Learning from the Outside In: Incorporating Wilderness Medicine into Traditional Emergency Medicine Education

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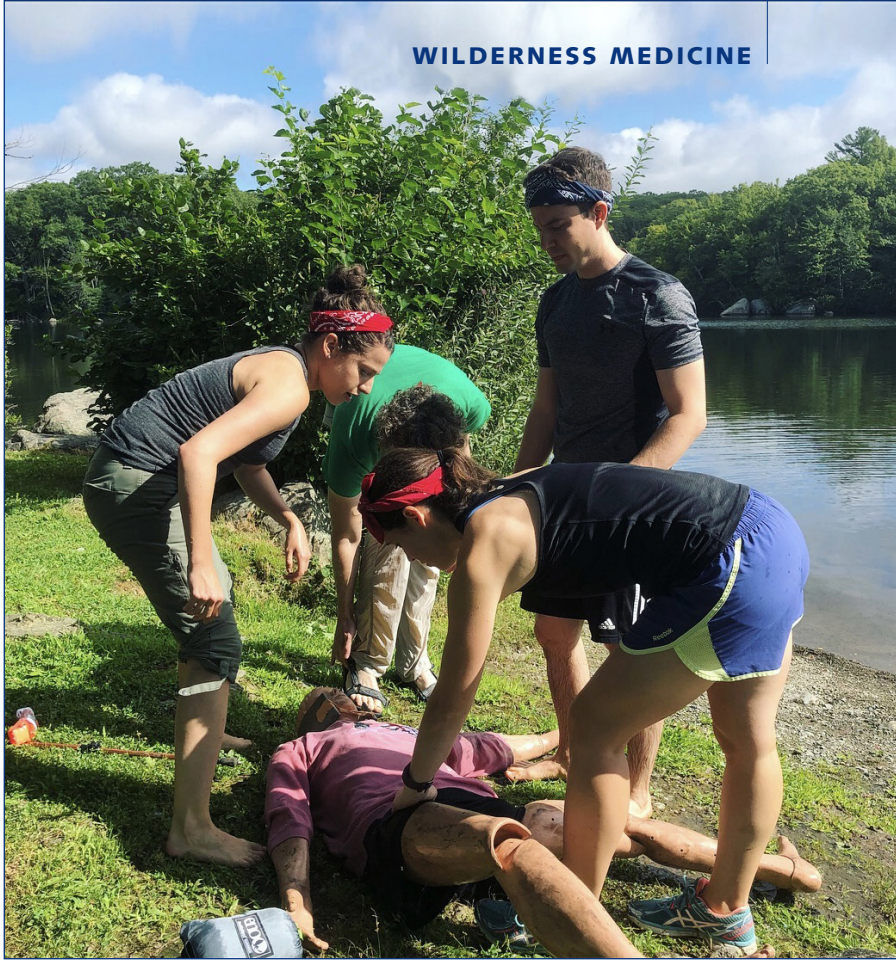
INTRODUCTION

Experiential education is a well-established method of learning, in which learners are purposefully engaged in direct experiences and focused reflection to promote the development of meaningful knowledge, skills and values essential to their jobs and place in the community.[1] The link between experience and education was formally introduced and written about by John Dewey in the early 20th century, but one of the most well-known leaders in this field was Kurt Hahn, the founder of Outward Bound. Even into the present day, Outward Bound programs revolve around wilderness activities, such as hiking, mountaineering, and paddle sports, among many others. Hahn used the principles of experiential education as the cornerstone of these experiences, hoping the endeavors would build leadership among its participants, develop them as a whole person, and create citizens who could make right, just, and independent decisions.[2]

Wilderness and austere medicine (WM) is the discipline of medicine characterized by the provision or improvisation of patient care in the remote setting, or when resources and manpower are limited.[3] This encompasses not just the provision of care at altitude or in the backcountry, but travel and expedition medicine, dive medicine, military medicine and EMS/search and rescue. WM has developed over the last few decades into an academic specialty in its own right with societies, conferences, research base and journal, textbooks, certifications and fellowship training. WM is a recognized sub-specialty of emergency medicine with 15 fellowships as of 2017.[4]

While often associated with emergency medicine, the principles of WM are multi-disciplinary and come from the fields not only of emergency medicine but surgery, toxicology, sports medicine, military and travel medicine, to name a few. Practitioners of WM come from all medical backgrounds and practice in a variety of settings, limited not just to backcountry travel but international travel, disaster and relief work, cruise ship medicine and EMS. WM education focuses on the gaps in traditional medical curriculum and relies heavily on out-of-classroom coursework and experiential education.

Experiential learning has formed the foundation of most WM courses (e.g. Wilderness First Responder, Advanced Wilderness Life Support, etc.) through the use of standardized patients, simulation dummies, and moulage. Such methods are essential because WM typically involves small numbers of patients and rarely encountered scenarios. Whereas traditional medical education provides ample opportunity to manage conditions like heart failure and asthma in the hospital, there are



very few, if any, opportunities to manage patients with wilderness-specific conditions such as envenomations, or to treat patients in an austere environment. WM also encompasses many sub-disciplines of emergency medicine, including toxicology, disaster medicine, and EMS/pre-hospital care, which often involve scenarios not usually encountered during typical emergency medicine training. Most providers are not involved in the medical decision making or practical aspects of patient evacuation, especially the lengthy and arduous transports needed for remote patients.

Over the past two decades, the Medical Wilderness Adventure Race (MedWAR) has become an increasingly popular way for medical providers to expand their knowledge base and put their wilderness/austere medicine knowledge and skills to the test.[5] Since the early 2000s, these races have brought the simulated scenarios of WM courses into the context of a competition. Race participants engage in various outdoor activities, such as orienteering, paddling, and biking, while being intermittently challenged with a variety of WM situations that encompass the entire breadth of wilderness practice. With its inception, there was also the hope that the MedWAR races would lead to interagency alliances, including search and rescue (SAR) teams, park rangers, outdoor activity guides, and WM education organizations.[5]

A two-year retrospective in 2003 noted that participants felt these races provided not only a boost in medical confidence, but also engendered teamwork and effective communication. Interestingly, while a number of racers felt that they had somewhat increased their knowledge base, they felt strongly that the experience itself was more important for their growth as medical professionals. Other lessons learned included difficulties with the written portions of the race and comments on the physical activities as being either too difficult or easy, and the medical challenges too complex or simple (even within the same race).[5] In short, these races offer unique opportunities for providers to practice in a pressured, time-sensitive situation, acquire new skills, and develop relationships that are essential to providing timely, high-quality care.

THE BROWN WILDERNESS MEDICINE COMPETITION

The Warren Alpert Medical School of Brown University has a four-year emergency medicine residency. All accredited residency programs have an Accreditation Council for Graduate Medical Education (ACGME) mandate for resident education, which is met predominantly through weekly conferences and didactic education, although there is significant variation among different programs. In an effort to promote resident education and engagement, one conference day per month is spent in the simulation center. This offers residents a chance to develop life-saving skills in an appropriately controlled setting, often with rarely encountered conditions and scenarios. In 2017, a group of residents at Brown developed an off-campus wilderness medicine event adapted from the MedWAR model, to replace a monthly simulation day.

This race was established with five main goals:

1) Increase learner engagement through experiential learning.
2) Exposure to the basic tenets of wilderness medicine.
3) Development of relationships across multiple learning levels, including medical students, residents, and attending physicians.
4) Deepen relationships between our program and local EMS and SAR resources.
5) To promote resident wellness through engagement in wilderness activities.

HOW THE RACE WORKS

For both 2017 and 2018, the competition has been held at Lincoln Woods State Park (LWSP) in Lincoln, RI. LWSP was chosen for its close proximity to the main residency teaching site and many options for outdoor activities, including hiking/running, rock climbing, paddle sports and mountain biking – perfect for the physical variety that is key to these wilderness medicine races. Residents, mid-level providers and medical students are split into teams of four and given a

very basic map of the park with the general location of 10–12 "stations," multiple choice questions and a variety of physical challenges. They must decide as a team how to find and complete as many stations and questions as possible within the allotted time.

Teams are required to plan and prepare a pre-packed med kit, which must include all equipment, supplies, and medications (pre-labeled syringes/bottles) they anticipate requiring to complete the stations as well as to care for real-world minor injuries. Following the competition, a debrief cookout allowed participants and facilitators to reflect on the experience, lessons learned and discuss the details of the scenarios. Small prizes were awarded to the top three teams.

The core of the event is the stations, each of which presents participants with a hands-on austere-medicine scenario. These stations are created and run by attending emergency medicine physicians and local EMS personnel, often with the assistance of medical student volunteers. Examples of scenarios from this past year included a drowning requiring water rescue, a penetrating eye injury while skiing, a fall on steep terrain actually requiring low-angle rescue by a high-angle tech rescue team, and a crush injury requiring extrication and management of a threatened limb. These stations are designed to have five critical actions, each of which must be completed to get full marks, one point for each critical action. For example, the drowning requiring water rescue station required:

1) Evaluate for the scene safety: Is it OK to enter water and rescue victim?
2) Improvised spinal immobilization
3) Control bleeding from leg injury w/ improvised tourniquet
4) Splint fracture
5) Treat for hypothermia

Additional points were awarded to the teams that completed their stations the fastest.

For the written portion of the competition, multiple choice questions on a variety of wilderness/austere medicine topics were placed along the course. Many questions utilized visual stimuli. Example questions included picture ID of poisonous plants and physical exam findings and wilderness survival knowledge.

INTEGRATION OF LEARNING AND WELLNESS

Overall, the goals set forth by organizers were accomplished; learners were engaged in the outdoor classroom and exposed to a variety of austere scenarios including search and rescue and tactical medicine. There was a great deal of engagement and camaraderie between EMS and physicians/learners and wellness was promoted in the pursuit of outdoor recreation and physical activity, teambuilding and friendly competition.

A cornerstone of the Brown Wilderness Medicine Race is integration of senior and junior providers/students within teams and scenarios, as well as with EMS personnel and EM faculty in unexpected and unfamiliar scenarios. Whereas typical simulation days are held indoors in a controlled environment, this race enabled cross-functional interaction during stressful medical scenarios. For example, during the low-angle rescue scenario mentioned above, patient was in a simulated ravine, unable to be initially assessed by the physicians. Personnel from the Fire Department taught and assisted residents with harness and safety gear, and provided a safe way for them to reach the patient and begin evaluation. The residents had to begin the scenario with remote patient evaluation as they awaited safe transport to the patient. During the debrief, participants had the opportunity to ask questions about the intricacies of technical rope rescue, Fire Department experience with such rescues and discuss how knowledge about the extrication could improve hospital care. The Fire Department also learned from the providers and were given hands-on instruction on patient care and assessment during the scenario. Both parties reported a great deal of benefit from working together and learning a different perspective on the scenario. EMS work and rotations notwithstanding, there are few times during training where residents may have access to such insight.

Another benefit of the model was the interaction between

learners and faculty, which were both EM attendings and senior EMS providers. The MedWARs event facilitated both casual interaction and more camaraderie than is usually found in the hospital setting. Additionally, EMS providers and physicians readily interacted and learned from each other during the training event, which is uncommon in traditional residency training and was described in feedback to be mutually beneficial.

From a health and wellness standpoint, the Brown Wilderness Medicine Race allowed all involved to break out of their usual routines, the demands of which often lead to stress. Burnout is prevalent among residents, and is particularly high among emergency physicians. In a prospective study, 45% of 2nd year residents report some symptoms of burnout, and 65% of attending emergency physicians reported symptoms of burnout, often associated with unhealthy coping behaviors such as overeating, alcohol, and drug use.[7,8]

Outdoor activities often provide an important outlet for health care providers, who often pursue adventurous endeavors outside of the hospital. Regular outdoor activity – even just walking – has shown a variety of health benefits, including weight management, blood pressure control, and lowering the risk of vascular catastrophes, such as myocardial infarction and stroke.[9] Increasingly, interventions are sought by health care organizations and residency programs to promote wellness and reduce burnout and stress.[10, 11] The MedWAR race enabled attending physicians and residents to engage in, and share, their knowledge regarding activities they found personally and professionally rewarding. Simultaneously, the race contributed to the participant's work-life balance, an essential component of a long and healthy career in medicine. Gawande has reported on the deleterious effect of computers impact on the physician's work day; experiential learning may be an antidote to physician burnout and stress.[12]

LESSONS LEARNED

The response to the first Brown Wilderness Medicine Race in 2017 was very positive. Participants greatly valued the realism of the faculty-developed scenarios and enjoyed learning outside of the confines of weekly conference and the simulation center. As with the MedWAR races, there was also a general feeling that the experience itself was as important as the educational aspect of the day. The race also did a great job of fostering provider bonding and camaraderie.

In 2018, the race was run in a similar manner, with some changes based on first-year course feedback. Improvements included assignment of a starting station expanding the course to different areas of the park. In the 2018 race, local EMS agencies created and ran stations and incorporated technical rescue components run by the Fire Department to foster additional exposure to the unique pre-hospital environment. The physical aspects of the race were extended by increasing the distance between some stations. Feedback regarding the physical activity part of the race was mixed; some groups were very tired by the end, whereas others wanted even more of a physical challenge.

The addition of technical rescue also had some unintended consequences including longer wait times for scenarios and more down time for both teams and faculty. Participant teams were found to cluster around the technical stations, both because they took longer to complete and because teams were very keen on completing those stations. While it was not expected that all teams complete all stations, this did result in inequity felt amongst faculty at less popular stations. Setting clear expectations for faculty including expected down time proved very important to keeping faculty both engaged and feeling appreciated for time spent.

CONCLUSIONS

With the overwhelmingly positive response from these first two years, the Brown Wilderness Medicine Race has become a permanent yearly fixture in the educational curriculum. Regarding race specifics and logistics, we fully expect this to vary year-by-year, not only because race leadership will turn over, but also because feedback will continue to vary. A key difference between this race and the MedWAR races is that all residents who would normally attend weekly conference are expected at this event. Whereas MedWAR self-selects participants who have a specific interest in wilderness medicine and physical activity; these might not be important to the participants in the Brown Wilderness Medicine Race. Based upon all of these variables, it will be difficult to develop an experience that caters to all tastes, but perhaps the most important aspect of the race is that it develops teamwork and communication skills necessary during all medical scenarios.

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