

— NGN NCLEX 2026 · VISUAL STUDY SERIES · CARD 18

Respiratory *Diagnostics*

A high-yield field guide to pulmonary testing — from ABGs and bronchoscopy to TB skin testing and thoracentesis.

● SYSTEM: RESPIRATORY

● CATEGORY: DIAGNOSTIC PROCEDURES

● FRAMEWORK: NCJMM

● PRIORITY: SAFETY & MONITORING

01 Overview & Definition

WHY IT MATTERS

WHAT

Diagnostic Testing

Procedures used to evaluate pulmonary function, airway patency, gas exchange, and infectious or malignant processes in the respiratory system.

WHY

Early Detection

Identifies hypoxia, acid-base imbalance, infection (TB), airway obstruction, and fluid/air in the pleural space — all time-sensitive findings.

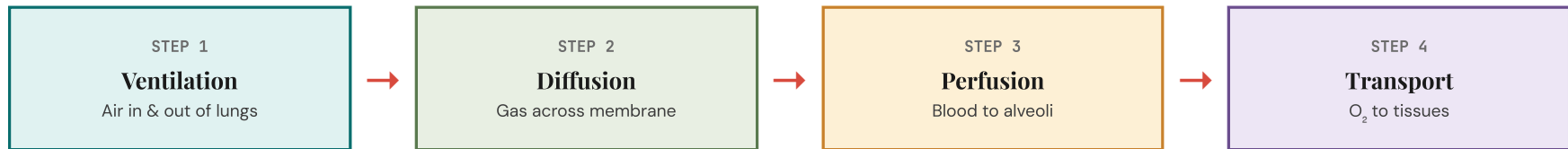
NURSE'S ROLE

Safety First

Consent, patient positioning, airway protection pre/post-procedure, and early recognition of complications (pneumothorax, bleeding, hypoxia).

02 Concept Flow — How Testing Maps to Physiology

ASSESS → INTERPRET



PH	PACO ₂	PAO ₂	HCO ₃ ⁻	SAO ₂
7.35 – 7.45	35 – 45	80 – 100	22 – 26	> 95%

Normal ABG reference values — memorize cold. These are the anchors for every acid-base question you will see on the NGN NCLEX.

03 Procedure-by-Procedure Breakdown

PRE · DURING · POST

Arterial Blood Gases (ABGs)

Evaluates oxygenation, ventilation & acid-base status via radial artery draw

PRE

- Perform **Allen's test** — confirm ulnar collateral circulation
- Document FiO₂ / O₂ delivery in use

POST

- Hold firm pressure **5 min** (10 min if on anticoagulants)
- Place sample **on ice**, transport immediately to lab
- Monitor site for bleeding, hematoma, loss of distal pulse

Pulse Oximetry (SpO₂)

Non-invasive continuous O₂ saturation monitoring

SETUP

- Normal: **> 95%** · COPD target: **88–92%**
- Remove nail polish, artificial nails; warm cold extremities
- Rotate probe site every 2–4 hrs (prevent pressure injury)

UNRELIABLE WHEN

- Poor perfusion, hypotension, vasoconstriction
- CO poisoning — reads **falsely high**

Chest X-Ray (CXR)

Visualizes lungs, heart, bony thorax — most common diagnostic

PRE

- Remove all metal (jewelry, snaps, pins)
- Shield abdomen if **pregnancy** possible — confirm LMP
- Patient inhales deeply and holds during exposure

POST

- No special care — return to prior activity

Pulmonary Function Tests (PFTs)

Measures lung volumes & airflow — diagnoses obstructive vs restrictive disease

PRE (CRITICAL HOLDS)

- No **smoking 6–8 hrs** before
- Hold **bronchodilators 4–6 hrs** before
- No heavy meal before test
- Loose clothing; empty bladder

POST

- Resume meds; rest — test is tiring

Bronchoscopy

Scope passed through airways — biopsy, culture, foreign body removal

Thoracentesis

Needle aspiration of pleural space — drain effusion, obtain specimen

PRE

- **Signed consent** (invasive procedure)
- **NPO 6–8 hrs** (aspiration risk)
- Remove dentures; atropine to dry secretions

POST — PRIORITY!

- **Check gag reflex** BEFORE food/fluid (throat anesthetized)
- Semi-Fowler's position
- Monitor for **bleeding, pneumothorax, laryngospasm**
- Blood-tinged sputum expected × 24 hrs; frank blood = report

PRE

- Signed consent; baseline VS, breath sounds
- Position: **sitting upright, leaning over bedside table**
- Instruct: do NOT cough or move during needle insertion

POST

- Max **1000 mL** removed at one time (re-expansion pulmonary edema)
- Position on **unaffected side** to seal puncture
- CXR post-procedure to rule out **pneumothorax**
- Monitor breath sounds, O₂ sat, for hemoptysis

Sputum Culture

Identifies bacteria, AFB (TB), fungi, malignant cells

COLLECTION

- **Early morning** specimen (secretions pooled overnight)
- Collect **BEFORE antibiotics** begin
- Rinse mouth with **water only** (no mouthwash)
- Deep cough from lungs — not saliva
- For TB (AFB): **3 consecutive mornings**

Mantoux / PPD (TB Skin Test)

Screens for TB exposure via intradermal injection

ADMINISTER

- **0.1 mL intradermal**, inner forearm, bevel up
- Must form a **wheal**; do NOT massage

READ IN 48–72 HRS

- Measure **induration** (raised area), NOT redness
- **≥ 5 mm**: HIV, close TB contact, immunosuppressed
- **≥ 10 mm**: high-risk groups, healthcare workers
- **≥ 15 mm**: low-risk, general population
- Positive = exposure, NOT active disease → confirm with CXR/sputum

V/Q Scan (Ventilation/Perfusion)

Detects pulmonary embolism — compares airflow vs blood flow

PRE

- Check for **allergies** (radioactive isotope IV)
- Remove metal; encourage fluids after to flush isotope

Peak Flow Meter

Daily home monitoring for asthma control

ZONES

- **GREEN (80–100% personal best)**: good control — continue meds
- **YELLOW (50–79%)**: caution — use rescue inhaler, call HCP

→ Patient inhales radioactive gas & receives IV tracer

→ **RED (< 50%)**: medical alert — use rescue inhaler, seek help NOW

04 Priority Nursing Interventions

ABC • SAFETY • PRIORITIZATION

! RED FLAG — Post-Bronchoscopy / Thoracentesis

Sudden sharp chest pain, dyspnea, absent breath sounds, tracheal deviation = **pneumothorax**. Notify HCP immediately and prepare for chest tube.

Airway First 1

Post-bronchoscopy: **confirm gag reflex** before oral intake. Hold food/fluids until swallow returns to prevent aspiration.

Breathing 2

Auscultate breath sounds **bilaterally** before and after invasive procedures. Report diminished/absent sounds or asymmetry.

Circulation 3

Monitor VS, O₂ sat, and bleeding at puncture/draw sites. Hold firm pressure after ABG × **5–10 minutes**.

Consent & Education 4

Verify signed consent for bronchoscopy, thoracentesis, biopsy. Ensure teach-back — patient must understand risks and post-procedure care.

Positioning 5

Thoracentesis = **sitting upright, leaning forward**. After = unaffected side down. Bronchoscopy = semi-Fowler's. PFTs = upright.

Specimen Handling 6

ABG on **ice**, delivered STAT. Sputum **early morning**, before antibiotics. Label everything with time, site, and FiO₂.

05 Pharmacology & Diagnostic Agents

MEDS TIED TO TESTING

DRUG / AGENT	CLASS / USE	KEY ACTIONS	NURSING CONSIDERATIONS
Atropine	Anticholinergic · Pre-bronchoscopy	Dries oral/respiratory secretions to improve visualization	Expect dry mouth, tachycardia, urinary retention. Contraindicated in glaucoma.
Lidocaine (topical)	Local anesthetic · Bronchoscopy	Numbs pharynx/vocal cords for scope passage	NPO until gag reflex returns . Usually 1–2 hrs post-procedure.
Midazolam (Versed)	Benzodiazepine · Conscious sedation	Sedation + amnesia for invasive tests	Monitor respiratory rate & O ₂ sat. Antidote = flumazenil .
Tuberculin PPD	Diagnostic antigen · ID injection	Triggers delayed hypersensitivity if TB exposure	Read at 48–72 hrs. Measure induration , not erythema.
Short-acting β_2 agonists (albuterol)	Bronchodilator	Used to assess reversibility during PFTs	Hold 4–6 hrs before PFT unless HCP orders test with agent.
Radioactive isotopes (V/Q scan)	Nuclear imaging tracer	Highlights ventilation and perfusion	Verify pregnancy status. Push fluids after to flush from bladder.

06 NCLEX Test Traps

WHERE STUDENTS LOSE POINTS

THE TRAP	WRONG THINKING	CORRECT PRIORITY
<i>Food after bronchoscopy</i>	"They're hungry — offer a meal right away."	Check gag reflex first. Throat is anesthetized → aspiration risk. NPO until gag returns.
<i>Mantoux reading</i>	Measuring the redness around the injection site.	Measure induration (hard, raised area) only. Erythema alone is not a positive result.
<i>COPD and oxygen</i>	"Low sat = crank up the O ₂ to 10 L."	COPD patients use hypoxic drive . High FiO ₂ can cause apnea . Target SpO ₂ 88–92%.
<i>Thoracentesis volume</i>	Drain as much pleural fluid as possible.	Max 1000 mL at once to prevent re-expansion pulmonary edema.
<i>ABG pre-draw</i>	"Just stick the radial — it's easy to find."	Perform Allen's test first — confirm ulnar collateral circulation before radial puncture.
<i>Sputum for TB</i>	One specimen will confirm TB.	AFB requires 3 consecutive early-morning specimens , collected before antibiotics.
<i>Post-procedure "OK" signs</i>	Blood-tinged sputum = emergency.	Blood-tinged sputum × 24 hrs after bronchoscopy is expected . Frank bleeding = report .
<i>Positive TB test</i>	"Positive PPD means active TB — isolate."	Positive PPD = exposure only . Confirm active disease with CXR + sputum AFB .

NCJMM CLINICAL JUDGMENT WALKTHROUGH

Apply the Model — Post-Thoracentesis Scenario

A 58-year-old client returns to the unit 15 minutes after thoracentesis (800 mL pleural fluid removed). On assessment, the nurse notes new-onset sharp right-sided chest pain, RR 30, SpO₂ 86% on 2L NC, and absent breath sounds on the right. Trachea appears deviated to the left.

01

RECOGNIZE

Sharp pain, tachypnea, hypoxia, absent breath sounds, tracheal deviation — cues of **tension pneumothorax**.

02

ANALYZE

Needle puncture of pleura → air leak into pleural space → lung collapse → mediastinal shift and cardiovascular compromise.

03

PRIORITIZE

ABCs: **high-flow O₂**, notify HCP STAT, prepare for emergent **chest tube**, keep client upright, obtain stat CXR.

04

EVALUATE

After chest tube: breath sounds return bilaterally, SpO₂ > 94%, trachea midline, RR normal, pain resolved.

07 Patient Education

TEACH-BACK POINTS



Bronchoscopy

Don't eat or drink until you can swallow normally again — your throat will be numb for 1–2 hrs.



Sputum Culture

Collect first thing in the morning. Rinse only with water, then cough deeply from your chest.



PFTs

Don't smoke for 6–8 hours before. Hold your inhaler (unless told otherwise) and avoid a big meal.



Mantoux (PPD)

Return in 48–72 hours to have it read. Do not scratch, cover, or apply anything to the site.



Peak Flow Meter

Use at the same time each day. Know your green, yellow, and red zone numbers.



After Thoracentesis

Report new chest pain, shortness of breath, or coughing up blood immediately.



Pulse Oximeter at Home

Remove nail polish. Warm cold hands. Contact HCP if readings stay below your target.



Positive PPD

Doesn't mean you have active TB — a chest X-ray and sputum test will confirm if treatment is needed.

08 Memory Boosters & Mnemonics

ANCHOR IT · ACE IT

ABG

- A** — Allen's test before you stick
- B** — Bleeding: hold 5 min (10 if anticoag)
- G** — Get it on ice, get it to lab STAT

GAG

- G** — Gag reflex check after bronchoscopy
- A** — Aspiration risk until throat wakes up
- G** — Give nothing by mouth first

5 • 10 • 15

- 5** — mm = positive in HIV / close TB contact
- 10** — mm = positive in high-risk groups
- 15** — mm = positive in low-risk population

SIT UP

- S** — Sitting upright for thoracentesis
- I** — Incline forward over bedside table
- T** — Tell client not to cough or move
- U** — Unaffected side down after
- P** — Post-CXR to rule out pneumothorax

ROME

- R** — Respiratory = Opposite ($\text{pH} \uparrow \text{CO}_2 \downarrow$)
- O** — Opposite direction for respiratory
- M** — Metabolic = Equal ($\text{pH} \uparrow \text{HCO}_3 \uparrow$)
- E** — Equal direction for metabolic

SPUTUM

- S** — Start of the day (early AM)
- P** — Prior to antibiotics
- U** — Use water only to rinse
- T** — Three mornings for AFB / TB
- U** — Up from lungs — not saliva
- M** — Move it STAT to the lab

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