

Core Content for Wilderness Medicine Training: Development of a Wilderness Medicine Track within an Emergency Medicine Residency

Jonathan Drew, MD, Indiana University Department of Emergency Medicine Residency Training Program

Nicole Battaglioli, MD, WellSpan York Hospital Emergency Medicine Residency Training Program

Walter A Schradling, MD, FACEP Department of Emergency Medicine, University of Alabama at Birmingham

The Wilderness Medicine Residency Curriculum Subcommittee, Wilderness Medicine Section, American College of Emergency Medicine

Introduction

Wilderness medicine is the practice of medicine in environments with limited resources, particularly under austere conditions. Such conditions particularly occur in wilderness environments, but may also occur in areas where disaster has caused limitation of medical resources, as well as the practice of medicine in less developed countries. It is a study of the physiology and pathophysiology that occurs when humans encounter such environments. A large component of the field is concerned with preventative care and preparation for activities in these environments. Practical components for practitioners are the ability to assess, stabilize and evacuate an ill or injured person from the austere environment, while ensuring the safety of all rescuers.

“Wilderness medicine shares many of the qualities and characteristics inherent to emergency medicine (EM). These include a large breadth of knowledge and improvisational skills, the ability to provide emergent interventions and stabilization, and proficiency in teamwork, often integrating personnel from varied health care backgrounds. What differentiates wilderness medicine from other disciplines is that application of the skills and knowledge base often occurs in locations where traditional medical infrastructure is limited or absent”(1).

There has been a growing need and interest in the field since the publications of the first edition of Paul Auerbach's *Wilderness Medicine* and the formation of the Wilderness Medical Society (WMS) in 1983. Since then Wilderness Medicine Sections have been established in the American College of Emergency Medicine (ACEP) and the Society of Academic Emergency Medicine (SAEM). Wilderness Medicine training has become increasingly popular among medical professionals with an increasing number of expanding opportunities for training including workshops, conferences, and medical student rotations. Wilderness medicine interest groups have become increasingly popular as well with intensive elective courses in wilderness medicine currently being offered in medical schools, such as those offered at Cornell, Johns Hopkins and George Washington Universities. <http://www.emra.org/committees-divisions/wilderness/wilderness-electives-for-medical-students/>

One study found that almost 40 percent of medical students claimed that a course taken in Wilderness Medicine was the best course in their medical school (2,3). There are now twelve Wilderness Medicine Fellowship programs across the nation listed on the SAEM website.

Several articles have been written outlining a model for a medical student wilderness medicine elective (3,4,5). A core content for fellowship training has also been written (1). However, a model has not been written to address the educational objectives in Wilderness Medicine at the

resident level. It is the goal of this document to outline a Wilderness Medicine curriculum that could be used within an emergency medicine residency program.

There are several options for developing such a curriculum. One option would be to develop a Wilderness Medicine Elective, which would typically occur over a one month time frame. The limitations of this model are that the resident might not be fully excused from clinical duties, and while potentially immersive and intensive, this abbreviated timeframe does not provide longitudinal learning opportunities. Another approach would be to simply develop a curriculum that would be presented to all residents in the EM training program to cover core content that overlaps and would be pertinent to the Model of Clinical Practice of Emergency Medicine (6). Finally, there also is a growing interest in scholarly tracks in EM training programs. The Residency Review Committee EM (RRC) requires that EM residents show competence in a variety of areas outside of clinical expertise, such as education, teaching, research, patient centered aspects of care, end of life issues and business aspects of emergency medicine. Such tracks offer the opportunity for the EM resident to focus on a single area of expertise. In this way, the resident, instead of randomly choosing topics to fulfill his/her research, administrative, and teaching requirements, can, instead, focus all of his/her projects within a niche of specific interest. The benefits of such scholarly tracks is outlined in the article by Regan et al (7). Such a track would thus be longitudinal throughout residency training, would have a graduated level of responsibility and involvement through the progression of training and would culminate with academic projects that build a body of work that are synonymous. This would certainly have advantages for graduating residents who might be considering a career in academic EM. In addition, such academic tracks allow for areas of specialty within the residency for faculty and residents to assist as experts teaching the core content of the residency as a whole. Examples of such scholarly tracks include: administration, education, emergency imaging, EMS, global health, public health, research, simulation, toxicology, ultrasound, and, of course, wilderness medicine (7)

Our working group chose the latter model to develop our model curriculum for a core content for a wilderness medicine track. This document has been compiled from the available literature to date on Wilderness Medicine education as well as resident education in Emergency Medicine to define an outline for our model. Our longitudinal curriculum would be completed by EM residents over the course of their residency. It would address many of the core concepts of EM resident knowledge and focusses the resident on deeper knowledge base of Wilderness Medicine.

This document outlines suggestions for integration of Wilderness Medicine into other requirements of an Emergency Medicine residency. Though each residency will vary in terms of geography and local availability of wilderness medicine resources, we will outline suggestions for integration of wilderness medicine into Administrative, Research, Teaching and Practice Improvement requirements mandated by the RRC. This would allow interested residents to develop a specialized niche within Emergency Medicine and prepare them with relevant experience in order to reach career goals.

Model of Wilderness Medicine Track

Didactic outline:

Not only can wilderness medicine based topics be incorporated into residency didactics, but a longitudinal curriculum in these areas can be a vehicle to review topics that are pertinent to resident education. Initiating wilderness medicine curriculum into residency core curriculum has

the potential to improve inservice scores and EM board scores (Annals of Emerg Med Cord Abstract). Additionally, the core content can be studied in a more in-depth way for those persons who express a stronger interest in Wilderness Medicine.

Below is a proposed 3 year curriculum. Based on the interest of the residents, the content can be covered in a minimal fashion to cover topics that would be tested in the Emergency Medicine boards or in a more in depth fashion for those who are truly interested in the field. Many residencies require at least one lecture given to peers on a topic related to the core content of Emergency Medicine. Participants in our Wilderness Medicine track would choose one of the following topics for their lecture. We also encourage preparation of these topics in paper form for potential publication. Some suggestions for publication include: local journals, WMS newsletter, EMRA Wilderness Division Newsletter, ACEP Wilderness Section newsletter or SAEM interest group newsletter.

Proposed three year longitudinal curriculum:

- Year 1
 - Dysbarism (**6.2**)
 - Air Embolism (6.2.1)
 - Barotrauma (6.2.2)
 - Decompression syndrome (6.2.3)
 - Submersion Incidents (**6.5**)
 - Cold water immersion (6.5.1)
 - Near drowning (6.5.2)
 - Marine Organisms (6.1.3)
 - Marine Toxins (17.1.28)
 - Environmental dermatology (**4.3**)
 - Approach to the injured person in the wilderness
 - *Expedition Medicine
 - *Wilderness Survival
 - *Wilderness medical kits
- Year 2
 - Envenomations (**6.1**)
 - Insects (6.1.1.1) and allergic reactions (9.2.1)
 - Arachnida (6.1.1.2)
 - Mammal bites (6.1.2)
 - Reptile bites and envenomations (6.1.3)
 - Protozoan/Parasites (**10.4**)
 - Malaria (10.4.1)
 - Toxoplasmosis (10.4.2)
 - Tick-borne Illnesses (10.5)
 - Ehrlichiosis (10.5.1)
 - Lyme disease (10.5.2)
 - Rocky Mountain spotted fever (10.5.3)
 - Emerging infections (**10.7**) and tropical medicine
 - Diarrheal diseases in the traveler (2.9.1)
 - Bacterial food poisoning (10.1.1)
 - Lightning Injuries (**6.3.1**)
 - Wound management in the wilderness (18.1.3)

- *Basics of Search and Rescue
- Year 3
 - Altitude Illnesses (**6.4**)
 - Acute mountain sickness (6.4.1)
 - Barotrauma of ascent (6.4.2)
 - High-altitude cerebral edema (6.4.3)
 - High-altitude pulmonary edema (6.4.4)
 - Hypothermia (1.1.1, 6.6.2.2)
 - Cold Injuries/Frostbite (6.6.2.1)
 - Hyperthermia (6.6.1)
 - Heat exhaustion (6.2.1.1)
 - Heat stroke (6.2.1.2)
 - Wilderness Toxicology (**6.1**, 18.1.3.2)
 - Mushrooms and poisonous plants (17.1.30)
 - *Avalanche Preparedness and Ski Injuries
- * Denotes topics that may be added if time allows or presented to those interested in wilderness medicine.

References and Reading sources:

- *Wilderness Medicine*, 6th ed. Auerbach P. Elsevier, Philadelphia, PA 2012
- *Field Guide to Wilderness Medicine*, 4th ed.: Auerbach P, Constance B, Freer L; Elsevier, Philadelphia, PA 2013
- *Wilderness Medical Society Practice Guidelines for Wilderness Emergency Care* 5th ed.: Forgey W (ed), Falcon Guides, Guilford, CT 2006
- *Improvised Medicine: Providing Care in Extreme Environment*: Iserson K; McGraw-Hill, 2012
- Wilderness and Environmental Medicine, *Journal of the Wilderness Medical Society*, Elsevier, 2015

Curriculum year goals:

Involvement in the wilderness medicine track will progress as the resident advances through his/her training. Residents can discern between those projects which would be required and those that would be completed as an elective to tailor the wilderness medicine track for their residency program. Core responsibilities to finish the track would focus on involvement with the Wilderness Medicine Society, completion of the WMS Fellowship and projects that are academically rigorous.

- Year 1
 - Join Wilderness Medicine Society
 - The Wilderness Medicine Society (WMS) was founded in 1983 and has since been a cornerstone in Wilderness Medicine Education. It offers CME, medical school rotations, outdoor didactic programming and its own fellowship program. Additionally, the WMS holds its own annual conference.
 - Other organizations involved in Wilderness Medicine include [Wilderness Medical Associates](#), [National Outdoor Leadership School](#), [International](#)

[Climbing and Mountaineering Federation \(UIAA\)](#), [International Commission for Alpine Rescue\(ICAR\)](#) and [International Society for Mountain Medicine\(ISMM\)](#).

- Encourage enrollment in the WMS Fellowship or Diploma in Mountain Medicine (DiMM) program
 - The WMS sponsors a robust fellowship program. Members of the WMS may enroll in the fellowship program. The fellowship involves accumulation of experiential and lecture based credits. Some activities within the residency track would count towards fellowship credits. After completion of 100 credits, which includes a set of rigorous core curriculum in addition to required experience credits, members will be awarded the designation of Fellow of the Academy of Wilderness Medicine (FAWM). This designation recognizes a candidate's training and education in the field of Wilderness Medicine and could be obtained by year three of the residency.
 - The Diploma in Mountain Medicine (DiMM) was developed between the UIAA, ICAR and ISMM in 1997. It is a program designed to train advanced providers in the essentials of caring for patients in the technical mountain environment. A list of diploma courses available is posted by the UIAA.
 - Attend a Wilderness, Mountain, High Altitude, Expedition, Marine or Tropical medicine, Disaster or Tactical medicine conference]
 - [UIAA World Congress of Wilderness Medicine](#)
 - [High Altitude](#)
 - [Marine/Hyperbaric](#)
 - [Expedition](#)
 - [Tropical Medicine](#)
 - [Special Operations Medicine](#)
 - [Disaster Medicine](#)
 - A list of [WMS conferences](#) for which credit is offered can be found at <http://wms.org/conferences/default.asp>
 - Attend residency didactics
 - Topics in Wilderness Medicine are an integral part of the core curriculum of an emergency medicine residency. Involvement in residency didactics will help foster and grow a track participant's knowledge in the core curriculum of Wilderness Medicine.
 - Participate in the activities of the Wilderness Medicine Track group (20.3.4.3)
- Year 2
 - Continue working on FAWM candidacy if desired.
 - Present wilderness topics during residency didactics (20.3.2.2, 20.3.2.3)
 - Those in the Wilderness Medicine track will be encouraged to give a presentation to their residency program about a topic in the core curriculum. This gives the participant experience in education and enriches residency didactics.
 - Choose and present one or several Wilderness Medicine based research papers at residency journal club (20.2.1)
 - Take Advanced Wilderness Life Support
 - Participants in the Track program are encouraged to take a practical training course in wilderness medicine. These courses provide hands on

didactics that go over how to treat common illnesses and injuries in the wild.

- [AWLS](#)
- [NOLS Wilderness Medical Institute](#)
- [Wilderness Medical Associates](#)
- Join and become an active participant in a wilderness medicine organization such as: (20.1.1)
 - Wilderness Medical Society
 - Wilderness Medicine Section, ACEP
 - Wilderness Medicine Interest Group, SAEM
 - Wilderness medicine interest group at local medical school
- Begin planning and implementation of wilderness medicine related research or educational project (20.2.1)
 - <http://www.wms.org/research/default.asp>
 - <http://www.emra.org/content.aspx?id=177>
- Year 3
 - Serve as mentor/advisor for first year residents entering into the Wilderness Medicine Track
 - Work with faculty supervisor to plan activities and didactics for the Track participants for the year
 - Finalize research or educational project (20.2.1)
 - Present research at wilderness conference (20.1.2)
 - Participants in the Wilderness Medicine track will be encouraged to present their research project at either a WMS sponsored conference or at the annual meeting of the Wilderness Medicine Section at ACEP, SAEM ISMM, etc.
 - Complete FAWM
 - After completion of the required credits, candidates will be awarded their FAWM designation and are encouraged to attend the WMS annual meeting to receive a medal of recognition.
 - Present/ Instructor involvement in a wilderness medicine conference
 - Participants will be encouraged to present a didactic lecture or hands on workshop at a wilderness medicine conference outside of their own residency.

Additional Areas for Involvement:

Join an National Committee Interest Group - Administrative requirement **(20.4.4)**

[ACEP Wilderness Medicine Section](#)

[SAEM Wilderness Medicine Interest Group](#)

[EMRA Wilderness Medicine Division](#)

[Wilderness Medical Society](#)

Join Search and Rescue or Disaster Medical Assistance Team

<http://www.publicsafety.ohio.gov/ohf1/applicants/pdf/Medical%20Team%20Manager%20-%20long.pdf>

Take a class sponsored by the National Disaster Life Support Foundation such as Basic Disaster Life Support or Advanced Disaster Life Support

<http://register.ndlsf.org>

Participate in medical student Wilderness Medicine Elective

<http://www.emra.org/committees-divisions/wilderness/wilderness-electives-for-medical-students/>

Summary:

We present a model core content and curriculum for a Wilderness Medicine Track within an Emergency Medicine Residency. We hope that this model may be used by interested faculty and residents to develop such a track within their home residency programs. We believe that such a track would enhance recruitment to the EM program, as medical students often have a keen interest in the outdoors and the topic area. They often choose emergency medicine because they enjoy problem solving, creativity, and improvisation. These are all skills employed in wilderness medicine. The Track would provide a group of interested faculty and residents whose experience and expertise would enhance the didactics and experience of the residency as a whole. The Track provides a framework for the resident with keen interest in wilderness medicine to synchronize the didactics, research and administrative requirements of the residency around the subspecialty of interest. The completion of the FAWM enhances the resident's sense of accomplishment and is an accredited acknowledgement of expertise within the field of Wilderness Medicine. The resident completing the track will have residency credentials which show a synchronous and focused area of specialty interest and experience. This would place the graduating resident in a strong position to seek further training within a Wilderness Medicine Fellowship Program; take a leadership role early in his or her career in a wilderness or rescue organization; seek employment at an academic emergency medicine program or academic medical center; or simply improve his or her chances for a successful emergency physician job search.

References:

1. Lipman G, Weichenthal L, et al. Core Content for Wilderness Medicine Fellowship Training of Emergency Medicine Graduates. *Acad EmergMed*. 2014; 21:204-207. doi: 10.1111/acem.12304
2. Macias D, Rogers K, Alcock J. Development of a Wilderness and Travel Medicine Rotation in an Academic Setting. *Wilderness & Environmental Medicine*. 2004; 15 (2):136-145. doi:10.1580/1080-6032(2004)015[0136:doawat]2.0.co;2.
3. Lareau S, Caudell M, Pandit K, Hiestand B. Medical Student Electives in Wilderness Medicine: Curriculum Guidelines. *Wilderness & Environmental Medicine*. 2014; 25 (4):474-480. doi:10.1016/j.wem.2014.04.014.
4. Donelan S. Wilderness Training for Medical Students—An Introduction. *Wilderness & Environmental Medicine*. 2004;15(2):135-135. doi:10.1580/1080-6032(2004)015[0135:wtfmsj]2.0.co;2.

5. Fielding C. Introducing Medical Students to Wilderness Medicine. *Wilderness & Environmental Medicine*. 2011;22(1):91-93. doi:10.1016/j.wem.2010.11.009
6. Counselman FL, Borenstein MA, et al. for the American Board of Emergency Medicine. The 2013 Model of the Clinical Practice of Emergency Medicine. *Acad Emerg Med*. 2014 May; 21 (5):574-598. doi: 10.1111/acem.12373
7. Regan L, Stahmer s, et al. Scholarly Tracks in Emergency Medicine. *Acad Emerg Med*. 2010; 17: S87-S94. doi: 10.1111/j.1553-2712.2010.00890.x