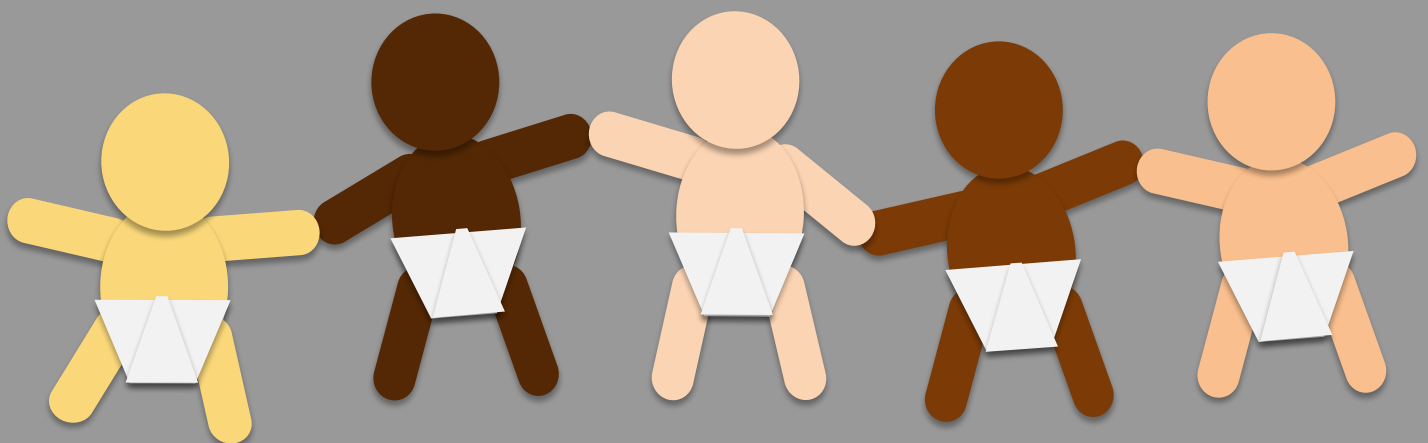


# Pediatric SimBox+ *Tele* SimBox

Pediatric Altered Mental Status (AMS):  
Organophosphate ingestion  
Emergency Department/Hospitalist



### Preparation

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### Purpose

#### **Thank you for your interest in SimBox low fidelity learning tools!**

This series of cases features low fidelity simulations that allow your teams to engage in the first 5-10 minutes of an emergency scenario.

You will use your own equipment and resources in your own clinical environment, or in the convenience of a virtual environment to practice non technical skills.

### SimBox, SimBox<sup>+</sup> vs TeleSimbox

There are three ways in which the simulation can be delivered:

#### **SimBox Original:**

Low-fidelity manikin + video and tablet-based resources for use *in situ*.

#### **SimBox<sup>+</sup>** (SimBox **PLUS** a telefacilitator).

SimBox was adapted for use in remote or underserved areas and/or limited access to content or simulation experts, with a remote facilitator.

#### **TeleSimBox:**

As a result of the COVID 19 Pandemic, SimBox was adapted to meet the demands for virtual learning platforms, and continuous education for learners of all levels. This version targets non-technical skills.

### Best way to use these resources

#### **SimBox or SimBox<sup>+</sup>**

- Review this document + run a session in your ED with a doll/pillow.

#### **TeleSimBox**

- Reference: [Tips / Tricks](#).
- Watch a sample recording of the telesimulation to see how it is run.

For additional questions or concerns, you can arrange a one-on-one tutorial with the project team.

**Sample telesimulation demo**

## Guide

This guide is meant to explain to facilitators with **varying levels of experience** how best to use these didactic resources.

## Novice Facilitator

Review this entire guide and watch video **prior to** first session.

Utilize the Prebriefing / Debriefing Scripts, Prompts and Resources.

Review the Checklist.

Encourage all participants to complete Survey.

## Advanced Facilitator

Use the learning tools included **or your own** for Prebrief / Debrief and Educational Resources.

Review this Checklist **or your own** adapted to your specific learner group.

## Tele Tips / Tricks

Trial sharing the video **prior to** the session.

Use **Gallery View**.

Have participants **name themselves** with assigned **role**.

Ask **observers to mute audio** and **turn off video** for simulation.

Both participants and facilitators can use a **“Time Out”** whenever necessary to pause and regroup.

Move scenario along through the **embedded participant**.

**After this activity, the team will be able to manage pediatric altered mental status patients with emphasis on the following objectives:**

1. Apply Crisis Resource Management and teamwork in the care of a toddler with altered mental status (with attention to role designation, directed orders, sharing mental model and closed loop communication with team and family members).
2. Prioritize treatment of potential etiologies to guide stabilization or escalation of care for a patient with altered mental status.
3. Determine the appropriate destination for transfer.

### Overall Scenario Schema

[Link to Pre-briefing Script for SimBox/SimBox+](#)

2 mins

[Play video to team](#)

**Assign** or **Coach them to allocate** roles

**Team Leader    Airway / Survey    Family Liaison**

6-10 mins

Stem: A 3 year old minimally responsive toddler brought in by EMS, saturating in the mid-80s with copious oral secretions, HR in 60's, patient is lethargic. Need to assess and manage, discuss differential diagnosis of altered mental status including toxin exposures, management and signout to inpatient/ICU team.

**Telesim Co-facilitator prompts are indicated in these boxes**

15 mins

[Link to Debriefing Script](#)

10 mins

**Option: re-run scenario**

## Scenario script:

"Please assign roles as you would in a typical scene response. You will hear a brief EMS dispatch and then see a two minute countdown clock as you are en route to the home:." [\\*CLICK TO PLAY VIDEO\\*](#)

**Video states: EMS: This is ALS Unit 1. We're coming in lights and sirens, with a minimally responsive toddler approximately 3 years old. Sats are currently in the mid-80s with copious oral secretions, HR in 60's, patient is lethargic, we're working on getting a blood pressure now and IV access. We'll be there in approximately 2 minutes. See you soon.'**

**2 minute  
warning**

**VIDEO GIVES 120 SECOND COUNTDOWN, THEN PATIENT APPEARS**

- Team assembles + confirms roles
- Asks for equipment: monitor, temperature, oxygen, breathing (BVM/CPAP), access (IV), Broselow tape/app
- Dons appropriate PPE, calls for help

**Video narrator states: "Hi guys, we're arriving now. The patient has continued to have desaturations and bradycardia. Had large vomitus and bowel incontinence during transport."**

**Time 0**

- Team ensures **proper PPE** of all members
- Team confirms patient is on monitors, pulse oximetry, BP cuff, temperature, uses Broselow tape to assess weight

**"Patient appears to be breathing fast with audible wheezing and has copious oral secretions, is lethargic and minimally responsive to painful stimulus. Pupils are constricted. Sweating on face, wet shirt and shorts. No evidence of injuries or bruising on head."**

**HR 64  
BP 89/59  
RR 38  
Temp 36C  
Sat 88%**

- Team performs primary survey
- Requests access (IV/IO), respiratory therapist, labs and imaging
- Facilitator provides AVPU status if asked:
  - **Wheezing**
  - Eyes: **Pupils are constricted**
  - Diaphoretic face, copious oral secretions, wet shirt and shorts.
  - AVPU: P-Withdraws to painful stimulus

Nurse verbalizes application of leads, BP cuff and pulse-ox. States: patient has altered mental status with copious oral secretions, wheezing and bradycardia **RN: there is a strong smell of garlic from the patient's mouth. Could he have ingested something? Did you see the small pupils? Did the parents provide any history? Would you like any other interventions at this time?"**

**HARD STOP: TEAM MUST PRIORITIZE PPE before taking care of pt**

**+ 6:20 min**

**HR 50  
BP 80/40  
RR 45  
Temp: 36 C  
Sat 90%**

- Team recognizes toxidrome, **decontaminates patient**
- Airway: open, suction, reposition, supplemental oxygen
- Obtain IV access and request IV fluids, labs, EKG
- Consider cholinergic toxidrome and plan treatment: order Atropine, Pralidoxime, Benzodiazepine and RSI medications

## SAMPLE History

**Signs/Symptoms:** 3 y old toddler was playing in backyard with a bottle of something, suddenly noted to have a large bout of emesis by mother, laid down on the grass and became lethargic. No known injury or falls. No recent known fevers, sick contacts.

**Allergies/Medications:** None. **PMHx:** Uneventful birth, full term, vaccinations UTD.

**Social Hx:** Lives on a farm with parents and extended family from Mexico.

**Last meal:** Ate breakfast of eggs 4 hours ago.

**Events:** Playing in the backyard with toys and water sprinklers. There are some chemicals for killing weeds, insects, pests and fertilizers in the backyard (if asked for name- Dursban, a pesticide).

+ 6:20 min

HR 50  
BP 80/40  
RR 45  
Temp: 36 C  
Sat 90%

- Team members ask the family about possible ingestion and update with plan of care.
- Consult a pharmacist/poison center
- Request Foley catheter
- Anticipate possibility of seizure and/or respiratory failure
- Prioritize medications: 1. Atropine, 2. Pralidoxime, 3. Benzos and RSI on hand PRN

**Facilitator:** “The patient continues to have bradycardia despite oxygen supplementation, copious secretions despite suction. Would you like any other interventions at this time?”

VS after  
Atropine  
HR 100  
BP 90/60  
RR 28  
Sat 96%

- ED team requests labs:
  - **VBG: 7.25/ 15 /70**
  - **IStat: Na 143 mEq/dL K 4.0 mEq/L CI 109 mEq/L**
  - **CO2 14 mEq/L BUN 12 mg/dL Cr 0.9 mg/dL**
  - **Glucose 120 mg/dL Hct: 40**
- **If not done**, ask for atropine and consult a pharmacist/poison center.

**Facilitator:** The bradycardia is improving after Atropine, mouth is clear with continuous oral suctioning. Pralidoxime is en route. PICU attending called, coming to assess the patient with the team. Please prepare for signout.”

+ 13:53 min

- PICU team in the ED for patient
- Give handoff

**Video recording:** “Hi team, I’m from the PICU. Can you please give me a status update on what’s going on with this patient. I heard he needs to come up to us. Please give sign out.”

After team performs handoff, state “This concludes the simulation” and move to debrief.

[Link to resource page: educational content](#)

TASK		Done correctly	Not done correctly	Not done
Team-centered care	Verbally assemble the necessary staff, equipment and resources to care for a seizing pediatric patient in the ED			
	Demonstrate effective teamwork and communication (i.e. designate leader/roles, directed orders, closed-loop communication, sharing mental model)			
	Demonstrate appropriate PPE			
Family-centered care	Obtain an appropriate history from the family member (SAMPLE)			
	Address family concerns, update on care (translate medical aspects of care in plain language)			
Medical knowledge	Verbalize the initial management of an acutely ill pediatric patient (airway, breathing, circulation)			
	Evaluate the patient with altered mental status			
	Identify toxidrome			
	Verbalize the first line therapeutic intervention of a patient in altered mental status and bradycardia from likely organophosphate toxicity			



## Tips to establish psychological safety in simulation

**Basic Assumption:** “we believe that everyone participating in our activities is intelligent, capable, cares about doing their best and wants to improve” - [CMS, Boston MA](#)

**Introduce team and Prebrief**

**Welcome your team, make introductions:** “This simulated resuscitation is to practice our team’s response to an emergency. We will spend about 15 minutes in simulation, then we will debrief for 20 to discuss what went well and what could be improved with input from the team. Even though it is not real, and the manikin can’t be harmed, everyone will get the most out of this scenario if we take it as seriously as possible.”

**Describe****Describe simulator capabilities, equipment and how to participate:**

“Act as you would within your role. You will not get monitor feedback unless your equipment is attached to the patient. Airway equipment should be attached to oxygen, etc. Try to make tasks realistic and timely using your equipment. Please ask for clarifications.”

**Demo****Closed loop communication demo:**

Know your role and task designation with closed loop communication to verify and complete.

Leader: Tech, we need an EKG.

Tech: OK going to get the machine.

Tech: OK, I’ve got the EKG machine here.

**Disclose**

In case of a safety concern during the simulation, state “Let’s take a safety pause.” If a real event happens that is **not** part of the simulation, state: “This is not a simulation.” Disclose if video recording.

## Components of a Debrief (Based on 3Ds + PEARLS)

“The purpose of this debrief is to discuss areas of great performance and discover areas for improvement. It is not a blame session- everyone is here to do their best.”

**Defuse**  
1-2 minutes

**Solicit emotions and reactions**

“Reactions?”; “Let’s take a moment to gather our thoughts.”

**Summary**  
1-2 minutes

**Clarify facts**

“Can a teammate share a short summary of the case?”; “Were there other thoughts?”

**Discover**  
7-8 minutes

**Explore Performance**

“What went well?”

“What could be improved?”

Use observations of learner experiences to highlight strengths of the team and individuals, while asking learners for their thoughts, observations and reflections. Then provide specific areas of opportunity for improvement.

**Deepen**  
1-2 minutes

**Provide focused feedback and identify patient care priorities**

Elicit any other outstanding issues or concerns.

**Take-Home points**  
1-2 minutes

**Identify take-home points to apply to future practice:**

Round the room reflections and thanks for participation.

This page provides possible questions to elicit teaching points during the debrief for each objective. These questions are not meant to replace your team discussion, but can help to steer the debriefing session.

## Identify signs of and symptoms of cholinergic toxicity

### **How do you identify signs of cholinergic toxicity?**

The clinical signs of a cholinergic toxidrome must be identified promptly to initiate interventions. The mnemonics **DUMBELS** or **SLUDGE** highlight symptoms that manifest as a result of inactivation of the cholinesterase enzyme.

#### **DUMBELS**

**D**iarrrhea/**D**iaphoresis **U**rination **M**iosis/**M**uscle weakness **B**ronchorrhea/**B**radycardia **E**mesis  
**L**acrimation/**L**ethargy **S**alivation/**S**weating/**S**eizures

**SLUDGE** **S**alivation, **L**acrimation, **U**rination, **D**iarrrhea, **G**I upset, **E**mesis

**History/red flags for accidental organophosphate exposure:** *Living on a farm with presence of pesticides, insecticides or other chemicals, sudden onset of symptoms, and acute worsening.*

## Describe the evaluation and management of organophosphate poisoning

### **What initial steps are essential for care of a poisoned patient?**

1. Recognition of toxidrome (SLUDGE / DUMBELS)
2. Get history
3. Don PPE and decontaminate / treat secretions as hazardous
4. ABCDs
5. Atropine for muscarinic effects and counteracting bradycardia. Used to dry up secretions and mostly treats "B" in ABCD.
  - o Dose: 0.05 mg/kg IV - *double dose* Q 5 minutes until secretions are dry and pulmonary symptoms abate.
  - o *No real max dose.* Children may need tens and adults hundreds of milligrams of atropine to achieve adequate atropinization endpoints of bronchial secretions and bronchospasm resolution.
  - o \*Note: place Foley when give Atropine.
6. Pralidoxime for neuromuscular junction effects. Treats fasciculations, weakness, paralysis.
  - o Dose: 25 mg/kg IV/IM

**Antidote management with consultation from Poison Control # (800) 222-1222.**

**Seizure Management:** Benzodiazepines are first line.

### **When should imaging and laboratory studies be considered?**

Routine chemistries (e.g. CMP, blood gas and EKG) to rule out other causes of altered mental status. Identification of acetylcholinesterase levels in plasma and erythrocytes are send-out labs and not available for acute management. Urine drug screen, acetaminophen and salicylate levels can identify co-ingestions. Imaging is not routinely obtained however, a high suspicion for aspiration should prompt a Chest Xray, or head injury (CT head).

## TeamSTEPPS Approach

**Components of effective teams (as developed in TeamSTEPPS) Table @DrM\_Kou**

Communication	Leadership	Situation Monitoring	Mutual Support
<b>SBAR:</b> Situation Background Assessment Recommendation	<b>Brief:</b> Planning, setting tone	<b>STEP:</b> Status of pt Team Members Environment Progress toward goal	<b>Task assistance:</b> awareness of team work load
<b>Call out:</b> sharing critical information with the team	<b>Huddle:</b> Ad-hoc planning	<b>I'M SAFE:</b> <ul style="list-style-type: none"> <li>• Illness</li> <li>• Medication</li> <li>• Stress</li> <li>• Alcohol/Drugs</li> <li>• Fatigue</li> <li>• Eating and Elimination</li> </ul>	<b>Feedback:</b> providing information for purpose of team improvement
<b>Check back:</b> Loop Closure	<b>Debrief:</b> Exchange of information to inform team of performance and effectiveness		<b>Advocacy and assertion:</b> advocating for patient in case of a disagreement with decision maker
<b>Handoff:</b>  <b>I PASS the BATON</b>  Introduction Patient Assessment Situation Safety Concern  Background Actions Timing Ownership Next	@DrM_Kou 		<b>Two challenge rule:</b> information conflict regarding patient safety  <b>DESC Script:</b> Tool for personal conflict* Describe situation Express your concern Suggest an alternative Consensus should be stated  <b>CUS: I'm concerned</b> I'm <b>uncomfortable</b> This is a <b>safety</b> issue  <b>Collaboration:</b> working toward a common mission

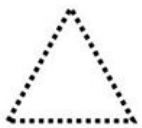
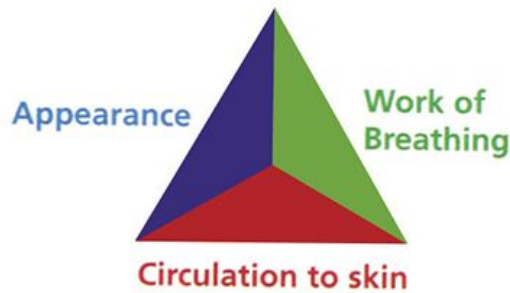
<https://www.ahrq.gov/professionals/education/curriculum-tools/cusptoolkit/modules/implement/teamworknotes.html>

## Pediatric Vital Signs/Weight by Age

Age	Weight (kg)	Pulse	Resp	Systolic BP*
<b>Newborn</b>	<b>3</b>	100-180	30-60	60-70
<b>6 mos</b>	<b>7</b>	100-160	30-60	70-80
<b>1 yr</b>	<b>10</b>	100-140	24-40	72-107
<b>2</b>	<b>12</b>	80-130	24-40	74-110
<b>3</b>	<b>15</b>	80-130	24-40	76-113
<b>4</b>	<b>16</b>	80-120	22-34	78-115
<b>5</b>	<b>18</b>	80-120	22-34	80-116
<b>6</b>	<b>20</b>	70-110	18-30	82-117
<b>8</b>	<b>25</b>	70-110	18-30	86-120
<b>10</b>	<b>35</b>	60-100	16-24	90-123
<b>12</b>	<b>40</b>	60-100	16-24	90-127
<b>14</b>	<b>50</b>	60-100	16-24	90-132
<b>15+</b>	<b>55+</b>	60-100	14-20	90-135

**BP\* in children is a late and unreliable indicator of shock**

### Pediatric Assessment Triangle



= STABLE



= SHOCK



= RESPIRATORY  
DISTRESS



= CNS /  
METABOLIC



= RESPIRATORY  
FAILURE



= CARDIO-  
PULMONAR  
Y FAILURE

### Pediatric Mental Status

**A**- Alert

**V**- Responsive to verbal

**P**- Responsive to painful

**U**- Unresponsive

# ORGANOPHOSPHATE POISONING

## Presenting as Altered Mental Status and Bradycardia

### SIGNS AND SYMPTOMS

#### DUMBELS

- D** - Diarrhea/Diaphoresis
- U** - Urination
- M** - Miosis/Muscle weakness
- B** - Bronchorrhea/Bradycardia
- E** - Emesis
- L** - Lacrimation/Lethargy
- S** - Salivation/Sweating/Seizures

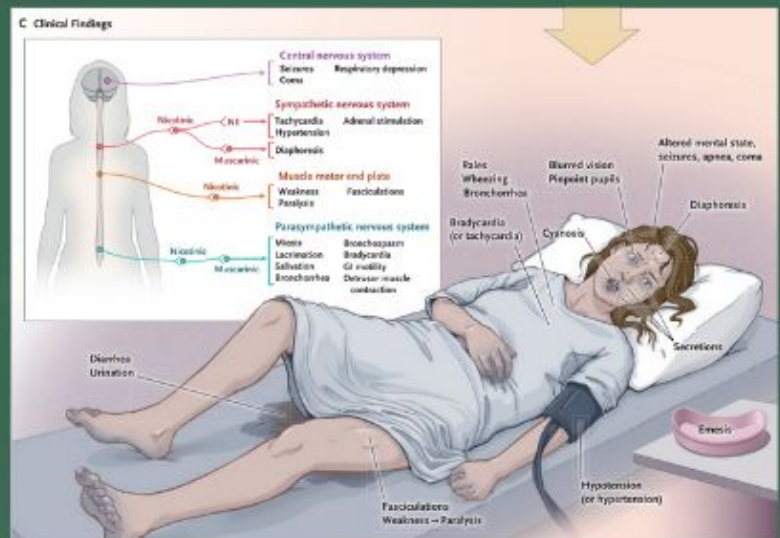


Image Source: N Engl J Med 2019; 380:1648

### MANAGEMENT

#### ABCDE

- A** Reposition head, oxygen support
- B** Treat secretions: Suction, Atropine
- C** Address bradycardia: Atropine
- D** Dextrose, identify toxidrome
- E** Exposure and decontamination



## ANTIDOTES

### ATROPINE

#### Pediatric Dosing:

0.05 mg/kg IV

- Double dose every five minutes until secretions are dry and pulmonary symptoms have abated (*no max dose*)

### PRALIDOXIME

#### Pediatric Dosing:

25 mg/kg IV



## TOXICOLOGY CONSULT

**POISON CENTER: +1 (800) 222-1222**

## ADDITIONAL CONSIDERATIONS

Benzodiazepines for possible seizures

- No IV Access:
  - Midazolam 0.3 mg/kg buccal, 0.2 mg/kg IN/IM (max 10 mg)
  - Diazepam 0.5 mg/kg PR (max 20 mg)
- IV/IO Access:
  - Midazolam 0.1 mg/kg IV/IO (max 5 mg)
  - Lorazepam 0.1 mg/kg IV/IO (max 4 mg)

Support ABCDs and consider broad DDX for AMS (VITAMINS Mnemonic)

Labs, EKG, and other imaging as indicated.

Copyright: Deeksha Borkar, MD, Ayush Gupta MD, Manu Madhok MD



**Poison Control Center:**

# 800 222 1222

**Recommended educational resources:**

Henretig, Fred M., Mark A. Kirk, and Charles A. McKay Jr. "Hazardous chemical emergencies and poisonings." *New England journal of medicine* 380.17 (2019): 1638-1655.

<http://emigcast.com/podcast/clinical/episode-48-toxtales-organophosphate-poisoning/>

<https://emergencymedicinecases.com/em-quick-hits-february-2019/>

Thank you for participating in the simulation.  
Please complete the facilitator and participant surveys by clicking on the links  
or scanning the QR codes below:

## Facilitator Survey



## Participant Survey



**Posted:** Oct, 2020

**Revised:**

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