Respiratory Core Case 1

Upper Airway Obstruction

(Peanut Allergy)

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are dispatched to a home for a 10-year-old child with difficulty breathing 10 to 15 minutes after eating.
ED: You are working in the ED and are asked to examine a 10-year-old child with difficulty breathing 10 to 15 minutes after eating.
General Inpatient Unit: You are called to evaluate a 10-year-old child admitted with difficulty breathing 10 to 15 minutes after eating.
ICU: You are called to the bedside of a 10-year-old child with difficulty breathing 10 to 15 minutes after eating.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Anxious *Breathing* • Increased inspiratory effort, stridor *Color* • Pale skin	• Respiratory distress or respiratory failure	• Activate emergency response system, if appropriate. • Open airway if needed. • Administer 100% oxygen via non-rebreathing mask as tolerated. • Attach pads/leads and turn on monitor. • Apply pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Inspiratory stridor • ***B**reathing:* Respiratory rate about 30/min, deep suprasternal retractions, nasal flaring, poor aeration on auscultation, SpO_2 90% on room air • ***C**irculation:* HR 130/min, peripheral pulses normal, capillary refill about 2 seconds, BP 115/75 mm Hg • ***D**isability:* Somewhat anxious • ***E**xposure:* Temperature 37°C (98.6°F)	• Respiratory distress versus respiratory failure • Upper airway obstruction	• Evaluate response to oxygen administration. • Analyze cardiac rhythm (sinus tachycardia).

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
SAMPLE history • ***S**igns and symptoms:* Difficulty breathing about 10 to 15 minutes after eating a cookie • ***A**llergies:* Peanuts • ***M**edications:* None • ***P**ast medical history:* Previously healthy, with exception of possible peanut allergy • ***L**ast meal:* Has had only a cookie from neighbor since breakfast this morning • ***E**vents (onset):* Difficulty breathing began within several minutes of eating a cookie **Physical examination** • *Repeat vital signs after oxygen administration:* HR 120/min, RR 20/min, SpO_2 98% (with 100% oxygen), BP 115/75 mm Hg • *Head, eyes, ears, nose, and throat/neck:* Stridor at rest • *Heart and lungs:* No murmur, breath sounds coarse, capillary refill about 2 seconds • *Abdomen:* Normal • *Extremities:* No edema, no rash, mottled skin • *Back:* Normal • *Neurologic:* Somewhat anxious	• Respiratory distress or respiratory failure • Upper airway obstruction	• Allow patient to assume position of comfort. • Give epinephrine IM for upper airway obstruction related to possible anaphylaxis. • Consider specific interventions for upper airway obstruction (eg, racemic epinephrine, IV/IM dexamethasone, helium-oxygen mixture, CPAP). • Consider vascular access (IV/IO). • Prepare for endotracheal intubation.

EVALUATE—*Diagnostic Tests* **(Perform throughout the evaluation of the patient as appropriate)**	IDENTIFY/INTERVENE
Lab data (as appropriate) • ABG/VBG, electrolytes, BUN/creatinine, glucose, CBC with differential, blood culture—DEFERRED *Imaging* • Review AP/lateral cervical neck films if infection suspected: Look for subglottic narrowing, rule out retropharyngeal abscess	• Lab tests generally not appropriate during first 5 to 10 minutes • Emphasis should be on management based on a clinical diagnosis of respiratory distress and possible respiratory failure

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Upper Airway Obstruction (Peanut Allergy)

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated

Scenario Specific

- Differentiates between respiratory distress and respiratory failure
- Summarizes signs and symptoms of upper airway obstruction (UAO) and when to intervene
- Discusses correct interventions for UAO (note that IM epinephrine is used in this scenario because systemic treatment is indicated for UAO related to anaphylaxis)
- Demonstrates how to deliver effective positive-pressure mask ventilation in an infant or child with UAO if indicated
- Identifies causes of UAO in infants and children on the basis of age

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Directs assessment of ABCDE and vital signs • Opens airway • Administers 100% oxygen • Applies monitor leads and pulse oximetry • Recognizes signs and symptoms of upper airway obstruction • Identifies as respiratory distress or failure • Indicates criteria for assisted ventilation or CPAP • Directs IV or IO access • Directs reassessment of patient in response to interventions • Summarizes specific interventions • Verbalizes indications for intubation	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Respiratory Core Case 2
Lower Airway Obstruction

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are dispatched to a rural hospital to transport a 20-month-old infant with difficulty breathing.

ED: You are working in the ED and are asked to see a 20-month-old infant sent to the ED by the primary care physician because of difficulty breathing.

General Inpatient Unit: You are called to evaluate a 20-month-old infant admitted to the general inpatient unit with difficulty breathing.

ICU: You are called to the bedside of a 20-month-old infant transferred from the general inpatient unit because of increased difficulty breathing.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Anxious *Breathing* • Increased effort, receiving nebulizer treatment *Color* • Pale skin	• Respiratory distress or respiratory failure	• Activate emergency response system, if appropriate. • Administer 100% oxygen by non-rebreathing mask after completion of nebulizer treatment. • Attach pads/leads and turn on monitor. • Apply pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Nasal secretions • ***B**reathing:* Respiratory rate 103/min, severe subcostal retractions, severe nasal flaring, use of accessory/abdominal muscles, expiratory wheezes on auscultation, Spo_2 89% during nebulizer treatment • ***C**irculation:* HR 170/min, peripheral pulses normal, capillary refill time 2 seconds, BP 95/55 mm Hg • ***D**isability:* Anxious • ***E**xposure:* Temperature 38.0°C (100.4°F)	• Respiratory distress or respiratory failure • Lower airway obstruction	• Suction nose. • Evaluate response to oxygen administration. • Analyze cardiac rhythm (sinus tachycardia).

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
SAMPLE history • ***S**igns and symptoms:* Cough, respiratory distress • ***A**llergies:* None known • ***M**edications:* None • ***P**ast medical history:* None • ***L**ast meal:* Juice 2 hours ago • ***E**vents (onset):* URI symptoms × 2 days, new onset of cough and labored breathing **Physical examination** • *Repeat vital signs after oxygen administration:* HR 170/min, RR 70/min, Spo_2 94% on 100% oxygen by nonrebreathing mask, BP 90/50 mm Hg • *Head, eyes, ears, nose, and throat/neck:* Nasal congestion, moderate nasal flaring • *Heart and lungs:* No murmur, coarse expiratory wheezes, poor air movement, persistent moderate subcostal and intercostal retractions • *Abdomen:* Normal • *Extremities:* No edema, no rash, mottled skin • *Back:* Normal • *Neurologic:* Anxious, no other abnormalities apparent	• Respiratory distress versus failure • Lower airway obstruction	• Consider specific interventions for lower airway obstruction (eg, nebulized albuterol, noninvasive positive-pressure ventilation, steroids if history of asthma). • Obtain vascular access (IV/IO). • Obtain ABG. • Prepare for bag-mask ventilation and endotracheal intubation.

EVALUATE—*Diagnostic Tests* (Perform throughout the evaluation of the patient as appropriate)	IDENTIFY/INTERVENE
Lab data (as appropriate) • ABG/VBG (ABG: pH 7.30, Pco_2 55 mm Hg, Po_2 80 mm Hg), glucose 130 mg/dL (point-of-care testing) • Pending: Electrolytes, BUN/creatinine, CBC with differential *Imaging* • Chest x-ray: Hyperinflated, no lobar infiltrates, patchy perihilar infiltrates, heart size small	• Respiratory acidosis/respiratory failure • Prepare for intubation • Chest x-ray: Consistent with lower airway obstruction—bronchiolitis or asthma

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Lower Airway Obstruction

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device as appropriate
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated

Scenario Specific

- Differentiates between respiratory distress and respiratory failure
- Summarizes signs, symptoms, and common causes of lower airway obstruction (LAO)
- Demonstrates correct interventions for LAO
- Describes correct administration of albuterol or nebulized racemic epinephrine
- Summarizes how to monitor effectiveness of ventilation
- Summarizes indications for bag-mask ventilation
- Discusses how to provide specific interventions for asthma, including steroid administration and effective bag-mask ventilation (ie, relatively slow rate to allow for adequate exhalation time)

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Directs assessment of ABCDE and vital signs • Opens airway • Administers 100% oxygen • Applies monitor leads and pulse oximetry • Recognizes signs and symptoms of lower airway obstruction • Identifies as respiratory distress or failure • Indicates need for assisted ventilation • Directs IV or IO access • Directs reassessment of patient in response to interventions • Summarizes specific interventions for lower airway obstruction • Verbalizes indications for endotracheal intubation	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Respiratory Core Case 3

Lung Tissue Disease

(Pneumonia)

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are dispatched to a physician's office to transport a 4-month-old infant with a history of poor feeding and difficulty breathing. The infant is receiving 2 L/min oxygen by nasal cannula and an IV is in place.

ED: You have just been informed that a 4-month-old infant with difficulty breathing and a history of poor feeding is coming to the ED transported by an ALS crew. The infant is receiving 2 L/min oxygen by nasal cannula and an IV is in place.

General Inpatient Unit: You are called to examine a 4-month-old infant admitted because of respiratory distress and a history of poor feeding. The infant is receiving 2 L/min oxygen by nasal cannula and an IV is in place.

ICU: You are called to assess a 4-month-old infant who has increased work of breathing and increasing irritability. The infant is receiving 2 L/min oxygen by nasal cannula and an IV is in place.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Irritable *Breathing* • Breathing rapidly with increased respiratory effort and grunting *Color* • Nail beds and mucous membranes pink	• Respiratory distress versus respiratory failure	• Activate emergency response system, if appropriate. • Provide 100% oxygen by non-rebreathing mask. • Attach pads/leads and turn on monitor. • Apply pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Copious secretions • ***B**reathing:* Respiratory rate about 58/min, subcostal retractions, scattered crackles and wheezes, expiratory grunting, Spo_2 88% with 100% oxygen applied • ***C**irculation:* HR 175/min, peripheral pulses normal, capillary refill time about 2 seconds, BP 102/50 mm Hg • ***D**isability:* Irritable • ***E**xposure:* Temperature 39.7°C (103.5°F)	• Respiratory failure	• Suction nasopharynx. • Evaluate response to oxygen administration. • Analyze cardiac rhythm (sinus tachycardia).

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
SAMPLE history • ***S**igns and symptoms:* Fever, labored breathing • ***A**llergies:* None known • ***M**edications:* None • ***P**ast medical history:* Term newborn, previously healthy, immunizations up to date • ***L**ast meal:* Has taken 2 bottles of formula in last 18 hours • ***E**vents (onset):* Vomited after feeding, with acute onset of respiratory distress **Physical examination** • *Repeat vital signs after oxygen administration and nebulizer treatment:* HR 175/min, RR 58/min, Spo_2 89% on 100% oxygen by nonrebreathing mask, BP 90/50 mm Hg • *Head, eyes, ears, nose, and throat/neck:* Normal • *Heart and lungs:* No murmur, coarse breath sounds with crackles and wheezes • *Abdomen and pelvis:* Normal • *Extremities:* No edema, no rash • *Back:* Normal • *Neurologic:* Very irritable	• Respiratory failure • Lung tissue disease	• Confirm patency of vascular access. • Consider albuterol nebulizer therapy. • Consider specific interventions for lung tissue disease (eg, antibiotics for suspected pneumonia). • Consider use of noninvasive ventilation support (eg, CPAP or noninvasive positive-pressure ventilation). • Prepare for bag-mask ventilation or endotracheal intubation.

EVALUATE—*Diagnostic Tests* **(Perform throughout the evaluation of the patient as appropriate)**	IDENTIFY/INTERVENE
Lab data (as appropriate) • ABG: pH 7.28, Pco_2 60 mm Hg, Po_2 60 mm Hg before assisted ventilation on Fio_2 of 1.00; glucose (point-of-care testing) 150 mg/dL • Pending: Electrolytes, BUN/creatinine, CBC with differential, blood culture *Imaging* • Chest x-ray: Bilateral pulmonary infiltrates	• ABG shows respiratory failure with increased Pco_2 and hypoxemia on 100% oxygen

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Lung Tissue Disease (Pneumonia)

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device as appropriate
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated

Scenario Specific

- Differentiates between respiratory distress and respiratory failure
- Summarizes signs and symptoms of lung tissue disease
- Demonstrates correct interventions for lung tissue disease
- Recalls that noninvasive ventilator support such as CPAP or noninvasive positive-pressure ventilation may improve oxygenation in lung tissue disease
- Recalls the importance of PEEP in improving oxygenation in lung tissue disease
- Correctly interprets the ABG as showing respiratory failure/respiratory acidosis
- Recalls the common causes of lung tissue disease (pneumonia, aspiration)

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Directs assessment of ABCDE and vital signs • Identifies as respiratory distress or failure • Administers 100% oxygen • Recognizes signs and symptoms of lung tissue disease • Applies monitor leads and pulse oximetry • Assists ventilation and ensures bag-mask ventilation is effective • Directs IV or IO access • Directs reassessment of patient in response to interventions • Summarizes specific interventions for lung tissue disease, including the importance of PEEP • Verbalizes indications for noninvasive ventilation, endotracheal intubation	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Respiratory Core Case 4

Disordered Control of Breathing

(Respiratory Depression After Seizure)

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are dispatched to a home where a 12-year-old child with a known seizure disorder is reported to be having a seizure.

ED: You are asked to examine a 12-year-old child brought to the ED by EMTs after a seizure.

General Inpatient Unit: You are asked by the nurse to examine a 12-year-old child with a known seizure disorder who was admitted after a generalized tonic-clonic seizure.

ICU: You are admitting a 12-year-old child with a known seizure disorder who was transported from another hospital after a generalized tonic-clonic seizure.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Obtunded, eyes closed, no response to environment *Breathing* • Decreased rate and effort, audible snoring *Color* • Pink mucous membranes	• Respiratory failure (inadequate breathing) • Acute life-threatening condition	• Activate emergency response system, if appropriate. • Open airway and suction the oropharynx. • Attach pads/leads and turn on monitor. • Apply pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Snoring respirations • ***B**reathing:* Respiratory rate and depth irregular, rate about 6 to 7/min, coarse breath sounds, Spo_2 99% on room air • ***C**irculation:* HR 74/min, peripheral pulses normal, capillary refill brisk, BP 105/65 mm Hg • ***D**isability:* Obtunded, not interactive • ***E**xposure:* Temperature 37°C (98.6°F)	• Respiratory failure (inadequate breathing)	• Assist ventilation with 100% FIo_2. • Analyze cardiac rhythm (normal sinus rhythm).

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
SAMPLE history • ***S**igns and symptoms:* Generalized tonic-clonic seizure with decreased responsiveness • ***A**llergies:* Amoxicillin (rash) • ***M**edications:* Carbamazepine daily; rectal diazepam as needed for seizures • ***P**ast medical history:* Seizures • ***L**ast meal:* Dinner last night • ***E**vents (onset):* Abrupt onset of generalized tonic-clonic seizure that stopped 10 minutes ago after administration of rectal diazepam **Physical examination** • *Repeat vital signs with assisted ventilation with 100% oxygen:* HR 82/min, RR 15/min (with bag-mask ventilation), Spo_2 98%, BP 105/65 mm Hg • *Head, eyes, ears, nose, and throat/neck:* Increased secretions • *Heart and lungs:* No murmur, coarse breath sounds, good chest rise with assisted ventilation • *Abdomen:* Normal • *Extremities:* No edema, no rash • *Back:* Normal • *Neurologic:* Obtunded, minimal response to pain	• Respiratory failure • Disordered control of breathing	• Obtain vascular access (IV/IO). • Consider specific interventions for disordered control of breathing (eg, reversal agents). *Note:* In patients with seizure disorder reversal of benzodiazepine is contraindicated. • Prepare for noninvasive positive-pressure ventilation or endotracheal intubation.

EVALUATE—*Diagnostic Tests* **(Perform throughout the evaluation of the patient as appropriate)**	IDENTIFY/INTERVENE
Lab data (as appropriate) • ABG (not obtainable), glucose (point-of-care testing and lab) 95 mg/dL • Pending: Electrolytes, BUN/creatinine, CBC with differential, anticonvulsant (carbamazepine) level, blood culture (if infection suspected) *Imaging* • Chest x-ray: Ordered	• Not always possible to obtain ABG • Manage respiratory failure on clinical basis—improve ventilation and oxygenation with positive-pressure ventilation

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Disordered Control of Breathing (Respiratory Depression After Seizure)

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device as appropriate
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated

Scenario Specific

- Differentiates between respiratory distress and respiratory failure
- Summarizes signs and symptoms of disordered control of breathing
- Demonstrates correct interventions for disordered control of breathing
- Summarizes indications for endotracheal intubation/ventilation or noninvasive ventilation
- Recalls causes of disordered control of breathing (drugs, increased intracranial pressure, seizure)

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Directs assessment of ABCDE and vital signs • Assists ventilation • Administers 100% oxygen • Ensures bag-mask ventilation is effective • Applies monitor leads and pulse oximetry • Recognizes signs and symptoms of disordered control of breathing • Identifies as respiratory distress or failure • Directs IV or IO access • Directs reassessment of patient in response to interventions • Summarizes specific interventions for disordered control of breathing • Verbalizes indications for endotracheal intubation or noninvasive ventilation	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Shock Core Case 5

Hypovolemic Shock
(Dehydration)

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are dispatched to transport a 12-year-old child who has had several days of vomiting and diarrhea with poor oral intake. He is receiving 2 L/min oxygen flow by nasal cannula.

ED: You are notified that the paramedics are en route with a 12-year-old child who has had several days of vomiting, diarrhea, and poor oral intake. He is receiving 2 L/min oxygen flow by nasal cannula.

General Inpatient Unit: You are called to admit a 12-year-old child with a history of several days of vomiting and diarrhea with poor oral intake. He is receiving 2 L/min oxygen flow by nasal cannula.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Lethargic *Breathing* • Slightly increased rate, no increase in effort *Color* • Pale nail beds and mucous membranes	• Possible dehydration • Possible shock	• Activate emergency response system, if appropriate. • Administer high-flow oxygen (non-rebreathing mask). • Attach pads/leads and turn on monitor. • Apply pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Clear • ***B**reathing:* Respiratory rate about 24/min, no nasal flaring, SpO_2 100% on 2 L/min by nasal cannula • ***C**irculation:* HR 128/min, peripheral pulses weak, central pulses present, capillary refill 3 to 4 seconds, BP 82/58 mm Hg • ***D**isability:* Lethargic, muttering incoherently • ***E**xposure:* Temperature 37.6°C (99.7°F)	• Hypotensive shock • Hypovolemic shock	• Analyze cardiac rhythm (sinus tachycardia). • Obtain vascular access (IV/IO). • Administer a fluid bolus 20 mL/kg of isotonic crystalloid rapidly IV/IO. • Assess response to oxygen administration and fluid bolus.

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
SAMPLE history • ***S**igns and symptoms:* Persistent vomiting and diarrhea, abdominal pain and tenderness • ***A**llergies:* None known • ***M**edications:* None • ***P**ast medical history:* Healthy • ***L**ast meal:* Ate a small amount at dinner last night • ***E**vents (onset):* Symptoms began 2 days ago **Physical examination** • *Repeat vital signs after 100% oxygen administration:* HR 140/min, RR 22/min, SpO_2 100%, BP 80/56 mm Hg • *Head, eyes, ears, nose, and throat/neck:* Mucous membranes dry and cracked, eyes sunken • *Heart and lungs:* No murmur, breath sounds clear • *Abdomen and pelvis:* Abdomen diffusely tender, no guarding, hyperactive bowel sounds • *Extremities:* No edema, no rash • *Back:* Normal • *Neurologic:* Lethargic, muttering incoherently	• Hypotensive shock • Hypovolemic shock	• Repeat fluid bolus 20 mL/kg of isotonic crystalloid rapidly IV/IO as necessary until improved blood pressure, heart rate, and distal pulses.

EVALUATE—*Diagnostic Tests* (Perform throughout the evaluation of the patient as appropriate)	IDENTIFY/INTERVENE
Lab data (as appropriate) • Glucose (point-of-care testing and lab) 75 mg/dL • ABG: pH 7.32, PCO_2 25 mm Hg, PO_2 230 mm Hg (on FIO_2 1.00) • Pending: Electrolytes, BUN/creatinine, calcium, magnesium, arterial lactate, CBC with differential, urinalysis *Imaging* • Chest x-ray: Normal heart size, clear lung fields	• By blood gas, metabolic acidosis with partial respiratory compensation • Heart size consistent with hypovolemia • Other labs not available in scenario

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Hypovolemic Shock (Dehydration)

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device as appropriate
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated

Scenario Specific

- Recognizes hypotensive shock
- Summarizes signs and symptoms of hypovolemic shock
- Demonstrates correct interventions for hypovolemic shock
- Summarizes how to assess the effectiveness of fluid resuscitation

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Directs assessment of ABCDE and vital signs • Administers 100% oxygen • Applies monitor leads and pulse oximetry • Recognizes signs and symptoms of hypovolemic shock • Identifies as compensated or hypotensive shock • Directs IV or IO access • Directs rapid administration of a fluid bolus of isotonic crystalloid • Directs reassessment of patient in response to interventions • Verbalizes therapeutic end points during shock management • Directs appropriate laboratory studies and interprets results	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Shock Core Case 6

Obstructive Shock

(Tension Pneumothorax)

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: As an ALS provider, you arrive at a local hospital to transport a 3-month-old orally intubated infant who suddenly deteriorated just as you arrived. He is being vigorously manually ventilated via the endotracheal tube by another provider. IV access is in place.

ED: You are a resident in the ED and are called to the room of a 3-month-old orally intubated infant because he suddenly deteriorated. The patient is receiving manual ventilation through the endotracheal tube from another healthcare provider. IV access is in place.

General Inpatient Unit: You are called to the bedside of a 3-month-old infant who was just orally intubated following development of respiratory distress. As the team prepared to move him to the ICU, the infant suddenly deteriorated. He is receiving manual ventilation via the endotracheal tube by another healthcare provider. IV access is in place.

ICU: You are called to the bedside of an orally intubated, ventilated 3-month-old infant who suddenly deteriorated. The infant is receiving manual ventilation via the endotracheal tube by a healthcare provider. IV access is in place.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Sedated, becoming increasingly agitated *Breathing* • Orally intubated, poor chest rise with bag-tube ventilation *Color* • Pale mucous membranes	• Respiratory distress or respiratory failure	• Activate emergency response system, if appropriate. • Ventilate at a rate of 24/min with 100% oxygen. - If mechanically ventilated disconnect and begin manual ventilation. • Attach pads/leads and turn on monitor. • Apply pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Orally intubated with 4 mm uncuffed ETT; remains secured at 10 cm at the lip • ***B**reathing:* Ventilated at 24/min, asymmetric chest rise, breath sounds decreased on the right, increasing pressures required to move chest, Spo_2 67% on 100% oxygen; as student attempts to evaluate by using the DOPE mnemonic, provide the following information in response: - Displacement: Depth of insertion unchanged, so bronchus intubation unlikely; chest rise and breath sounds are present on left, but a left mainstem bronchus intubation is uncommon; CO_2 detected with $ETCO_2$ - Obstruction: Adequate breath sounds present on left so tube obstruction unlikely (if patient was not deteriorating so rapidly, suctioning could be performed, but not in this case) - Pneumothorax is consistent with clinical picture - Equipment failure ruled out during manual ventilation • ***C**irculation:* HR 130/min, peripheral pulses weak, central pulses present, capillary refill about 4 seconds, BP 72/56 mm Hg • ***D**isability:* Irritable • ***E**xposure:* Temperature 37.8°C (100.0°F)	• Respiratory failure and compensated shock (cardiopulmonary failure) • Probable pneumothorax	• Analyze cardiac rhythm (sinus tachycardia). • Assess response to oxygen administration and ventilation. • Consider causes of acute deterioration in the intubated patient (DOPE mnemonic). • Perform needle thoracostomy on the right (second intercostal space, midclavicular line).

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
SAMPLE history • ***S**igns and symptoms:* Recent history of pneumonia; intubated, tube inserted to 10 cm at lip; verified correct depth by chest radiograph; sudden deterioration • ***A**llergies:* None known • ***M**edications:* Antibiotics for pneumonia • ***P**ast medical history:* Pneumonia, respiratory failure • ***L**ast meal:* NPO • ***E**vents (onset):* Sudden deterioration **Physical examination** • *Repeat vital signs after continuing ventilation with 100% oxygen:* HR 160/min, RR 24/min (assisted) If needle thoracostomy NOT performed, Spo_2 70% and continuing to fall; BP falls to 55/40 mm Hg If needle thoracostomy performed, Spo_2 80% and rapidly increasing; BP rises to 82/58 mm Hg • *Head, eyes, ears, nose, and throat/neck:* Normal • *Heart and lungs:* If needle thoracostomy NOT performed, markedly diminished breath sounds on right; asymmetric chest rise (left greater than right) If needle thoracostomy performed, breath sounds equal bilaterally, symmetrical chest rise • *Abdomen and pelvis:* Normal • *Extremities:* Normal • *Back:* Normal • *Neurologic:* Sedated If needle thoracostomy NOT performed, increasing agitation If needle thoracostomy performed, decreasing agitation, more responsive	• Cardiopulmonary failure • Compensated shock (deteriorates to hypotensive shock if needle thoracostomy not performed) • Obstructive shock • Probable pneumothorax	• Prepare for chest tube insertion. • Confirm patency of vascular access (IV/IO); replace if not functioning. • Consider a fluid bolus 20 mL/kg of isotonic crystalloid rapidly IV/IO and repeat as necessary until BP and circulation improve.

EVALUATE—*Diagnostic Tests* **(Perform throughout the evaluation of the patient as appropriate)**	IDENTIFY/INTERVENE
Lab data (as appropriate) • Pending: ABG/VBG *Imaging* • Chest x-ray: Called for but do not delay intervention to await radiograph	• Lab tests pending because in this acute emergency immediate intervention is indicated to resolve pneumothorax

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Obstructive Shock (Tension Pneumothorax)

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device as appropriate
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated

Scenario Specific

- Recognizes respiratory failure
- Recognizes compensated shock deteriorating to hypotensive shock
- Summarizes signs and symptoms of obstructive shock
- Demonstrates correct interventions for obstructive shock
- Lists components of the DOPE mnemonic to evaluate the intubated patient
- Recalls that tension pneumothorax should be emergently treated with pleural decompression

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Directs assessment of ABCDE and vital signs • Applies monitor leads and pulse oximetry • Verbalizes DOPE mnemonic for intubated patient who deteriorates • Recognizes signs and symptoms of obstructive shock • Identifies as compensated or hypotensive shock • Directs IV or IO access • Directs rapid administration of a fluid bolus of isotonic crystalloid • Directs reassessment of patient in response to interventions • Summarizes interventions for a tension pneumothorax • Verbalizes therapeutic end points during shock management	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Shock Core Case 7

Distributive Shock

(Sepsis)

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are dispatched to transport a 12-year-old oncology patient with a fever. The child is intubated with a central venous catheter and nasogastric tube in place.

ED: EMS providers brought in a 12-year-old oncology patient with a fever. The child is intubated with a central venous catheter and nasogastric tube in place.

General Inpatient Unit: You are called to evaluate a 12-year-old oncology patient with a fever. The child developed respiratory distress and required emergent intubation. The child has a central venous catheter and nasogastric tube in place.

ICU: You are called to the bedside of a 12-year-old oncology patient who has a fever. The child is intubated with a central venous catheter and nasogastric tube in place.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Lethargic, sedated, not interactive *Breathing* • Increased rate but no distress *Color* • Pink	• Possible shock	• Activate emergency response system, if appropriate. • Continue present inspired oxygen concentration. • Attach pads/leads and turn on monitor. • Apply pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Clear, oral endotracheal tube in place • ***B**reathing:* Respiratory rate about 15/min (assisted), no increased effort, lungs clear, SpO_2 95% on FIO_2 0.50 • ***C**irculation:* HR 125 to 140/min, peripheral pulses strong, central pulses bounding, capillary refill brisk, BP 85/40 mm Hg • ***D**isability:* Lethargic, not interactive • ***E**xposure:* Temperature 39.5°C (103°F)	• Hypotensive shock	• Verify endotracheal tube placement. • Analyze cardiac rhythm (sinus tachycardia). • Verify patency of central venous catheter; place peripheral IV if possible. • Administer a fluid bolus of 20 mL/kg of isotonic crystalloid central/IV/IO push.

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
SAMPLE history • ***S**igns and symptoms:* Fever, lethargy, vomiting × 1 day • ***A**llergies:* None known • ***M**edications:* Receiving chemotherapy • ***P**ast medical history:* Acute lymphoblastic leukemia diagnosed 3 months ago • ***L**ast meal:* NPO • ***E**vents (onset):* Fever, lethargy, respiratory distress started last night; vomited this morning **Physical examination** • *Repeat vital signs after initial fluid bolus:* HR 125 to 140/min, RR 15/min (assisted), SpO_2 98% on FIO_2 0.50, BP 84/46 mm Hg • *Head, eyes, ears, nose, and throat/neck:* Mucous membranes dry, neck supple, no jugular venous distention • *Heart and lungs:* No murmur or gallop, lungs clear • *Abdomen:* Nondistended, nontender, normal bowel sounds, no masses palpable • *Extremities:* Cool distal extremities, peripheral pulses strong, central pulses bounding, scattered bruises • *Back:* Normal • *Neurologic:* Lethargic; pupils 4 mm, equal, reactive	• Hypotensive shock • Distributive (septic) shock	• Repeat fluid bolus of 20 mL/kg of isotonic crystalloid central/IV/IO push rapidly; repeat boluses needed for persistent shock symptoms. • If within scope of practice, obtain blood cultures; administer antibiotics if not already done. • Identify appropriate vasoactive agent for use if shock is fluid refractory. • Arrange for transfer to appropriate setting.

EVALUATE—*Diagnostic Tests* (Perform throughout the evaluation of the patient as appropriate)	IDENTIFY/INTERVENE
Lab data (as appropriate) • VBG (from central line): pH 7.30, PCO_2 30 mm Hg, PO_2 40 mm Hg, base deficit/excess –12; lactate 5.0; SvO_2 63%; Hgb 11 g/dL • Glucose (point-of-care testing) 185 mg/dL • Pending: Electrolytes, BUN/creatinine, calcium, CBC with differential, PT/INR/PTT, platelet count *Cultures* • Blood, urine, CSF *Imaging* • Chest x-ray: Small heart, clear lung fields	• Metabolic acidosis with partial respiratory compensation • VBG and lactate obtained from catheter; other tests not available

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Distributive Shock (Sepsis)

Learning Objectives

General Management

- Calls for additional help (emergency response system) as appropriate
- Uses the PALS Systematic Approach in examining the child
- Applies the 8 elements of effective team dynamics
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device as appropriate
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated possible

Scenario Specific

- Recognizes hypotensive shock
- Summarizes signs and symptoms of distributive/septic shock
- Demonstrates correct interventions for distributive/septic shock by using the Pediatric Septic Shock Algorithm
- Recognizes need for early/rapid intervention with antibiotics
- Summarizes how to evaluate systemic (end-organ) perfusion

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Directs assessment of ABCDE and vital signs • Administers 100% oxygen • Applies monitor leads and pulse oximetry • Recognizes signs and symptoms of distributive (septic) shock • Categorizes as compensated or hypotensive shock • Directs IV or IO access • Directs rapid administration of a fluid bolus of isotonic crystalloid • Directs reassessment of patient in response to interventions • Recalls that early administration of antibiotics is essential • Summarizes indications for vasoactive drugs • Verbalizes therapeutic end points during shock management, including use of central venous oxygen saturation	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Shock Core Case 8

Cardiogenic Shock

(Myocarditis)

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are dispatched to transport a 3-month-old infant with a 2-week history of intermittent low-grade fever. She has not been feeding well for the past 24 hours. An IV is in place.

ED: An ambulance is en route with a 3-month-old infant who has had an intermittent low-grade fever. She has not been feeding well for the past 24 hours. An IV is in place.

General Inpatient Unit: You are called to evaluate a 3-month-old infant who was admitted with a history of intermittent low-grade fever. She has not been feeding well for the past 24 hours. An IV is in place.

ICU: You are called to the bedside of a 3-month-old infant who was admitted to the ICU with a history of intermittent low-grade fever. She has not been feeding well for the past 24 hours. An IV is in place.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Lethargic *Breathing* • Increased rate and effort *Color* • Pale skin	• Respiratory distress • Possible shock	• Activate emergency response system, if appropriate. • Administer high-flow oxygen. • Attach pads/leads and turn on monitor. • Apply pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Clear • ***B**reathing:* Breathing rate about 55/min, significant subcostal and intercostal retractions, mild nasal flaring, head bobbing; Spo_2 93% on room air, 97% on 100% oxygen • ***C**irculation:* HR 180 to 200/min, peripheral pulses weak, central pulses fair, capillary refill about 4 seconds, cool and slightly dusky hands and feet, BP 74/54 mm Hg • ***D**isability:* Lethargic • ***E**xposure:* Rectal temperature 37.6°C (99.7°F), no rash	• Respiratory distress • Compensated shock	• Analyze cardiac rhythm (sinus tachycardia). • Assess response to oxygen administration.

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
SAMPLE history • ***S**igns and symptoms:* Lethargy, rapid breathing • ***A**llergies:* None known • ***M**edications:* None • ***P**ast medical history:* Term newborn, healthy until recent illness • ***L**ast meal:* Formula several hours ago • ***E**vents (onset):* URI resolved 1 week ago, progressive fatigue, lethargy, poor feeding past 24 hours **Physical examination** • *Repeat vital signs after oxygen administration:* HR 180 to 200/min, RR 55/min, Spo_2 100% on 100% oxygen, BP 74/54 mm Hg • *Head, eyes, ears, nose, and throat/neck:* Mucous membranes slightly dry • *Heart and lungs:* Rapid rate, gallop, no murmur; crackles at lung bases • *Abdomen and pelvis:* Liver edge palpable 4 cm below right costal margin; nondistended, nontender, hypoactive bowel sounds • *Extremities:* Cool hands and feet, dusky • *Back:* Normal • *Neurologic:* Lethargic; pupils 4 mm, equal, reactive	• Compensated cardiogenic shock	• Verify patency of vascular access (IV/IO). • Administer a fluid bolus 5 to 10 mL/kg of isotonic crystalloid IV/IO carefully over 10 to 20 minutes. • Start appropriate inotropic/vasoactive agent if shock persists. • Arrange for transfer to PICU or equivalent expertise.

EVALUATE—*Diagnostic Tests* (Perform throughout the evaluation of the patient as appropriate)	IDENTIFY/INTERVENE
Lab data (as appropriate) • Glucose (point-of-care testing) 90 mg/dL • ABG/VBG: pH 7.34, Pco_2 32 mm Hg, Po_2 200 mm Hg; lactate 3 • Additional lab work delayed while intervening for shock *Imaging* • Chest x-ray: Cardiomegaly; mild pulmonary edema	• Chest x-ray consistent with a cardiac etiology of the shock, likely myocarditis • ABG/VBG confirms metabolic acidosis likely from poor perfusion

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Cardiogenic Shock (Myocarditis)

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device as appropriate
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated

Scenario Specific

- Differentiates between respiratory distress and respiratory failure
- Recognizes hypotensive shock
- Recognizes signs and symptoms of cardiogenic shock
- Provides correct interventions for cardiogenic shock, and describes possible negative impact of excess fluids and the appropriate use of inotropic/vasoactive agents
- Recognizes that reducing work of breathing may be helpful; considers CPAP/noninvasive positive-pressure ventilation

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Directs assessment of ABCDE and vital signs • Administers 100% oxygen • Applies monitor leads and directs activation • Recognizes signs and symptoms of cardiogenic shock • Categorizes as compensated or hypotensive shock • Directs IV or IO access • Directs slow administration of a 5 to 10 mL/kg fluid bolus of isotonic crystalloid (10 to 20 minutes) • Directs reassessment of patient in response to interventions • Recalls indications for vasoactive drugs during cardiogenic shock • Verbalizes therapeutic end points during shock management	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Cardiac Core Case 9
Supraventricular Tachycardia

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are dispatched to a house where a 3-month-old infant has respiratory distress. The infant has an IV and gastrostomy in place.
ED: An ambulance is en route to the ED with a 3-month-old infant with respiratory distress. The infant has an IV and gastrostomy in place.
General Inpatient Unit: You are called to examine a 3-month-old infant who is lethargic and pale. The infant has an IV and gastrostomy in place.
ICU: You are called to the bedside of a 3-month-old infant. The infant is very lethargic and pale. An IV and gastrostomy are in place.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Awake but appears sleepy *Breathing* • Increased rate and effort *Color* • Pale, mottled skin	• Respiratory distress • Possible shock	• Activate emergency response system, if appropriate. • Provide high-flow oxygen via non-rebreathing mask. • Attach pads/leads and turn on monitor. • Attach pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Clear • ***B**reathing:* Respiratory rate about 50/min, mild intercostal retractions and nasal flaring, SpO_2 92% before oxygen; crackles in lung bases bilaterally (for EMS/ED scenario) OR no crackles (for inpatient unit/ICU case); after oxygen, SpO_2 99% to 100% • ***C**irculation:* HR 235/min, central pulses present, adequate peripheral pulses, capillary refill about 2 to 3 seconds, skin cool and pale, BP 80/60 mm Hg • ***D**isability:* Awake but appears sleepy • ***E**xposure:* Temperature 37.6°C (99.7°F)	• Respiratory distress • Identify tachycardia	• Analyze cardiac rhythm (SVT with adequate perfusion).

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
SAMPLE history • ***S**igns and symptoms:* Awake but appears sleepy, diaphoretic, rapid breathing • ***A**llergies:* None known • ***M**edications:* Metoclopromide • ***P**ast medical history:* Term infant, gastrostomy for poor weight gain • ***L**ast meal:* 2 oz of formula 4 hours ago via gastrostomy • ***E**vents (onset):* Sudden onset **Physical examination** • *Repeat vital signs after oxygen, vagal maneuvers, first dose of adenosine:* HR 235/min, RR 50/min, SpO_2 100% on 100% oxygen, BP 80/60 mm Hg; after second adenosine dose, brief bradycardia converts to HR 165/min (sinus tachycardia) • *Head, eyes, ears, nose, and throat/neck:* Nasal flaring • *Heart and lungs:* Tachycardic; no murmur, gallop, or rub; intercostal retractions; auscultation reveals crackles at lung bases (for EMS/ED case); no crackles for inpatient unit/ICU case • *Abdomen and pelvis:* Liver edge palpable 3 cm below right costal margin; gastrostomy in place • *Extremities:* No edema, no rash, cool skin, adequate peripheral pulses, capillary refill 2 to 3 seconds • *Back:* Normal • *Neurologic:* Awake but appears sleepy, weak cry in response to pain	• Respiratory distress • Cardiac arrhythmia (SVT with adequate perfusion)	• Perform vagal maneuvers (ice to face, sparing nose or mouth). • Verify vascular access (IV/IO). • Prepare adenosine 0.1 mg/kg and saline flush. • Administer adenosine IV/IO by rapid bolus followed by rapid saline flush. • If no response to initial adenosine dose, consider and prepare for second dose of 0.2 mg/kg followed by saline flush. • Prepare for synchronized cardioversion at 0.5 to 1 J/kg if no response to adenosine. • After rhythm conversion, monitor for signs of heart failure.

EVALUATE—*Diagnostic Tests* **(Perform throughout the evaluation of the patient as appropriate)**	IDENTIFY/INTERVENE
Lab data (as appropriate) • ABG/VBG, electrolytes, BUN/creatinine, glucose (point-of-care testing), calcium, magnesium, phosphorus, consider lactate *Imaging* • Chest x-ray, ECG	• Lab tests pending—focus is on converting rhythm back to normal sinus rhythm

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Supraventricular Tachycardia

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device as appropriate
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated

Scenario Specific

- Identifies SVT
- Describes potential vagal maneuvers
- Applies the Pediatric Tachycardia With a Pulse and Adequate Perfusion Algorithm
- Uses the proper technique in giving adenosine (rapid IV push followed immediately with rapid saline flush)
- Recalls that synchronized cardioversion should be considered first for SVT in the unstable patient without vascular access
- Performs pediatric electrical cardioversion if needed, including synchronized mode and proper doses

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Directs assessment of ABCDE and vital signs • Directs administration of oxygen • Applies monitor leads and pulse oximetry • Recognizes narrow-complex tachycardia, distinguishes between ST and SVT • Categorizes as compensated or hypotensive • Directs performance of appropriate vagal maneuvers • Directs IV or IO access • Directs preparation and administration of appropriate dose of adenosine • Directs reassessment of patient in response to interventions • Verbalizes indications and appropriate energy doses for synchronized cardioversion	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Cardiac Core Case 10
Bradycardia

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are called to a house where a 3-year-old child has decreased responsiveness.
ED: An ambulance is en route to the ED with a 3-year-old child with decreased responsiveness.
General Inpatient Unit: You are called to examine a 3-year-old child who was admitted for decreased responsiveness after an MRI.
ICU: You are called to the bedside of a 3-year-old child who was admitted for decreased responsiveness after an MRI.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Decreased responsiveness *Breathing* • Shallow respirations *Color* • Pale mucous membranes	• Acute, life-threatening problem	• Activate emergency response system, if appropriate. • Provide ventilation with 100% oxygen. • Attach pads/leads and turn on monitor. • Attach pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Snoring noises • ***B**reathing:* Spontaneous respiratory rate about 6/min but regular, poor chest rise, SpO_2 79% before interventions; SpO_2 rises rapidly with bag-mask ventilation with 100% oxygen provided at a rate of about 16/min; adequate bilateral breath sounds and chest rise with bag-mask ventilation • ***C**irculation:* HR at about 50/min, central pulses present, weak peripheral pulses, capillary refill about 4 seconds. BP DEFERRED ———— Defer further assessment until HR and perfusion improve ———— • ***D**isability:* Minimally responsive—DEFERRED • ***E**xposure:* DEFERRED	• Respiratory failure • Cardiopulmonary failure • Bradycardia with poor perfusion	• Initiate high-quality CPR. • Analyze cardiac rhythm (sinus bradycardia). • Assess HR response to ventilation and oxygen administration.

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
SAMPLE history • ***S**igns and symptoms:* Lethargy, minimal response to pain • ***A**llergies:* None known • ***M**edications:* *Prehospital/ED:* None *In-hospital:* Received sedation for MRI • ***P**ast medical history:* Previously healthy • ***L**ast meal:* Dinner last night • ***E**vents (onset):* *Prehospital/ED:* Found minimally responsive in bedroom this morning with empty medication bottle *In-hospital:* Found minimally responsive after returning from MRI **Physical examination** • *Repeat vital signs after bag-mask ventilation:* HR 65/min, RR 16/min (with bag-mask ventilation), SpO_2 94% on 100% oxygen, BP 85/61 mm Hg If bag-mask ventilation not provided, heart rate, respiratory rate, and SpO_2 continue to fall and BP is unobtainable • *Head, eyes, ears, nose, and throat/neck:* Normal • *Heart and lungs:* No murmur, gallop, or rub; lungs clear • *Abdomen:* Nondistended, nontender, no masses, normal bowel sounds • *Extremities:* No edema, no rash, cool hands and feet, peripheral pulses weak, capillary refill 4 seconds • *Back:* Normal • *Neurologic:* Reacts minimally to pain, pupils equal and reactive	• Respiratory failure • Cardiac arrhythmia (bradycardia with poor perfusion)	• Provide compressions with ventilation if HR does not quickly increase in response to adequate oxygenation and ventilation (ie, 2 minutes of CPR is acceptable before reevaluating heart rate). • Obtain vascular access (IV/IO). • Prepare to administer IV/IO epinephrine 0.01 mg/kg (0.1 mL/kg of 1:10 000) followed by a saline flush. • Consider ingested/administered agents and administer reversal agents/antidotes and interventions as needed. • Prepare for endotracheal intubation. • Obtain expert consultation as needed for ingestion.

EVALUATE—*Diagnostic Tests* **(Perform throughout the evaluation of the patient as appropriate)**	IDENTIFY/INTERVENE
Lab data (as appropriate) • ABG/VBG, electrolytes, BUN/creatinine, glucose (point-of-care testing), calcium, magnesium, phosphorus, toxicology screening *Imaging* • Chest x-ray, CT of head, ECG	• Test results are deferred until child is stable.

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Bradycardia

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device as appropriate
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated

Scenario Specific

- Identifies bradycardia with cardiopulmonary compromise
- Applies the Bradycardia Algorithm
- Supports adequate oxygenation and ventilation
- Provides high-quality CPR if symptomatic bradycardia continues
- Summarizes potentially reversible causes of bradycardia

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Directs assessment of ABCDE and vital signs • Directs initiation of assisted ventilation with 100% oxygen • Applies monitor leads and pulse oximetry • Recognizes bradycardia with cardiopulmonary compromise • Categorizes shock as compensated or hypotensive • Recalls indications for chest compressions in a bradycardic patient • Directs IV or IO access • Directs preparation and administration of appropriate dose of epinephrine • Directs reassessment of patient in response to interventions • Verbalizes at least 3 underlying causes of bradycardia	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Cardiac Core Case 11
Asystole/PEA

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are dispatched to a house where a 9-month-old infant has had respiratory distress and is now unresponsive.

ED: An ALS ambulance is en route to the ED with a 9-month-old infant who was found unresponsive in his crib. CPR is in progress.

General Inpatient Unit: As a member of the pediatric code team, you are called to a general inpatient unit for a 9-month-old infant who was admitted earlier for respiratory distress and became unresponsive.

ICU: You are called emergently to the bedside of a 9-month-old infant admitted for respiratory distress. The infant just became unresponsive.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Unresponsive, limp, no spontaneous movement *Breathing* • No spontaneous breathing *Color* • Cyanotic/pale extremities and lips; mottling	• Life-threatening condition	• Activate emergency response system, if appropriate. • Ensure provision of high-quality CPR. • Provide bag-mask ventilation with 100% oxygen. • Place leads or pads and assess cardiac rhythm on monitor. • Attach pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Can maintain open airway with head tilt–chin lift • ***B**reathing:* Apnea—ventilation with bag-mask device produces chest rise • ***C**irculation:* No central pulses—CPR in progress ——— Defer further assessment until stabilization ——— • ***D**isability:* Unresponsive, limp, no spontaneous movement • ***E**xposure:* DEFERRED • Weight: Estimated at 8 kg with color-coded length-based tape	• Cardiac arrest	• Provide high-quality CPR. • Analyze cardiac rhythm (asystole).

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
• ***Attempt to identify reversible causes of arrest (H's and T's). Do not interrupt resuscitation.*** • SAMPLE history ***should be deferred until ROSC or only obtained to identify potentially reversible causes.*** • Physical examination ***should be deferred until ROSC or only obtained as part of a review of potentially reversible causes.***	• Cardiac arrest • Asystole or PEA	• Provide high-quality CPR. • Establish vascular access (IO/IV). • Do not intubate emergently unless unable to provide adequate ventilation with bag-mask device (consider oropharyngeal airway to facilitate ventilation). • Prepare and administer epinephrine 0.01 mg/kg (0.1 mL/kg of 1:10 000) IO/IV during chest compressions. Follow with a saline flush. Repeat dose every 3 to 5 minutes. • Continue to provide high-quality CPR. Rotate compressors every 2 minutes. • Reassess rhythm every 2 minutes. • Consider potentially reversible causes of asystole/PEA (H's and T's).

EVALUATE—*Diagnostic Tests* **(Perform throughout the evaluation of the patient as appropriate)**	IDENTIFY/INTERVENE
Lab data (as appropriate) • Glucose 100 mg/dL (point-of-care testing), ABG/VBG, calcium, magnesium, electrolytes *Imaging* • Chest x-ray: Bilateral patchy infiltrates; no pneumothorax; hyperinflated; normal heart size	• Lab tests pending—focus is on delivering high-quality CPR

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: Asystole/PEA

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when indicated

Scenario Specific

- Identifies rhythm as asystole or PEA
- Applies the Pediatric Cardiac Arrest (Asystole/PEA) Algorithm
- Summarizes potentially reversible causes of asystole (6 H's and 5 T's)
- Applies high-quality CPR by using the C-A-B sequence to start
- Discusses importance of postdeath family comfort and support; obtains family history, possible unrestricted autopsy and collection of genetic material to evaluate for channelopathies

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Recognizes cardiopulmonary arrest • Directs initiation of CPR and ensures performance of high-quality CPR at all times • Directs placement of pads/leads and monitor • Recognizes asystole or PEA • Directs IO or IV access • Directs preparation of appropriate dose of epinephrine • Directs administration of epinephrine at appropriate intervals • Directs checking rhythm on monitor approximately every 2 minutes • Verbalizes consideration of at least 3 reversible causes of PEA or asystole	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Cardiac Core Case 12
VF/Pulseless VT

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Pediatric Advanced Life Support

Scenario Lead-in

Prehospital: You are en route to a house where a 14-month-old child was found apneic and gray during a nap. The parents started CPR and called 911.

ED: You are called to the ED to help out when a 14-month-old child is brought in apneic and gray by his parents.

General Inpatient Unit: You are called as a member of the rapid response team to see a 14-month-old child who suddenly became apneic and gray after being upset because his parents left for home. The child was admitted for observation following a "limp" episode at home.

ICU: You are called to see a 14-month-old child who was admitted to the ICU following a "limp" episode at home.

EVALUATE—*Initial Impression*	IDENTIFY	INTERVENE
Consciousness • Unresponsive, limp, no spontaneous movement *Breathing* • No spontaneous breathing *Color* • Cyanotic/pale extremities and lips; mottling	• Life-threatening condition	• Activate emergency response system, if appropriate. • Begin or ensure continuation of CPR. Ensure provision of high-quality CPR. • Provide bag-mask ventilation with 100% oxygen. • Place leads or pads and assess cardiac rhythm on the monitor. • Attach pulse oximeter.

EVALUATE—*Primary Assessment*	IDENTIFY	INTERVENE
• ***A**irway:* Can maintain open airway with head tilt–chin lift • ***B**reathing:* Apnea—ventilation with bag-mask device produces chest rise • ***C**irculation:* No central pulses—CPR in progress Defer further assessment until stabilization • ***D**isability:* DEFERRED • ***E**xposure:* DEFERRED • Weight: Estimated at 11 kg per color-coded length-based tape	• Cardiac arrest	• Provide high-quality CPR. • Analyze cardiac rhythm (VF). • Attempt defibrillation at 2 to 4 J/kg as soon as defibrillator is available.

EVALUATE—*Secondary Assessment*	IDENTIFY	INTERVENE
• ***Attempt to identify reversible causes of arrest (H's and T's). Do not interrupt resuscitation.*** • SAMPLE history ***should be deferred until ROSC or only obtained to identify potentially reversible causes.*** • Physical examination ***should be deferred until ROSC or only obtained to identify potentially reversible causes.*** • After high-quality CPR, shock delivery, and 1 dose of epinephrine, ROSC develops. Repeat vital signs— After ROSC: Sinus rhythm, HR 120/min; RR 12 to 20/min (bag-mask ventilation); Spo_2 100%; BP 73/48 mm Hg • If no shock delivered, VF/VT continues.	• Cardiac arrest • VF or pulseless VT	• Continue high-quality CPR and rotate compressors every 2 minutes. • Reassess rhythm every 2 minutes. • If VF/pulseless VT persists, attempt subsequent defibrillations with at least 4 J/kg (up to 10 J/kg). • Do not intubate emergently unless unable to provide adequate ventilation with bag-mask device (consider oro-pharyngeal airway to facilitate ventilation). • Establish IO/IV access. • Prepare epinephrine 0.01 mg/kg (0.1 mL/kg of 1:10 000) IO/IV and administer during chest compressions any time after second rhythm check. Follow with saline flush. Repeat dose every 3 to 5 minutes during cardiac arrest. • Prepare an antiarrhythmic (amiodarone 5 mg/kg) and administer for persistent VF/pulseless VT (up to 2 doses). • After ROSC, titrate oxygen to maintain oxygen saturation of 94% to 99%. • After ROSC, initiate post–cardiac arrest care.

EVALUATE—*Diagnostic Tests* (Perform throughout the evaluation of the patient as appropriate)	IDENTIFY/INTERVENE
Lab data (as appropriate) • ABG/VBG, electrolytes, glucose (point-of-care testing), calcium, magnesium, electrolytes *Imaging* • Chest x-ray (after ROSC): Normal heart and lung fields	• Blood work and chest x-ray not available during scenario

Re–evaluate-identify-intervene after each intervention.

Debriefing Tool

Scenario: VF/Pulseless VT

Learning Objectives

General Management

- Applies the 8 elements of effective team dynamics
- Uses the PALS Systematic Approach in examining the child
- Provides oxygen appropriately
- Demonstrates basic airway maneuvers and use of relevant airway device
- Demonstrates application of cardiac and respiratory monitors
- Summarizes general indications, contraindications, and dosages of relevant drugs
- Demonstrates C-A-B CPR when possible
- Able to describe titration of oxygen after ROSC

Scenario Specific

- Identifies pulseless VT or VF
- Applies the Pediatric Cardiac Arrest (VF/Pulseless VT) Algorithm
- Recalls that CPR and defibrillation are the most important interventions for pulseless VT/VF
- Ensures high-quality CPR at all times
- Uses appropriate pediatric defibrillation dose and sequence (should round dose up if needed)
- Uses appropriate dose of epinephrine
- Obtains rapid IO access as preferred route for drug administration
- Uses appropriate antiarrhythmics
- Describes titration of oxygen to maintain saturation 94% to 99% after child stabilizes (following ROSC) and treatment of fever.

General Debriefing Principles

- Use the table below to guide your debriefing. Also refer to the **Team Dynamics** Debriefing Tool.
- Debriefings are 10 minutes long.
- Address all learning objectives.
- Summarize take-home messages at the end of the debriefing.
- ***Encourage:*** Students to self-reflect
  Engagement of all participants
- ***Avoid:*** Mini-lectures and closed-ended questions
  Dominating the discussion

ACTION	GATHER	ANALYZE	SUMMARIZE
• Recognizes cardiopulmonary arrest • Directs initiation of CPR and ensures performance of high-quality CPR at all times • Applies monitor leads and pulse oximetry • Recognizes VF or pulseless VT • Directs initial defibrillation at 2 to 4 J/kg safely • Directs immediate resumption of CPR after interventions • Directs IO or IV access • Directs preparation of epinephrine • Directs subsequent defibrillation at 4 to 10 J/kg (up to adult dose) safely • Directs administration of epinephrine • Verbalizes consideration of antiarrhythmic (amiodarone or lidocaine) with appropriate dose	***Student Observations*** • Can you describe the events from your perspective? • How well do you think your interventions worked? • Can you review the events of the scenario? *(directed to the recorder)* • What could you have improved? • What did the team do well?	***Done Well*** • How were you able to [*insert action here*]? • Why do you think you were able to [*insert action here*]? • Tell me a little more about how you [*insert action here*].	***Student-Led Summary*** • What are the main things you learned? • Can someone summarize the key points made? • What are the main take-home messages?
	Instructor Observations • I noticed that [*insert action here*]. • I observed that [*insert action here*]. • I saw that [*insert action here*].	***Needs Improvement*** • Why do you think [*insert action here*] occurred? • How do you think [*insert action here*] could have been improved? • What was your thinking while [*insert action here*]? • What prevented you from [*insert action here*]?	***Instructor-Led Summary*** • Let's summarize what we learned… • Here is what I think we learned… • The main take-home messages are…

Team Dynamics Debriefing Tool

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Pediatric Advanced Life Support

Instructions

- Use the table below to guide your debriefing.
- Observe and record elements of team dynamics.
- Identify 2 or 3 elements of team dynamics to discuss per debriefing session.

<table>
<tr><th>ACTION</th><th>GATHER</th><th>ANALYZE</th><th>SUMMARIZE</th></tr>
<tr>
<td rowspan="2">Closed-Loop Communication
• Orders acknowledged and confirmed when given
• Orders announced when executed
Clear Messages
• Team members speak clearly
• Orders are questioned when doubt exists
Clear Roles
• All team members have appropriate roles
• Roles are reallocated when appropriate
Knowing One's Limitations
• Calls for assistance
• Seeks advice when appropriate
Knowledge Sharing
• Sharing information between team members
• Asks for ideas and suggestions
Constructive Intervention
• Identifies priorities
• Questions colleagues who make mistakes
Reevaluation and Summarizing
• Reevaluates patient
• Summarizes patient condition and treatment plan
Mutual Respect
• Speaks in a professional, friendly tone of voice
• Provides positive feedback</td>
<td>Student Observations
• Can you describe the events from your perspective?
• How well do you think your interventions worked?
• Can you review the events of the scenario? (directed to the recorder)
• What could you have improved?
• What did the team do well?</td>
<td>Done Well
• How were you able to [insert action here]?
• Why do you think you were able to [insert action here]?
• Tell me a little more about how you [insert action here].</td>
<td>Student-Led Summary
• What are the main things you learned?
• Can someone summarize the key points made?
• What are the main take-home messages?</td>
</tr>
<tr>
<td>Instructor Observations
• I noticed that [insert action here].
• I observed that [insert action here].
• I saw that [insert action here].</td>
<td>Needs Improvement
• Why do you think [insert action here] occurred?
• How do you think [insert action here] could have been improved?
• What was your thinking while [insert action here]?
• What prevented you from [insert action here]?</td>
<td>Instructor-Led Summary
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• Here is what I think we learned…
• The main take-home messages are…</td>
</tr>
</table>