Toxicological Emergencies

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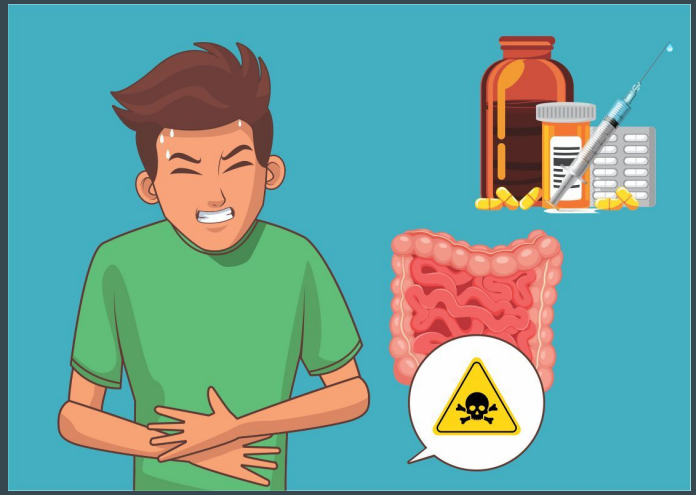
What is a Toxicological Emergency?

A toxicological emergency is any situation where exposure to a toxin, poison, or drug causes life-threatening effects.

Over **2 million poisonings reported each year** in the US with ~50% of poisonings occur in children age 6 and under (American Association of Poison Control Centers)



Toxin - a poisonous substance produced by bacteria, animals, or plants

Poison - any substance whose chemical action can damage the body or impair bodily function (the dose is what matters!)

General Treatment

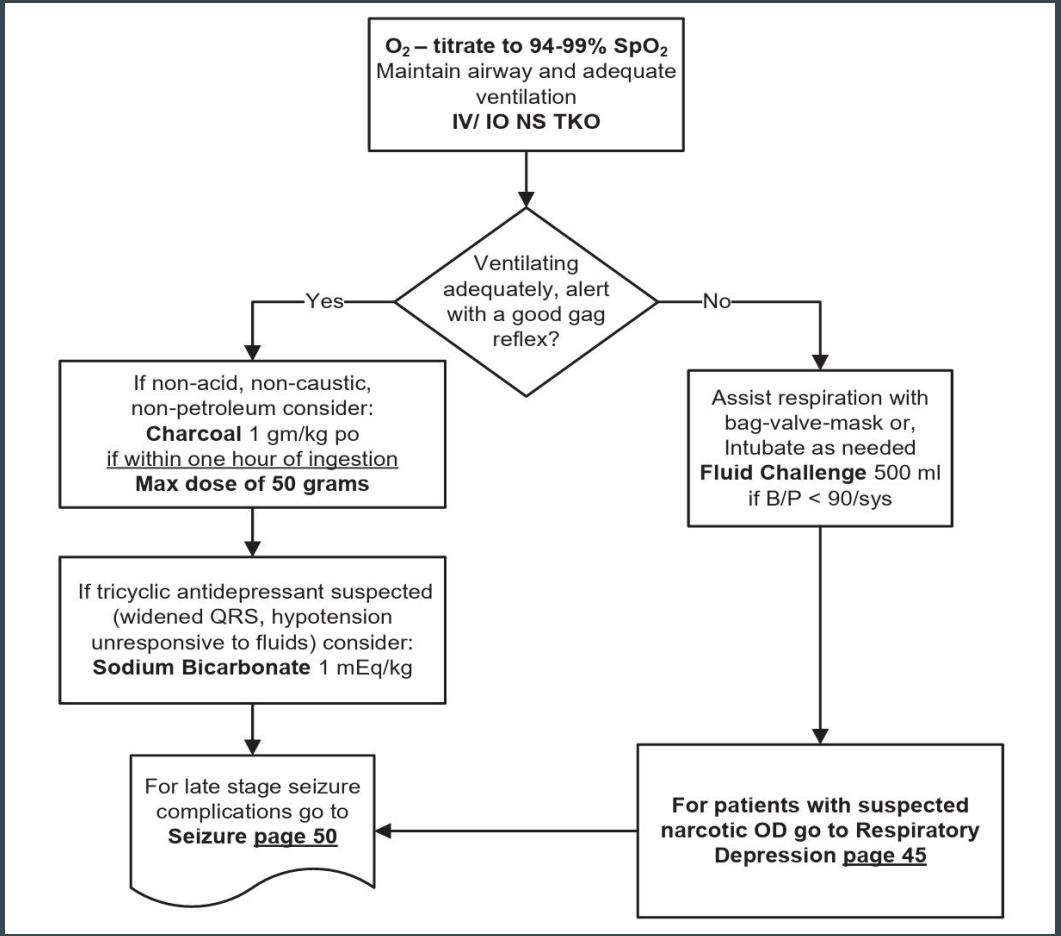
ALCO Treatment Protocol

POISONING | INGESTION | OVERDOSE

- **Routine Medical Care**
- **Protect Yourself!** - See Hazardous Materials Incidents - EMS Response **page 152**
- **Identify substance** - Bring any containers, labels or a sample (if safe) into the hospital with the patient. Determine type, amount and time of the exposure.
- **Consult the Base Physician:**
  - ➔ If ***organophosphate poisoning*** suspected*
  - ➔ If ***calcium channel*** or ***beta blocker OD*** suspected*
  - ➔ For treatment options for specific exposures

  * Consider contacting Poison Control for other substances **800-222-1222**
- Remove contaminated clothing. Brush off powders, wash off liquids with copious amounts H_2O

ALCO Flow Chart



Scene Safety

EMS interface with HazMat teams

2.1 The Incident Command System (ICS) shall be used for on scene management

2.2 The Medical Branch Supervisor shall make contact with the Incident Commander, face-to-face or by radio, who will direct the Medical Branch Supervisor to the Hazardous Materials Group Supervisor

2.3 Pertinent information will be relayed to the Medical Branch Supervisor including, patient information (number requiring transport and injuries) and the type of exposure (chemical name and information about the chemical [**SPELL CHEMICAL NAME**])

2.4 The Medical Branch Supervisor shall make Base contact in order to obtain recommendations regarding decontamination and patient treatment

2.5 Once cleared by the Site Access Leader, EMS personnel may proceed to the end of the "Contamination Reduction Corridor" to receive patients. Any secondary treatment by EMS personnel should be done in the "Support Area"

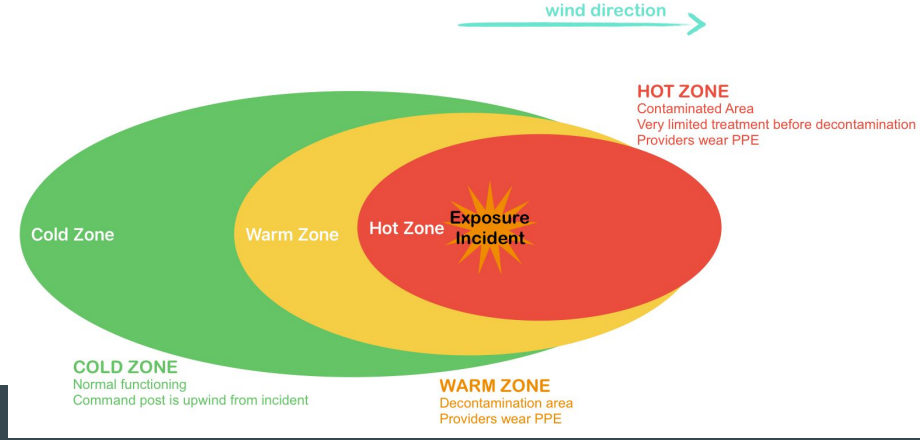
Definitions

3.1 **Exclusion Zone** (Hot Zone) - Area that encompasses all known or suspected hazardous materials

3.2 **Contamination Reduction Zone** (Warm Zone) - Area between the "Exclusion Zone" and the "Support Area". "Safe Refuge Area" and "Contamination Reduction Corridor" are set up within this area

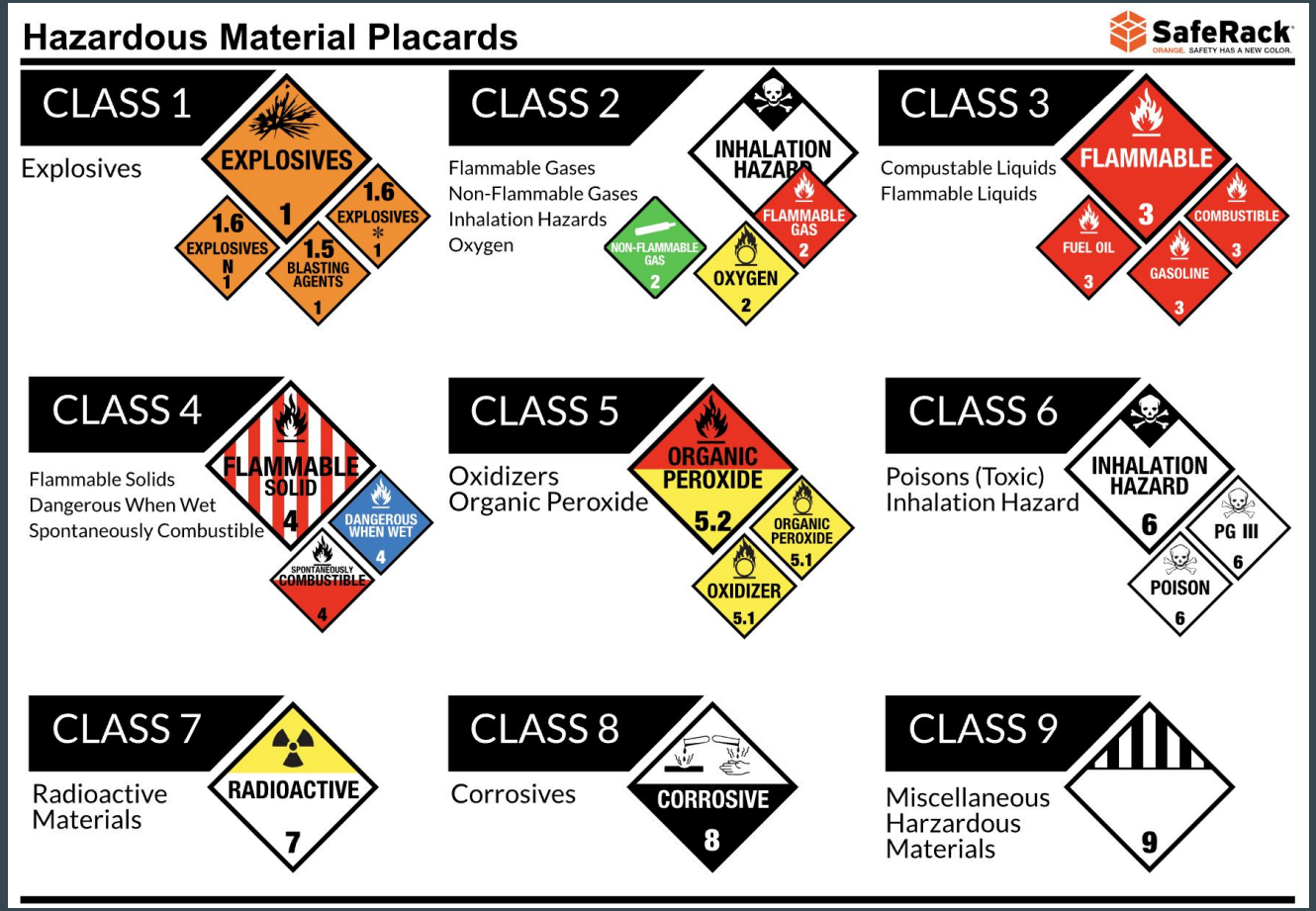
3.3 **Contamination Reduction Corridor** - An area within the "Contamination Reduction Zone" where the actual decontamination takes place. EMS personnel, once cleared, receive patients at the end of the "Contamination Reduction Corridor" and move them to the "Support Area" for secondary treatment

3.4 **Support Zone** (Cold Zone) - Clean area outside "Contamination Reduction Zone" where equipment and rescue personnel are staged to receive and treat decontaminated patients. Secondary exposure to hazardous materials is not expected in this area and special clothing is not required



HazMat Placards

Use the HazMat Emergency Response Guidebook (ERG)



Patient Considerations in a Toxicological Emergency

What substance(s)? Quantity? Poison entry type?

When were they exposed?

Did they eat or drink anything before?

Patient's weight?

Note: Some patients may be hesitant to admit they consumed an illegal substance

Organophosphate Poisoning

Use the acronym **SLUDGEM** to identify organophosphate poisoning

Cholinergic poisoning (organophosphate or nerve agent) — involves overactive parasympathetic nervous system resulting from the buildup of the neurotransmitter acetylcholine due to inhibition of acetylcholinesterase.

Salivation

Lacrimation (tearing)

Urination

Defecation

Gastrointestinal upset

Emesis (vomiting)

Miosis (pinpoint pupils)

Treatment:
Atropine & Pralidoxime

Via auto injector

Depressants

- Drugs that reduce the neural activity and body functions.
- Common examples:
  - Alcohol
  - Benzodiazepine
  - Opioids (heroin, fentanyl, etc.)
  - Marijuana can act as both a depressant and a stimulant – mixed effects depending on dose and strain

Alcohol Poisoning

Key signs/symptoms:

- Slurred speech, confusion, vomiting
- Slow or irregular respirations
- Cool, clammy skin, cyanosis
- Hypoglycemia (especially in smaller or fasting drinkers)
- Aspiration risk – loss of gag reflex → vomit entering airway
- Positional airway concerns:
  - Keep patient on their side (recovery position)
  - Maintain airway patency, suction as needed

EMT actions:

- Maintain patent airway
- Support ABCs, monitor SpO2
- Prepare for ALS backup if respirations decline
- Treat for shock if indicated

Benzodiazepine Overdose

Benzos are prescription depressants — often used for anxiety or seizures — but dangerous when combined with alcohol or opioids.

Signs/Symptoms:

- Drowsiness, unsteady gait
- Slurred speech, confusion
- Shallow respirations
- CNS depression → low HR, low BP, possible coma
- NO SPECIFIC antidote for EMT field use; flumazenil is ALS/hospital-only
- Greatest danger = combo use with other depressants → increases possibility for respiratory failure

EMT actions:

- Support airway, O2, monitor vitals
- Suction as needed
- Transport; notify ALS if mixed ingestions suspected

Opioid Overdose

Opioids are the most lethal class of depressants because they directly suppress the brain's respiratory center.

Classic triad:

1. Pinpoint pupils (miosis)
2. Respiratory depression (slow, shallow, or absent breathing)
3. Cyanosis/unresponsiveness

Other signs + symptoms:

- Bradycardia, hypotension
- Snoring respirations, track marks, paraphernalia nearby
- Possible cardiac arrest if not reversed

EMT actions:

- NARCAN!!!!
- Supplemental oxygen
- Close monitoring + transport
- Document!

Reminder for any overdose:

Always treat the airway first, then circulation, then drugs!

Stimulants (SNS Overdrive)

What are they?

- Meth, Cocaine, Caffeine, Nicotine
- Drugs that increase the activity of the central nervous system

Signs and Symptoms:

- Anxiety, agitation and insomnia
- Tachycardia, chest pain
- Hyperthermia
- Seizures and severe altered mental status
- “Overamping”

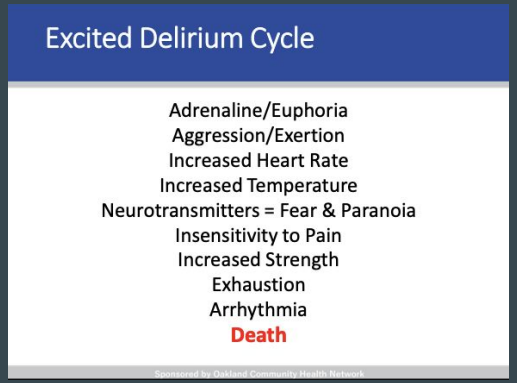
EMT Actions:

- Calm approach to minimize stimuli
- Supplemental O2
- Monitor vitals, active cooling
- If unconscious and S&S match opioid overdose narcan anyway!

Excited Delirium (ExDS)

What is it?

- State of extreme mental and physiological excitement
- Linked to many causes
  - Meth, Cocaine, withdrawal from lithium or other psych meds and alcohol, Psychosis, multi substance abuse



Signs and Symptoms

- Extreme agitation, paranoia and violent unpredictable behavior
- Profuse sweating, and hyperthermia
- Tachycardia, rapid respirations
- “Superhuman” strength, increase pain tolerance
- Confusion and seizures

EMT Actions:

- Scene Safety (violent behavior) call for backup
- Restraints may need to be used to properly ventilate
- Active cooling
- Supplemental O2 and Monitor Vitals
- Rapid Transport

Hallucinogens/Psychedelics

What are they?

- LSD, MDMA/ecstasy, psilocybin, PCP, Ketamine
- Drugs that broadly alter perception, mood, and thinking.

Signs and Symptoms

- Visual or auditory hallucinations
- Anxiety or paranoia

EMT Actions:

- Scene safety
- Keep calm, use reassurance
- Support airway and O2 if needed
- Transport monitor continuously

Dissociation and Hallucinations Management

Patients may lose connection with reality, experiencing detachment from self or surroundings (dissociation) or perceiving things that aren't real (hallucinations)

Signs:

- Blank stare, nonresponse or talking to themselves
- Confused identity, disoriented withdrawn
- Rapid Mood shifts
- May be calm or agitated

Actions:

- Reduce Stimuli, minimize noise, lights and people.
- Reassure
- Monitor Vitals
- Transport in quiet environment
- Speak calmly in short clear phrases, don't challenge beliefs.
- If agitated call for backup
- SCENE SAFETY

Activated Charcoal

Mechanism

Binds to certain ingested toxins

Prevents GI absorption

Dose and field tip

~1g per kg

Mix to slurry & monitor for vomiting

When to use

Be sure to call poison control and medical control

Oral poisonings within 1 hour

When NOT to use

-Acids/alkalis

-Gasoline, kerosene

-Decreased level of consciousness and/or no protected airway

Naloxone Recap

Dose

0.4 - 4 mg

Repeat every 2 - 3 minutes if necessary

Purpose

Opioid antagonist
(reverses respiratory depression)

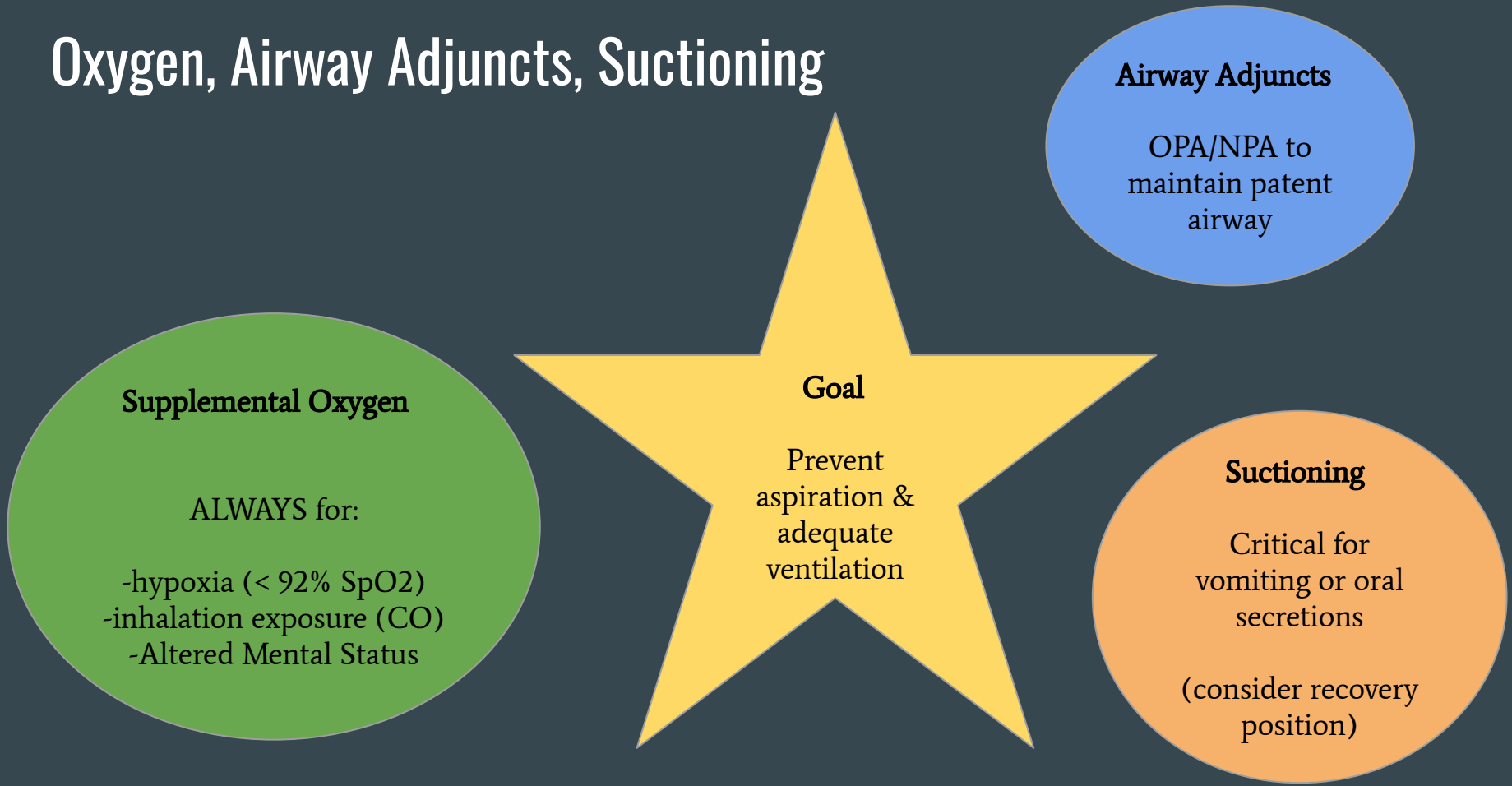
Field notes

-Give just enough to restore respirations

-May cause withdrawal or agitation

-Continue airway and ventilation support

Oxygen, Airway Adjuncts, Suctioning



Check glucose for Unconscious Patients!

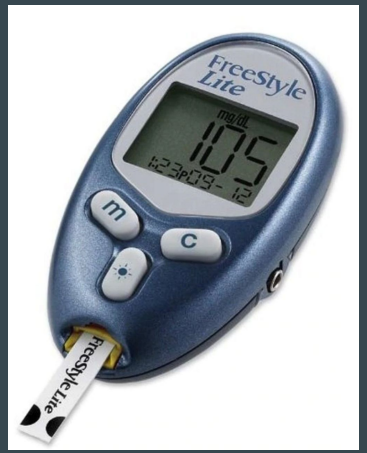
Why do we check for Glucose?

- Hypoglycemia mimics drug or poison presentations

Check for glucose before assuming intoxication!!

What if Glucose is low?

- Administer oral glucose (if patient is able to swallow) and alert ALS



Poison Control

1-(800)-222-1222

When do you call?

1. Unknown substance exposure or unclear ingestion
2. Mixed drug overdose
3. Unusual toxin overdose / pediatric cases

What does poison control do?

- They can give advice, recommendations, and hospital follow-up guidance.

Poison Entry Types

There are four different routes that poisons can enter the body.

Ingestion, Inhalation, Absorption, Injection

~80% cases from ingestion

Usually accidental for children, deliberate for adults

Each route requires a different EMS treatment approach.

When EMTs arrive on scene, they need to identify how the toxin entered the body.

This helps guide EVERYTHING.

Inhalation

Examples: Smoke, CO, Chlorine gas, ammonia

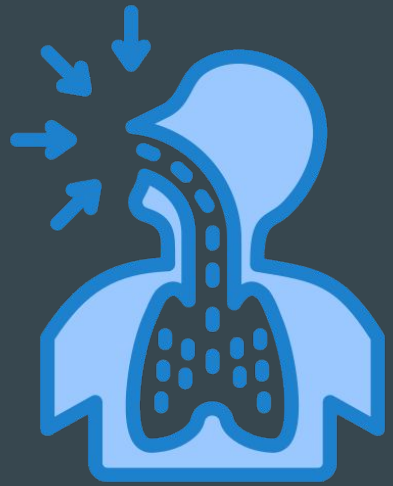
Mechanism: Toxins enter through the lungs (absorbed into the bloodstream)

Dangers:

- Hypoxia
- Pulmonary edema
- CNS effects (AMS)

Treatment:

- High flow O2 with NRB
- Monitor airway and breathing
- If severe, consider CPAP or rapid transport



Absorption

Examples: Pesticides, fertilizers, acids, fentanyl powder on skin

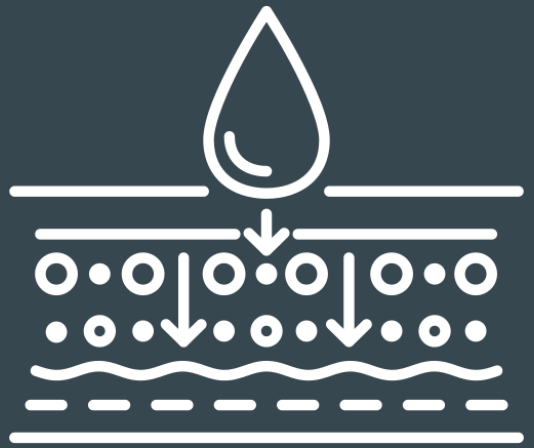
Mechanism: Toxin passes through the skin into the bloodstream

Dangers:

- Skin irritation or burn
- Systemic absorption (organophosphates)

Treatment:

- Brush off any dry powder
- Flush with water for 20+ minutes
- Remove contaminated clothing / jewelry



Ingestion

Examples: Medications, cleaning supplies, alcohol, food poisoning

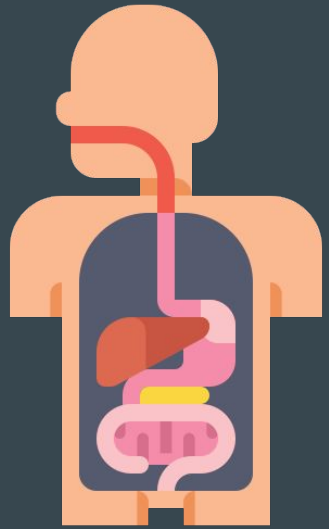
Mechanism: Swallowed substances absorbed into stomach and intestines

Dangers:

- Burns (alkali / acid)
- GI bleeding, aspiration, AMS

Treatment:

- Do NOT induce vomiting (can re-expose esophagus)
- Activated charcoal
- Monitor airway
- Bring the pill bottle or container with you to hospital



Injection

Examples: Snake bites, insect stings, recreational or IV drug use

Mechanism: Direct entry into the bloodstream / tissue

Dangers:

- Rapid systemic effects
- Local swelling or allergic reaction
- Shock or infection

Treatment:

- Cold packs to slow absorption
- Immobilize affected limb BELOW heart level
- Mark swelling (monitor for progression)
- Do NOT apply tourniquet or cut the wound
- Rapid transport

THANK YOU!

Kahoot!

https://create.kahoot.it/details/5ed9af4e-74f3-423c-baa1-65bcc35beeee

Scenarios

https://docs.google.com/document/d/1hbEMJ1egglPmtIAF_UASuWrfjPG-LYbuRtbiKhfi-PU/edit?usp=sharing