

Wilderness Medicine Boot Camp for Primary Care Sports Medicine Fellows Goes Virtual: From Uncertain Times Comes a Novel Approach to Traditional In-person Teaching

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ABSTRACT

Wilderness medicine (WM) education is desired in Primary Care Sports Medicine fellowship training. Due to the COVID-19 pandemic and travel restrictions, a virtual wilderness medicine boot camp was created to share a WM experience with learners across the United States. A previously led in-person WM boot camp was converted to lecture format and delivered through video conference. This covered information relevant to WM and the sports medicine certification exam. A post intervention survey was completed by 79.5% of participants (128/161). Participants rated the virtual experience positively. Both fellows and faculty felt the virtual boot camp adequately taught WM topics (fellows [5(4-5)], faculty [5(5-5)], $P < 0.01$). Both felt the virtual experience was sufficient over an in-person boot camp (fellows [4(2.75-4)], faculty [4(4-5)], $P < 0.01$). Due to the ongoing COVID-19 pandemic, it is important to rethink teaching strategies to optimize the opportunities for learners. To date, this is the largest boot camp recorded in the literature. This was a safe and cost effective way to ensure that requirements for a WM experience were met. This virtual course could be adjusted to fit learning objectives of any specialty and tailored to accommodate any level of learning.

Keywords: Virtual, Boot camp, Wilderness medicine, Education, Primary care sports medicine, Survey

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Introduction

The COVID-19 pandemic has caused significant challenges throughout the United States, and the world. In March 2020, the World Health Organization announced the spread of the SARS-CoV-2 virus as a global pandemic. In an attempt to mitigate the spread of the virus, worldwide lockdowns and quarantines were imposed (1). Many schools, including postgraduate, undergraduate, and

elementary education, were closed down to in-person learning and transitioned to virtual education (2). People were asked to socially distance and large gatherings were discouraged. Traditional in-person teaching needed to be reconsidered and new teaching strategies encompassing a more wide population were possible. Through the use of online platforms teachers and students have been able to attend virtual classrooms

from anywhere in the world (2). We have been given the opportunity to rethink the way we teach and learn. Out of the chaos and uncertainty of the COVID-19 pandemic, a virtual national learning opportunity was created and could potentially be an example of future remote learning on a large stage.

Prior to COVID-19, a wilderness medicine boot camp for primary care sports medicine fellows was created (3). Boot camps are a commonly used teaching style for medical education. They have been utilized in medical school, residency, and fellowship education (4, 5). Multiple fellowship boot camps have been reported across varying specialties (4-6). These boot camps are said to be highly efficient as they bring together multiple fellows for focused learning opportunities including didactics and hands-on procedural scenarios. Additionally, simulated scenarios are utilized to expose learners to unique and potentially unusual or high-risk events, in a safe and controlled environment. Through the intentional and orchestrated experience, as well as directed feedback afterwards, the learner is able to develop comfort and confidence with skills that may be difficult to obtain through an uncontrolled clinical environment (7).

Unfortunately due to the COVID-19 pandemic and recommendation for widespread social distancing, repeating the planned experience for a new cohort amidst the ongoing pandemic was not possible. Therefore, the decision was made to convert this to a virtual experience. Prior to this decision, a total of 20 primary care sports medicine fellows who were regionally located had planned to attend the boot camp.

There is currently little literature available regarding wilderness medicine education. Some primary care sports medicine fellowships send their fellows to austere environments to obtain wilderness medicine experiences. This can be time consuming and expensive. One previously reported wilderness medicine course included 3 pediatric residents and occurred over a 3 week period (8).

The purpose of this paper is to share an experience in organizing a large virtual event teaching curriculum on topics that are typically taught in a small group setting with hands on simulations. We hypothesized that through an interactive format we could efficiently communicate board essential learning to a large virtual group, while maintaining the same level of small group interaction and overall positive satisfaction. Outcomes were measured in a post-event survey.

Solution

Virtual Facilities

In order to promote social distancing, a two-way interactive video conferencing platform was used, allowing both presenters and participants to be socially isolated, but still maintain a connection to the group. The Zoom® platform was utilized to facilitate the virtual event as this was the designated video conferencing platform for the origination site; although, any comparable platform would also work.

The lead moderator served as the event host and also helped to keep each speaker on time. Participants were encouraged to mute their microphones if not speaking, to limit noise disruption. The moderator had the ability to mute individual participants as needed.

To encourage audience participation, the chat feature was utilized throughout the day. This allowed questions and responses to be submitted and read by the moderator. Given the large size of the audience, this style kept participants from talking over each other.

Each speaker utilized PowerPoint® to create their presentation. Through the Zoom® platform, presenters shared their screen with the group. This enabled each speaker to transition through their presentation at their own speed, and allowed the audience the opportunity to follow along. Text, pictures, and video were all incorporated in presentations throughout the day. This allowed all teaching points to be demonstrated in a similar fashion if the talks were to be given in person.

Curriculum Design

The curriculum was designed by presenting faculty, all of whom are primary care sports medicine specialists. Information and topics covered in the boot camp were created with the Certificate of Added Qualification (CAQ) exam and similar relevant learning material in mind. In addition, core content for a wilderness medicine fellowship for emergency medicine providers was also used for content guidance (9).

The boot camp was created to be “fellow-centric”, meaning the focus and learning objectives were geared toward fellowship education. The schedule of the day is included as Table 1.

Presenters were allotted 40 minutes to complete their session. In order to allow and encourage audience participation, but facilitate order, each fellow was assigned to a group. Each presentation had a fellow group assigned to it. The presenter was asked to speak for 25 minutes, then review 1-2 cases with interactive question and answer. Questions generally involved clinical decision making. Only fellows were asked to participate and they could respond through the group chat. A moderator would read answers aloud to the group. Cases were slotted for 10 minutes, allowing 5 minutes of time for other questions and attending comments before the next lecture began. Each group was scheduled to participate in the interactive component of two lectures. Fellows and attending physicians were encouraged to

listen to all lectures and submit questions through the chat, which would be shared with the presenter through the moderator. A second moderator was utilized during the day to relieve the primary moderator of his duty for brief periods of time.

Because of the national nature of the event, the start time was 10 AM Eastern Standard Time, to allow those on the west coast to join at a reasonable hour. Participants were encouraged to take breaks at their leisure, and to turn off their video so not to disrupt the group.

Presenters

All presenters were faculty members of an ACGME accredited PCSM fellowship program. Each faculty member is CAQ certified and had a range of teaching experience from 3 to 14 years (average 7.3 years).

Participants

Boot camp participants included primary care sports medicine fellows from across the USA. Using the primary care sports medicine list serve, an email was generated to contact all fellowship program directors and notify them of the opportunity. Those interested were encouraged to respond directly to the program coordinator who kept their names, programs, and email addresses. The course was free of charge to all participants.

All primary care sports medicine fellows and fellowship faculty were invited to

Table 1. 2020 Wilderness Medicine Boot Camp Agenda

| Agenda reflects Eastern Standard Time | | |
|---------------------------------------|---|---------|
| 10:00 AM | Conference Start- Introduction | |
| 10:10 | Hypothermia | Group A |
| 10:50 | Hyperthermia | Group B |
| 11:30 | Altitude Sickness | Group C |
| 12:10 | Break | |
| 12:20 | Envenomation + Lightning Strike | Group A |
| 1:00 | Mass Casualty | Group B |
| 1:40 | Improvise Splinting | |
| 2:00 | Communication/ Extraction Decision Making | Group C |
| 2:20 | Wilderness medicine kit | |
| 2:40 | Wrap up | |
| 3:00 | Adjourn | |

attend regardless of their residency training background. It is difficult to know exactly how many participants took part in the virtual boot camp. The most participants, including fellows and faculty, logged on to the event throughout the day was 161. Based on a post-event survey, the primary specialty background of participants included Family Medicine (66%), Pediatrics (10%), Physical Medicine and Rehabilitation (10%), Emergency Medicine (7%), Internal Medicine (5%), and Med/Peds (1%).

Program Evaluation

Participants were asked to complete a survey following the event. The survey-tool was approved as exempt from review by the Institutional Review Board. To assess how well the virtual boot camp taught wilderness medicine information, two statements were presented to each participant, as seen in Table 2. Answers were assessed using a 5-point Likert scale. An answer of 5 indicated the participant strongly agreed. Similar survey questions have been reported to evaluate previous fellowship boot camps (3, 4).

Results and Conclusions

In total, 82 fellow and 46 faculty participants completed the post survey. Median and Interquartile Range (IQR) survey response data suggests that all members found this virtual boot camp to be successful at teaching wilderness medicine concepts. Both faculty and fellows indicated neutral to strong agreement that the virtual boot

camp was sufficient over an in-person event for teaching wilderness medicine (Table 3). Faculty seemed to feel an in-person event was less needed than fellows. The difference between fellow and faculty responses were found to be statistically significant as determined through a Mann Whitney U test.

Although the literature is limited, boot camp events have been shown to be an effective way to efficiently teach various topics within graduate medical education (4-8). They allow for a multi-institutional learning experience. Due to the COVID-19 pandemic, a planned wilderness medicine boot camp was converted from an in-person to virtual experience. Although there was some concern regarding this change, event survey data demonstrated it was well received by participants. All participants found that the virtual experience adequately taught wilderness medicine topics.

It is difficult to draw comparisons to prior medical education boot camps, as this is the first virtual boot camp that has been studied and reported in the literature. In a previous study by Patel et al., pediatric anesthesiology fellows felt they had increases in their knowledge and self-confidence after a boot camp experience (7). This was following an in-person, hands-on boot camp. It is interesting to note that the participants of this virtual boot camp felt the information was taught adequately, and felt the event did not need to occur in person.

The virtual experience allowed us to reach out to participants nationally, which

Table 2. Summary of survey questions for the 2020 Virtual Boot Camp

| Summary of Post-BC survey questions | |
|-------------------------------------|---|
| 1. | I feel today's boot camp adequately taught wilderness medicine topics. |
| 2. | I feel the virtual experience was sufficient to learn wilderness medicine topics (i.e. does not need to be done in person). |

Table 3. Survey results of 2020 Virtual Boot Camp

| | # of Completed Surveys | Taught adequately | | Sufficient experience | |
|---------|------------------------|-------------------|-------|-----------------------|----------|
| | | Median | IQR | Median | IQR |
| Fellow | 82 | 5 | (4-5) | 4 | (2.75-4) |
| Faculty | 46 | 5 | (5-5) | 4 | (4-5) |
| P value | | <0.01 | | <0.01 | |

provided an opportunity for fellows across the United States to engage in a WM experience. Prior to the course being made virtual, 20 local fellows were scheduled to attend the boot camp. Virtually, 102 fellows participated in the boot camp. Similarly, 11 different fellowships had planned to attend in person. Virtually, 65 different fellowships from across the country were able to join the experience. In the end, this was a much larger boot camp than those previously described. In a study by Ceresnak et al., 16 fellows engaged in a pediatric cardiology boot camp (10). Another procedure-focused boot camp included only 10 fellows (11). In a meta-analysis of medical education boot camps, studies reported the size from 6 to 47 participants (5). Therefore, to the authors' knowledge, this virtual format allowed for the largest studied boot camp to date.

Despite the many strengths of this virtual format, there were several limitations to our boot camp. By doing the event virtually, participants missed out on the benefits of hands-on learnings that is traditionally offered through in-person teaching. Learners were not able to handle or manipulate equipment that they may never have seen before. Using pictures and descriptive language, presenters did their best to recreate the experience, but it is difficult to match the real work on the field. Similarly, previous in-person boot camps have utilized simulated scenarios to teach various concepts and techniques (3, 4). Again, presenters walked through specific wilderness medicine cases, allowing the audience to participate, but this was a limited experience. Working through treatment scenarios, alongside a group of people you may not have met before, and creating a team based treatment approach is something that could not be created virtually. The social cues and principles of working in a team will never be able to be created in a virtual platform.

As the COVID-19 pandemic continues to evolve and affect the world in various ways, medical education needs to further adapt. Faculty will need to continue to be flexible with teaching strategies. The above

experience demonstrated that a virtual experience could be well received, effectively disseminate information, and teach topics that were previously taught in small-group, in-person experiences. This teaching format could be adapted to countless topics, training levels, and specialties, and we hope this can act as a guide for the creation of new virtual boot camps and learning opportunities.

Lessons Learned

There are several ideas that could improve future virtual boot camps. It was difficult to communicate with speakers if they approached the end of their allotted speaking time. There is now a countdown timer function that can be displayed to notify speakers of their remaining time. Another option would be to prerecord each lecture, but this may detract from the engaging, "in-person" feel that was being created. Developing videos to demonstrate described techniques would provide a visual representation of things being discussed.

Ethical Considerations

There were no ethical concerns in this study. The survey-tool was approved as exempt from review by the Penn State University Institutional Review Board.

Authors' Contributions

JL was the boot camp creator and prepared the initial draft. CO and SF were boot camp instructors and critically revised the manuscript. AB provided data and statistical analysis. DR helped create the study concept and critically revised the manuscript. All authors read and approved the final submitted version.

Conflict of Interest

The author declares that there is no conflict of interest.

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