Toxidromes and Antidotes

Toxidromes, antidotes and decontamination for exam review

TOXIDROMES AT A GLANCE

TOXIDROME	VITALS	PUPILS, SKIN	CLUES
Sympathomimetic (cocaine, meth)	High HR, BP, temp	Dilated; sweaty	Agitation, seizures
Anticholinergic (diphenhydramine, jimsonweed)	High HR, temp	Dilated; hot, dry, red	Delirium, urinary retention, quiet bowel
Cholinergic (organophosphates, nerve agents)	Low HR (can be high)	Pinpoint; wet	SLUDGE, wheeze, fasciculations
Opioid	Low RR	Pinpoint; normal	Coma, shallow breaths
Sedative-hypnotic (benzos, barbiturates)	Normal to low	Variable; normal	Slurred speech, ataxia

Cholinergic DUMBELS: diarrhea, urination, miosis, bradycardia/bronchorrhea/bronchospasm, emesis, lacrimation, salivation. The three B's kill.

EXAM TIP Sympathomimetic and anticholinergic are both hot, fast and dilated. Sweaty skin means sympathomimetic; dry skin means anticholinergic.

SAFETY Sympathomimetic crisis: sedate (often benzodiazepines), avoid prolonged restraint without sedation, cool fast; ice-water immersion is preferred (AHA 2025).

SEROTONIN SYNDROME VS NMS

FEATURE	SEROTONIN SYNDROME	NMS
Trigger	SSRI, SNRI, MAOI, tramadol	Antipsychotics, metoclopramide; stopping levodopa
Onset	Hours, usually within 24 h	Over days
Muscles	Clonus, hyperreflexia, tremor	Severe rigidity, reflexes decreased
Other	Mydriasis, diarrhea, shivering	High fever, high CK
Treatment	Stop drug, benzodiazepines, cooling, cyproheptadine	Stop drug, cooling, benzodiazepines, bromocriptine, dantrolene

Cool physically; antipyretics do not work in serotonin syndrome.

EXAM TIP Both cause fever, sweating and confusion. Speed of onset and clonus versus rigidity tell them apart.

REVERSAL ANTIDOTES

Doses on this page are typical adult doses for exam study; follow your institution's or agency's protocols.

POISON	ANTIDOTE, TYPICAL ADULT DOSE	EXAM POINT
Opioids	Naloxone 0.2–2 mg IV/IM/IO or 2–4 mg nasal, every 2–3 min	Goal is breathing; may wear off first
Benzodiazepines	Flumazenil 0.2 mg IV, titrated to 1 mg	Rarely used; no role in arrest
Organophosphates	Atropine 1–2 mg IV, doubled every 5 min; pralidoxime 1–2 g IV	Atropine endpoint: clear chest, not pupils
Methanol, ethylene glycol	Fomepizole 15 mg/kg IV, then 10 mg/kg every 12 h	Blocks alcohol dehydrogenase
Cyanide (smoke inhalation)	Hydroxocobalamin 5 g IV over 15 min, plus 100% oxygen	Preferred over nitrite if CO likely; red skin, urine
Anticholinergic delirium	Physostigmine 1 mg slow IV over 5 min	Avoid with TCA or QRS over 100 ms

- EMS DuoDote (atropine plus pralidoxime): 1 autoinjector IM if mild, 3 rapidly if severe.
- Discharge opioid overdose patients with naloxone and teaching (AHA 2025).

SAFETY Flumazenil can trigger seizures in benzodiazepine-dependent patients or with TCA co-ingestion. Physostigmine has caused asystole in severe TCA poisoning.

SAFETY Opioid arrest: CPR with breaths comes first; naloxone may be given if it does not delay CPR (AHA 2025). Xylazine sedation may persist after naloxone; support breathing.

ACETAMINOPHEN AND NAC

- Early symptoms are vague; liver failure appears days later.
- Level at 4 h or later; on or above 150 mcg/mL at 4 h: give NAC.
- Over 200 mg/kg or 10 g and no level by 8 h: start NAC.
- IV NAC, 3-bag: 150 mg/kg over 1 h, 50 mg/kg over 4 h, 100 mg/kg over 16 h.
- Rash or wheeze on IV NAC: pause, antihistamine, restart; flushing alone often settles.
- Extended-release or unknown time: repeat levels, call poison control.

EXAM TIP Exams test the 4-hour level, the 150 line and the 8-hour window.

CARDIOTOXIC DRUGS

Typical adult doses; follow your institution's or agency's protocols.

POISON	TREATMENT, TYPICAL ADULT DOSE	EXAM POINT
TCA, sodium channel blockers	Sodium bicarbonate 50–150 mEq IV, repeat to narrow QRS	QRS ≥100 ms: seizures; ≥160 ms: VT/VF
Beta-blockers	Glucagon 2–10 mg IV, then infusion	Bypasses beta receptors; vomiting
Calcium channel blockers	Calcium chloride 2 g or gluconate 6 g IV	Chloride: central line preferred
Beta-blockers, CCBs	High-dose insulin 1 unit/kg, then 1–10 units/kg/h	Give dextrose; check glucose, K
Digoxin	Digoxin Fab 10–20 vials (acute, unknown); 6 if chronic	Dysrhythmias or K over 5.5; levels unreliable after
Local anesthetics	20% lipid 1.5 mL/kg (up to 100 mL), then infusion	Small epinephrine doses; no vasopressin

SAFETY Potassium drops with bicarbonate, high-dose insulin and digoxin Fab. During bicarbonate, avoid pH above 7.50–7.55 and sodium above 150–155 mEq/L.

BEYOND ANTIDOTES: ECMO, MCS, DIALYSIS

- VA-ECMO: reasonable for poison-induced cardiogenic shock, dysrhythmias or arrest despite maximal therapy; unproven in vasodilatory shock. Call early.
- Sympathomimetic cardiogenic shock: IABP or VA-ECMO is reasonable.
- Newer percutaneous pumps (such as Impella) may be considered; no graded AHA advice.
- Dialysis clears toxic alcohols, lithium and salicylates, not TCAs.
- Intermittent hemodialysis is preferred; CRRT if IHD is unavailable.

DECONTAMINATION

- Poison Control: 1-800-222-1222, free, 24/7.
- Activated charcoal: consider within 1 h, not routinely; adult dose 50–100 g.
- Never with an unprotected airway (aspiration risk).
- Charcoal misses alcohols, caustics, iron, lithium; not for hydrocarbons.
- Whole bowel irrigation: sustained-release pills, metals, drug packets.
- Organophosphate on skin: PPE, remove clothing, wash.

Sources (29) are listed with links at icubasics.com/sheets/toxicology-antidotes.html. For education and exam preparation only. Not medical advice; follow current guidelines and your institution's protocols. ICU Basics is an independent study aid not affiliated with any certifying body.