BREATHING

- Auscultate all lung fields
- Count RR for full minute
- Apply O₂ (start low, titrate up)
- Incentive spirometry q1h awake
- Encourage pursed-lip breathing

C

CIRCULATION

- Continuous SpO₂ monitoring
- HR, BP, cap refill q15min if unstable
- Assess skin color & temperature
- IV access — large bore
- ABG as ordered

★ Top Priority Actions

- 1 Position first.** Sit them up — High Fowler's / tripod — before reaching for O₂
- 2 Hyperoxygenate BEFORE suctioning** — 100% O₂ for 30 seconds to prevent hypoxia
- 3 Suction only on withdrawal** — never on insertion; max 10–15 seconds
- 4 COPD patients: LOW flow O₂ only** — max 2–3 L/min; high flow suppresses respiratory drive
- 5 Humidify O₂** if flow rate > 4 L/min to prevent drying mucous membranes
- 6 Remove O₂ source if patient smokes** — O₂ supports combustion (not explosive)

4b

Oxygen Delivery Devices

FLOW RATES · FIO₂ · CLINICAL USE

DEVICE	FLOW RATE	FIO ₂ DELIVERED	KEY POINTS
Nasal Cannula	1–6 L/min	24–44%	Low-flow; comfortable; allows eating/talking. Max 6 L/min. Assess ears & nares q6–8h.
Simple Face Mask	5–8 L/min	40–60%	Minimum 5 L/min to flush CO ₂ . Not for long-term use.
Venturi Mask	4–10 L/min	24–50% (precise)	Most accurate FiO ₂ delivery. Best for COPD patients.
Partial Rebreather	6–11 L/min	60–75%	Keep reservoir bag ⅔ full at all times. Don't deflate.

DEVICE	FLOW RATE	FIO ₂ DELIVERED	KEY POINTS
Non-Rebreather	10-15 L/min	80-100%	Highest O ₂ delivery w/o intubation. Emergency use.
High-Flow Nasal Cannula	Up to 60 L/min	Up to 100%	Heated & humidified; alternative to BiPAP for some.

5 Pharmacology

RESPIRATORY MEDICATIONS FOR AIRWAY & OXYGENATION

DRUG / CLASS	MECHANISM	KEY SIDE EFFECTS	NURSING CONSIDERATIONS
Albuterol SABA · Rescue Bronchodilator	Beta-2 agonist — relaxes bronchial smooth muscle; fast onset within 5 min	Tachycardia, tremor, nervousness, hypokalemia	Give FIRST if combined with steroid. Hold if HR > 100. Rescue inhaler only.
Salmeterol LABA · Long-Acting	Long-acting beta-2 agonist — maintenance control over 12 hours	Tremor, headache, throat irritation	NEVER use as rescue. Maintenance only. Always paired with ICS.
Ipratropium Atrovent · Anticholinergic	Blocks acetylcholine — bronchodilation via parasympathetic inhibition	Dry mouth, blurred vision, urinary retention	Contraindicated in peanut allergy (older formulations). Rinse mouth after.
Fluticasone ICS · Inhaled Corticosteroid	Anti-inflammatory; reduces airway swelling and mucus production	Oral thrush, hoarseness, dysphonia	Rinse mouth after every use. Give bronchodilator FIRST, wait 5 min, then steroid.
Prednisone Systemic Corticosteroid	Potent anti-inflammatory for acute exacerbations	Hyperglycemia, osteoporosis, cushingoid effects, immunosuppression	Give WITH meals. Never stop abruptly — taper to prevent adrenal crisis.
Montelukast Singulair · Leukotriene Modifier	Blocks leukotrienes — reduces inflammation & bronchoconstriction	Mood changes, suicidal ideation (black box), headache	Monitor for mood/behavior changes. Give in evening. Not for acute attacks.
Acetylcysteine Mucomyst · Mucolytic	Breaks disulfide bonds in mucus — thins secretions. Also Tylenol antidote.	"Rotten egg" smell, nausea, bronchospasm	Have suction ready — patients often cough up lots of mucus. Give bronchodilator first.

Theophylline
Methylxanthine

Bronchodilator; narrow therapeutic window (10–20 mcg/mL)

TOXICITY > 20: N/V, tachycardia, tremors, seizures — life-threatening

Monitor serum levels. Avoid caffeine. Coffee-ground emesis = severe toxicity.

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NCLEX Test Traps

COMMON MISTAKES · PRIORITY VS NON-PRIORITY

1 Cyanosis is Early

~~✗ Cyanosis means the patient just started decompensating~~

✓ Cyanosis is a LATE sign — restlessness comes first. Act on restlessness, don't wait for blue lips.

2 COPD = Normal SpO₂ Target

~~✗ Increase O₂ flow to keep COPD patient's SpO₂ at 95–100%~~

✓ COPD target is 88–92%. High O₂ removes their hypoxic drive → apnea.

3 Give O₂ First

~~✗ Patient can't breathe → slap on O₂ immediately~~

✓ Position FIRST — sit them up. Proper positioning often fixes breathing before O₂ is even needed.

4 Steroid Before Bronchodilator

~~✗ Give inhaled steroid first to reduce inflammation~~

✓ Bronchodilator FIRST (opens airways), then wait 5 min, then steroid (reaches deeper).

5 Suction on Insertion

~~✗ Apply continuous suction while inserting and withdrawing catheter~~

✓ Suction ONLY on withdrawal. Rotate catheter. Max 10–15 seconds.

6 O₂ Explodes

~~✗ Oxygen is explosive — avoid near any heat source~~

✓ O₂ doesn't explode — it SUPPORTS COMBUSTION. Still no smoking; remove source entirely.

7 Silent Chest = Good

~~✗ No wheezing means asthma attack is resolving~~

8 Salmeterol for Rescue

~~✗ Patient wheezing → use Salmeterol (LABA) inhaler~~

✓ Silent chest in asthma = EMERGENCY. Airways so narrow no air moves. Call rapid response.

✓ LABA = maintenance only. Use Albuterol (SABA) for rescue. LABA during attack can worsen outcomes.



Patient Education

SAFETY · SELF-MANAGEMENT · ADHERENCE



Home Safety & Lifestyle

- 1 **No smoking** — in the patient, in the home, or near O₂ sources
- 2 Keep O₂ tanks **10 feet away** from open flames, stoves, and heaters
- 3 Avoid aerosol sprays, petroleum products, and wool blankets near O₂
- 4 Get annual **flu vaccine** and pneumococcal vaccine
- 5 Avoid triggers: cold air, allergens, strong scents, smoke
- 6 Stay hydrated — thins mucus, easier to clear



Inhaler & Device Technique

- 1 Shake MDI, exhale fully, then inhale slowly while pressing canister
- 2 **Hold breath 10 seconds** after inhalation for absorption
- 3 Wait **1 minute** between puffs of the same inhaler
- 4 Use spacer when available — improves delivery
- 5 **Rinse mouth after steroid** inhalers to prevent thrush
- 6 Track peak flow daily — green/yellow/red zones

NCJMM · CLINICAL JUDGMENT

Applying the Model to an Airway Scenario

A 68-year-old with COPD on 4 L/min nasal cannula becomes increasingly drowsy. SpO₂ reads 96%. RR is 8 and shallow. What do you do?

1

RECOGNIZE

2

ANALYZE

3

PRIORITIZE

4

EVALUATE

Drowsiness + high SpO_2 + low RR = CO_2 retention from excess O_2 in COPD.

4 L/min is too high for COPD. Hypoxic drive suppressed → hypoventilation.

Lower O_2 to 2 L/min, stimulate breathing, notify HCP, prepare for ABG.

RR returns to 14–20, LOC improves, SpO_2 stabilizes at 88–92%.

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Memory Boosters

MNEMONICS · PATTERN RECOGNITION · QUICK RECALL

HYPOXIA PROGRESSION

RAT' → BED

Restlessness → **A**nxiety →
Tachycardia (*early*)

Bradycardia → **E**xtrême
restlessness → **D**yspnea/cyanosis
(*late*)

INHALER ORDER

BB&S

Bronchodilator first (opens the
airway)

Break — wait 5 minutes

Steroid second (goes deeper, works
longer)

COPD PRIORITY

LOW & SLOW

LOW O_2 flow: 2–3 L/min max

SLOW delivery to avoid knocking
out hypoxic drive

Target SpO_2 : **88–92%** — not 95–
100%

SUCTION SAFETY

HOLD 10

Hyperoxygenate first with 100% O_2

Only apply suction on withdrawal

Limit to 10–15 seconds per pass

Don't exceed 3 passes without
recovery

POSITIONING

SIT TO BREATHE

Semi / High Fowler's is first-line

Tripod = severe distress
(COPD/asthma)

Orthopnea = sleeps with pillows
propped up

CLASSIC PAIRS

PINK vs BLUE

Pink Puffer — Emphysema. Thin,
barrel chest, pursed lips.

Blue Bloater — Chronic Bronchitis.
Cyanotic, overweight, edema.

O_2 SAFETY

NO S.P.A.R.K.

Smoking prohibited

Petroleum products avoided

Aerosols not allowed nearby

Remove device when smoking (if
permitted)

Keep 10 feet from flames

ASTHMA EMERGENCY

SILENT' = DEADLY

No wheezing in acute asthma is NOT
improvement

Airways so narrow no air moves →

respiratory failure imminent

Call rapid response; prepare for
intubation

NGN NCLEX 2026 · *Airway & Oxygenation* · Clinical Judgment Measurement Model · High-Yield Review