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Commentary

Teaching Resilience and Recovery: Disaster Medicine for Medical and Healthcare Professional Educators

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In today's increasingly unstable world—shaped by natural disasters, pandemics, climate change, and humanitarian crises—the role of healthcare professionals must extend beyond routine care to encompass effective crisis response (1). The global COVID-19 pandemic exposed critical gaps in health workforce readiness, supply chain management, and public health communication. Many frontline workers operated without adequate protection, support, or mental health resources, underscoring the urgent need for formal disaster medicine training.

This need is equally evident in local contexts. In Bangladesh, the recent tragic plane crash into Milestone School on 21 July 2025 and the collapse of Rana Plaza on 24 April 2013 revealed significant deficiencies in emergency preparedness and healthcare system response. These mass casualty incidents exposed the lack of structured training in triage, trauma care, inter-agency coordination, and psychological first aid—competencies essential for managing disasters effectively.

Disaster medicine is emerging as a critical field, gaining recognition due to the growing frequency and intensity of global disasters (2,3). Despite its increasing importance, disaster medicine remains underrepresented in most traditional medical curricula (1,4). Many programs mistakenly assume that emergency medicine training is sufficient, overlooking the distinct realities of disaster situations—limited resources, infrastructure collapse, complex ethical dilemmas, and intense emotional strain.

Integrating disaster medicine and resilience training into health professions education is therefore imperative. This can be achieved through multidisciplinary, simulation-based approaches that prepare learners for high-pressure, unpredictable environments (5). Alongside clinical skills, such programs must cultivate resilience to help healthcare workers manage prolonged stress, uncertainty, and emotional fatigue (4,6).

As disasters grow in frequency and complexity, equipping healthcare professionals to respond effectively—and to recover and lead in times of crisis—is not merely desirable; it is essential. This commentary explores the importance, core components, and pedagogical strategies for teaching resilience and recovery in disaster medicine, offering practical insights for educators preparing future healthcare professionals for crisis scenarios.

The Case for Disaster Medicine in Healthcare Education

Disaster medicine encompasses the science and practice of addressing healthcare needs during large-scale emergencies such as earthquakes, floods, pandemics, mass casualties, and other man-made or natural catastrophes. It demands an interdisciplinary approach that includes emergency medicine, public health, logistics, mental health, ethics, and leadership. Educating community members, particularly health workers, in disaster medicine is essential for disaster preparedness and planning (7). The need for disaster medicine education at the undergraduate level has been well-documented (8) and continues to gain prominence. While still a relatively new and evolving field, its significance is increasingly acknowledged.

Healthcare professionals are often first responders during disasters, expected to act quickly and effectively under extreme stress. Yet, conventional medical curricula tend to overlook disaster medicine, frequently assuming that emergency medicine training is sufficient (1,4,5). In reality, disaster contexts differ vastly: resources are limited, infrastructure may be damaged, and professionals must make complex ethical decisions in high-pressure situations. The psychological burden can also be substantial.

Incorporating disaster medicine and resilience training into medical curricula ensures that graduates are not only competent in managing emergencies but also equipped to safeguard public health and their own mental well-being (9). Curricula should include practical training in managing emergencies across diverse environments—from wilderness settings to active shooter incidents (10). Elective courses in disaster medicine have been well received by students and are associated with improved performance and engagement. Several countries, including the United States (11) and Germany (12), as well as European institutions such as the Research Center in Emergency and Disaster Medicine and Computer Science Applied to Medical Practice, in Italy (8), have proposed multidisciplinary curricula that involve simulation and human factors training.

Teaching Resilience: Beyond Clinical Competence

While technical competence is essential during emergencies, mental resilience is equally critical. Resilience refers to the ability to recover from adversity, adapt to change, and maintain psychological stability. For healthcare professionals, this includes coping with patient loss, overwhelming demands, moral conflicts, and threats to personal safety (13). Including resilience training in medical education can help students develop the emotional tools necessary to withstand the pressures of both training and practice (14).

Teaching resilience involves more than motivational speeches or occasional wellness workshops—it must be embedded into the curriculum through a structured, evidence-based approach. Core components may include:

- *Resilience workshops* are offered at the start of clinical placements to provide students with stress management and coping strategies, aiming to reduce burnout and enhance emotional regulation (15).
- Training in stress management techniques, including mindfulness, cognitive-behavioral strategies, and relaxation exercises.
- *Reflective practice* that enables students to process clinical experiences and develop emotional insight (16).
- *Peer support systems* and structured debriefings following simulations or real-life disaster events (17).
- *Role-playing* and scenario-based learning help students navigate uncertainty, address ethical challenges, and manage resource constraints effectively.
- *Formative feedback* on students' emotional resilience during clinical placements, supporting self-awareness, stress management, and professional growth (18).

Evidence suggests that resilience training can reduce burnout, enhance decision-making in high-stress environments, and improve job satisfaction—all essential outcomes in disaster contexts.

Recovery: A Core Learning Objective

Disaster medicine must address not only immediate response efforts but also the longer-term process of recovery. Recovery includes restoring healthcare services, rebuilding infrastructure, supporting community mental health, and learning from past experiences to improve future preparedness.

Embedding recovery concepts into medical curricula encourages students to think beyond the acute crisis phase and consider systemic, long-term impacts (19). They learn that disasters exist within a broader framework of mitigation, preparedness, response, and recovery—the four pillars of emergency management.

Case-based learning can expose students to successful and unsuccessful recovery efforts. For example, examining healthcare reconstruction in post-earthquake Haiti or public health responses after Hurricane Katrina offers rich opportunities for reflection and learning (20).

Pedagogical Strategies for Effective Integration

Despite challenges in fitting new content into already packed curricula, educators can adopt creative and interdisciplinary strategies to incorporate disaster medicine effectively (4,5,21):

- *Simulation-based learning:* High-fidelity simulations such as mock disaster drills, mass casualty scenarios, and pandemic exercises provide immersive and realistic experiences.
- *Interprofessional education (IPE)*: Collaborative training for medical, nursing, pharmacy, and public health students fosters teamwork and communication—essential during disasters.
- *Problem-based learning (PBL)*: Disaster scenarios in PBL settings promote critical thinking and collaborative decision-making.
- *Service-learning and community engagement*: Involvement with local disaster response teams or community resilience projects offers hands-on, contextual learning.
- *Online and hybrid modules*: Especially useful in global and resource-limited settings, digital platforms (e.g., WHO and FEMA resources) can enhance accessibility and supplement in-person training.

Faculty Development and Institutional Support

Successful integration requires that faculty be adequately trained in disaster medicine content and pedagogy (22). Institutions must invest in faculty development programs that empower educators with the necessary expertise and teaching tools (23).

Curriculum mapping can help identify overlap between disaster medicine and existing content (e.g., emergency medicine, ethics, public health), offering strategic entry points for integration. Support from accrediting bodies and national education standards is also crucial in legitimizing and promoting disaster medicine education as a core component of training.

Global Relevance and Equity

Disasters disproportionately affect low- and middle-income countries, where healthcare systems are often under-resourced (24). Therefore, disaster medicine curricula must be adapted to reflect regional challenges and capabilities. While high-income nations may emphasize advanced simulations and technology-driven learning, resource-limited settings may prioritize community engagement, low-cost innovations, and culturally grounded resilience strategies (25).

Global partnerships are key. Institutions in high-resource settings can collaborate with those in lower-resource areas to co-create disaster education programs tailored to local needs. Faculty and

student exchanges, as well as joint research initiatives, can further strengthen global disaster preparedness and health system resilience.

Conclusion

Disasters are no longer rare occurrences—they are inevitable. Future healthcare professionals must be trained not only to deliver clinical care but also to lead and sustain healthcare systems during times of crisis. Teaching resilience and recovery as integral elements of disaster medicine prepares students to serve with competence, empathy, and resolve in the most demanding circumstances.

The integration of disaster medicine into health professions education is more than a curricular enhancement—it is an ethical necessity. As educators, we have a responsibility to equip future healthcare workers with the skills and mindset needed to face the uncertainties of our world with confidence and compassion.

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