Pediatric Opioid Toxidrome

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1. Instructor Contact Information

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2. Description of Curriculum

Course Overview
This course teaches learners to recognize and manage pediatric opioid toxicity and its complication, respiratory failure.

The course is simulation based with an integrated team communication focus.

The learners will identify the signs and symptoms of an opioid toxidrome, learn its antidote and learn that repeated doses of the antidote may be necessary in managing opioid toxicity (Appendix A).

The learners should recognize the seriousness of the situation and recruit a full resuscitation team. The primary complication for the team to recognize and manage is respiratory failure.

Educational Rationale on How the Course Generalizes to Real-Life Circumstances
Prescription opioids have become a primary cause of child poisonings. Medical providers must be able to quickly recognize and manage this increasingly common situation.

In a recent study, [http://www.jointogether.org/news/research/summaries/2008/kids-face-rising-risk-of.html](http://www.jointogether.org/news/research/summaries/2008/kids-face-rising-risk-of.html) 9,179 toddlers and children were involved in incidents related to opiate access between January 2003 and June 2006. In these incidents, eight children died while 43 suffered life-threatening injuries or serious disabilities and 214 required prolonged medical attention. The medications involved belonged to parents, grandparents and other adults.

The goal of this course is to provide the learner with an opportunity to manage a life threatening pediatric opioid overdose, where the correct steps need to be taken in a limited period of time.

Key elements include the primary survey (including exam of the pupils), eliciting critical history (potential medication/ingestion exposures), recognizing the need to call for team assistance early in an event, recognizing and treating respiratory failure, and recognizing and treating opioid toxicity (naloxone).

Duration of Training Session: 1 hour
Frequency of Course: 3 times per year
Number of Trainees per Session: 3 to 7
### 3. Target Trainees

<table>
<thead>
<tr>
<th>Primary</th>
<th>Secondary</th>
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<tbody>
<tr>
<td>Pediatric and emergency medicine residents, fellows, faculty and nurses</td>
<td>N/A</td>
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</table>
4. Prerequisite Knowledge and Skills

Required background knowledge:
- Anatomy related to the pediatric airway
- Application and use of airway adjuncts (oral, nasal airway)
- How to provide ventilatory support: Bag Mask Ventilation, Endotrachaeal Intubation
- Drugs used for rapid sequence intubation (RSI)
- Toxidrome of opioid toxicity
- Antidote to opioids toxicity: naloxone
- TeamSTEPPS™ communication terminology (Appendix F)

Required background skills expected in trainees prior to receiving training in the target course:
- Airway assessment
- Airway positioning techniques
- Correct use of oral & nasal airway
- Proper bag mask ventilation technique
- Rapid sequence intubation procedures, medications and dosages
- Proper endotracheal intubation technique and confirmation
5. Goals and Objectives

Goal 1: Recognition and Management of Respiratory Failure
The learner will improve skills in recognizing and managing respiratory failure in a safe and professional manner. (*ACGME Competencies: Medical Knowledge¹, Patient Care², Interpersonal and Communication Skills³, Professionalism⁴, System-based Practice⁵, Technical skills⁶*)

**Objective 1a - Initial patient assessment**¹,²,³,⁴
The learner will be expected to discuss what s/he would look for in an initial history and physical examination (primary survey) of a patient presenting to the emergency department.

**Objective 1b - Identification of respiratory failure**¹,²,³
The learner should identify signs of respiratory failure: airway obstruction, bradypnea, hypoxia, secondary bradycardia.

**Objective 1c - Appropriate monitoring**¹,²,³
The learner should be familiar with and apply basic monitoring standards for a patient in respiratory failure (cardiorespiratory monitors, pulse oximetry, blood pressure, and temperature). S/he should obtain a patient weight or accurate estimate (i.e. Broselow-Luten Tape).

**Objective 1d - Equipment setup**¹,²,³,⁶
The learner should be able to set up the equipment required to treat a patient in respiratory failure: airway adjuncts (nasal airways), supplemental oxygen, bag-mask ventilation, suction, endotracheal tube with stylet, and laryngoscope. S/he should know and select an appropriate size nasal airway, face mask, bag, endotracheal tube, and laryngoscope for the patient.

**Objective 1e - Demonstrate understanding of the relevant anatomy**¹
The learner should be able to identify pediatric anatomy that could impede ventilation. The neck should not be flexed or hyper extended. The airway should be evaluated for patency.

**Objective 1f - Technical skills**⁶
The learner should position the patient for maximal ventilation: shoulder roll and/or jaw thrust. S/he should be able to bag-mask ventilate the patient effectively, using the “E” and “C” technique, either one person or two person technique. If s/he elect to intubate, s/he should use rapid sequence intubation techniques, including pre-oxygenation, pre-medications (atropine), a sedative (optional, due to the opioid toxicity), a paralytic and appropriate cricoid pressure. The learner should place the endotracheal tube in the trachea. Intubation should be confirmed with at least 2 techniques (physical exam for chest rise, auscultation, capnography, colorimeter, and x-ray). S/he should identify a reference resource and verify medication doses.
5. Goals and Objectives

**Goal 2: Recognition and Management of Opioid Toxicity**
The learner will recognize and treat opioid toxicity in a safe and professional manner. *(ACGME Competencies: Medical Knowledge¹, Patient Care², Interpersonal and Communication Skills³, Professionalism⁴, System-based Practice⁵, Technical skills⁶)*

**Objective 2a - Recognition of opioid toxidrome⁷,⁸**
The learner should identify physical exam findings consistent with opioid toxicity: pinpoint pupils, upper airway obstruction secondary to depressed mental status and decreased muscle tone, bradypnea, hypoxia, bradycardia, and hypotension.

**Objective 2b - Management of opioid toxidrome with naloxone⁷,⁸**
The learner should identify naloxone as the antidote to an opioid toxicity. Dosing should either be stated or obtained from resource material at 0.1 mg/kg, max dose 2mg. The learner should recognize that naloxone has a shorter half-life than most opioids and may need to be re-administered if signs of respiratory failure return.

**Objective 3c - Appropriate monitoring⁹,¹⁰**
The learner should recognize the need for ongoing monitoring (cardiorespiratory monitors, pulse oximetry, blood pressure, and temperature), due to the potential of recurrent respiratory failure.

**Goal 3: Team Training and Communication Skills**
The learner will become more skilled in the management and leadership of emergency personnel including physicians, nurses, and ancillary personnel. *(Competencies: Interpersonal and Communication Skills³, Professionalism⁴, System-based Practice⁵, Technical skills⁶)*

**Objective 3a - Team training⁴,⁵,⁶**
The learner will be exposed to a full-scale high-fidelity simulation using a human patient simulator in which the learners are faced with a life threatening emergency due to respiratory failure. The team will be expected to brief at the beginning of the scenario, huddle during the scenario and debrief after the scenario.

**Objective 3b - Communication skills⁴,⁵,⁶**
The learner will be required to direct available resources to manage respiratory failure and opioid toxicity. S/he will coordinate, direct and communicate with a resuscitation team using directed call-out and check-back.
6. Instructor Notes

1. Environmental Set Up
   - Try to re-create the location, look, and feel of the participant’s “home” work environment.
   - Place SimBaby in a gown, diaper, etc, to maximize realism.

2. Pre-Simulation Introduction
   - Share the “basic assumption”: We believe each of you is intelligent, well-trained, want to do their best and improve.
   - Share the “goals”: This is an opportunity for us to practice patient care and team dynamics in a safe, supportive environment.
   - We will practice, with the help of a _____(i.e. SimBaby) patient simulator. Review the simulator capabilities: where monitors can be applied, where to auscultate for breath sounds or heart sounds, where to look/feel for clinical findings (breathing, pulses, pupils, etc) where procedures can be performed (IV, IO, bag valve mask, endotracheal intubation).
   - Review supplies: location of resuscitation equipment, monitors, defibrillator, discuss that if additional equipment or resources are desired, request should be made to facilitator.
   - Review safe use of defibrillator.
   - Review: If equipment malfunctions or is missing, please continue with the simulation as you would in a real patient environment.
   - Review: We recognize that this is a “simulated” environment; please do your best to act as you would in a real patient environment/case.
   - Review: Discuss principles of team dynamics/management for your hospital environment (Appendix F). Review expectations of team leaders and members: take time to plan before a patient arrives (brief) and “get the team on the same page” (huddle).
   - Review: Discuss that additional history, physical exam findings, lab/imaging results, consults may be requested, as they would in a real clinical situation. Not all results/requests may be available immediately.
   - Review: After the scenario concludes, we will discuss the medical management and the team dynamics of the scenario together.

3. Scenario Notes
   - A “trigger” is a critical time or event that signifies the start or end of an act in the scenario. These are the critical steps that help the scenario progress. Please review these prior to conducting your session.

4. Debriefing
   - Please see Appendix B.
   - Remember: Have the participants step away from the simulator either into a different space (chairs in a circle or separate room).
   - Remind participants this is a “confidential” opportunity to discuss and ask questions. Try to avoid personal critiques and refrain from discussing individual performances outside of the simulator environment. (i.e. “I was confused about the best way to perform bag-valve masking.” Vs. “Jim, it looked like you were suffocating the patient.” This could make a participant defensive and shut down discussion.)
   - Remind participants that the debriefing time is intended to focus on the group’s performance. This is an opportunity to discuss, ask, and try to identify how the entire group can improve. This session is not meant to be “graded”, either for the group or for individuals.
7. Common Errors and Preventions Strategies

Common errors observed in trainees and strategies for helping address the errors

a. Failure to recognize respiratory failure.
   **Strategy:** Review signs of respiratory failure and impending respiratory arrest: upper airway obstruction, bradypnea, inadequate ventilation, hypoxia, altered mental status.

b. Fixation error: focus on endotracheal intubation leading to failure to use stepwise treatment of respiratory failure.
   **Strategy:** Review basic airway management: assessment, positioning, airway adjuncts (oral/nasal airways), bag mask ventilation (BMV) as progressive steps in airway management.

c. Failure to use cricoid pressure throughout positive pressure ventilation.
   **Strategy:** Review need for cricoid pressure from initiation of BMV until definitive airway established to reduce risk of air entry to stomach and potential for aspiration.

d. Failure to use RSI for intubation for patient with assumed full stomach.
   **Strategy:** Review components of RSI: preoxygenation, premedication with atropine in children < 5 yrs, sedative (not needed in this case due to opioid toxicity), paralytic and timely cricoid pressure.

e. Failure to recognize opioid toxidrome.
   **Strategy:** Review signs of opioid toxicity: pinpoint pupils, depressed mental status, bradypnea.

f. Failure to treat opioid toxidrome.
   **Strategy:** Review antidote to opioid toxicity: naloxone 0.1 mg/kg, up to 2mg max per dose. Review that opioids may have longer half-life than naloxone and repeat doses of naloxone may be required.

g. Inefficient teamwork
   **Strategy:** Review need to brief (discuss team roles) prior to a critical situation and huddle (ad-hoc planning to re-establish situation awareness) during a crisis.

h. Inefficient communication: lack of call-out
   **Strategy:** Review importance of directed communication:
   “Survey MD- What’s the airway status?”

i. Inefficient communication: lack of check-back
   **Strategy:** Review use of closed-loop communication:
   Tm Leader- “Give Naloxone 1mg IV”.
   Med Prep RN-“Naloxone 1 mg IV”.
   Tm Leader-“ That’s correct”.

General strategies to solve the problems

- Increase knowledge base: assigned reading, lectures, TeamSTEPPS™ training
- Debriefing focused to re-evaluate critical thinking and structure planning of actions
- Teaching points based on errors
- Regular simulation training to avoid previous mistakes
Key methods for delivering cognitive training include the following:

- Respiratory Failure and Opioid Toxicity PowerPoint Handouts (See Appendix G)
Participants:
Doctor #1: Team Leader
Doctor #2: Airway Physician
Doctor #3: Survey Physician
Nurse #1: Medication Administration Nurse
Nurse #2: Documenting or Circulating Nurse
Instructor #1: Attending PEM or EM physician (Facilitator)
Instructor #2: If a 2nd instructor is available, cast them as “grandma”, available to answer questions. If a 2nd instructor isn’t available, the facilitator can play the role of grandma as well.

To begin:
- This scenario works best if learners function in their normal roles (physicians function as physicians, nurses function as nurses). If your learners consist only of physicians, please ask 1-2 of them to function as nurses during the scenario. To maximize the realism of the scenario, it helps to ask them to do everything a nurse would normally do at your institution.
- If your learners have not been introduced to the concept of specific team roles (including a team leader) and responsibilities, we recommend discussing your institutional standard prior to the start of the scenario. If your learners are already familiar with this concept, we recommend reminding them of your institution’s code team roles and responsibilities prior to the start of the scenario. Based on your learners needs/experience, the instructor can decide whether to assign roles or allow them to determine their own roles during the brief. Depending on the needs of your learners, you may choose to have the learners remain in the same roles throughout the scenario or rotate. Please state your expectation to the group. *i.e. “Now that we have reviewed the code team roles and responsibilities, I will assign the team leader to be Dr. Stone. Dr. Stone, you will have the opportunity to assign all other roles and organize your team after I introduce you to the scenario (prelude)”.*
- Remind them that an instructor/facilitator will be available (identify WHO) to answer questions (i.e. history, labs) and assist them (if they are having difficulty examining SimBaby or finding equipment). Not all results or requests may be available at the time the request is made.
- All learners will be read the Prelude outside the simulation area.
- Following the Prelude, give the team 2 minutes to brief. This is their opportunity to organize their team prior to receiving the triage history.
- The team will then be read the Triage history outside the simulation area and then be permitted to enter the “patient’s room”.
- Remind them that “grandma” (identify WHO) is also available to answer questions.

Prelude: 0-3 minutes

Introduction:
The communication (triage) nurse just received a phone call from a grandma. Her 15 month old granddaughter has been very sleepy: she’s having trouble waking her up. She’s driving her to the ED, and the phone call dropped as she tried to arouse her in the car. She’ll be here in 2 minutes. You have 2 minutes to organize your team.

(Give the team 2 minutes to brief).
**Triage history:**
The triage nurse met the grandma and Robin, a 15 mo old girl, at the emergency department entrance. Robin was in good health this morning and spent the day at her grandmother’s house. She has not been sick. The triage nurse brought her directly back to an emergency department room because she was so sleepy.

Grandma is available to answer questions. (____) will be playing the role of grandma.

(The team can now enter the simulation room to meet the patient).

**Act 1: 3-5 minutes**

**Triggers:** 3 minutes

**Additional History and Medical Information if asked:**

Robin: 15 mo girl.

**Chief Complaint:** Sleepiness

**History:** She was in good health this morning. She spent the day at her grandmother’s house. Grandma became concerned when her nap lasted more than 3 hours. She tried to wake her up, but found her difficult to arouse. Grandma drove Robin to the ED. She has not been sick (no cold, cough, or fever).

**PMH:**
- Healthy, no medical problems
- Immunizations up to date

**Medications:**
- Robin is on no medications
- If asked, Grandma on diabetes medication, arthritis, and chronic pain medications.

**Social:**
Lives with mom; cared for by grandma.

No allergies.

**Initial Examination (becomes available with appropriate monitors, evaluation):**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Rhythm</td>
<td>sinus bradycardia</td>
</tr>
<tr>
<td>HR</td>
<td>92 bpm</td>
</tr>
<tr>
<td>BP</td>
<td>80/45</td>
</tr>
<tr>
<td>Sat</td>
<td>93%</td>
</tr>
<tr>
<td>RR</td>
<td>16/min</td>
</tr>
<tr>
<td>Temp</td>
<td>37.0</td>
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</tbody>
</table>
9. Skill Training

**Act 1 Cont’d**

**Appearance:** Listless, limp, responds only to pain.

**Respiratory:** Slow deep breathing, with intermittent upper airway obstruction. Clear breath sounds bilaterally.

**Circulation:** Facial pallor, mottled hands and feet. Cap refill 4 seconds. 1+ pulses.

**Neuro:** Pinpoint pupils bilaterally, unresponsive to light. Responds to painful stimuli.

**Additional:** No signs of trauma

**Act 2: 5-13 minutes**

**Triggers:** Start- 5 minutes  
End- 30 seconds after Naloxone given or intubation or 7 minutes in this act

**Physical Examination:**
- **Rhythm:** sinus bradycardia
- **HR:** 64 bpm  
- **BP:** 72/35  
- **Sat:** ramps down to 78% on room air over 1 min  
- **RR:** ramps down to 6/min over 1 min, followed by apnea of 20 sec x 4 over 2 min  
- **Temp:** 37.0

If requested:

**Appearance:** Listless, limp, unresponsive to pain.

**Respiratory:** Slowed shallow breathing, with upper airway obstruction. Clear breath sounds bilaterally.

**Circulation:** Facial pallor, mottled hands and feet. Capillary refill 4 seconds. 1+ pulses.

**Neuro:** Pinpoint pupils bilaterally, unresponsive to light. Does not respond to painful stimuli.

**Additional:** No signs of trauma

**Potential Interventions, if requested:**

If requested: Doctor #2, #3, and Nurse #2 are available to participate.

If requested: Oral airway is available, but makes patient vomit if attempted.

If requested: Nasal airway is available, overcoming upper airway obstruction. Addition of BMV allows easy ventilation of patient, oxygen saturations increase to 96%.

If requested: BMV is available, allowing ventilation if airway properly positioned.

If requested: IV access obtained on first attempt.

If requested: Naloxone is available.
# 9. Skill Training

## Act 2 Cont’d

<table>
<thead>
<tr>
<th>Naloxone</th>
<th>&lt;20kg</th>
<th>0.1 mg/kg</th>
<th>IV/IO/IM/SQ</th>
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</thead>
<tbody>
<tr>
<td>Naloxone</td>
<td>&gt;20kg</td>
<td>2 mg</td>
<td>IV/IO/IM/SQ</td>
</tr>
</tbody>
</table>

If given via ETT (2-10x dose, diluted in 1 ml NS)

If requested: Intubation equipment available: endotracheal tubes, laryngoscopes, suction, colorimeter.

If requested: Rapid sequence intubation medications available: atropine, midazolam, etomidate, rocuronium, and succinylcholine.

If requested: glucose 85

*** If team reaches end of this act (total of 7 min in this act) without either administering naloxone or intubating patient, allow 2 more minutes in this act to allow team opportunity to intervene. If still no naloxone or intubation, end session and proceed to debrief.

***If team reaches end of this act (total of 7 min in this act) and has intubated patient, but NOT administered naloxone, proceed to Act 3.

***If team intubates patient and then gives naloxone patient pulls out ETT, proceed to Act 3.

## Act 3: 13-15 minutes

**Triggers:** Start- 30 seconds after Naloxone given or 13 minutes into scenario.
End- 2 min in Act 3 or proceed to OPTIONAL Act 4

**Physical Examination:**

- **Rhythm**: sinus
- **HR**: 115 bpm
- **BP**: 105/56
- **Sat**: ramps up to 96% over 1 min
- **RR**: ramps up to 26/min over 1 min***
- **Temp**: 37.2

If requested:

- **Appearance**: Some movement of arms/legs.***
- **Circulation**: Warm well perfused. Cap refill 3 seconds. 2+ pulses.
- **Neuro**: 3mm pupils bilaterally, responsive to light. ***
- **Additional**: No signs of trauma.

**Potential Interventions, if requested:**

- If requested: X-ray enroute for evaluation.
- If requested: Additional naloxone available for administration.
- If requested: Toxicology/Critical care en route for consultation.
- If requested: glucose 85.
9. **Skill Training**

**Act 3 Cont’d**

If ending scenario here consider asking:

- Any additional evaluations/interventions team would like
- Anticipated disposition of patient

***Note: If the team has intubated the patient and not given naloxone:*** respiratory rate should reflect the rate at which they are bagging, if paralytics were given, no movement should be happening, and pupils should remain pinpoint.

**Optional, Act 4: 15-17 minutes**

**Triggers:**
- Start- 1 ½ min after naloxone given
- End- naloxone 2nd dose given or 2 minutes in Act 4

**Physical Examination:**

- **Rhythm**
  - sinus bradycardia
- **HR**
  - ramps down to 64 bpm over 1 minute
- **BP**
  - 80/40
- **Sat**
  - ramps down to 78% over 1 min
- **RR**
  - ramps down to 6/min over 1 min, followed by apnea of 20 sec
- **Temp**
  - 37.0

**If requested:**

- **Appearance:** Listless, limp, unresponsive to pain.
- **Respiratory:** Slowed shallow breathing, with upper airway obstruction. Clear breath sounds bilaterally.
- **Circulation:** Facial pallor, mottled hands and feet. Capillary refill 4 seconds. 1+ pulses.
- **Neuro:** Pinpoint pupils bilaterally, unresponsive to light. Does not respond to painful stimuli.
- **Additional:** No signs of trauma.

**Potential Interventions, if requested:**

- If requested: additional doses of naloxone available.
- If requested: BMV is available.
- If requested: Intubation equipment available: endotracheal tubes, laryngoscopes, suction, colorimeter.
- If requested: Rapid sequence intubation medications available: atropine, midazolam, etomidate, rocuronium, and succinylcholine.
- If requested: glucose 85.

If naloxone redosed, proceed to Act 5.
9. Skill Training

Optional, Act 5: 17-19 minutes

**Triggers:**
- Start: After naloxone 2nd dose given or 2 minutes in Act 4
- End: 2 min in Act 5

**Physical Examination:**
- **Rhythm:** sinus
- **HR:** 115 bpm
- **BP:** 105/56
- **Sat:** ramps up to 96% over 1 min
- **RR:** ramps up to 26/min over 1 min
- **Temp:** 37.6

If requested:
- **Appearance:** Some movement of arms/legs.
- **Respiratory:** No upper airway obstruction. Clear breath sounds bilaterally.
- **Circulation:** Warm well perfused. Capillary refill 3 seconds. 2+ pulses.
- **Neuro:** 3mm pupils bilaterally, responsive to light.
- **Additional:** No signs of trauma.

**Potential Interventions, if requested:**
- If requested: X-ray en route for evaluation.
- If requested: Additional naloxone available for administration.
- If requested: Toxicology/Critical care en route for consultation.

If ending scenario here consider asking:
- Any additional evaluations/interventions team would like
- Anticipated disposition of patient

***Note: If the team has paralyzed & intubated the patient:** respiratory rate should reflect the rate at which they are bagging, no movement should be happening, and pupils should remain pinpoint.

***Note: If the team has intubated the patient, without paralytics:** respiratory rate should be 18+ bagging, some arm/leg movement, cough against the tube.
10. Equipment Set-up

Simulation Environment preparation

Before each simulation, ensure the anticipated resuscitation equipment is available for the team’s use. Preferably located within 6 feet of simulator.

Resources

- PALS reference cards, material
- Patient Weight Estimator
- Pediatric Resuscitation Medication references (ie: Broeslow tape, reference cards)
- Documentation forms (Code Blue forms)

Universal Precautions

- Staff gowns
- Gloves
- Mask and face shields
- Teaching crash cart & Backboard
- Teaching Defibrillator

Medications

- Adenosine
- Amiodarone
- Atropine
- Etomidate
- Fentanyl
- Ketamine
- Lidocaine
- Midazolam
- Naloxone
- Normal Saline/Lactated Ringers
- Rocuronium
- Succinylcholine
- Epinephrine 1:10,000

Equipment

- Simulator in hospital gown, on bed
- Monitor – NIBP, HR, RR, Oxygen saturation, temp
- BP cuff, HR monitor leads, O2 sat probe, defibrillator cables
- Oxygen hook-up on wall or cylinder
- Bag-mask system, multiple size masks
- O2 Mask, simple or non-rebreather
- Suction
- Thermometer
- Temperature probe
- Nasal, oral airways, multiple sizes
- Shoulder roll
- Endotracheal tubes- 3.0, 3.5, 4.0, 4.5, 5.0, styles
10. Equipment Set-up

Equipment Cont’d

- Laryngoscope, Miller and Mac blades, multiple sizes
- Co2 colorimeter
- Stethoscopes
- IV/Angiocaths, various sizes
- IO needles, 2 sizes
- Gauze, Tape
- IV tubing
- IV pumps, pressure bags
- Syringes, multiple sizes
- Bedside blood sample processors: glucose, lytes, gases
11. Assessment Methods

<table>
<thead>
<tr>
<th>Type(s) of Assessment Methods Used in This Course:</th>
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<tbody>
<tr>
<td>□ Pre-test Only</td>
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<tr>
<td>□ Pre-test &amp; Post-test</td>
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<tr>
<td>□ Post-test Only</td>
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<tr>
<td>✅ Medical Management Evaluation (Appendix C)</td>
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<td>✅ Crisis Resource Management Evaluation (Appendix D)</td>
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<tr>
<td>✅ Simulation Session Evaluation (Appendix E)</td>
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Appendix A: Scenario Algorithm

**SCENARIO TIMELINE**

**Introduction**
Initial history + PMH provided outside the simulation room

**Act 1: Opioid Toxicity**
Start Timer: 0-5 min.
Primary Assessment in simulation room

**Act 2: Respiratory Failure**
5-13 min.
Triggers: Start 5 min into scenario
End: 30 sec after naloxone, intubation or 13 min into scenario

**Act 3: Resolution**
13-15 min.
Triggers: Start 30 sec after naloxone given or 10 min into scenario
End: 15 min into scenario

**Optional**
**Act 4: Recurrent Respiratory Failure**
15-17 min.
Triggers: 1½ min after naloxone administration
End: Naloxone after 2nd dose or 17 min into this scenario

**Optional**
**Act 5: Resolution**
17-19 min.
Triggers: Naloxone 2nd dose given or 19 min into scenario
End: 2 min in this act

**VITAL SIGNS**

- Rhythm sinus
- HR 92 bpm
- BP 80/45
- SAT 93%
- RR 16/min
- Temp 37.0 °C

- Rhythm sinus
- HR 64 bpm
- BP 70/45
- SAT ramps down to 78% over 1 min
- RR ramps down to 6/min over 1 min followed by apnea of 20 sec ± 4 over 2 min
- Temp 37.0 °C

- Rhythm sinus
- HR 115 bpm
- BP 105/60
- SAT ramps up to 96% over 1 min
- RR ramps up to 26/min
- Temp 37.7 °C

- Rhythm sinus
- HR ramps down to 64 bpm over 1 min
- BP 80/45
- SAT ramps down to 78% over 1 min
- RR ramps down to 6/min over 1 min followed by apnea of 20 sec
- Temp 37.0 °C

- Rhythm sinus
- HR 115 bpm
- BP 105/60
- SAT ramps up to 96% over 1 min
- RR ramps up to 26/min
- Temp 37.0 °C

**FACILITATOR INFORMATION**

- Allow team to brief outside the simulation room
- If requested, additional history/exam available
- If requested, naloxone is available
- Nasal airway allows ventilation
- G/V mask improves SAT to 96%
- If requested, additional history/exam available
- If requested, additional naloxone available
- If requested, X-ray or consultants en route
- If requested, additional naloxone available
- If requested, X-ray or consultants en route
Appendix B: Debriefing Overview

“Simulation creates the opportunity to debrief.”

- We believe that the focus of each simulation should be the DEBRIEF. The simulation creates the opportunity for us to examine our medical management, team dynamics, and communication skills. It allows us to talk about the challenges we faced in a safe environment and improve the way we care for patients as a team.

Framework for debriefing:

Each debrief should consist of 3 components:

- Introduction
- Discussion of Medical Management
- Discussion of Crew Resource (Team) Management

1) Introduction

This “sets the stage” for debriefing and creates expectations.

What you might say:
- This is an opportunity to reflect and learn, improve our medical care, team work, and communication.
- Everyone should be able to ask questions and share their feelings.
- Once you leave this session, we encourage open discussions of the concepts you learn, but ask you to keep specifics about the scenario and individual’s performances within these walls.

2) Medical Management

This portion of the discussion focuses on the medical aspects of the case. It’s usually more comfortable to begin with these “facts”.

What you might say:
- Let’s begin by discussing medical management.
- What did you think was wrong with the patient? Can someone summarize what happened in this scenario for us?
- What signs led you to think this?
- What information/resources could have helped guide your decision making?

3) Crew Resource/Team Management

This portion of the discussion focuses on how the team worked together. It can be emotionally charged and difficult to discuss without feeling “personal”. The challenge is to try to generalize specifics into themes, i.e.: “Will someone start chest compressions?” This order wasn’t DIRECTED at a specific individual. That’s a common communication problem. Both the team leader and members may have been unsure of who was/should do it. A DIRECTED order would be “Jennifer, please start CPR”. Then the entire team knows who should/will do it.
Appendix B: Debriefing Overview

What you might say:
- How did you function as a team?
- What did your team do well?
- What could your team have done differently?

4) Summarizing
- This is your opportunity to ensure the key learning points are highlighted
- Try to choose approximately 3 take-home medical management and team management points.

  Medical management examples:
  (a) This was a case of pediatric opioid toxicity leading to respiratory failure.
  (b) Signs of opioid toxicity include pinpoint pupils, bradypnea, upper airway obstruction (due to decreased muscle tone), hypotension (vasodilation) and bradycardia (due to resp failure).
  (c) Signs of respiratory failure: bradypnea, inadequate ventilatory effort (upper airway obstruction), apnea, hypoxia.

  Team management examples:
  (d) Recognize need for a full resuscitation team when a patient develops respiratory failure.
  (e) Delegate and maintain specific team member roles to ensure coordinated team functioning.

General Facilitator Goals:
- Try to facilitate the TEAM’s discussion (avoid dominating the conversation)
- Ask open ended questions (avoid yes/no questions)
- Discuss the performance (not the individual)
Pediatric Opioid Toxidrome
Medical Management

This checklist identifies core medical management skills. It’s hard to discuss more than 3 of these during one debriefing session. We recommend selecting 2-4 of these issues to focus on.

<table>
<thead>
<tr>
<th>Assessment of ABCDE’s</th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific comments:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What did you think of the assessment of the ABCDE’s? What could you do differently?

<table>
<thead>
<tr>
<th>Obtaining significant history</th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific comments:</td>
<td></td>
</tr>
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<td></td>
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</tr>
</tbody>
</table>

What’s in a SAMPLE history? Signs and symptoms, Allergies, Medications, Past Medical History, Last meal, Events. What made you think/not about potential exposures/ingestions?

<table>
<thead>
<tr>
<th>Recognition of respiratory failure</th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific comments:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion Points: What signs of respiratory failure did you see?-airway obstruction, bradypnea, hypoxia. What would have helped you identify them sooner?

<table>
<thead>
<tr>
<th>Management of respiratory failure</th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific comments:</td>
<td></td>
</tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Discuss Points: What did you think about in managing respiratory failure? (airway positioning, bag-valve mask technique). What could you have done differently?
### Appendix C: Medical Management Evaluation and Debriefing Form

<table>
<thead>
<tr>
<th>Recognizing opioid toxicity</th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific comments:</td>
<td>________________________</td>
</tr>
<tr>
<td></td>
<td>________________________</td>
</tr>
<tr>
<td></td>
<td>________________________</td>
</tr>
</tbody>
</table>

*Discuss Points: What are the signs of opioid toxicity? Pinpoint pupils, decreased muscle tone, secondary upper airway obstruction, depressed mental status, bradypnea, hypoxia*

<table>
<thead>
<tr>
<th>Managing opioid toxicity</th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific comments:</td>
<td>________________________</td>
</tr>
<tr>
<td></td>
<td>________________________</td>
</tr>
</tbody>
</table>

*Discuss Points: What’s the antidote for opioid toxicity? Naloxone 0.1 mg/kg, max dose 2 mg, repeat for recurrent symptoms)*

**Specific medical management issues:**
(list any particular elements of history or interventions you want to assure are discussed)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pediatric Opioid Toxidrome
## Appendix D: Crisis Resource Management Evaluation and Debriefing Form

### Pediatric Opioid Toxidrome

**Crisis Resource Management Evaluation**

This checklist identifies core teamwork and communication skills. It’s hard to discuss more than 3 of these during one debriefing session. We recommend selecting 2-4 of these issues to focus on.

<table>
<thead>
<tr>
<th><strong>Recognize Emergent Situation and Call for Help</strong></th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific comments: ______________________________</td>
<td></td>
</tr>
<tr>
<td>_______________________________________________</td>
<td></td>
</tr>
<tr>
<td>_______________________________________________</td>
<td></td>
</tr>
</tbody>
</table>

*Discussion Points: What helped you recognize this was an emergent situation and call for more help? What hindered you?*

<table>
<thead>
<tr>
<th><strong>Leader Identified</strong></th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific comments: ______________________________</td>
<td></td>
</tr>
<tr>
<td>_______________________________________________</td>
<td></td>
</tr>
<tr>
<td>_______________________________________________</td>
<td></td>
</tr>
</tbody>
</table>

*Discussion Points: What helped the leader be effective? What hindered having clear leadership?*

<table>
<thead>
<tr>
<th><strong>Roles Delegated/Maintained</strong></th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific comments: ______________________________</td>
<td></td>
</tr>
<tr>
<td>_______________________________________________</td>
<td></td>
</tr>
<tr>
<td>_______________________________________________</td>
<td></td>
</tr>
</tbody>
</table>

*What helped/hindered delegation/maintaining roles?*

<table>
<thead>
<tr>
<th><strong>Directed Messages</strong></th>
<th>□ Done Well □ Needs Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific comments: ______________________________</td>
<td></td>
</tr>
<tr>
<td>_______________________________________________</td>
<td></td>
</tr>
<tr>
<td>_______________________________________________</td>
<td></td>
</tr>
</tbody>
</table>

*Discussion Points: How were orders given- “Into the air” or directed at specific individuals? What did that impact you? How could they be delivered more effectively?*
### Appendix D: Crisis Resource Management

**Evaluation and Debriefing Form**

<table>
<thead>
<tr>
<th>Section</th>
<th>Evaluation Options</th>
<th>Specific Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Closed Loop Communication</strong></td>
<td>□ Done Well □ Needs Work</td>
<td></td>
</tr>
<tr>
<td>Discussion Points: Describe closed loop communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sharing Knowledge</strong></td>
<td>□ Done Well □ Needs Work</td>
<td></td>
</tr>
<tr>
<td>Discussion Points: How did team members share information? What thoughts guided your actions?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Recognize Limitations</strong></td>
<td>□ Done Well □ Needs Work</td>
<td></td>
</tr>
<tr>
<td>Discussion Points: What did you think about your ability to “complete all your tasks”? What could have been done?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reevaluation/Summarizing</strong></td>
<td>□ Done Well □ Needs Work</td>
<td></td>
</tr>
<tr>
<td>Discussion Points: At what points is it valuable for the team leader to reevaluate/summarize? How can a summary be provided? What can you do as a team member when you want one?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix E: Simulation Evaluation Form

## Simulation Session Evaluation Form

<table>
<thead>
<tr>
<th>Facilitator: ______________________________</th>
<th>Date: ____________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case Presented: __________________________</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. This simulation case provided is relevant to my work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. The simulation case was realistic.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. This simulation case was effective in teaching basic resuscitation skills.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. This simulation case was effective in teaching case-specific management skills.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. The debriefing after the case was useful.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Can you list/describe 1 or more ways this simulation session will change how you do your job?

Comments:
### TeamSTEPPS™ Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptable</td>
<td>The ability to adjust strategies and altering a course of action in response to changing conditions (internal and external).</td>
</tr>
<tr>
<td>Brief</td>
<td>Discussion prior to start that assigns essential roles, establishes expectation, anticipated outcomes, and likely contingencies.</td>
</tr>
<tr>
<td>Call-Out</td>
<td>A tactic used to communicate critical information during an emergent event. Helps the team prepare for vital next steps in patient care. (Example: “Airway status?” – “Airway clear”; “Breath sounds?” – “Breath sounds decreased on right”)</td>
</tr>
<tr>
<td>Check-Back</td>
<td>A communication strategy that requires a verification of information. The sender initiates the message, the receiver accepts it and restates the message. In return, the sender verifies that the re-statement of the original message is correct or amends if not. (Example: “Give 25 mg Benadryl IV push” – “25 mg Benadryl IV push” – “That’s correct”)</td>
</tr>
<tr>
<td>CUS</td>
<td>Signal phrases that denote “I am Concerned, I am Uncomfortable, This is a Safety Issue.” When spoken, all team members will understand clearly not only the issue but the magnitude of the issue.</td>
</tr>
<tr>
<td>Debrief</td>
<td>Brief, informal information exchange session designed to improve team performance and effectiveness.</td>
</tr>
<tr>
<td>DESC Script</td>
<td>A technique for managing and resolving conflict. Describe the specific situation or behavior; provide concrete data. Express how the situation makes you feel/what your concerns are. Suggest other alternatives and seek agreement. Consequences should be stated in terms of impact on established team goals; strive for consensus.</td>
</tr>
<tr>
<td>Huddle</td>
<td>Ad hoc planning to re-establish Situation Awareness; designed to reinforce plans already in place, and assess the need to adjust the plan.</td>
</tr>
<tr>
<td>I’M SAFE</td>
<td>A checklist to determine both your coworkers’ and your ability to perform safely: I = Illness; M = Medication ; S = Stress ‘ A = Alcohol and Drugs; F = Fatigue; E = Eating and Elimination.</td>
</tr>
<tr>
<td>SBAR</td>
<td>A framework for team members to structure information when communicating to one another. S = Situation (What is going on with the patient?) B = Background (What is the clinical background or context?) A = Assessment (What do I think the problem is?) R = Recommendation (What would I do to correct it?)</td>
</tr>
<tr>
<td>Shared Mental Model</td>
<td>An organizing knowledge structure of relevant facts and relationships about a task or situation that are commonly held by team members</td>
</tr>
<tr>
<td>Situation Awareness</td>
<td>The ability to identify, process, and comprehend the critical elements of information about what is happening to the team with regards to the mission. It’s knowing “What is going around you” and “What is likely to happen next”.</td>
</tr>
<tr>
<td>Situation Monitoring</td>
<td>The process of actively scanning and assessing elements of the situation to gain information or maintain an accurate awareness or understanding of the situation in which the team functions.</td>
</tr>
<tr>
<td>Two-Challenge Rule</td>
<td>Assertively voicing concern at least two times to ensure it has been heard.</td>
</tr>
</tbody>
</table>

*TeamSTEPPSTM is a trademark of the Agency for Healthcare Research and Quality and the Department of Defense.*
Primary Survey

- **A** is for Airway
  - Patent, obstructed, maintainable
- **B** is for Breathing
  - Independent, needs assistance, breath sounds
- **C** is for Circulation
  - Central pulses, mottling, capillary refill
- **D** is for Disability
  - Mental status (AVPU), check glucose
- **E** is for Exposure
  - Remove clothing, check and control temperature
Pediatric Anatomy

- Pediatric heads are BIG
  - Big skull forces neck to flex
  - Use a shoulder roll in infants
  - Use head support in older pts

- Goal:
  - Align airway components
  - Lift jaw (with big, floppy tongue)
    up and away from airway

Equipment Selection and Set-up

- Age-based selection:
  - Nasal airway:
    - Diameter of patient’s pinky, fit nares without blanching
    - Length: tip of nose to inferior edge of ear
  - Face mask:
    - Cross bridge of nose, no pressure on eyes, rest snugly on chin
Bag Mask Ventilation

- Jaw thrust or shoulder roll
- "E" technique
  - Fingers 3-5 on jawline
  - Be careful not to put fingers under jaw and obstruct airway
- "C" technique
  - Fingers 1-2 on mask for good seal on face

Opioid Toxicity- Signs

- Ask for potential medications in environment
- Physical Exam:
  - Pinpoint pupils
  - Bradypnea, Apnea
  - Decreased muscle tone, leading to upper airway obstruction, hypoxia
  - Decreased smooth muscle tone leading to hypotension
Opioid Toxicity- Treatment

- Support Respiratory Failure:
  - Airway positioning
  - Supplemental Oxygen
  - Suctioning
  - Bag-Mask Ventilation
  - Endotracheal Intubation

---

Opioid Toxicity- Treatment

- Naloxone:
  - 0.1 mg/kg up to 2 mg per dose
  - Repeat as needed for recurrent signs of toxicity
  - Be wary of chronic opioid users
  - Maintain patient on monitors

---
## Opioid Agent Characteristics

ND = no Data, NA = Not Applicable. Table based on acute use unless otherwise specified.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Onset (min)</th>
<th>Peak (h)</th>
<th>Duration (h)</th>
<th>Equianalgesic Doses* (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I.M.</td>
<td>P.O.</td>
<td></td>
</tr>
<tr>
<td>Codeine</td>
<td>P.O.: 30-60</td>
<td>0.5-1</td>
<td>4-6</td>
<td>120 200</td>
</tr>
<tr>
<td></td>
<td>I.M.: 10-30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
<td>I.M.: 7-15</td>
<td>ND</td>
<td>1-2</td>
<td>0.1 NA</td>
</tr>
<tr>
<td></td>
<td>I.V.: Immediate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>ND</td>
<td>ND</td>
<td>4-8</td>
<td>ND ND</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>P.O.: 15-30</td>
<td>0.5-1</td>
<td>4-6</td>
<td>1.5 7.5</td>
</tr>
<tr>
<td>Meperidine</td>
<td>P.O./I.M./S.C.:</td>
<td>0.5-1</td>
<td>2-4</td>
<td>75 300</td>
</tr>
<tr>
<td></td>
<td>10-15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I.V.: ≤5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methadone</td>
<td>P.O.: 30-60</td>
<td>0.5-1</td>
<td>4-6 (acute)</td>
<td>10 20</td>
</tr>
<tr>
<td></td>
<td>I.V.: 10-20</td>
<td></td>
<td>&gt;8 (chronic)</td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>P.O.: 15-60</td>
<td>P.O./I.M./S.C.:</td>
<td>0.5-1</td>
<td>3-6 10 60 (acute) 30 (chronic)</td>
</tr>
<tr>
<td></td>
<td>I.V.: ≤5</td>
<td>I.V.: 0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxycodone</td>
<td>P.O.: 10-15</td>
<td>0.5-1</td>
<td>4-6</td>
<td>NA 30</td>
</tr>
</tbody>
</table>

