Crown to Cortex

Pharmacology

Respiratory Pharmacology

The Unhackables Medical

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How to read this topic

Respiratory Pharmacology is a high-yield Pharmacology topic for NEET PG and INI-CET. The safest preparation approach is to organize it by mechanism, classification, prototype drugs, indications, adverse effects, contraindications, interactions, and emergency use. This PDF is designed as a compact final-revision note, not a textbook chapter.

Classify

Place the drug in the correct class before reading the clinical stem.

V

Mechanism

Convert receptor, enzyme, or pathway action into expected benefit.

V

Patient filter

Apply pregnancy, renal/hepatic disease, ECG, electrolyte, allergy, and interaction filters.

V

Exam answer

Choose the drug that fits the indication and avoids the hidden contraindication.

Classification map

Class / axis	High-yield details
Mechanism	classify by receptor/enzyme/channel/site of action
Prototype	learn one clean drug per class
Toxicity	signature adverse effects identify the answer
Clinical selection	comorbidity and contraindication decide final choice

Prototype drug map

Prototype	What to remember
First-line	drug used when no special contraindication exists
Alternative	used in allergy, pregnancy, organ failure, or resistance
Emergency drug	chosen for fast onset and suitable route
Antidote	must be memorized with toxicity pattern

Mechanism to clinical use

1. Mechanism

Mechanism anchor: classify by receptor/enzyme/channel/site of action. In NEET PG style questions, this becomes important when the stem asks for drug choice, mechanism of toxicity, resistance, organ-specific effect, or a contraindication. Always connect the class to the expected physiological change rather than memorizing the name alone.

Clinical conversion: ask whether the desired effect is immediate symptom relief, disease modification, prophylaxis, reversal of toxicity, or long-term prevention. The same class can be correct or wrong depending on timing, route, patient risk, and monitoring feasibility.

2. Prototype

Mechanism anchor: learn one clean drug per class. In NEET PG style questions, this becomes important when the stem asks for drug choice, mechanism of toxicity, resistance, organ-specific effect, or a contraindication. Always connect the class to the expected physiological change rather than memorizing the name alone.

Clinical conversion: ask whether the desired effect is immediate symptom relief, disease modification, prophylaxis, reversal of toxicity, or long-term prevention. The same class can be correct or wrong depending on timing, route, patient risk, and monitoring feasibility.

3. Toxicity

Mechanism anchor: signature adverse effects identify the answer. In NEET PG style questions, this becomes important when the stem asks for drug choice, mechanism of toxicity, resistance, organ-specific effect, or a contraindication. Always connect the class to the expected physiological change rather than memorizing the name alone.

Clinical conversion: ask whether the desired effect is immediate symptom relief, disease modification, prophylaxis, reversal of toxicity, or long-term prevention. The same class can be correct or wrong depending on timing, route, patient risk, and monitoring feasibility.

4. Clinical selection

Mechanism anchor: comorbidity and contraindication decide final choice. In NEET PG style questions, this becomes important when the stem asks for drug choice, mechanism of toxicity, resistance, organ-specific effect, or a contraindication. Always connect the class to the expected physiological change rather than memorizing the name alone.

Clinical conversion: ask whether the desired effect is immediate symptom relief, disease modification, prophylaxis, reversal of toxicity, or long-term prevention. The same class can be correct or wrong depending on timing, route, patient risk, and monitoring feasibility.

Drug signatures

Drug / class	Mechanism cue	Use cue	Toxicity cue
First-line	drug used when no special contraindication exists	Know preferred indication	Know signature adverse effect
Alternative	used in allergy, pregnancy, organ failure, or resistance	Know preferred indication	Know signature adverse effect
Emergency drug	chosen for fast onset and suitable route	Know preferred indication	Know signature adverse effect
Antidote	must be memorized with toxicity pattern	Know preferred indication	Know signature adverse effect

Clinical edges

- Organ failure: renal and hepatic adjustment
- Pregnancy: avoid teratogenic or fetal-toxic drugs
- Interactions: enzyme effects and additive toxicity
- Monitoring: labs, ECG, drug levels, or clinical endpoint
- For Respiratory Pharmacology, start every clinical question by identifying the syndrome, patient risk factors, organ function, pregnancy status, and interacting drugs.
- Prototype drugs are more important than long drug lists; know one clean example for each mechanism.
- Adverse-effect signatures often identify the drug even when the stem hides the class name.
- When two drugs look similar, compare onset, route, elimination, monitoring, and toxicity.

Adverse effects and contraindication logic

First-line

Expected exam cue: drug used when no special contraindication exists. When this drug or class appears in a clinical vignette, actively look for allergy, pregnancy risk, renal or hepatic impairment, ECG abnormality, electrolyte disturbance, bleeding risk, respiratory disease, CNS depression, or interacting medicines.

How to eliminate options: reject drugs that worsen the dominant clinical danger in the stem, even if their mechanism seems suitable. This is especially important in pharmacology questions where the wrong option is often a contraindicated first-line drug.

Alternative

Expected exam cue: used in allergy, pregnancy, organ failure, or resistance. When this drug or class appears in a clinical vignette, actively look for allergy, pregnancy risk, renal or hepatic impairment, ECG abnormality, electrolyte disturbance, bleeding risk, respiratory disease, CNS depression, or interacting medicines.

How to eliminate options: reject drugs that worsen the dominant clinical danger in the stem, even if their mechanism seems suitable. This is especially important in pharmacology questions where the wrong option is often a contraindicated first-line drug.

Emergency drug

Expected exam cue: chosen for fast onset and suitable route. When this drug or class appears in a clinical vignette, actively look for allergy, pregnancy risk, renal or hepatic impairment, ECG abnormality, electrolyte disturbance, bleeding risk, respiratory disease, CNS depression, or interacting medicines.

How to eliminate options: reject drugs that worsen the dominant clinical danger in the stem, even if their mechanism seems suitable. This is especially important in pharmacology questions where the wrong option is often a contraindicated first-line drug.

Antidote

Expected exam cue: must be memorized with toxicity pattern. When this drug or class appears in a clinical vignette, actively look for allergy, pregnancy risk, renal or hepatic impairment, ECG abnormality, electrolyte disturbance, bleeding risk, respiratory disease, CNS depression, or interacting medicines.

How to eliminate options: reject drugs that worsen the dominant clinical danger in the stem, even if their mechanism seems suitable. This is especially important in pharmacology questions where the wrong option is often a contraindicated first-line drug.

Exam traps

- Do not choose a drug only because it belongs to the right class; contraindications can reverse the answer.
- Do not ignore renal or hepatic impairment in dosing questions.
- Drug interactions are commonly tested through enzyme induction, enzyme inhibition, additive toxicity, or pharmacodynamic opposition.
- Emergency therapy depends on speed and route, not only mechanism.
- In Respiratory Pharmacology, do not memorize a class without its route, onset, elimination, and monitoring.
- Toxicity questions often hide the drug name and reveal the answer through one adverse-effect signature.
- Contraindications are tested more often than rare mechanisms.
- A drug can be first-line in one patient and dangerous in another.

Last-day revision grid

Question	Answer to recall quickly
Best prototype?	First-line, Alternative, Emergency drug, Antidote
Most tested danger?	toxicity, contraindication, interaction, and monitoring
Emergency angle?	route, onset, antidote, supportive care
Do-not-miss filter?	pregnancy, renal/hepatic failure, ECG/electrolytes, bleeding or respiratory risk

High-yield definitions

Term	Definition / exam meaning
Mechanism	classify by receptor/enzyme/channel/site of action
Prototype	learn one clean drug per class
Toxicity	signature adverse effects identify the answer
Clinical selection	comorbidity and contraindication decide final choice
First-line	drug used when no special contraindication exists
Alternative	used in allergy, pregnancy, organ failure, or resistance
Emergency drug	chosen for fast onset and suitable route
Antidote	must be memorized with toxicity pattern
Hemodynamics	Map drug action to preload, afterload, contractility, heart rate, and conduction.
Outcomes	Mortality benefit matters more than symptom relief in chronic disease.
Electrolytes	Potassium, magnesium, sodium, and calcium strongly affect cardiac drug safety.

How this helps in Respiratory Pharmacology: this page is meant to convert memorized pharmacology into option elimination. Read the left column first, then force yourself to say the mechanism, clinical use, toxicity, and reason another option is wrong.

Drug-by-drug comparison

Comparison	How to separate them in an exam stem	Most useful discriminator
First-line vs Alternative	First-line is recalled by: drug used when no special contraindication exists. Alternative is recalled by: used in allergy, pregnancy, organ failure, or resistance.	Indication, toxicity pattern, route/onset, or contraindication hidden in the stem.
Emergency drug vs Antidote	Emergency drug is recalled by: chosen for fast onset and suitable route. Antidote is recalled by: must be memorized with toxicity pattern.	Indication, toxicity pattern, route/onset, or contraindication hidden in the stem.

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Toxicity signatures

Drug / class	Toxicity pattern to actively search for	Immediate exam response
First-line	Link the prototype clue to organ toxicity, laboratory change, ECG change, bleeding, CNS depression, allergy, or pregnancy risk. Cue: drug used when no special contraindication exists	Stop/avoid the drug if the stem contains the danger sign; choose antidote or safer alternative when asked.
Alternative	Link the prototype clue to organ toxicity, laboratory change, ECG change, bleeding, CNS depression, allergy, or pregnancy risk. Cue: used in allergy, pregnancy, organ failure, or resistance	Stop/avoid the drug if the stem contains the danger sign; choose antidote or safer alternative when asked.
Emergency drug	Link the prototype clue to organ toxicity, laboratory change, ECG change, bleeding, CNS depression, allergy, or pregnancy risk. Cue: chosen for fast onset and suitable route	Stop/avoid the drug if the stem contains the danger sign; choose antidote or safer alternative when asked.
Antidote	Link the prototype clue to organ toxicity, laboratory change, ECG change, bleeding, CNS depression, allergy, or pregnancy risk. Cue: must be memorized with toxicity pattern	Stop/avoid the drug if the stem contains the danger sign; choose antidote or safer alternative when asked.
Respiratory Pharmacology	Any severe allergy, organ failure, pregnancy risk, or dangerous interaction can override first-line status.	Do not pick a drug only because it is famous.

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Contraindication filters

Clinical filter	What it changes	Exam habit
Pregnancy/lactation	Avoid teratogenic, fetal-toxic, or neonatal-toxic drugs; prefer established safer options.	Always scan age/sex/history lines.
Renal impairment	Accumulation increases toxicity for renally cleared drugs; dose interval may need extension.	Look for creatinine, oliguria, CKD, elderly patient.
Hepatic disease	Reduced metabolism, low albumin, and bleeding risk can change drug choice.	Check jaundice, cirrhosis, INR, albumin.
ECG/electrolytes	QT prolongation, heart block, hypokalemia, and hyperkalemia decide many answers.	Never ignore ECG and potassium.
Respiratory disease	Bronchospasm or respiratory depression risk can make a familiar drug unsafe.	Asthma/COPD/sleep apnea are not decorative details.
Bleeding risk	Antiplatelets, anticoagulants, thrombolytics, NSAIDs, and marrow-toxic drugs need caution.	Check ulcer, surgery, stroke, platelets, INR.
First-line	drug used when no special contraindication exists	Ask: where is this drug dangerous?
Alternative	used in allergy, pregnancy, organ failure, or resistance	Ask: where is this drug dangerous?
Emergency drug	chosen for fast onset and suitable route	Ask: where is this drug dangerous?

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Drug interaction map

Interaction type	Mechanism	Common exam expression
CYP induction	Increases metabolism of substrate drugs and can cause treatment failure.	Rifampicin/carbamazepine/phenytoin reducing OCP, warfarin, antiretroviral, or steroid effect.
CYP inhibition	Raises substrate levels and toxicity.	Macrolide/azole/ritonavir/cimetidine/grapefruit toxicity stem.
Additive toxicity	Two drugs injure the same organ or pathway.	QT plus QT, bleeding plus bleeding, nephrotoxic plus nephrotoxic, CNS depressant plus CNS depressant.
Pharmacodynamic opposition	One drug blocks the desired effect of another.	NSAID reducing antihypertensive effect; beta blocker opposing beta agonist.
First-line	drug used when no special contraindication exists	Check whether the vignette adds another drug that amplifies toxicity or reduces benefit.
Alternative	used in allergy, pregnancy, organ failure, or resistance	Check whether the vignette adds another drug that amplifies toxicity or reduces benefit.
Emergency drug	chosen for fast onset and suitable route	Check whether the vignette adds another drug that amplifies toxicity or reduces benefit.
Antidote	must be memorized with toxicity pattern	Check whether the vignette adds another drug that amplifies toxicity or reduces benefit.

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Monitoring and dose adjustment

Monitoring target	Why it matters	What to remember
Clinical endpoint	Symptom relief or prevention outcome confirms benefit.	Pain, BP, seizure control, infection response, glucose, dyspnea, psychosis, bleeding.
Laboratory endpoint	Detects efficacy and silent toxicity.	Renal function, liver enzymes, CBC, electrolytes, coagulation, glucose, drug levels.
ECG	Many drugs alter conduction, QT, or rhythm.	QT prolongation, AV block, QRS widening, torsades risk.
Therapeutic drug monitoring	Needed when therapeutic window is narrow.	Lithium, digoxin, phenytoin, valproate, aminoglycosides, vancomycin, tacrolimus.
First-line	Monitoring depends on the toxicity implied by its mechanism and elimination.	drug used when no special contraindication exists
Alternative	Monitoring depends on the toxicity implied by its mechanism and elimination.	used in allergy, pregnancy, organ failure, or resistance
Emergency drug	Monitoring depends on the toxicity implied by its mechanism and elimination.	chosen for fast onset and suitable route

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Emergency decision table

Emergency scenario	First pharmacology decision	Common mistake
Shock/anaphylaxis/severe acute state	Choose route and onset before elegance of mechanism.	Choosing an oral chronic drug for an emergency.
Poisoning/toxicity	Stabilize airway, breathing, circulation, then antidote if indicated.	Giving antidote while ignoring supportive care.
Severe infection or organ-threatening disease	Start rational empirical therapy promptly, then narrow when data arrives.	Waiting for perfect information in an unstable patient.
Withdrawal or rebound	Recognize dependence physiology and taper/replace appropriately.	Abruptly stopping clonidine, beta blockers, steroids, opioids, alcohol, or benzodiazepines.
Respiratory Pharmacology: First-line	drug used when no special contraindication exists	Wrong route, delayed onset, or ignored contraindication.
Respiratory Pharmacology: Alternative	used in allergy, pregnancy, organ failure, or resistance	Wrong route, delayed onset, or ignored contraindication.
Respiratory Pharmacology: Emergency drug	chosen for fast onset and suitable route	Wrong route, delayed onset, or ignored contraindication.
Respiratory Pharmacology: Antidote	must be memorized with toxicity pattern	Wrong route, delayed onset, or ignored contraindication.

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Rapid pathway

Read the stem

Disease, severity, age, pregnancy, organ function, emergency status.

v

Name the class

Mechanism and prototype before option elimination.

v

Apply exclusions

Contraindications, interactions, and toxicity signatures.

v

Pick final answer

Most specific safe drug for that exact stem.