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Directions for Disaster Nursing Education in the United States

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The potential for a high-impact incident resulting in mass casualties remains a specter plaguing the health care system. The increasing frequency of natural disasters and world-wide terrorist events has emphasized the need for adequate preparation of health care providers in the event that such an incident occurs. Nurses comprise a large percentage of the health care workforce, so that adequate educational preparation for nurses is essential. Yet recent studies [1,2] indicate that nurses remain unprepared to adequately respond to a high-impact event.

Immediately after the attacks on the World Trade Center in New York and the anthrax exposures in the eastern United States, there was an explosion of courses focused on the elements of chemical, biological, radiological, and nuclear terrorism, collectively known as weapons of mass destruction. Emerging infections (eg, severe acute respiratory syndrome [SARS]), the threat of pandemic viral influenza (eg, Avian influenza), and the frequent occurrence of natural disasters, however, have emphasized the fact that these events may result in an influx of the sick or injured equaling or exceeding the number associated with weapons of mass destruction. Consequently, many educational programs for health

care professionals now use the all-hazards approach. Education for nurses, built on the all-hazards approach, provides the framework for college nursing program curricula, and for continuing education (CE) and just-in-time instruction.

Educational demand

Before 2001, few nurses received any formal education in the areas of emergency preparedness or disaster response. Nurses who did possess some rudimentary knowledge likely served in the military, worked as prehospital providers, were employed in a hospital emergency department, or participated in humanitarian disaster relief work. Consequently, most nurses graduating from schools before 2001 have wide gaps in their knowledge of disaster care.

It is accepted that any event resulting in mass illness or injury will exceed the number of health care workers able to supply care. Nurses comprise the largest number of health care workers, but many nurses are unprepared to respond because of lack of knowledge or skills. These existing deficits create a nursing workforce requiring additional hours of formal instruction to be able to respond effectively in the event of a high-impact incident resulting in mass casualties. It is accepted that all practicing nurses should possess a basic understanding and skill set to be able to provide care in the event of a mass casualty event [3]. These educational demands are staggering, particularly in a health care environment already

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operating at or above capacity. Innovative ways to educate nurses and other health professionals are being instituted. At least three national CE courses targeting physicians, dentists, paramedics, and nurses were created and are now offered nationally under the sponsorship of the American Medical Association [4]. Patterned on the basic and advanced life support course model, these courses and have three levels: core disaster life support (CDLS), basic disaster life support (BDLS) and advanced disaster life support (ADLS). These programs, however, may be unavailable in more rural locations. Additionally, they can be costly, and many nurses cannot get paid time off work to attend the courses.

Computer-based training, a strategy used in many fields of study, is another newer alternative for practicing nurses to augment their disaster training. On-line training has been purported to be more efficacious, more convenient and more flexible, because it can be completed at the learner's own time and pace [5]. These electronic resources typically include on-line, learn at one's own pace modules [5], and many are offered free of charge. Upon completion of many of these computer modules, the learner can print a certificate to show proof of training. A basic review of nurses' responsibilities during disasters is sponsored jointly by the American Red Cross and Sigma Theta Tau International, but this on-line course provides very basic information and should be considered a starting point for further more in-depth education (http://www.nursingsociety.org/education/case_studies/cases/SP0004.htmlwww.nursingsociety.org). The Centers for Disease Control and Prevention (CDC) offer excellent information on chemical, biological, and radiological emergencies, and the information can be accessed easily from the CDC Web site. Two nursing groups, the International Nursing Coalition for Mass Casualty Education (INCMCE; as of spring 2007 changed to Nursing Emergency Preparedness Education Coalition, NEPEC) and the National Nurse Emergency Preparedness Initiative (NNEPI), are excellent sources of computer links for many of these Web-based training modules relevant for nurses.

Although numerous computer-based training modules for health professionals exist, most of these on-line educational offerings do not specifically target nurses. With funding from the Agency for Healthcare and Quality (AHRQ), Elizabeth Weiner was one of the first individuals to spearhead the development of six disaster education modules specific for nurses [5]. All the modules were

developed and centered on the core competencies for practicing nurses identified by INCMCE/NEPEC. Access to these free modules is obtained at the INCMCE Web site (www.incmce.org). Another recent computer-based initiative specifically for nurses is under construction by NNEPI (www.nnepi.org) and funded by the US Department of Homeland Security. Similar to the INCMCE/NEPEC modules, the NNEPI on-line program consists of six modules taking about 6 hours to complete. These free modules are nearing completion, and it is anticipated that they will be available on-line in the near future. Another innovative CE program of study can be accessed on-line at St. Louis University (http://nursing.slu.edu/cne_disaster_prep_home.html). Completion of this nurse-focused CE program provides a certificate in disaster preparedness. Nurses desiring to obtain a certificate are required to pay a fee and must complete six required and four elective modules (from a list of 12). Many other on-line disaster training programs not specifically targeted to nurses are widely available, and both NEPEC and NNEPI have links to the Web sites.

Although the need to educate nurses in the fundamentals of disaster care is recognized, and great strides have been made, nursing school curriculum in the United States for the most part remains inadequate [6]. Weiner and colleagues [6] showed that as late as 2003, the number of hours focused on the nurse's role in disaster preparedness in American schools of nursing had increased marginally, but continued to be inadequate. They identified several important obstacles for this including: curricula already heavily content laden, lack of scholarly articles targeted for nurses, inadequately defined and validated fundamental content, and faculty insufficiently prepared to teach the content [5]. Nevertheless, some university-based schools of nursing are attempting to integrate disaster nursing content throughout the curriculum, often as part of community health course content, or as electives for students to choose [7-9]. For example, the Long Island University School of Nursing involves senior nursing students in a 3-hour lecture covering basic disaster management principles and a 1-day symposium as part of their community health experience [10]. Another school, the Texas Tech University Health Sciences Center School of Nursing, had nursing students participate in a simulated mass casualty drill to allow students an opportunity to practice skills [11]. The question remains, however, how much and

what type of content is sufficient? Jennings-Sanders and colleagues [9] suggest that short lectures do not provide enough time to synthesize disaster nursing principles. Consequently, they propose that disaster nursing should be a required semester-long course for undergraduate nursing students. This may be very difficult to achieve, because most undergraduate curricula are content-overloaded.

Efforts to expand and formalize essential disaster-related content have been hampered by the fact that no consensus exists concerning fundamental elements, how the content is taught best, or how to promote retention of an overwhelming amount of information. To date, some anecdotal evidence exists to support the efficacy of bioterrorism and disaster preparedness courses [8,10], but a systematic analysis of relevant curricular threads has yet to be completed. This emphasizes that core content for nursing curriculum needs to continue to be delineated and that outcome competencies must be identified and then validated through research. Creation of such a framework then can guide curriculum organization and design. One of the major impediments in the establishment of such a framework is the fact that essential content for disaster nursing education remains poorly characterized; however, preliminary work on competencies is well underway.

Competencies

The fundamental content of emergency preparedness curricula remains controversial. When considering emergency preparedness training in the hospital setting for example, Rubin questioned not only the quantity of training, but also the usefulness and realistic nature of existing competencies. Although both the American Nurses Association [12] and the American Association of Colleges of Nursing [13] recommend appropriate basic education and continued education for all nurses in emergency preparedness, neither define content.

So, what is meant by competencies? Core competencies are defined as the knowledge, skills, abilities, and behaviors needed to carry out a job [14]. Articulated by measurable statements, competencies are based on key essential job functions, frequently used job functions and accountabilities, and high-risk job functions and accountabilities that involve actions that could cause harm, death or legal actions to customers, employees, or the organization. Whitcomb [15] emphasized that core competencies delineate the knowledge, skills, and attitudes that learners must acquire to be able

to perform within each competency domain at a predetermined level. Attaining competencies helps to ensure that programs achieve certain outcomes.

Several authors suggest the development of formal emergency preparedness educational core competencies [16–18] with competency-based objective evaluation [19]. A second group suggests that emergency preparedness training should be required CE [20–22] or a requisite for medical privileges or licensure [23]. The Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) requires measurement of competency in its accreditation process [24]. In January 2001, JCAHO introduced new emergency management standards, building on its long-standing disaster preparedness requirements [24]. One specific phase of the new standard includes determination of the priorities for, and means for effectively deploying, the finite resources needed to support response systems, including trained personnel.

In the absence of standardized federal criteria, several groups have attempted independently to develop core competencies for various responder types without any attempts to harmonize them. Those addressing health care include emergency medical technicians, emergency physicians and emergency nurses [25], emergency response clinicians [26], hospital workers [27], and public health workers [27]. Those specifically addressing nursing include the Columbia School of Nursing [27] (public health and hospital nurses), the Association of Teachers of Preventive Medicine (2003), (clinicians–nurses and physicians) [26], and INCMCE/NEPEC (general nurses) [28]. Unfortunately, the vision and resulting competency requirements are inconsistent across the groups. Further, no attempt has been made to validate if these competencies are accurate or address the full spectrum of required skill sets—information that is essential for planning and future training.

According to the White House-commissioned Katrina Report [29], the required knowledge, skills, and abilities of health care professionals differed from existing competency lists. The White House report stated:

“Immediate public health and medical support challenges included the identification, triage, and treatment of acutely sick and injured patients; the management of chronic medical conditions in large number of evacuees with special health care needs; the assessment, communication and mitigation of public health risks; mortuary support;

and the provision of assistance to state and local health officials to quickly reestablish health care deliver systems and public health infrastructures.”

Recently the National Organization of Nurse Practitioner Faculties recognized that curricula development for advanced practice nurses (APN) is difficult, as most educators are unfamiliar with emergency preparedness content [30,31], and curricula are already full. As a result, the group has taken a different approach, identifying key emergency preparedness content that can be incorporated into existing courses and providing resources to assist faculty in delivering the content. The white paper should be published soon and will be widely available.

Educational content

Because disasters are intrinsically unpredictable, complete preparedness for disasters, particularly in the case of a bioterrorism event, is likely not fully attainable [32]. Consequently, the dynamic nature of preparedness makes precise identification of basic educational priorities specific for nurses difficult at best. Nevertheless, since 2001, progress has been made. Existing literature reflects five general elements important for nurses, and several authors suggest that these should be incorporated into curricula [8,33,34]. These educational priorities include: detection and reporting of unusual outbreaks, treatment of ill and injured, control measure implementation, resources and preparedness planning, and management of the public. Interestingly, a landmark study of Wisconsin nurses identified at least eight similar educational priorities for nurses dealing with disasters and other large health care emergencies [1]. Unsurprisingly, the top three priorities dealt with nurses' knowledge of: 1) triage and first aid, 2) detection of symptoms associated with biological agent-caused diseases, and 3) accessing critical resources such as the strategic national stockpile. Other areas where nurses felt undereducated were the incident command system, quarantine, decontamination, psychological first aid, epidemiology, clinical decision-making, and communications/connectivity [1].

To date, three models for disaster nursing have been described. The Jennings-Saunders disaster management model highlights four phases that nurses in the community may use to plan disaster nursing care [35]. Each phase focuses on different aspects of disaster planning and response. While

the phase 1 (predisaster) targets planning for disaster and resource allocation, phase 2 (disaster) addresses nurses' role in the midst of a disaster. Phases 3 and 4 of the model deal with health need evaluation and effects of the disaster on patient or population health, respectively [35]. In Veenema's early ground-breaking text, the author uses the typical disaster model phases of pre-impact, impact, and postimpact to describe model nursing roles specific for each phase of the disaster [36]. Most recently, Wynd proposed a model for disaster military nursing [37], incorporating elements of both the Jennings and the Veenema models [35,36]. Wynd's model, like Veenema's, focuses on military nursing activities involving preparedness and readiness (phase 1); on impact/response and implementation (phase 2); and finally on postimpact recovery, reconstruction, and re-evaluation (phase 3).

These examples illustrate the progress thus far that nurses and nurse educators have made in the identification of components of core knowledge and practice models necessary for optimal function in the event of large-scale health emergencies. Ground-breaking work already had been accomplished, as evidenced by the publication of the core competencies for public health workers and by INCMCE/NEPEC [3,38]. The next steps will be to design a suggested curriculum for university and continuing education that is widely available and endorsed by all the major nursing accreditation bodies as requisite knowledge for nurses responding to emergencies caused by natural disasters, infectious illness, or terrorism.

New directions in disaster nursing

Effective response to disasters and other large-scale health emergency requires strong leadership, strategic planning, and interprofessional collaboration. Several schools of nursing recognize the need for graduate education and to that end have created masters degree programs and post-masters certificates in emergency planning and disaster response [39]. The University of Rochester (New York) was the first school of nursing to create a masters program to educate nurses as leaders in disaster response and emergency preparedness [39]. The program focuses on the development of skills leaders need to design, implement, and evaluate programs dealing with emergency response and disaster management. Another trendsetter was the Johns Hopkins

Table 1
Masters degree nursing programs focused on disaster preparedness/disaster response in the United States
(in alphabetical order)

University	Program title	Credits for degree completion
Adelphi University School of Nursing, Garden City, N.Y.	Emergency Nursing and Disaster Management	39 credits ^a
Columbia University School of Nursing, New York	Emergency Preparedness Response	45–49 credits masters plus nine credits as emergency preparedness subspecialty
Johns Hopkins University School of Nursing, Baltimore,	Health Systems Management: Emergency Preparedness/Disaster Response	39 credits ^a
University of Pittsburgh School of Nursing, Pittsburgh	ACNP: Trauma and Emergency Preparedness	44–46 credits for ACNP including subspecialty disaster preparedness courses
University of Rochester School of Nursing, Rochester, N.Y.	Leadership in Health Care Systems in Disaster Response and Emergency Preparedness	30 credits
University of Tennessee College of Nursing, Knoxville, Tenn.	Homeland Security Nursing	37 credits (CNS) ^a
Vanderbilt University School of Nursing, Nashville, Tenn.	Health Systems Management	56 credits (NP) ^a 39 credits, plus six credits elective concentration

Abbreviations: ACNP, acute care nurse practitioner; CNS, clinical nurse specialist.

^a Post-masters certificate option.

School of Nursing (JHUSON, Baltimore), which in fall 2005 inaugurated what is believed to be the first nursing graduate program geared toward the preparation of nurse leaders in emergency response and disaster management in health care facilities. The masters track was established on the belief that nurses always have held key positions in health care facilities, that they possess valuable insider knowledge of how health care facilities function during disasters, and that they hold pivotal roles in the formulation of institutional disaster management plans. Students are required to complete courses on health systems management, education, national/international humanitarian relief, emergency planning, and disaster response (a series of three). A 12 credit post-masters certificate is also available. Concurrent to the initiation of the JHUSON masters program, the University of Tennessee at Knoxville also launched a nursing masters degree and post-masters certificate option in homeland security nursing. Students may opt to focus their studies on management or on advanced practice/clinical nurse specialist roles. The post-masters option requires completion of 24 credits. Adelphi University (Garden City, Long Island, N. Y.) recently started a masters/post-masters degree in emergency nursing and disaster management.

Other university schools of nursing offer masters track subspecialty options or post-masters certificates, including Columbia University and University of Pittsburgh (Table 1). As more university schools of nursing expand their masters options to include specialty tracks in emergency response and disaster preparedness, it is likely that graduates will assume groundbreaking new roles as health care leaders, emergency planners, biopreparedness coordinators, and educators.

Summary

Educating nurses to meet the challenge of dealing with patients from large-scale health emergencies such as natural disasters, infectious disease outbreaks, and chemical, biological, and radiological terrorism always will be difficult based on the unpredictable nature of such events. Content development is complicated further, because few researched-based studies validating the efficacy and retention of emergency preparedness training/education are published. Consequently, much of the work in this area is accessible only through preliminary (and often unpublished) reports at conferences and therefore unavailable for use by nursing faculty, policy makers, decision makers, and researchers.

Fundamental to a comprehensive and effective national training plan for nurses and other health care professionals is consensus about the operational definitions of emergency preparedness. Heightened understanding of all the components of emergency preparedness education ensures that the range of preincident actions and processes are standardized and consistent with mutually agreed upon doctrine and measurable, resulting in integrated emergency preparedness education. Additionally, there should be training exercises incorporating nationally formulated core competencies across all responder/receiver roles. Once this preliminary work is completed, more attention needs to be devoted to rigorous scientific evaluation of the effectiveness of existing emergency preparedness education programs. In addition, systems of metrics to detail capacity and performance must be created. These have significant implications for the future development of educational programs in this area. Although it is virtually impossible to completely prepare every nurse to respond to all types of large-scale health crises, it is possible to identify comprehensive emergency preparedness principles that can provide a framework for university curriculum, CE programs, and just-in-time training, thus creating a nursing workforce better equipped to respond when disasters do strike.

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