

Rural SimCenter Scenario Template

Scenario: *Opioid Overdose-Ari Sawyer-6-26-XX*

Scenario Name: <i>Opioid Overdose</i>			Learner Preparation Exercise:
<i>Date Created:</i> 11/20 ●●●●●●●●●●●●●● <i>Date Validated:</i> 12/20			
High Fidelity	Low Fidelity	Static Model	Review: (Insert skills or reading students should review) <ul style="list-style-type: none"> • CDC Opioid Guideline Mobile App Drug Overdose CDC Injury Center • Helpful Materials for Patients Drug Overdose CDC Injury Center • Yarlagadda, K., Kim, J., Kanderi, T., Sendil, S., & Nookala, V. K. (2020). Opioid antidote induced pulmonary edema and lung injury. <i>Respiratory medicine case reports</i>, 30, 101107. https://doi.org/10.1016/j.rmcr.2020.101107 <p style="text-align: center;">●●●●●●●●●●●●●●</p>
Learning Objectives:			
Primary Objectives: <ol style="list-style-type: none"> 1. Execute appropriate pharmacological and airway management of an opioid overdose patient using equipment available 2. Recognize complications of Naloxone treatment. 3. Execute the best management for a patient in pulmonary edema that is difficult to oxygenate 			Insert Scenario Summary (Basic overview of Case) This case describes a 31-year-old male patient presenting unresponsive after an opioid overdose. He responds well to naloxone, but he quickly develops dyspnea secondary to pulmonary edema. The learner goals are to recognize this potential complication of naloxone and to appropriately treat it.
Secondary Objectives: <ol style="list-style-type: none"> 1. Demonstrate team work and communication skills by: <ul style="list-style-type: none"> • Appointing a team leader • Team leader assigns clear roles and tasks to available team members • Team utilizes closed-loop communication as appropriate • Team communicates in an open and respectful manner 2. Understand benefits of positive pressure ventilation 			

Rural SimCenter Scenario Template

Scenario: *Opioid Overdose-Ari Sawyer-6-26-XX*

Initial Subjective Data:	Patient Description and Image
<p>Background Information:</p> <p>EMS informs the learners that the patient was found unresponsive. His friends informed the EMS personnel that before going unresponsive, the patient had injected heroin. EMS administered 0.4 mg of naloxone on the ambulance during the 5-minute transport time before arrival without any effect.</p> <p><u>Past History:</u> Asthma—uses an albuterol inhaler prn .</p> <p><u>Presenting History:</u> Patient is initially unresponsive, but appears dyspneic after revival with naloxone</p>	<p>Name Ari Sawyer Age 23 yo Birthdate 6-26-XX Gender Male Weight 145 Height 5'9" Allergies NKDA</p> 

Scenario: Opioid Overdose with treatment complications-Ari Sawyer-6-26-XX

Supplies	Set-up Notes: What is needed for the patient (simulator/actor) and what is needed for the patient room?
<p>IV Set Up <input type="checkbox"/> Saline Lock <input checked="" type="checkbox"/> IV <input checked="" type="checkbox"/> IV Pump <input type="checkbox"/> Second IV Fluid Type: Infusion Rate: Tubing:</p>  <p>Medications <input type="checkbox"/> Med Dispense</p> <p>Medication List</p> <ol style="list-style-type: none"> 1. Albuterol Inhaler PRN 2. 3. 4. 5. 6. 7. 	<p>Setting: <input checked="" type="checkbox"/> ICU <input checked="" type="checkbox"/> Emergency <input type="checkbox"/> Medical <input type="checkbox"/> Surgery/OR <input type="checkbox"/> Out-Patient <input type="checkbox"/> Other _____</p>  <p>Monitor Setup: <input checked="" type="checkbox"/> Primary ECG <input type="checkbox"/> Secondary ECG <input checked="" type="checkbox"/> Pulse <input checked="" type="checkbox"/> Respiratory Rate <input checked="" type="checkbox"/> B/P <input checked="" type="checkbox"/> SPO2 <input type="checkbox"/> Temp <input checked="" type="checkbox"/> CO2</p> <p>Other Settings</p> <p>Moulage: Dark Circles around eyes Cyanosis from mannequin</p> <p>Patient Actors Requested: Girlfriend or parent</p> <ul style="list-style-type: none"> • EMT SP for handoff report at start of case • At the start of the case, an SP plays the role of the patient but then transfer to the mannequin • Patient accompanied by either parent or friend played by SP • Age: If boy/girlfriend, young 20's—if parent, 50s • Gender F or M • Clothing: Street Clothes

Scenario: *Opioid Overdose with treatment complications-Ari Sawyer-6-26-XX*

Equipment:

- Nasal Cannula O2 Mask Non-Rebreather
 PPE (goggles, gloves, etc) Penlight Crash Cart
 EMR Thermometer Accucheck NG Tube
 Suction Chest Tube Other

Please Describe Additional Equipment Needs

Paperwork*

- Physician Orders Chart Lab Reports

***Attach Reports to the file**

Facilitator Notes: Labwork and orders can be available as case progresses

Scenario: Opioid Overdose with treatment complications-Ari Sawyer-6-26-XX



Scenario Progression: Admission/Arrival Information

Initial State: Frame 1		Initial Patient History	
Vital Signs Cardiac Rhythm:Tachycardia Pulse:110 Respiratory Rate: 6 Breathing Pattern Agonal Chest Rise reduced Blood Pressure: 88/62 SPO2 65% General Conditions to be in place for Scenario: ER Setting—Patient arrives via EMT unresponsive. Has received 1 dose of Naloxone.		Body System Assessment	Patient is initially unresponsive, but appears dyspneic after revival with naloxone
		• Neurological/Sensory	Pupils are initially 2 mm and minimally reactively. GCS 3 on arrival.
		• Cardiac	Regular tachycardic rhythm
		• Pulmonary	Initially, patient’s respiratory rate is profoundly low. Lung sounds are equal bilaterally without wheezes, rales, rhonchi.
		• Musculoskeletal	No pertinent findings
		• Gastrointestinal	Soft and non-tender on exam.
		• Genitourinary	No pertinent findings
		• Skin/Wound	No pertinent findings
		• Vocal Complaint	Unresponsive
Correct Action: Naloxone	Move to Frame: 2	• Initial Lab/Diagnostics	CBC and Chem Panel—can be ordered UA Toxicology screen—can be ordered
Wrong Action	Move to Frame:		
No Action	Move to Frame:		

Facilitator Notes: Observe report handoff—time of naloxone administration

Scenario: Opioid Overdose with treatment complications-Ari Sawyer-6-26-XX

Initial State: Frame 2		Change in Patient Condition	
Vital Signs Cardiac Rhythm: Regular Rhythm-tachycardia Pulse: 109 Respiratory Rate: 22 Bilateral Rales Blood Pressure: 129/93 SPO2: 88% and dropping General Conditions to be in place for Scenario: ER doc should be on scene but requires prompting for tests		Body System Assessment	appears dyspneic after revival with naloxone
		• Neurological/Sensory	Pupils dilate to 4 mm after naloxone administration and are reactive. GCS 15 after appropriate naloxone administration. Eyes open, GCS 13
		• Cardiac	Regular tachycardic rhythm
		• Pulmonary	RR increased, dyspneic and breathing Bilateral Rales
		• Musculoskeletal	No Pertinent findings
		• Gastrointestinal	No Pertinent findings
		• Genitourinary	No Pertinent findings
		• Skin/Wound	No Pertinent findings
		• Vocal Complaint	<i>Patient responds to learner questions and provides history described above-States: "my chest feels tight"</i>
Correct Action Notice Rales and dyspnea-low SPO2 – Suggest X-ray and labs	Move to Frame: 3 with or without intervention	• New Lab Reports	X-ray ordered Labs ordered
Wrong Action: Does not notice continued distress	Move to Frame: 3		

1. Facilitator Notes: Students should recognize continued distress—reassess patient—patient fights mask

Failure to recognize failure of the patient to oxygenate: Learners may not recognize that the patient is dyspneic and that their O2% sat is still low after naloxone administration. If they do not notice, a “nurse” can enter and ask if the learners want to do anything for the patient’s vitals. Suggest X-ray and labs. The SP/Voice of patient can also further exacerbate his dyspnea.

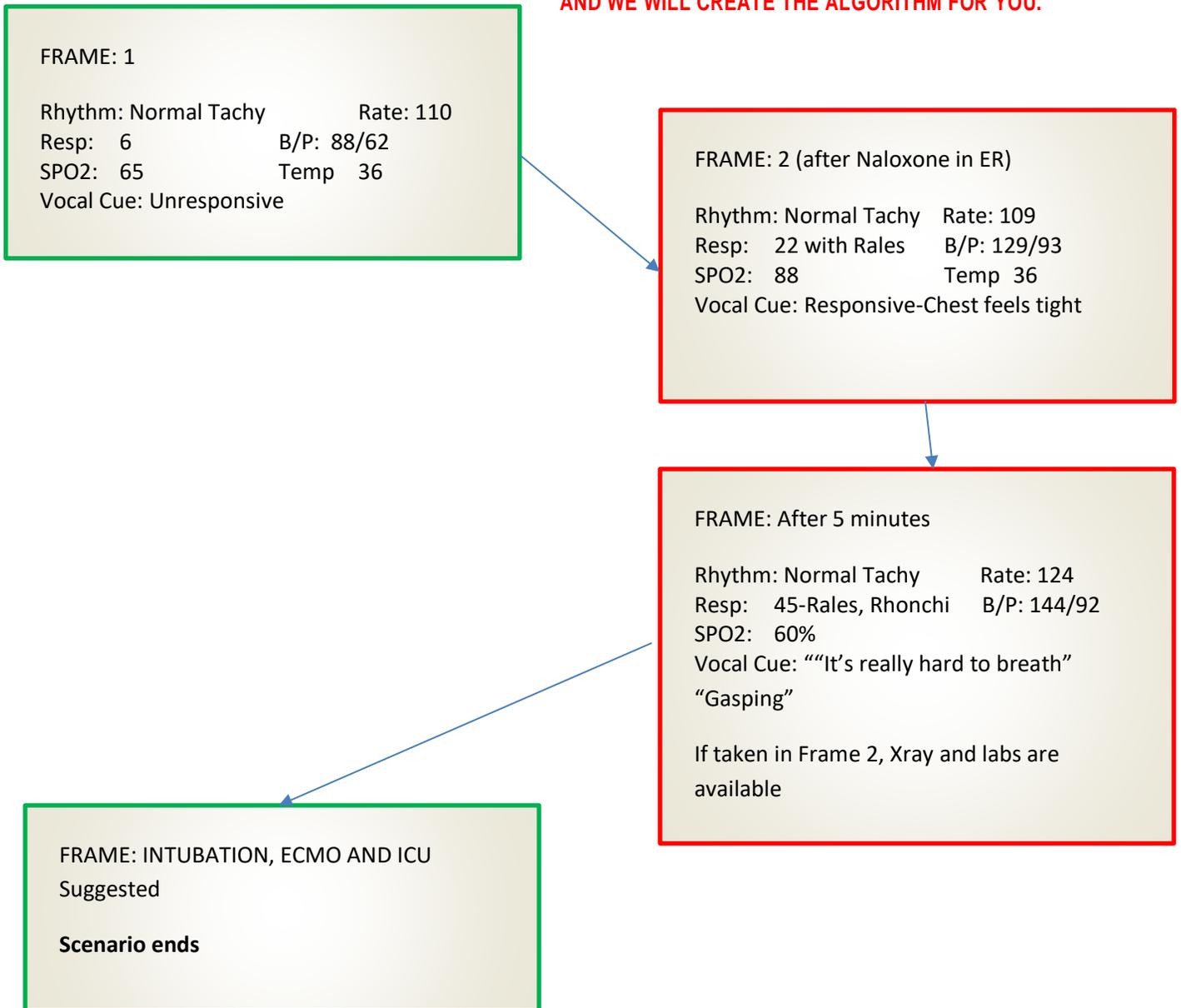
Scenario: Opioid Overdose with treatment complications-Ari Sawyer-6-26-XX

Initial State: Frame 3		Initial Patient History	
Vital Signs Cardiac Rhythm: Normal Tachycardia Rhythm Pulse:124 Respiratory Rate:45 Breathing Pattern Dyspnea - Bilateral Rales and Rhonchi Blood Pressure:144/92 SPO2: 60% General Conditions to be in place for Scenario:		Body System Assessment	Patient Finding
		• Neurological/Sensory	
		• Cardiac	
		• Pulmonary	Dyspnea
		• Musculoskeletal	No findings
		• Gastrointestinal	No findings
		• Genitourinary	No findings
		• Skin/Wound	No findings
	• Vocal Complaint	“It’s really hard to breath” “Gaspings”	
Correct Action: recognize distress and ask for consultation- chest x-ray – possible advanced airway/ECMO	Move to Frame: END	• Initial Lab/Diagnostics	X-ray available Labs Available
Wrong Action: more Naloxone	Move to Frame: End Scenario		
No Action	Move to Frame: End Scenario		

- Facilitator Notes:** Failure to recognize need for ECMO or advanced ICU management: Learners may not recognize the need for ECMO or advanced ICU management in this patient, especially if they have not encountered a patient like this before.
- If the learners are struggling, the case can be stopped at this point and management options can be discussed further in the debrief.

Scenario: *Opioid Overdose with treatment complications-Ari Sawyer-6-26-XX*

Scenario Progression Algorithm: Copy and use the images to create your algorithm **OR DRAW YOUR ALGORITHM, TAKE A PICTURE AND SEND WITH THE SCENARIO AND WE WILL CREATE THE ALGORITHM FOR YOU.**





PHYSICIAN'S ORDERS



NAME: Ari Sawyer
 ROOM NO: ER Bed 4
 PATIENT ID NO: 1455
 PHYSICIAN: Cummings

Drug Allergies			Nurse's Initials
	Another brand of drug identical in form and content may be dispensed unless checked	<input type="checkbox"/>	
1.	UA for toxicology		
2.	Chest X-ray		
3.	EKG		
4.	CBC		
5.	Chemistry Panel		
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			

Doctor Sign _____

PHYSICIAN'S ORDERS



PATIENT CHART

Name:

GENDER: **Male**

DOB: **6-26-XX**

ALLERGIES: **NKDA**

PRIMARY PHYSICIAN: **Cummings**

Case Details: Results of Chest Xray



First film is taken day 1 showing PE--second day 2 suggesting aspiration pneumonia

Chest X-Ray revealed diffuse bilateral interstitial and alveolar density with concerns of asymmetric pulmonary edema or multifocal infiltrative pneumonia (Day 1).

LAB Results:

ECG: showed sinus tachycardia and troponin level was within normal limits.

White blood count: 14.9K/mL
Hemoglobin: 16.3g/dL
Platelet count: 281,000/mL

Metabolic profile:

Sodium: 134 mmol/L, Potassium: 5.6 mmol/L, Creatinine 1.74 mg/dL, Glucose

Arterial blood gas showed respiratory acidosis with pH 7.2, pCO₂ 59.8 mm of Hg, pO₂ 92 mm of Hg.



Patient Actors Roles:

Suggested Dialogue for each Actor:

EMT – Gives ER team report and gives information about Naloxone in route to ER

Friends—“pretty sure he was shooting heroin” He was fine until he passed out—seemed his old self. “He talked about wanting to get clean but could never make it through the withdrawal.” Seems like he’s having trouble breathing—he usually uses an inhaler.

Patient Voice: Patient initially unresponsive—after 2nd Naloxone in ER is able to give report of illness and symptoms

Gradually becomes more and more short of breath!

Key Points to emphasize:

Shortness of breath developing after Naloxone



DEBRIEFING Points

Instructors should developed a structured debriefing and develop questions related to:

1. Review Objectives
 - a. What is the antidote of choice for opioid overdose?
 - i. It is well established that naloxone is the antidote of choice for opioid overdose. The dose of naloxone is 0.1-0.4 mg if the patient is breathing spontaneously. The dose is 2 mg if the patient is apneic.²
 - b. What is the noninfectious differential for dyspnea in an IV drug abuser?
 - i. The differential for dyspnea in an IV drug abuser is relative wide. Depending on the injection sites, pneumothorax or hemothorax are a concern. Air emboli or foreign body emboli can occur from inappropriate injection technique. The provider must also consider “Talc Lung” from injection of talc, which may be a contaminant in street drugs. IV heroin or cocaine can cause a hypersensitivity reaction that responds to albuterol. Pulmonary edema can also occur due to opioid or cocaine use or from naloxone reversal.^{3,12}
 - c. What is the mechanism of naloxone-induced pulmonary edema?
 - i. One rare but life-threatening adverse effect is pulmonary edema.³ The pathophysiology is believed to one of three mechanisms. The primarily mechanism is believed to be due to unrestricted catecholamine surge following the opioid reversal.^{3,4} It can also be due to constriction of the pulmonary vasculature due to central neurogenic mechanisms, leading to pulmonary hypertension.³ A final possible mechanism is return of respiratory drive prior to patient control of their own airway, resulting in inspiration against an obstructed glottis, precipitating negative pressure pulmonary edema.^{3,5}
 - d. What is the mechanism of opioid-induced pulmonary edema?
 - i. Finally, opioid overdose itself can induce pulmonary edema by inducing histamine release, hypoxia, and acidosis resulting in permeability of the pulmonary vasculature.⁶
 - e. What is the general treatment approach to severe pulmonary edema or ARDS?
 - i. Patients with acute respiratory distress from pulmonary edema or ARDS need aggressive management. These patients can become profoundly hypoxemic, and the treatment is oxygenation. Initial management can begin with supplemental oxygenation by nasal cannula or non-rebreather. If the patient does not respond to this, noninvasive positive pressure ventilation can be attempted.
 - ii. If this does not work, intubation should be performed.^{13, 14, 15} If the patient continues to be difficult to oxygenate after intubation and optimizing the ventilator settings, more advanced care is required. This included ICU level management (prone positioning, advanced ventilator modes, neuromuscular blockade), ECMO, or transfer to more advanced care if this level of care is not available.⁸
3. In our patient the symptoms followed administration of naloxone. Patient's hemoptysis and pulmonary edema were probably due to naloxone administration itself causing lung injury. We strongly recommend close monitoring of the patient post administration of naloxone for signs of respiratory failure. If pulmonary complications were to occur, we recommend treating with noninvasive positive pressure ventilation as long as the patient qualifies this modality of treatment.
4. Naloxone is the drug of choice for opiate overdose. However in literature there is limited evidence of naloxone treated opiate overdose induced lung complications. Therefore we strongly recommend monitoring these patients post treatment for these complications with early initiation of noninvasive ventilation whenever possible to reduce the morbidity in these patients.



RURAL SIMCENTER

5. Call for Help Early-When first symptoms appear—Get evidence (Labs and X-ray) The learner should recognize decline and reassess the patient. They should discover rales on exam. The learners should order a chest x-ray at some point, which will show pulmonary edema.
6. The learner should recognize the need for intubation. IF Oxygenation does not improve, despite intubation. The learner should recognize the need for ECMO in this patient. Discuss indications for ECMO

Tips for Debriefing

1. Learner focused
2. Focus on the team, roles and leadership
3. Focus on the process not the individual
4. Keep the debriefing positive