

# A Review of Competencies Developed for Disaster Healthcare Providers: Limitations of Current Processes and Applicability

Elaine Daily RN, BS, FAHA, FCCM;<sup>1</sup> Patricia Padjen, RN, MBA, MS, PhD;<sup>2</sup>  
Marvin Birnbaum, MD, PhD<sup>3</sup>

1. Independent Consultant, Madison, Wisconsin USA; Immediate Past-President, Nursing Section, World Association for Disaster and Emergency Medicine
2. Program Manager/BSN Advisor, University of Wisconsin Oshkosh College of Nursing, Oshkosh, Wisconsin USA
3. Professor Emeritus, Department of Medicine, University of Wisconsin, Madison, Wisconsin USA

#### Correspondence:

E-mail: elainedaily@gmail.com

**Keywords:** competencies; disaster education; disaster health; disaster nursing; disaster preparedness; emergency planning; healthcare personnel; public health

#### Abbreviations:

EMT = emergency medical technician

HRSA = Health Resources and Service Administration

MCI = mass-casualty incident

WADEM = World Association for Disaster and Emergency Medicine

**Web publication:** 20 September 2010

#### Abstract

**Introduction:** In order to prepare the healthcare system and healthcare personnel to meet the health needs of populations affected by disasters, educational programs have been developed by numerous academic institutions, hospitals, professional organizations, governments, and non-government organizations. Lacking standards for best practices as a foundation, many organizations and institutions have developed “core competencies” that they consider essential knowledge and skills for disaster healthcare personnel.

**Problem:** The Nursing Section of the World Association for Disaster and Emergency Medicine (WADEM) considered the possibility of endorsing an existing set of competencies that could be used to prepare nurses universally to participate in disaster health activities. This study was undertaken for the purpose of reviewing published disaster health competencies to determine commonalities and universal applicability for disaster preparedness.

**Methods:** In 2007, a review of the electronic literature databases was conducted using the major keywords: disaster response competencies; disaster preparedness competencies; emergency response competencies; disaster planning competencies; emergency planning competencies; public health emergency preparedness competencies; disaster nursing competencies; and disaster nursing education competencies. A manual search of references and selected literature from public and private sources also was conducted. Inclusion criteria included: English language; competencies listed or specifically referred to; competencies relevant to disaster, mass-casualty incident (MCI), or public health emergency; and competencies relevant to healthcare.

**Results:** Eighty-six articles were identified; 20 articles failed to meet the initial inclusion criteria; 27 articles did not meet the additional criteria, leaving 39 articles for analysis. Twenty-eight articles described competencies targeted to a specific profession/discipline, while 10 articles described competencies targeted to a defined role or function during a disaster. Four of the articles described specific competencies according to skill level, rather than to a specific role or function. One article defined competencies according to specific roles as well as proficiency levels. Two articles categorized disaster nursing competencies according to the phases of the disaster management continuum. Fourteen articles described specified competencies as “core” competencies for various target groups, while one article described “cross-cutting” competencies applicable to all healthcare workers.

**Conclusions:** Hundreds of competencies for disaster healthcare personnel have been developed and endorsed by governmental and professional organizations and societies. Imprecise and inconsistent terminology and structure are evident throughout the reviewed competency sets. Universal acceptance and application of these competencies are lacking and none have been validated. Further efforts must be directed to developing a framework and standardized terminology for the articulation of competency sets for disaster health professionals that can be accepted and adapted universally.

Daily E, Padjen P, Birnbaum ML: A review of competencies developed for disaster healthcare providers: Limitations of current processes and applicability. *Prehosp Disaster Med* 2010;25(5):387–395.

Characteristic	Yes (n)	No (n)
Healthcare-specific?	38	1
Target groups defined by profession?	28	11
Target groups defined by role or function?	15	23
Solely nursing-centric?	11	28
If not nursing centric, are competencies specific to nursing included?	5	23
If not nursing centric, are competencies relevant to nursing included?	28	0
Disaster specific?	37	2
Research based?	12	27
Provided by professional organization or governmental agency?	16	23

Daily © 2010 Prehospital and Disaster Medicine

**Table 1**—Characteristics of competency articles reviewed

### Introduction

Meeting the numerous and varied health needs of populations affected by disasters requires a prepared healthcare system and personnel. Education and training are the cornerstones of disaster preparedness. Thus, local, regional, national, and international educational programs have been developed with the goal of providing healthcare providers with the knowledge and skills required to care for the victims of a disaster. Such programs may be offered by academic institutions, hospitals, professional organizations, governments, non-governmental organizations, as well as by individuals with expertise in at least some area of disaster health care. However, while the number of disaster educational programs continues to grow, there are no common standards upon which these programs are based. Lacking standards for best practices, many organizations and institutions have developed “core competencies” that they consider to be essential knowledge and skills for disaster healthcare personnel.

In the 2004 *National Strategy for Terrorism Preparedness and Response: 2003–2008 Strategic Plan*, the Centers for Disease Control and Prevention specifically identified critical objectives to ensure a competent and sustainable workforce. These objectives included: (1) increase the number and type of professionals that comprise a preparedness and response workforce; (2) deliver certification and competency-based training and education; (3) recruit and retain the highest quality workforce; and (4) evaluate the impact of training to assure that learning has occurred.<sup>1</sup> Since 2005, the Health Resources and Service Administration (HRSA) of the US Department of Health and Human Services has required that funded Bioterrorism and Curriculum Training Programs be competency-based.<sup>2</sup>

Throughout the literature, the uses and definition of the term “competency” are numerous, varied, and inconsistent.

While competence refers to the capability to function in a given setting, *competency* refers to one’s actual performance in a specific role in a given situation.<sup>3</sup> According to Eraut,<sup>4</sup> “Competence... is given a generic or holistic meaning and refers to a person’s overall capacity. Competency... refers to specific capabilities”. As defined by the US Department of Education, competency is “a combination of skills, abilities, and knowledge needed to perform a specific task”.<sup>5</sup> Although not universally accepted, competency generally is used as a synonym for some operational skill.

In 2007, members of the Nursing Section of the World Association for Disaster and Emergency Medicine (WADEM) proposed that the Section consider the endorsement of a set of competencies that could be used to prepare nurses universally to participate in disaster health activities. This study was undertaken for the purpose of reviewing existing published disaster health competencies to determine commonalities and universal applicability for disaster preparedness.

Although the original intent of this study was to determine commonalities that could be adapted universally by nurses in disaster health, the review was not limited to the discipline of nursing but, rather, included all published competencies relative to disaster health care, regardless of discipline.

### Methods

A review of the electronic literature databases (Medline, PubMed, and Cochrane Library) was conducted in 2007 using the major keywords: disaster response competencies; disaster preparedness competencies; emergency response competencies; disaster planning competencies; emergency planning competencies; public health emergency preparedness competencies; disaster nursing competencies; and disaster nursing education competencies. In addition, a manual search of references and selected peer-reviewed and non-peer reviewed literature from public and private sources was conducted.

Inclusion criteria included: English language; competencies listed or specifically referred to; competencies relevant to a disaster, mass-casualty incident (MCI), or public health emergency; and competencies relevant to health care. Articles that included an incomplete list of competencies were excluded.

Two investigators (ED and PP) independently reviewed the articles to determine whether they met the initial inclusion criteria, and if so, to determine further: (1) if the article was healthcare specific; (2) if target groups were defined by profession; (3) if target groups were defined by role or level of function; (4) if the article was nursing centric (i.e., competencies specific to nursing); (5) if competencies were relevant to nursing; (6) if the article was disaster specific; (7) if the article was research-based; and (8) if the article was published by a professional organization or governmental agency.

### Results

A total of 86 articles were identified, of which, 20 articles failed to meet the initial inclusion criteria and were excluded from further review. Of the remaining 66 articles reviewed, 27 did not meet the additional criteria, leaving 39 articles for analysis.<sup>6–44</sup> One article<sup>18</sup> was not healthcare-specific but was included because it used published competencies for public health workers<sup>14</sup> to identify generic competencies

Domain	Reference #
Assessment	25,26,33,38
Analytical assessment	7,41
Needs assessment and planning	31
Policy development/program planning	7,41
Communication(s)	34,26,27,33,37,41
Communication and notification	12
Communication and connectivity	23
Communication and interpersonal relationships	31
Communication and information sharing	32
Cultural competency	7,41
Community dimensions of practice	7,41
Basic health sciences	7,41
Financial planning and management	7,41
Leadership and systems thinking	7,41
Disease surveillance, disease reporting, and laboratory identification	12
Personal protective equipment	12
Personal protection and safety	28
Facility	12
Dedicated decontamination facilities	12
Medical/surgical and pharmaceutical supplies	12
Training and drills	12
Mental health	25
Mental health resources	12
Psychological issues/care	23,32
Triage and basic first aid	23
Detection	23,27
Index of suspicion and event recognition	28
Incident recognition	34
Accessing critical resources and reporting	23
Incident command system	23
Isolation, quarantine, and decontamination	23
Epidemiology and clinical decision-making	23
Basic clinical care	25
Administration	25
Triage	25
Wound care	25
Resuscitation	25
Immunizations	25
Liaison	25
Epidemiology	25
Critical thinking	26,33,38
Technical skills	26,33,38
Health promotion, risk reduction, and disease prevention	26
Healthcare systems and policy	26
Illness and disease management	26
Information and healthcare technologies	26
Ethics	26
Ethical and legal issues and decision-making	31
Public health law and ethics	27
Ethical and legal practice and accountability	32
Human diversity	26
Preparation and planning	27
Preparedness and planning	40,44
Incident management support system	27
Safety and security	27,31
Clinical/Public health assessment and intervention	27

Daily © 2010 Prehospital and Disaster Medicine

Table 2—Competency domains listed in 17 articles (*continued on page 390*)

Domain	Reference #
Contingency, continuity, and recovery	27
Public health	31
Public health surveillance and response	37
Terrorism	28
Event types	28
Response systems and communications	28
WMD response	28
Care principles	31
Nursing care	31
Healthcare systems and policies in emergency situations	31
Risk reduction, disease prevention, and health promotion	32
Policy development and planning	32
Professional development	32
Care of communities	32
Care of individuals and family	32
Patient care for disasters, terrorism, and public health emergencies	37
Psychological care	32
Vulnerable populations	32
Long-term care needs	32
Effective decision-making	34
Integration and management of resources	34
Response/recovery roles	34
Prevention	35
Response	35
Response and mitigation	40,44
Emergency management and preparedness	37
Terrorism and public health emergency preparedness	37

Daily © 2010 Prehospital and Disaster Medicine

Table 2—(continued from page 389) Domains listed in 17 articles (WMD = weapons of mass destruction)

Profession	Reference #
Public Health Workforce	6, 10, 13, 14, 15, 17, 19, 22, 24, 40, 41, 44
Healthcare Worker	16, 25, 27, 30, 34, 42, 43
Nurses	9, 23, 26, 29, 31, 32, 33, 36
Nurses/Nurse Practitioners	7, 35
Public Health Nurses	12
Nurse Executives	21
School Nurses	38
Nursing Students	
Emergency Physicians, Emergency Nurses, Emergency Technicians	28
Dentists/Dental Students	8, 20
Mental Health Professionals	11
Medical Reserves Corps Volunteers	39
Health Profession Students	37
All workers with potential exposure to CBRNE terrorist threats	18

Daily © 2010 Prehospital and Disaster Medicine

Table 3—Professions targeted in the articles reviewed (CBRNE = chemical, biological, radiological, nuclear, or explosive)

for all workers potentially exposed to chemical, biological, radiological, and nuclear weapons. The characteristics of these 39 articles are listed in Table 1.

Less than half (17 of 39 [43.6%]) of the articles identified “domains” under which individual competencies were

organized. These domains are listed in Table 2. Fifteen of the articles (38%) included competencies that were the same as, or modified slightly from, those described in Gebbie and Merrill’s initial work on competencies for all public health workers.<sup>14</sup>

Role/Function/Proficiency Level	Reference #
Public Health Administrators/Leaders; Public Health Professionals; Public Health Technicians; Public Health Clerical/Support Staff	13,14
Nurse Executive	12
First Responders; Skilled Support Personnel; Other Emergency Response Personnel	18
Relief Responders	25
Informed Worker/Student; Practitioner; Leader	27
Healthcare Leaders and Administrative Decision-Makers	34
Leaders/Administrators; Public Health Professionals; Technical Staff; Support Staff	40
Frontline Staff; Senior Staff; Supervisory and Management Staff	41
Hospital Workers	42

Daily © 2010 Prehospital and Disaster Medicine

**Table 4**—Targeted roles/functions

Twenty-eight of the 39 articles described competencies targeted to a specific profession/discipline (Table 3). Specific professions or disciplines targeted included: (1) public health workers (public health nurses, physicians, leaders, administrators, and technicians); (2) nurses/nurse practitioners; (3) nurse executives in disaster planning; (4) school nurses; (5) healthcare leadership and administration; (6) mental health professionals; (7) emergency physicians, nurses, and medical technicians; (8) healthcare professional students; (9) nursing students; and (10) dental students. Broader target groups addressed in some articles included: (1) hospital healthcare workers; (2) hospital personnel; (3) healthcare relief responders; and (4) Medical Reserve Corps volunteers.

Eleven of the reviewed articles described competencies solely for the nursing profession. Of the remaining 28 articles that were not nursing centric, five included competencies specific to nursing, and in all 28, the competencies listed were at least relevant to nursing. For example, the competency to “recognize a potential critical event and implement initial actions”<sup>16</sup> is not specific to the nursing profession, but, rather, is applicable to various healthcare workers, including nursing.

Ten of the reviewed articles described competencies targeted to a defined role or function during a disaster, rather than to a specific professional discipline. The roles/functions described in these articles are listed in Table 4.

Four of the 39 articles described specific competencies according to skill level or proficiency, rather than to a specific role or function. These levels consisted of: (1) “awareness”, “performance”, and “planning”;<sup>28</sup> (2) “basic level”, “mid-level”, “advanced level”;<sup>30</sup> (3) “knowledge”, “comprehension”, “application”, “investigation”, “synthesis”, and “assessment”;<sup>37</sup> and (4) “awareness”, “proficiency”, and “expert”.<sup>44</sup> One article defined competencies according to specific roles (frontline staff, senior staff, supervisory and management staff) as well as proficiency levels (“aware”, “knowledgeable”, and “advanced”).<sup>41</sup> Two arti-

cles<sup>32,35</sup> categorized disaster nursing competencies in accordance to the phases of the disaster management continuum.

Fourteen of the reviewed articles described specified competencies as “core” competencies for various target groups,<sup>7,9,11,13,14,26,27,29,30,33,37,39–41</sup> while one article described “cross-cutting” competencies applicable to all healthcare workers.<sup>16</sup>

Sixteen of the 29 articles were publications produced by a professional organization or governmental or non-governmental agency. These groups are identified in Table 5.

Research methodologies were described in 76% of the articles reviewed. Consensus building among selected experts and stakeholders were identified methods used to develop competencies in 13 of the reviewed articles.<sup>13,14,16,23,26,27,28,31,33,34,35,37,41</sup> Only one article described the results of a survey to determine the skills actually used by healthcare providers who responded to Hurricanes Katrina and/or Rita.<sup>25</sup> Results of self-assessment surveys to evaluate learning from educational programs using described competencies were reported in five articles.<sup>15,17,19,21,43</sup>

## Discussion

Events within the last 10 years have prompted countries the world over to attempt to strengthen their level of preparedness to prevent and respond to terrorist attacks and disasters from all hazards. Key to this effort is the development of a healthcare workforce capable of meeting the challenges inherent in these threats. This has resulted in the development of numerous, disaster-focused, competency-based educational programs for healthcare professionals and students. Correspondingly, hundreds upon hundreds of disaster-focused competencies have been articulated and utilized as the foundations of these programs.

Competency-based education, initiated in the 1980s, focuses on what the learner must know and be able to do in

Agency for Healthcare Research and Quality
American Association of Colleges of Nursing
American College of Emergency Physicians
American Dental Association
American Medical Association
American Red Cross
Centers for Disease Control and Prevention
Council on Linkages Between Academia and Public Health Practice
International Council of Nurses
Medical Reserve Corps
National Association of City and County Health Officials
North Carolina Center for Public Health Preparedness and the Institute for Public Health at the University of North Carolina
Nursing Emergency Preparedness Education Coalition (formerly the International Nursing Coalition for Mass Casualty Education)
State of Florida
US Navy and Inova Health System
World Health Organization

Daily © 2010 Prehospital and Disaster Medicine

**Table 5**—Agencies/organizations/governments/institutions responsible for 16 of the competency articles

various, complex, working situations, and is an approach that has been embraced by many professions, agencies, and institutions to improve workforce preparation.<sup>45</sup> In 2005, the Council on Education for Public Health amended its accreditation criteria to define educational quality in terms of the competence of the graduates of public health schools and programs reviewed.<sup>46</sup>

Challenges to the development of competencies for disaster healthcare personnel include the facts that: (1) disasters occur infrequently and can result from numerous and varied events in disparate settings and conditions; (2) multiple professions and disciplines are involved in healthcare management during a disaster; (3) many unique roles and tasks are required during a disaster; and (4) different levels of performance of some competencies may be acceptable and/or necessary. Getting one's arms around all of these issues in the creation of a list of competencies for disaster healthcare workers clearly is a challenge and is reflected in the wide array of competencies found in this review. And, while many articles did not identify the domains (taxonomy of competency clusters)<sup>47</sup> for each of the competencies listed, the sheer number of domains, as listed in Table 1, reveals an essential problem in the identification of the areas of practice relevant to disaster health. With the exception of the Assessment, Communication(s), and Detection domains, there was little agreement among the articles reviewed. Much of this disagreement may be related to the lack of standard terminology and definitions, a recurring

problem in the field of disaster health.<sup>48,49</sup> However, it also may be related to a lack of understanding of competency-based education that involves a hierarchical structure (from broad to specific) with the articulation of a systematically grouped competency domain or cluster that is broken down into competencies, and further decomposed into subcompetencies or skills along with specification of required behavioral indicators and levels of performance.<sup>50</sup>

Typically, competency lists are developed using a consensus-building process involving a review of the literature, input from select experts, use of the Delphi process, and input from stakeholders or practitioners.<sup>45,51</sup> However, according to Shewchuk *et al*, most processes rely predominantly on the opinions of nominal experts and existing literature.<sup>52</sup> Variations of the consensus-building process were described as the methods used to determine the competencies in several of the reviewed articles.<sup>13,14,16,23,26–28,31,33–35,37,41</sup> Certainly, buy-in from relevant professional organizations and societies is important in establishing credibility and acceptance of purported competency requirements. And, ideally, a required competency should have some demonstrated link with outcomes.<sup>51</sup> However, the nascence and nature of the discipline of disaster health have resulted in a dearth of evidence relating practices to outcomes, and few disaster health standards.<sup>53</sup> Although one article describes an “evidence-based consensus building” process in the development of cross-cutting competencies, documentation of the evidence used is lacking.<sup>16</sup>

The numerous approaches to competency development, the abundance of identified disaster health competencies, and the lack of consensus and clarity among the competency sets may have both positive and negative consequences. From a negative standpoint, the plethora of promulgated disaster health competencies may contribute to the ongoing lack of standards and impede the development of standardized education and practices. On the positive side, however, the existence and availability of these articulated competencies can provide valuable groundwork for the development of a common framework for competencies based on the critical issues in disaster health. Fundamental to this process is the identification of those critical issues. Certainly, some input regarding these issues can be obtained from healthcare professionals previously or currently involved in some aspect of disaster health. Such empirical data are lacking in the field of disaster health. One exception is the pilot study conducted by Slepski, which sought input from healthcare responders (physicians, nurses, paramedics/emergency medical technician (EMTs)) to Hurricanes Katrina and/or Rita regarding the specific professional competencies they needed and performed during their responses.<sup>25</sup> The responders identified basic clinical care and triage as the most frequently used skills in this setting, but also identified those areas in which they felt least prepared. While the majority of responders felt sufficiently skilled for their professional function and role, personal and team member attributes and attitudes were identified as areas in which they felt least prepared. Notably, although 60% of the respondents in this study had prior disaster response experience, they indicated that environmental, organizational, and personal issues created feelings of inadequacies in the disaster setting. These findings are consistent with the view that greater emphasis often is put on job and role competencies than on personal competencies.<sup>54</sup> This likely relates to the difficulties in teaching and objectively assessing the attainment of personal competencies. Slepski's study represents an initial approach to obtaining data on professional competency needs from field experiences and the information that is required to establish the framework for competency modeling. Ideally, such information would be collected from all responders to disasters from various events, thereby identifying competencies necessary to perform various job roles.

Clearly, some competencies are more important or essential than others for a particular role or position during a disaster. "Core" competencies, i.e., competencies applicable to all levels/jobs and functions<sup>54</sup> among various target groups of workers were identified in many of the articles,<sup>7,9,11,13,14,26,27,29,30,33,37,39-41</sup> while Hsu *et al* described these as "cross-cutting" competencies required of all healthcare workers.<sup>16</sup> Nonetheless, the degree or level to which a particular competency needs to be performed or demonstrated may vary depending on the job or task required of the position. Thus, different levels of proficiency for the various behavioral descriptors need to be included in a competency model and a competency must be described in terms of skills and abilities taking into account the situation and the level of performance required.<sup>47</sup> The latter factor has been addressed in several, although certainly not all, of the competencies

reviewed. When specified, performance levels were differentiated using broad terms such as basic, middle, and advanced levels,<sup>30</sup> awareness, performance, and planning levels,<sup>28</sup> and awareness, proficiency, and mastery levels.<sup>44</sup> Others specified levels of performance according to roles such as administrators, professional, technicians, and clerical/support staff,<sup>13,14,40</sup> and informed worker/student, practitioner, and leader.<sup>27</sup> The competency set developed by the Council on Linkages between Academia and Public Health Practice differentiates performance both by role (frontline staff, senior level staff, and supervisory/management staff) and proficiency (awareness, knowledgeable, and advanced) levels.<sup>41</sup> In a set of public health competencies for health profession students, Markenson *et al* utilize different behavioral descriptors to differentiate the proficiency of each competency according to the students' health profession (public health, nursing, physicians and surgeons, and dental and oral surgery).<sup>37</sup>

If core competencies are stated sufficiently broadly, the associated knowledge, skills, and abilities can be broken down into sub-competencies, which are small, focused components of the knowledge and skills that comprise the stated overall competency.<sup>55</sup> This allows the instruction of these sub-competencies to follow Bloom's taxonomy, building upon each other, and sequentially leading to higher levels of knowledge and performance as required by the worker's role or anticipated role.

One major challenge to gaining consensus on currently published competencies is the varied and inconsistent terminology used in describing them. Numerous articles used the word "domain" to describe the general area or focus of the competency being addressed (e.g., assessment, critical thinking), with specific competencies listed under each domain. Others used the word "competency" for this purpose and categorized "sub-competencies" as elements of the primary competency. Although both methods are correct, depending on the point of competency development, these distinctions led to barriers in the comparison of "domains" and competencies among the articles reviewed. Agreement on the terminology would greatly facilitate comparison as well as communication among those involved.

An additional confusing element concerns the articulation of an individual competency. A competency should describe a measurable skill used to achieve a particular work objective.<sup>56</sup> As such, competency statements should include an action verb describing some behavior expressed in terms that can be readily assessed. In this review, many of the competencies did not include a specific action, and many were written without consideration of the context and/or the ability to examine or assess the skill addressed. For example, the stated competency, "Develop a lifelong commitment to rigorous critical thinking,"<sup>41</sup> is impossible to target in terms of instruction, and is impossible to assess regarding its attainment. Examples such as this were rife throughout the articles reviewed and highlight the need for thoughtfully constructed competency statements that: (1) articulate the knowledge and skill in a manner that can be assessed; (2) include the context for performance; and (3) describe the learner in terms of level of function or responsibility.<sup>55</sup> As stated by Punnett, "Clarity in an operational definition of competency is a *sine qua non* to methodologies used in achieving valid and useful competency models."<sup>54</sup>

In terms of the disaster healthcare workforce, the scope of practice is wide and involves multiple professional disciplines with a wide range of experiences, abilities, and responsibilities. Indeed, the nature of disaster health requires crossovers in roles, functions, and responsibilities of providers that mandate a harmonization of competencies and standards applicable to all disciplines involved. For these reasons, this review focused not on disaster nursing-specific competencies, but, rather, on competencies for disaster healthcare providers in various disciplines and professions. Reaching consensus on the core competencies for all disaster healthcare workers will be challenging, but is essential to developing a unified public health workforce. Well-articulated competencies not only define what is required of whom to fulfill essential or core functions related to disaster health, but also provide educational guidelines, potentially improve consistency in response performances, and create reasonable expectations on the part of the public, stakeholders, other disciplines, and fellow workers.<sup>55</sup> Additionally, endorsed competencies can provide a framework for regulatory bodies by setting standards for practice certification and the accreditation of educational programs.

One limitation of this study is its restriction to the field of disaster health. Although many of the competencies required of healthcare professionals during a disaster are applicable to other professions, this was beyond the purview of this study. Likewise, many competencies required of other professions would be applicable to healthcare professionals; these too, were not included in the review.

Another major limitation of this study is its prominent US-based focus. At the time of this review (2007), the com-

petencies published by US organizations or groups predominated the literature. Notable exceptions were the World Health Organization and the International Council of Nurses, a federation of more than 130 national nurses associations throughout the world, that have compiled a comprehensive list of competencies for nurses in disaster health.<sup>31,32</sup> As the majority of disasters occur outside of the US, input from the international community is essential to the creation of truly universally applicable competencies.

Limiting this review to articles or documents in the English language also placed inherent restrictions on the fullness of the review.

## Conclusions

To date, hundreds of competencies have been developed in attempts to create a healthcare workforce prepared to respond appropriately and effectively to a disaster. Imprecise and inconsistent terminology and structure evident throughout the reviewed competency sets impede analysis and comparisons of the sets, and may inadvertently sabotage standardized educational endeavors. Despite the fact that many of the competency sets have been endorsed by various governmental and professional organizations and societies, universal acceptance and application of these competencies are lacking. Thus far, none of the reviewed competencies have been validated, nor is there any evidence to indicate that any one of the published sets of competencies is better or more useful than another. Further efforts must be directed to developing a framework for the articulation of competency sets for disaster health professionals that can be accepted and adapted universally.

## References

- Centers for Disease Control and Prevention: A National Public Health Strategy For Terrorism Preparedness and Response: 2003 -2008. Available at [http://www.bt.cdc.gov/cotpet/cphp/downloads/CPHP\\_fy2004\\_rfa.pdf](http://www.bt.cdc.gov/cotpet/cphp/downloads/CPHP_fy2004_rfa.pdf). Accessed 14 December 2009.
- US Department of Health and Human Services, Health Resources and Service Administration. Available at <http://www.federalgrantswire.com/bioterrorism-training-and-curriculum-development-program.html>. Accessed 22 July 2010.
- Schroeter K: Competence literature review. 2008. Available at [http://www.cc-institute.org/docs\\_upload/competence\\_lit\\_review.pdf](http://www.cc-institute.org/docs_upload/competence_lit_review.pdf). Accessed 07 December 2009.
- Eraut M: *Developing Knowledge and Competence*. London: RoutledgeFalmer, 1994.
- US Department of Education, National Center for Education Statistics: *Defining and Assessing Learning: Exploring Competency-Based Initiatives*. Washington DC: US Department of Education, National Center for Education Statistics, 2001.
- Barnett DJ, Everly GS, Parker CL, Links JM: Applying educational gaming to public health workforce emergency preparedness. *Am J Prevent Med* 2005;28:390-395.
- Berkowitz B: Public health nursing practice: Aftermath of September 11, 2001. *Online J Issues Nurs* 2002;7:5.
- Chmar JE, Ranney RR, Guay AH, Haden NK, Valachovic RW: Incorporating bioterrorism training into dental education: Report of ADA-ADEA terrorism and mass casualty curriculum development workshop. *J Dent Educ* 2004;68:119-1199.
- Couig MP, Martinelli A, Lavin RP: The National Response Plan: Health and Human Services the lead for Emergency Support Function #8. *Disaster Manag Response* 2005;3:34-40.
- Estrada LC, Fraser MR, Cioffi JP, et al: Partnering for preparedness: The project Public Health Ready experience. *Public Health Rep* 2005;120:69-75.
- Everly GS Jr: Thoughts on training guidelines in emergency mental health and crisis intervention. *Int J Emerg Ment Health* 2002;4:139-141.
- Fahlgren TL, Drenkard KN: Healthcare system disaster preparedness, Part 2: Nursing executive role in leadership. *J Nurs Adm* 2002;32:531-537.
- Gebbie K, Merrill J, Hwang I, et al: Identifying individual competency in emerging areas of practice: An applied approach. *Qual Health Res* 2002;12:990-999.
- Gebbie K, Merrill J: Public health worker competencies for emergency response. *J Public Health Manag Pract* 2002;8:73-81.
- Harrison LM, Davis MV, MacDonald PDM et al: Development and implementation of a public health workforce training needs assessment survey in North Carolina. *Public Health Rep* 2005;120:28-34.
- Hsu EB, Thomas TL, Bass EB, et al: Healthcare worker competencies for disaster training. *BMC Med Educ* 2006;6:19.
- Kerby DS, Brand MW, Elledge BL, Johnson DL, Magas OK: Are public health workers aware of what they don't know? *Biosecurity and Bioterrorism-Biodefense Strategy Practice and Science* 2005;3:31-38.
- Mitchell CS, Doyle ML, Moran JB, et al: Worker training for new threats: A proposed framework. *Am J Indust Med* 2004;46:423-431.
- Kerby DS, Brand MW, Johnson DL, Ghouri FS: Self-assessment in the measurement of public health workforce preparedness for bioterrorism or other public health disasters. *Public Health Rep* 2005;120:186-191.
- More FG, Phelan J, Boylan R, et al: Predoctoral dental school curriculum for catastrophe preparedness. *J Dent Educ* 2004;68:851-858.
- Mosca NW, Sweeney PM, Hazy JM, Brenner P: Assessing bioterrorism and disaster preparedness training needs for school nurses. *J Public Health Man* 2005;38-s44.
- Rottman SJ, Shoaf KI, Dorian A: Development of a training curriculum for public health preparedness. *J Public Health Man* 2005;128-s131.
- Wisniewski R, Dennik-Champion G, Peltier JW: Emergency preparedness competencies: Assessing nurses' educational needs *J Nurs Adm* 2004;34:475-480.
- Parker CL, Barnett DJ, Fewes AL, Blodgett D, Links JM: The road map to preparedness: A competency-based approach to all-hazards emergency readiness training for the public health workforce. *Public Health Rep* 2005;120:504-514.



25. Slepski LA: Emergency preparedness and professional competency among health care providers during hurricanes Katrina and Rita: Pilot study results. *Disaster Manag Response* 2007;5:99–110.
26. International Nursing Coalition for Mass Casualty Education: Educational competencies for Registered Nurses responding to mass casualty incidents. 2003. Available at <http://www.aacn.nche.edu/education/pdf/INCMCEcompetencies.pdf>. Accessed 12 February 2008.
27. Subbarao I, Lyznicki J, Hsu EB, et al: A consensus-based educational framework and competency set for the discipline of disaster medicine and public health preparedness. *Disaster Medicine and Public Health Preparedness* 2008;2:57–68.
28. Waeckerle JF, Seamans J, Whiteside M et al: Executive summary: Developing objectives, content, and competencies for the training of emergency medical technicians, emergency physicians, and emergency nurses to care for casualties resulting from nuclear, biological, or chemical (NBC) incidents. *Ann Emerg Med* 2001;37:587–601.
29. Gebbie KM, Qureshi K: Emergency and disaster preparedness. *AJN* 2002;102:46–51.
30. The Hospital Competency Subcommittee and Health, Medical, Hospital and EMS Committee Florida State Working Group: State of Florida recommended core competencies and planning/mitigation strategies for hospital personnel. 2004.
31. WHO Health Actions in Crises Cluster: Integrating Emergency Preparedness and Response into Undergraduate Nursing Curriculum. Geneva: WHO, 2007.
32. Dorsey DM for the International Council of Nurses: ICN Framework of Disaster Nursing Competencies (Draft), 2008.
33. NEPEC Competency Committee: Educational competencies for registered nurses responding to mass casualty incidents. 2003. Available at [www.nepec.com](http://www.nepec.com). Accessed 07 December 2007.
34. Pryor E, Heck E, Norman L, et al: Integrated decision-making in response to weapons of mass destruction incidents: Development and initial evaluation of a course for healthcare professionals. *Prehosp Disaster Med* 2006;21(1):24–31.
35. Polivka BJ, Stanley SAR, Gordon D, et al: Public health nursing competencies for public health surge events. *Public Health Nurs* 2008;25(2):159–165.
36. Weiner E: Preparing nurses internationally for emergency planning and response. *Online J Issues Nurs* 2006;11(3).
37. Markenson D, DiMaggio C, Redlener I: Preparing health professions students for terrorism, disaster, and public health emergencies: Core competencies. *Acad Med* 2005;80(6):517–525.
38. American Red Cross: Develop nursing students' disaster competency by working with the American Red Cross. 2004.
39. US Department of Health and Human Services Office of the Surgeon General: Medical Reserve Corps: *MRC Core Competencies Matrix*. 2007. Available at [http://www.medicalreservecorps.gov/File/MRC%20TRAIN/Core%20Competency%20Resources/Core\\_Competencies\\_Matrix\\_April\\_2007.pdf](http://www.medicalreservecorps.gov/File/MRC%20TRAIN/Core%20Competency%20Resources/Core_Competencies_Matrix_April_2007.pdf). Accessed 04 February 2008.
40. Centers for Disease Control and Prevention: Bioterrorism and emergency readiness: Competencies for all public health workers. 2002. Available at <http://www.training.fema.gov/emiweb/downloads/Bioterrorism%20and%20Emergency%20Readiness.pdf>. Accessed 04 February 2008.
41. Council on Linkages Between Academia and Public Health Practice: Competencies for public health professionals. 2001. Available at <http://www.phf.org/link/corecompetencies.htm>. Accessed 07 February 2008.
42. Center of Public Health Preparedness Columbia University Mailman School of Public Health, Columbia University School of Nursing, and Greater New York Hospital Association: Emergency preparedness response competencies for hospital workers. 2003. Available at [www.ncdp.mailman.columbia.edu/files/hosp-comps.pdf](http://www.ncdp.mailman.columbia.edu/files/hosp-comps.pdf). Accessed 10 March 2009.
43. Ablah E, Molgaard CA, Frederickson DD, Wetta-Hall R, Cook DJ: Quantitative evaluation of "Can it happen in Kansas": Response to terrorism and emerging infections. *J Public Health Man* 2005;November (Suppl):s17–s24.
44. Calhoun JG, Rowney R, Eng E, Hoffman Y: Competency mapping and analysis for public health preparedness training initiatives. *Public Health Rep* 2005;120:s91–s99.
45. Calhoun JG, Davidson PL, Sinioris ME, Vincent ET, Griffith JR: Toward an understanding of competency identification and assessment in health care management. *Quality Management in Health Care* 2002;11(1):14–38.
46. Accreditation Criteria—Schools of Public Health. June 2005. Available at <http://www.ceph.org/files/public/SPH-Criteria-2005.SO5.pdf>. Accessed 14 December 2009.
47. Humphress R: Building an emergency response competency system: Optimizing emergency personnel mobilization. *J Homel Secur Emerg* 2007;4(3):No.04-E015-1.
48. Task Force for Quality Control of Disaster Management: *Guidelines for Evaluation and Research in the Utstein Style*. Madison: World Association for Disaster and Emergency Medicine, 2003.
49. Birnbaum ML: Structure and science. *Prehosp Disaster Med* 2006;21(6):369–370.
50. Westera W: Competencies in education: A confusion of tongues. *J Curriculum Stud* 2001;33(1):75–88.
51. Stefl ME: Common competencies for all healthcare managers: the Healthcare Leadership Alliance model. *J Healthc Manag* 2008;53(6):360–374.
52. Shewchuk RM, O'Connor SJ, Fine DJ: Building an understanding of the competencies needed for health administration practice. *J Healthc Manag* 2005;50(1):32–47.
53. The Sphere Project. Available at <http://www.sphereproject.org/handbook>. Accessed 07 March 2007.
54. Punntitami W: The application of competency modeling for human resource management: A holistic inquiry. *J Thai Public Admin* 2002;3:113–131.
55. Miner KR, Childers WK, Alperin M, Cioffi J, Hunt N: The MACH model: From competencies to instruction and performance of the public health workforce. *Pub Health Rep* 2005;120:s9–s15.
56. Green P: *Building Robust Competencies*. San Francisco: Jossey-Bass, Inc., 1999.