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Perinatal Considerations in the Hospital Disaster Management Process

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ABSTRACT

Nurses play a vital role in providing care to mothers and infants during a disaster, yet few are fully prepared for the challenges they will encounter under extreme conditions. The ability to provide the best possible care for families begins with understanding the perinatal issues in relation to each phase of the disaster management process. This article reviews the hospital and perinatal nursing role in the mitigation, preparedness, response, and recovery phases of disaster management.

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Hospitals remain at the forefront of disaster planning after the catastrophic events that marked the past decade. On September 11, 2001, the terrorist attacks on the World Trade Center and the Pentagon demonstrated the important role hospitals play in the frontline response to sudden, unexpected incidents. Saint Vincent’s Hospital in Manhattan (New York) and Virginia Hospital Center-Arlington activated their emergency operations, becoming vital elements of the organized medical response (Jurkovich, 2003; Kirschenbaum, Keene, O’Neil, Westfal, & Astiz, 2005). The subsequent anthrax attacks in 2002 demonstrated the need for hospital personnel to know how to safely respond to victims of bioterrorism while maintaining a secure environment for other patients and staff. Likewise, the events following the 2005 Hurricanes Katrina and Rita exposed the necessity of a resilient hospital infrastructure with the sustainability to care for vulnerable populations days following a widespread community disaster.

Among the most vulnerable populations in the aftermath the 2005 hurricanes were pregnant women and newborns. The unexpected levee system failure in New Orleans following the passage of Hurricane Katrina required that mothers and newborns be sustained in deteriorating conditions without back-up power, limited food and water, and sometimes insecure settings (Giarratano, Orlando, & Savage, 2008). Through the heroic efforts of many, all mothers and newborns were eventually rescued and survived. Yet the evacuation process was riddled with complications and took more than 4 days to fully accomplish (Orlando, Bernard, & Mathews, 2008). Meanwhile, the surge in mother/newborn services in receiving hospitals, such as Woman’s Hospital in Baton Rouge 70 miles northwest of New Orleans, was enormous as they received and stabilized more than 122 infants and high-risk obstetrical patients (Spedale, 2006).

These events sparked renewed attention to disaster planning in mother/newborn hospital settings, motivating work that resulted in the 2007 National Working Group for Women and Infant’s Needs in Emergencies in the United States (Women and Infants Service Package, 2007) and the State Emergency Planning and Preparedness Recommendations for Maternal and Child Populations in 2008 (Association of Maternal and Child Health Programs) that guide disaster management in acute care and community settings. In addition, a plethora of information on disaster planning from governmental agencies such as the Centers of Disease Control and Prevention (CDC) and Department of Health and Human Services (DHHS) and varied health care organizations provides a foundation for developing guidelines aimed at...
minimizing the impact of disaster or pandemics on women and mother/newborn patients.

Whether caused by natural forces, technological failures, or intentional violence, disasters are destructive events that result in property damage, mass casualties, injuries, or illness that can overwhelm the community and the health care system. Pregnant women and newborns are most affected by environmental and social changes in the community with the disruption of housing, routine medical care, the food and water supply and increased exposure to violence or toxins (Pfeiffer et al., 2008). Pregnancy and childbirth place women at higher risk for health complications from disasters including obstetrical complications, such as low birth weight and preterm birth (Xiong et al., 2008).

The purpose of this article is to review the basic phases of emergency management that include mitigation, preparedness, response, and recovery in relation to managing the special needs of hospitalized women and newborns in situations of emergencies or disasters. Additionally, governmental and organizational policies with recommendations or guidelines that regulate hospital and community disaster preparation are described.

**Governmental, Regulatory, and Organizational Influences on Hospital Disaster Preparation**

Federal, state, and local governments have defined roles and responsibilities in working with nongovernment organizations and the private sector to implement a shared and coordinated approach to disaster management in the United States. The National Response Framework (NRF) provides guidance to all levels of government in operational planning to prepare and respond to disasters (U.S. Department of Homeland Security [DHS], 2008). Each disaster response is carefully evaluated to identify areas needing improvement. The NRF is based on action plans incorporating key disaster response principles and replaces the National Response Plan (NRP) (DHS, 2004).

Although state and local governments handle most emergency events, federal resources may be deployed in advance of an impending disaster. When local and state resources are overwhelmed, the governor can request assistance from the federal government through the Department of Homeland Security. Local governments rely on state resources such as emergency management, police, transportation, health agencies, and the National Guard.

The NRF provides a master plan for predisaster collaboration among local government, nongovernment, and private agencies (DHS, 2008). Hospitals represent only one stakeholder at the local level within the overall health care system needed for disaster preparedness. Pharmacies, home care services, health centers, public health departments, and the overall community must integrate their efforts to build community-wide and regional networks that can respond in a coordinated manner (Knebel & Phillips, 2009). Figure 1 outlines the organizational chart for disaster management.

There have been a number of recent Congressional acts aimed at supporting state and local coordination efforts among all stakeholders. The passage of the Public Health Security and Bioterrorism Preparedness and Response Act in 2002 provided funding and guidance to improve local and state hospital preparedness for public health emergencies. This was followed in 2006 with the Pandemic and All-Hazards Preparedness Act (PAHPA). This act set up the Department of Health and Human Services (DHHS) as the lead agency for coordinating public health and medical emergencies and an assistant secretary for preparedness and response (ASPR) to oversee the Hospital Preparedness Program (HPP). The HPP funding is administered through state health departments to promote community emergency preparedness where local hospitals partner with state and community agencies to strengthen local responses. Outcomes of the HPP include benchmark initiatives to improve responses such as the National Hospital Available Beds for Emergencies and Disasters (HAvBED) system which includes a bed-tracking system to better measure response capabilities (Cantrill et al., 2005; Sauer, McCarthy, Knebel, & Brewster, 2009). The DHHS is also developing a single national verification system that will improve coordination of volunteers resulting from integration of the Emergency System for Advance Registration of Volunteer Health Professionals and Medical Reserve Corps.

Since 2001, the Joint Commission (TJC), the not-for-profit agency for voluntary accreditation of hospitals, expects the inclusion of comprehensive emergency management using an all-hazards approach. For the first time hospitals were required to...
to conduct a hazards vulnerability analysis to prioritize and plan responses to incident specific threats that they were likely to face. Hospitals were required to set up an incident command system to be used during an emergency to coordinate the hospital's responses from a central location and authority. In 2008 standards were revised to plan for resilience and assess surge capabilities. Thus hospitals are expected to plan critical resources for at least 96 hours of self-reliance; have plans for management of utilities, safety and security, and communication systems; and prepare staff to focus on teamwork and collaboration in rapidly changing situations (Danna, Bernard, Jones, & Mathews, 2009).

The Office of Public Health Emergency Preparedness and the Agency for Healthcare Research and Quality (AHRQ) developed a report that outlines how to deliver services and care in mass casualty events by analyzing such processes as triage and providing care with scarce resources (AHRQ, 2005). The American Nurses Association (ANA, 2002a, 2002b, 2008) has developed several reports in the form of position and policy papers to address nurses’ roles and responsibilities related to disasters. The ANA’s position statement on Registered Nurses’ Rights and Responsibilities Related to Work Release During a Disaster (2002a) provides guidelines for the registered nurse to use who requests to be excused or released from work to respond in a disaster. A companion position statement was also written by ANA (2002b) that addresses the employer and the development of organizational policies and procedures relating to the release of registered nurses from work during a disaster. In 2008 ANA released a policy paper, Adapting Standards of Care Under Extreme Conditions: Guidance for Professionals During Disasters, Pandemics, and Other Extreme Emergencies, that addresses the important questions regarding ethics and standards that apply during extreme circumstances.

At the international level, the World Health Organization (WHO) and the International Council of Nurses (ICN) joined together to develop a set of core disaster nursing competencies. The ICN Framework of Disaster Nursing Competencies (World Health Organization [WHO] and the International Council of Nurses [ICN], 2009) provides the foundation for preparing nurses to functional effectively in providing disaster relief. The competencies address the role of the nurse in the phases of disaster management and serve as a standard for development of disaster education and training for nurses around the world. Nursing education...
programs are designing introductory disaster nursing courses based on the competencies to help undergraduate students gain the required knowledge and skills to respond to disasters (Pang, Chan, & Cheng, 2009).

Disaster Management Process
The disaster management process includes four basic phases: mitigation, preparation, response and recovery (TJC, 2005) and is used to address all facets related to a disaster. Minor variations in the labels and number of phases in the disaster management process may be seen in various government and agency documents; however TJC publications reflect terminology most commonly used in the National Response Plan (TJC, 2005). Figure 2 displays the disaster management process used by hospitals in developing and maintaining a state of readiness. Each phase of the process is associated with specific activities along the disaster continuum. The disaster management process can create challenges that are complex and overwhelming where actions in each phase are needed to minimize or decrease the impact of a disaster (WHO & ICN, 2009). The process is continuous and involves using what is learned from one disaster to assist in preparing for future events.

Mitigation Phase
Mitigation includes “measures taken to reduce the harmful effects of a disaster by attempting to limit its impact on human health, community function, and economic infrastructure” (Veevema, 2007, p. 6). The goal is to minimize the impact of a disaster or, if possible, prevent the disaster. Mitigation should focus on long-term measures for minimizing or eliminating structural risks such as maintaining compliance with safety and building codes and zoning requirements, ensuring adequate flood levee protection, installing flame-retardant shingles in a fire prone area, as well as focusing on potential nonstructural risks such as legislation that addresses insurance coverage for disasters. In a perinatal hospital setting, mitigation includes identifying additional safe space to which mothers and infants can be relocated (i.e., away from windows, lower floors in case of evacuation) by nurses who are knowledgeable about this patient population. Nurses play an active role in the planning and design of new perinatal units.

Proactive measures during hospital renovation projects, such as installation of hurricane shutters in a renovated Neonatal Intensive Care Unit (NICU) with a large number of windows, can potentially reduce significant wind and water damage. Long-term infrastructure planning for adequate back-up power sources to supply electrical needs of obstetrical settings is also critical for operating rooms for emergency Cesarean deliveries, infant respiratory or incubator support, and monitoring of laboring high-risk patients. Alternate water sources should also be considered in sites prone to extreme flooding or earthquakes (Mitchell et al., 2009).

During the mitigation phase hospitals are expected to perform a hazard vulnerability assessment (HVA). An HVA is conducted to identify conditions caused by either physical, cultural, social, or economic factors that can increase the exposure of a community to hazards. An HVA involves examining and forecasting the probability and severity of harm, the impact on the facility and community, and the level of preparedness of the facility to manage the disaster (TJC, 2005). A prioritization of the hazards identified in the HVA assessment will enable the hospital to make decisions and develop specific goals and objectives that are in the best interest of the facility. An agency providing obstetrical services needs to have an estimate of the number of childbearing women in the community who may need services. Additionally, the agency should be aware of the social and economic issues that might affect the population and make them more vulnerable to health care complications after a disaster. The mitigation phase is a continual process, and an analysis of hazards should be conducted routinely.

Preparedness Phase
Preparedness refers to the “proactive planning efforts to structure the disaster response prior to
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Planners take into consideration her or his work obligations that might include reporting to work and remaining onsite for several days. Each nurse needs to identify family options for care of dependent family members and animals in cases of emergency. Those institutions who choose to provide shelter for staff’s family members or pets need a plan that considers the additional resources required to provide for safety, food, water, and space. Lessons learned from the Hurricane Katrina disaster indicated advantages and disadvantages to having family members shelter within the hospital complex (Bernard & Mathews, 2008). Although evacuation of family members from the disaster risk area is usually considered best when natural disasters can be anticipated, a protocol that considers sheltering staff’s family members in cases when disaster strikes without warning may be warranted.

Staff who respond and work in a disaster need targeted education and training that provides them with the knowledge, skills, and competencies to provide quality care to victims in need of services. Staff education must include, but is not limited to, the triage process, hospital-specific policies and procedures relating to care of patients during a disaster, incident command structure, evacuation purposes of conducting emergency management drills and exercises should be conducted at least twice a year, with one drill focusing on a community-wide exercise (TJC, 2003). The purposes of conducting emergency management drills are to train staff, identify weaknesses, and make corrections and improvements to the emergency operations plan (TJC, 2003).

The unit-specific emergency operations plan is expected to be thoroughly articulated during new hire orientation and annually thereafter. This would include information such as the unit’s emergency staffing plan and what essential items to bring when reporting for work during a disaster. Preparations might include appropriate changes of clothing for work in harsh conditions (heat or cold) and bringing one’s own food, water, flashlights, batteries, and radio. If the hospital uses a rotating schedule of staff teams assigned to work either during or after a disaster, nurses should know the expectations. Staff must be prepared to be flexible, patient, and self-reliant, keeping themselves nourished and hydrated (Slepski, 2007). Staff must know how changing information will be disseminated. A clear channel of communication using websites, e-mail, or hotlines must be planned for staff to know when and where to report.
The families of hospitalized women and infants need to be included in the communication chain. Written instructions should be developed and shared with each family on the perinatal units and contact information for family members should be updated. Family members should be prepared for what to expect if they choose to remain with the hospitalized mother or infant. Resources are available to assist nurses in developing disaster preparation teaching tools for families (Giarratano et al., in press; March of Dimes, 2006). The hospital needs to collaborate with civil authorities to develop community public service announcements to instruct childbearing families on where to seek shelter or evacuate and under what conditions to access limited hospital services.

Hospital-wide evacuation plans are also a major component of preparedness planning. Evacuation planning identifies the conditions under which the facility would evacuate, including deciding on which patients will be first to evacuate and who would receive them. Procedures are needed to disseminate information about evacuation routes and available shelters to those patients and their families being discharged or not requiring medical care. It is essential that hospitals maintain a log documenting essential information about patient evacuation (i.e., evacuation site, time and date of evacuation).

**Surge Capacity Preparedness**

Surge capacity and triage of patients (admission and discharge) are two areas of special focus in hospital preparedness. According to TJC (2003), defining the hospital’s surge capacity is one of the most essential parts of an emergency operations plan. Surge capacity is defined as “the ability to expand capabilities in response to sudden or more prolonged demand” (TJC, 2003, p. 19). Hospital surge capacity refers to the sudden and unexpected increase in patients needing services that would severely challenge the capabilities and resources of the institution (Hick, Barbera, & Kelen, 2009). Disasters have the potential to stress every aspect of the health care delivery system. Consider what would happen if the patient admissions doubled over a few hours. This increase in census may represent surge of patients with multiple needs crossing over many departments, such as seen in an influenza pandemic or can be limited to specific needs such as adult or neonatal critical care beds.

Ability to respond to surge is based on the management of space, available beds, staff and supplies, equipment and medications, and legal capacity to provide care when the hospital’s capacity has exceeded its limit (TJC). Hospitals should consider all options in addressing surge capacity potential with a goal to be self-sufficient with ample supplies for at least 96 hours. Strategies to assist hospitals in becoming self-sufficient during surge periods include standardizing equipment, supplies, and medication doses. Critical supplies for obstetrical and newborn care such as peripads, blankets, diapers, pediatric needles, bottles, special formula, and medications need to be identified and alternate suppliers planned. During a disaster, the usual resources for securing additional incubators, radiant warmers,

| **Table 1: Disaster Training Resources** |
|-----------------------------------------|
| **The George Washington University**     |
| Department of Nursing Education          |
| Nurses on the frontline: Preparing for emergencies and disasters |
| (Free or CEU)                            |
| http://learning.nnepi.org/catalog/        |
| **University of Minnesota Emergency**    |
| Readiness and Training                   |
| Emergency Preparedness for Pregnant/Birthing Women and Newborns/Children |
| CEU Series:                              |
| Caring for Pregnant/Birthing women and their newborns during disasters: |
| An introduction to the issues            |
| Caring for women giving birth            |
| Caring for postpartum and breastfeeding women |
| Caring for newborns                      |
| http://www.nursing.umn.edu/MERET/MERETModules/home.html |
| **U.S. Dept. of Homeland Security**      |
| FEMA Center for Domestic Preparation     |
| Noble Training Facility Courses: Healthcare Courses |
| http://cdc.dhs.gov                        |
| **International Nursing Coalition for**  |
| Mass Casualty Education                  |
| Nursing Curriculum for Emergency Preparedness |
| http://webapps.nursing.vanderbilt.edu/incmcmodules2/main.html |

The families of hospitalized women and infants need to be included in the communication chain. Written instructions should be developed and shared with each family on the perinatal units and contact information for family members should be updated. Family members should be prepared for what to expect if they choose to remain with the hospitalized mother or infant. Resources are available to assist nurses in developing disaster preparation teaching tools for families (Giarratano et al., in press; March of Dimes, 2006). The hospital needs to collaborate with civil authorities to develop community public service announcements to instruct childbearing families on where to seek shelter or evacuate and under what conditions to access limited hospital services.

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Perinatal nurses need education and training to apply disaster management principles that guide care of hospitalized women and newborns during extreme conditions.

Established agreements with nearby health care facilities for the purpose of transferring patients or obtaining additional critical equipment and supplies should be included as part of the hospital surge capacity plan (TJC, 2006). There should be prearranged agreements for transport of high-risk mothers and newborns under specified conditions. Clear communication between referral and receiving hospitals is necessary to determine the level of patient acuity and equipment needs. All efforts should be made to keep lactating mothers and their newborn infants together. For high-risk infants, special consideration should be given in planning for the transport and handling of human milk.

Hospitals transferring high-risk neonates to a surge hospital should plan to bring equipment as well as staff for each infant. There should be a mechanism to ensure proper identification of each piece of equipment including hospital name and asset number, whereas the receiving hospital should document receipt of loaned equipment upon admission of the infant. This process assists evacuated hospitals in recovering valuable equipment needed for reopening.

In times of disaster it is common for people to go to a hospital to seek shelter or safety. This is especially true for pregnant women who see the hospital as a safe haven. During a disaster or emergency situation this would not be the case, however, as room is needed for women requiring medical intervention. Surge capacity in obstetrical areas mandates preplanning and evaluating space that can be reserved for normal labor and births, for complications of pregnancy, surgery space, and for isolation of patients for birth and care in case of an influenza outbreak. Large rooms such as recovery rooms, waiting rooms, clinic space, and conference rooms can be converted to patient care areas. Elective surgeries and inductions are immediately cancelled, leaving only essential services. Discharge of patients who are ready or near ready for discharge is also an important strategy to address surge. Criteria for early and immediate discharge of patients can be used to guide decisions. Early discharge of postpartum women and normal newborns can be carried out using assessment criteria, assuming there is a safe place for discharge, such as an appropriate shelter if home is not an option. Initiation of breastfeeding would be one key factor in determining discharge readiness, because bottle feeding may not be sustainable.

Surge capacity planning is part of the daily routine in many obstetrical and NICUs. In hospitals with a busy high-risk antepartum service, delivery of several high-risk women with multiple fetuses within a short period of time can result in a sudden increase in the labor and delivery and NICU census that may exceed the normal unit capacity. A proactive approach is required to secure the necessary equipment and staff before the expected deliveries, especially when the unit census is already at capacity. Obstetrical and neonatal nurse managers can use a similar on-call system when planning for an expected increase in unit census following a disaster. The same principles used in management of sudden census spikes can be modified and applied to disaster planning.

Surge capacity planning for the high-risk neonatal population requires critical evaluation of all available alternate physical spaces outside the NICU. Patient acuity and level of care determine the physical environment and equipment needs for each infant. National design standards specify the minimum number of square feet per bedspace and requirements for electrical, oxygen, air and vacuum outlets, as well as evacuation routes and exits in the NICU (White, 2007). However, few hospitals can meet these standards when forced to use an alternate location within the main facility. When a decision is made to shelter in place, it may be necessary to relocate NICU patients to another area of the hospital. Oxygen, air, and vacuum outlets are critical needs in an alternate physical space. Postanesthesia care units can often be used as an alternate space for relocating the NICU population or planning for neonatal admissions from a hospital under evacuation.

Response Phase

The National Response Plan defines response as “those activities that address the short-term, direct effects of an incident. These activities include immediate actions to preserve life, property, and the environment; meet basic human needs; and maintain the social, economic, and political structure of the affected community” (DHS, 2004, pp. 53–54). The National Response Framework describes how to implement response activities at all levels of
government (DHS, 2008). Hospitals are expected to implement the Hospital Incident Command System (HICS). HICS is the standard for health care disaster response and is a response infrastructure under the NIMS. The HICS provides the organization with a predictable chain of command, as well as a defined scope of supervision and job duties, and allows for flexible and rapid response to events before, during and after the event. HICS utilizes five functional areas (command, operations, planning, logistics, and finance/administration).

It is during this response phase that collaboration and communication is critical between local, state, and national levels for an effective disaster response to occur. During this phase the urgent needs of survivors are met. Nurses must have the necessary knowledge and skills to competently assess, triage, and monitor survivors for physical and mental health issues, and provide appropriate care in an environment with limited resources (WHO & ICN, 2009). Evacuation of the hospital and relocation of patients, visitors, and staff usually occurs during the response phase of the disaster. Nurses should be trained on evacuation procedures such as developing a process for infallible identification of infants, identifying evacuation sites for mothers and infants, identifying proper evacuation equipment (i.e., vests), and establishing back-up or alternate evacuation routes (Schultz, Pouletsos, & Combs, 2008). At one hospital after Hurricane Katrina, well newborn babies and their mothers had to be evacuated by boats to access ambulances several miles away. Family members should be kept together whenever possible to provide support to each other. If it becomes necessary to separate mothers from sick babies or family, there should be a system in place to assist in reconnecting families as soon as possible.

Adapted Standards of Care

Large-scale disasters that overwhelm the system also disrupt the usual standards and expectations that guide health care delivery. Situations resulting in scarce equipment and supplies, limited staff and support services (dietary, laundry, sterilization, pharmacy), and infrastructure losses (electricity, water, plumbing, sanitation) will change nursing care delivery. Priorities shift to providing only essential care. During the time of disaster, the expected goal of providing the best, complete nursing care based on the individualized needs of the patient may change to a utilitarian framework of care in which the objective is to provide the greatest good for the greatest number of individuals. When this shift is called for by an incident command structure in the institution, there needs to be guidance on what conditions of care will change. TJC requires that hospitals predetermine what routine activities would be delayed or omitted, such as vital signs, baths, extensive charting, and nonessential medications (TJC, 2006).

Perinatal nurses must have the knowledge and flexibility to change from high-tech to low-tech management of care, if required. Changes in care would likely include intrapartal nurses assisting women to labor without epidural support or minimal medication if electronic monitoring capabilities are limited, and depending on maternal warmth for neonatal temperature stabilization. In most situations, breastfeeding would be recommended for infant feeding. All standards of care in obstetrics and neonatal nursing need to be considered in the context of extreme conditions. For example, if continuous electronic fetal monitoring (EFM) is not available, what would be the expectations for maternal/fetal assessment for a woman in normal labor? At what point might nonlicensed personnel or family members be used to monitor or provide basic care for mothers and newborn infants?

Perinatal nursing staff may find themselves working in new patient-care situations, requiring rapid training. This may be likely in surge situations where well obstetrical and neonatal patients are discharged or transferred first, leaving neonatal and obstetrical nurses to assist with medical-surgical adult patients or the elderly. What rapid training would be needed to prepare a neonatal intensive care nurse to work in an adult critical care site, with no prior cross training?

In all situations, however, nurses are required to practice competently to be best of their ability. Adapting Standards of Care under Extreme Conditions (ANA, 2008) should be used as a guide for professionals planning care during disasters. Although acknowledging there are challenges, this ANA paper addresses the professional responsibility of nurses to adapt standards of care to provide the best possible care with the resources available. This includes using their best professional judgment at all times. Nurses who volunteer for out of state disaster relief work have an obligation to know the laws governing the practice of nursing in that state. Contact with the state board of nursing is essential (ANA, 2002a).

Disaster Triage

Among the most challenging issues for nurses is disaster triage whereby decisions are made on who
will receive care based on the likelihood of survival, commonly referred to as field triage. Triage is a skill that combines an assessment of the status and prognosis of the patient with knowledge of the medical resources available for treatment. Advanced practice nurses including nurse midwives, clinical nurse specialists, and nurse practitioners with expertise in advanced assessment of mothers and infants can fill critical disaster response roles in triage, transfer, and discharge (Cole, 2005). A shift to a utilitarian ethical framework necessitates that scarce resources be used to provide immediate care for those most likely to recover without extraordinary means. This also includes deciding which patients have priority for transfer from the disaster area to a full-care facility. These decisions are best made by a designated triage officer or those trained to use established criteria or algorithms to categorize, score, or rank patients based on who will benefit most from immediate emergency care (Qureshi & Veenema, 2007).

Table 2 lists an example of triage criteria commonly used in disaster situations. Patients are categorized based on type and severity of illness or injury, and assessment of airway, breathing, circulation, vital signs, level of consciousness, and by visual inspection. Although nurses working on hospital units may not be directly involved in the triage process, they care for patients based on triage decisions, providing specific interventions to support those who are likely to recover, and palliative care to those not expected to survive. Nurses need to understand the triage decisions made and be prepared to care for patients in this complex situation, using competencies that support worker and patient safety and the basics of airway, breathing, circulation, control of blood loss, and infection control (Gebbie, Peterson, Subbarao, & White, 2009).

It is essential that the in-patient birth center and neonatal units develop a triage plan for all mothers and neonates entering the units for care following a disaster or during a pandemic. This plan should include the resources of the obstetrical unit and the special needs of pregnant women and newborns (Woodson, 2009). The triage process will serve as a critical tool to assess the pregnant patients that present at the obstetrical units and to prioritize their most immediate concerns. Criteria for prioritizing obstetrical patients that require hospitalization versus those who can be discharged home or to community shelters should be preestablished and ready for use by staff.

Assessment of resources required for essential care for pregnant women include considering needs of laboring patients (uncomplicated and previous Cesarean delivery), breech presentations or fetal distress in labor requiring operative interventions, prolonged rupture of membranes, multiple births, diabetics, severe pregnancy induced hypertension (PIH) and placenta previa or abruption. Availability of resources is an important element in applying disaster-level triage in care of obstetrical patients. For example, if blood products are scarce, the supply might be reserved for emergency use in laboring patients and not released for use on a woman experiencing acute HELLP syndrome, with multiple health complications.

Resources in the NICU, as well, might be channeled to the neonates with the greatest chance of survival. Extremely low-birth-weight neonates in need of ventilator support would have little chance of survival without continuous care and resources. The degree of prematurity may be one consideration in triage of high-risk neonates. However, full-term neonates may have life-threatening multisystem medical or surgical conditions that may not be treatable during a disaster with limited resources. Education and understanding of disaster triage as it relates to mothers and high-risk newborns are essential for nurses because decisions and subsequent actions taken during a disaster may be considerably different from care provided under ordinary circumstances.

**Recovery Phase**

The recovery phase can be considered a short-term and long-term activity. The National Response Framework describes recovery as “the actions taken to help individuals, communities, and the Nation return to normal” (DHS, 2008, p. 45). After a disaster, recovery focuses on setting up temporary housing, providing medical care, supplying the

| Table 2: Disaster Triage |  |
|--------------------------|-------------------------------|
| Red (emergent)           | Critical life threatening; Immediate intervention likely will save lives |
| Yellow (urgent)          | Acute problem, illness or injury, stable but may deteriorate. Requires treatment within 20 min to 2 hr |
| Green (nonurgent)        | Injured or ill but stable; not likely to deteriorate if treatment delayed up to 2 hr (walking wounded) |
| Black (expectant)        | Dead or expected to die; nonsalvageable with current resources available |
public with current information and health and safety education, and implementing counseling programs. Hospitals that reopen postdisaster need to anticipate women and their newborn infants using medical emergency services for routine care due to disrupted clinics and pediatric services in the community. Mental health clinics may need to be expanded to address long-term stress in the community. Hospital-based social services will need referrals for women who lack housing, food and infant supplies, or are in need of day care services. The long-term goal of the recovery phase is to restore the affected area to its previous state as much as possible. This phase involves rebuilding, reemployment, and repairing the infrastructure. It is crucial that coordination and collaboration with the community occurs. During this phase, a postdisaster evaluation should be conducted within the organization to identify areas for improvement.

Conclusion
A series of major disasters in the past 10 years has highlighted the need for nurses and other health care workers in hospitals and other health care settings to know and understand their role in the disaster management process. Nurses have a vital role in participating in all phases of the disaster process at the federal, state, and local level. Hospitals have an obligation to maintain a state of readiness for unexpected or expected extreme emergencies. Optimal hospital emergency planning requires input from expert nurses with knowledge and experience with specific patient populations such as new mothers and high-risk infants. Disaster education and practice drills are essential for all hospital care providers. When disaster strikes and resources are limited, nurses have a duty to provide care using their skills, knowledge, and best professional judgment.

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Learning Objectives

Upon completion of this article, participants will be able to
1. Explain the role of government agencies in assisting hospitals during disasters.
2. Define the four phases of the disaster management process.
3. Give one example of appropriate use of disaster triage principles in the perinatal setting.
4. Define surge capacity.
5. Explain the role of the perinatal nurse when adapted standards of care are utilized during a disaster.

Test Questions

1. Which of the following is a true statement about the effects of disaster or pregnant women?
   a. Complications such as low birth weight and premature are known to occur following a disaster.
   b. No documented effects have been noted in women who received prenatal care.
   c. The effect of disaster on pregnancy is related to the location and duration of the event.

2. The recommendations from the 2007 National Working Group for Women and Infant's Needs in Emergencies in the United States provided
   a. a guide for disaster management in acute care and community settings.
   b. a higher rate of disaster related reimbursement for pregnant women.
   c. the establishment of protocols for emergency shelter of mothers and infants.

3. In the mitigation phase of disaster management, the goal is to
   a. lessen the impact or potential for damage.
   b. plan for evacuation to a surge hospital.
   c. repair damage to physical facilities.

4. When local and state governments are overwhelmed by the impact of a disaster, the federal response is initiated through the
   a. Centers for Disease Control (CDC).
   b. Department of Homeland Security (DHS).
   c. World Health Organization (WHO).

5. The advanced practice perinatal nurse is best suited for which of the following disaster management roles?
   a. incident command
   b. staff education
   c. triage

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6. Current standards require hospitals to plan critical resources necessary to continue operating for at least ____ hours of self-reliance during and after a disaster.
   a. 48
   b. 72
   c. 96

7. Which of the following statements demonstrates appropriate use of disaster triage principles in the neonatal intensive care unit?
   a. All available resources will be reserved for the lowest birth weight infants.
   b. Efforts and resources will be directed to infants with the highest probability of survival.
   c. Infants with multisystem organ failure and life-threatening surgical conditions will be evacuated first.

8. Hospitals should perform a hazards vulnerability assessment (HVA) to
   a. determine the resources needed for the most likely disasters in their location.
   b. determine what can be done to prevent disasters from occurring.
   c. identify surge hospitals for evacuation of mothers and newborns.

9. The details of a hospital evacuation plan are developed during which phase of the disaster management process?
   a. mitigation
   b. preparedness
   c. response

10. Which of the following activities should be carried out in the recovery phase of disaster management?
    a. Determining the cost of resources
    b. Releasing limited information
    c. Setting up counseling programs

11. The use of adapted standards of care during times of disaster requires that the nurse
    a. practice with a predefined scope determined by the unit manager.
    b. provide care only to patients within his/her area of experience and expertise.
    c. use skill, knowledge, and the best decision making under the difficult circumstances.

12. When disaster nursing care is guided by a utilitarian framework, the nurse will
    a. give the best, complete care for the good of the individual.
    b. provide the greatest good for the greatest number of individuals.
    c. ration care and resources equally among all in need.

13. Which of the following applies to a labor and delivery nurse who volunteers for disaster relief work in a neighboring state?
    a. No license is required since this is a state of emergency.
    b. The employer is obligated to assist the nurse in obtaining a temporary permit.
    c. The nurse is obligated to know the law of the state of practice.

14. Responsibilities of a surge hospital providing care for mothers and newborns include
    a. preplan staffing, supplies, and equipment for several days of self-sufficiency.
    b. provide nurses with 24 hours of off duty time for every 72 hours worked.
    c. setting up an isolation area for all admissions from evacuated hospitals.

15. Which of the following obstetric patients would be classified as a “red” emergent case needing first priority for helicopter transfer from a disaster-disrupted hospital with limited surgical services to a full-care facility 30 minutes away?
    a. Eighteen-year-old primigravida, dilated 7 cm, in active term labor, breech presentation, occasional late decelerations.
    b. Thirty-year-old, gravida III, para III, 6 hours postpartum, boggy uterus, moderate bleeding, retained placental fragment suspected.
    c. Twenty-eight-year-old, gravid II, para I, 32 weeks gestation, placenta previa, early labor begins, with moderate bleeding.