


Scenario Name: Methadone Overdose - Child			Learner Preparation Exercise: Review: (skills or reading students should review) <ul style="list-style-type: none"> Supparamaniam, B., Yunus, R., Fong, J., & Tang, K. (2021). Accidental Methadone Poisoning in a Four-Year-Old Child Reversed With Continuous Intravenous Infusion of Naloxone. International Journal Of Clinical Pediatrics, 10(1), 18-23 Budnitz DS, Lovegrove MC, Geller RJ. Prevention of Unintentional Medication Overdose among Children: Time for the Promise of the Poison Prevention Packaging Act to Come to Fruition. JAMA. 2020;324(6):550–551. doi:10.1001/jama.2020.2152 Smith, V.C., Wilson, C.R. (2016). Families Affected by Parental Substance Use, COMMITTEE ON SUBSTANCE USE AND PREVENTION. Pediatrics Aug 2016, 138 (2) e20161575; DOI: 10.1542/peds.2016-1575 Auerbach, M. (2021) Pediatric Resuscitation technique. Available at: https://emedicine.medscape.com/article/1948389-technique#c9
Author: RSC	Date: 4/21	Validated: 6/21	
			
High Fidelity	Low Fidelity	Static Model	
Target Group: <input checked="" type="checkbox"/> Student <input checked="" type="checkbox"/> Professional Level: <input type="checkbox"/> Advanced <input checked="" type="checkbox"/> Intermediate <input type="checkbox"/> Beginner			
Learning Objectives: Primary Objectives: <ol style="list-style-type: none"> Identify signs of respiratory failure and provide appropriate treatment Determine history and timeline for opioid toxicity ingestion Implement appropriate naloxone treatment for methadone ingestion overdose. Select an appropriate size nasal airway, face mask, bag, endotracheal tube, and laryngoscope for the patient and provide excellent Bag/mask ventilation. Recognize indications for ET Intubation and appropriate meds and equipment to provide support Secondary Objectives: <ol style="list-style-type: none"> Understand equipment and set up for Rapid Sequence Intubation Participate using team dynamics Anticipatory Guidance for prevention of accidental exposure 			
Insert Scenario Summary (Basic overview of Case) Accidental ingestion of about 25 mg of methadone in a 3-year-old boy. The methadone syrup belonged to his father, a former intravenous drug user (IVDU), who is currently a participant of a detoxification program under the supervision of a licensed practitioner. The child presents with typical early signs and symptoms opioid toxicity.			
Scenario Total Time: 60 min Set-up: 10 min Simulation: 20 min Debrief: 30 min			
Instructor Notes: This scenario can be modified for a range of learners from novice (bagging patient) to intermediate (setting up IV naloxone) to expert (pediatric intubation).			



Initial Subjective Data:

Background Information:

Patient's father is a former intravenous drug user (IVDU) and currently on methadone treatment. He often brings back syrup methadone as "take-away dose" in an undiluted form from the methadone clinic to cover weekend doses.

Past History:

Patient's past developmental milestones were up to age. He had no known underlying chronic medical illnesses, not on any chronic medications or any over-the-counter medications prior to diagnosis. Immunizations are up to date for age. Patient and brother are the only children in the family and they stays with the mother at home. Father visits often.

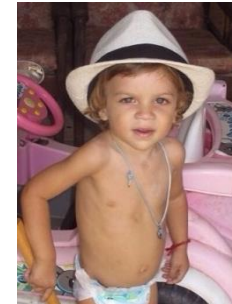
Presenting History:

A 3-year-old boy presented to the emergency department with excessive drowsiness and lethargy. According to the patient's mother, the child was playing with his brother in her room when he found the bottle of methadone syrup and drank it. She confirmed about the ingestion after she found an empty methadone bottle and the brother stated Cheyanne drank the contents.

Mother waited 30 minutes before calling 911 because Cheyanne "seemed just fine". Then he got really sleepy

Patient Description and Image

Name Cheyanne James
Age 3
Birthdate 2-2-XX
Gender Male
Weight 32 lbs
Height 34"
Allergies Bee Stings



Technician Notes for Patient Set up

1. Equipment Notes-have varying sizes of respiratory equipment available
2. Programming Notes-use of trends to indicate deterioration and improvement are important
3. Special Features- use of a pediatric hi-fidelity mannequin. Cyanosis should be evident if ventilation is not adequate

Scenario: *Cheyenne James-B.D. 2-2-XX-Methadone Ingestion Overdose*

Supplies	Set-up Notes: What is needed for the patient (simulator/actor) and what is needed for the patient room?
<p>IV Set Up</p> <p><input type="checkbox"/> Saline Lock <input checked="" type="checkbox"/> IV <input checked="" type="checkbox"/> IV Pump <input type="checkbox"/> Second IV</p> <p>Fluid Type: Normal Saline</p> <p>Infusion Rate: 50cc/hour</p> <p>Tubing:</p> <p>.....</p> <p>Medications</p> <p><input type="checkbox"/> Med Dispense</p> <p>Medication List-no standard meds</p> <ol style="list-style-type: none"> 1. Naloxone drip available 2. Naloxone nasal spray 3. 4. 5. 6. 7. 	<p>Setting:</p> <p><input type="checkbox"/> ICU <input checked="" type="checkbox"/> Emergency <input type="checkbox"/> Medical <input type="checkbox"/> Surgery/OR</p> <p><input type="checkbox"/> Out-Patient <input checked="" type="checkbox"/> Other <u>Pediatric ICU</u></p> <p>.....</p> <p>Monitor Setup:</p> <p><input type="checkbox"/> Primary ECG <input type="checkbox"/> Secondary ECG <input checked="" type="checkbox"/> Pulse</p> <p><input checked="" type="checkbox"/> Respiratory Rate <input checked="" type="checkbox"/> B/P <input checked="" type="checkbox"/> SPO2 <input checked="" type="checkbox"/> Temp <input type="checkbox"/> CO2</p> <p>Other Settings</p> <p>Moulage: Cyanosis when SP02 drops below 90</p> <p>Patient Actors Requested: Parents</p> <ul style="list-style-type: none"> • Age 20-30 • Gender: Parents—one or both • Clothing: Street Clothes • Relationship to Patient: Parents <p>Paperwork* Lab Values Available</p> <p>Urine toxicology screen available</p>

Scenario: *Cheyenne James-B.D. 2-2-XX-Methadone Ingestion Overdose*

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

RSI equipment for pediatric patient

- ☒ Physician Orders ☐ Chart ☒ Lab Reports

***Attach Reports to the file**

Facilitator Notes: The scenario can be completed in the ER setting or child can be transferred to PICU after stabilization. If advanced training is desired the patient can trend down rapidly before IV naloxone can be started. This will require intubation to support respirations.

Technician Notes: Use of pediatric hi-fidelity mannequin is helpful to show trends in vital signs. With advanced learners trends could support rapid sequence intubation so equipment should be available.

If students do not do adequate ventilations with bag/mask the patient should not respond.

Scenario: *Cheyenne James-B.D. 2-2-XX-Methadone Ingestion Overdose*

Scenario Progression: Admission Information --

Initial State: Frame 1		Initial Patient History	
Vital Signs Cardiac Rhythm: NSR Pulse:118 Respiratory Rate:22 Breathing Pattern WNL Blood Pressure:93/51 SPO2: 98% on room air General Conditions to be in place for Scenario: Child presents in ER		Body System Assessment	Patient Finding
		• Neurological/Sensory	Pupils 2mm bilaterally-child drowsy
		• Cardiac	WNL
		• Pulmonary	WNL
		• Musculoskeletal	No evidence of trauma
		• Gastrointestinal	Vomited 2X since in ER
		• Genitourinary	WNL
		• Skin/Wound	Cap refill <2 seconds
		• Vocal Complaint	Difficult to alert-lethargic
Correct Action Naloxone (2mg via nasal spray)	Move to Frame: 2	• Initial Lab/Diagnostics	See Reports – UA toxicology, CBC, Chem panel
No Action: Child progresses to respiratory distress	Move to Frame: 5		

Facilitator Notes: Child can be in ER room with report from EMT—“child did not require respiratory support during transport” – 1mg naloxone administered via nasal spray during transport.

After administration of Naloxone 2mg via nasal spray—child improves—awakes briefly then deteriorates to bradycardia and respiratory depression in frame 2

Should be placed on continuous monitoring

Scenario: *Cheyenne James-B.D. 2-2-XX-Methadone Ingestion Overdose*

Initial State: Frame 2 (5 minutes after Naloxone)		Change in Patient Condition	
Vital Signs Cardiac Rhythm: NSR trend to bradycardia Pulse:72 Respiratory Rate: 8 Breathing Pattern: Shallow Blood Pressure:68/32 SPO2: 88 General Conditions to be in place for Scenario: Patient still in ER and considered unstable. HR trends to bradycardia-cyanosis below a SP02 of 92%		Body System Assessment	Patient Finding
		• Neurological/Sensory	Pupils pinpoint
		• Cardiac	Bradycardia
		• Pulmonary	Respiratory depression
		• Musculoskeletal	
		• Gastrointestinal	
		• Genitourinary	
		• Skin/Wound	
		• Vocal Complaint	Lethargic
Correct Action: Naloxone 2mg via nasal spray-Respiratory support with Bag/Mask	Move to Frame: 3	• New Lab Reports	None Available Consider EKG
No Action: Child progresses to coma	Move to Frame: 5		

Facilitator Notes:

Scenario: *Cheyenne James-B.D. 2-2-XX-Methadone Ingestion Overdose*

Initial State: Frame 3		Initial Patient History	
Vital Signs Cardiac Rhythm: NSR Pulse: 110 Respiratory Rate: 18 Blood Pressure: 96/72 SPO2: 96		Body System Assessment	Patient Finding
		• Neurological/Sensory	
		• Cardiac	
		• Pulmonary	
		• Musculoskeletal	
		• Gastrointestinal	
		• Genitourinary	
		• Skin/Wound	
		• Vocal Complaint	Awake-wants to go home
Correct Action: Consider continuous IV Naloxone infusion and admission to PICU	Move to Frame: 4	• Initial Lab/Diagnostics	Repeat labs ordered
No Action: Child progresses to Coma	Move to Frame: 5		

Facilitator Notes: Child continues to respond to Naloxone but requires frequent administration. Consider IV Naloxone continuous infusion to support child and monitor in PICU for 72 hours.

Scenario: *Cheyenne James-B.D. 2-2-XX-Methadone Ingestion Overdose*

Initial State: Frame 4		Change in Patient Condition	
Vital Signs Cardiac Rhythm: NSR Pulse: 114 Respiratory Rate: 20 B/P: 102/78 SPO2: 98% General Conditions to be in place for Scenario: Child on IV Naloxone infusion		Body System Assessment	Patient Finding
		• Neurological/Sensory	WNL
		• Cardiac	
		• Pulmonary	
		• Musculoskeletal	
		• Gastrointestinal	
		• Genitourinary	
		• Skin/Wound	
		• Vocal Complaint	Child awake/alert talking
Correct Action: Continue to monitor VS	Move to Frame: END	• New Lab Reports	
Wrong Action	Move to Frame:		
No Action	Move to Frame:		

Facilitator Notes: Child should be monitored in the ICU for continued signs of respiratory depression.

Scenario: *Cheyenne James-B.D. 2-2-XX-Methadone Ingestion Overdose*

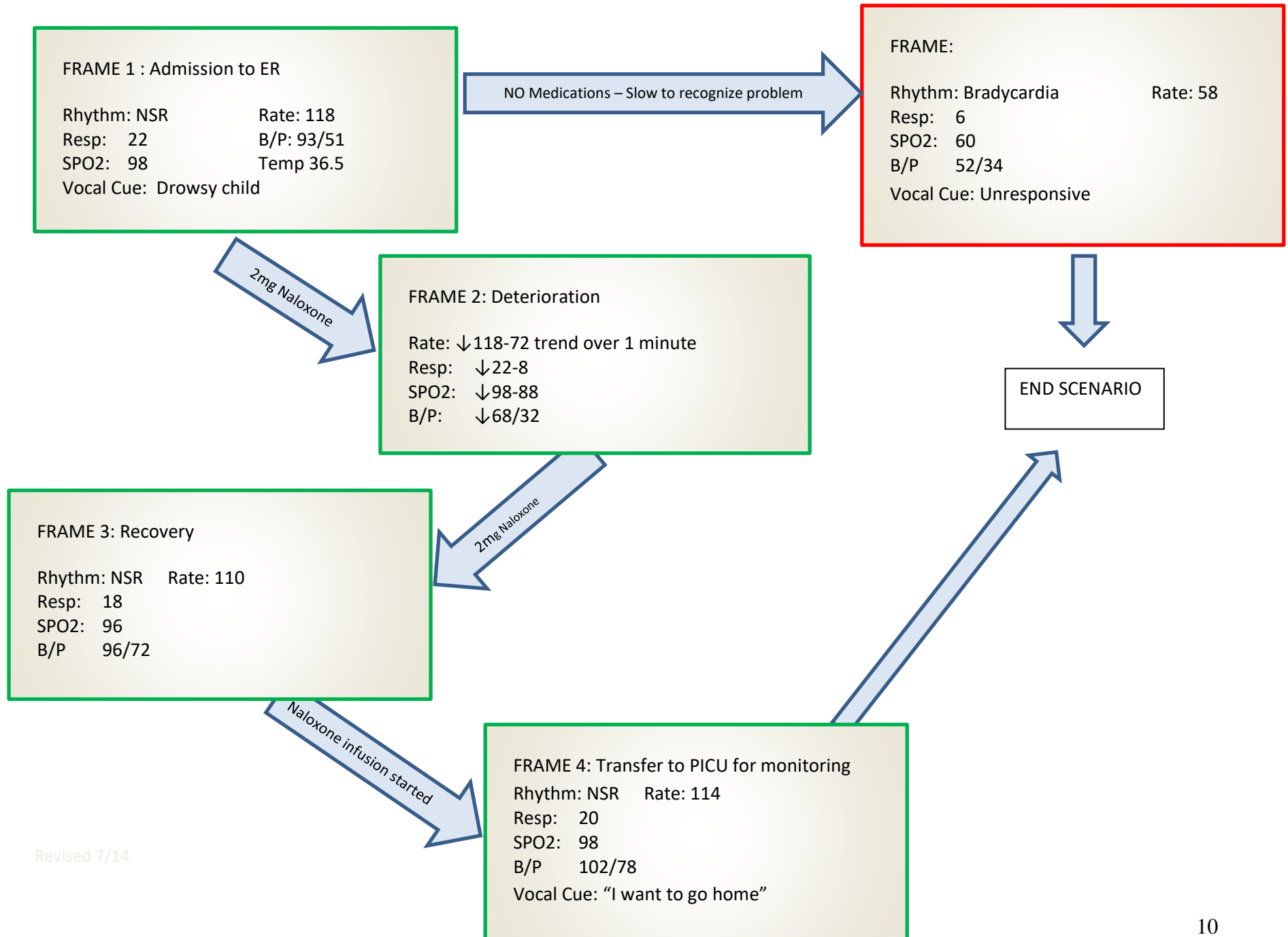
Initial State: Frame 5		Change in Patient Condition	
Vital Signs Cardiac Rhythm: Bradycardia Pulse:58 Respiratory Rate:6 Breathing Pattern Shallow Blood Pressure:52/34 SPO2: 60% General Conditions to be in place for Scenario:		Body System Assessment	Patient Finding
		• Neurological/Sensory	Unable to arouse
		• Cardiac	bradycardia
		• Pulmonary	Respiratory depression
		• Musculoskeletal	
		• Gastrointestinal	
		• Genitourinary	
		• Skin/Wound	
		• Vocal Complaint	N/A
Correct Action: Naloxone	Move to Frame:	• New Lab Reports	
Wrong Action	Move to Frame:		
No Action	Move to Frame:		

Facilitator Notes:

End scenario and discuss need for Naloxone therapy--

Scenario: Cheyanne James-B.D. 2-2-XX-Methadone Ingestion Overdose

Scenario Progression Algorithm:



Scenario: *Cheyenne James-B.D. 2-2-XX-Methadone Ingestion Overdose*

**RURAL SIMCENTER
MEDICATION ADMINISTRATION RECORD**



NAME: Cheyanne James DOB: 2-2-XX GENDER: Male PT. ID # 0165 ALLERGIES: Bee Stings		ROOM # ER bed 4 PHYSICIAN: Saunders PATIENT NOTES & COMMENTS:		
Medication Order	Scheduled Time	Time Administered	Nurse Initials	Comments
Normal Saline-IV	Continuous			
Naloxone-IV drip- 3.8 mg in 50 mL NS infused at 2 mL/h	Continuous			



PHYSICIAN'S ORDERS

Drug Allergies: NKDA Reports allergy to Bee Stings		NAME: Cheyanne James-	
		Birthdate: 2-2-XX	
		PATIENT ID NO: 0165	
		PHYSICIAN: Saunders	
	Another brand of drug identical in form and content may be dispensed unless checked <input type="checkbox"/>		Nurse's Initials
1.	Admit for observation to PICU		
2.	IV Normal Saline		
3.	Naloxone IV drip: 3.8 mg in 50 mL NS infused at 2 mL/h (40 mcg/kg/h)		
4.	Monitor vital signs q 15 minutes for 4 hours, then hourly		
5.	Repeat labs in 4 hours		
6.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
		Doctor Sign _____	

PHYSICIAN'S ORDERS



PATIENT CHART- Lab Report

Name: Cheyanne James

GENDER: **Male**

DOB: **2-2-XX**

PATIENT ID: **0165**

ALLERGIES: **Bee Stings**

PRIMARY PHYSICIAN: **Saunders**

Lab Report

Urine immunoassay screening: Negative for amphetamines, cocaine, opiates, cannabinoids, oxycodone, fentanyl, barbiturate, buprenorphine, and benzodiazepines.

Urine methadone screen was positive.

Complete blood count: white blood cell count 12, hemoglobin 12.5, hematocrit 37.0, and platelet count 313

Complete metabolic panel: sodium 139 mmol/L, potassium 4.3 mmol/L, chloride 108 mmol/L, bicarbonate 19 mmol/L, BUN 14 mg/dL, serum creatinine 0.22 mg/dL, serum glucose 77 mg/dL, alkaline phosphatase 300 U/L, ALT 15 U/L, AST 37 U/L, total bilirubin 0.3 mg/dL, and calcium of 9.3 mg/dL.



Patient Actors Roles:

Parent who called 911 and followed child to the ER. The parent should be able to provide ingestion history

EMT-handoff to ER team

Suggested Dialogue for each Actor

EMT gives report—"child did not require respiratory support during transport" – 1mg naloxone administered via nasal spray during transport-10 minutes prior to arrival. "Child seems stable but continues to be drowsy".

Parent can state concern—"I just left the kids for a minute", blames father for leaving the dose out where the child could find it. Father can state he is getting treatment—that was supposed to be the "right thing" for his family. Mother can state repeatedly that she never uses drugs.

Key Points to emphasize:

Time of exposure and waiting to call 911 until child showed symptoms.

Importance of good communication during handoff

Suggested Character Development:

Parent can express concern over child left at home.

Parent can be helpful or become suspicious at involvement of recommended home social service follow up



DEBRIEFING Points

Instructors should develop a structured debriefing and develop questions related to methadone toxicity in pediatrics:

This case reminded us that methadone poisoning in children can potentially be life-threatening if early signs and symptoms of poisoning are not identified and eventually missed. Prolonged course of continuous infusion of IV naloxone is effective in reversing the signs and symptoms of methadone toxicity in children.

Discuss the half-life of methadone compared to other opioids. Slower onset and longer lasting effects in children require sustained monitoring. Duration of toxicity effects following acute methadone poisoning is unpredictable. Because of the long duration of action of methadone, if over-sedation or respiratory depression occurs, a prolonged period of observation may be needed.

1. Review Objectives-
 - A. Review case and if students were quick to identify signs of respiratory failure and provide appropriate treatment
 - B. How did they determine the timeline for the opioid toxicity ingestion—discuss therapeutic communication with the parent.
 - C. Were the students able to implement appropriate naloxone treatment for methadone ingestion overdose
 - D. Do they know the half-life of naloxone and how often it can be administered—what are the benefits of IV naloxone for this patient?
 - E. Were students able to select an appropriate size nasal airway, face mask, bag, endotracheal tube, and laryngoscope for the patient and provide excellent Bag/mask ventilation?
 - F. Were there any indications that ET intubation or an advanced airway was required?
2. Describe Teamwork
 - a. Who was the leader?
 - b. What were the roles
 - c. Did the team work together?
 - d. Did the team have a shared mental model?
 - e. Was communication adequate?
3. Patient Safety- Were safety checks in place—how smooth was the medication administration and dosage calculations?
4. Patient Teaching-What anticipatory guidance would be important for this family on discharge?
5. Systems Errors-were there sufficient pediatric meds/lines/airway supplies

Tips for Debriefing

1. Learner focused
2. Allow enough time for learning (2-3 times the scenario length)
3. Focus on the process not the individual
4. Keep the debriefing positive