

Enhancing the Translation of Disaster Health Competencies Into Practice

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ABSTRACT

Objectives: Disaster health workers currently have no common standard based on a shared set of competencies, learning objectives, and performance metrics with which to develop courses or training materials relevant to their learning audience. We examined how existing competency sets correlate within the 2012 pyramidal learning framework of competency sets in disaster medicine and public health criteria and describe how this exercise can guide curriculum developers.

Methods: We independently categorized 35 disaster health-related competency sets according to the 4 levels and criteria of the pyramidal learning framework of competency sets in disaster medicine and public health.

Results: Using the hierarchical learning framework of competency sets in disaster medicine and public health criteria as guidance, we classified with consistency only 10 of the 35 competency sets.

Conclusions: The proposed series of minor modifications to the framework should allow for consistent classification of competency sets. Improved education and training of all health professionals is a necessary step to ensuring that health system responders are appropriately and adequately primed for their role in disasters. Revising the organizing framework should assist disaster health educators in selecting competencies appropriate to their learning audience and identify gaps in current education and training. (*Disaster Med Public Health Preparedness*. 2014;8:70-78)

Key Words: disaster health, competency, workforce training, disasters

In 2007, Homeland Security Presidential Directive 21 (HSPD-21) established a national strategy for public health and medical preparedness. This directive included a call for action to the nation to “support and facilitate the establishment of a discipline of disaster health” to provide a “foundation for doctrine, education, training, and research.”¹ The need for disaster health to become a formal discipline has long been recognized by leaders in the field, and considerable progress has been made toward its advancement. However, the disaster health community has not reached consensus on the complete body of knowledge needed by its professionals, a certification body, nor a process for credentialing. Consequently, disaster health workers are not held to a common standard based on a shared set of competencies, learning objectives, and performance metrics.

While most of the health-related disciplines that are part of the disaster health workforce are competency based, no standards regarding the disaster health-related competencies have been incorporated into the curricula of each discipline. Furthermore, the majority of responders in a local disaster will be health

professionals not necessarily trained as response workers, so continuing education and training must also aim to augment their competence.

To better establish an objective basis for workforce competency development, a number of authors have described consensus-based recommendations regarding the areas of competence needed for specific subsets of potential disaster responders.²⁻¹² Their work has contributed to the literature a wealth of disaster health competencies for a variety of audiences and settings. Disaster-related competencies are available for particular health professions and primary specialties; for those who want to include disaster health as a secondary specialty; and for professions within a particular organization or agency. Competencies related to specific subject areas such as weapons of mass destruction, mental and behavioral health, and pediatrics also exist. Navigating through these competency sets, however, can be challenging for disaster health educators wishing to develop courses or training materials. A clear understanding of how existing competency sets relate to one another and to the discipline is essential to ensure commonality of

TABLE 1

Criteria for Classifying Competency Sets According to a Hierarchical Learning Framework of Competency Sets in Disaster Medicine and Public Health¹¹

Level 1 (base)	“serve as the foundation for the more specific competencies developed by other entities involved in DMPH”
Level 2	“those required by the institutions, organizations, and agencies in which health professionals work, although the foundational competency education should always relate to the provider role”
Level 3	“apply to some, but not all, members of the health disciplines and professions that require more specialized knowledge and skills in disaster-related medicine and public health”
Level 4 (top)	“the very specific competencies expected of health personnel who compose various disaster response teams, both foreign and domestic, that must be highly integrated in their performances and actions”

knowledge, procedures, and terminology across the many professions within the health sector.

In 2010, an interdisciplinary group of professionals worked together to examine available competency sets and draw from them a consensus set of core competencies that represent the baseline knowledge applicable to all responders in the health professions, regardless of their experience and background or previous roles in a disaster.¹¹ A key outcome of this effort was the conceptualization of a hierarchical learning framework in the form of a pyramid model that summarizes and integrates the various existing disaster medicine and public health competency sets that were developed for different target audiences within the disaster workforce.¹¹ The pyramid summarizes the different target audiences and subject areas encompassed in the discipline of disaster health and thus provides an integrated view of competency requirements in the disaster workforce. Individuals, regardless of profession or years of experience, could use this model to guide their own learning, e.g., by focusing on relevant competencies at the pyramid’s base before integrating competencies from the three progressively higher levels. From there, the competencies each person might choose to develop would be influenced by several factors, including their particular role in a disaster, profession, specialization, and interests.

The progression in specialization of competencies seen as one ascends the pyramid should not be interpreted to represent a hierarchy of individuals, levels of leadership, or years of experience. Instead, the levels represent increasingly specialized competencies intended for different and distinct target audiences. Consequently, the pyramid can help in efforts to reduce redundancies, gaps, and inconsistencies in competency-based learning in disaster health. To our knowledge, however, this model has not been tested in practice. The present report attempts to move along the continuum from concept to practice by (1) examining whether, and how well, existing competency sets can be placed within the pyramidal framework and (2) illustrating how this exercise can guide curriculum developers in choosing competencies relevant to their learning audiences from among the numerous sets of available competencies in disaster health. It is our hope to continue to engage in a collaborative discussion surrounding disaster health education

and training and to assist this emerging discipline in moving toward a more robust infrastructure for learning.

METHODS

A total of 35 competency sets were identified by a literature search in PubMed, the National Library of Medicine’s Disaster Information Management Research Center database, and Google Scholar. These databases were searched for the key words “disaster competency,” “disaster education,” “disaster health competencies,” “preparedness education,” and “preparedness competencies.” In addition, a Google search was performed to identify competency sets that may not have been published in the peer-reviewed literature. Cited sources in articles from both searches were also investigated. To be included for classification in this exercise, the document had to have enumerated specific competencies for learning in disaster health, be directed toward a health or health-related profession, and be written in English.

The authors independently categorized the 35 disaster health-related competency sets according to the 4 levels and criteria of the pyramid framework published by Walsh et al (Table 1).¹¹ Then we met to discuss any discrepancies among them and any challenges that were encountered. All of us were involved in drafting the criteria of the framework, and were therefore familiar with the intent behind the pyramid structure and its potential use in practice. Furthermore, we all have been actively involved in using the core competencies and the published pyramid as a guide to develop education and training opportunities in disaster health. Two of us (R.V.K. and B.A.A.) also have expertise in adult learning and educational theory and practice.

RESULTS

Using the pyramid’s criteria as guidance, we classified with consistency only 10 of the 35 competency sets (Table 2). Competency sets categorized to level 1 were unanimously agreed on, but ambiguity in the definitions of the remaining 3 levels made it difficult for us to use the framework consistently and reach consensus on most of the remaining sets. In conducting this exercise, 3 main obstacles in using the pyramid as a classification scheme were identified.

TABLE 2

Author Categorization of Competency Sets According to Pyramid Framework^a

Reference ^{5-11,13-40}	Year	Title	A1	A2	A3	A4
American College of Emergency Physicians, NBC Taskforce	2001	Recommendations for WMD training and sustainment	3	3	3	3
Gebbie and Qureshi	2002	Emergency and disaster preparedness: core competencies for nurses	3	2/3	2/3	2
Centers for Disease Control and Prevention (CDC), Columbia University	2002	Bioterrorism and emergency readiness: competencies for all public health workers	2	2/3	2	2
Gebbie and Merrill	2002	Public health worker competencies for emergency response	3	2/3	2/3	2/3
Nursing Emergency Preparedness Education Coalition	2003	Educational competencies for registered nurses responding to mass casualty incidents	3	2/3	2/3	2
CDC, Columbia University	2003	Emergency preparedness and response competencies for hospital workers	2	2	2	2
More et al	2004	Predoctoral dental school curriculum for catastrophe preparedness	3	2/3	2	2/3
Iowa Department of Public Health Mental Health Competencies Task Force	2004	Mental health competencies for healthcare providers for terrorism and emergency preparedness and response	2	2/3	2	2
Florida Department of Health	2004	State of Florida recommended core competencies and planning/mitigation strategies for hospital personnel	2	2	2	2
Markenson et al	2005	Preparing health professions students for terrorism, disaster, and public health emergencies: core competencies	2	2/3	2/3	2/3
Tachibanai et al	2005	Competencies necessary for Japanese public health center directors in responding to public health emergencies	4	2	2	2
World Health Organization	2006	The contribution of nursing and midwifery in emergencies	3	2/3	2	2
Hsu et al	2006	Healthcare worker competencies for disaster training	2	2	2	2
Minnesota Department of Health Office of Emergency Preparedness	2006	Bioterrorism hospital preparedness program healthcare personnel emergency preparedness (HPEP) competencies	2	?	3	2
College of Nursing Art and Science University of Hyogo	2006	Core competencies required for disaster nursing	3	3	3	3
Wenzel and Wright	2007	Veterinary accreditation and some new imperatives for national preparedness	3	2/3	2	2
National Panel for APRN Emergency Preparedness for All Hazards Response and Education	2007	APRN education for emergency preparedness and all hazards response: resources and suggested content	3	2/3	2/3	3
Barbera et al	2007	VHA-EMA certification program, healthcare emergency management, professional certification program	3	3	2/3	2/3
Office of the Surgeon General	2007	Medical Reserve Corps core competencies matrix	2	4	4	4
Subbarao et al	2008	A consensus-based educational framework and competency set for the discipline of disaster medicine and public health preparedness	1	1	1	1
American College of Occupational and Environmental Medicine	2008	American College of Occupational and Environmental Medicine competencies	3	2/3	2	2/3
US Public Health Service	2008	Pharmacist readiness training program: pharmacist readiness roles and competencies	3	2/3	2	3
Public Health Risk Management Association	2008	Public Risk Management Association core competencies	3	2/3	2	3
Kuntz et al	2008	Disaster preparedness white paper for community/public health nursing educators	3	3	3	3
Polivka et al	2008	Public health nursing competencies for public health surge events	3	2/3	2/3	2/3
Everly et al	2008	On academics: training for disaster response personnel: the development of proposed core competencies in disaster mental health	2	2/3	3	3
World Health Organization, International Council of Nurses (ICN)	2009	ICN framework of disaster nursing competencies	?	2/3	?	3
Jorgensen	2010	Emergency preparedness and disaster response core competency set for perinatal and neonatal nurses	3	2/3	2	2
Association of Schools of Public Health	2010	Public health preparedness and response core competency model	2	2/3	2	2
Walker and Russ	2010	Humanitarian core competencies: professionalizing the humanitarian sector: a scoping study	2	4	4	4
Consortium of British Humanitarian Agencies	2010	Establishing common competencies and leadership frameworks	2	4	4	4
Walsh et al	2012	Core competencies for disaster medicine and public health	1	1	1	1
Schultz and Koenig	2012	Development of national standardized all-hazard disaster core competencies for acute care physicians, nurses, and EMS professionals	3	3	3	3
European Master in Disaster Medicine	2012	European Master in Disaster Medicine XI edition	2	3	3	3
American Red Cross	2011	Disaster Services Human Resource training courses	4	4	4	4

Abbreviations: APRN, Advanced Practice Registered Nurse; EMS, emergency medical services; VHA-EMA, Veterans Health Administration-Emergency Management Academy.
^a Competency sets are listed by publication year. Question mark indicates the authors (A1-A4) could not agree on the classification of a competency set. Slash mark indicates the author thought the competency set could fit in either of 2 categories.

First, level 2 contains 2 distinct types of competency sets, which caused confusion when classifying sets that met just 1 of the criteria. According to the original framework, second-level competency sets are for “institutions, organizations, and agencies in which health professionals work,” but which “always relate to the provider role.” Often, a given competency set would fit just 1 of the criteria rather than both. For example, More et al’s “predoctoral dental school curriculum for catastrophe preparedness” is meant for students of a specific health profession (dentistry). Because dentistry is a provider role, it would appear that this set would fit level 2; however, because the competencies are intended for all dentistry *students*, and are not “required by the institutions, organizations, and agencies in which health professionals [dentists] *work*” [italics added], it does not clearly fit the description for that level.

In contrast, some competency sets that clearly pertain to employees of a specific organization or agency, for example the “VHA-EMA [Veterans Health Administration-Emergency Management Academy] emergency response and recovery competencies” for all employees in the Veterans Health Administration system, do not include competencies specific to each professional role within that system. Thus, some competency sets are written by virtue of profession, whereas others are written by one’s place of employment. Currently, both sets are categorized as level 2, which could mislead educators to believe they should choose one set or the other, while both may be relevant to the learner.

Second, the definition of professionals that may “require more specialized knowledge and skills in disaster-related medicine and public health” is very subjective. In attempting to classify each competency set, it has become apparent that a difference exists between competencies that are (1) generalized for a health profession that may not traditionally specialize in disaster or emergency health, but which may, by virtue of its education or training, be reasonably expected to play a role in disaster response, and (2) intended for those specializing in disaster-related medicine, nursing, public health, and the like. It could be argued that both sets “require more specialized knowledge and skills”; however, they are distinctly different groups requiring distinctly different levels of competence. The former refers to an augmentation of one’s acquired professional skills and chosen specialization, whereas the latter refers to individuals who desire specifically to become disaster health specialists.

Finally, certain competency sets are defined for a specific scenario or event, or for a specific topic area, rather than characterizing a comprehensive all-hazards approach. Good examples of these are the “educational competencies for registered nurses responding to mass casualty incidents” from the **Nursing Emergency Preparedness Education Coalition** and “mental health competencies for healthcare providers for terrorism and emergency preparedness response” from the Iowa Department of Public Health. Under the current framework,

it is not readily apparent whether these would be placed in level 2 or level 3.

DISCUSSION

Proposed Modifications to the 2012 Hierarchical Learning Framework

Recognizing and appreciating the collaborative work that came before the present exercise, we present for discussion potential additions to the previous framework. Based on the inconsistencies identified here and to improve practical application of the pyramidal framework to educators and learners, we suggest the following modifications to the existing hierarchical learning framework (Table 1):

1. Separate level 2 into 2 distinct levels. The lower level would contain profession-specific competency sets, and the higher level would include organization, agency, or institution-specific competency sets. This split would allow competencies that are specific to an agency or organization and that apply to multiple professions within that agency (eg, VHA system) to clearly build on the competencies for unique professions within that agency, which would still build on the core competencies.
2. Clearly differentiate between competency sets that should be integrated into the basic training of health professions that do not specifically specialize in disaster or emergency and those that are intended for individuals who wish to specialize in disaster health or a closely related discipline.
3. Create a classification method for competency sets meant to cover only a specific topic or focal area (ie, mental health, pediatrics, or chemical, biological, radiological and nuclear defense) within each level of the pyramid.

A Revised Hierarchical Learning Framework

The modifications proposed would result in a slightly more detailed figure, but one with more practical utility as a framework for disaster health learning. The revised pyramid (Figure) would be analogous to a library of existing and future competency sets, where each shelf comprises a broad learning audience and contains different “books” of competencies relevant to a more specific subset of that learning audience. Similar to the 2012 pyramid, the modified hierarchical framework does not represent individuals and their progression upward through the pyramid, but instead represents a framework of competency sets that are meant for different target audiences at each level of the structure.

Included in the revised competency pyramid are all professions that could reasonably be expected to play a health-related role in a disaster (or, even more broadly, any health professional with an interest in education or training in disaster health). Each of the 5 levels of the pyramid includes all competency sets targeted at a particular learning audience.

The core level at the base includes only competency sets targeted for *all* disaster health professionals. The profession

FIGURE

Revised Framework for the Articulation of Competency Sets for Disaster Health Professionals.



Core level: includes only competency sets targeted for all disaster health professionals.

Profession level: includes disaster health competency sets specifically intended for any of the health professions that contribute to the disaster health workforce.

Organizational level: includes competency sets for disaster health professionals linked by a multiprofessional organization such as a hospital, health care coalition, or nonprofit organization.

Specialist level: includes competency sets targeted to individuals seeking advanced specialization in disaster health rather than looking to augment previous training with basic disaster health skills and concepts.

Deployment level: highly specialized competency sets meant for regularly deployed disaster health responders.

Focal areas: competency sets that are relevant to the learner described in each level, but which cover only a specific subject area within the cadre of topics that a learner may need to know.

level contains disaster health competency sets specifically intended for any of the health professions that contribute to the diverse disaster health workforce (eg, epidemiologists, nurses, emergency physicians, pharmacists, primary care practitioners, veterinarians). The organizational level competency sets are for disaster health professionals linked by a multiprofessional organization such as a hospital, health care coalition, or nonprofit organization; rather than being targeted at *professions*, these competencies are relevant to the *context* in which the professions work. Specialist level competency sets are targeted to individuals seeking advanced specialization in disaster health rather than looking to augment previous training with basic disaster health skills and concepts. Competency sets in the deployment level are highly specialized and meant for regularly deployed disaster health responders.

The competency sets included within each level of the pyramid can be either general (encompassing the full range of

topic areas relevant to the target audience) or specific (covering just 1 subject area of particular interest to the learning audience). The specific focal areas are represented above each main level because they would ideally build on the general breadth of competencies written for that target learning audience. Focal areas may include competencies in discrete topics such as pediatric preparedness, veterinary medicine, ethics, or triage and could be taught to any of the identified target learning audiences in the pyramid. These competencies may be targeted to disaster health professionals without direct specialization in that focal area but who may work closely with the population of interest or otherwise want additional training in the subject. Therefore, the 5 main levels of the pyramid contain comprehensive competency sets covering the broad range of disaster health competencies needed for a particular audience, and the corresponding focal areas contain competency sets that are targeted to that audience but *focused* on particular areas within disaster health.

TABLE 3

Categorization of Existing Competency Sets by Targeted Learning Audience According to the Revised Framework

Level	Breadth	Target Audience	Reference	Year	Publication Title
Core	General	All disaster health workers	Subbarao et al	2008	A consensus-based educational framework and competency set for the discipline of disaster medicine and public health preparedness
			Walsh et al	2012	Core competencies for disaster medicine and public health
Core Focal Area Professional	Specific	All disaster health workers	None	2004	Predoctoral dental school curriculum for catastrophe preparedness
	General	Professions or groups of professions	More et al	2007	Veterinary accreditation and some new imperatives for national preparedness
			Wenzel and Wright	2007	Competencies necessary for Japanese public health center directors in responding to public health emergencies
			Tachibanai et al	2008	American College of Occupational and Environmental Medicine competencies
			American College of Occupational and Environmental Medicine	2008	Pharmacist readiness training program: pharmacist readiness roles and competencies
			US Public Health Service	2009	ICN Framework of Disaster Nursing Competencies
			World Health Organization, International Council of Nurses (ICN)	2006	Core competencies required for disaster nursing
			College of Nursing Art and Science University of Hyogo	2007	APRN education for emergency preparedness and all hazards response: resources and suggested content
			National Panel for APRN Emergency Preparedness for All Hazards Response and Education	2006	The contribution of nursing and midwifery in emergencies
			World Health Organization	2008	Public Risk Management Association core competencies
			Public Health Risk Management Association	2003	Educational competencies for registered nurses responding to mass casualty incidents
			Nursing Emergency Preparedness Education Coalition	2008	Disaster preparedness white paper for community/public health nursing educators
			Kuntz et al	2008	Public health nursing competencies for public health surge events
			Polivka et al	2002	Emergency and disaster preparedness: core competencies for nurses
			Gebbie and Qureshi	2002	Public Health Worker Competencies for Disaster Training
			Gebbie and Merrill	2010	Emergency preparedness and disaster response core competency set for perinatal and neonatal nurses
Jorgensen	2005	Preparing health professions students for terrorism, disaster, and public health emergencies: core competencies			
Professional Focal Area	Specific	Professions or groups of professions	Markenson et al	2012	Development of national standardized all-hazard disaster core competencies for acute care physicians, nurses, and EMS professionals
			Schultz et al	2010	Public health preparedness and response core competency model
			Association of Schools of Public Health	2004	Mental health competencies for healthcare providers for terrorism and emergency preparedness and response
			Iowa Department of Public Health Mental Health Competencies Task Force	2008	On academics: training for disaster response personnel: the development of proposed core competencies in disaster mental health
			Everly	2003	Bioterrorism and Emergency Readiness: Competencies for All Public Health Workers
			Centers for Disease Control and Prevention (CDC), Columbia University	2001	Recommendations for WMD training and sustainment
Organizational	General	Organizations, agencies	American College of Emergency Physicians – NBC Taskforce	2006	Healthcare worker competencies for disaster training
			Hsu et al	2002	Emergency preparedness and response competencies for hospital workers
			CDC, Columbia University	2004	State of Florida recommended core competencies and planning/mitigation strategies for hospital personnel
			Florida Department of Health		

Table 3. Continued

Level	Breadth	Target Audience	Reference	Year	Publication Title
Organizational Focal Area Specialist	Specific	Organizations, agencies	Minnesota Department of Health Office of Emergency Preparedness Barbera et al	2006	Bioterrorism hospital preparedness program healthcare personnel emergency preparedness (HPEP) competencies
Specialist Focal Area Deployment	General	Disaster health specialists	None	2007	VHA-EMA certification program, healthcare emergency management, professional certification program
Deployment Focal Area Specific	Specific	Disaster health specialists	Office of the Surgeon General	2007	Medical Reserve Corps Core competencies matrix
	General	Highly specialized response workers	European Master in Disaster Medicine None	2012	European Master in Disaster Medicine XI edition
			American Red Cross	-	Disaster Services Human Resource Training Courses
			Walker and Russ	2010	Humanitarian core competencies; professionalizing the humanitarian sector: a scoping study
			Consortium of British Humanitarian Agencies	2010	Establishing common competencies and leadership frameworks
			None		

Abbreviations: APRN, Advanced Practice Registered Nurse; EMS, emergency medical services; VHA-EMA, Veterans Health Administration-Emergency Management Academy.

Classification of Competency Sets According to the Revised Hierarchical Framework

As shown in Table 3, published competency sets can be categorized in the revised framework according to both their target audience and the breadth (or specificity) of subject. Target audiences that have yet to be addressed are made more obvious, as are opportunities for improvement in the education and training of the disaster health workforce. Because specialization of the competencies increases with movement up the pyramid, it is not surprising that more competency sets exist at the professional and organizational levels than at the specialist and deployment levels. The lower levels of the pyramid focus predominantly on increased domestic resilience and integrating emergency preparedness principles into the general academic or professional training of health professions, whereas the specialist and deployment levels examine highly specialized domestic response, humanitarian assistance, and foreign medical teams. Thus, a greater number of individuals across a greater number of professions will require basic education and training in disaster health than will need specialty expertise in deployed disaster response.

CONCLUSIONS

The goal of this organizing framework is to better understand and categorize the many published competency sets within the discipline of disaster health to identify opportunities for education and training and assist disaster health educators in selecting competencies appropriate to their learning audience. This framework is not intended to generate an additional competency set or represent an exhaustive list of all competencies for all people within the discipline.

The strength of this revised pyramid lies in its ability to clearly illustrate the different target audiences within the disaster health workforce and the breadth of subject matter taught within the discipline, thus eliminating ambiguity from the original framework and highlighting areas for additional competency development. This revision allows for a more useful comparison of the competency sets within each tier. It also helps educators visualize a layered approach to competency-based education and training, which begins with core competencies and then adds disaster health competencies relevant to one's profession. These levels are next followed by disaster health competencies related to one's organization or agency, before adding increasingly specialized competencies, with the transition from a general health care workforce to a specifically trained disaster health specialist or for response deployment. The revised framework can also help guide the necessary integration of competencies into a curriculum by allowing educators to select relevant competencies and use them to craft learning experiences suited to their target audience.⁴¹

We believe that most, if not all, existing competency sets can be categorized according to this revised framework. However, within each level and within each competency set

are opportunities for flexibility in the intensity and scope of training. Much discussion, for example, has centered on the competencies needed for humanitarian response professionals,^{35,42–47} which has also used a pyramidal concept to show the need for increasing competence within their field.³⁵ The present pyramid framework does not imply static training and education requirements within each level; for example, humanitarian response professionals do not require the same competencies as national disaster medical system response teams, although they would be categorized alongside them. Rather, the humanitarian assistance initiative toward professionalization is a necessary and important step to further define education and training requirements for a very specific subset of professionals within the broader and more inclusive disaster health workforce.

The revised pyramid framework will allow curriculum developers and educators to select competencies relevant to the (1) core knowledge of the field or a particular focal area within it, (2) one's particular profession, (3) one's relationship to an organization, (4) a specialization and career focus in disaster health, and (5) deployed response. Competency sets can be adapted to meet the needs of the novice, intermediate, or advanced professional within each target audience. Furthermore, they can be selected to increase requirements for those who desire leadership or teaching positions and need a greater understanding and command of knowledge and skill. The framework is not intended to encompass competency-based education and training normally required of one's profession but to demonstrate increased mastery of that profession by integrating concepts of preparedness, response, recovery, and mitigation relevant to one's role. Although the organization can be modified, and is likely subject to change, the value of this design lies in depicting the relationship of existing sets to each other and to their respective disaster health audiences.

Improved education and training of all health professionals helps ensure our workforce is appropriately and adequately primed for its role in disasters. Under this framework, current and future competency sets can be catalogued and sorted based on one's interest or target audience. Such an approach allows improved understanding of the integration of all health-related roles in the disaster management system, and simplifies the task of selecting competencies relevant and necessary for any subset of the disaster health workforce. In this way, a progressive competency-based curriculum could be developed. Building all competencies from a common foundation and lexicon creates consistencies in their application, construction, and relevance in the framework, offering flexibility in education and training of the disaster health workforce, and ensuring a common foundation across all members of the workforce.

The competency sets shown in the tables represent a subset of those currently published in the peer-reviewed and gray literature. They are intended to initiate the use of the pyramid concept as a way of cataloguing the myriad disaster

health competency sets that now exist. The placement of existing competency sets in Table 2 reflects our interpretation and not necessarily that of the researchers who published them. Because these authors were involved in the drafting of the original pyramid framework, their interpretations of the criteria for the classification of competency sets would differ from those of novice users. Future research in the application of the pyramid could include its use by trainers and educators. We hope that the organizational framework presented here will continue the movement toward the formation of the discipline and aid those who identify, teach, and perform the multifaceted competencies of disaster health.

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