

Wilderness Medicine (Hypothermia, Dehydration, and Ankle Injury): A Pediatric Simulation Case for Medical Trainees

Elizabeth Sanseau, MD, MS*, Anita Thomas, MD, MPH, Rosny Daniel, MD, Julie Augenstein, MD, Douglas Diekema, MD, MPH

*Corresponding author: elizabeth.sanseau@gmail.com

Abstract

Introduction: Wilderness recreation is increasingly popular among people of all ages. Pediatric providers should have the skills to counsel on risk reduction and respond to medical emergencies in remote settings. However, few physicians receive training in wilderness medicine, and this simulation-based curriculum aims to address that gap. **Methods:** The scenario features an adolescent male in a remote setting with hypothermia, dehydration, and an ankle injury. The simulation is not resource intensive, utilizing a simulated patient actor and minimal equipment. The case includes a case description, learning objectives, instructor notes, example of ideal scenario flow, and anticipated management mistakes. A didactic PowerPoint highlighting the learning objectives is included. **Results:** The simulation was carried out over 1 year in various settings, including urban parks, the wilderness, and the classroom, with 35 medical trainees. Thirty participants (11 medical students, eight residents, and 11 fellows) completed postsimulation surveys; more than 86% gave the highest score of 5 (strongly agree) when asked if the simulation improved their understanding of managing hypothermia, dehydration, and ankle injury in the wilderness. **Discussion:** This simulation case trains responders to recognize an injured hiker; activate the emergency response system; initiate appropriate treatment for hypothermia, dehydration, and an ankle injury; and stabilize for transport. It reinforces medical conditions unique to the wilderness, improvisation in managing medical issues outside of the usual health care environment, and teamwork/communication skills. This case has been found to be an effective learning tool for medical students, residents, and fellow physicians alike.

Keywords

Wilderness Medicine, Pediatric Simulation, Ankle Injury, Hypothermia, Dehydration, Emergency Medicine, Pediatric Emergency Medicine, Pediatrics, Sports Medicine

Educational Objectives

At the end of this session, learners will be able to:

1. Assess the scene for safety prior to responding to an injured or incapacitated patient.
2. Assess the patient according to the Pediatric Advanced Life Support algorithm; recognize an injured teenage hiker with hypothermia, dehydration, and a stable ankle injury; and provide effective initial stabilization and management.
3. Effectively activate the emergency medical system in a remote wilderness setting and safely transport and sign out the patient.

4. Demonstrate effective teamwork and communication skills, utilizing the TeamSTEPPS glossary, while managing an emergency in a remote setting.

Introduction

Outdoor recreation is becoming increasingly popular, including among children and adolescents.¹ While the exact numbers are difficult to determine, the Outdoor Industry Association estimates that nearly one-half of the U.S. population over the age of 6 engaged in an outdoor activity in 2017.² As more people engage in outdoor activities, it is logical that more injuries are likely to result. Children and adolescents are at increased risk for environmental injuries due to problems related to differences in anatomy and physiology compared to adults (e.g., differences in thermoregulation) and limited judgment and experience that can lead to dangerous behaviors that result in falls, drowning, or encounters with wildlife, to name a few.³ There are guidelines with recommendations for safe recreation and the

Citation:

Sanseau E, Thomas A, Daniel R, Augenstein J, Diekema D. Wilderness medicine (hypothermia, dehydration, and ankle injury): a pediatric simulation case for medical trainees. *MedEdPORTAL*. 2020;16:10900. https://doi.org/10.15766/mep_2374-8265.10900

prevention of potential difficulties in the outdoors,⁴ and health professional trainers have responded by creating wilderness medicine programs at the undergraduate, medical school, residency, and fellowship levels as well as for the layperson.⁵ The term *wilderness medicine* is typically defined broadly by these training programs to include outdoor recreational activities, remote expeditions, disaster response, and rural resource-limited clinics.

Currently, there are no *MedEdPORTAL* publications on wilderness medicine targeted towards a pediatric emergency scenario. One prehospital simulation, written for emergency medicine services (EMS) providers, includes a learning objective related to rapid sequence intubation in the trauma patient;⁶ another scenario relates to the provision of basic life support in clinic.⁷ A resource reviewing the clinical presentation and initial evaluation of a patient experiencing dehydration after running a marathon at high altitude is written with the objective of introducing basic science preclinical medical curriculum content to the first-year medical student learner.⁸ Several publications address in-hospital management of hypothermia.⁹⁻¹¹ There is one didactic on ankle injuries in a bundle on the evaluation of common musculoskeletal injuries in the urgent care setting.¹² Our resource seeks to fill the educational gap for the physician or student-physician of the prehospital management of an adolescent patient found in the wilderness with an ankle injury who is dehydrated and hypothermic and must be stabilized and transported to care. This resource can be viewed as part of a series with the aforementioned *MedEdPORTAL* publications that outline the subsequent in-hospital management.

Given the physical experience of responding to a patient in the wilderness, we chose simulation with a simulated patient actor as a didactic tool to heighten realism and expose the learner to the hands-on, interactive, and practical components of managing the scenario. As a tool, simulation allows for an interactive and efficacious educational experience.¹³⁻¹⁵ Although this simulation is designed to be low fidelity, it can be very realistic in the outdoor setting. The target audience of this simulation is broad, consisting of trainees in pediatric, family, and/or emergency medicine including medical students, residents, and fellows. The simulation therefore requires learners to have basic medical knowledge, including familiarity with the Pediatric Advanced Life Support (PALS) algorithm, in order to be able to perform a primary and secondary survey while gathering relevant historical data.¹⁶ If learners have not taken a PALS course, we recommend that the facilitator supply them with the PALS algorithm as part of the presimulation reading material. We provide a PowerPoint presentation (Appendix F) that can be used by the learner

prior to or after the simulation to review the basic medical management of an ankle injury, dehydration, and hypothermia in the wilderness setting. The teacher might elect to share the PowerPoint with a beginner audience (e.g., medical students) before the simulation and with a more advanced audience (e.g., fellows) after the simulation. If the simulation is run as part of a comprehensive wilderness medicine course, the teacher can elect to expand the case to include other course material being covered, such as assembling a rope litter or performing a wheelbarrow carry to evacuate the patient. On the other hand, if the simulation is run in an urban setting as part of a daily mock code in a hospital, not connected to a wilderness medicine skills course, the simulated patient can have a stable ankle injury and the ability to bear weight and ambulate to help with some assistance. For all settings, we encourage the facilitator to prep the learners by letting them know to pack a bag as if they were going on a daylong hike. We do not recommend being more specific than this, as it will become a learning objective in the debrief if the participants do not know what to pack to be useful in the wilderness should their medical attention be emergently needed. We encourage the simulation facilitator to review tools to optimize the simulation environment (Appendix B), teamwork and communication (Appendix E), and the debrief (Appendix D) prior to running this scenario (Appendix A).

Methods

Development

We designed this case as a simulation in order to facilitate an active learning environment. The learners were expected to know how to assess the scene for safety before assisting the injured hiker, assess the patient, recognize that the patient was experiencing hypothermia and dehydration and had an ankle injury, and improvise using their gear (or a backpack that was planted by the simulation facilitator) to initially manage, stabilize, and safely transport the patient to a higher level of care. We designed a didactic PowerPoint presentation for learners to review prior to or after the simulation, depending on the nuances and logistical restraints of the simulation program (Appendix F). Of note, the PowerPoint provided the answers to the medical learning objectives of the scenario. The facilitator could give the presentation prior to the simulation for beginner or intermediate learners (e.g., medical students, first-year residents) or if choosing to focus on the physical, logistical, and teamwork components of responding to a patient in the woods. On the other hand, the PowerPoint didactic presentation could be saved for after the simulation to give the learners a yardstick to measure their performance and learn from their experiential mistakes. We have included various appendices modified for this scenario

from work that we previously published in *MedEdPORTAL*.¹⁷ These appendices include supplemental materials to aid in optimizing the simulation environment (Appendix B), teamwork and communication (Appendix E), and debriefing (Appendix D). During the debrief, the facilitator encouraged the learners to reflect on their performance and identify areas for improvement.

Equipment/Environment

For this scenario, we found that the most realistic environment was an outdoors woody area with a river or stream. We ran some implementations of the scenario during a wilderness medicine elective in which the participants were on a day hike and came across the injured hiker without warning. We facilitated other instances in an urban park or a staged classroom. To heighten realism in the urban park, we selected parks with a stream and planted the simulated patient actor by the water source. When limited to the classroom setting, we provided learners with a more thorough presimulation orientation to the staged room (river water, trees, etc.) and emphasized the importance of suspending disbelief. To set up the scene, we used a blue sheet for the river, green paper for foliage, and a fan to create a cold, windy environment. Prior to the simulation, we encouraged the participants to pack a daypack as if they were going on a daylong hike in cold weather. In case the participants forgot a pack, we hid a prepacked bag that included the 10 essentials of a survival kit (Appendix B).

Personnel

Two people were needed to run this simulation case: the hike leader/facilitator/debriefer and the simulated patient actor playing the injured hiker. The hike leader/facilitator/debriefer transitioned into the arriving EMS provider to complete the scenario. We felt the ideal number of participants for the scenario was four, allowing for the roles of team lead, survey, runner/EMS caller, and helper to gather gear and perform patient interventions. To prepare the simulated patient, the faculty met the actor prior to the simulation to review the scenario and discuss the learning objectives of the case (see “Prepping the simulated patient actor” in Appendix B). We wrote this case for formative educational use rather than for standardized testing; therefore, we elected to use a simulated patient actor to allow for greater flexibility and authenticity across the various environmental settings in which the scenario was run. We were liberal in our selection of patient actors, choosing available and interested personnel among our faculty and personal acquaintances. We recommend that future users of this resource refer to the Association of Standardized Patient Educators (ASPE) for the established best practices for the use of standardized patients.¹⁸

Implementation

We implemented this simulation over 1 year with four pediatric residents, four emergency medicine residents, 16 pediatric emergency medicine fellows, and 11 medical students training at the following institutions: Seattle Children’s Hospital, Phoenix Children’s Hospital, and the University of California, San Francisco. Our facilitators ran the simulation in various settings, including an annual resident wilderness medicine elective, embedded into an annual resident “sim wars” day made up of various teams competing in several simulations in a staged classroom, as part of a fourth-year medical student event for rising emergency medicine residents in a classroom, and integrated into a weekly fellow simulation curriculum adapted to take place in a nearby urban park. We prepped the simulated patient actor playing the injured hiker to be lying next to a cold body of water—such as a river or a stream—and to be wet, shivering, and moaning in pain when the hiking group came across him. When the simulation was run inside a classroom, the facilitator staged a fake river and outdoorsy setting (see Equipment/Environment above and Appendix B). We encouraged the patient actor to exaggerate the ankle injury or his dehydrated and hypothermic state if the simulation participants were slow to meet the learning objectives of acknowledging and treating the conditions of hypothermia, dehydration, and an ankle injury in a timely fashion. We changed the patient transport learning objectives based on the learner audience. When run during a more comprehensive wilderness medicine course that included didactics on evacuation techniques (not provided in this publication), we prepped the simulated actor to be unable to walk in order to encourage the participants to practice an evacuation maneuver. When we ran the simulation in the urban setting, not as part of a greater course, we prepped the actor to be able to walk with assistance. The hike leader/facilitator transitioned to the EMS provider whose arrival and patient sign-off marked the completion of the simulated scenario. We sent the PowerPoint didactic presentation to beginner participants prior to the simulation and to advanced participants following the simulation (Appendix F). Prior to the simulation, we reviewed the appendices on optimizing the simulation environment (Appendix B), teamwork and communication (Appendix E), and debriefing (Appendix D), and the actor reviewed the simulation script (Appendix A) and critical actions checklist (Appendix C).

Assessment

Participants provided feedback on the evaluation form (Appendix G) on whether the simulation was relevant, realistic, and performed in a safe learning environment. We wrote the form to elicit participant reflection on whether the simulation was

effective in teaching basic skills, medical management, and teamwork (Kirkpatrick Level 2). We asked participants to describe how the simulation might alter their medical management in the future (Kirkpatrick Level 3). Finally, we encouraged the participants to comment on the simulation as a whole (Kirkpatrick Level 1).¹⁹ We did not make an attempt to measure knowledge before the simulation; however, we acknowledge that future facilitators might decide to do so to evaluate the impact of the simulation on the knowledge acquisition of participants.

Debriefing

We allowed approximately twice the amount of time used for the simulation for debriefing. We adapted the debriefing materials (Appendix D) from our prior *MedEdPORTAL* publication.¹⁷

We wrote the PowerPoint as a supplemental information tool (Appendix F). We found the PowerPoint was best incorporated after the debrief, given that it gave away most answers to the simulation.

Results

Of the 35 participants, 30 completed postsimulation surveys (Appendix G). We intentionally sought out a broad audience of facilitators and participants in an effort to explore the acceptability and impact of this simulation on a wide range of learners at different academic institutions. Our sample size and postsimulation survey response rate were limited by the inherent scheduling and coordination challenges of the endeavor. The participants provided overwhelmingly positive feedback.

Overall, on a 5-point scale (1 = *strongly disagree*, 3 = *neutral*, 5 = *strongly agree*), the curriculum received a median of 5, range of 3-5, with 84% of the 30 answering participants responding with 5 when asked if the content was relevant to their practice; a median of 5, range of 1-5, with 70% responding with 5 when asked if the scenario was realistic; a median of 5, range of 4-5, with 87% responding with 5 when asked if they had a better

understanding of evaluating an ankle injury; a median of 5, range of 4-5, with 90% responding with 5 when asked if they had a better understanding of evaluating dehydration; and a median of 5, range of 4-5, with 93% responding with 5 when asked if they had a better understanding of evaluating hypothermia (see [Table](#)). The median score for the debrief creating a safe environment was 5, range of 4-5, with 90% of participants responding with 5. One hundred percent of the participants who responded desired future simulations incorporated into the curriculum.

When asked to describe how this simulation experience would change how they approached wilderness outings, respondents endorsed being more mindful of how to prepare supplies for a hike while considering potential medical incidents on the trail. They appreciated learning the medical knowledge, thinking through the in situ logistics, and practicing with a live simulated patient actor to heighten realism. Sample responses included the following:

- “Thinking about supplies/people before outing, adequate hydration and preparation, knowing the laws in the area you are hiking.”
- “This is a common scenario we could encounter and I appreciate learning how to manage an ankle injury in a hypothermic patient in the wilderness.”
- “It was good to talk through [a] real life example and go through logistics.”
- “I liked having a real patient rather than a sim body, it was more realistic.”
- “Debriefs for these sims are always very educational.”

When asked how this scenario could be improved, some participants wanted to be challenged to transport the patient a further distance: “Have to transport [patient] a longer distance to get a feel of how sustainable our transport method is.” Others

Table. Participants’ Feedback on Simulation (N = 30)^a

Statement	Percentage Giving a Score of 5	Median Likert Score	Range of Likert Scores
This simulation case is relevant to my work.	84	5	3-5
The simulation case was realistic.	70	5	1-5
Following this simulation, I have a better understanding of the assessment and treatment of ankle injuries in the wilderness.	87	5	4-5
Following this simulation, I have a better understanding of the assessment and treatment of dehydration in the wilderness.	90	5	4-5
Following this simulation, I have a better understanding of the assessment and treatment of hypothermia in the wilderness.	93	5	4-5
The debrief created a safe environment.	90	5	4-5

^aRated on a 5-point Likert scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*).

noted that they felt distracted by the lay observers (i.e., hikers on trail or urban park) when participating in the simulation in the wilderness setting. One participant suggested running the simulation in an iterative fashion to better master the learning objectives, and several participants requested additional wilderness medicine scenarios. When conducting the simulation inside a staged classroom setting, participants asked for a “better intro so we know more about our surroundings” and requested us to “make the river more obvious” and to “give a little more info—didn’t know we had a duffle bag or river.”

Discussion

We designed this resource as a simulation didactic to supplement a wilderness medicine curriculum or any pediatric simulation training program, acknowledging the gap in medical education in the prehospital management of pediatric injuries in the wilderness. We constructed the case to teach the recognition and management of an adolescent male hiker with dehydration, hypothermia, and an ankle injury necessitating transport to higher level of care. We included learning objectives to improve teamwork and communication. In addition, we highlighted the objectives of assessing the scene for safety and calling for help in the wilderness.

We encountered several challenges when running the simulation. First, optimizing the staged wilderness setting in a classroom was difficult, requiring creativity and a big ask from learners to suspend disbelief. We all agreed as facilitators that the simulation felt more alive when run in the park or woods. Despite this, participants still responded positively when surveyed about their experience, even when the simulation was run in the staged classroom.

A challenge we encountered when running the simulation in the wilderness was learners who were distracted by nonparticipant hikers stopping to watch. In the future, we will consider eliciting an extra faculty member to crowd-control in a public space. Due to the fact that we trialed this simulation in various settings for formative educational purposes, we elected to use simulated patient actors to represent the injured hiker. The simulated patients were selected liberally from the medical faculty or personal friends and family members. While we found that training readily available personnel as the actor was effective, we acknowledge this potentially decreased the standardization of learner experience across settings. Should this case be used for formative testing, we recommend utilizing standardized patients as defined by the ASPE.¹⁸ Additionally, future groups might consider incorporating the actor’s feedback into the debrief

so as to provide a unique patient perspective. Despite these challenges, a benefit of this simulation is the lack of supplies and personnel needed to run the scenario effectively.

We trialed incorporating the PowerPoint supplemental didactic presentation (Appendix F) both pre- and postsimulation. Fellow-level learners gave feedback that when the PowerPoint was viewed prior to the simulation, the exercise was too easy. This makes sense, as the presentation explicitly lays out the medical learning objectives. Interestingly, we found that less-advanced learners did not feel the simulation was too easy, despite having reviewed the PowerPoint prior to it. This could be due to the fact that the implementation of how to get a task done in the woods is very different than knowing what to do. Therefore, we think there is value in reviewing the PowerPoint either pre- or postsimulation, depending on learner level and facilitator preference.

We limited the evaluation of the simulation to learner perceptions of utility and did not evaluate impact on knowledge, acquisition, or communication skills. Pre- and posttests and/or videotaping with subsequent review are ways to enhance the evaluation piece of this simulation in the future.

Finally, we limited the simulation to only three common backcountry threats: hypothermia, dehydration, and musculoskeletal injury. Future simulations can be written to develop a more comprehensive simulation curriculum on wilderness medicine in *MedEdPORTAL*.

Appendices

- A. Wild Med Sim Case.docx
- B. Wild Med Environment Prep.docx
- C. Wild Med Critical Action Checklist.docx
- D. Wild Med Debrief.docx
- E. Wild Med TeamSTEPPS.docx
- F. Wild Med PowerPoint.pptx
- G. Wild Med Postsimulation Survey.docx

All appendices are peer reviewed as integral parts of the Original Publication.

Elizabeth Sanseau, MD, MS: Fellow, Department of General Pediatrics, Division of Emergency Medicine, Children’s Hospital of Philadelphia

Anita Thomas, MD, MPH: Assistant Professor, Department of Pediatrics, Division of Emergency Medicine, University of Washington; Assistant

Professor, Department of Pediatrics, Division of Emergency Medicine, Seattle Children's Hospital

Rosny Daniel, MD: Assistant Professor, Department of Emergency Medicine, University of California, San Francisco

Julie Augenstein, MD: EMS Base Hospital Medical Director, Phoenix Children's Hospital; Assistant Professor of Pediatrics, Mayo Clinic College of Medicine and Science - Phoenix; Clinical Assistant Professor of Child Health and Emergency Medicine, University of Arizona College of Medicine-Phoenix

Douglas Diekema, MD, MPH: Director of Education, Treuman Katz Center for Pediatric Bioethics, Seattle Children's Hospital and Research Institute; Professor of Bioethics and Emergency Medicine, University of Washington; Adjunct Professor, Department of Bioethics and Humanities, University of Washington School of Medicine; Adjunct Professor, Department of Internal Medicine, University of Washington School of Medicine; Adjunct Professor, Department of Health Services, University of Washington School of Public Health

Acknowledgments

We would like to thank the following people:

Elizabeth Wolpaw, MD: Emergency Medicine Physician at Swedish Edmonds, WA

Jennifer Reid, MD: Co-Director of Pediatric Emergency Medicine Simulation at Seattle Children's Hospital and Associate Professor in the Department of Pediatrics, Division of Emergency Medicine, at the University of Washington and Seattle Children's Hospital

Kimberly Stone, MD: Co-Director of Pediatric Emergency Medicine Simulation at Seattle Children's Hospital and Associate Professor in the Department of Pediatrics, Division of Emergency Medicine, at the University of Washington and Seattle Children's Hospital

Rebecca Burns, MD: Assistant Professor in the Department of Pediatrics, Division of Emergency Medicine, at the University of Washington and Seattle Children's Hospital

Disclosures

None to report.

Funding/Support

None to report.

Ethical Approval

Reported as not applicable.

References

1. Heggie TW, Küpper T. Pediatric and adolescent injury in wilderness and extreme environments. *Res Sports Med*. 2018;26(suppl 1):186-198. <https://doi.org/10.1080/15438627.2018.1438280>
2. 2018 Outdoor Participation Report. Outdoor Industry Association website. <https://outdoorindustry.org/resource/2018-outdoor-participation-report/>. Published July 17, 2018. Accessed April 19, 2019.
3. Newman RD, Shubkin CD, Chapman SH, Diekema DS. A wilderness medicine course for pediatric residents. *Pediatr Emerg Care*. 1998;14(1):58-61. <https://doi.org/10.1097/00006565-199802000-00015>
4. Gentile DA, Kennedy BC. Wilderness medicine for children. *Pediatrics*. 1991;88(5):967-981.
5. Lemery J, Tedeschi C, Miner T. Wilderness medicine education in the city: a new paradigm. *Wilderness Environ Med*. 2008;19(3):206-209. [https://doi.org/10.1580/1080-6032\(2008\)19\[206:WMEITC\]2.0.CO;2](https://doi.org/10.1580/1080-6032(2008)19[206:WMEITC]2.0.CO;2)
6. Stopyra J, Beaver B, Fitch MT, Nelson RD. Prehospital rapid sequence intubation in a blunt trauma patient: a case for high-fidelity simulation in prehospital medicine. *MedEdPORTAL*. 2016;12:10358. https://doi.org/10.15766/mep_2374-8265.10358
7. Ghory H, Kuo J, Sawan L, Scott S. Assessing first-responder and BLS skills: the case of Mona Shadid. *MedEdPORTAL*. 2013;9:9451. https://doi.org/10.15766/mep_2374-8265.9451
8. Berrocal Y, Fisher J, Regan J, Christison AL. Dehydration: a multidisciplinary case-based discussion for first-year medical students. *MedEdPORTAL*. 2018;14:10725. https://doi.org/10.15766/mep_2374-8265.10725
9. Thomas A, Sanseau E, Uspal N, et al. Pediatric Emergency Medicine Simulation Curriculum: submersion injury with hypothermia and ventricular fibrillation. *MedEdPORTAL*. 2017;13:10643. https://doi.org/10.15766/mep_2374-8265.10643
10. Lawson L, Patterson L. Skating on thin ice: hypothermia and near-drowning simulation. *MedEdPORTAL*. 2013;9:9467. https://doi.org/10.15766/mep_2374-8265.9467
11. Smith M, Noeller T. Ice, ice, baby. *MedEdPORTAL*. 2011;7:8303. https://doi.org/10.15766/mep_2374-8265.8303
12. Miller AN. Evaluation of common musculoskeletal injuries in the urgent setting. *MedEdPORTAL*. 2016;12:10514. https://doi.org/10.15766/mep_2374-8265.10514
13. Issenberg SB, McGaghie WC, Petrusa ER, Gordon DL, Scalese RJ. Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. *Med Teach*. 2005;27(1):10-28. <https://doi.org/10.1080/01421590500046924>
14. Cheng A, Auerbach M, Hunt EA, et al. Designing and conducting simulation-based research. *Pediatrics*. 2014;133(6):1091-1101. <https://doi.org/10.1542/peds.2013-3267>
15. Doughty CB, Kessler DO, Zuckerbraun NS, et al. Simulation in pediatric emergency medicine fellowships. *Pediatrics*. 2015;136(1):e152-e158. <https://doi.org/10.1542/peds.2014-4158>
16. PALS systemic approach algorithm. American Heart Association website. http://ahainstructornetwork.americanheart.org/idc/groups/ahaec-public/@wcm/@ecc/documents/downloadable/ucm_432369.pdf. Published June 29, 2011. Accessed April 19, 2019.

17. Sanseau E, Reid J, Stone K, Burns R, Uspal N. Pediatric simulation cases for primary care providers: asthma, anaphylaxis, seizure in the office. *MedEdPORTAL*. 2018;14:10762.
https://doi.org/10.15766/mep_2374-8265.10762
18. Lewis KL, Bohnert CA, Gammon WL, et al. The Association of Standardized Patient Educators (ASPE) standards of best practice (SOBP). *Adv Simul (London)*. 2017;2(1):10.
<https://doi.org/10.1186/s41077-017-0043-4>

19. Kirkpatrick's four levels of training evaluation in detail. Connecticut Training & Development Network website.
http://www.ct.gov/ctdn/lib/ctdn/tt_14_m5_handouts2.pdf.
Accessed April 19, 2019.

Received: May 24, 2019

Accepted: October 7, 2019

Published: May 15, 2020