SPECIAL REPORT

Professionalization of Disaster Medicine—An Appraisal of Criterion-Referenced Qualifications

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Abbreviations:
ERC = Emergency Relief Coordinator
HRR = Humanitarian Response Review
IASC = Inter-Agency Standing Committee
NGO = non-governmental organization
SMART = Standardized Monitoring and Assessment of Relief and Transitions
UN = United Nations
WHO = World Health Organization

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Abstract

The landmark Humanitarian Response Review, commissioned by the United Nations Emergency Relief Coordinator in 2005, has catalyzed recent reforms in disaster response through the Inter-Agency Standing Committee. These reforms include a "cluster lead" approach to sectoral responsibilities and the strengthening of humanitarian coordination. Clinical medicine, public health, and disaster incident management are core disciplines underlying expertise in disaster medicine. Technical lead agencies increasingly provide pre-deployment training for selected health personnel. Moreover, technical innovations in disaster health sciences increasingly are disseminated to the disaster field through multi-agency initiatives, such as the Standardized Monitoring and Assessment of Relief and Transitions (SMART) initiative.

The hallmark qualification of competency to render an informed opinion in the health specialties remains specialty board certification in North American healthcare traditions, or specialty society fellowship in British and Australasian healthcare traditions. However, disaster incident management training lacks international consensus on hallmark qualifications for competency. Disaster experience is best characterized in terms of months of full-time, hands-on field service. Future practitioners in disaster medicine will see intensified efforts to define competency benchmarks across underlying core disciplines as well as key field performance indicators. Quantitative decision-support tools are emerging to assist disaster planners and medical coordinators in their personnel selection.

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Introduction

In this report, a *disaster* is defined as a phenomenon that produces large-scale disruption of societal infrastructure and the normal healthcare system, presents immediate threat to public health, and requires external assistance for response.

Consistent with this definition, clinical medicine, public health, and disaster incident management have been characterized as core disciplines underlying expertise in disaster medicine.[1,2] Key competencies relevant to disaster medicine are presented in Table 1. Disaster medicine remains an inter-disciplinary body of knowledge; a conceptual framework of this is illustrated in Figure 1. While the three core disciplines do not address all issues relevant to disaster health—engineering, economics, anthropology, sociology, and religion among those unmentioned—the core disciplines embrace fundamental technical expertise required within the health sector.

This article examines professionalization of disaster medicine through criterion-referenced qualifications with a particular focus on utility for medical coordinators in international disaster settings.

Current Context

Under United Nation (UN) General Assembly Resolution 46/182, the UN established the Inter-Agency Standing Committee (IASC) in 1992 as the primary mechanism for inter-agency coordination of humanitarian response

Clinical Medicine	-prehospital care, treatment and transport -standardized case management (common diseases and injuries of primary care, as well as disaster-specific pathology, relying on standardized case management tools embodied in the Integrated Management of Childhood Illness, reproductive health Minimum Initial Service Package, and Interagency Emergency Health Kit, etc.) -referral thresholds, rules for denial
Public Health	-rapid epidemiological assessment -environmental health -hazardous material handling and safety -epidemic preparedness -outbreak investigation and communicable disease control -immunization programs -disease surveillance -health policy and personnel planning
Disaster Management	-site security -urban search and rescue -hazard analysis, vulnerability reduction -inter-agency coordination (incident command systems vs. emergency operation centers) -medical logistics -geographic information systems -public information and media relations -community recovery

Table 1—Core disciplines and key competencies in disaster medicine

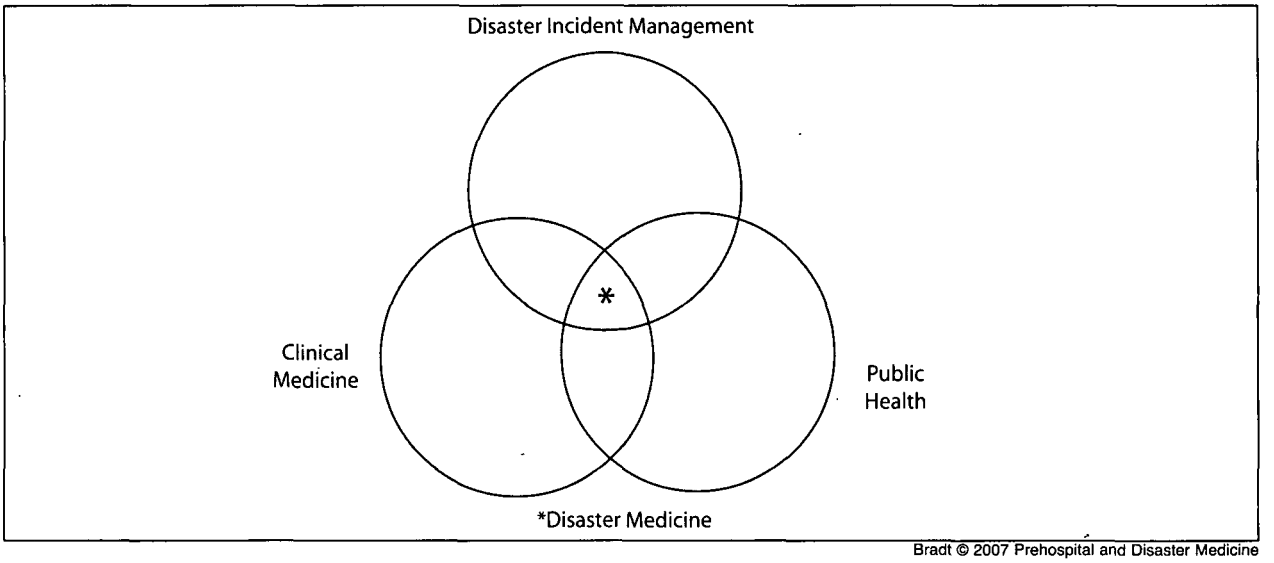

Figure 1—Conceptual framework of core disciplines in disaster medicine[2]

to disasters internationally.[3] The IASC is comprised of full members from UN agencies along with standing invitees from Red Cross and non-governmental organizations (NGOs). The IASC is chaired by the UN Emergency Relief Coordinator (ERC) who serves as Under-Secretary-General for Humanitarian Affairs.

In 2005, the ERC commissioned an independent report to examine the humanitarian response capacities of the three international humanitarian networks (UN, Red Cross/Red Crescent Movement, and NGOs), to identify gaps, and to make recommendations for addressing them. The report was published in August 2005 as the Humanitarian Response Review (HRR).[4]

One of the major gaps identified in the HRR was the low level of preparedness of the humanitarian organizations—particularly in terms of human resources and sectoral capacities. In order to strengthen response capacities, the HRR recommended the development and application of benchmarks and indicators to measure performance with priority placed on human resources.

The HRR has since catalyzed reform of humanitarian activities in IASC member agencies to bridge these long-standing and serious gaps in humanitarian assistance. Member agencies in the IASC are pursuing four major reforms intended to increase overall predictability, effectiveness, and accountability in humanitarian responses. These reforms include: (1) developing a "cluster lead" approach to sectoral responsibilities; (2) strengthening humanitarian coordination; (3) revising funding mechanisms; and (4) building more effective partnerships.[5]

Sector	Cluster Lead
Technical Areas	
Nutrition	UNICEF
Health	WHO
Water/Sanitation	UNICEF
Emergency Shelter	UNHCR (conflict-associated disasters with IDPs) IFRC (natural disasters)
Cross-Cutting Areas	
Camp coordination/Management	UNHCR (conflict-associated disasters with IDPs) IOM (natural disasters)
Protection	UNHCR (conflict-associated disasters with IDPs) UNHCR/OHCHR/UNICEF (disasters without significant displacement)
Early Recovery	UNDP
Common Service Areas	
Logistics	WFP
Telecommunications	OCHA (overall) UNICEF (common data services) WFP (common security telecommunications)

Table 2—Global "Cluster Leads"[6] (IDP = internally displaced persons; IFRC = International Federation of Red Cross and Red Crescent Societies; IOM = International Organization for Migration; OCHA = Office for the Coordination of Humanitarian Affairs; OHCHR = Office of the High Commissioner for Human Rights; UNHCR = United Nations High Commissioner for Refugees; UNDP = United Nations Development Programme; UNICEF = United Nations Children's Fund; WHO = World Health Organization; WFP = World Food Programme)

A cluster lead is an agency with expertise and capacity that has agreed to serve in the lead role for a specific technical sector or crosscutting domain. These sectors are presented in Table 2. The aim of the cluster lead approach is to strengthen system-wide preparedness and technical capacity to respond to humanitarian emergencies by ensuring predictable leadership and accountability in the main sectors of humanitarian response.[6] Cluster leads are responsible for establishing partnership bases that set standards and policy, build response capacity, and provide operational support. A significant concept in the cluster lead's added value over traditional sectoral coordination efforts remains the accountability enshrined as the provider of last resort.

Rules of engagement and expectations for cluster leads continue to evolve as humanitarian stakeholders express their concerns and practice experience informs the process. At least three Nobel Peace Prize winning humanitarian organizations have contested different aspects of the cluster system. The International Federation of Red Cross and Red Crescent Societies agrees to engage the cluster system, but rejects the concept of cluster lead in favor of "convener", and where it serves as convener for emergency shelter, it refuses to serve as the provider of last resort. The UN High Commissioner for Refugees also agrees to engage in the cluster system, but stipulates that at the country level, any of three different UN agencies ultimately may serve as lead for protection.[6] Medécins sans Frontiéres refuses to join the cluster system.

The World Health Organization (WHO) serves as the global cluster lead for health. Following the Indian Ocean Tsunami of December 2004, the World Health Assembly, in May 2005, directed the WHO to intensify support for member states affected by disasters through needs assessments, health coordination, gap filling, and capacity building.[7] As a means to fulfill that mandate, the WHO started a pilot training course in November 2005 to prepare health professionals who can rapidly, safely, and efficiently be deployed in crises as part of public health response teams, and who can perform effectively as part of an inter-agency field team.[8] At the same time, a regional meeting of countries from South East Asia, convened by WHO/SEARO, called for benchmarks in human resource development, training, and education.[9]

By the following year, the IASC's Global Health Cluster had codified eight core commitments. The first commitment was to establish rosters of skilled, trained, and prepared professionals.[10] The 2006 Global Health Cluster Work Plan now addresses a range of technical issues such as assessments, coordinated responses, and training through *ad hoc* subgroups.

Specialist Clinician Attribute	Epidemiological Ground Truth
Western trained	African/Asian disasters
Hospital-based	Out-of-hospital treatments
Resource enabled	Resource constrained
Technology dependent	Low technology
Procedurally oriented	*Infrequent procedures*
Invasive	Non-invasive
Monolingual	Polylingual
War naive	War prone

Table 3—Limitations of specialist clinicians in international disaster response

Clinical Medicine and Public Health Competency

Disaster epidemiological data inform the healthcare skill sets appropriate for disaster medicine. During the last decade, even excluding disasters of conflict, 60% of global disasters occurred in Africa and Asia. Eighty percent of global disaster deaths and 90% of global disaster-affected populations were in Asia.[11] In these populations, demographic data have demonstrated median ages of 15 years, disproportionate absence of adult males, and 40% of childbearing females pregnant.[12] Disease burdens in disasters are well-described and include common illnesses in the affected areas complicated by hazard-specific effects on communicable disease risks, trauma, and food scarcity. In complex emergencies, particularly in developing countries, between 60% and 90% of deaths have been attributed to one of four major infectious causes: (1) measles; (2) diarrhea; (3) acute respiratory infections; and (4) malaria.[13] Effective case management of communicable diseases in complex emergencies requires linkages to environmental health, immunization, health education, and disease surveillance.[14] Non-communicable disease burdens are well-recognized to include trauma as well as reproductive and mental health.[13]

Clinical skills required of disaster medicine practitioners are influenced by the demography of the disaster-affected populations, type of pathology, case mix, and clinical complexity. Epidemiological justifications exist for clinical skills in pediatrics, obstetrics, emergency medicine, internal medicine, infectious diseases, tropical medicine, surgery, rehabilitation medicine, and psychiatry. Thus, the multidisciplinary challenges of disaster medicine have led to calls for the "crossing of professional boundaries" by health professionals.[15] This call places the burden on disaster medicine practitioners of obtaining multi-disciplinary training in pursuit of disaster medicine expertise.

Field conditions with limited resources place predictable constraints on specialist clinicians, particularly in international disaster settings (Table 3). This is recognized by the International Committee of the Red Cross, whose approach to standardized case management of war surgery explicitly calls for basic surgical principles, basic surgical tools, no specialist surgery, and no onward referral.[16] Thus, optimal disaster patient care relies upon specialist insight into the problems of case management coupled with the ability to improvise amid the resource limitations of the disaster setting. A provider with case management experience in multiple clinical disciplines proves particularly useful in managing the diversity of patients encountered during a disaster. This multi-disciplinary "generalist" contrasts sharply with both the undifferentiated generalist lacking in-depth case management expertise in any field, as well as the specialist with case management expertise in only one field.

In addition to clinical expertise, disaster medicine practitioners need broad public health skills particularly in environmental health, communicable disease control, disease surveillance, and survey science. Consensus opinions have prompted multi-agency initiatives to disseminate refinements in public health practices in the field to best serve beneficiary populations. For example, the Standardized Monitoring and Assessment of Relief and Transitions (SMART) initiative extensively has addressed controversies in mortality indicators, nutritional measurements, and food security assessment.[17] The Tracking of Health Performance and Humanitarian Outcomes project has attempted to address the statistical anarchy of multiple, incomplete, and competing field surveys.[18]

Disaster medicine practitioners also must be aware of non-compliance with accepted health standards in clinical medicine and public health aspects of disaster response. Minimum standards during a disaster response, as codified in the *Sphere Handbook*, have gained progressive acceptance since their inception in 2000. Nonetheless, efforts to comply with them are undermined by changes in the assistance paradigm. Recent UN field documentation of major disasters, such as the Darfur genocide, reveals little attempt to track minimum standards in favor of indicators tracking the magnitude of the "assisted population".[19] The use of process indicators rather than outcome indicators as evidence of achievement, and the failure to quantify "assistance" significantly erode the concept of minimum standards. Measures of effectiveness in disasters are well-defined in the disaster literature as operationally quantifiable management tools that provide a means for measuring effectiveness, outcome, and performance of disaster management.[20,21] Defining minimum standards of care and measuring progress toward those standards, are obligatory steps in implementing disaster best practices. Recognizing departure from these standards is a fundamental step toward identifying potential disaster malpractice.

Health professionals worldwide, recognizing both field needs and constraints, have attempted to detail professional competencies required in disaster medicine. Recommendations have emerged from disaster-related special interests groups, professional trade associations, academic institutions, and individual scholars.[22–26] These recommendations encompass a broad array of healthcare workers and specializations.

At present, education and training in disaster medicine is flourishing at academic medical centers. By 2005, there were 14 disaster fellowships based at academic medical

Clinical Medicine	Public Health
Specialty board certification	Specialty board certification
Specialty board eligibility	Specialty board eligibility
MD, DO, MBBS or equivalent	DrPH, DSc, or equivalent
RN, nurse clinical specialist	MPH, MHS, MSPH, MAE, FETP
Diploma courses (DTM&H, DCH, paramedic courses)	Diploma courses

Table 4—Spectrum of qualifications in health specialties, rank ordered by time to accomplishment (DCH = Diploma of Child Health; DO = doctor of osteopathy; DrPH = doctor of public health; DTM&H = Diploma of Tropical Medicine; FETP = field epidemiology training program; MBBS = Bachelor of Medicine and Bachelor of Surgery; MAE = Master of Applied Epidemiology; MD = medical doctor; MPH = Master of Public Health; MSPH = Master of Science in Public Health; RN = registered nurse)

centers in the US.[27] Many of these are housed in departments of emergency medicine. In Europe, with different traditions of allopathic specialization, other departments are hosting such fellowships. In this ever-widening educational environment, pilot tools have emerged to facilitate information-sharing and curriculum development in disaster health education.[1]

While the appropriate degree and type of clinical training required for expertise in disaster medicine remains internationally unsettled, there is broad recognition of multi-specialty relevance to disaster medicine. There is increasing recognition that some form of clinical specialty training is needed as a precursor to competence in disaster medicine. In the US, a certifying body of physician specialties plans to offer a disaster medicine certifying examination open to graduates of any residency accredited by the US Accreditation Council for Graduate Medical Education, the American Osteopathic Association, or the Royal College of Physicians and Surgeons of Canada.[28]

Criterion-referenced qualifications acquired through post-graduate degree programs in medicine and public health are rank-ordered in Table 4. The hallmark qualification of competency is specialty board certification in North American healthcare traditions or specialty society fellowship in British and Australasian healthcare traditions. Nonetheless, experienced, non-medical providers may excel at some critical aspects of disaster medicine. A nurse practitioner with 10 years of field experience is recognized as one of the strongest human resources in the disaster field. Red Cross organizations preferentially select them as field providers. An experienced nurse practitioner may be better suited than their many physician colleagues to handle key relief issues, such as initiating a local disaster relief effort from a pre-existing development program, engaging local health authorities, planning the range of health services for a displaced population, and evacuating a delegation after a security breakdown. Hence, health professional qualifications alone are an inadequate expression of expertise in disaster medicine.

Disaster Incident Management Competency

Disaster incident management, which is among the core disciplines underlying disaster medicine, is not a health specialty, *per se*. Moreover, a hallmark qualification for competency in disaster incident management is not internationally accepted. This lack of international standardization complicates attempts to characterize expertise in this discipline. Numerous stakeholders in responder agencies have stipulated benchmarks of disaster incident management competency in career-specific pathways—firefighters, law enforcement, and government bureaucracies among them. In the US, there remains much overlap between professions in the training of fundamental concepts—particularly as statutory law and administrative regulation oblige compliance with a standardized "unified" incident command system, multi-agency coordination system, and public information system.[29,30]

Technical lead agencies and donor agencies in international disaster response also have developed an extensive array of pre-deployment training courses available to selected health professionals. Representative examples are listed in Table 5. While similar benchmarks of accomplishment in the health sector, such as doctoral degrees, are uncommon in disaster incident management, commitment to skill building can be evidenced by performance in suitable courses. Training courses of 2–3 months in length may be comparable to diploma courses in the health disciplines.

Language Competency

English is the primary language of inter-agency field communications in international disaster response. English and French are official languages of the UN Secretariat. With numerous UN, intergovernmental, and Red Cross agencies headquartered in Geneva, Switzerland, French remains useful as a second language of intra-agency communication in international disaster response. Benchmarks of language competency are well established in the foreign service professions and merit adoption within the disaster medicine community.[31]

Field Experience

International organizations seeking disaster medicine specialists find practitioners attesting to a wide variety of field experiences with a wide variety of legitimacy. Professional activities generically used to evidence disaster medicine expertise are listed in Table 6. These activities, organized by a project management perspective, lend themselves to appli-

United Nations	
WHO	Public Health Pre-Deployment Course
UNHCR	National Emergency Management Training Workshop
Red Cross	
ICRC	Health Emergencies in Large Populations
Governmental Organizations	
USAID	Disaster Assistance Response Team Training
US Military	Combined Humanitarian Assistance Response Training
Non-Governmental Organizations	
Asian Disaster Preparedness Center	Public Health in Complex Emergencies
Advanced Life Support Group, Australia	Major Incident Medical Management and Support Course

Table 5—Pre-deployment training in disaster management (ICRC= International Committee of the Red Cross; UNHCR = United Nations High Commissioner for Refugees; USAID = US Agency for International Development; WHO = World Health Organization)

Health Program/Project Identification, Design, and Development
Disaster Preparedness and Mitigation Planning
Disaster Impact and Needs Assessment*
Disaster Relief Site Operations*
Mass Casualty Incident Management**
Disaster Response Project Management*
Disaster Health Program/Project Monitoring and Evaluation
Disaster Education and Training
Disaster Research and Publication

Table 6—Professional activities in disaster medicine
*field activities occurring exclusively in the acute disaster setting
**clinical activities occurring occasionally in the acute disaster setting

cation by different technical specialties. Nevertheless, the essential element of expertise in disaster medicine is full-time, hands-on, field-based performance in the acute disaster setting. Relevant experiences from Table 6 are disaster impact and needs assessments, disaster relief and rehabilitation site operations, disaster response project management, and occasionally, mass-casualty incident management. By contrast, other listed experiences, such as facility preparedness and mitigation planning, program monitoring and evaluation, education and training, research and publication, all characterize the activities of many hospital-based and academic physicians who are well-removed from actual disasters. While such activities may rely upon acquired disaster expertise, they do not constitute an adequate demonstration of disaster experience by themselves.

The amount of experience sought by international lead agencies in disaster relief has been relatively consistent across organizations and across time. The International Federation of Red Cross and Crescent Societies explicitly requested 10 years experience in its medical coordinators after the Rwandan genocide in 1994. The IASC explicitly requested 10 years experience in its medical coordinators after the Humanitarian Response Review of 2005. Ten years of post-graduate experience in the chosen field is a typical requirement. Non-governmental organizations may recruit medical coordinators with less extensive field experience.

The duration of field assignments, however, varies markedly by organization. International disaster field assignments with governmental, non-governmental, UN, and Red Cross agencies may occur over months. By contrast, domestic disaster field assignments are much shorter. In the US, American Red Cross deployments typically are three weeks. Disaster Medical Assistance Response Team field deployments in the US typically are 11 days. The duration of deployment for US responders federalized in a domestic disaster is understood to be a compromise between field requirements versus the exigencies of volunteers taking leave from their family and job. Nonetheless, a health professional offering an 11-day commitment to most organizations responding internationally rarely would be seen as useful. Occasionally, governments may controversially deploy medical teams internationally for short time periods in environments such as field hospitals. Such deployments commonly violate best practice guidelines stipulated by the WHO.[32] Even so, the resulting medical literature from these short missions often appears self-congratulatory about their clinical impact, while it pays scant attention to implications of international best practices, and makes no mention of controversy within donor governments on the utility of such deployments.[33,34]

Overall, the month remains the fundamental unit of time in international disaster field deployments—with a premium on the first three months of field work in any given disaster. Prolonged experiences in the field do not confer expertise proportional to the time spent. For example, five years of experience in one setting may mean one year of experience and four years of repetition. Conversely, field experiences of <1 month may be little more than medical tourism, as commonly practiced by healthcare bureaucrats on duty or healthcare providers on vacation. Overall, claims to disaster expertise are supported best by acute disaster field experience accounting for at least half of the total corpus of reported experience. In this context, the

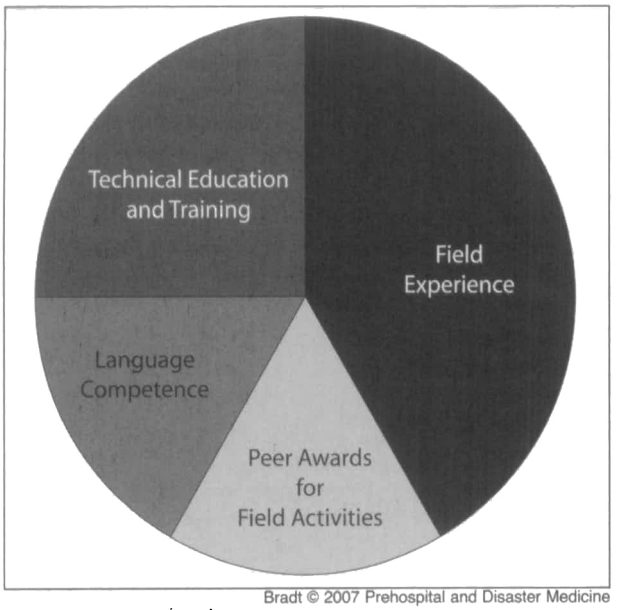

Figure 2—Weighted qualifications relevant to disaster medicine

American Board of Physician Specialties eligibility criteria for its certification examination in disaster medicine are remarkable. The criteria call for credit points that may be acquired by field disaster medicine deployment under the formula: 8 points credit per deployment day not to exceed 40 points for any single deployment and not to exceed 80 points in any single calendar year.[28] Such claims to expertise founded on 5–10 days of field experience are irresponsible.

Finally, field experience subsumes organizational experience. Within the health sector, international disaster response brings professionals from governmental, non-governmental, UN, and Red Cross organizations. Disaster medicine expertise depends in part on mastery of organizational culture within each of these types of organizations. Field operational experience with those organizations best delivers that mastery.

Peer Awards

Peer awards from established organizations in disaster response are recognized as credible evidence of professional excellence. Moreover, such awards tend to provide inferential evidence of the absence of destructive inter-personal behavior. Many factors challenge team functioning in disaster relief, including patient volume and complexity, medical logistics, relations with local health authorities, and security concerns. Nevertheless, commonly recurring factors impairing team performance are interpersonal—including alcoholism, anger mismanagement, passive-aggressive personality, sexual opportunism, recreational drug use, as well as non-compliance with preventive practices in health maintenance and security management. Hence, peer awards are embraced for their explicit inclusion criteria as well as implicit exclusion criteria. A provider's claim to excellence with no demonstrable peer awards from the field is not reassuring.

In this context, members of national armed forces who have practiced their military medicine skills under combat conditions deserve increased attention. Field-grade awards for such activities demanding competence, discipline, and bravery surpass virtually all peer accolades conferred upon civilian practitioners of disaster medicine. Within the civilian realm, the esteem for awards relating to disaster relief, in general, relates to the field credibility of the conferring organization.

Application to Personnel Selection

There currently are no explicit inter-agency standards for the education and training or evaluation of health personnel who respond to disasters.[35] Professionalization in disaster medicine will rely on verifiable, criterion-referenced qualifications. Benchmarking appropriate criterion-referenced qualifications will make the process of personnel selection highly specific, if insensitive. The process will limit false positive errors of commission in personnel selection process at the risk of false negative errors of omission.

Ultimately, respect for complexity obliges consideration of multiple indicators of performance in disaster medicine. A profile of the competencies discussed above, and weighted for relevance to disaster medicine, is illustrated in Figure 2. In this illustration, technical and language expertise balance field experience. A quantitative assessment of qualifications derived from this schema is presented in Table 7. Units of measure within domains are defined in the table. Cumulative weights of different domains are capped at the level at which additional qualifications confer decreasing added value.

The approach to criterion-referenced assessments in medical specialties leads to establishment of benchmarks in performance appraisal. Consistent with this approach, the authors propose that healthcare workers deployed internationally in disaster medicine fulfill at least 50% of aggregate weighted criteria (60 points). Further, the authors propose that disaster medicine practitioners deployed internationally to serve as medical coordinators fulfill 75% of aggregate weighted criteria (90 points).

While designed as a quantitative decision support tool, the instrument is intended to be neither time-consuming nor cumbersome, and thus, suitable for data gathering by non-technical assistants. Such a tool helps to screen candidates for potential field roles. Identified candidates, then, may be referred for reference and background checks, interviews, security clearances, or other forms of administrative due diligence in human resources recruitment.

With a vulnerable population at hand, complex technical issues in the field, formidable consequences of error, increasing intervenor accountability, and extensive media scrutiny, disaster field operations require multi-disciplinary expertise. The professionalization of disaster medicine is expected to be a major step in providing that expertise. It is expected that disaster best practices, preceded by criterion-referenced qualifications, will optimize disaster medical care, minimize departures from emerging standards of disaster medical care, and help to assure donors and recipients of appropriateness of interventions. Nonetheless, competent providers will not be able to ensure successful outcomes in disaster medicine any more than in any other specialty area. Providers will need the technical competence to render an

Domain	Qualification	Points
Specialty-Specific Competency		30 maximum
Clinical Medicine	Specialty board certification Specialty board eligibility MD, DO, MBBS, or equivalent RN, nurse clinical specialist paramedic, diploma courses	5 each, maximum of 10 4 each, maximum of 8 3 2 each 1 each
Public Health	Specialty board certification Specialty board eligibility DrPH, ScD, or equivalent MPH, MHS, MSPH, MAE, FETP diploma courses	5 each, maximum of 10 4 each, maximum of 8 3 2 each 1 each
Disaster Managment	No internationally endorsed standards at present	1/quarter year, maximum of 10
Section Total		**30 maximum**
Language-Specific Competency	5-tier Foreign Service Scale for language competency	20 maximum; 5 point foreign service scale for language competency
UN	English and French preferred	5 maximum/language
Other	Only germane if used by population or providers of the disaster-affected area	5 maximum/language
Section Total		**20 maximum**
Field Experience	Assignments of >1 month duration by location, hazard type, and agency	
Military medicine in combat operations		3/month of full-time field service; maximum 10/conflict
Field assignments in disaster impact and needs assessment, disaster relief site operations, mass-casualty incident management, or disaster response project management. Military active duty in peacekeeping or humanitarian assistance operations		2/month of full-time field service; maximum 5/disaster
Field assignments in disaster preparedness, project identification, monitoring, education, and research		1/month of full-time field service; maximum 5/country
Section Total		**50 maximum**
Peer Awards in Disaster-Related Activities		20 maximum
Military medicine in combat operations		10/award
UN field assignments		5/award
Red Cross field assignments		5/award
Governmental organizations, military medicine in peacekeeping or humanitarian assistance operations		5/award
Non-governmental organizations		3/award
Academic and trade associations		2/award
Section Total		**20 maximum**
Grand Total		**120 maximum**

Table 7—Quantitative assessment of key qualifications in disaster medicine (DO = doctor of osteopathy; FETP = field epidemiology training program; MAE = Master of Applied Epidemiology; MBBS = Bachelor of Medicine and Bachelor of Surgery; MD = medical doctor; MHS = Master of Health Science; MPH = Master of Public Health; MSPH = Master of Science in Public Health; RN = registered nurse; ScD = Doctor of Science)

informed opinion, as well as the administrative authority to draw on necessary human, material, and financial resources. A medical coordinator with technical responsibility for health outcomes, but no administrative authority over resources, will experience predictable organizational failures.

Conclusions

Recent peer assessments of inadequate, institutional, field performance are current drivers of the professionalization in disaster responses. Disaster medicine's underlying core disciplines lend themselves to competency appraisal evidenced by acquisition of criterion-referenced qualifications. Future practitioners of disaster medicine will see intensified efforts to define competency benchmarks across the underlying core disciplines. Quantitative decision-support tools are emerging to assist disaster managers in their personnel selection.

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