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A Simulation-Based Course for Prehospital Providers in the Developing Emergency Medical Response System

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## A Simulation-Based Course for Prehospital Providers in a Developing Emergency Medical Response System

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### ABSTRACT:

**Audience:** This simulation-based training focuses on emergency prehospital medical stabilization. It was created to augment the skills of prehospital providers in developing emergency medical services (EMS) systems. We designed and implemented the curriculum in the Republic of Botswana and trained the public prehospital providers employed by the Ministry of Health (MOH).

**Length of Curriculum:** The entire course was designed to be presented over 2 days for approximately six to eight total hours.

**Introduction:** Prehospital medicine continues to develop around the world. Many new, public programs are steadily emerging in Sub-Saharan Africa which utilize fewer resources than many of the more established EMS models. Because of the unique practice environment, and the novelty of these organized EMS programs, educational and interventional initiatives are needed, as well as research on prehospital medicine in lower- and middle-resource settings, particularly in Sub-Saharan Africa. The novel, prehospital, medical simulation-based, educational curriculum we have presented here was specifically created to develop EMS systems in lower- and middle-income countries (LMIC) in Africa. The course was successfully implemented multiple times in Botswana as a collaborative effort between the providers of well-established EMS systems and the emerging Botswanan system. This simulation-based training program was considered an appropriate, effective, and welcome means of teaching the relevant concepts, as indicated by the statistically significant improvement in test scores and participant feedback.

# CURRICULUM

**Educational Goals:** This curriculum presents a refresher course in recognizing and stabilizing an acutely ill patient for prehospital providers practicing in a low/middle-income developing EMS system.

**Educational Methods:** The educational strategies used in this curriculum include rapid cycle deliberate practice (RCDP) medical simulation, written testing, and simulation testing.

**Research Methods:** Learners completed pre- and post-tests covering the concepts taught in the curriculum. Continuous variables (written and simulation test scores) were compared between two dependent groups (pre- and post-training) using paired t-test.

**Results:** The mean scores were 67% [standard deviation (SD) = 10] on the written pre-test and 85% (SD = 7) on the written post-test ( $p < 0.001$ ). The mean scores for the simulation were 42% (SD = 14.2) on the pre-test and 75% (SD = 11.3) on the post-test ( $p < 0.001$ ).

**Discussion:** This curriculum was specifically developed based on the needs of the Botswana EMS system. Nevertheless, we strongly believe that only minor adaptations would be required for teaching it in other developing, lower-resourced prehospital systems, considering the relative ubiquity of the clinical concepts being covered. The curriculum described in this study represents an invaluable educational tool that serves to educate healthcare providers, disseminate practical knowledge, and standardize clinical procedures. We hope that these measures, when taken together, will greatly enhance the standard of prehospital medical care and thereby improve patient outcomes.

**Topics:** Abdominal pain, blunt trauma, precipitous birth, respiratory distress, weakness, prehospital, EMS, Botswana, global health, collaboration, rapid cycle deliberate practice (RCDP), medical simulation.



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## Learner Audience:

Prehospital providers

## Recommended Number of Instructors:

- 1 simulation instructor/debriefing facilitator per group of three to six learners
- 1 confederate/assistant per group of three to six learners

## Length of Curriculum:

The entire course was designed to be presented over 2 days for approximately six to eight total hours. The curriculum consisted of five simulation sessions, lasting 50–60 minutes each. Most learners completed pre- and post-written testing in 15–30 minutes. Each participant had up to 15 minutes to complete pre- and post-simulation testing.

Day 1 included written multiple-choice pre-testing (Appendix A, B), simulation pre-testing (Appendix I, J), and simulation scenarios (Appendix D-H), as time permitted.

Depending on the number of facilitators and simulation materials (see *Equipment & Environment*), the learners were divided into groups of three–six people. Each scenario was repeated, using RCDP, for up to 40 min. The learners took turns and acted in different roles within each scenario. Day 2 involved completion of the scenarios (Appendix D–H), written multiple-choice post-testing (Appendix A, B), and simulation post-testing (Appendix I, J).

## Topics:

Abdominal pain, blunt trauma, precipitous birth, respiratory distress, weakness, prehospital, EMS, Botswana, global health, collaboration, rapid cycle deliberate practice (RCDP), medical simulation.

## Objectives:

From this curriculum, learners practicing in limited resource environments will augment their proficiency in identifying and stabilizing an acutely ill patient in prehospital settings. The learners will also acquire the core skills needed for responding to some of the most common prehospital medical complaints.

By the end of this course, the learners will:

1. Gain confidence in rapid assessment and emergency intervention for five of the more common prehospital complaints in both Botswana and Sub-Saharan African LMICs (ie, abdominal pain, blunt trauma, respiratory distress, weakness, and vaginal bleeding).
2. Improve communication and teamwork when managing acutely ill patients.
3. Use prehospital supplies and resources appropriately.
4. Increase proficiency in performing emergency interventions.

## Brief introduction:

Organized prehospital medicine in lower- and middle-income, Sub-Saharan African countries is still in the early stages of development compared to many other regions worldwide. The Botswana Ministry of Health (MOH) organized the nation’s first public prehospital emergency medical services (EMS) drive in 2012, and the program still focuses on optimizing the system. In developing EMS, poor outcomes are often due to lack of resources, insufficient training, and other system deficiencies.<sup>1</sup> The present curriculum was designed to augment the prehospital care providers’ training, enhance their performance in identifying and stabilizing emergency conditions, and, in turn, improve patient outcomes.



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The curriculum includes six low-fidelity simulation teaching scenarios (abdominal pain, vaginal bleeding, respiratory distress, weakness, and blunt trauma) using RCDP and a traditional testing scenario (major trauma) with a scoring rubric. These simulations were designed based on a formal needs assessment of the Gaborone national EMS system, particularly after reviewing the most common response calls from 2015. Rapid cycle deliberate practice was selected because the providers lacked experience in simulation-based learning as well as to provide timely feedback, ensuring rapid behavior modification.<sup>6</sup> The pre- and post-test medical simulations were based on a major trauma scenario, executed in a traditional simulation format. Simulation testing was conducted by the learner, without interruption from the instructor or any debriefing, unlike the deliberate interruptions and feedback provided during RCDP. The scoring rubric was modified using a trauma simulation assessment tool which has already been successfully applied in other sub-Saharan African countries.<sup>7</sup>

## **Problem identification, general and targeted needs assessment:**

The Botswana MOH requested external consultation for reorienting and refreshing its public EMS providers in optimizing field management of critically ill patients. Our group, from the United States of America (USA), brought experiences and practices from more established EMS programs in the USA. We collaborated with practitioners in Botswana who brought experiences and knowledge from research and travels and from their own practices in Botswana. We found that the needs and structure of the Botswana EMS system were consistent with many other prehospital programs in LMICs. This led us to believe that the curriculum would likely be applicable to other emerging EMS systems in LMICs. Hence, we set out to create a refresher course for the prehospital providers in LMICs.

Knowledge gaps and other opportunities for educational development were uncovered through a formal needs assessment of the Botswana MOH and Gaborone EMS system.<sup>2</sup> Prehospital care providers in Botswana include those initially trained as nurses, emergency medical technicians (EMTs), and paramedics. Through qualitative interviewing, we gauged the expectations, needs, and demands of the current Botswana system. We then worked with EMS leaders and providers to identify their concerns and priorities for training. EMS supplies were inventoried, and logbook records were reviewed to determine the frequency of the chief complaints for which patients called the EMS system in 2015.

Medical simulation was a useful technique chosen to address the prehospital medical care providers' educational needs within this course. Simulation-based medical education allows practicing high-risk scenarios in a safe learning environment

with reproducible conditions. This method helps foster clinical knowledge, procedural skills, confidence, teamwork, and effective communication practices. The efficacy of this training tool for prehospital medicine has been established in the literature.<sup>3</sup> The rapid cycle deliberate practice (RCDP) format was specifically selected for this population because it is well-suited for individuals who have less prior exposure to learning via medical simulation and for those seeking skill mastery.<sup>4</sup> Rapid cycle deliberate practice is an instructional method for simulation-based learning that incorporates multiple, shorter repetitions of cases with intermixed feedback. This practice has been shown to be useful in improving the key performance measures in resuscitation.<sup>5</sup>

Based on our findings in Botswana, this simulation-based educational curriculum was developed to augment the training of prehospital care providers in LMICs.

## **Goals of the curriculum:**

This curriculum serves as a refresher course for prehospital providers practicing in low/middle-income emerging EMS systems, helping them recognize and stabilize an acutely ill patient.

## **Objectives of the curriculum:**

From this curriculum, learners practicing in limited resource environments will augment their proficiency in identifying and stabilizing an acutely ill patient in prehospital settings. The learners will also acquire the core skills needed for responding to some of the most common prehospital medical complaints.

By the end of this course, the learners will:

1. Gain confidence in rapid assessment and emergency intervention for five of the more common prehospital complaints in both Botswana and Sub-Saharan African LMICs (ie, abdominal pain, blunt trauma, respiratory distress, weakness, and vaginal bleeding).
2. Improve communication and teamwork when managing acutely ill patients.
3. Use prehospital supplies and resources appropriately.
4. Increase proficiency in performing emergency interventions.

## **Educational Strategies:**

Please see the separate document of linked objectives and educational goals.

## **Equipment & Environment:**

- Large room (at least 50-person capacity) with multiple tables and ample floor space or multiple rooms, if available
- For each group of three–six learners, equipment setup includes:



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- 1- Low-fidelity, full-body, simulation mannequin. Higher fidelity mannequins can be used if available (a Mega Code Man and a local mannequin from the MOH were used in this study)
- 1- Intravenous arm task trainer (if mannequin itself is not equipped)
- 1- Lower extremity task trainer (if mannequin itself is not equipped)
- 1- Medical resuscitation setup, including the standard resuscitation equipment available in EMS vehicles and a medical bag (including intravenous line starter kits, intravenous fluid bags, intraosseous drill, intraosseous needles, medical tape, bag valve mask, and backboard) (Appendix L)
- 1- Video recorder (if the simulation-based pre- and post-tests are scored by video review rather than in real time)

## Results and tips for successful implementation:

Prior to beginning the course, each learner completed the written test individually (Appendix A). The learners then, independently, attempted the simulation test in the traditional format (Appendix I) to the best of their ability without performance feedback or debriefing. Learners were not present to observe during each other's simulation testing sessions. We split the large group into two such that one group was doing written testing while the other was doing simulation testing; then they switched. After testing, the learners were randomly divided into groups of three to six. Each group performed the teaching scenarios using the RCDP format. Learner debriefing was integrated regularly into each performance round and guided by the critical actions pertaining to the case and relevant feedback cues (Appendix M). The scenarios can be scored in real-time using a scoring rubric (Appendix J) when sufficient educators are available. However, we used video recording to score the learners' performance at a later time. After completing the RCDP scenarios, the learners were again separately evaluated with the same written exam (Appendix A), simulation testing (Appendix I), and scoring rubric (Appendix J). At the end of the course, the learners were asked to provide written evaluations of the course and instructors (Appendix K). Continuous variables (written and simulation test scores) were compared between two dependent groups (pre- and post-training) using paired t-test.

## Demographic Characteristics:

The curriculum was offered three times in three large Botswanan cities in 2015. The learners represented convenience samples of off-duty, public, prehospital care providers who were invited to participate by the MOH.

Collectively, 31 learners were involved in the three courses; 19 (61%) were men and 12 (39%) were women. The learners were roughly equally distributed between the three study sites: Francistown (10/41, 32.3%), Mahalapye (10/31, 32.3%), and Gaborone (11/31, 35.4%).

## Test Scores:

The mean scores were 67% [standard deviation (SD) = 10] on the written pre-test and 85% (SD = 7) on the written post-test ( $p < 0.001$ ). The mean scores for the simulation were 42% (SD = 14.2) on the pre-test and 75% (SD = 11.3) on the post-test ( $p < 0.001$ ). There was no statistically significant difference in the scores among the different teaching/testing sites.

## Evaluation and Feedback:

The feedback was overwhelmingly positive, with 100% of the learners reporting that the course was "useful." Twenty-one learners (68%) found the course to be "extremely useful," and the remaining 32% stated that it was "very useful" on a five-point Likert scale.

Learners stated that the best part of the course was the medical simulation, particularly the RCDP format.

*"Simulation as they gave real life scenarios that we see every day."*

*"Simulation, scenario, and giving feedback on how [we] performed on scenarios."*

*"[My favorite part was] guided simulation when we would stop and do a post mortem of the scenario."*

*"The simulations part where you have the chance to stop and assess the case."*

The learners' recommendations for improving the curriculum varied; however, many requested a more extensive curriculum that incorporated other teaching methods.

*"More theory before we get to simulations."*

*"They should add videos to their simulation, but everything else was perfect."*

*"The course should be longer (offered over a number of days) because there is a lot of material to cover."*

*"Not enough time, and next time should include more days to learn more things."*

Overall, the learners enjoyed the curriculum and reported that they could incorporate their learnings in clinical practice.



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*“Thank you for your time and teachings, I think I’m well equipped to manage the patient better than before.”*

*“I did have a great and fun time of learning and I have certainly learnt a lot from this course. [I] am going to use what I learnt here to save lives.”*

*“... Course was informative and relevant.”*

*“... I have learnt a lot from this training. Wish we could regularly do this kind of training.”*

Since the initial three courses described here, the curriculum has been implemented several times in 2016-2017 in other locations within Botswana, reaching an additional 120 learners. We hope to make the course regularly and indefinitely available across Botswana by training local practitioners to teach the curriculum independently. We have already identified several EMS practitioners who are currently training to become course instructors under the guidance of curriculum originators. It is important that the instructors are well-versed in the simulation-based education techniques that are central to this curriculum. A potentially limiting factor for the efficacy of the curriculum is the instructor’s ability to dynamically adapt to the various turns a medical simulation can take. In addition, the learner relies heavily on the instructor and confederate to enhance the low-fidelity simulation conditions. The course is also limited by its short duration, as inferred from the learners’ request for it to be longer and cover more topics. Hence, an opportunity exists to integrate another relevant curriculum with it. In this way, we used a comparable pediatric curriculum in conjunction with this one to present more diversified and robust content.

Given the short duration of the course, the pre- and post-testing were usually only one day apart. Ideally, we would like to evaluate the retention of the course material over time to assess the providers’ ongoing behavioral changes and patient outcomes resulting from applying the concepts taught in the curriculum.

This curriculum was specifically developed based on the needs of the Botswana EMS system. Nevertheless, we strongly believe that only minor adaptations would be required for teaching it in other developing, lower-resourced prehospital systems, considering the relative ubiquity of the clinical concepts being covered. The curriculum described in this study represents an invaluable educational tool that serves to educate healthcare providers, disseminate practical knowledge, and standardize clinical procedures. We hope that these measures, when taken together, will greatly enhance the standard of prehospital medical care and thereby improve patient outcomes.

## Associated Content:

- A. Written Test – Questions.docx
- B. Written Test – Answers.docx
- C. Introduction to Simulation.pptx
- D. Simulation Case Abdominal Pain.docx
- E. Simulation Case Blunt Trauma.docx
- F. Simulation Case OB-GYN Hypovolemic Shock.docx
- G. Simulation Case Respiratory Distress.docx
- H. Simulation Case Weakness.docx
- I. Trauma Test Scenario.docx
- J. Trauma Test Assessment Tool.pdf
- K. Course Evaluation Form.docx
- L. Equipment Setup for Simulation Scenarios
- M. Debriefing Techniques

## References/suggestions for further reading:

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# DIDACTICS AND HANDS-ON CURRICULUM

Topic	Abdominal Pain	Learners	Prehospital Providers
Recommended Educational Strategy	Rapid Cycle Deliberate Practice (RCDP) Medical Simulation		
Educational Content	Identification of a patient who is acutely ill due to septic shock Initiate stabilization of an acutely ill patient with septic shock		
Objectives	By the end of the session, learners should be able to: Cognitive: <ol style="list-style-type: none"> <li>1. Recognize septic shock</li> <li>2. Understand that there may be multiple etiologies of shock</li> <li>3. Consider various causes of abdominal pain</li> <li>4. Perform early fluid resuscitation of a patient in shock</li> <li>5. Consider pain management in a patient presenting for pain</li> <li>6. Recognize signs/symptoms of perforated bowel</li> <li>7. Name the different causes of pulseless arrest (5 H's &amp; T's)</li> <li>8. Recognize and provide initial management for pulseless electrical activity (PEA)</li> </ol> Technical: <ol style="list-style-type: none"> <li>1. Perform a rapid primary assessment</li> <li>2. Administer supplemental O2</li> <li>3. Perform peripheral IV line-placement</li> <li>4. Perform IO placement</li> <li>5. Perform basic airway management if patient clinically deteriorates</li> <li>6. Perform effective CPR</li> </ol> Behavioral: <ol style="list-style-type: none"> <li>1. Communicate clear leadership roles with delegation of roles</li> <li>2. Use closed-loop communication               <ul style="list-style-type: none"> <li>○ All messages or orders addressed to specific individuals</li> <li>○ Team members confirm each request and inform the team leader when a task begins or ends</li> </ul> </li> <li>3. Respect each other with language and behavior               <ul style="list-style-type: none"> <li>○ Use proper names with eye contact or touch</li> <li>○ Share ideas and information as suggestions or constructive interventions, not as criticism</li> </ul> </li> <li>4. Provide a shared mental model (summary of scenario and next steps given to maintain situational awareness)</li> </ol>		
Timing, Resources Needed	Total Time: ~50 minutes for multiple rounds of RCDP Setup for All Rounds: <ul style="list-style-type: none"> <li>• Room configuration: living room of a small home</li> <li>• Equipment needed:               <ul style="list-style-type: none"> <li>○ standard equipment available in EMS truck and medical bag</li> <li>○ Adult simulation mannequin, IV arm task trainer, lower extremity IO task trainer</li> </ul> </li> <li>• Personnel:               <ul style="list-style-type: none"> <li>○ Simulation instructor/debriefer</li> <li>○ Confederates: medical control (via telephone or radio), another EMS provider</li> </ul> </li> </ul>		
Milestones	Emergency stabilization, Task-switching, Vascular Access, Team Management	Assessment	Critical actions of simulation scenario
		Evaluation	Real-time feedback during RCDP





# DIDACTICS AND HANDS-ON CURRICULUM

Topic	Blunt Trauma	Learners	Prehospital Providers
Recommended Educational Strategy	Rapid Cycle Deliberate Practice (RCDP) Medical Simulation		
Educational Content	Application of a rapid trauma survey to identify blunt polytrauma Initiate stabilization of an acutely ill patient in hemorrhagic shock		
Objectives	<p>By the end of the session, learners should be able to:</p> <p>Cognitive:</p> <ol style="list-style-type: none"> <li>1. Perform a primary survey (Airway, Breathing, Circulation, Disability, Exposure)</li> <li>2. Recognize signs of hemorrhagic shock</li> <li>3. Initiate management of blunt abdominal trauma</li> <li>4. Initiate management of extremity trauma</li> <li>5. Perform early fluid resuscitation of a patient in hypovolemic shock</li> <li>6. Consider pain management in a traumatically injured patient</li> <li>7. Immobilize the traumatically injured patient</li> </ol> <p>Technical:</p> <ol style="list-style-type: none"> <li>1. Perform a rapid primary assessment</li> <li>2. Perform basic airway management</li> <li>3. Administer supplemental oxygen</li> <li>4. Perform IV/IO line placement</li> <li>5. Apply a splint</li> </ol> <p>Behavioral:</p> <ol style="list-style-type: none"> <li>1. Communicate clear leadership roles with delegation of roles</li> <li>2. Use closed-loop communication               <ul style="list-style-type: none"> <li>o All messages or orders addressed to specific individuals</li> <li>o Team members confirm each request and inform the team leader when a task begins or ends</li> </ul> </li> <li>3. Respect each other with language and behavior               <ul style="list-style-type: none"> <li>o Use proper names with eye contact or touch</li> <li>o Share ideas and information as suggestions or constructive interventions, not as criticism</li> </ul> </li> <li>4. Provide a shared mental model (summary of scenario and next steps given to maintain situational awareness)</li> </ol>		
Timing, Resources Needed	<p>Total Time: ~50 minutes for multiple rounds of RCDP</p> <p>Setup for All Rounds:</p> <ul style="list-style-type: none"> <li>• Room configuration: living room of a small home</li> <li>• Equipment needed:               <ul style="list-style-type: none"> <li>o standard equipment available in EMS truck and medical bag</li> <li>o Adult simulation mannequin, IV arm task trainer, lower extremity IO task trainer</li> </ul> </li> <li>• Personnel:               <ul style="list-style-type: none"> <li>o Simulation instructor/debriefer</li> <li>o Confederates: medical control (via telephone or radio), another EMS provider</li> </ul> </li> </ul>		
Milestones	Emergency Stabilization, Task-switching, Vascular Access, Team Management	Assessment	Critical actions of simulation scenario
		Evaluation	Real-time feedback during RCDP



# DIDACTICS AND HANDS-ON CURRICULUM

Topic	Vaginal Bleeding	Learners	Prehospital Providers
Recommended Educational Strategy	Rapid Cycle Deliberate Practice (RCDP) Medical Simulation		
Educational Content	Rapid medical assessment to identify a precipitous birth Deliver a baby in the field Initiate stabilization of an acutely ill patient in hemorrhagic shock		
Objectives	By the end of the session, learners should be able to: <b>Cognitive:</b> <ol style="list-style-type: none"> <li>1. Recognize hypovolemic shock</li> <li>2. Recall risks of bleeding with various stages of pregnancy</li> <li>3. Recognize a woman in active labor</li> <li>4. Perform early fluid resuscitation of a patient in hypovolemic shock</li> <li>5. Advocate for higher level of care when necessary</li> </ol> <b>Technical:</b> <ol style="list-style-type: none"> <li>1. Perform a rapid primary assessment</li> <li>2. Perform IV/IO line placement</li> <li>3. Perform vaginal delivery of a baby</li> <li>4. Use personal protective equipment</li> <li>5. Collect and transport products of conception</li> </ol> <b>Behavioral:</b> <ol style="list-style-type: none"> <li>1. Communicate clear leadership roles with delegation of roles</li> <li>2. Use closed-loop communication               <ul style="list-style-type: none"> <li>○ All messages or orders addressed to specific individuals</li> <li>○ Team members confirm each request and inform the team leader when a task begins or ends</li> </ul> </li> <li>3. Respect each other with language and behavior               <ul style="list-style-type: none"> <li>○ Use proper names with eye contact or touch</li> <li>○ Share ideas and information as suggestions or constructive interventions, not as criticism</li> </ul> </li> <li>4. Provide a shared mental model (summary of scenario and next steps given to maintain situational awareness)</li> </ol>		
Timing, Resources Needed	Total Time: ~50 minutes for multiple rounds of RCDP <ul style="list-style-type: none"> <li>• Room configuration: living room of a small home</li> <li>• Equipment needed:               <ul style="list-style-type: none"> <li>○ Standard equipment available in EMS truck and medical bag</li> <li>○ Suction bulb, clean/dry towels and sheets, umbilical cord clamp</li> <li>○ Gravid simulation mannequin with moulage, defibrillator/adaptor, IV arm task trainer, lower extremity IO task trainer</li> <li>○ Baby doll or low fidelity neonate/infant mannequin</li> </ul> </li> <li>• Personnel:               <ul style="list-style-type: none"> <li>○ Simulation instructor/debriefer</li> <li>○ Confederates: medical control (via telephone or radio), another EMS provider</li> </ul> </li> </ul>		
Milestones	Emergency Stabilization, Task-switching, Vascular Access, Team Management	Assessment	Critical actions of simulation scenario
		Evaluation	Real-time feedback during RCDP



# DIDACTICS AND HANDS-ON CURRICULUM

Topic	Respiratory Distress	Learners	Prehospital Providers
Recommended Educational Strategy	Rapid Cycle Deliberate Practice (RCDP) Medical Simulation		
Educational Content	Identification of a patient who is acutely ill due to respiratory distress Initiate stabilization of an acutely ill patient with a respiratory distress		
Objectives	By the end of the session, learners should be able to: Cognitive: <ol style="list-style-type: none"> <li>1. Recognize a patient in respiratory distress</li> <li>2. Recall various causes of respiratory distress</li> <li>3. Understand the various interventions available in the prehospital setting for a patient in respiratory distress</li> </ol> Technical: <ol style="list-style-type: none"> <li>1. Perform a rapid primary assessment</li> <li>2. Administer supplemental O2</li> <li>3. Optimally position a patient in respiratory distress</li> <li>4. Perform peripheral IV line-placement</li> <li>5. Perform IO placement</li> <li>6. Perform basic airway management</li> </ol> Behavioral: <ol style="list-style-type: none"> <li>1. Communicate clear leadership roles with delegation of roles</li> <li>2. Use closed-loop communication               <ul style="list-style-type: none"> <li>○ All messages or orders addressed to specific individuals</li> <li>○ Team members confirm each request and inform the team leader when a task begins or ends</li> </ul> </li> <li>3. Respect each other with language and behavior               <ul style="list-style-type: none"> <li>○ Use proper names with eye contact or touch</li> <li>○ Share ideas and information as suggestions or constructive interventions, not as criticism</li> </ul> </li> <li>4. Provide a shared mental model (summary of scenario and next steps given to maintain situational awareness)</li> <li>5. Coordination of airway management</li> </ol>		
Timing, Resources Needed	Total Time: ~50 minutes for multiple rounds of RCDP Setup for All Rounds: <ul style="list-style-type: none"> <li>• Room configuration: living room of a small home</li> <li>• Equipment needed:               <ul style="list-style-type: none"> <li>○ standard equipment available in EMS truck and medical bag</li> <li>○ Adult simulation mannequin, IV arm task trainer, lower extremity IO task trainer</li> </ul> </li> <li>• Personnel:               <ul style="list-style-type: none"> <li>○ Simulation instructor/debriefer</li> <li>○ Confederates: medical control (via telephone or radio), another EMS provider</li> </ul> </li> </ul>		
Milestones	Emergency Stabilization, Task-switching, Vascular Access, Team Management	Assessment	Critical actions of simulation scenario
		Evaluation	Real-time feedback during RCDP



# DIDACTICS AND HANDS-ON CURRICULUM

Topic	Weakness	Learners	Prehospital Providers
Recommended Educational Strategy	Rapid Cycle Deliberate Practice (RCDP) Medical Simulation		
Educational Content	Identification of a patient who has altered mental status Identification of hypoglycemia and trauma as causes for altered mental status Initiate stabilization of an acutely ill patient with altered mental status and blunt head injury		
Objectives	By the end of the session, learners should be able to: <b>Cognitive:</b> <ol style="list-style-type: none"> <li>1. Recognize a patient with altered mental status</li> <li>2. List a differential diagnosis for a patient with weakness</li> <li>3. Detect and manage hypoglycemia</li> </ol> <b>Technical:</b> <ol style="list-style-type: none"> <li>1. Perform a rapid primary assessment</li> <li>2. Perform basic airway management</li> <li>3. Perform IV/IO line placement</li> <li>4. Perform cervical spine precautions</li> </ol> <b>Behavioral:</b> <ol style="list-style-type: none"> <li>1. Obtain a focused history from all available resources</li> <li>2. Manage a behaviorally difficulty patient</li> <li>3. Communicate clear leadership roles with delegation of roles</li> <li>4. Use closed-loop communication               <ul style="list-style-type: none"> <li>o All messages or orders addressed to specific individuals</li> <li>o Team members confirm each request and inform the team leader when a task begins or ends</li> </ul> </li> <li>5. Respect each other with language and behavior               <ul style="list-style-type: none"> <li>o Use proper names with eye contact or touch</li> <li>o Share ideas and information as suggestions or constructive interventions, not as criticism</li> </ul> </li> <li>6. Provide a shared mental model (summary of scenario and next steps given to maintain situational awareness)</li> </ol>		
Timing, Resources Needed	Total Time: ~50 minutes for multiple rounds of RCDP Setup for All Rounds: <ul style="list-style-type: none"> <li>• Room configuration: living room of a small home</li> <li>• Equipment needed:               <ul style="list-style-type: none"> <li>o standard equipment available in EMS truck and medical bag</li> <li>o Adult simulation mannequin, IV arm task trainer, lower extremity IO task trainer</li> </ul> </li> <li>• Personnel:               <ul style="list-style-type: none"> <li>o Simulation instructor/debriefer</li> <li>o Confederates: medical control (via telephone or radio), another EMS provider</li> </ul> </li> </ul>		
Milestones	Emergency Stabilization, Task-switching, Vascular Access, Team Management	Assessment	Critical actions of simulation scenario
		Evaluation	Real-time feedback during RCDP



## Appendix A: Prehospital Curriculum Written Test

1. A patient is found to be tachycardic and confused. A condition in which low blood volume results in inadequate perfusion is referred to as:
  - A. Hemorrhage
  - B. Hyperbole
  - C. Hypovolemic shock
  - D. Hypoxia
  
2. A patient has been having vomiting and diarrhea for 3 days. You have decided to start an intravenous (IV) line and administer fluids. Fluid resuscitation should be given using a(n):
  - A. Glucose containing solution
  - B. Hypertonic solution
  - C. Hypotonic solution
  - D. Isotonic solution
  
3. True or False: All patients experiencing a myocardial infarction will present with chest pain.
  - A. True
  - B. False
  
4. An obese man is found unconscious in his home. A friend went to check on him and found that he could not wake him. You perform an initial assessment. Often the most effective initial airway management technique is:
  - A. Placing an oropharyngeal airway
  - B. Placing an oxygen mask at 10 liters per minute flow rate
  - C. Suctioning the airway and providing assistance with a bag valve mask
  - D. Using a head-tilt/chin-lift or jaw thrust maneuver



## DIDACTICS AND HANDS-ON CURRICULUM

5. You are assessing a patient who was involved in a motor vehicle collision. The patient will only open his eyes to painful stimuli, uses incomprehensible words, and withdraws from painful stimuli. What is the Glasgow Coma Score for this patient?
  - A. 7
  - B. 8
  - C. 9
  - D. 10
  
6. A college student with history of asthma has collapsed while walking home from the library. All of the following are signs of adequate breathing EXCEPT:
  - A. Audible breath sounds on both sides of the chest
  - B. Nasal flaring
  - C. Respiratory rate of 18 breaths per minute
  - D. Warm, dry skin without pallor
  
7. A woman has called for help because she has been having significant vaginal bleeding and pelvic pain for the past several hours. You should:
  - A. Apply direct pressure to control the bleeding
  - B. Cover the vagina with a feminine pad
  - C. Elevate the patient's pelvis
  - D. Pack the vagina with a trauma dressing
  
8. You have been called to a home where a 20-year-old female complains of vaginal bleeding for the past day. Which of the ways listed is human immunodeficiency virus (HIV) most likely to be transmitted?
  - A. Getting blood in an open wound
  - B. Getting scratched by the woman
  - C. Having the woman bite your hand
  - D. Wiping the woman's tears with your bare hand



# DIDACTICS AND HANDS-ON CURRICULUM

9. A patient has been deaf and mute since birth. His mother called for help because he has been having abdominal pain that has been getting worse. Which of the following plays one of the largest roles in the medical diagnosis of a patient?
- A. Focused patient assessment
  - B. Patient history
  - C. Patient signs
  - D. Patient symptoms
10. You have been instructed to obtain vital signs on a 38-year-old woman who had a syncopal episode. Vital signs are most comprehensive when the following are measured:
- A. Pulse rate (rhythm and quality), respiratory rate (rhythm and quality), blood pressure, temperature, and pulse oximetry
  - B. Pulse rate (rhythm and quality), temperature, and pulse oximetry
  - C. Pulse rate, blood pressure, breath sounds, and temperature
  - D. Temperature, blood pressure, pulse oximetry, and respiratory rate
11. A 25-year-old farmer has called for help because he has had sudden increased difficulty breathing. When listening to lung sounds, what are you listening for?
- A. Normal breath sounds, or wheezes, rales, rhonchi, or stridor
  - B. Normal lung sounds, decreased breaths sounds, decreased tidal volume
  - C. Normal lung sounds, emphysema, pneumonia, wheezing
  - D. Normal lung sounds, or fluid in the lungs, asthma, coughing
12. Diarrhea or hemorrhage can cause an absolute loss of fluid volume, leading to:
- A. Chills
  - B. Hypertension
  - C. Infection
  - D. Shock
13. Which of the following is NOT a type of shock?
- A. Cardiogenic
  - B. Hypertensive
  - C. Hypovolemic
  - D. Neurogenic



## DIDACTICS AND HANDS-ON CURRICULUM

14. A 60-year-old man with history of heart disease has called for help because he has been feeling worse each day, and now he feels like he cannot walk because of weakness. If evaluating for circulatory overload, signs would include which of the following?
- A. Fast heart rate and unequal pupils
  - B. Jugular venous distention, foot/leg edema, and difficulty breathing
  - C. Slow heart rate and blue extremities
  - D. Slow heart rate and hypovolemia
15. A patient has jumped from a building. After two attempts at a peripheral IV for fluid resuscitation, you are considering placing an intraosseous needle. Intraosseous access is contraindicated in:
- A. A bone with a known or suspected fracture
  - B. Children
  - C. The awake patient
  - D. The elderly





## Appendix B: Prehospital Curriculum Written Test Answers

1. A patient is found to be tachycardic and confused. A condition in which low blood volume results in inadequate perfusion is referred to as:
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  - B. Hyperbole
  - C. Hypovolemic shock**
  - D. Hypoxia
  
2. A patient has been having vomiting and diarrhea for 3 days. You have decided to start an intravenous (IV) line and administer fluids. Fluid resuscitation should be given using a(n):
  - A. Glucose containing solution
  - B. Hypertonic solution
  - C. Hypotonic solution
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3. True or False: All patients experiencing a myocardial infarction will present with chest pain.
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4. An obese man is found unconscious in his home. A friend went to check on him and found that he could not wake him. You perform an initial assessment. Often the most effective initial airway management technique is:
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  - C. Suctioning the airway and providing assistance with a bag valve mask
  - D. Using a head-tilt/chin-lift or jaw thrust maneuver**



## DIDACTICS AND HANDS-ON CURRICULUM

5. You are assessing a patient who was involved in a motor vehicle collision. The patient will only open his eyes to painful stimuli, uses incomprehensible words, and withdraws from painful stimuli. What is the Glasgow Coma Score for this patient?
- A. 7
  - B. 8**
  - C. 9
  - D. 10
6. A college student with history of asthma has collapsed while walking home from the library. All of the following are signs of adequate breathing EXCEPT:
- A. Audible breath sounds on both sides of the chest
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  - C. Respiratory rate of 18 breaths per minute
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  - D. Pack the vagina with a trauma dressing
8. You have been called to a home where a 20-year-old female complains of vaginal bleeding for the past day. Which of the ways listed is human immunodeficiency virus (HIV) most likely to be transmitted?
- A. Getting blood in an open wound**
  - B. Getting scratched by the woman
  - C. Having the woman bite your hand
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# DIDACTICS AND HANDS-ON CURRICULUM

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  - B. Patient history**
  - C. Patient signs
  - D. Patient symptoms
10. You have been instructed to obtain vital signs on a 38-year-old woman who had a syncopal episode. Vital signs are most comprehensive when the following are measured:
- A. Pulse rate (rhythm and quality), respiratory rate (rhythm and quality), blood pressure, temperature, and pulse oximetry**
  - B. Pulse rate (rhythm and quality), temperature, and pulse oximetry
  - C. Pulse rate, blood pressure, breath sounds, and temperature
  - D. Temperature, blood pressure, pulse oximetry, and respiratory rate
11. A 25-year-old farmer has called for help because he has had sudden increased difficulty breathing. When listening to lung sounds, what are you listening for?
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  - C. Normal lung sounds, emphysema, pneumonia, wheezing
  - D. Normal lung sounds, or fluid in the lungs, asthma, coughing
12. Diarrhea or hemorrhage can cause an absolute loss of fluid volume, leading to:
- A. Chills
  - B. Hypertension
  - C. Infection
  - D. Shock**
13. Which of the following is NOT a type of shock?
- A. Cardiogenic
  - B. Hypertensive**
  - C. Hypovolemic
  - D. Neurogenic



## DIDACTICS AND HANDS-ON CURRICULUM

14. A 60-year-old man with history of heart disease has called for help because he has been feeling worse each day, and now he feels like he cannot walk because of weakness. If evaluating for circulatory overload, signs would include which of the following?
- A. Fast heart rate and unequal pupils
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  - C. Slow heart rate and blue extremities
  - D. Slow heart rate and hypovolemia
15. A patient has jumped from a building. After two attempts at a peripheral IV for fluid resuscitation, you are considering placing an intraosseous needle. Intraosseous access is contraindicated in:
- A. A bone with a known or suspected fracture**
  - B. Children
  - C. The awake patient
  - D. The elderly



Appendix C:

Prehospital Simulation Training:

Introduction to Simulation PowerPoint Presentation



Please see associated PowerPoint presentation



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

### Appendix D:

## Abdominal Pain Rapid Cycle Deliberate Practice (RCDP) Case.

#### Learner Audience:

Prehospital providers

#### Time Required for Implementation:

~ 50 minutes for multiple rounds of RCDP

#### Recommended Number of Learners per Instructor:

- 1 simulation instructor/debriefing facilitator per group of three to six learners
- 1 confederate/assistant per group of three to six learners

#### Objectives:

By the end of the session, learners should be able to:

##### Cognitive:

1. Recognize septic shock
2. Understand that there may be multiple etiologies of shock
3. Consider various causes of abdominal pain
4. Perform early fluid resuscitation of a patient in shock
5. Consider pain management in a patient presenting for pain
6. Recognize signs/symptoms of perforated bowel
7. Name the different causes of pulseless arrest (5 H's & T's)
8. Recognize and provide initial management for pulseless electrical activity (PEA)

##### Technical:

1. Perform a rapid primary assessment
2. Administer supplemental O<sub>2</sub>
3. Perform peripheral intravenous (IV) line placement
4. Perform interosseous (IO) placement
5. Perform basic airway management if patient clinically deteriorates
6. Perform effective cardiopulmonary resuscitation (CPR)

##### Behavioral:

1. Communicate clear leadership roles with delegation of roles
2. Use closed-loop communication
  - All messages or orders addressed to specific individuals
  - Team members confirm each request and inform the team leader when a task begins or ends
3. Respect each other with language and behavior
  - Use proper names with eye contact or touch
  - Share ideas and information as suggestions or constructive interventions, not as criticism
4. Provide a shared mental model (summary of scenario and next steps given to maintain situational awareness)

#### Learner responsible content:

The learner should be trained in and familiar with local prehospital protocol.

#### Abbreviations

AED = automatic external defibrillator

BP = blood pressure

Bpm = beats per minute

BVM = bag valve mask

CPR = cardiopulmonary resuscitation

EKG = electrocardiogram

EMS = emergency medical services

GCS = Glasgow Coma Scale

HR = heart rate

IO = intraosseous

IV = intravenous

LR = Ringer's lactate

NS = normal saline

O<sub>2</sub> = oxygen

PEA = pulseless electrical activity



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

Pt = patient

RCDP = rapid cycle deliberate practice

RR = respiratory rate

O<sub>2</sub>Sat = oxygen saturation

T = temperature

### References/suggestions for further reading:

1. Yamamoto W, Kono H, Maekawa M, Fukui T. The relationship between abdominal pain regions and specific diseases: an epidemiologic approach to clinical practice. *J Epidemiol.* 1997;7(1):27. doi: 10.2188/jea.7.27.
2. Nassour I, Fang SH. Gastrointestinal perforation. *JAMA Surg.* 2015;150(2):177. doi: 10.1001/jamasurg.2014.358.
3. Jacobs DO. Clinical practice. Diverticulitis. *N Engl J Med.* 2007; 357:2057. doi: 10.1056/NEJMcp073228.
4. Parks TG. Natural history of diverticular disease of the colon. A review of 521 cases. *Br Med J.* 1969;4(5684):639. doi: 10.1136/bmj.4.5684.639.
5. Konvolinka CW. Acute diverticulitis under age forty. *Am J Surg.* 1994;167(6):562-565. doi:10.1016/0002-9610(94)90098-1.
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7. Kriwanek S, Armbruster C, Beckerhinn P, Dittrich K. Prognostic factors for survival in colonic perforation. *Int J Colorectal Dis.* 1994;9(3):158.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

**Case Title:** Abdominal Pain RCDP Case

**Case Description & Diagnosis (short synopsis):** The prehospital provider is called to a home where a patient is complaining of abdominal pain.

The patient has a perforated viscus due to diverticulitis. He has unstable vital signs. He requires fluid resuscitation and respiratory support. If appropriate and time sensitive therapy occurs, he will have improvement of his vital signs and mental status. If inappropriate or delayed interventions, the patient can decompensate to PEA arrest due to acidosis and hypovolemic shock.

### **Equipment or Props Needed:**

Setup for All Rounds:

- Room configuration: living room of a small home
  
- Equipment needed:
  - Standard equipment available in EMS truck and medical bag, but particularly:
    - Gurney
    - IV starter kits
    - Normal saline
    - IO needles (+/- drill)
    - Medical tape
    - BVM
    - CPR backboard
  - Adult simulation mannequin, IV arm task trainer, lower extremity IO task trainer
  
- Demonstration items needed for debriefing: none

### **Confederates needed:**

- Medical control (via telephone or radio), another EMS provider





# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

### How the Scenario Unfolds:

#### Ideal Scenario Flow:

The prehospital provider is called to a home where a patient is complaining of abdominal pain. The provider should arrive at the patient's home where he/she performs a rapid assessment of the patient including obtaining vital signs and obtaining vascular access. The provider should take a pertinent and brief history of the patient's complaint.

The patient has a perforated viscus due to diverticulitis. He has unstable vital signs.

The provider should identify a patient in shock and who is hemodynamically unstable and should intervene with fluid resuscitation and respiratory support. If appropriate and time sensitive therapy occurs, he will have improvement of his vital signs and mental status. If inappropriate or delayed interventions, the patient can decompensate to PEA arrest due to acidosis and hypovolemic shock. The provider should reassess the patient after interventions and should also try to make the patient comfortable.

The provider should recognize the patient decompensation and respond with cardiorespiratory support with focus on transporting the patient to the appropriate setting, giving handoff to the providers there.

### Critical Actions:

#### Round 1:

- Rapid assessment of circulation, airway, breathing (CAB)
- Check vital signs
- Obtain IV/IO access
- Recognize abnormal vital signs
- Take basic history from the patient

#### Round 2:

- Recognize shock (and etiology)
- Give IV fluids
- Recognize signs of perforated bowel
- Consider giving analgesia
- Reassess after bolus



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

### Round 3:

- Recognize continued tachycardia
- Recognize now unresponsive patient without pulses and begin CPR
- Bag valve mask
- Give epinephrine IV/IO (1:10,000)
- Attach patient to AED or defibrillator
- Recognize PEA
- Perform interventions as necessary for PEA
- Recognize need to transfer to a hospital as soon as possible

**Expected Endpoint of the Scenario:** 15-minute time limit per round

**Distractors Within Scenario:** high acuity, administrators want to send the patient to a clinic

### Optional Challenges for Higher Level Learners:

- Evaluation for altered mental status
- Considering other types of shock

**Roles of Participants/Trainees:** Usual roles at a scene response

**Roles of Confederates (if applicable):** Medical control – wants to send the patient to lower-acuity facility; another EMS provider/assistant is relatively inexperienced and can only help when told specifically how to do so

### Anticipated Management Errors:

1. Failure to recognize the unresponsive patient: Because this is a low-fidelity simulation and a simulated cardiac monitor is not used, learners may not realize that the patient is not interacting and they often do not realize the deterioration in the vital signs. It is useful for the confederate to clearly indicate that there is an acute change in vital signs and that the patient has deterioration of vital signs even if the provider does not check.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

**Case Title:** Abdominal Pain RCDP Case

**Chief Complaint:** Abdominal pain

**Vitals:** Heart Rate (HR) 140                      Blood Pressure (BP) 100/52  
Respiratory Rate (RR) 24                      Temperature (T) 39.2°C  
Oxygen Saturation (O<sub>2</sub>Sat) 98% on room air

### Initial Physical Exam for All Rounds:

**General Appearance:** He appears uncomfortable. Dry mucous membranes. Abdomen distended, bowel sounds diminished. Lethargic. GCS 13 due to confusion and moves to localized pain at the left lower quadrant.

### Primary Survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. Lungs with shallow respirations, clear bilaterally. Tachypneic.
- **Circulation:** Hypotensive. Tachycardic. No murmur, weak central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

### Round 1: Initial Assessment of Patient

#### Objectives introduced this round:

1. Perform a rapid primary assessment
2. Perform peripheral IV placement

**Prompt for Team:** “A 35-year-old man has called EMS because he has had abdominal pain that has been getting worse.”

#### History:

- **History of present illness:** The man has had abdominal pain for the past 2 days, but 2 hours ago the pain suddenly got worse. He has not been able to eat. He has been nauseated and has vomited several times.
- **Pain qualifiers:** onset 2 days ago, worsened the past 2 hours. Worsened with movement. Dull and aching quality. Does not radiate. Very severe and getting worse.
- He feels feverish, but no chills. He has nausea and vomiting. No diarrhea. He is diaphoretic. He feels dizzy.
- He last ate yesterday. Emesis is green. Last bowel movement was 2 days ago and described as “normal.”
- Last urination 5 hours ago was normal. No history of any surgeries in the past.
- **Past medical history:** Denies
- **Past surgical history:** Denies
- **Patient’s medications:** Denies
- **Allergies:** Denies
- **Social history:** He does not smoke, but drinks alcohol weekly

**Vitals (need to be obtained by EMS):** HR 140      BP 100/54      RR 24      Temp 39.2C  
O<sub>2</sub>Sat 98% on room air

#### Physical Examination (if asked):

- **General appearance:** He appears uncomfortable. Dry mucous membranes. Abdomen distended, bowel sounds diminished. Lethargic. GCS 13 due to confusion and moves to localized pain at the left lower quadrant.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

### Primary Survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. Lungs with shallow respirations, clear bilaterally. Tachypneic.
- **Circulation:** Hypotensive. Tachycardic. No murmur, weak central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool.

### Critical Actions Round 1:

- Rapid assessment of CAB
- Check vital signs, and recognize abnormal vitals
- Obtain peripheral IV, or IO if unable
- Take basic history from patient

*No scenario progression, yet.*

### End Round 1.

### Round 1 Debriefing and Evaluation:

Review initial exam, reinforce importance of rapid initial assessment, checking vital signs, administering supplemental O<sub>2</sub>, and obtaining IV/IO access in a sick patient.

Refer to expected actions and teaching points below:

Expected Action	Teaching Point
Rapid assessment of CAB	When presented with ill patient, assess circulation, airway, and breathing. Immediately intervene if emergent situation found.
Check vital signs	Document initial vitals.
Obtain IV/IO access	Try peripheral IV first, particularly if pt. is awake. IO if critically ill, particularly if altered mental status/ coma.
Recognize abnormal vitals	HR for age: greater than 100bpm is abnormal BP: less than 90/60 is considered hypotensive RR greater than 20 is tachypneic.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

### Round 2: Initial Management of Shock

#### Objectives introduced this round:

1. Recognize shock and etiology
2. Perform early fluid resuscitation of a patient in shock
3. Recognize signs/symptoms of perforated bowel

#### Restart scenario from beginning.

**Prompt for Team:** “A 35-year-old man has called EMS because he has had abdominal pain that has been getting worse.”

#### History:

- **History of present illness:** The man has had abdominal pain for the past 2 days, but 2 hours ago the pain suddenly got worse. He has not been able to eat. He has been nauseated and has vomited several times.
- Pain qualifiers: onset 2 days ago, worsened the past 2 hours. Worsened with movement. Dull and aching quality. Does not radiate. Very severe and getting worse.
- He feels feverish, but no chills. He has nausea and vomiting. No diarrhea. He is diaphoretic. He feels dizzy.
- He last ate yesterday. Emesis is green. Last bowel movement was 2 days ago and described as “normal.”
- Last urination 5 hours ago was normal. No history of any surgeries in the past.
- **Past medical history:** Denies
- **Past surgical history:** Denies
- **Patient’s medications:** Denies
- **Allergies:** Denies
- **Social history:** He does not smoke, but drinks alcohol weekly

**Vitals (need to be obtained by EMS):** HR 140      BP 100/54      RR 24      Temp 39.2C  
O<sub>2</sub>Sat 98% on room air

#### Physical Examination (if asked):

- **General appearance:** He appears uncomfortable. Dry mucous membranes. Abdomen distended, bowel sounds diminished. Lethargic. GCS 13 due to confusion and moves to localized pain at the left lower quadrant.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. Lungs with shallow respirations, clear bilaterally. Tachypneic.
- **Circulation:** Hypotensive. Tachycardic. No murmur, weak central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool.

### Critical Actions Round 2:

- Rapid assessment of CAB
- Check vital signs, and recognize abnormal vitals
- Obtain peripheral IV, or IO if unable
- Take basic history from patient
- Recognize shock and etiology and verbalize
- Give rapid IV bolus of isotonic fluids
- Consider analgesia for pain control
- Reassess patient after bolus
- For advanced learners:
  - Recognize signs concerning for perforated bowel
  - Recognize need for emergent surgical evaluation

### END Round 2.

#### Round 2 Debriefing and Evaluation:

Review initial exam, reinforce importance of rapid initiation of IVF in shock, appropriate fluid volume for adult patients, and immediate reassessment after fluids.

Refer to expected actions and teaching points below:

Expected Action (including actions from Round 1)	Teaching Point
Recognize shock (& etiology)	In a hypotensive, tachycardic patient with abdominal pain and fever, strongly consider septic shock.
Give IV fluids	Rapid bolus, 500-1000 mL push as fast as possible for a previously healthy adult patient. Only isotonic fluids (NS or LR) should be given as a bolus.
Recognize signs of perforated bowel	A patient with LLQ abdominal pain with new/ acute worsening abdominal distension and diminished



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

	<p>bowel sounds should raise concern for perforated bowel, which is a surgical emergency.</p> <p>The location of the abdominal pain at the LLQ indicates likely diverticulitis causing weakening of the intestinal wall.</p>
Consider giving analgesia	<p>Morphine is dosed 2-6mg per dose. Preferred administration is IV for predictable absorption.</p> <p>Administer via slow IV push; may repeat in increments q5 minutes up to 20mg.</p> <p>Prior to any administration of morphine sulfate, reassess vital signs (SBP&gt;90mmHg, RR&gt;12, awake).</p>
Reassess after bolus	<p>Always recheck vitals, perfusion, respiratory status, and mental status after giving a bolus.</p>





# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

### Round 3: Progression of Shock to Pulseless Arrest

#### Objectives introduced this round:

1. Understand that there may be multiple etiologies of shock
2. Perform basic airway management if patient clinically deteriorates
3. Name the different causes of pulseless arrest (5 H's & T's)
4. Recognize and provide initial management for pulseless electrical activity (PEA)
5. Perform effective CPR

#### Restart scenario from beginning.

**Prompt for Team:** "A 35-year-old man has called EMS because he has had abdominal pain that has been getting worse."

#### History:

- **History of present illness:** The man has had abdominal pain for the past 2 days, but 2 hours ago the pain suddenly got worse. He has not been able to eat. He has been nauseated and has vomited several times.
- Pain qualifiers: onset 2 days ago, worsened the past 2 hours. Worsened with movement. Dull and aching quality. Does not radiate. Very severe and getting worse.
- He feels feverish, but no chills. He has nausea and vomiting. No diarrhea. He is diaphoretic. He feels dizzy.
- He last ate yesterday. Emesis is green. Last bowel movement was 2 days ago and described as "normal."
- Last urination 5 hours ago was normal. No history of any surgeries in the past.
- **Past medical history:** Denies
- **Past surgical history:** Denies
- **Patient's medications:** Denies
- **Allergies:** Denies
- **Social history:** He does not smoke, but drinks alcohol weekly

**Vitals (need to be obtained by EMS):** HR 140      BP 100/54      RR 24      Temp 39.2C  
O<sub>2</sub>Sat 98% on room air



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

### Physical Examination (if asked):

- **General appearance:** He appears uncomfortable. Dry mucous membranes. Abdomen distended, bowel sounds diminished. Lethargic. GCS 13 due to confusion and moves to localized pain at the left lower quadrant.

### Primary Survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. Lungs with shallow respirations, clear bilaterally. Tachypneic.
- **Circulation:** Hypotensive. Tachycardic. No murmur, weak central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool.

### Critical Actions Round 2:

- Rapid assessment of CAB
- Check vital signs, and recognize abnormal vitals
- Obtain peripheral IV, or IO if unable
- Take basic history from patient
- Recognize shock and etiology and verbalize
- Give rapid IV bolus of isotonic fluids
- Consider analgesia for pain control
- Reassess patient after bolus

**Scenario Progression #1:** After the first bolus, HR 155, BP 90/56, RR 20, O<sub>2</sub>sat 98% on RA. The patient was continuing to complain of abdominal pain; however, is now no longer responsive.

### Updated Physical Exam:

**Circulation:** Hypotensive. Tachycardic. Unable to palpate central pulses for >10 seconds. Capillary refill 5 seconds, extremities cool.

### Expected actions after scenario progression:

- Recognize continued tachycardia
- Recognize now unresponsive patient without central pulses and begin CPR
- Initiate bag valve mask ventilation during CPR (30 compressions: 2 breaths for 2-person CPR)
- Give epinephrine IV/IO every 3-5 minutes for patient in pulseless arrest



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

- Attach patient to AED or defibrillator

**Scenario Progression #2:** If defibrillator is attached, the rhythm is to show an organized rhythm consistent with pulseless electrical activity (PEA). If possible, the learners should interpret this rhythm.

If AED attached, it will recognize a non-shockable rhythm.

### END Round 3.

#### Round 3 Debriefing and Evaluation:

Review ongoing management including fluids. EMS providers should be able to advocate for an appropriate level of care for a critically ill patient. Septic shock requires early fluid replacement and antibiotic administration for best outcomes. This patient will even need surgery consultation for a perforated viscus.

Refer to expected actions and teaching points below:

Expected Action (including actions from Round 1)	Teaching Point										
Recognize continued tachycardia	Recheck vitals after every intervention.										
Recognize now unresponsive patient without pulses and begin CPR	Despite vital signs, recognize deteriorating patient and initiate CPR if no pulse for up to 10 seconds.										
Bag valve mask	Give during CPR (compressions: breaths, 30:2) for two-person CPR.										
Give epinephrine IV/IO (1:10,000)	Epinephrine is indicated in shockable and non-shockable rhythms q 3-5 minutes.										
Attach patient to AED or defibrillator	An AED will recognize a shockable versus non-shockable rhythm. Interpret the rhythm on a defibrillator.										
Recognize PEA	Organized rhythm on the monitor. Not a shockable rhythm. Review causes of pulseless arrest: 5 Hs & Ts.										
	<table border="0"> <tr> <td>Hypothermia</td> <td>Thrombosis (pulmonary)</td> </tr> <tr> <td>Hypoxia</td> <td>Thrombosis (coronary)</td> </tr> <tr> <td>Hypo/Hyperkalemia</td> <td>Tamponade</td> </tr> <tr> <td>Hypovolemia</td> <td>Tension Pneumothorax</td> </tr> <tr> <td>H+ (acidosis)</td> <td>Toxins</td> </tr> </table>	Hypothermia	Thrombosis (pulmonary)	Hypoxia	Thrombosis (coronary)	Hypo/Hyperkalemia	Tamponade	Hypovolemia	Tension Pneumothorax	H+ (acidosis)	Toxins
Hypothermia	Thrombosis (pulmonary)										
Hypoxia	Thrombosis (coronary)										
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Hypovolemia	Tension Pneumothorax										
H+ (acidosis)	Toxins										



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)*

Intervene as necessary for PEA	Give 100% O2 by BVM for Hypoxia. Give another NS bolus by IV/IO for Hypovolemia. Consider giving 1 ampule bicarbonate for acidosis.
Recognize need to transport to outside facility as soon as possible	Initiate life-saving interventions at the scene. Once these are starting, begin transport to hospital while providing ongoing care en route.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

*Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)*

## **ROUND 4: Full scenario**

If time allows, restart from the beginning of the scenario and run the full scenario without interruption. If initial actions are performed well, can restart where needed.

Final debriefing and feedback

- Praise learners for tasks accomplished well.
- Provide areas for continued improvement.

**END OF RCDP Session.**



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

### Wrap Up:

#### Abdominal Emergencies

#### General Considerations:

Exam: cardiovascular, respiratory, neurologic, and abdominal.

#### General Information/Tips:

- Abdominal pain in a woman of child-bearing age is an ectopic pregnancy until proven otherwise.
- Diabetic ketoacidosis can present with abdominal pain, nausea, and vomiting. Abdominal pain warrants checking a blood glucose.
- Abdominal pain in people with risk factors or in whom pain is vague could be cardiac in origin. Check the cardiac monitor and obtain a 12-lead ECG.
- Abdominal aneurysm should be considered in older people with abrupt onset of abdominal pain and hypertension or hypotension.
- Appendicitis classically presents with peri-umbilical pain that migrates to the right lower quadrant (RLQ).
- Myocardial infarction may present as abdominal pain in the elderly or diabetic.

History	Signs and Symptoms
<ul style="list-style-type: none"> <li>• onset, provocation, quality, region, radiation, severity, time</li> <li>• fever, chills, nausea, vomiting, diarrhea, diaphoresis, dizziness, shortness of breath</li> <li>• last meal, describe emesis, last bowel movement, describe bowel movement</li> <li>• urine: difficulty, pain, burning, frequency, color, odor, blood</li> <li>• gynecologic: last menstrual period, vaginal bleeding, history of gynecologic problems, vaginal discharge, sexual activity, trauma</li> <li>• medical history: surgery, medications, remedies tried</li> </ul>	<ul style="list-style-type: none"> <li>• pain (location, migration)</li> <li>• vomiting</li> <li>• diarrhea</li> <li>• dysuria</li> <li>• constipation</li> <li>• vaginal bleeding/discharge</li> </ul>



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

Case 1: Abdominal Pain Rapid Cycle Deliberate Practice (RCDP)

## Differential Diagnosis

<p><b><u>Right upper quadrant (RUQ)</u></b> Gallstones Cholangitis Hepatitis Liver abscess Lung problem</p>	<p><b><u>Epigastric</u></b> Esophagitis Peptic ulcer Perforated ulcer Pancreatitis Cardiac problem</p>	<p><b><u>Left upper quadrant (LUQ)</u></b> Spleen abscess Acute splenomegaly Spleen rupture Cardiac problem</p>
<p><b><u>Right Lumbar</u></b> Pyelonephritis Ureteral colic</p>	<p><b><u>Peri-Umbilical</u></b> Early appendicitis Mesenteric adenitis Meckel’s diverticulitis Lymphoma Abdominal aneurysm</p>	<p><b><u>Left Lumbar</u></b> Pyelonephritis Ureteral colic</p>
<p><b><u>Right lower quadrant (RLQ)</u></b> Appendicitis Crohn’s disease Ovarian cyst Ectopic pregnancy Hernia</p>	<p><b><u>Hypogastric</u></b> Testicular torsion Urinary retention Cystitis Placental abruption</p>	<p><b><u>Left lower quadrant (LLQ)</u></b> Diverticulitis Ulcerative colitis Constipation Ovarian cyst Hernia</p>



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

### Appendix E:

## Blunt Trauma Rapid Cycle Deliberate Practice (RCDP) Case

**Learner Audience:**

Prehospital providers

**Time Required for Implementation:**

~ 50 minutes for multiple rounds of RCDP

**Recommended Number of Learners per Instructor:**

- 1 simulation instructor/debriefing facilitator per group of three to six learners
- 1 confederate/assistant per group of three to six learners

**Objectives:**

By the end of the session, learners should be able to:

**Cognitive:**

1. Perform a primary survey (Airway, Breathing, Circulation, Disability, Exposure)
2. Recognize signs of hemorrhagic shock
3. Initiate management of blunt abdominal trauma
4. Initiate management of extremity trauma
5. Perform early fluid resuscitation of a patient in hypovolemic shock
6. Consider pain management in a traumatically injured patient
7. Immobilize the traumatically injured patient

**Technical:**

1. Perform a rapid primary assessment
2. Perform basic airway management
3. Administer supplemental oxygen
4. Perform IV/IO line placement
5. Apply a splint

**Behavioral:**

1. Communicate clear leadership roles with delegation of roles
2. Use closed-loop communication
  - All messages or orders addressed to specific individuals
  - Team members confirm each request and inform the team leader when a task begins or ends

3. Respect each other with language and behavior
  - Use proper names with eye contact or touch
  - Share ideas and information as suggestions or constructive interventions, not as criticism
4. Provide a shared mental model (summary of scenario and next steps given to maintain situational awareness)

**Learner responsible content:**

The learner should be trained in and familiar with local prehospital protocol.

**Abbreviations**

AED = automatic external defibrillator

BP = blood pressure

Bpm = beats per minute

BVM = bag valve mask

CPR = cardiopulmonary resuscitation

EKG = electrocardiogram

EMS = emergency medical services

GCS = Glasgow Coma Scale

HR = heart rate

IO = intraosseous

IV = intravenous

LR = Ringer's lactate

NS = normal saline

O<sub>2</sub> = oxygen

PEA = pulseless electrical activity

Pt = patient

RCDP = rapid cycle deliberate practice

RR = respiratory rate

O<sub>2</sub>Sat = oxygen saturation

T = temperature

**References/suggestions for further reading:**

1. Advanced Trauma Life Support: Student Course Manual. Chicago, IL: American College of Surgeons; 2012.





# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)*

2. Campbell JE, Alson RL. International Trauma Life Support. 8<sup>th</sup> Edition. Upper Saddle River, NJ: Prentice Hall; 2015.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

**Case Title:** Blunt Trauma RCDP Case

**Case Description & Diagnosis (short synopsis):** The prehospital provider is called to the scene of an injured person due to a motor vehicle accident. A bystander has called emergency services to the scene of a motor vehicle accident where a 24-year-old cyclist was hit by an oncoming car. The patient is awake and alert but is screaming in pain. He complains of abdominal, back, and right lower extremity pain. Emergency medical services find him to have signs of injury at the abdomen (e.g. bruising, tenderness) and he has an open fracture. The patient is found to be in stage 2 hypovolemic shock due to abdominal injury or blood loss from vessel injury at open fracture. He requires IVF resuscitation. He also requires splinting of the RLE for pain and stabilization or he will decompensate to PEA arrest due to hypovolemia. He should be transported to a hospital with surgical capabilities because he has a suspected intra-abdominal injury. Teams will need to focus on assessment of Primary Survey, recognition of hypovolemic shock and administering fluids, and immobilizing a traumatically injured patient.

The case will consist of two rounds of learning with increasing difficulty in each added scenario. The overall goal is for the learner to master the initial steps of assessment and management of an acutely ill patient in the prehospital setting.

### Equipment or Props Needed:

Setup for All Rounds:

- Room configuration: living room of a small home
  
- Equipment needed:
  - Standard equipment available in EMS truck and medical bag, but particularly:
    - Gurney
    - IV starter kits
    - Normal saline
    - IO needles (+/- drill)
    - Medical tape
    - BVM
    - CPR backboard
  - Adult simulation mannequin, IV arm task trainer, lower extremity IO task trainer
  
- Demonstration items needed for debriefing: none



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

### Confederates needed:

- Medical control (via telephone or radio), another EMS provider

### How the Scenario Unfolds:

#### Ideal Scenario Flow:

The prehospital provider is called to the scene of an injured person due to a motor vehicle accident. The patient was a cyclist hit by an oncoming car. Obvious injury is that of an open fracture to the lower extremity. However, less obvious is the likely abdominal trauma, unless the learner intentionally investigates. His presentation could also be concerning for injury to the back.

The patient is found to be in stage 2 hypovolemic shock most likely due to the abdominal injury, but the learner must also consider that his lower extremity injury could be causing bleeding due to vessel injury.

He requires IVF resuscitation. He also requires splinting of the RLE for pain and stabilization, or he will decompensate to PEA arrest due to hypovolemia. He should be transported to a hospital with surgical capabilities because he has a suspected intra-abdominal injury. Teams will need to focus on assessment of Primary Survey, recognition of hypovolemic shock and administering fluids, and immobilizing a traumatically injured patient.

The provider should recognize when the patient decompensates and respond with cardiorespiratory support with focus on transporting the patient to the appropriate setting and giving handoff to the providers there.

### Critical Actions:

#### Round 1:

- Rapid assessment of Airway, Breathing, and Circulation
- Check vital signs and recognize abnormal vital signs
- Obtain IV/IO access
- Recognize hypovolemic shock and verbalize
- Give rapid bolus of isotonic IV fluid
- Complete primary survey (disability, exposure)
- Reassess patient after each bolus
- Place a splint to support the open fracture



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

### Round 2:

- Recognize continued tachycardia and continue to give fluid boluses
- Consider immobilizing/transporting patient on a backboard
- Apply a c-collar for cervical stabilization
- Consider pain management
- Call the receiving facility (one with surgical services) to notify about an incoming trauma patient and to give handoff

**Expected Endpoint of the Scenario:** 15-minute time limit per round

**Distractors Within Scenario:** high acuity, administrators want to send the patient to a clinic

### Optional Challenges for Higher Level Learners:

- Consider major head injury
- Consider reduction of a grossly deformed lower extremity in context of extreme pain and hemodynamically instability if no pulses at affected limb

**Roles of Participants/Trainees:** Usual roles at a scene response

**Roles of Confederates (if applicable):** Medical control – wants to send the patient to lower-acuity facility; another EMS provider/assistant is relatively inexperienced and can only help when told specifically how to do so

### Anticipated Management Errors:

1. Failure to recognize the unresponsive patient: Because this is a low-fidelity simulation and a simulated cardiac monitor is not used, learners may not realize that the patient is not interacting, and they often do not realize the deterioration in the vital signs. It is useful for the confederate to clearly indicate that there is an acute change in vital signs and that the patient has deterioration of vital signs even if the provider does not check.
2. Cervical spine immobilization: The prioritization of cervical spine immobilization is slightly different depending on how learners were trained. Advanced Trauma Life Support (ATLS) recommends c-spine immobilization with evaluation of disability (i.e. the fourth major step in trauma evaluation) whereas International Trauma Life Support



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)*

(ITLS) recommends immobilization of the c-spine as a concomitant step with airway during initial trauma evaluation and intervention.

3. Fracture reduction when splinting in prehospital setting: Many providers had some confusion regarding whether to splint in place versus reducing a fracture before splinting. It is generally acceptable to splint in place; however, it may be necessary to reduce a fracture if there is a cool distal extremity or pulseless distal extremity.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

**Case Title:** Blunt Trauma RCDP Case

**Chief Complaint:** Shortness of breath

**Vitals:** Heart Rate (HR) 120                      Blood Pressure (BP) 110/70  
Respiratory Rate (RR) 30                      Temperature (T) 37.0°C  
Oxygen Saturation (O<sub>2</sub>Sat) 97% on room air

### Initial Physical Exam for All Rounds:

**General Appearance:** Appears uncomfortable and anxious, clothing is damaged. Awake, interactive. Dry mucous membranes. Abdomen soft, diffusely tender, bruises visible.

### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. No increased work of breathing, clear breath sounds bilaterally. Tachypneic.
- **Circulation:** Tachycardia. No murmur, strong central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool.
- **Disability:** Pupils 5mm, equal, reactive. Moves all extremities spontaneously and with normal strength. Decreased motion at affected leg due to pain. Able to wiggle toes at injured leg.
- **Exposure:** Open fracture to the right tibia, oozing blood.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

### Round 1: Initial Assessment of Patient

#### Objectives introduced this round:

1. Perform a rapid primary assessment
2. Perform IV/IO line placement
3. Apply a splint
4. Be able to recognize hemorrhagic shock
5. Perform early fluid resuscitation of a patient in hypovolemic shock
6. Perform basic airway management

**Prompt for Team:** “Bystanders have called emergency services to the scene of a motor vehicle accident. A 24-year-old cyclist ran a traffic light and was hit by an oncoming car. He was not wearing a helmet.”

#### History:

- **History of present illness:** The patient complains of abdominal pain, right leg pain, right hip pain, and lower back pain.
- He remembers all events associated with the injury.
- **Past medical history:** Denies
- **Past surgical history:** Denies
- **Patient’s medications:** Denies
- **Allergies:** He does not have any drug allergies
- **Social history:** He occasionally smokes marijuana but denies other recreational drugs or alcohol

**Vitals (need to be obtained by EMS):** HR 120      BP 110/70      RR 30      Temp 37.0C  
O<sub>2</sub>Sat 97% on room air

#### Physical Examination (if asked):

- **General appearance:** Appears uncomfortable and anxious, clothing damaged. Awake, interactive. Dry mucous membranes. Abdomen soft, diffusely tender, bruises visible.

#### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. No increased work of breathing, clear breath sounds bilaterally. Tachypneic.



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

- **Circulation:** Tachycardia. No murmur, strong central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool.
- **Disability:** Pupils 5mm, equal, reactive. Moves all extremities spontaneously and with normal strength. Decreased motion at affected leg due to pain. Able to wiggle toes at injured leg.
- **Exposure:** Open fracture to the right tibia, oozing blood.

#### Critical Actions Round 1:

- Rapid assessment of CAB
- Check vital signs and recognize abnormal vitals
- Obtain IV/IO access
- Administer supplemental oxygen
- Take basic history from the patient

*No scenario progression, yet.*

#### End Round 1.

#### Round 1 Debriefing and Evaluation:

Review initial exam, reinforce importance of rapid initial assessment, checking vital signs, administering supplemental O<sub>2</sub>, and obtaining IV/IO access in a sick patient.

Refer to expected actions and teaching points below:

Expected Action	Teaching Point
Rapid assessment of Airway, Breathing, and Circulation	Systematically approach the primary survey and address any unstable findings.
Check vital signs	Document initial vitals.
Obtain IV/IO access	Try PIV first, particularly if pt. awake. IO if critically ill, particularly if altered mental status/ coma.
Recognize abnormal vitals	HR for age: greater than 100 bpm is abnormal. BP: less than 90/60 is considered hypotensive. RR greater than 20 is tachypneic.
Recognize shock (& etiology)	In a patient who has had abdominal trauma, he is most likely having hemorrhagic (hypovolemic) shock.





# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

	He is in stage 2 shock based on tachycardia, tachypnea, anxiousness, cool extremities.
Give IV fluids	Rapid bolus, 500-1000 mL push as fast as possible for a previously healthy adult patient. Only isotonic fluids (NS or LR) should be given as a bolus.
Complete primary survey (Disability, Exposure)	As time allows, a provider should always attempt to complete the primary survey to identify the immediate life threats to a patient who has experienced a traumatic injury.
Reassess after bolus	Always recheck vitals, perfusion, and respiratory status, and mental status after giving a bolus.
Place a splint to support the open fracture	Important because it is potentially a source of hemorrhage. Also, immobilization should improve some of the patient's pain.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

### Round 2: Immobilize and Transport

#### Objectives introduced this round:

1. Immobilize the traumatically injured patient
2. Consider pain management in a trauma patient
3. Communicate concisely with receiving facility to hand off patient's care

#### Restart scenario from beginning.

**Prompt for Team:** "Bystanders have called emergency services to the scene of a motor vehicle accident. A 24-year-old cyclist ran a traffic light and was hit by an oncoming car. He was not wearing a helmet."

#### History:

- **History of present illness:** The patient complains of abdominal pain, right leg pain, right hip pain, and lower back pain.
- He remembers all events associated with the injury.
- **Past medical history:** Denies
- **Past surgical history:** Denies
- **Patient's medications:** Denies
- **Allergies:** He does not have any drug allergies
- **Social history:** He occasionally smokes marijuana but denies other recreational drugs or alcohol

**Vitals (need to be obtained by EMS):** HR 120      BP 110/70      RR 30      Temp 37.0C  
O<sub>2</sub>Sat 97% on room air

#### Physical Examination (if asked):

- **General appearance:** Appears uncomfortable and anxious, clothing damaged. Awake, interactive. Dry mucous membranes. Abdomen soft, diffusely tender, bruises visible.

#### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. No increased work of breathing, clear breath sounds bilaterally. Tachypneic.
- **Circulation:** Tachycardia. No murmur, strong central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool.



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

- **Disability:** Pupils 5mm, equal, reactive. Moves all extremities spontaneously and with normal strength. Decreased motion at affected leg due to pain. Able to wiggle toes at injured leg.
- **Exposure:** Open fracture to the right tibia, oozing blood.

#### Critical Actions Round 2:

Repeat from Round 1:

- Rapid assessment of Airway, Breathing, and Circulation
- Check vital signs and recognize abnormal vital signs
- Obtain IV/IO access
- Recognize hypovolemic shock and verbalize
- Give rapid bolus of isotonic IV fluid
- Complete primary survey (disability, exposure)
- Reassess patient after each bolus
- Place a splint to support the open fracture

**Scenario progression:** *After first bolus, HR 105, BP 115/88, RR 20, sat 99% on RA.*

*The patient says he feels a little better. If immobilized, his leg still hurts but it feels better than before.*

Expected actions after scenario progression:

- Recognize continued tachycardia and continue to give fluid boluses
- Consider immobilizing patient on a backboard
- Apply a cervical collar for cervical stabilization
- Consider pain management
- Call the receiving facility (one with surgical services) to notify about an incoming trauma patient and to give handoff

**END Round 2.**

**Round 2 Debriefing.**



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

Review the expected actions and teaching points below:

Expected Action	Teaching Point
Recognize continued tachycardia	Recheck vitals after every intervention.
Consider immobilizing the patient on a backboard	This is the preferred method for this blunt trauma patient.
Apply a c-collar	A c-collar is an appropriate intervention because this patient had a significant trauma, is hypotensive, and has a distracting injury (the leg fracture).
Consider pain management	Splinting should help reduce pain but can cause pain in the process. Review if the patient has deteriorating vital signs or mental status before giving analgesics. Morphine 4-6mg IV.
Give handoff at the receiving facility	Be able to describe a critically ill patient and give a concise handoff while conveying need urgent/emergent intervention.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)*

### **ROUND 3: Full scenario**

If time allows, restart from the beginning of the scenario and run the full scenario without interruption. If initial actions are performed well, can restart where needed.

Final debriefing and feedback

- Praise learners for tasks accomplished well.
- Provide areas for continued improvement.

**END OF RCDP Session.**



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 2: Blunt Trauma Rapid Cycle Deliberate Practice (RCDP)

### Wrap Up:

#### Blunt Traumatic Injury

#### General Considerations:

Exam: respiratory, cardiovascular, neurologic, pain

#### General Information/Tips:

- make sure the scene is safe
- note the mechanism of injury and as many details as feasible
  - intoxicants used, pregnancy status, medications, protective equipment
- cover open wounds, burns, and eviscerations
- all major trauma patients should receive IV/IO access and cardiac monitoring
- documentation should support why an intervention was or was not performed
- blunt abdominal injuries are harder to diagnose and have a higher death rate than that of penetrating trauma

#### Signs and Symptoms of blunt abdominal trauma

- altered mental status
- shock
- abdominal distention
- nausea, vomiting
- bleeding
- tenderness, pain
- discoloration



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

### Appendix F:

## Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP) Case

**Learner Audience:**

Prehospital providers

**Time Required for Implementation:**

~ 50 minutes for multiple rounds of RCDP

**Recommended Number of Learners per Instructor:**

- 1 simulation instructor/debriefing facilitator per group of three to six learners
- 1 confederate/assistant per group of three to six learners

**Objectives:**

By the end of the session, learners should be able to:

**Cognitive:**

1. Recognize hypovolemic shock
2. Be able to recall risks of bleeding with various stages of pregnancy
3. Recognize a woman in active labor
4. Perform early fluid resuscitation of a patient in hypovolemic shock
5. Advocate for higher level of care when necessary

**Technical:**

1. Perform a rapid primary assessment
2. Perform IV/IO line placement
3. Perform vaginal delivery of a baby
4. Use personal protective equipment
5. Collect and transport products of conception

**Behavioral:**

1. Communicate clear leadership roles with delegation of roles
2. Use closed-loop communication
  - All messages or orders addressed to specific individuals
  - Team members confirm each request and inform the team leader when a task begins or ends
3. Respect each other with language and behavior
  - Use proper names with eye contact or

touch

- Share ideas and information as suggestions or constructive interventions, not as criticism
4. Provide a shared mental model (summary of scenario and next steps given to maintain situational awareness)

**Learner responsible content:**

The learner should be trained in and familiar with local prehospital protocol.

**Abbreviations**

AED = automatic external defibrillator

BP = blood pressure

Bpm = beats per minute

BVM = bag valve mask

CPR = cardiopulmonary resuscitation

EKG = electrocardiogram

EMS = emergency medical services

GCS = Glasgow Coma Scale

HR = heart rate

IO = intraosseous

IV = intravenous

LR = Ringer's lactate

NS = normal saline

O<sub>2</sub> = oxygen

PEA = pulseless electrical activity

Pt = patient

RCDP = rapid cycle deliberate practice

RR = respiratory rate

O<sub>2</sub>Sat = oxygen saturation

T = temperature

**References/suggestions for further reading:**

1. Bhatia K and Cranmer H. Trauma in Pregnancy. In: Walls RM, Hockberger RS, Gausche-Hill M, et al, eds. *Rosen's Emergency Medicine: Concepts and Clinical Practice*. 8th ed. Elsevier/Saunders; 2013:296-304.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

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# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)*

**Case Title:** Ob/Gyn and Hypovolemic Shock RCDP Case

**Case Description & Diagnosis (short synopsis):** The prehospital provider is called to a home where a patient is complaining of vaginal bleeding.

A 24-year-old woman has called Emergency Services for help. She has been having bleeding from her vagina and she has developed intense pain in her abdomen. She presents with hypovolemic shock secondary to post-partum hemorrhage. Patient taken from place in home onto gurney and into back of EMS truck. There are unstable vital signs. She requires fluid resuscitation and respiratory support.

Teams will need to focus on assessment of airway, breathing and circulation (ABCs), recognition of hypovolemic shock and altered mental status, and will need to administer IV fluids. If appropriate and time sensitive therapy occurs, she will have improvement of her mental status and vital signs. If inappropriate or delayed interventions, the patient will decompensate to PEA arrest due to hypovolemia.

The case will consist of three rounds of learning with increasing difficulty in each added scenario. The overall goal is for the learner to master the initial steps of assessment and management of an acutely ill patient in the prehospital setting.

### **Equipment or Props Needed:**

Setup for All Rounds:

- Room configuration: living room of a small home
- Equipment needed:
  - Standard equipment available in EMS truck and medical bag, but particularly:
    - Gurney
    - IV starter kits
    - Normal saline
    - IO needles (+/- drill)
    - Medical tape
    - BVM
    - CPR backboard



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### *Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)*

- Gravid-appearing adult simulation mannequin with moulage, defibrillator/adaptor, IV arm task trainer, lower extremity IO task trainer
  - Suction bulb, clean/dry towels and sheets, umbilical cord clamp
  - Baby doll or low fidelity neonate/infant mannequin
- 
- Demonstration items needed for debriefing: none

#### **Confederates needed:**

- Medical control (via telephone or radio), another EMS provider

#### **How the Scenario Unfolds:**

##### **Ideal Scenario Flow:**

The prehospital provider is called to a home where a patient is complaining of vaginal bleeding.

The provider should arrive at the patient's home where he/she performs a rapid assessment of the patient including obtaining vital signs and obtaining vascular access. The provider should take a pertinent and brief history of the patient's complaint.

The provider should identify a patient who did not realize that she was pregnant and is having a precipitous birth presenting with vaginal bleeding and intense abdominal pain. The provider should deliver the baby. The provider should also realize that the patient is likely in hypovolemic shock due to her post-partum hemorrhage. She has unstable vital signs and requires fluid resuscitation and respiratory support.

The provider should identify a patient in hemorrhagic shock and who is hemodynamically unstable and should intervene with fluid resuscitation and respiratory support. Teams will need to focus on assessment of ABCs, recognition of hypovolemic shock and altered mental status, need to establish access and administer IV fluids. If appropriate and time sensitive therapy occurs, she will have improvement of her mental status and vital signs. If inappropriate or delayed interventions, the patient will decompensate to PEA arrest due to hypovolemia.



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### *Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)*

The provider should recognize any patient decompensation and respond with cardiorespiratory support with focus on safe transfer to a facility that can accommodate both the mother and the baby, giving handoff to providers there.

#### **Critical Actions:**

##### Round 1:

- Rapid assessment of CAB
- Check vital signs and recognize abnormal vitals
- Obtain IV/IO access
- Recognize shock and etiology and verbalize
- Take basic history from the patient
- Give rapid bolus of isotonic IV fluids
- Reassess vital signs after IV bolus.
- Perform rapid, relevant physical exam to include inspection of perineal area

##### Round 2:

- Prepare for imminent delivery by putting on personal protective equipment and prepare mother for delivery
- Guide the mother in pushing with contractions to avoid fatigue
- Encourage deep, slow breathing
- Support the baby's head
- Deliver the baby's body
- Clamp the umbilical cord prior to cutting

##### Round 3:

- Recognize continued tachycardia, then give additional fluid bolus
- Monitor the 3<sup>rd</sup> stage of delivery (placental delivery)
- Place pad or large dressing at vagina for continued bleeding
- Call the medical control
- Give handoff to the receiving facility

**Expected Endpoint of the Scenario:** 15-minute time limit per round



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

*Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)*

**Distractors Within Scenario:** High acuity patient, patient does not realize she is pregnant, administrators want to send the patient to a poorly equipped small hospital, CPR if patient decompensates

**Optional Challenges for Higher Level Learners:**

- Evaluation for increased work of breathing
- Considering various causes for increased work of breathing

**Roles of Participants/Trainees:** Usual roles at a scene response

**Roles of Confederates (if applicable):** Medical control – wants to send the patient to lower-acuity facility; another EMS provider/assistant is relatively inexperienced and can only help when told specifically how to do so

**Anticipated Management Errors:**

1. Failure to recognize the unresponsive patient: Because this is a low-fidelity simulation and a simulated cardiac monitor is not used, learners may not realize that the patient is not interacting, and they often do not realize the deterioration in the vital signs. It is useful for the confederate to clearly indicate that there is an acute change in vital signs and that the patient has deterioration of vital signs even if the provider does not check. Particularly after the delivery of the baby, providers can be so distracted by the baby that they neglect the deterioration of the mother.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)*

**Case Title:** Ob/Gyn and Hypovolemic Shock RCDP Case

**Chief Complaint:** Vaginal bleeding

**Vitals:** Heart Rate (HR) 133                      Blood Pressure (BP) 102/73  
Respiratory Rate (RR) 26                      Temperature (T) 37.2°C  
Oxygen Saturation (O<sub>2</sub>Sat) 98% on room air

### **Initial Physical Exam for All Rounds:**

**General Appearance:** Obese woman. Diaphoretic. Unable to hear bowel sounds. General abdominal tenderness. GCS 14 due to confusion. There is crowning at the vagina and the patient seems to be pushing.

### **Primary survey:**

- **Airway/Breathing:** Airway open. Speaks in clear sentences. Lungs with shallow respirations, clear bilaterally. Tachypneic.
- **Circulation:** Low blood pressure. Tachycardic. No murmur, weak central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool. Vaginal bleeding. Dry mucous membranes.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

### Round 1: Initial Assessment of Patient

#### Objectives introduced this round:

1. Perform a rapid primary assessment
2. Perform IV/IO line placement
3. Recognize hypovolemic shock
4. Perform early fluid resuscitation of a patient in hypovolemic shock

**Prompt for Team:** “A 24-year-old woman has called emergency services for help. She had previously been feeling well, but she has been having bleeding from her vagina for the past day and now she is generally not feeling well.”

#### History:

- **History of present illness:** The woman has not had a normal menstrual period in about 8 months, but she notes that she never had a “normal” period. The past day she has had scant vaginal bleeding. The past 5 hours, she has had increasingly worsened abdominal pain and back pain. She has used about 6 maxi pads today. She feels weak and dizzy.
- She has never been prescribed any medications. She has had chlamydia in the past, but has been treated for it at a clinic. That was over 2 years ago. The woman has had a spontaneous abortion 1 year ago and does not have any children of her own. Doctors have told her that she has a gland problem called PCOS (polycystic ovary syndrome). Her mother had difficulty conceiving her as well, but she does not know the details. She has not had prenatal care because she did not think she was pregnant because the doctors told her it would be difficult for her to become pregnant.
- Severe generalized abdominal discomfort and back discomfort. The pain is coming in intervals every 2 minutes. She has no edema, no seizures, no headache, no visual change.
- **Past medical history:** Polycystic ovary syndrome
- **Past surgical history:** Denies
- **Patient’s medications:** Denies
- **Allergies:** Denies
- **Social history:** She lives at home with her husband.



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### *Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)*

**Vitals (need to be obtained by EMS):** HR 133      BP 102/73      RR 26      Temp 37.2C  
O<sub>2</sub>Sat 98% on room air

#### **Physical Examination (if asked):**

- **General appearance:** Obese woman. Diaphoretic. Unable to hear bowel sounds. General abdominal tenderness. GCS 14 due to confusion. There is crowning at the vagina and the patient seems to be pushing.

#### **Primary survey:**

- **Airway/Breathing:** Airway open. Speaks in clear sentences. Lungs with shallow respirations, clear bilaterally. Tachypneic.
- **Circulation:** Low blood pressure. Tachycardic. No murmur, weak central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool. Vaginal bleeding. Dry mucous membranes.

#### **Critical Actions Round 1:**

- Rapid assessment of CAB
- Check vital signs and recognize abnormal vitals
- Obtain IV/IO access
- Recognize shock and etiology and verbalize
- Take basic history from the patient
- Give rapid bolus of isotonic IV fluids
  - Reassess vital signs after IV bolus
- Perform rapid, relevant physical exam to include inspection of perineal area

**Scenario progression:** *After first bolus, HR 110, BP 105/85, RR 20, sat 98% on RA. Her mental status has improved*

#### **End Round 1.**

#### **Round 1 Debriefing and Evaluation:**

Review the initial exam, reinforce the importance of rapid initial assessment, checking vital signs and obtaining IV/IO access in a sick patient.



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

Refer to expected actions and teaching points below:

Expected Action	Teaching Point
Rapid assessment of CAB	When presented with ill patient, assess circulation, airway and breathing and immediately intervene if emergent situation found.
Check vital signs	Document initial vitals.
Obtain IV/IO access	Try PIV first, particularly if patient is awake. IO if critically ill, particularly if altered mental status/ coma.
Recognize abnormal vitals	HR for age: greater than 100bpm is abnormal. BP: less than 90/60 is considered hypotensive. RR greater than 20 is tachypneic.
Recognize shock (& etiology)	In a tachycardic & tachypneic patient with vaginal bleeding, most likely hypovolemic shock from blood loss.
Take basic history from the patient	History is important to management. Focus should be on the past medical history, medications, OB/GYN history. This will guide management. Try to obtain information while performing other tasks.
Give IV fluids	Rapid bolus, 500-1000 mL push as fast as possible for a previously healthy adult patient. Only isotonic fluids (NS or LR) should be given as a bolus. Always reassess vitals, perfusion, respiratory status, and mental status after each bolus.
Inspect perineal area	Request permission before starting exam. Place patient in dorsal lithotomy position. Inspect the perineal area to determine if there is crowning present, or if there are other concerning signs that would require emergent transport for C-section including placenta previa or signs of a breech delivery. <sup>1</sup>





# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### *Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)*

#### **Round 2: Preparation for Spontaneous Vaginal Delivery**

##### **Objectives introduced this round:**

1. Recognize a woman in active labor
2. Perform vaginal delivery of a baby
3. Use personal protective equipment

##### **Restart scenario from beginning.**

**Prompt for Team:** “A 24-year-old woman has called emergency services for help. She had previously been feeling well, but she has been having bleeding from her vagina for the past day and now she is generally not feeling well.”

##### **History:**

- **History of present illness:** The woman has not had a normal menstrual period in about 8 months, but she notes that she never had a “normal” period. The past day she has had scant vaginal bleeding. The past 5 hours, she has had increasingly worsened abdominal pain and back pain. She has used about 6 maxi pads today. She feels weak and dizzy.
- She has never been prescribed any medications. She has had chlamydia in the past, but has been treated for it at a clinic. That was over 2 years ago. The woman has had a spontaneous abortion 1 year ago and does not have any children of her own. Doctors have told her that she has a gland problem called PCOS (polycystic ovary syndrome). Her mother had difficulty conceiving her as well, but she does not know the details. She has not had prenatal care because she wasn’t sure that she is pregnant because the doctors told her it would be difficult for her to become pregnant.
- Severe generalized abdominal discomfort and back discomfort. The pain is coming in intervals every 2 minutes. She has no edema, no seizures, no headache, no visual change.
- **Past medical history:** Polycystic ovary syndrome
- **Past surgical history:** Denies
- **Patient’s medications:** Denies
- **Allergies:** Denies
- **Social history:** She lives at home with her husband.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

**Vitals (need to be obtained by EMS):** HR 133      BP 102/73      RR 26      Temp 37.2C  
O<sub>2</sub>Sat 98% on room air

### Physical Examination (if asked):

- **General appearance:** Obese woman. Diaphoretic. Unable to hear bowel sounds. General abdominal tenderness. GCS 14 due to confusion. There is crowning at the vagina and the patient seems to be pushing.

### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. Lungs with shallow respirations, clear bilaterally. Tachypneic.
- **Circulation:** Low blood pressure. Tachycardic. No murmur, weak central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool. Vaginal bleeding. Dry mucous membranes.

### Critical Actions Round 2:

Repeat from Round 1:

- Prepare for imminent delivery by putting on personal protective equipment and prepare mother for delivery
- Guide the mother in pushing with contractions to avoid fatigue
- Encourage deep, slow breathing
- Support the baby's head.
- Deliver the baby's body
- Clamp the umbilical cord prior to cutting

**Scenario progression:** *Contractions are timed as occurring every 2 minutes. Pelvic exam is showing progression of crowning with each contraction.*

*The team will need to deliver the baby.*

**END Round 2.**



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

#### Round 2 Debriefing and Evaluation:

Review normal, uncomplicated vaginal delivery.

Review expected actions and teaching points below:

Expected Action	Teaching Point
Put on personal protective equipment and prepare mother for delivery	Put on gloves and whatever other personal protective equipment is available. Mentally prepare mother through the delivery plan and processes. A healthcare provider is at high risk for transmitting Human Immunodeficiency Virus (HIV) with exposure of blood to open wounds.
Determine timing of contractions	Contractions are timed from the beginning of one to the beginning of the next. If contractions are 2 minutes apart or less, delivery is imminent.
Guide the mother in pushing	Avoid fatigue by only having the mother push when she has an irresistible pressure to push. Three to four pushes lasting 6-8 seconds each is appropriate, focused as soon as the contraction eases rather than at the peak of contraction.
Encourage deep, slow breathing	Due to this patient being hemodynamically unstable, IV pain medication is not encouraged; however, encourage deep, slow breathing which can help with relaxation.
Support the baby's head	Never pull on the head. If a cord is wrapped around the baby's neck, gently lift it over the baby's head. The head should rotate to the side on its own.
Deliver the body	A shoulder will emerge first. Then, gently lift the body and the other shoulder should come through.
Clamp the cord prior to cutting the cord	Optimal timing of cord clamping is debated. Generally, 30-60 seconds after birth is accepted.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

### Round 3: Delivery of baby and placental delivery

#### Objectives introduced this round:

1. Perform vaginal delivery of a baby
2. Use personal protective equipment
3. Advocate for higher level of care when necessary

#### Restart scenario from beginning.

**Prompt for Team:** “A 24-year-old woman has called emergency services for help. She had previously been feeling well, but she has been having bleeding from her vagina for the past day and now she is generally not feeling well.”

#### History:

- **History of present illness:** The woman has not had a normal menstrual period in about 8 months, but she notes that she never had a “normal” period. The past day she has had scant vaginal bleeding. The past 5 hours, she has had increasingly worsened abdominal pain and back pain. She has used about 6 maxi pads today. She feels weak and dizzy.
- She has never been prescribed any medications. She has had chlamydia in the past, but has been treated for it at a clinic. That was over 2 years ago. The woman has had a spontaneous abortion 1 year ago and does not have any children of her own. Doctors have told her that she has a gland problem called PCOS (polycystic ovary syndrome). Her mother had difficulty conceiving her as well, but she does not know the details. She has not had prenatal care because she wasn’t sure that she is pregnant because the doctors told her it would be difficult for her to become pregnant.
- Severe generalized abdominal discomfort and back discomfort. The pain is coming in intervals every 2 minutes. She has no edema, no seizures, no headache, no visual change.
- **Past medical history:** Polycystic ovary syndrome
- **Past surgical history:** Denies
- **Patient’s medications:** Denies
- **Allergies:** Denies
- **Social history:** She lives at home with her husband.



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

**Vitals (need to be obtained by EMS):** HR 133      BP 102/73      RR 26      Temp 37.2C  
O<sub>2</sub>Sat 98% on room air

### Physical Examination (if asked):

- **General appearance:** Obese woman. Diaphoretic. Unable to hear bowel sounds. General abdominal tenderness. GCS 14 due to confusion. There is crowning at the vagina and the patient seems to be pushing.

### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. Lungs with shallow respirations, clear bilaterally. Tachypneic.
- **Circulation:** Low blood pressure. Tachycardic. No murmur, weak central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool. Vaginal bleeding. Dry mucous membranes.

### Critical Actions Round 3:

Repeat from previous rounds:

- Rapid assessment of CAB
- Check vital signs and recognize abnormal vitals
- Obtain IV/IO access
- Recognize shock and etiology and verbalize
- Take basic history from the patient
- Give rapid bolus of isotonic IV fluids
- Perform rapid, relevant physical exam to include inspection of perineal area
- Determine timing of contractions

**Scenario progression:** *Contractions are timed as occurring every 2 minutes. Pelvic exam is showing progression of crowning with each contraction.*

*The team will need to deliver the baby.*

### Critical Actions with scenario progression:

- Prepare for imminent delivery by putting on personal protective equipment and prepare mother for delivery



# DIDACTICS AND HANDS-ON CURRICULUM

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### *Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)*

- Guide the mother in pushing with contractions to avoid fatigue
- Encourage deep, slow breathing
- Support the baby's head
- Deliver the baby's body
- Clamp the umbilical cord prior to cutting

**Scenario progression:** *The mother has delivered a viable baby after not knowing she was pregnant. She says she feels a little better, but she is very tired. She continues to have vaginal bleeding.*

*The first bolus has completed, and repeat vital signs are: HR 115, BP 100/80, RR 22, sat 98% on RA*

#### **Critical Actions with scenario progression:**

- Recognize continued tachycardia then give additional fluid bolus
- Monitor the 3<sup>rd</sup> stage of delivery (placental delivery)
- Place pad or large dressing at vagina for continued bleeding
- Call the medical control
- Give handoff to the receiving facility

#### **END Round 3.**

#### **Round 3 Debriefing and Evaluation:**

Review ongoing management, including fluids. Review delivery of placenta. EMS providers should be able to advocate for an appropriate level of care for a critically ill patient.



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

Review expected actions and teaching points below:

Expected Action (Including actions from Round 2)	Teaching Point
Recognize continued tachycardia	Recheck vitals after every intervention.
Monitor the 3 <sup>rd</sup> stage of delivery	Delivery of the placenta can last up to 1 hour. Stages: 1) lengthening of the umbilical cord, 2) uterus becomes more globular and firm, 3) uterus rises in the abdomen, 4) gush of blood. After delivery, collect and transport all products of conception.
Place pad or large dressing at vagina for continued bleeding	Do not pack the vagina for transport. Save and transport all tissue or fetal remains. The products help with pathologic diagnoses and help the clinicians estimate blood loss. Use personal protective equipment.
Call the medical control	Be able to describe a critically ill patient and convey need for higher level of care.
Give handoff to the receiving facility	Be able to describe a critically ill patient and give a concise handoff while conveying need for urgent/emergent intervention.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

*Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)*

## **ROUND 4: Full scenario**

If time allows, restart from the beginning of the scenario and run the full scenario without interruption. If initial actions are performed well, can restart where needed.

Final debriefing and feedback

- Praise learners for tasks accomplished well.
- Provide areas for continued improvement.
- Review debriefing points and additional teaching points below.

**END OF RCDP Session.**





# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

### Wrap Up:

#### Obstetrical and Gynecologic Emergencies

#### General Considerations:

Exam: cardiovascular, respiratory, neurologic, and abdominal

#### General Information/Tips:

- Consider placing the patient in left lateral decubitus position to help alleviate supine hypotensive syndrome for those further along in gestation
  - Same is true if transported with c-collar and backboard
- Ask patient to quantify bleeding – number of pads used per hour
- Do not apply packing to the vagina prior to transport
- Be alert for fluid overload when administering fluids
- Consider a second IV early if patient is having excessive vaginal bleeding or hypotension
- Be sure to transfer to an appropriate OB facility

History	Signs and Symptoms
<ul style="list-style-type: none"> <li>• Past medical history – medications that cause bleeding, bleeding diathesis, history of complicated pregnancies, oncologic history, etc.</li> <li>• Hypertension medications</li> <li>• Prenatal care</li> <li>• Prior pregnancies &amp; births</li> <li>• Weeks/months pregnant or estimated due date</li> </ul>	<ul style="list-style-type: none"> <li>• Vaginal bleeding</li> <li>• Abdominal pain</li> <li>• Edema</li> <li>• Seizures</li> <li>• Hypertension</li> <li>• Headache</li> <li>• Visual change</li> </ul>



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### Case 3: Obstetrics and Gynecology (Ob/Gyn) and Hypovolemic Shock Rapid Cycle Deliberate Practice (RCDP)

Differential Diagnosis OB/GYN emergencies:

<u>Early Pregnancy</u>	<u>Late Pregnancy</u>
<p><b><u>Pre-eclampsia/Eclampsia</u></b></p> <ul style="list-style-type: none"> <li>• Headache, vision change, right upper quadrant pain</li> <li>• SBP&gt;140mmHg or DBP&gt;90 in a person who was previously normotensive AND proteinuria</li> <li>• Relative increase of 30 SBP and 20 DBP from the patient’s normal BP</li> </ul>	<p><b><u>Placenta Abruptio</u></b></p> <ul style="list-style-type: none"> <li>• usually after 20 weeks, associated with trauma</li> <li>• Dark red vaginal bleeding</li> <li>• May only experience internal bleeding; amount of bleeding may not correlate with severity</li> <li>• Painful; May complain of a “tearing” pain</li> </ul>
<p><b><u>Spontaneous abortion/miscarriage</u></b></p> <ul style="list-style-type: none"> <li>• Complaints of cramping, nausea, vomiting</li> <li>• Collect any expelled tissue to deliver to the receiving facility</li> <li>• Usually less than 20 weeks</li> </ul>	<p><b><u>Placenta Previa</u></b></p> <ul style="list-style-type: none"> <li>• Usually in 3<sup>rd</sup> trimester</li> <li>• Painless bright red vaginal bleeding</li> <li>• Avoid digital exam</li> </ul>
<p><b><u>Pelvic inflammatory disease</u></b></p> <ul style="list-style-type: none"> <li>• Be tactful but clear when questioning</li> <li>• Lower back and abdominal pain</li> <li>• Nausea, vomiting, fever</li> <li>• Vaginal discharge can be present</li> </ul>	<p><b><u>Post-partum hemorrhage</u></b></p> <ul style="list-style-type: none"> <li>• Post-partum blood loss greater than 500mL</li> <li>• Bright red vaginal bleeding</li> </ul>
<p><b><u>Ectopic pregnancy</u></b></p> <ul style="list-style-type: none"> <li>• Most commonly in 1st trimester</li> <li>• Bleeding may be without pain</li> <li>• Consider in all women of child-bearing age with abdominal/pelvic pain</li> </ul>	<p><b><u>Uterine rupture</u></b></p> <ul style="list-style-type: none"> <li>• Often with prolonged, obstructed, or non-progressive labor</li> <li>• History of caesarian section</li> <li>• Painful</li> <li>• Can be associated with trauma</li> </ul>



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

### Appendix G:

## Shortness of Breath Rapid Cycle Deliberate Practice (RCDP) Case

#### Learner Audience:

Prehospital providers

#### Time Required for Implementation:

~ 50 minutes for multiple rounds of RCDP

#### Recommended Number of Learners per Instructor:

- 1 simulation instructor/debriefing facilitator per group of three to six learners
- 1 confederate/assistant per group of three to six learners

#### Objectives:

By the end of the session, learners should be able to::

##### Cognitive:

1. Recognize a patient in respiratory distress
2. Recall various causes of respiratory distress
3. Understand the various interventions available in the prehospital setting for a patient in respiratory distress

##### Technical:

1. Perform a rapid primary assessment
2. Administer supplemental O<sub>2</sub>
3. Optimally position a patient in respiratory distress
4. Perform peripheral IV line placement
5. Perform IO placement
6. Perform basic airway management

##### Behavioral:

1. Communicate clear leadership roles with delegation of roles
2. Use closed-loop communication
  - All messages or orders addressed to specific individuals
  - Team members confirm each request and inform the team leader when a task begins or ends
3. Respect each other with language and behavior
  - Use proper names with eye contact or touch

- Share ideas and information as suggestions or constructive interventions, not as criticism

4. Provide a shared mental model (summary of scenario and next steps given to maintain situational awareness)
5. Coordination of airway management

#### Learner responsible content:

The learner should be trained in and familiar with local prehospital protocol.

#### Abbreviations

AED = automatic external defibrillator

BP = blood pressure

Bpm = beats per minute

BVM = bag valve mask

CPR = cardiopulmonary resuscitation

EKG = electrocardiogram

EMS = emergency medical services

GCS = Glasgow Coma Scale

HR = heart rate

IO = intraosseous

IV = intravenous

LR = Ringer's lactate

NS = normal saline

O<sub>2</sub> = oxygen

PEA = pulseless electrical activity

Pt = patient

RCDP = rapid cycle deliberate practice

RR = respiratory rate

O<sub>2</sub>Sat = oxygen saturation

T = temperature

#### References/suggestions for further reading:

9. Lightner L, Brywczyński J, McKinney J, Slovis CM. Shortness of breath prehospital treatment of respiratory distress. *J Emerg Med Services*. 2010;35(5):56-63. doi:10.1016/S0197-2510(10)70122-4.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

**Case Title:** Shortness of Breath RCDP Case

**Case Description & Diagnosis (short synopsis):** The prehospital provider is called to a home where a patient is complaining of difficulty breathing.

The patient has a cardiac history and is currently having a congestive heart failure (CHF) exacerbation with shortness of breath. She should be taken from her place in the home onto a gurney and into back of EMS truck. The patient has unstable vital signs. She requires respiratory support. She should be placed in a position of comfort and given supplemental oxygen. With appropriate intervention, her work of breathing improves. If she does not have appropriate and timely intervention, she will develop respiratory failure and require BVM oxygenation and ventilation.

The case will consist of two rounds of learning with increasing difficulty in each added scenario. The overall goal is for the learner to master the initial steps of assessment and management of an acutely ill patient in the prehospital setting.

### **Equipment or Props Needed:**

Setup for All Rounds:

- Room configuration: living room of a small home
  
- Equipment needed:
  - Standard equipment available in EMS truck and medical bag, but particularly:
    - Gurney
    - IV starter kits
    - Normal saline
    - IO needles (+/- drill)
    - Medical tape
    - BVM
    - CPR backboard
  - Adult simulation mannequin, IV arm task trainer, lower extremity IO task trainer
  
- Demonstration items needed for debriefing: none

### **Confederates needed:**

- Medical control (via telephone or radio), another EMS provider



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

### How the Scenario Unfolds:

#### Ideal Scenario Flow:

The prehospital provider is called to a home where a patient is complaining of difficulty breathing.

The patient has a cardiac history and is currently having a congestive heart failure (CHF) exacerbation with shortness of breath. The provider should arrive to the patient's home where he/she performs a rapid assessment of the patient including obtaining vital signs and obtaining vascular access. The provider should take a pertinent and brief history of the patient's complaint.

The provider should identify a patient in severe respiratory distress and impending respiratory failure. She should be taken from her place in the home onto a gurney and into back of EMS truck. The patient has unstable vital signs. She requires respiratory support. She should be placed in a position of comfort and given supplemental oxygen. With appropriate intervention, the patient's work of breathing improves. If she does not have appropriate and timely intervention, she will develop respiratory failure and require bag valve mask (BVM).

The provider should recognize any patient decompensation and respond with cardiorespiratory support with focus on transporting the patient to the appropriate setting, giving handoff to providers there.

### Critical Actions:

#### Round 1:

- Rapid assessment of CAB
- Check vital signs and recognize abnormal vitals
- Obtain IV/IO access
- Administer supplemental oxygen
- Take basic history from the patient

#### Round 2:

- Recognize respiratory distress
- Place the patient in a position of comfort (sitting upright) to alleviate work of breathing
- Reassess after the interventions



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

**Expected Endpoint of the Scenario:** 15-minute time limit per round

**Distractors Within Scenario:** high acuity, administrators want to send the patient to a clinic

**Optional Challenges for Higher Level Learners:**

- Evaluation for increased work of breathing
- Considering various causes for increased work of breathing

**Roles of Participants/Trainees:** Usual roles at a scene response

**Roles of Confederates (if applicable):** Medical control – wants to send the patient to lower-acuity facility; another EMS provider/assistant is relatively inexperienced and can only help when told specifically how to do so

**Anticipated Management Errors:**

1. Failure to recognize the unresponsive patient: Because this is a low-fidelity simulation and a simulated cardiac monitor is not used, learners may not realize that the patient is not interacting, and they often do not realize the deterioration in the vital signs. It is useful for the confederate to clearly indicate that there is an acute change in vital signs and that the patient has deterioration of vital signs even if the provider does not check.
2. Overaggressive or inappropriate interventions: Because the patient is presenting with shortness of breath and wheezing, it is not uncommon for a provider to anchor on asthma management if he/she does not collect an appropriate history and physical exam. Many providers do not utilize airway adjuncts: positioning, supplemental oxygen regularly. Those who know how to intubate a patient may be very quick to intubate the patient rather than first trying less invasive interventions.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

**Case Title:** Shortness of Breath RCDP Case

**Chief Complaint:** Shortness of breath

**Vitals:** Heart Rate (HR) 122                      Blood Pressure (BP) 165/87  
Respiratory Rate (RR) 32                      Temperature (T) 37.0°C  
Oxygen Saturation (O<sub>2</sub>Sat) 92% on room air

### Initial Physical Exam for All Rounds:

**General Appearance:** Appears uncomfortable. Obese abdomen. Lethargic. GCS 15. Lower extremity edema.

### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences but with short statements. Lungs with shallow respirations. Using accessory muscles. Wheezes and rales. Tachypneic and hypoxic.
- **Circulation:** Hypertensive. Tachycardic. No murmur, strong central and peripheral pulses. Capillary refill 4-5 seconds, extremities warm. JVD present.
- **Other:** Appears uncomfortable. Obese abdomen. Lethargic. GCS 15. Lower extremity edema.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

### Round 1: Initial Assessment of Patient

#### Objectives introduced this round:

1. Perform a rapid primary assessment
2. Administer supplemental O<sub>2</sub>
3. Perform peripheral IV placement
4. Perform IO line placement
5. Perform basic airway management

**Prompt for Team:** “A relative has called Emergency Services for help. His mother is a 63-year-old woman who has been having increased difficulty breathing.”

#### History:

- **History of present illness:** The woman has had increasing difficulty breathing since she went to a wedding last week. The breathing is worse when she is walking. This has happened to her before and she has been told that she has “fluid on the lungs.”
- She has had lower extremity swelling, abdominal swelling, no chest pain, cough, nausea, vomiting, or fever.
- **Past medical history:** She has had a heart attack before but is uncertain of any other diagnoses.
- **Past surgical history:** She has never had surgery.
- **Patient’s medications:** daily aspirin, furosemide (forgot to take today), nitroglycerin, atenolol.
- **Allergies:** She does not have any drug allergies
- **Social history:** She lives at home with her husband.

**Vitals (need to be obtained by EMS):** HR 122      BP 165/87      RR 32      Temp 37.0C  
O<sub>2</sub>Sat 92% on room air

#### Physical Examination (if asked):

- **General appearance:** Appears uncomfortable. Obese abdomen. Lethargic. GCS 15. Lower extremity edema.





# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences but with short statements. Lungs with shallow respirations. Using accessory muscles. Wheezes and rales. Tachypneic and hypoxic.
- **Circulation:** Hypertensive. Tachycardic. No murmur, strong central and peripheral pulses. Capillary refill 4-5 seconds, extremities warm. JVD present.
- **Other:** Appears uncomfortable. Obese abdomen. Lethargic. GCS 15. Lower extremity edema.

### Critical Actions Round 1:

- Rapid assessment of CAB
- Check vital signs and recognize abnormal vitals
- Obtain IV/IO access
- Administer supplemental oxygen
- Take basic history from the patient

*No scenario progression, yet.*

### End Round 1.

### Round 1 Debriefing and Evaluation:

Review initial exam, reinforce importance of rapid initial assessment, checking vital signs, administering supplemental O2, and obtaining IV/IO access in a sick patient.

Refer to expected actions and teaching points below:

Expected Action	Teaching Point
Rapid assessment of CAB	When presented with ill patient, assess circulation, airway and breathing and immediately intervene if emergent situation found.
Check vital signs	Document initial vitals.
Obtain IV/IO access	Try PIV first, particularly if pt. awake. IO if critically ill, particularly if altered mental status/ coma.
Recognize abnormal vitals	HR for age: greater than 100bpm is abnormal. RR greater than 20 is tachypneic.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

Administer supplemental oxygen	Any hypoxic patient should receive O <sub>2</sub> . Consider escalation from nasal cannula to facemask to non-rebreather facemask.
Take basic history from the patient	History is important to management. Focus should be on the past medical history, surgical history, and medications. This will guide management. Try to obtain information while performing other tasks.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

### Round 2: Recognize and Address Respiratory Distress

#### Objectives introduced this round:

1. Recognize a patient in respiratory distress
2. Recall various causes of respiratory distress
3. Optimally position a patient in respiratory distress

#### Restart scenario from beginning.

**Prompt for Team:** “A relative has called Emergency Services for help. His mother is a 63-year-old woman who has been having increased difficulty breathing.”

#### History:

- **History of present illness:** The woman has had increasing difficulty breathing since she went to a wedding last week. The breathing is worse when she is walking. This has happened to her before and she has been told that she has “fluid on the lungs.”
- She has had lower extremity swelling, abdominal swelling, no chest pain, cough, nausea, vomiting, or fever.
- **Past medical history:** She has had a heart attack before but is uncertain of any other diagnoses.
- **Past surgical history:** She has never had surgery.
- **Patient’s medications:** daily aspirin, furosemide (forgot to take today), nitroglycerin, atenolol.
- **Allergies:** She does not have any drug allergies
- **Social history:** She lives at home with her husband.

**Vitals (need to be obtained by EMS):** HR 122      BP 165/87      RR 32      Temp 37.0C  
O<sub>2</sub>Sat 92% on room air

#### Physical Examination (if asked):

- **General appearance:** Appears uncomfortable. Obese abdomen. Lethargic. GCS 15. Lower extremity edema.

#### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences but with short statements. Lungs with shallow respirations. Using accessory muscles. Wheezes and rales. Tachypneic and hypoxic.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

- **Circulation:** Hypertensive. Tachycardic. No murmur, strong central and peripheral pulses. Capillary refill 4-5 seconds, extremities warm. JVD present.
- **Other:** Appears uncomfortable. Obese abdomen. Lethargic. GCS 15. Lower extremity edema.

### Critical Actions Round 2:

- Repeat from prior round:
  - Rapid assessment of CAB
  - Check vital signs and recognize abnormal vitals
  - Obtain IV/IO access
  - Administer supplemental oxygen
  - Take basic history from the patient
- Recognize respiratory distress
- Place the patient in a position of comfort (sitting upright) to alleviate work of breathing
- Reassess after the interventions

### END Round 2.

### Round 2 Debriefing:

Review initial exam, reinforce importance of rapid initiation of respiratory support for adult patients, and immediate reassessment after oxygen administration and positioning.

Review the expected actions and teaching points below:

Expected Action (including actions from Round 1)	Teaching Point
Recognize respiratory distress	Identify signs and symptoms consistent with respiratory distress.
Place the patient in a position of comfort	Perfusion and work of breathing in respiratory distress is often improved with the patient sitting upright.
Reassess after interventions	Always recheck vitals, perfusion, respiratory status, and mental status after interventions.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)*

### **ROUND 3: Full scenario**

If time allows, restart from the beginning of the scenario and run the full scenario without interruption. If initial actions are performed well, can restart where needed.

Final debriefing and feedback

- Praise learners for tasks accomplished well.
- Provide areas for continued improvement.

**END OF RCDP Session.**



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

### Wrap Up:

#### Approach to Dyspnea

#### General Considerations:

Exam: cardiovascular, respiratory, neurologic

Asthma & COPD	Pneumonia	Heart Failure
Often due to lifelong history of asthma or smoking other chronic irritants	Lower respiratory infection	Inability of the heart to pump enough blood to provide for metabolic needs
Can be triggered by viral or bacterial infections	Affects all persons but immunocompromised particularly at risk	Often associated with pulmonary edema – fluid backed up into the lungs
Goal oxygen saturation is greater than 92%	Productive cough	Risk factors: hypertension, prior myocardial infarction, valve disease, poorly controlled lung disease
	Fever	Often associated with atrial fibrillation
	Pain	Edema, weight gain, dyspnea with exertion, orthopnea
		Medications often include furosemide, digoxin, warfarin

#### General Information/Tips:

- Diagnoses to consider include:
  - Pneumonia, decompensated heart failure, COPD exacerbation, asthma, pneumothorax, pulmonary embolism, cardiac tamponade, anaphylaxis.
- Many elderly patients have multiple coexisting medical problems which can make identifying the cause of dyspnea difficult without supplementary testing.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 4: Shortness of Breath Rapid Cycle Deliberate Practice (RCDP)

- Three very common causes of respiratory distress seen in the prehospital setting present with dyspnea, cough, hypoxia, abnormal breath sounds (wheezing, rales, rhonchi).
- Standard treatments include:
  - Oxygen
  - Albuterol nebulization +/- ipratropium
  - Nitroglycerin
  - Bag valve mask
  - Advanced airway management
- Goal should be O<sub>2</sub> saturation greater than 95%.
- Aspirin should be given whenever myocardial infarct is suspected.
  - Not all cases of myocardial infarction will present with chest pain, especially in women, the elderly, or patients with diabetes.
- Assisted ventilation is required whenever poor ventilatory effort or apnea.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

### Appendix H:

## Weakness Rapid Cycle Deliberate Practice (RCDP) Case

**Learner Audience:**

Prehospital providers

**Time Required for Implementation:**

~ 50 minutes for multiple rounds of RCDP

**Recommended Number of Learners per Instructor:**

- 1 simulation instructor/debriefing facilitator per group of three to six learners
- 1 confederate/assistant per group of three to six learners

**Objectives:**

By the end of the session, learners should be able to:

**Cognitive:**

1. Recognize a patient with altered mental status
2. Be able to list a differential diagnosis for a patient with weakness
3. Detect and manage hypoglycemia

**Technical:**

1. Perform a rapid primary assessment
2. Perform basic airway management
3. Perform IV/IO line placement
4. Perform cervical spine precautions

**Behavioral:**

1. Obtain a focused history from all available resources
2. Be able to manage a behaviorally difficulty patient
3. Communicate clear leadership roles with delegation of roles
4. Use closed-loop communication
  - All messages or orders addressed to specific individuals
  - Team members confirm each request and inform the team leader when a task begins or ends
5. Respect each other with language and behavior
  - Use proper names with eye contact or touch
  - Share ideas and information as suggestions or constructive interventions, not as criticism

6. Provide a shared mental model (summary of scenario and next steps given to maintain situational awareness)

**Learner responsible content:**

The learner should be trained in and familiar with local prehospital protocol.

**Abbreviations**

AED = automatic external defibrillator

BP = blood pressure

Bpm = beats per minute

BVM = bag valve mask

CPR = cardiopulmonary resuscitation

EKG = electrocardiogram

EMS = emergency medical services

GCS = Glasgow Coma Scale

HR = heart rate

IO = intraosseous

IV = intravenous

LR = Ringer's lactate

NS = normal saline

O<sub>2</sub> = oxygen

PEA = pulseless electrical activity

Pt = patient

RCDP = rapid cycle deliberate practice

RR = respiratory rate

O<sub>2</sub>Sat = oxygen saturation

T = temperature

**References/suggestions for further reading:**

1. Asimos AW. Evaluation of the adult with acute weakness in the emergency department. In: UpToDate, Hockberger RS (Ed), Grayzel J (Ed), UpToDate, Waltham, MA. Apr 2017. <https://www.uptodate.com/contents/evaluation-of-the-adult-with-acute-weakness-in-the-emergency-department>. (Accessed on November 25, 2018).
2. National Association of State EMS Officials. Altered Mental Status. In: *National Model EMS Clinical Guidelines*. Vol 2. Sept 2017:64-66. Available at: <https://www.nasemso.org/documents/National-Model-EMS-Clinical-Guidelines-Version2-Sept2017.pdf>.





# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

**Case Title:** Weakness RCDP Case

**Case Description & Diagnosis (short synopsis):** The prehospital provider is called to a home where a patient is complaining of weakness.

The son had called emergency services for assistance. EMS arrives at the scene, which is a disheveled, small, house. They find the 65-year-old patient lying on the ground, moaning. The EMS providers should identify the alcohol bottle and aspirin bottle at the scene. The patient does not want to go to the hospital and vomits in the presence of the EMS providers. He is not very cooperative with the team. He is hypoxic, and he is having sonorous respirations, which respond to jaw thrust and supportive oxygen. He is intoxicated with alcohol and has suffered a minor head injury. He has not been eating recently and is found to be hypoglycemic, requiring glucose supplementation. If his hypoglycemia is not addressed, he will suffer from generalized tonic-clonic seizures. The patient is transported to the hospital in critical condition. Pertinent positive and negative symptoms include generalized weakness, nausea, vomiting once, no abdominal pain, no chest pain, no shortness of breath, no headache, and no seizure.

The case will consist of three rounds of learning with increasing difficulty in each added scenario. The overall goal is for the learner to master the initial steps of assessment and management of an acutely ill patient in the prehospital setting.

### Equipment or Props Needed:

Setup for All Rounds:

- Room configuration: living room of a small home
  
- Equipment needed:
  - Standard equipment available in EMS truck and medical bag, but particularly:
    - Gurney
    - IV starter kits
    - Normal saline
    - IO needles (+/- drill)
    - Medical tape
    - BVM
    - CPR backboard
  - Adult simulation mannequin, IV arm task trainer, lower extremity IO task trainer



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

- Demonstration items needed for debriefing: none

### Confederates needed:

- Medical control (via telephone or radio), another EMS provider

### How the Scenario Unfolds:

#### Ideal Scenario Flow:

The prehospital provider is called to a home where a patient is complaining of weakness.

The provider should arrive to the patient's home where he/she performs a rapid assessment of the patient including obtaining vital signs and obtaining vascular access. The provider should take a pertinent and brief history of the patient's complaint.

The provider will be interrupted by the patient vomiting and being an aspiration risk. He/she is expected to communicate a plan to continue appropriate care with the assistant. It is important that the provider gets appropriate information from the patient, the son, the environmental clues, and the exam. Reasons for this patient's altered mental status include intoxication, head injury, hypoglycemia, and others. The provider should not be distracted by the uncooperative patient, but rather should be diligent and systematic in talking to the patient and the son while medically managing the patient.

The patient is hypoxic and with sonorous respirations. The provider should address the abnormal findings with airway maneuvers and supplemental oxygen.

The provider should consider hypoglycemia as a diagnosis early on and intervene with administration of glucose; otherwise, the patient will have a generalized tonic-clonic seizure.

A good exam will reveal sign of trauma to the head, and with an unreliable historian, head injury should be considered as a cause for the patient's altered mental state.

The provider should recognize any patient decompensation and respond with cardiorespiratory support with focus on transporting the patient to the appropriate setting, giving handoff to providers there.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

### Critical Actions:

#### Round 1:

- Rapid assessment of Circulation, Airway, Breathing (CAB)
- Rapid primary survey
- Check vital signs and recognize abnormal vitals (tachycardia)
- Obtain IV/IO access
- Take basic history from a reliable source
- When patient vomits, consider placing in lateral decubitus position for airway protection

#### Round 2:

- Jaw thrust for sonorous respirations
- Apply supplemental oxygen
- Identify hypoglycemia
- Reassess after interventions

#### Round 3:

- Administer correct amount of IV glucose
- Call the medical control
- Give handoff at the receiving facility

**Expected Endpoint of the Scenario:** 15-minute time limit per round

**Distractors Within Scenario:** high acuity, administrators want to send the patient to a clinic

### Optional Challenges for Higher Level Learners:

- Evaluation for other causes of altered mental status (AMS) (eg, there is an aspirin bottle at the scene)
- Considering trauma as a cause for AMS (i.e., placing in c-collar, backboard, exposure)

**Roles of Participants/Trainees:** Usual roles at a scene response

**Roles of Confederates (if applicable):** Medical control – wants to send the patient to lower-acuity facility; another EMS provider/assistant is relatively inexperienced and can only help when told specifically how to do so



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

### Anticipated Management Errors:

1. Failure to recognize the unresponsive patient: Because this is a low-fidelity simulation and a simulated cardiac monitor is not used, learners may not realize that the patient is not interacting, and they often do not realize the deterioration in the vital signs. It is useful for the confederate to clearly indicate that there is an acute change in vital signs and that the patient has deterioration of vital signs even if the provider does not check.
2. Glucose and/or glucagon administration: Providers often forgot to check for hypoglycemia as a cause of altered mental status. They would often be hesitant to place an IV/IO for the purpose of administering glucose. All necessary products are available, but rarely used. For those less comfortable with glucose administration, encouraging PO intake for the patient who is able, or glucagon intramuscular administration are options.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

**Case Title:** Weakness RCDP Case

**Chief Complaint:** Weakness

**Vitals:** Heart Rate (HR) 118                      Blood Pressure (BP) 100/76  
Respiratory Rate (RR) 20                      Temperature (T) 37.0°C  
Oxygen Saturation (O<sub>2</sub>Sat) 92% on room air

### Initial Physical Exam for All Rounds:

**General Appearance:** Laying on the ground. Lethargic. Alternates talking with confused speech and mumbled speech. Dry mucous membranes. Bowel sounds active. Healing wound on the head.

### Primary survey:

- **Airway/Breathing:** Airway obstructed by soft tissue (tongue), and he is snoring. Speaks in mumbled sentences when aroused, but easily falls back asleep. No other signs of increased work of breathing. Lungs clear bilaterally. Tachypneic.
- **Circulation:** Normotensive. Tachycardic. No murmur, strong central and peripheral pulses. Capillary refill 3 seconds, extremities warm.
- **Disability:** Altered mental status. GCS 13 (eyes 4, verbal 4, motor 5), moves all extremities with equal strength when prompted.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

### Round 1: Initial Assessment of Patient

#### Objectives introduced this round:

1. Perform a rapid primary assessment
2. Administer supplemental O<sub>2</sub>
3. Perform peripheral IV placement
4. Perform IO line placement
5. Perform basic airway management

**Prompt for Team:** “The son of a 65-year-old man has called EMS for help. He went to check on his father at home and he seemed weak and acting abnormally.”

[He vomits upon being approached by the EMS team.]

#### History:

- **History of present illness:** He found his father on the ground, moaning. When he got him up, he was wandering around the house with a staggering gait, and he appeared weak and confused. There were several empty bottles of alcohol in the home. Normally his father is able to take care of his activities of daily living by himself, and he lives by himself. The house looked disheveled. His father refused to tell the son or the EMS providers much information and insists that he is fine when he is aroused.
- Pertinent positive and negative symptoms include generalized weakness, nausea, vomiting once, no abdominal pain, no chest pain, no shortness of breath, no headache, and no seizure.
- **Past medical history:** He has a history of cardiac disease and diabetes.
- **Past surgical history:** He has never had surgery.
- **Patient’s medications:** He takes a daily aspirin and insulin.
- **Allergies:** He does not have any drug allergies.
- **Social history:** The man’s wife recently died. The patient usually drinks 1-2 bottles of beer daily. He does not use drugs.

**Vitals (need to be obtained by EMS):** HR 118      BP 100/76    RR 20      Temp 37.0C  
O<sub>2</sub>Sat 92% on room air



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

### Physical Examination (if asked):

- **General appearance:** Laying on the ground. Lethargic. Alternates talking with confused speech and mumbled speech. Dry mucous membranes. Bowel sounds active. Healing wound on the head.

### Primary survey:

- **Airway/Breathing:** Airway obstructed by soft tissue (tongue), and he is snoring. Speaks in mumbled sentences when aroused, but easily falls back asleep. No other signs of increased work of breathing. Lungs clear bilaterally. Tachypneic.
- **Circulation:** Normotensive. Tachycardic. No murmur, strong central and peripheral pulses. Capillary refill 3 seconds, extremities warm.
- **Disability:** Altered mental status. GCS 13 (eyes 4, verbal 4, motor 5), moves all extremities with equal strength when prompted.

### Critical Actions Round 1:

- Rapid primary survey
- Check vital signs and recognize abnormal vitals (tachycardia)
- Obtain IV/IO access
- Take basic history from a reliable source
- Consider placing in lateral decubitus position when patient vomits for airway protection

*No scenario progression, yet.*

### End Round 1.

### Round 1 Debriefing and Evaluation:

Review initial exam, reinforce importance of rapid initial assessment, checking vital signs, administering supplemental O2, and obtaining IV/IO access in a sick patient.

Refer to expected actions and teaching points below:

Expected Action	Teaching Point
Rapid primary assessment	When presented with ill patient, assess circulation, airway and breathing and immediately intervene if emergent situation found.
Check vital signs	Document initial vitals.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

Obtain IV/IO access	Try peripheral IV first, particularly if patient is awake. Place IO if critically ill, particularly if altered mental status/ coma.
Recognize abnormal vitals	HR for age: greater than 100 bpm is abnormal. RR greater than 20 is tachypneic.
Take basic history from a reliable source	History is important to management. Focus should be on the past medical history, medications, and in this case, the social history. This will guide management. Try to obtain information while performing other tasks. Be observant of the scene the patient is retrieved from.
Consider placing in lateral decubitus position	The patient has vomited and he has sonorous respirations. It may help keep the airway patent and prevent aspiration of stomach contents.





# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

### Round 2: Immobilize and Transport

#### Objectives introduced this round:

1. Detect and manage hypoglycemia
2. Safe and appropriate transport to appropriate facility

#### Restart scenario from beginning.

**Prompt for Team:** “Bystanders have called emergency services to the scene of a motor vehicle accident. A 24-year-old cyclist ran a traffic light and was hit by an oncoming car. He was not wearing a helmet.”

**Prompt for Team:** “The son of a 65-year-old man has called EMS for help. He went to check on his father at home and he seemed weak and acting abnormally.”

[He vomits upon being approached by the EMS team.]

#### History:

- **History of present illness:** He found his father on the ground, moaning. When he got him up, he was wandering around the house with a staggering gait, and he appeared weak and confused. There were several empty bottles of alcohol in the home. Normally his father is able to take care of his activities of daily living by himself, and he lives by himself. The house looked disheveled. His father refused to tell the son or the EMS providers much information and insists that he is fine when he is aroused.
- Pertinent positive and negative symptoms include generalized weakness, nausea, vomiting once, no abdominal pain, no chest pain, no shortness of breath, no headache, and no seizure.
- **Past medical history:** He has a history of cardiac disease and diabetes.
- **Past surgical history:** He has never had surgery.
- **Patient’s medications:** He takes a daily aspirin and insulin.
- **Allergies:** He does not have any drug allergies.
- **Social history:** The man’s wife recently died. The patient usually drinks 1-2 bottles of beer daily. He does not use drugs.

**Vitals (need to be obtained by EMS):** HR 118      BP 100/76    RR 20      Temp 37.0C  
O<sub>2</sub>Sat 92% on room air



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

### Physical Examination (if asked):

- **General appearance:** Laying on the ground. Lethargic. Alternates talking with confused speech and mumbled speech. Dry mucous membranes. Bowel sounds active. Healing wound on the head.

### Primary survey:

- **Airway/Breathing:** Airway obstructed by soft tissue (tongue), and he is snoring. Speaks in mumbled sentences when aroused, but easily falls back asleep. No other signs of increased work of breathing. Lungs clear bilaterally. Tachypneic.
- **Circulation:** Normotensive. Tachycardic. No murmur, strong central and peripheral pulses. Capillary refill 3 seconds, extremities warm.
- **Disability:** Altered mental status. GCS 13 (eyes 4, verbal 4, motor 5), moves all extremities with equal strength when prompted.

### Critical Actions Round 2:

- Repeat from round 1:
  - Rapid primary survey
  - Check vital signs and recognize abnormal vitals (tachycardia)
  - Obtain IV/IO access
  - Take basic history from a reliable source
  - Consider placing in lateral decubitus position when patient vomits for airway protection
- Jaw thrust for sonorous respirations
- Apply supplemental oxygen
- Identify hypoglycemia
- Reassess after interventions

### END Round 2.

### Round 2 Debriefing.

Review the initial exam and findings. Identify appropriate interventions for abnormal vital signs. Hypoglycemia is a critical finding in this patient with altered mental status in addition to his alcohol intoxication.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

Review the expected actions and teaching points below:

<b>Expected Action (Including actions from Round 1)</b>	<b>Teaching Point</b>
Jaw thrust for sonorous respirations	The patient may have obstructive sleep apnea at baseline, or he may have increased laxity at this time because he is intoxicated. Jaw thrust is a reasonable intervention instead of a chin tilt, considering possible c-spine injury.
Apply supplemental oxygen	Supplemental oxygen is indicated in this hypoxic patient.
Identify hypoglycemia	It is important to evaluate for hypoglycemia with any patient who has altered mental status.
Reassess after interventions	Always recheck vitals, perfusion, and respiratory status, and mental status after giving interventions.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

### Round 3: Broaden and Manage Differential Diagnosis

#### Objectives introduced this round:

1. Detect and manage hypoglycemia
2. Safe and appropriate transport to appropriate facility

#### Restart scenario from beginning.

**Prompt for Team:** “Bystanders have called emergency services to the scene of a motor vehicle accident. A 24-year-old cyclist ran a traffic light and was hit by an oncoming car. He was not wearing a helmet.”

**Prompt for Team:** “The son of a 65-year-old man has called EMS for help. He went to check on his father at home and he seemed weak and acting abnormally.”

[He vomits upon being approached by the EMS team.]

#### History:

- **History of present illness:** He found his father on the ground, moaning. When he got him up, he was wandering around the house with a staggering gait, and he appeared weak and confused. There were several empty bottles of alcohol in the home. Normally his father is able to take care of his activities of daily living by himself, and he lives by himself. The house looked disheveled. His father refused to tell the son or the EMS providers much information and insists that he is fine when he is aroused.
- Pertinent positive and negative symptoms include generalized weakness, nausea, vomiting once, no abdominal pain, no chest pain, no shortness of breath, no headache, and no seizure.
- **Past medical history:** He has a history of cardiac disease and diabetes.
- **Past surgical history:** He has never had surgery.
- **Patient’s medications:** He takes a daily aspirin and insulin.
- **Allergies:** He does not have any drug allergies.
- **Social history:** The man’s wife recently died. The patient usually drinks 1-2 bottles of beer daily. He does not use drugs.

**Vitals (need to be obtained by EMS):** HR 118      BP 100/76      RR 20      Temp 37.0C  
O<sub>2</sub>Sat 92% on room air



# DIDACTICS AND HANDS-ON CURRICULUM

## INSTRUCTOR MATERIALS

### Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

#### Physical Examination (if asked):

- **General appearance:** Laying on the ground. Lethargic. Alternates talking with confused speech and mumbled speech. Dry mucous membranes. Bowel sounds active. Healing wound on the head.

#### Primary survey:

- **Airway/Breathing:** Airway obstructed by soft tissue (tongue), and he is snoring. Speaks in mumbled sentences when aroused, but easily falls back asleep. No other signs of increased work of breathing. Lungs clear bilaterally. Tachypneic.
- **Circulation:** Normotensive. Tachycardic. No murmur, strong central and peripheral pulses. Capillary refill 3 seconds, extremities warm.
- **Disability:** Altered mental status. GCS 13 (eyes 4, verbal 4, motor 5), moves all extremities with equal strength when prompted.

#### Critical Actions Round 3:

- Repeat from round 1:
  - Rapid primary survey
  - Check vital signs and recognize abnormal vitals (tachycardia)
  - Obtain IV/IO access
  - Take basic history from a reliable source
  - Consider placing in lateral decubitus position when patient vomits for airway protection
- Jaw thrust for sonorous respirations
- Apply supplemental oxygen
- Identify hypoglycemia
- Reassess after interventions

**Scenario progression:** After first bolus, jaw thrust, and oxygen, HR 110, BP 105/89, RR 18, O<sub>2</sub> saturation 98% on 2L nasal cannula. Patient's blood glucose is 46 mg/dL.

The patient continues to moan and intermittently is argumentative with team.

#### Expected actions after scenario progression:

- Administer correct amount of IV glucose.
- Call the medical control
- Give handoff at the receiving facility



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

### END Round 3.

Review the expected actions and teaching points below:

Expected Action	Teaching Point
Administration of IV glucose	IV glucose is the preferred method of administration because the patient is actively altered and already has mild respiratory depression. D5W 200 mL slow IV/IO push for glucose OR D10W 100 mL IV/IO push for glucose OR D50W 20 mL IV/IO push Repeat as needed. Glucagon 1mg IM is an alternative if IV/IO access is not attainable. Glucagon can take 15 minutes to effect. Glucose paste, or other oral glucose is acceptable if the patient can swallow without difficulty.
Call the medical control	Be able to describe a critically ill patient and convey need for higher level of care.
Give handoff to the receiving facility	Be able to describe a critically ill patient and give a concise handoff while conveying need for urgent/emergent intervention.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)*

### **ROUND 4: Full scenario**

If time allows, restart from the beginning of the scenario and run the full scenario without interruption. If initial actions are performed well, can restart where needed.

Final debriefing and feedback

- Praise learners for tasks accomplished well.
- Provide areas for continued improvement.

**END OF RCDP Session.**



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)

### Wrap Up:

#### General Approach to Adult with Weakness

Exam: ocular exam, skin, cardiovascular, respiratory, neurologic, extremities

General Information/Tips:

- Evaluate for hypo/hyperglycemia
- Observe the environment that the patient is being taken from, protect yourself first
- Even if a patient is intoxicated, keep the differential diagnosis broad
- Consider restraints if the patient serves as a risk to himself or to others
- Document a Glasgow Coma Scale before and after an intervention
- Be attentive for excessive oral secretions, vomiting, and inadequate tidal volume
- Naloxone should be considered if concerned for acute opiate intoxication (altered mental status and respiratory depression). For chronic opiate users, naloxone can trigger opiate withdrawal (agitation, seizures)

History	Signs and Symptoms
<ul style="list-style-type: none"> <li>• Medical history (eg, diabetes)</li> <li>• Illicit or recreational drug use</li> <li>• Psychiatric history (eg, suicide)</li> <li>• Home medications</li> <li>• History of trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Abnormal respirations or rhythm</li> <li>• Change from baseline mental status</li> <li>• Hypoglycemia (diaphoresis, cool extremities, seizures)</li> <li>• Hyperglycemia (warm skin, Kussmal respirations, appears dehydrated, fruity breath)</li> </ul>

#### Differential Diagnosis of Weakness and Altered Mental Status

- Head trauma
  - Consider spinal immobilization
  - Elevate head of bed to 30 degrees
  - Early IV access
- Neurologic disorder (stroke, tumor, seizure, infection)
  - If persistent generalized seizures (>5 minutes) or recurrent seizures without returning to baseline, give a benzodiazepine
    - Midazolam 2-4 mg IV/IM/IO
    - Monitor the vital signs carefully
- Cardiac (myocardial infarction, congestive heart failure)





# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Case 5: Weakness Rapid Cycle Deliberate Practice (RCDP)*

- Infection
- Thyroid disorder
- Shock state
- Diabetes (hypo/hyperglycemia)
- Toxic ingestion or exposure
- Acidosis/alkalosis
- Environmental exposure
- Hypoxia
- Electrolyte disturbance
- Psychiatric disorder



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 6: Blunt Traumatic Injury Test Scenario

### Appendix I:

## Blunt Traumatic Injury Test Scenario Case

**Learner Audience:**

Prehospital providers

**Time Required for Implementation:**

**Preparation:** 5-10 minutes

**Time for case:** up to 30 minutes

**Time for debriefing:** none

**Recommended Number of Learners per Instructor:**

- One learner per Instructor

**Abbreviations**

AED = automatic external defibrillator

BP = blood pressure

Bpm = beats per minute

BVM = bag valve mask

CPR = cardiopulmonary resuscitation

EKG = electrocardiogram

EMS = emergency medical services

GCS = Glasgow Coma Scale

HR = heart rate

IO = intraosseous

IV = intravenous

LR = Ringer's lactate

NS = normal saline

O<sub>2</sub> = oxygen

PEA = pulseless electrical activity

Pt = patient

RCDP = rapid cycle deliberate practice

RR = respiratory rate

O<sub>2</sub>Sat = oxygen saturation

T = temperature



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 6: Blunt Traumatic Injury Test Scenario

**Case Title:** Blunt Traumatic Injury Test Scenario

**Case Description & Diagnosis (short synopsis):** A bystander has called emergency services to the scene of an accident where a 24-year-old man fell from a tree. The patient is awake and alert but is screaming in pain. He complains of abdominal, back, and right lower extremity pain. EMS find him to have signs of injury at the abdomen (eg, bruising, tenderness) and he has an open fracture. The patient is found to be in stage 2 hypovolemic shock due to abdominal injury or blood loss from vessel injury at open fracture. He requires IVF resuscitation and also requires splinting of the RLE for pain and stabilization or he will decompensate to PEA arrest due to hypovolemia. He should be transported to a referral care center because he has a suspected intra-abdominal injury. Provider will need to focus on assessment of Primary Survey, recognition of hypovolemic shock and administering appropriate fluids, and immobilizing a traumatically injured patient.

### Equipment or Props Needed:

Setup for All Rounds:

- Room configuration: Patient is on the ground.
  
- Equipment needed:
  - Standard equipment available in EMS truck and medical bag, but particularly:
    - Gurney
    - IV starter kits
    - Normal saline
    - IO needles (+/- drill)
    - Medical tape
    - BVM
    - CPR backboard
    - cervical collar
    - immobilization/splinting materials
  - Adult simulation mannequin, IV arm task trainer, lower extremity IO task trainer
  
- Demonstration items needed for debriefing: none



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 6: Blunt Traumatic Injury Test Scenario

### Confederates needed:

- Simulation instructor/debriefer
- Confederates: medical control (via telephone or radio), another EMS provider

### How the Scenario Unfolds:

#### Ideal Scenario Flow:

- Rapid assessment of Airway, Breathing, and Circulation
  - The patient should be placed on the portable monitor (if available)
- Check vital signs and recognize abnormal vital signs
- Obtain IV/IO access
- Recognize hypovolemic shock and verbalize the concern
- Give rapid bolus of isotonic IV fluid
- Complete primary survey (Disability, Exposure)
- Apply a c-collar for cervical stabilization
- Reassess patient after each bolus
- Place a splint to support the open fracture
- Immobilize the traumatically injured patient
- Consider pain management in a trauma patient
- Recognize continued tachycardia and continue to give fluid boluses (maximum 2 liters)
- Consider immobilizing patient on a backboard
- Choose the appropriate receiving facility for patient drop-off (should have surgical capabilities)
- Communicate concisely with receiving facility to hand off patient's care
  - This will end the case

**Expected Endpoint of the Scenario:** when the provider gives hand off to the receiving facility

**Distractors Within Scenario:** high acuity, administrators want to send the patient to a clinic, the patient is in a lot of pain

**Roles of Participants/Trainees:** team lead at a scene response

**Roles of Confederates (if applicable):** Medical control – wants to send the patient to lower-acuity facility; another EMS provider/assistant is relatively inexperienced and can only help when told specifically how to do so



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 6: Blunt Traumatic Injury Test Scenario

**Case Title:** Blunt Traumatic Injury test Scenario

**Chief Complaint:** Fall

**Vitals:** Heart Rate (HR) 120                      Blood Pressure (BP) 110/70  
Respiratory Rate (RR) 30                      Temperature (T) 37.0°C  
Oxygen Saturation (O<sub>2</sub>Sat) 97% on room air

### Initial Physical Exam for All Rounds:

**General Appearance:** Appears uncomfortable and anxious, clothing damaged. Awake, interactive. Dry mucous membranes. Abdomen soft, diffusely tender, bruises visible.

### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. No increased work of breathing, clear breath sounds bilaterally. Tachypneic.
- **Circulation:** Tachycardia. No murmur, strong central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool.
- **Disability:** Pupils 5mm, equal, reactive. Moves all extremities spontaneously and with normal strength. Decreased motion at affected leg due to pain. Able to wiggle toes at injured leg.
- **Exposure:** Open fracture to the right tibia, oozing blood.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Case 6: Blunt Traumatic Injury Test Scenario

**Prompt for Team:** “Bystanders have called emergency services to the scene of a trauma. A 24-year-old man fell from a tree while trying to do carpentry work.”

### History:

- **History of present illness:** The man complains of abdominal pain, right leg pain, right hip pain, and lower back pain.
- He remembers all events associated with the injury.
- **Past medical history:** denies
- **Past surgical history:** denies
- **Patient’s medications:** denies
- **Allergies:** denies
- **Social history:** He occasionally smokes marijuana but denies other recreational drugs or alcohol

**Vitals (need to be obtained by EMS):** HR 120      BP 110/70      RR 30      Temp 37.0C  
O<sub>2</sub>Sat 92% on room air

### Physical Examination (if asked):

- **General appearance:** Appears uncomfortable and anxious, clothing damaged. Awake, interactive. Dry mucous membranes. Abdomen soft, diffusely tender, bruises visible.

### Primary survey:

- **Airway/Breathing:** Airway open. Speaks in clear sentences. No increased work of breathing, clear breath sounds bilaterally. Tachypneic.
- **Circulation:** Tachycardia. No murmur, strong central and peripheral pulses. Capillary refill 4-5 seconds, extremities cool.
- **Disability:** Pupils 5mm, equal, reactive. Moves all extremities spontaneously and with normal strength. Decreased motion at affected leg due to pain. Able to wiggle toes at injured leg.
- **Exposure:** Open fracture to the right tibia, oozing blood.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Case 6: Blunt Traumatic Injury Test Scenario*

### **Scenario branch points:**

- After first bolus
  - HR 105, BP 115/88, RR 20, sat 99% on RA.
  - The patient says he feels a little better.
- After analgesia or after splinting
  - His leg still hurts but it feels better than before.

**Diagnosis:** Fall from heights, displaced tibia/fibula fracture, concern for abdominal viscus injury

**Disposition:** Transport to a hospital with trauma surgical capabilities.



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

*Blunt Traumatic Injury Test Scenario Assessment Tool*

## Appendix J:

## Blunt Traumatic Injury Test Scenario Assessment Tool

City:	Date: Day	PRE or POST	Total time:
Trainee:			
Evaluator:			
Scenario: Trauma			

I. Team Organization	
1. Verbal communication within team	0 = no clear instructions
	1 = clear communication sometimes or inconsistent communication
	2 = consistently clear communication
2. Systematic and orderly assessment	0 = disorganized or incomplete primary survey
	2 = organized and complete primary survey
3. Ability to handle distractions	0 = allow attention to be diverted prior to addressing primary survey
	2 = addresses the distractor at the appropriate time

II. Airway and Breathing	
1. Airway assessed	0 = no assessment
	2 = airway assessed
2. Oxygen applied	0 = no oxygen delivered
	1 = delivered oxygen, but not during Airway or Breathing evaluation
	2 = delivered oxygen during Airway or Breathing evaluation
3. Time to assess airway and breathing (from initial interaction with patient)	0 = >60 seconds
	1 = 30-60 seconds
	2 = <30 seconds





# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Blunt Traumatic Injury Test Scenario Assessment Tool

III. Circulation	
1. Initiated BP check:	0 = > 3 minutes
	1 = 2 - 3 minutes
	2 = < 2 min
2. Initiated HR check:	0 = > 3 minutes
	1 = 2 - 3 minutes
	2 = < 2 min
3. Assessed for central or peripheral pulses during primary survey	0 = not checked
	2 = checked
4. Time to IV access achieved:	0 = > 5 minutes or none established
	1 = 3 – 5 minutes
	2 = < 3 minutes
5. Administered IV fluids for possible shock	0 = no fluids given
	1 = low volume or slow rate of NS or LR (eg, “slow,” “drops”)
	2 = 1 liter of NS or LR at rapid rate (eg, “push/pull,” “fast,” “wide open,” or “< 15 min”)
6. Timeliness of IV fluid initiation	0 = > 6 min
	1 = 4 - 6 min
	2 = < 4 min

IV. Disability	
1. Assessed responsiveness	0 = no
	2 = yes
2. Pupils assessed	0 = not examined
	2 = examined
3. C-spine precautions taken	0 = none
	1 = done improperly or in untimely manner
	2 = done with airway assessment properly
4. Objective mental status measurement	0 = none performed
	1 = incorrect assessment of GCS or AVPU
	2 = correct measurement of GCS or AVPU
5. Splinting of broken extremity	0 = no immobilization
	2 = Immobilizes affected extremity



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## *Blunt Traumatic Injury Test Scenario Assessment Tool*

V. Exposure	
1. Performed a log roll	0 = not performed
	2 = performed properly with c-spine immobilization
2. Exposed patient for further evaluation	0 = not performed
	2 = Attempts to look at covered areas

VI. Total Score	
1. Total Points	
2. Total Points Possible	38
3. Percentage	%



## Appendix K: Simulation Course for Prehospital Providers Course Evaluation

1. Please rate the course on a scale of 1-5 (please select one):

Not useful	Somewhat Useful	Useful	Very Useful	Extremely Useful
1	2	3	4	5

2. What was the best part of the course?

3. What changes would you make to the course?

4. Please comment about the specific instructors:

[Name]:

[Name]:

[Name]:

[Name]:

5. Any other comments?



## Appendix L:

## Equipment Setup for Simulation Scenarios

Based on Botswana EMS Response Bag

### Fluids/Access:

- Intravenous (IV) cannulas of various sizes (18, 20, and 22 gauge)
- 1 × 45 mm intraosseous needle (14 gauge or 16 gauge regular can be used instead)
- 1 × 25 mm intraosseous needle (14 gauge or 16 gauge regular can be used instead)
- 5-10 × syringes of various volumes (3, 5, 10, 20, 50 mL)
- 1-2 rubber tourniquets
- 1 × roll of cloth tape
- 1 × razor blade or 1 pair of scissors
- IV fluids:
- 1 × adult IV infusion set
- 1 × pediatric IV infusion set
- 1-liter bag of Ringer's lactate
- 1-liter bag of saline
- 1 × 500 mL bag of dextrose, 10% saline
- 1 × 500 mL bag of dextrose, 5% saline
- 1 × ampule of dextrose 50
- 2 × 10 mL sterile water for injection

### Airway equipment:

- 1 × adult-size, pediatric-size, infant-size simple face mask
- 1 × adult-size, pediatric-size, infant-size non-rebreather face mask
- 1 × adult-size, pediatric-size, infant-size nebulizer mask
- 1 × of each adult-size, pediatric-size, infant-size nasal cannula
- 1 × of each adult-size, pediatric-size, infant-size bag valve and mask
- 1 × non-flexible suction tip
- 2 × flexible suction catheters of various sizes
- 1 set of oral pharyngeal airways (infant to adult sizes)
- 1 set of nasopharyngeal airways (infant to adult sizes)
- Multiple endotracheal tubes of various sizes (3.0–7.5, including ½ sizes)
- 1 × pulse oximeter
- 1 × size 1, 2, 3 straight laryngoscope blades
- 1 × size 1, 2, 3, 4, 5 curved laryngoscope blades
- 1 × size 1, 3, 4 laryngeal mask airways



# DIDACTICS AND HANDS-ON CURRICULUM INSTRUCTOR MATERIALS

## Medications:

- 1 × albuterol
- 1 × paracetamol
- 1 × diazepam

## Trauma equipment:

- 1 × spine immobilization board with stretcher straps
- 1 × head blocks and securing straps

## Orthopedic splinting material for adult lower extremity

(can be cardboard, padded boards, or other polymer malleable splinting materials)

- 1 × trauma tourniquet
- 1 × each adjustable cervical collars (infant, pediatric, and adult)

## Miscellaneous equipment:

- 1 × pediatric length-based tape to estimate weight
- Disposable gloves of various sizes
- 10 × gauze pads of various sizes
- 5 × plastic bandage wraps of various widths
- 1 × container of glucose test strips
- 1 × glucometer
- 1 × adult, pediatric, infant blood pressure cuff
- 1 × stethoscope
- 1 × thermometer
- 3 × wooden tongue blades
- 1 × small flashlight
- 5 towels of various sizes
- 1 × umbilical cord clamp



## Appendix M: Debriefing Techniques

Directive Feedback	Learner Self-Assessment (plus/delta)	Advocacy-Inquiry
Immediate, instructor-driven feedback on performance gaps and learning objectives	Exploration of learner-centric performance gaps and learning objectives	Learner-focused facilitation related to instructor-driven performance gaps and learning objectives

<p><i>"I noticed you did (<u>actual action</u>). Next time you may want to try doing (<u>desired action</u>) because (<u>rationale</u>)."</i></p> <p><i>"I liked how you did (<u>praise point</u>). Next time continue to do that because (<u>rationale</u>)."</i></p>	<p><i>"What aspects of (<u>performance</u>) do you think you'd like to do differently?"</i></p> <p><i>What aspects of (<u>performance</u>) do you think you managed well?"</i></p>	<p><i>"I noticed (<u>actual action</u>). I was concerned because (<u>rationale</u>). How do you see it?"</i></p> <p><i>I saw how you (<u>desired action</u>). I liked that because (<u>appreciation</u>). What was your take on it?"</i></p>
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