

tools for practice in resource-limited settings. We created a medical student elective which delivered core content related to wilderness medicine, environmental illness and disaster preparedness and response, along with overarching skills including improvisation, teamwork, and resource allocation.

Method: Content experts partnered with educational design specialists to create a new student experience. We identified key impact areas using an analysis of courses at peer institutions, informal surveys, and published literature. Learning objectives were informed by relevant skills and content, as well as the cross-cutting goal of teaching students to perform in resource-limited settings.

A four-week curriculum was conceptualized, including lectures, workshops and skill sessions, synchronous and asynchronous online experiences, and a five-day backcountry trip focusing on *in situ* simulation and skills training. The course was offered in May 2021 and May 2022. Students completed post-course surveys regarding the utility of course elements, as well as teaching effectiveness.

Results: Overall satisfaction was 3.64/4.00. Self-reported competence increased in the domains of diagnosis and pathophysiology, treatment, teamwork, and resource management and improvisation. Qualitative data suggested that students are generally under-exposed to wilderness, environmental and disaster content. Self-reported helpfulness of learning activities was greatest for small-group outdoor workshops, and least for large teleconference-based sessions.

Conclusion: Strengths included interactive coursework reflecting teamwork, open access learning modules, and rubric-based assessment structures. Limitations include pandemic-related restrictions in group activities as well as limited objective measurements of knowledge and skills. Future goals include increasing in-person learning, dissemination of the curriculum to larger groups of learning, and development of reproducible performance measures.

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Medical Students' Education in Disaster Medicine: A Systematic Literature Review of Existing Curricula

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Introduction: Disaster Medicine (DM) is currently underrepresented in medical schools' curricula worldwide, and existing DM courses for medical students are extremely heterogeneous due to the lack of pragmatic and standardized guidelines. Moreover, there is a gap in knowledge regarding the curriculum development methodology used for DM courses. This study aims to identify DM courses for medical students worldwide and to map their curriculum development methodologies by reviewing available literature.

Method: The search was conducted on three databases using the terms "Disaster medicine" AND "Education". Following the PRISMA approach, twenty-five articles that described the content and implementation of DM curricula were included in the analysis.

Results: Nine studies thoroughly described the curriculum development process. Expert opinion and literature review were the methodologies mostly used to develop DM curricula. Only four studies followed a multi-method process made up of four different methodologies, including expert opinion, literature review, survey, and Delphi methodology. Most of the courses adopted a face-to-face approach combining different training modalities, including the use of virtual reality simulations and drills.

Conclusion: This systematic review provides a compendious analysis of the curricula and curriculum development processes in DM training for medical students. The scarce usage of reproducible, comprehensive curriculum development methodologies and consequently a great heterogeneity of the covered topics and course design were brought forward. Therefore, there is a need for standardization in DM education. Overall, this systematic review highlights the need for evidence-based educational curricula in DM and provides recommendations for developing DM courses following a scientific approach.

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Analysis of Delphi Study Seven-Point Linear Scale Data by Parametric Methods—Use of the Mean and Standard Deviation

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Introduction: The Delphi technique is a unique survey method that involves an iterative process to gain consensus when consensus is challenging to establish and is widely used in Disaster Medicine research. Participants typically rate a variety of statements using a specified rating scale. The survey is repeated for several rounds, and at each round statements that do not reach a predefined level of consensus are advanced to the next round while giving the participants information about the responses of other participants for their comparison. The final statements are then ranked in order of the average rating. The statistical methods to analyze Delphi studies are not well described. This study investigates the use of a 1 to 7 linear rating scale along with parametric summary statistics for assessment of consensus and ranking of statements.

Method: A study set of 9297 individual ratings on the 1 to 7 scale were obtained from previously performed Delphi studies and used to create 490,000 simulated Delphi ratings with various numbers of participants.

Results: While the overall distribution of ratings was strongly left skewed the sampling distribution was near normally distributed for studies with five or more participants. The average difference between the standard deviation and interquartile range was $-0.26/7$. The overall risk of falsely concluding consensus using the standard deviation as a summary statistic was 7.3% when compared to using the interquartile range. The average difference between mean and median was $-0.20/7$. The risk of falsely ranking the statements by a value of 0.5 or more was near zero for all sample sizes when the mean was compared to the median.

Conclusion: This study suggests that the use of the 1 to 7 linear rating scale in combination with the parametric summary statistics of standard deviation and mean is a valid method to analyze ratings from Delphi studies.

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Mixed Reality—Exploring the Requirements of Realism in the Context of Mass Casualty Incident Training

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Introduction: The occurrence of mass casualty incidents is increasing globally. Training is an essential cornerstone in achieving disaster preparedness, yet studies show that medical first responders perceive their level of readiness to face disaster incidents as inadequate. As real-world disaster training exercises can be characterized as resource-intensive in terms of cost and time, virtual training environments have been highlighted as a potential alternative to mass casualty incident training. In order to increase the preparedness of medical first responders, a deeper understanding of their requirements in the context of disaster training exercises is needed.

Method: Individual, contextual interviews were conducted with a total of 26 medical first responders from four European emergency service organizations: Hellenic Rescue Team (Greece), Summa 112 (Spain), Sanitätspolizei Bern (Switzerland), and Johanniter Österreich (Austria). The interviews were analyzed using qualitative content analysis.

Results: The preliminary results indicate that real-world disaster training exercises have limitations regarding realism. The participants described a need to train in an environment that accurately represents what they might face amidst a real-world incident site. This included the recreation of potential environmental dangers that had to be taken into consideration before approaching the incident site. The participants also highlighted the importance of realistic representations of injuries and reactions from the victims during training. The limited possibilities to provide a realistic training environment that corresponds to

the set requirements lead to the participants feeling less prepared to face a real-world mass casualty incident.

Conclusion: Medical first responders' need for increased realism in real-world disaster training exercises deserves attention. Training solutions that could potentially increase the level of preparedness needs to be taken into consideration. How the degree of realism in Virtual or Mixed Reality based training platforms affects the perception of preparedness among medical first responders warrant further research.

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Developing a HazMat Decontamination Training Program for a Hospital in Singapore for National Emergency Preparedness.

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Introduction: Sengkang General Hospital (SKH) is a part of the national network of hospitals to respond to civil emergencies including hazardous material (Hazmat) incidents in Singapore. The HDS course aims to train our staff on basic knowledge of the effects of hazardous material exposure and the operations of the HDS.

Method: HDS course was planned in three phases:

Phase one aimed to train all DEM personnel so as to have a critical mass of personnel equipped to operate the HDS upon immediate notice. Phase two involves hospital staff from non-emergency departments. Material and simulations for phase two was simplified to focus on the skills and prompt decontamination. Phase three aims to test out capabilities of HDS and review processes through department simulations and hospital.

Results: 155 staff have completed HDS training since 2019, amongst them, 23 as instructors. 67.7% found the demonstrations, skills and practices exceeded expectations. 69% were able to apply skills taught during simulation and overall, 71.2% were able to understand topics covered in the modules.

SKH was at the forefront of battling Covid-19 and resources were tight. We have resumed trainings to complete Phase two. We aim to train more than 35% of manpower in non-emergency departments to achieve higher recall.

Conclusion: Training for national emergencies is challenging. HDS is located right outside the emergency department and has advantages of allowing smooth traffic to decontaminate patients and prompt treatment. However, training can get disrupted with incoming ambulances, patient influx and lack of resources.

SKH aims to be well prepared in handling pandemics and still maintain its capabilities in assisting in national emergencies. There are plans for hospital simulation exercises for all relevant stakeholders and internal and external reviews are required to improve decontamination systems and processes. It is important to continue training hospital personnel to support HDS during crises.

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