

CONTENT REVIEW • CHAPTERS 22 AND 32

Airway, Respiration and Ventilation

Mapped to the National Registry Paramedic Examination Specifications

Pathophysiology • Assessment • Management

Where airway sits, and how it is actually tested

Content domain	Percent of examination
Clinical Judgment	34– 38%
Medical / Obstetrics / Gynecology	24– 28%
Cardiology & Resuscitation	10– 14%
AIRWAY, RESPIRATION & VENTILATION	8– 12%
EMS Operations	8– 12%
Trauma	6– 10%

Item types you will meet

Multiple choice — one of four.
 Multiple response — two or three correct of five or six.
 Build list — put steps in order.
 Drag-and-drop — sort options into categories.
 Options box — classify items in a table.
 Graphical — waveforms, images, charts. Can appear inside any type.
 Scenario-based — several items from one passage.

1 Airway is bigger than 12%

Clinical Judgment scenarios draw on every clinical domain. A scenario about respiratory failure scores in Clinical Judgment but is answered with airway knowledge.

2 Pediatrics is integrated, not separate

The specifications footnote the distribution table: pediatric items are integrated throughout the examination content. There is no pediatric domain to revise on its own.

3 Three knowledge areas per domain

Assessment, pathophysiology, management. This review is built in those blocks — pathophysiology first, because assessment and management both follow from it.

4 Adaptive format

110 to 150 items, 3.5 hours, 20 unscored pilot items. Items get harder as you answer correctly. A hard exam is not a failing exam.

Six steps — and the airway question each one asks

1 Recognize cues

What is abnormal? Rate, effort, sounds, color, mentation, SpO₂, ETCO₂.

2 Analyze cues

Organize and classify them. Upper or lower airway? Ventilation, diffusion or perfusion?

3 Define hypothesis

Name the likely condition, and the severity — distress, failure or arrest.

4 Generate solutions

What are the options, and what does each one fix?

5 Take action

Which one, and in what order. Highest-yield first.

6 Evaluation

Did it work? Re-enter the cycle with the new findings.

Read the stem to find the step — it tells you what kind of answer is wanted

“Which findings are of concern?” → recognize cues. “Which condition do these suggest?” → analyze cues, define hypothesis. “Which interventions are indicated?” → generate solutions. “What do you do first?” → take action. “Which finding shows it is working?” → evaluation.

The cycle repeats

Scenario items add new information partway through. That is deliberate — they are testing whether you re-enter the cycle rather than defend your first answer.

Communication and leadership are sampled too

Handover content, crew direction, resource use and scene safety are part of the domain, not extras.

The airway loop

What do I see — what does it mean — which process is failing — what could I do — what do I do now — is it working.

KNOWLEDGE AREA 1

Pathophysiology

Three processes, and the diseases that break each one.
Everything in assessment and management follows from this.

Ventilation · Diffusion · Perfusion

Three processes — and what failure looks like

Process	Fails when	Looks like	Responds to
VENTILATION Moving air	Obstruction · chest wall or diaphragm impaired · CNS control impaired	Stridor, wheeze, poor air movement, abnormal rate or depth. RISING ETCO ₂	Moving air: position, bronchodilators, positive pressure, assisted ventilation
DIFFUSION Crossing the membrane	Alveoli altered or filled · membrane thickened · capillary permeability changed · low alveolar O ₂	Crackles, consolidation, fever, hypoxia with reasonable air movement	Steepening the gradient: oxygen, CPAP, treating the cause
PERFUSION Delivering blood	Volume loss · blocked or destroyed capillaries · pump failure	CLEAR lungs with real hypoxia. Tachycardia. Often LOW ETCO ₂ at a high rate	Fixing the circuit. Expect the LEAST from oxygen alone

Five structures for ventilation

Chest wall · nerve pathways · diaphragm · pleural cavity · brainstem. Each fails in a different disease.

Dead space vs shunt

Ventilation without perfusion is DEAD SPACE (PE). Perfusion without ventilation is SHUNT (atelectasis, consolidation). Only shunt answers oxygen well.

Resistance vs compliance

Resistance problems struggle to get air OUT and wheeze. Compliance problems struggle to get air IN and breathe fast and shallow.

A portion of lung without blood flow is unavailable for gas exchange REGARDLESS of oxygenation.

The numbers worth carrying

Value	Number	Why it is examinable
Tidal volume	~500 mL (5–7 mL/kg)	The size of one normal breath
Anatomic dead space	~150 mL	Subtracted from EVERY breath — the tax that makes shallow breathing ineffective
Alveolar volume	~350 mL	Tidal minus dead space. Alveolar volume × rate is what the patient actually gets
Normal ETCO ₂	35–45 mmHg	Mirrors PaCO ₂ closely in a healthy lung; the gap widens with dead space and poor perfusion
Oxygen carriage	~97% on hemoglobin	Which is why hemoglobin matters more than dissolved oxygen
CO ₂ carriage	~70% bicarbonate, ~23% on Hgb, <7% dissolved	The hinge between respiratory and metabolic acid–base
Adult respiratory rate	12–20	Children: 30–60 infant, falling to 18–30 at school age

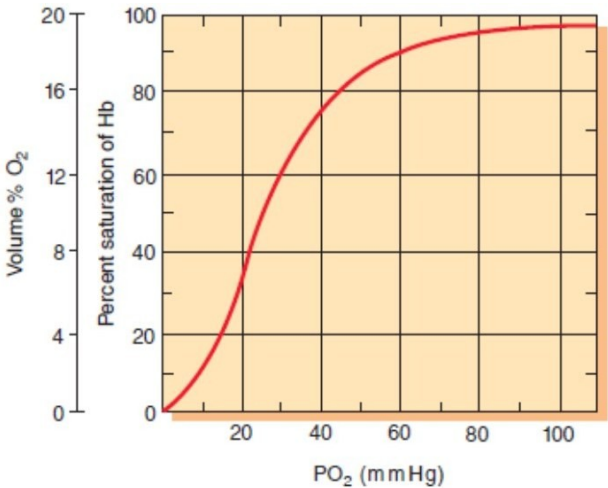


Figure 32-10 Oxygen dissociation curve.

Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

1 Do the alveolar arithmetic

$500 \times 12 = 6,000$ mL/min, alveolar 4,200. $200 \times 30 =$ the same 6,000, alveolar only 1,500. Same minute volume, a third of the ventilation.

2 Read the curve’s shape

Flat above ~90%: the oximeter hides deterioration. Steep below: the patient falls fast. Act on trend and slope.

3 FRC is the apneic reservoir

Preoxygenation fills it. Obesity and pregnancy shrink it — those patients desaturate quickly.

Twelve diseases, sorted by what they break

Primarily VENTILATION	Primarily DIFFUSION	Primarily PERFUSION
ASTHMA — bronchospasm + mucosal edema; delayed inflammatory phase at 6–8 h	ARDS — noncardiogenic edema from increased capillary permeability	PULMONARY EMBOLISM — the pure dead-space lesion
CHRONIC BRONCHITIS — goblet cell proliferation, mucus. Alveoli spared, diffusion NORMAL	PNEUMONIA — alveoli fill. Text classes it as primarily a ventilation disorder with a diffusion consequence	HEMORRHAGE / ANEMIA — reduced carrying capacity with normal lungs
UPPER AIRWAY OBSTRUCTION — tongue, foreign body, edema	CARDIOGENIC PULMONARY EDEMA — interstitial flooding from pump failure	CARDIOGENIC SHOCK — the pump fails to deliver
PNEUMOTHORAX — loss of the intact container, so no pressure gradient	EMPHYSEMA — alveolar walls destroyed; ALSO perfusion (fewer capillaries) and ventilation (floppy bronchioles)	CARBON MONOXIDE — carriage, not exchange. The lungs work perfectly
CNS DEPRESSION — opioids, stroke, head injury. Structurally normal lungs	BRONCHIOLITIS / RSV — small airway inflammation and mucus in under-2s	HYPERVENTILATION SYNDROME — no lung lesion at all. A diagnosis of exclusion

Emphysema appears in all three columns. That is not untidy classification — it is why those patients are the sickest chronic respiratory patients you meet, and why relief rather than reversal is the goal.

KNOWLEDGE AREA 2

Assessment

From the doorway to the monitor — and the findings that change your tempo.

Primary · Sounds · Patterns · Monitoring

The primary assessment, and nine findings that mean dying

1 Is the airway patent?

Snoring, gurgling, stridor = partial obstruction with a name. Correct it BEFORE moving on. Silence in a patient who should be noisy is worse.

2 Is breathing ADEQUATE?

Not “is it present.” Four properties: rate, depth, effort, effectiveness. A rate of 40 can fail three of them.

3 Look at the chest wall

Asymmetric or paradoxical movement means a flail segment or serious ventilatory problem — visible from the doorway.

4 Then act, immediately

Inadequate or absent → assist ventilation. Adequate → oxygen, move to circulation. Chest rise is continuous feedback afterwards.

Nine findings suggesting a life-threatening respiratory problem — seven need no equipment

Altered mental status • severe CENTRAL cyanosis • absent breath sounds • audible stridor • one- to two-word dyspnea • tachycardia ≥ 130 • pallor and diaphoresis • intercostal and sternocleidomastoid retractions • accessory muscle use.

Central cyanosis — lips, tongue, mucous membranes — means arterial desaturation. Peripheral cyanosis of the fingers can be cold or poor perfusion.

From the doorway

Position • color • mental status • ability to speak • respiratory effort. Count the words per breath — a vital sign needing no equipment.

Mental status IS a respiratory sign

Confusion and agitation are hypoxia or hypercarbia until proven otherwise — and a patient who suddenly calms has often not improved. Rising CO₂ is sedating.

Sounds and patterns — decoded by location and cause

Sound	Where	Means
Snoring	Upper airway, soft tissue	Tongue. Fixed by POSITION
Stridor	Larynx / upper trachea	Edema, foreign body, croup, epiglottitis, anaphylaxis — AIRWAY EMERGENCY
Wheeze	Lower airway narrowing	Asthma, COPD — and heart failure, which also wheezes
Rhonchi	Larger airways	Secretions. Often CLEARS or changes with a cough
Crackles	Alveoli	Fluid, or collapsed alveoli reopening — edema, pneumonia, ARDS
Friction rub	Pleural surfaces	Inflamed pleura — pneumonia, pulmonary embolism
DIMINISHED / ABSENT	Anywhere	Worse than loud. Noise requires airflow

Pattern	Points to
Kussmaul — deep, rapid, sustained	Metabolic acidosis, classically DKA. CORRECTIVE — do not suppress it
Cheyne-Stokes — crescendo-decrescendo with apnea	Brain injury, raised ICP, severe heart failure
Central neurogenic hyperventilation	Midbrain or upper pons injury
Ataxic (Biot's) — irregular, unpredictable	Raised ICP. More ominous than Cheyne-Stokes
Apneustic — prolonged inspiratory gasps	Stroke or severe CNS disease
Agonal — slow, gasping	NOT breathing. This patient is in arrest

Four of the five abnormal patterns are neurologic or metabolic findings that happen to be visible in the breathing

Treating them as respiratory disease is the error. A Kussmaul patient needs their acidosis treated, not their rate slowed. A Biot's patient needs imaging, not a bronchodilator.

Three monitors — and what each one is blind to

1 Pulse oximetry

Percentage of binding sites OCCUPIED.
Not delivery, not ventilation, not use.
Normal 96–99% at sea level.

2 Four ways it lies

Cannot tell WHAT is bound (CO reads as oxygen) · needs a pulse · LATE warning from the flat curve · motion, polish, dirt, bright light.

3 CO-oximetry

Extra wavelengths report SpCO and SpMet. < 5% normal for a non-smoker; 5–9% may be NORMAL for a smoker.

4 Peak flow

A direct measure of airway RESISTANCE — but it needs a cooperative patient, so it fails in the sickest.

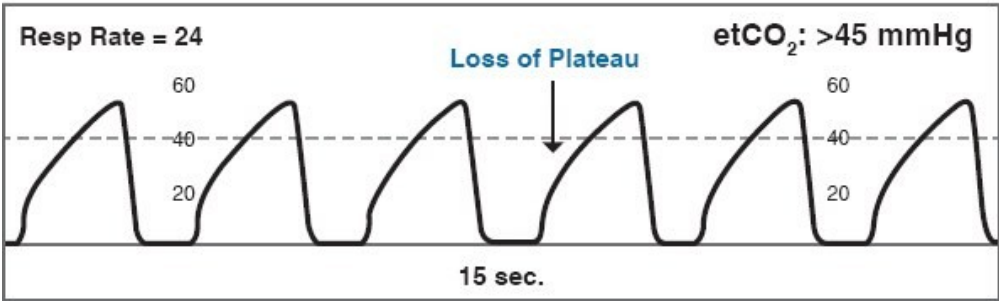


Figure 32-35 Normal versus asthmatic capnogram.

Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

Four questions for any waveform

Is there one? · what SHAPE? · what HEIGHT? · what TREND? Height without shape is nearly worthless — shape is what separates a tracheal tube from an esophageal one.

Capnography	Causes
DECREASED ETCO ₂	Shock · cardiac arrest · pulmonary embolism · bronchospasm · incomplete airway obstruction — the first three because less blood delivers less CO ₂
INCREASED ETCO ₂	Hypoventilation · respiratory depression · hyperthermia
SHARK FIN shape	Obstruction — sloped upstroke, rising plateau. The SHAPE improves before the number does
NO waveform	Esophageal intubation · disconnection · complete obstruction · arrest with no circulation
Normal shape, low number	In arrest: correct tube, poor pulmonary blood flow. Do NOT pull the tube

A normal saturation says nothing about ventilation. The opioid overdose on high-flow oxygen sits at 100% while CO₂ climbs into narcosis — the oximeter says they became hypoxic, the capnograph says they stopped breathing.

Pediatric differences — integrated throughout the exam

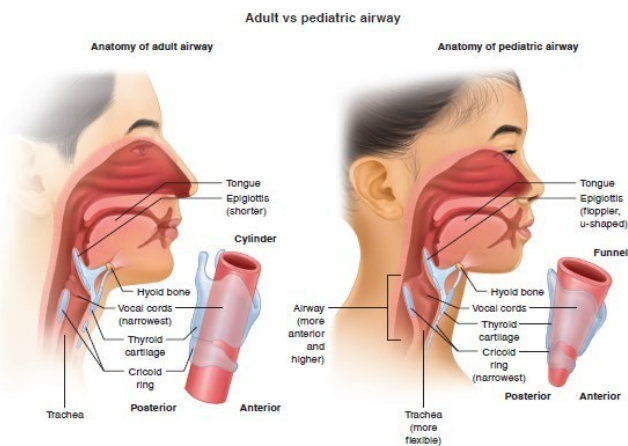


Figure 22-107 Adult versus pediatric airway.

Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

The PAT

Appearance · work of breathing · circulation to skin — all from the doorway.

Work of breathing alone abnormal = DISTRESS.
Work of breathing + appearance = FAILURE.

Difference	Consequence
Large occiput	Head flexes when supine — pad under the SHOULDERS in small children
Narrow airway	A millimeter of edema matters. Croup obstructs a toddler, not an adult
Obligate nose breathers (<6 mo)	Keep the nares clear; nasal suction can transform work of breathing
Large tongue, soft trachea	Obstructs easily; the trachea COLLAPSES if hyperextended — do not overextend
Floppy epiglottis, higher larynx	Straight blade usually preferred
Cricoid ring narrowest	A tube through the cords may still be too large
2× O ₂ demand, smaller reserve	Fast desaturation — preoxygenation buys less time
Rate-dependent cardiac output	BRADYCARDIA = hypoxia until proven otherwise. Ventilate first

Distress → failure: irritability becomes lethargy, tachypnea becomes bradypnea, retractions fade, tachycardia becomes bradycardia. Every transition looks calmer.

KNOWLEDGE AREA 3

Management

Climb only as far as you must — and stop when the patient is oxygenated and ventilated.

The ladder · Oxygen and pressure · Advanced airway · Difficult airway

The ladder — and where each rung stops being enough

1 Position

Head-tilt/chin-lift, or jaw thrust if trauma. Moves the mandible, which moves the tongue. Position of comfort for the conscious patient.

2 Oxygen

Titrated to target, not flooded. Nasal cannula, simple mask, non-rebreather, or nebulizer as indicated.

3 Adjuncts

OPA only with NO gag, sized corner of mouth to angle of jaw. NPA tolerates a gag — avoid with midface trauma or basilar skull fracture.

4 Bag-valve mask

Two providers: one seals with a jaw thrust, one squeezes slowly. Adult ~1 breath q5–6 sec; child q2–3 sec.

5 Advanced airway

Extraglottic device or endotracheal tube — when less invasive methods are ineffective or inappropriate.

6 Surgical airway

Cannot intubate, cannot ventilate. Failure of oxygenation by every other route.

The Rule of Threes — when bagging is not working

Three providers · three inches of padding · three fingers performing a jaw thrust · three airways (two nasal, one oral) · three PSI of gentle pressure · three seconds per breath · three centimeters of PEEP.

Seven checkable items, none of which needs new equipment.

Almost every BVM failure is one of three things

TOO FAST · TOO HARD · NO SEAL.

Too fast and too hard both inflate the stomach, raise intrathoracic pressure and cut venous return. In arrest that directly degrades your compressions.

Escalate when less invasive methods are **INEFFECTIVE** or **INAPPROPRIATE** — not merely because a more advanced option exists. Exam items reward the least invasive effective choice.

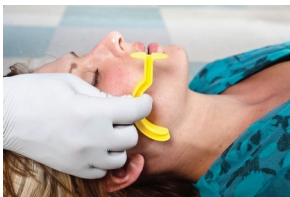


Figure 22-47 Oropharyngeal airway.



Figure 22-44 Two-provider BVM.

Oxygen delivery, and when pressure beats flow

Device	Flow	Approximate O ₂	Use
Nasal cannula	1–6 L/min	Low–moderate	Comfortable, tolerated for hours, lets the patient talk
Simple face mask	6–10 L/min	Moderate	Moderate requirement; delivered concentration varies with the patient
Partial rebreather	Up to 10 L/min	Moderate–high	When a simple mask is not enough
Non-rebreather	12–15 L/min	~80% — NOT 100%	The highest concentration of these, with reservoir filled and a tight seal
Venturi mask	Varies by setting	Precise 24–50%	Rarely used in EMS — recognize it on a transfer
Small volume nebulizer	6–8 L/min	With 3–5 mL fluid	The delivery route for bronchodilators

CPAP — what it does

Recruits collapsed alveoli
 Splints airways open
 Reduces the work of breathing
 In cardiogenic edema, reduces preload and LV afterload

Indicated: pulmonary edema, COPD and asthma exacerbation, pneumonia, drowning

CPAP contraindications — and the single principle behind them

Unresponsive or unable to protect the airway · apnea or agonal respirations · respiratory or cardiac arrest · hypotension · suspected pneumothorax · active GI bleeding or recent gastric surgery · facial anomalies or trauma · closed head injury · nausea and vomiting.

The principle: a conscious cooperative patient who is BREATHING, with a blood pressure that tolerates reduced venous return, and no hole for the pressure to escape through.

Oxygen is a drug — dose, target, indication, side effects

Titrate for normoxia. Hyperoxia causes vasoconstriction and reactive oxygen species, and is linked to worse outcomes post-arrest, in stroke and in MI. And the folklore, stated plainly: never withhold oxygen from a hypoxic COPD patient to protect a drive — titrate, do not restrict.

Extraglottic devices, intubation, and confirmation

1 Extraglottic devices

RETROGLOTTIC pass behind the larynx (Combitube, King LT). SUPRAGLOTTIC seat above it (LMA, i-gel). Blind, fast, high success — and less aspiration protection than a cuffed tube.

2 The seal has a ceiling

Severe bronchospasm, morbid obesity or pulmonary edema can exceed the seal pressure — the device leaks before delivering an adequate volume.

3 Intubation indications

Failure to MAINTAIN or PROTECT the airway · failure to VENTILATE or OXYGENATE · anticipated clinical course — which permits acting before failure.

4 Depth and position

Cuff 2–3 cm past the cords; roughly 3 × the tube size in cm at the teeth. Absent LEFT sounds with a normal waveform = right mainstem. WITHDRAW.

Confirmation	Status	Failure mode
Waveform capnography	GOLD STANDARD	False negative in ARREST — low pulmonary blood flow delivers little CO ₂ . Shape confirms the trachea
Direct visualization	Supportive	Confirms a moment, not a current state — tubes move
Misting in the tube	Supportive	Occurs with ESOPHAGEAL placement too — the stomach holds warm humid gas
Auscultation	Supportive	Misleads, especially in children — a small chest transmits sound across the thorax

DOPE

Displacement
Obstruction
Pneumothorax
Equipment

The differential when ANY tubed patient deteriorates. Reconfirm after every patient movement.

Capnography answers trachea versus esophagus. Equal breath sounds answer too deep. Two different questions — two different tests.

The difficult airway, and the failed airway

1 Four difficulties

Difficult BVM • difficult EGA • difficult intubation • difficult cricothyrotomy. A backup is only useful if it fails for DIFFERENT reasons than the primary.

2 LEMONS — mostly anatomy

Look • Evaluate 3-3-2 • Mallampati • Obstruction • Neck mobility • Saturations. Use the PATIENT’S fingers — the measurement is proportional to them.

3 HEAVEN — adds physiology

Hypoxemia • Extremes of size • Anatomic disruption • Vomit/blood • Exsanguination • Neck mobility • rapid desaturation. Validated in PREHOSPITAL patients.

4 Prediction vs description

Mallampati predicts before you touch. Cormack-Lehane and POGO describe what you got. Grade 3 — epiglottis only — is the bougie’s indication.

The failed airway is CANNOT INTUBATE, CANNOT VENTILATE

A failed intubation in a patient you can still bag is not a surgical airway. The bar is failure of OXYGENATION by every other available route — and the commonest failure in cricothyrotomy is not technical, it is deciding too late.

Cricothyrotomy essentials

Landmark: the soft depression between the THYROID and CRICOID cartilages. Needle technique in young children — the membrane is tiny and the larynx high. Open technique in older children and adults. A needle airway oxygenates; it does not ventilate well.

Improves first-attempt success	Why
Positioning — ear to sternal notch	Aligns the axes. Free, and the most modifiable factor of all
Preoxygenation and apneic oxygenation	Buys time — a cannula left running under the mask costs one cannula
Bougie	Passes under an epiglottis-only view; tracheal clicks and hold-up confirm
External laryngeal manipulation / BURP	Brings an anterior larynx into view
Video laryngoscopy, and ongoing practice	Video improves the VIEW, not tube delivery. Practice is the factor most within your control

Drug classes — what each one does, and where it fits

Class	What it does	Where it fits
Beta-2 agonist	Relaxes bronchial smooth muscle directly	First line in bronchospasm — asthma, COPD, anaphylaxis. Tremor, tachycardia, anxiety
Anticholinergic	Blocks muscarinic receptors — bronchodilates and dries secretions	Added to a beta-2 agonist: two receptors, additive effect
Corticosteroid	Treats the INFLAMMATORY component	Given early, works in hours — which is why the delayed phase of asthma matters
Magnesium	Smooth muscle relaxation	Severe refractory bronchospasm. Watch for hypotension
Epinephrine	Alpha vasoconstricts mucosa; beta-2 bronchodilates	First line in anaphylaxis · late option in severe asthma · nebulized for upper airway edema
Nitrates / diuretics	Reduce preload and afterload; remove fluid	CARDIOGENIC pulmonary edema — a pump problem, not an airway one
Naloxone	Competitive opioid antagonist	Opioid respiratory depression. Ventilate FIRST. Shorter-acting than many opioids

Four classes in drug-facilitated intubation

Premedication · induction agent · neuromuscular blocker · post-intubation sedation and analgesia — which is essential, not optional.

What a paralytic actually does

Stops SKELETAL muscle without affecting cardiac or smooth muscle. The heart beats on; the diaphragm does not. The patient is now entirely dependent on you.

Delayed sequence intubation

Sedate FIRST to break the hypoxia-agitation loop, then preoxygenate properly, then proceed. Sedation with its own goal: preoxygenation.

Classes and effects only — doses vary by system. Know what each drug does and when it is indicated.

Suction, gastric decompression, and the stoma patient



Figure 22-128 Oropharyngeal suctioning.

Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

1 Suction — 10 seconds, and why

It removes AIR with the secretions, emptying the FRC of an already hypoxic patient. Measure depth, insert with suction OFF, suction on withdrawal only.

2 Rigid for volume, soft for reach

Yankauer in the oropharynx. Soft catheter through an NPA, ET tube or trach — and through a tube it is STERILE technique.

3 Gastric decompression is a VENTILATION intervention

Distention elevates the diaphragm and cuts lung volume. OG for the unconscious; NG for the awake — not with facial trauma or basilar skull fracture.

4 One question before you bag a stoma

Is the upper airway still connected? Tracheostomy — usually yes. Total LARYNGECTOMY — no, and bagging the face achieves nothing.

Lead with suction

Contaminated airways are a leading cause of failed intubation. Clear the field before the laryngoscope, not around it afterwards.

Trach troubleshooting

Displacement • obstruction • pulmonary problem • equipment. Remove anything on the end of the tube, remove the inner cannula, then suction.

Suctioning is a patient movement — and every patient movement means reconfirming tube placement.

Disease-specific management — the quick table

Condition	The identifying finding	Management aimed at the mechanism
Asthma / COPD exacerbation	Wheeze, prolonged expiration, accessory muscles	Oxygen to target • beta-2 agonist + anticholinergic • CPAP if severe • steroids • magnesium if refractory
Cardiogenic pulmonary edema	Crackles, cardiac history, often LOWER ETCO ₂ than COPD	Upright position • oxygen • CPAP • nitrates. Not primarily a bronchodilator problem
Anaphylaxis	Urticaria, angioedema, stridor, hypotension after exposure	EPINEPHRINE IM FIRST • oxygen • bronchodilator • fluids. Antihistamines and steroids are adjuncts
Upper airway obstruction	Stridor, drooling, ineffective cough	Position • remove what you can see • do not agitate • surgical airway only if all else fails
Tension pneumothorax	Unilateral absent sounds, hypotension, JVD, tracheal shift (late)	Needle decompression — not intubation. Positive pressure makes it worse
Pulmonary embolism	SUDDEN dyspnea, CLEAR lungs, low ETCO ₂ at a high rate, risk factors	High-concentration oxygen, expecting limited improvement • rapid transport
Carbon monoxide	Normal SpO ₂ , headache, nausea, multiple patients in one building	Remove from source • high-concentration oxygen • CO-oximetry. Consider cyanide in fires
Opioid overdose	Slow shallow respirations, pinpoint pupils, normal lungs	VENTILATE first, then naloxone. Expect re-sedation

Both wheeze. Both are dyspneic. The history, the cardiac findings and a lower ETCO₂ separate heart failure from COPD — and stridor is never treated with a bronchodilator.

Pediatric differences that change what you do

1 Position

Pad under the SHOULDERS in small children — the large occiput already flexes the head. Never hyperextend: the soft trachea collapses.

2 Ventilate faster, smaller

About 1 breath every 2–3 seconds against an adult's 5–6. Volume to visible chest rise only. Know how to occlude the pop-off valve.

3 OPA goes in right side up

Follow the curve of the tongue with a tongue blade. Rotating it 180° risks damaging the soft palate.

4 Choking by age

Infant: back blows and CHEST thrusts — the large liver rules out abdominal thrusts. Over 1 year: abdominal thrusts. No blind sweeps, ever.

5 Suction gently

Lower pressure, under 10 seconds, no deeper than you can see — and watch for bradycardia from vagal stimulation.

6 Intubate differently

Straight blade. Size by LENGTH-BASED TAPE, not age. ≤ 30 seconds per attempt. Short tubes move with every head movement.

Bradycardia in a sick child is hypoxia until proven otherwise — and the treatment is ventilation

Cardiac output in infants and small children is rate-dependent, so they compensate by raising heart rate. A falling rate means the compensation is failing. Many pediatric bradycardias resolve with effective bag-mask ventilation — which is why ventilation, not a drug, is the first answer.

A surgical airway in a young child is the needle technique: the membrane is tiny and the larynx high and soft.

Item types — with airway examples

Item type	What it asks	Airway example	The trap
Multiple choice	One correct of four	Which finding best indicates correct tube placement?	Two options are defensible; one is BEST
Multiple response	Two or three correct of five or six	Select the three findings suggesting respiratory failure	No partial credit — select exactly the number asked
Build list	Put options in order	Order the steps of bag-mask ventilation for an apneic adult	Anchor first and last, then fill the middle
Drag-and-drop	Sort into categories	Sort these conditions into ventilation, diffusion, perfusion	Do the obvious ones first; the rest narrow by elimination
Options box	Classify rows in a table	Mark each finding as expected or not expected in tension pneumothorax	Treat every row as its own true/false
Graphical	Read a waveform, image or chart	Identify this capnography waveform	Read SHAPE before height
Scenario-based	Several items from one passage	A patient deteriorating across three sets of vitals	New information arrives mid-scenario — re-enter the cycle

Answer the question asked

The stem names the step of the clinical judgment cycle — recognize, analyze, hypothesize, generate, act, evaluate — and that tells you what kind of answer is wanted.

Adaptive means it gets harder

Items rise toward your ability level. Feeling stretched is the design working, not a sign you are failing.

No partial credit anywhere

Every item type is scored all-or-nothing. On multiple response, an extra selection costs the whole item.

The findings that look like improvement

1 A silent chest

The asthmatic who has stopped wheezing has stopped moving enough air to make noise. Noise requires airflow.

2 A falling respiratory rate

In a previously tachypneic patient it is exhaustion, not recovery. Tachypnea deteriorating into bradypnea is the textbook progression.

3 Fading retractions

In a tiring child, decreased retractions and decreasing stridor with decreasing breath sounds signal impending failure.

4 A patient who calms down

Rising carbon dioxide is sedating. The agitated patient who becomes peaceful may be about to arrest.

5 Bradycardia in a hypoxic child

Rate-dependent cardiac output means a slowing heart is failing compensation — ventilate, do not reassure.

6 A reassuring oximeter

Normal in carbon monoxide. Normal in an opioid overdose on oxygen while CO₂ climbs. Late in everyone, because the curve is flat above 90%.

Monitors that mislead

Low ETCO₂ with a NORMAL waveform in arrest is perfusion, not tube position — do not pull the tube. Misting occurs with esophageal placement. Auscultation misleads in a small chest. Rising saturation lags by a minute.

Three reversals worth memorizing

CLEAR lungs with real hypoxia points to PERFUSION. Normal minute volume can still be severe hypoventilation once dead space is subtracted. Hypotension in a child is a LATE sign.

Twelve things to be able to say out loud

1 The three processes

Ventilation moves air, diffusion crosses the membrane, perfusion delivers the blood. Name a disease that breaks each.

2 The dead space arithmetic

500×12 and 200×30 give the same minute volume and wildly different alveolar ventilation.

3 The curve

Flat above 90%, steep below. Saturation is a late warning.

4 Nine life threats

Seven need no equipment. Recite them.

5 Six sounds by location

Snoring, stridor, wheeze, rhonchi, crackles, rub — and why absent is worse than loud.

6 Four waveform questions

Is there one, what shape, what height, what trend. Shape before height.

7 The ladder

Position, oxygen, adjuncts, BVM, advanced airway, surgical airway — and stop when adequate.

8 The Rule of Threes

Seven checkable items when bagging fails, none needing new equipment.

9 CPAP contraindications

And the single principle: conscious, breathing, with a pressure that tolerates reduced venous return.

10 Confirmation

Waveform capnography is the gold standard; its one false negative is arrest.

11 Four difficulties

BVM, EGA, intubation, cricothyrotomy — and a backup that fails differently.

12 The pediatric fact

Bradycardia in a sick child is hypoxia until proven otherwise. Ventilate.

Cover the text. If the heading does not produce the content, that is where revision goes.