CHAPTER 7 Nursing Care of Clients Experiencing Disasters

LEARNING OUTCOMES

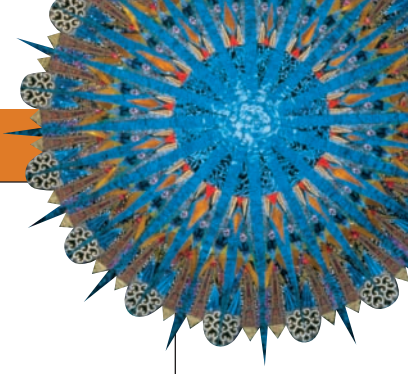
- Distinguish the difference between an emergency and a disaster.
- Describe the types of injuries or symptoms that are associated with biologic, chemical, or radiologic terrorism.
- Evaluate nursing interventions for the treatment of injuries related to biologic, chemical, or radiologic terrorism.
- Explain the rationale for reverse triage in disasters versus conventional triage in emergencies.
- Discuss situations requiring the need for client isolation or client decontamination.
- Discuss the role of the nurse in disaster planning, response, and mitigation.
- Identify ways that nurses are able to provide care to clients with special considerations.

CLINICAL COMPETENCIES

- Assess health status of clients who have experienced a disaster and monitor, document, and triage to the appropriate level of care.
- Use evidence-based research to plan and implement nursing care for clients with injuries suffered as a result of a disaster.
- Using assessment skills, determine priority nursing diagnoses, implement, and evaluate individualized nursing interventions for clients who are victims of disasters.
- Provide skilled nursing care to treat disaster-related injuries.
- Integrate interdisciplinary care of clients with an understanding of local, state, and federal systems of disaster response.
- Evaluate and revise plan of care and interventions based on client's condition, environmental factors, and resources to promote, maintain, or restore functional health status to clients who have sustained injuries due to a disaster.
- Provide education to promote prevention of disaster-related injuries.

MEDIALINK

Resources for this chapter can be found on the Prentice Hall Nursing MediaLink DVD-ROM accompanying this textbook, and on the Companion Website at http://www.prenhall.com/lemone



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All nurses will be expected to care for victims of disasters whether they work in acute care settings, ambulatory sites, long-term care facilities, or at home in their communities. There is no way to know where or when disasters may strike. Because of this, nurses must be prepared to assist clients, families, friends, healthcare workers, first responders, and communities in their recovery from disastrous events. There are a number of basic competencies that nurses should be cognizant of related to disaster preparedness.

CORE EMERGENCY AND DISASTER PREPAREDNESS COMPETENCIES FOR NURSES

The International Nursing Coalition for Mass Casualty Education (INCMCE) was founded to ensure a competent nurse workforce to respond to mass casualty incidents (MCIs) by facilitating the development of policies related to mass casualty events as they influence the public health infrastructure and impact on nursing practice, education, research, and regulation.

In August 2003, the INCMCE published *Educational Competencies for Registered Nurses Responding to Mass Casualty Incidents*. The purpose of this publication is to provide registered nurses with the awareness of critical competencies necessary to respond effectively to mass casualty events (Box 7–1). Nurses are expected to have sufficient knowledge to recognize the potential for a disaster event, when such an event has occurred, and what nurses can do to protect themselves, family members, and community members from harm or from potential exacerbation of conditions. Nurses must be aware of their role in disaster planning, response, and mitigation. Equally important, nurses must be aware of professional limitations and be able to respond to MCIs appropriately within the scope of nursing practice. It is strongly recommended that these core competencies be introduced in basic nursing curricula and be offered as continuing education for those who have completed their basic education.

BOX 7–1 Educational Competencies for Registered Nurses Responding to Mass Casualty Incidents

Core Competencies

1. Critical thinking
2. Assessment
3. Technical skills
4. Communication

Core Knowledge Areas

1. Health promotion, risk reduction, and disease prevention
2. Healthcare systems and policy
3. Illness and disease management
4. Information and healthcare technologies
5. Ethics
6. Human diversity

Professional Role Development

1. A description of nursing roles in MCIs
2. Identification of the most appropriate or most likely healthcare role for oneself during an MCI

Source: INCMCE (2003).

DEFINITIONS

Types of Disasters

Disasters may be natural or man-made. Noji (1997) defines disasters as "events that require extraordinary efforts beyond those needed to respond to everyday emergencies." **Natural disasters** are caused by acts of nature or emerging diseases. They may be predictable through advanced meteorologic technologies or unexpected. One of the greatest natural disasters in recorded history ravaged the province of Banda Aceh, Indonesia, which was less than 150 kilometers from the epicenter of a 9.15 earthquake that triggered a tsunami and killed more than 200,000 people in December 2004. Hurricane Katrina hit landfall on August 29, 2005, along the Central Gulf Coast. The hurricane caused vast devastation as its storm surge breached the levee system that protected New Orleans from Lake Ponchartrain and the Mississippi River. Most of the New Orleans area was flooded, and heavy damage was also inflicted on the coasts of Mississippi and Alabama. Katrina is considered the most destructive and costliest natural disaster in the history of the United States (U.S. Department of Homeland Security, 2005). **Man-made disasters** are either accidental or intentional. They include complex emergencies, technologic disasters, material shortages, and other disasters not caused by natural hazards (Noji, 1997). Examples of man-made or human-generated

disasters include war; chemical, biologic, radiologic, and nuclear terrorism; transportation accidents; group violence; food or water contamination; deforestation; and building collapses. Contamination of large amounts of vegetables at a grocery store is an example of a deliberate or *intentional* man-made disaster. A campfire that has been left unattended such that the embers are carried by high winds to the dry trees and brush nearby creating a massive forest fire is an example of a man-made *accidental* disaster.

An **emergency** is distinguished from a disaster in that an emergency encompasses an unforeseen combination of circumstances calling for immediate action for a range of victims from one to many. For example, a motor vehicle accident may call for emergency assistance for a small number of individuals whose injuries are minor to very severe or fatal. Emergencies are generally accommodated within the emergency management system. Disasters seldom involve a single victim. Instead, disasters are complex emergencies that significantly overwhelm available hospitals, emergency medical services, facilities, and resources. Disasters are typically labeled as **multiple casualty incidents** with more than 2 but fewer than 100 persons injured or **mass casualty incidents** in which 100 or more casualties are involved (Beachley, 2000). An example of a mass casualty incident is that of an entire community affected by the release of a hazardous material such as a chemical as a result of a train derailment. With human fatalities of approximately 200,000 and 1300 in Banda Aceh and the Gulf Coast, respectively, the tsunami in Indonesia and Hurricane Katrina are prime examples of mass casualty incidents (American Red Cross, 2006). In summary, the key difference between an emergency and a disaster is that an emergency can be handled by the usual emergency management systems already in place, while a disaster overwhelms general emergency systems and requires additional resources.

Hazardous materials pose a potential risk to life, health, or property if they are released because of their chemical, biologic, or physical nature. The hazard exists during any stage of use, from the production and storage of these substances to their transportation, use, or disposal. Hazardous materials accidents range from the unintentional release of household hazardous materials to chemical spills on highways to groundwater contamination by naturally occurring methane gas (Langan, 2005a).

Terrorism

Another classification of man-made, intentional disaster is terrorism. **Terrorism** is defined by the U.S. Department of Defense as the "calculated use of violence or the threat of violence to inculcate fear; intended to coerce or to intimidate governments or societies in the pursuit of goals that are generally political, religious or ideological" (Payne, 2003). One of the goals of terrorism is to cause psychologic effects that reach a much wider audience than the immediate victims or object of an attack. High-profile acts draw attention to the terrorists and their cause. It is thought that terrorists seek to obtain leverage, influence, and power through the publicity generated by their violence (Hoffman, 2003).

The weapons terrorists use are often described as conventional and nonconventional. **Conventional weapons** include bombs and guns. Car and truck bombs have become powerful weapons in suicide attacks such as the Oklahoma City bombing of the Alfred P. Murrah Federal Building on April 19, 1995. Terrorists use explosive bombs such as letter and parcel bombs as well as incendiary bombs such as Molotov cocktails. Other types of conventional terrorist weapons include handguns, rifles, semiautomatic weapons, hand grenades, rocket-propelled devices, and even surface-to-air, shoulder-fired missiles that can bring down helicopters, fighter aircraft, and civilian airliners (United Nations Office for Drug Control and Crime Prevention, 2002).

Nonconventional terrorist weapons include those in the chemical, biologic, and nuclear categories. Chemical terrorism attacks may manifest as the release of a toxin into highly populated areas, bodies of water, and unventilated areas. Another type of chemical terrorism is a specific attack on a particular product, especially a food product. This is accomplished by introducing a toxic chemical substance directly into the product. The anthrax attacks against U.S. public officials after 9/11 illustrate how these small amounts of "white powder" can encourage mass panic and hysteria in the public (Simonsen & Spindlove, 2004). (See Box 7–2.)

Another name for biologic terrorism is **bioterrorism**. Biologic terrorism is the "use of etiological agents (disease) to cause harm or kill a population, food, and/or livestock. Biological terrorism includes the use of organisms such as bacteria, viruses, and rickettsia and the use of products of organisms—toxins" (Maniscalco & Christen, 2002, p. 144). The main purpose of biologic weapon use is mass devastation. Unfortunately, it is not uncommon for the results of a biologic attack not to be known for several hours or days after the attack because aerosolized biologic particles are odorless, colorless, and tasteless. Unless the terrorists announce the biologic attack, it may remain unknown until clients begin to present at emergency departments or physicians' offices a few days or weeks after the release of the agent. Detection is difficult because of the numerous different healthcare facilities available for client treatment. Surveillance is essential to detect such an event. **Surveillance** is "collecting and analyzing data to establish a baseline and determine a point at which there is a change or trend in the health of the population" (Rebmann, 2005, p. 204). The goal of the surveillance system is to determine the status of the public's health and detect any sudden change in that status. Fortunately, biologic weapons are not as common, accessible, or available as chemical weapons.

Healthcare providers must be alert to the recognition, reporting, and treatment of high-priority biologic agents. A disaster preparedness plan should be established in every healthcare facility that outlines the protocol and procedures to be taken with a suspected bioterrorism attack. Hospital staff will alert the infection control nurse when subtle changes or trends in symptoms among clients are seen. The public health department is also given these data. When an unusual disease pattern presents itself, laboratories perform tests on cultures that would normally be discarded as contaminants. Laboratory personnel report unusual clusters of laboratory results. Special laboratories have been established to perform a battery of tests on suspicious specimens of rarely seen bacteria, toxins, viruses, or increased numbers of a particular strain or specimen. The Centers for Disease Control and Prevention (CDC) have created detailed "Fact Sheets" about bioterrorism agents and diseases for healthcare providers.

MEDIALINK Bioterrorism Resources

BOX 7–2 **Biologic Threat Infections**

Following the terrorist attacks on September 11, 2001, and the development of anthrax cases in the United States, concern has arisen about the possible use of biologic weapons. The most likely pathogens to be used for this purpose include anthrax, smallpox, botulism, pneumonic plague, and viral hemorrhagic fevers.

Anthrax is an acute bacterial infection caused by *Bacillus anthracis,* a gram-positive, spore-producing organism that occurs in inhaled, cutaneous, and gastrointestinal forms. The spores are impervious to temperature and sunlight, and remain viable for years.

Inhalation anthrax carries the highest mortality rate because spores of 1 to 5 microns are easily inhaled and deposited in the alveoli. The client initially exhibits influenza-like symptoms such as fever, nonproductive cough, headache, and malaise that advances to respiratory distress, x-ray evidence of mediastinal widening, and hemodynamic collapse in 3–5 days. Death may occur shortly thereafter. Untreated clients die in 2 to 3 days. The characteristic lesion of cutaneous anthrax progresses from an itching papule to a painless, serosanguineous-filled vesicle that forms a black necrotic center. Clients who ingest the anthrax bacillus develop nausea, vomiting, severe abdominal pain, and bloody diarrhea. Diagnosis is confirmed by a positive blood culture, polymerase chain reaction, and serology. On confirmation of anthrax exposure, prophylaxis is initiated with oral ciprofloxacin (Cipro) or doxycycline (Doxycin) for 60 days; people with confirmed systemic anthrax cases must receive anti-infectives intravenously (CDC, 2006).

Healthcare workers risk exposure to anthrax through direct contact with a contaminated surface, contact with exposed persons' contaminated clothes, or direct unprotected contact with the open lesions of cutaneous anthrax. Guidelines for decontamination of extensively exposed persons include removal of clothing and storage in a sealed plastic bag, and showering with soap and water. If gross contamination with the agent occurs and soap and water decontamination is ineffective, use a bleach solution (1:10 dilution of household bleach/final hypochlorite concentration 0.5%) and rinse after 10 to 15 minutes (Heymann, 2004).

In 1980, the World Health Organization certified that *smallpox* was eradicated. Routine smallpox vaccination was discontinued in 1972, leaving people under the age of 30 at risk for this disease if it reappears or is used as a weapon. Smallpox spreads by direct contact or by inhalation of respiratory droplets. Symptoms include a high fever, headache, and malaise, followed by a vesicular/pustular rash appearing simultaneously on the face and extremities. Once the lesions break open and spread large amounts of the virus into the mouth and throat, people are highly contagious and should be placed in negative-pressure rooms. Anyone exposed to the client should be vaccinated and monitored closely. Vaccination up to 4 days of exposure provides almost complete protection.

Healthcare providers should be alert to illness patterns that could indicate an unusual infectious disease outbreak. Indicators of a biologic agent release include increased disease incidence among people in the same geographic area (e.g., people who attended the same event); the disease pattern is inconsistent with client age, such as chickenpox among adults; and a client presents with symptoms of a rare disease. The presence of one or more of these indicators should be reported to public health authorities to determine the infectious disease source and to prevent further exposure (World Health Organization, 2006).

PRACTICE ALERT

Healthcare providers should become suspicious when increased numbers of clients present to the emergency department with flu-like symptoms and retailers notice an increase in purchases of over-the-counter flu and diarrhea medications.

Nuclear/Radiologic Terrorism

The **nuclear** category of nonconventional terrorist weapons encompasses the use of a nuclear device to cause mass murder and devastation. This category of terrorism includes the use or threat of the use of fissionable radioactive materials in an attack. An explosion at a nuclear power plant is an example of this type of terrorism. Using conventional weapons against one of the many nuclear reactors in the world could cause an explosion that would cause extensive and possibly irreversible environmental damage. Damage to the reactors could cause radioactive matter to be released into the atmosphere, potentially endangering large population centers (U.S. Department of State, 2006).

The **radiologic dispersion bomb** is probably the most accessible nuclear device to be used by terrorists. Another name for this device is **dirty bomb** because it consists of a conventional explosive and radioactive waste by-products from nuclear reactors. The dirty bomb discharges deadly radioactive particles into the environment. It is cheaper to make than a nuclear bomb and radioactive waste material is relatively easy to obtain. Radioactive waste is found throughout the world and is typically not as well guarded as nuclear weapons (Harris, 2005).

TYPES OF DISASTERS AND COMMON INJURIES

Hurricane and Tsunami-Related Injuries

A **hurricane** is a type of tropical cyclone. It is a low-pressure system that generally forms in the tropics. Hurricanes can wreak havoc on coastlines as well as several hundred miles inland. Hurricanes and tropical storms can also spawn tornadoes, create storm surges along the coast, and cause extensive damage from heavy rainfall. Floods are deadly and destructive. Excessive rain can trigger landslides or mudslides, especially in mountainous regions. Flooding on rivers and streams may persist for several days or more after the storm (Federal Emergency Management Agency, 2005).

Common physical effects include asphyxia due to drowning; wounds; bone, joint, and muscle injuries; aggravation of chronic illnesses; stress-related symptoms; upper respiratory infections; gastrointestinal illnesses; clean-up injuries; animal, snake, and insect bites; skin irritations and infections; obstetrical complications; and waterborne and insect-borne diseases from contaminated water supplies and insect breeding grounds (Clark, 2003a; Smith & Maurer, 2000). See Table 7–1 for injury-specific nursing interventions.

TABLE 7–1 **Types of Disasters and Common Injuries**

TYPE OF DISASTER	COMMON INJURIES	NURSING IMPLICATIONS
Hurricane-Related Injuries	Drowning; clean-up injuries; aggravation of chronic illnesses; stress-related symptoms; upper respiratory infections; gastrointestinal illnesses; animal, snake, and insect bites; obstetrical complications; contaminated water supplies and insect-breeding grounds; heat-related illnesses; lack of sanitation and safe housing	Asphyxia can occur along with wounds; bone, joint, and muscle injuries; and infections. Also possible are skin irritations and infections; waterborne and insect-borne diseases; dehydration; starvation or malnutrition, and diseases and injuries.
Tsunami-Related Injuries	"Tsunami lung," a severe infection caused by swallowing muddy, bacteria-laden water	Requires aggressive respiratory and ventilator management, blood transfusions, antibiotics, and other medical support.
Thunderstorm-Related Injuries	Resistance of body tissues to electrical current *Least resistance:* nerves, blood, mucous membranes, muscle *Intermediate resistance:* dry skin *Most resistance:* tendon, fat, bone	Potential for tissue destruction with longer duration of contact with high-voltage current; if energy current is dissipated at the skin surface, significant surface burns result, especially in calloused areas.
Tornado-Related Injuries	Flying debris; injuries similar to hurricane-related injuries	Injuries and fatalities can occur.
Earthquake-Related Injuries	High incidence of mortality and morbidity; explosions	May result in stress-related symptoms; wounds; bone, joint, and muscle injuries; clean-up injuries; gastrointestinal and respiratory problems; aggravation of chronic illnesses; obstetrical complications; burns.
Snowstorm-Related Injuries	Overexertion and exhaustion	Myocardial infarction can occur.
Disaster-Related Eye Injuries	"Specks" of dust or debris; cuts, punctures, or stuck objects; blows to the eye	Administer eyewash or flushing versus rubbing; stabilize eye with rigid shield. Apply cold compress, no pressure; client should visit healthcare professional to rule out serious injury or internal eye damage.
Blast Injuries	Auditory	Tympanic membrane rupture, ossicular disruption, and cochlear damage occur; damage from foreign body can occur.
	Eye, orbit, face	Perforated globe, air embolisms, fractures are common; damage from foreign body can occur.
	Respiratory	May result in blast lung, hemothorax, pneumothorax, pulmonary contusion and hemorrhage, atrioventricular fistulas (source of air embolism), airway epithelial damage, aspiration pneumonitis, sepsis.
	Digestive	May result in bowel perforation, hemorrhage, ruptured liver or spleen, sepsis, mesenteric ischemia from air embolism.
	Circulatory	Cardiac contusion, myocardial infarction from air embolism, shock, vasovagal hypotension, peripheral vascular injury, and air embolism-induced injury can occur.
	Central nervous system injury	Concussion, closed and open brain injury, stroke, spinal cord injury, air embolism-induced injury can occur.
	Renal injury	May result in renal contusion, laceration, acute renal failure due to rhabdomyolysis, hypotension, and hypovolemia.
	Extremity injury	Traumatic amputation, fractures, crush injuries, compartment syndrome, burns, cuts, lacerations, acute arterial occlusion, air embolism-induced injury can occur.
Blunt Trauma	Head and torso blunt trauma, penetrating trauma	Fractured limbs and spinal injury can occur.
Pressure Trauma	Lungs	Tearing of the alveoli cause swelling, fluid accumulation, possible pulmonary emboli, eventual hypoxia.
	Ear and bowel injury: ear pain, hearing loss	Keep auditory canal clean, make the client comfortable.

(continued)

TABLE 7–1 **Types of Disasters and Common Injuries (continued)**

TYPE OF DISASTER	COMMON INJURIES	NURSING IMPLICATIONS
Radiological Dispersion Bomb (Dirty Bomb) Blast	Radiation sickness	Get rid of contaminated clothes, shower, and evacuate the area within a day of a small or medium blast. Those close to the blast could suffer radiation sickness and require hospital care.
Nuclear Detonation	Thermal burns	May involve only the epidermis and upper layers of dermis with short duration of heat exposure.
Bright Light Flash of Nuclear Detonation	Eye burn injuries	May blind the client momentarily, effects will disappear with time, can impair a client's ability to perform self-care and other ADLs.
Radiation Exposure Injury	Bone marrow and blood cell damage	A reduction in the blood's oxygen-carrying capacity results in nausea, fatigue, and a general feeling of malaise. Reduced platelet production causes clotting disorders and possibly hemorrhage. When the body's white blood cells are destroyed, it is important to reduce the client's exposure to infection. Infection at the time of reduced WBC production can be severe and even fatal.
	Bowel	Cells that reproduce the bowel lining are damaged, resulting in nausea, loss of appetite, vomiting, diarrhea, fluid loss, and malaise in the acute stage; later, dehydration, malnutrition, bowel hemorrhage, and perforation may occur; if radiation exposure is not exacerbated by other injury or pathology, clients will generally survive.
	Integument	Erythema or generalized reddening of the skin occurs when skin cells are damaged, with the appearance of a sunburn; more serious burns may occur with persistent exposure or extremely high radiation doses.
	Nervous and cardiovascular systems	With acute radiation exposure, blood vessel and nerve cells are damaged and the client is incapacitated and experiences cardiovascular collapse, confusion, and even an "on fire" sensation throughout the body; symptoms this severe generally do not permit survival.
Chemical Burns	Range from minor to life-threatening injuries	Remove clothing from injury site as well as any jewelry; flush chemical from skin with thorough decontamination; cover wounds loosely with a dry, sterile, or clean cloth.

Source: Adapted from *Centers for Disease Control and Prevention* (2003a), Cooper (1995), DeLorenzo & Porter (2000), and Harris (2005).

As a result of Hurricane Katrina, many people lost their homes, family members, friends, and the environment that supported their daily routines. Many basic physical needs in the aftermath of the hurricane could not be met, which put survivors at risk of dehydration, starvation or malnutrition, heat-related illnesses, and diseases and injuries related to lack of sanitation and safe housing (Myers-Walls, 2005). The CDC offers a number of specific strategies to promote health and safety after a hurricane.

A **tsunami**, a seismic sea wave, is a series of ocean waves characterized by having a long period and wavelength and the ability to travel at speeds greater than 500 miles per hour. As the tsunami encounters shallow water, its height increases drastically, resulting in a sudden increase in sea level, thereby flooding low-lying coastal areas (Pacific Tsunami Museum, 2001). Injuries are similar to those seen with hurricanes.

Thunderstorm-Related Injuries

Risk of a lightning strike is possible during a thunderstorm. The short duration of a lightning strike results in a very short flow of current internally, despite the high voltage of lightning. Additionally, the almost immediate flashover of current around the body usually results in very little, if any, skin breakdown or burning of tissues (Cooper, 1995). Note, however, that the longer the duration of contact with high-voltage current, the greater the potential for tissue destruction.

High electrolyte and water content in the body conduct the greatest electrical current. Hence, the greatest conductors of electrical current in the body are the nerves, muscle, and blood vessels. High resistors to electric current are bone, tendon, and fat, due to their tendency to heat up and coagulate instead of transmitting current. Much of the energy current may be dissipated at the skin surface. This results in significant surface burns, especially in calloused areas (Cooper, 1995). Care providers should realize that a person who has been struck by lightning does not carry an electrical charge that can shock other people.

Tornado-Related Injuries

Flying debris causes most fatalities and injuries in tornadoes. Additionally, the following physical effects may be seen: bone, muscle, and joint injuries; fractures; aggravation of chronic illnesses, obstetrical complications, stress-related symptoms; upper respiratory infections and those associated with fiberglass; clean-up wounds; and gastrointestinal illnesses (Smith & Maurer, 2000).

MEDIALINK CDC Hurricane Recovery Resources

Earthquake-Related Injuries

Earthquakes have a high incidence of mortality and morbidity. The most common health effects experienced by victims of earthquakes include stress-related symptoms; wounds; bone, joint, and muscle injuries; burns from explosions; clean-up injuries; gastrointestinal and respiratory problems; aggravation of chronic illnesses; obstetrical complications; and death (Smith & Maurer, 2000).

Snowstorm-Related Injuries

Overexertion and exhaustion are major problems during the snow shoveling that is done following a snowstorm. The exertion required to shovel heavy snow in the extreme cold may cause a myocardial infarction.

Disaster-Related Eye Injuries

Clients should be cautioned not to rub the eye that has "specks" of dust or debris in it. They should instead use an eyewash, flushing the eye with copious amounts of water. However, if there are cuts, punctures, or objects stuck in the eye, clients should not wash the eye or try to remove an object stuck in the eye. The eye should be stabilized with a rigid shield without pressure. The bottom half of a paper cup can be used as a shield. When there are complaints of blows to the eye, cold compresses should be applied without pressure. A plastic bag full of crushed ice can be taped to the forehead to rest gently on the injured eye. All of these clients should see a physician to rule out serious injury or internal eye damage (National Institute for Occupational Safety and Health, 2001).

Blast Injuries

Blast injuries are the result of explosive munitions, often involving car or package bombs. Care for persons injured by blast injuries typically focuses on abdominal and lung injuries, penetrating wounds, traumatic amputations, and burns (Scott et al., 2005).

Radiologic Dispersion Bomb (Dirty Bomb) Blast

The dirty bomb consists of a conventional explosive such as trinitrotoluene (TNT) packed with radioactive waste by-products from nuclear reactors. When detonated, the dirty bomb will discharge deadly radioactive particles into the environment. When the dirty bomb explodes, the radioactive material spreads in the wind like a dust cloud. In this way, it reaches far wider areas than the initial explosion (Harris, 2005).

As Harris (2005) explains, the long-term destructive force of the dirty bomb would be caused by the ionizing radiation from the radioactive material. In a person's body, an ion's electrical charge may lead to unnatural chemical reactions inside the cells. The charge can break DNA chains. Cells with broken DNA strands either die or the DNA develops a mutation. Diseases develop as the result of widespread cell death. If the DNA mutates, a cell may become cancerous. The cancer may spread and the cells may malfunction. This series of events may result in a wide variety of symptoms collectively referred to as **radiation sickness**. While this condition can be deadly, it is survivable with bone marrow transplantation (Harris, 2005).

People are exposed to ionizing radiation frequently, but in small doses, with little if any ill effects. Some of the sources of this everyday exposure are outer space, the stars, sun, natural radioactive isotopes, and x-ray machines. The risk of cancer and radiation sickness would be increased by exposure to a dirty bomb and the subsequent rise in radiation levels above normal. The fatal effects of the dirty bomb may not be apparent in the short term after exposure, but could kill people years later (Harris, 2005).

Thermal Burns

A thermal burn is the most common mechanism resulting in injury and death associated with nuclear detonation. A tremendous amount of thermal energy is created by a nuclear reaction. This energy travels unimpeded through the air. The energy is absorbed by the contact surface. It may create burns or ignite combustibles. The burns may involve only the epidermis and upper layers of dermis because of the short duration of heat exposure.

Thermal burn injuries can be severe and are treated as any other burn. Radiation suppresses the immune system, so special care must be taken to reduce the potential infection often associated with full-thickness burns (DeLorenzo & Porter, 2000). More information on burn care can be found in Chapter 17 ∞.

Radiation Exposure Injury

Radiation exposure results in injury from ionizing radiation altering some cell structures. Cells are damaged from the changes in DNA in bone marrow, blood, bowel, skin, and nervous and cardiovascular systems (DeLorenzo & Porter, 2000).

The major activities performed for clients who have suffered a nuclear casualty are triage, evacuation or sheltering, search and rescue, radioactive monitoring, decontamination, and direct client care. The client will be assessed for injuries such as burns or blunt trauma. Pressure injuries such as lung injury, difficult breathing, or minor stroke-like symptoms (air emboli) must be assessed quickly. There may be some early complaints of radiation exposure such as nausea or fatigue. The signs and symptoms of serious radiation exposure may not occur for several hours and do not suggest imminent death. Since radiation has a cumulative danger, shorter exposure times are less damaging.

The victim should be evacuated from the exposure area, along with the healthcare provider and first responders (DeLorenzo & Porter, 2000). Wind shifts are monitored continuously to minimize exposure. Triage is done to classify the clients into categories of immediate, delayed, and minimal. Comfort measures, such as psychologic support and empathy, are given to clients.

Flash blindness to the eyes caused by a detonation blast lasts only a few minutes during daylight and up to 30 minutes at night. Reassure clients that their eyesight will return and have someone remain with them until their sight is restored (DeLorenzo & Porter, 2000).

INTERDISCIPLINARY CARE

DISASTER PLANNING, RESPONSE, AND MITIGATION

In the United States, disaster preparedness has been a priority issue for government and military agencies. These efforts have been expanded to public and private healthcare sectors. Healthcare professionals are among the essential personnel in addressing disaster preparations and in dealing with the consequences of a disaster. Nurses comprise the largest group of healthcare professionals, and will play key roles in disaster relief whether they work in hospitals, residential facilities, ambulatory care, schools, or simply at home in their communities. The general public looks to nurses for information and trusts that what nurses advise is true and accurate. Nurses have a responsibility to be educated and to assimilate the new skills and demands necessary to assist clients, families, and communities in preparing for and responding to disastrous situations effectively.

Numerous disaster agencies are involved in disaster planning, response, and mitigation depending on the severity of the disaster and the resultant necessary response:

- A *Level I disaster* is dealt with effectively by local emergency response personnel and organizations.
- A *Level II disaster* requires mutual aid from surrounding communities and regional efforts.
- A *Level III disaster* overwhelms local and regional assets and statewide or federal assistance is required (Goolsby, Kulkarni, & Mothershead, 2006).

Agencies that may become involved include the Federal Emergency Management Agency (FEMA), the U.S. Army Corps of Engineers, the U.S. Department of Health and Human Services (DHHS), the American Red Cross (an international disaster relief agency), United Nations Headquarters of the Disaster Relief Organization, Pan American Health Organization (PAHO), International Reserve Committee, and local volunteer organizations such as the Boy Scouts of America, Goodwill Industries, and Volunteers of America. National agencies have state and local offices that respond to disasters. However, the most immediate response is from the local groups and organizations. Individual states may request aid from neighboring states or the federal government if the disaster exceeds local and state resources. The local disaster response organizations include fire departments, police departments, public health departments, public works, emergency services, and the local branch of the American Red Cross.

Local disaster response plans include action plans for various types of disaster situations, designation of the overall incident commander, and identification of community resources. The local emergency management agency is also represented in the state management planning efforts.

Hospitals and other healthcare agencies develop their own disaster plans. However, it is very important that each agency understands its role within the larger community disaster plan. When disasters occur, competing healthcare systems must put the competition aside and work collaboratively in the response effort to ensure favorable outcomes following the impact of the disaster.

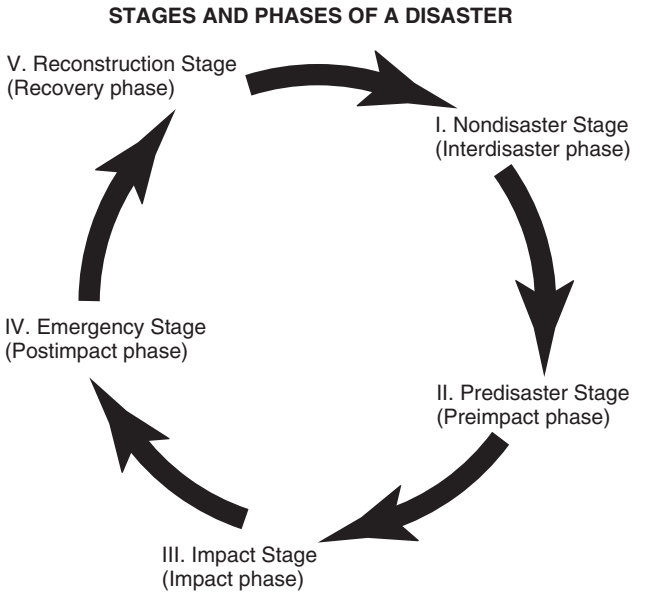

Figure 7–1 ■ The stages of a disaster are cyclical. After a disaster, the planning cycle begins again, with evaluation of the current disaster plan and community response, debriefing with all disaster response agencies and personnel, and modifying disaster plans based on lessons learned.

Source: Illustration by Christina Langan Dalton.

The five stages of disaster preparedness are the *nondisaster* or *interdisaster* stage, the *predisaster* stage, the *impact* stage, the *emergency* stage, and the *reconstruction* or *rehabilitation* stage (Noji, 1997) (See Figure 7–1 ■). The nondisaster stage is the time for planning and preparation as the threat of a disaster is still in the future. It is a time for prevention, preparedness, and mitigation activities. The predisaster stage occurs when there is knowledge about an impending disaster that has not yet occurred. Activities during this stage include warning, preimpact mobilization, and evacuation if appropriate. The impact stage is a time when the disaster event has occurred and the community experiences the immediate effects. The emergency stage involves the immediate response to the effects of the disaster. The community relies on local assistance or aid because outside sources of aid have not yet arrived. In the reconstruction or recovery stage, restoration, reconstitution, and mitigation take place. This stage involves rebuilding and returning to some semblance of "normalcy" but also includes mitigation activities or planning to prevent subsequent disasters or to minimize the effects of future disasters (Langan, 2005b).

The key to effective disaster management is predisaster planning and preparation. Clark (2003a) states that the two purposes of disaster planning are to "reduce the community's vulnerability to the disaster and to prevent it, if possible, and to ensure that resources are available for effective response in the event of a disaster" (p. 634). A comprehensive emergency management plan addresses four major areas: mitigation, preparedness, response, and recovery.

Mitigation is the action taken to prevent or reduce the harmful effects of a disaster on human health or property. It involves future-oriented activities to prevent subsequent disasters or to

MEDIALINK Disaster Resources

minimize their effects. Mitigation may take the form of reinforcing highway overpasses and levees, sandbagging, developing communication strategies as backup systems to what is currently in place, and educating professionals and the public regarding preparation and response to disasters. A key nursing activity related to mitigation is the active participation in learning about the major aspects of disasters to remain current in their knowledge base and be able to teach the general public. Another mitigation activity is the anticipation of needed resources and policies to assist nurses and other professionals in implementing an effective disaster response.

Preparedness is having a comprehensive disaster plan in place that coordinates efforts among many people, agencies, and levels of government. The plan will be based on familiarity with possible disaster agents based on previous experiences, as well as experiences of others from various regions and countries. It is imperative that all persons and agencies who may be involved in the disaster response be involved in the planning. In this way, information is shared and representatives from each agency explain and offer their respective resources and expertise and note deficiencies in the plan. Planning committees will exist on all levels—federal, regional, state, local, and individual agency. Nurses participate in this facet of disaster planning by having a nurse representative on the planning committee at least at the agency level.

Response to disasters happens in the emergency stage, after the disaster event has occurred. The community has been rapidly assessed for damage, and the types and extent of injuries suffered as well as the immediate needs of the community have been determined. Hospital disaster planners must plan for the possibility that the next disaster may involve the hospital. The hospital's response may include the evacuation of clients as well as relocating and operating from an independent facility. **Surge capacity** is the healthcare system's ability to rapidly expand beyond normal services to meet the increased demand for qualified personnel, medical care, and public health in the event of a large-scale disaster. The Agency for Healthcare Research and Quality (2005) has published a report discussing the use of former "shuttered" hospitals to expand surge capacity during mass casualty events. Hospitals must be constantly aware of the number of beds available, which clients may be discharged, staffing, equipment, other resources, and their overall ability to manage casualties quickly.

The local community provides assistance or aid initially, because outside sources of aid have not yet arrived. Assistance from outside of the affected area arrives later and search and rescue operations commence as well as first aid, emergency medical assistance, establishment or restoration of communication and transportation, assessment of infectious diseases and mental health problems, and evacuation of residents, if necessary. Nurses should follow the disaster plan of their agencies, communities, and the local emergency management agency. This includes having a disaster plan for the nurse's immediate family. In this way, the nurse will feel secure in the fact that the immediate family is situated safely and the nurse can respond to the staging area to await instructions. Nurses use their expertise in infectious disease control and in assessing physical as well as psychosocial needs. In a disaster, mental health issues are extremely significant for victims, families, friends, first responders, and all healthcare workers. Nurses will ensure that clients receive follow-up care for both physical wounds and mental health concerns. Advanced practice nurses may take on significantly greater responsibilities especially if they are competent and prepared in emergency and trauma care. Protocols and standards of care are in place to guide the practice of all nurses. It is imperative that nurses determine the boundaries of their practice in times of emergencies when mass numbers of victims must be treated without the luxury of an on-site physician.

The **recovery** aspect of disaster response is also called **reconstruction**. During this stage, restoration, reconstitution, and mitigation take place. Restoration includes rebuilding, replacing lost or damaged property, returning to school and work, and continuing life without those who were killed in the disaster. Reconstitution occurs when the life of the community returns to a new "normal." The final stage of recovery is mitigation, which is also an activity in the preparation and planning aspects of the nondisaster stage. This illustrates the cyclical nature of planning and disaster response. The work is never complete. Future-oriented activities take place to prevent subsequent disasters or to minimize their effects. Some of these activities may include increased security and surveillance measures. Nurses may suggest ideas for responding to the victims of disasters more effectively and efficiently. For example, nurses may communicate the need for carts stocked with specific items that will assist them in treating clients faster. They may also suggest a more efficient method of tracking clients as they enter the healthcare system and move from area to area based on the clients' acuity and condition. Nurses will participate in mock disasters, read updated protocols, and practice their skills repeatedly to maintain competence. Mock disasters or disaster drills can take the form of tabletop exercises/discussions or simulated drills with "mock" victims. Mock disaster drills allow the participants to become familiar with the plan, and the areas that need strengthening in the plan will become evident (Langan, 2005b).

CASUALTY MANAGEMENT

During a disaster, nurses may be expected to perform triage. Nurses perform triage every day in every emergency department. **Triage** means sorting. A very basic triage system is to categorize or label victims needing the most support and emergency care as "red." Those less critical but still in need of transport to emergency centers for care are classified as "yellow." Victims who have minor injuries and do not warrant transport to an emergency center are categorized as "green." Victims who are least likely to survive or are already deceased are color coded as "black." (See Table 7–2.) These are the triage levels given to clients under normal circumstances or when there are only a few victims. However, when there is a mass casualty event with greater than 100 victims, **reverse triage** may be instituted. Reverse triage works on the principle of the greatest good for the greatest number. For example, if there were a collision between a train full of railroad cars filled with toxic chemicals and a full tour bus in a highly populated area, this disaster would likely be called a mass casualty event. In this case, those persons who were the most ambulatory and least injured would be transported or instructed to

MEDIALINK Case Study: Disaster Scenario

TABLE 7–2 Simple Triage and Rapid Transport (START) System

Red (Immediate)	Critically injured, with problems that will require immediate intervention to correct. (Clients with a respiratory rate above 30 are tagged "red." If their respirations are below 30, assess their circulatory status. If capillary refill takes more than 2 seconds, tag them "red." If it is below 2 seconds, assess mental status.)
Yellow (Delayed)	Injured, and will require some medical attention, but they will not die if care is delayed while you care for other clients; not ambulatory and will require a stretcher for transportation. (Clients who can follow simple commands such as hand grips are tagged as "yellow." Clients who cannot follow simple commands are tagged "red.")
Green (Ambulatory)	Not critically injured, and can walk and care for themselves. (Have them walk to a safe place, but do not lose track of them; every client triaged at an incident is tracked to the best of the responder's ability.)
Black (Expectant)	Deceased, or have such catastrophic injuries that they are not expected to survive to be transported. (If the client is not breathing, open the airway manually. If they remain apneic, tag them "black"; if they begin breathing, they are tagged "red.")

Source: Adapted from Streger (n.d.). *Prehospital Triage.* Retrieved from http://www.emsmagazine.com/articles/emsarts/triage.html

move quickly to the warm zone, away from the immediate accident site to get decontaminated and processed first. (See Box 7–3.) Those with minor injuries would be decontaminated next. Those with more severe to most severe injuries would be treated in that order. In this way, the most victims with the greatest chance of survival could be saved most efficiently with limited resources. Many emergency personnel will share the difficulty of making these decisions at disaster sites when the first inclination might be to rescue the most severely injured.

Triage is a continuous process in which priorities are reassigned as needed treatments, time, and the condition of the victims change. This process must balance human lives with the realities of the situation, such as supplies and personnel. (See Box 7–4.) The triage role requires a person who is able to rapidly assess clients' conditions under stressful, often adverse conditions and assign a category. Those assigned to triage are expected to function independently, yet as part of a coordinated team effort (James et al., 2005). It has been suggested that emergency personnel should triage/categorize the victims so that physicians and nurses can be best utilized in the treatment area, performing client care. Advanced practice personnel will continue to triage and perform more complete assessments.

BOX 7–3 Hot, Warm, and Cold Zones

The site of the disaster where a weapon was released or where the contamination occurred is called the **hot zone**. It is considered contaminated and only those persons in the appropriate **personal protective equipment** (PPE) may enter this zone. PPE is equipment used for the protection of personnel including gloves, masks, goggles, gowns, and biologic disposal bags (Maniscalco & Christen, 2002). Typically, fire, police, and military personnel will collect evidence and begin their investigation in this zone. The **warm zone** is adjacent to the hot zone. Another name for this area is the *control zone*. This area is where decontamination of victims or triage and emergency treatment take place. The level of PPE required is based on the dynamic risk assessment of the threat and agent involved. The **cold zone** is considered to be the safe zone. It is adjacent to the warm zone and is the area where a more in-depth triage of victims would occur. Survivors may find shelter in this area, and the command and control vehicles would be found here as well as the emergency transport vehicles.

BOX 7–4 Key Triage Points to Remember

1. Use a triage system that is easy to learn, easy to implement in stressful conditions, and does not require advanced diagnostic skills yet allows for basic client interventions.
2. Use the Incident Management System on every incident and wear personnel identification vests.
3. Get accurate preliminary and final client counts and relay this information to the incident commander.
4. Use some type of visual color-coded identification system to indicate client priority.
5. Do not fall into the trap of using your time providing one-to-one client care.
6. Retriage clients frequently, at the incident, on arrival at the treatment area, and periodically thereafter.
7. Make certain the walking-wounded are gathered and treated.
8. Preplan for potential incidents that may occur.
9. Be aware that emergency responders may be potential targets.
10. Practice, practice, practice.

Source: Adapted from Streger (n.d.). *Prehospital Triage.* Retrieved from http://www.emsmagazine.com/articles/emsarts/triage.html

Isolation and Personal Protective Equipment

Persons suspected of having smallpox or some other highly contagious disease will need to be isolated from other clients, visitors, or healthcare personnel. For example, persons with pulmonary tuberculosis and a severe illness requiring hospitalization should be placed in a private room with negative-pressure ventilation. Clients are taught to cover their nose and mouth when coughing or sneezing. Persons entering the room (including nurses and other healthcare personnel) should wear personal respiratory protective devices capable of filtering submicron particles. Decontamination of the air may be achieved through ventilation and supplemented by ultraviolet light (Heymann, 2004).

Gas masks are used in a broad range of military, industrial, and emergency situations to protect the user from hazardous dust, gas, or other aerosols. Biologic contaminants that are spread through aerosolized droplets create a threat to those not wearing PPE. A

gas mask may be considered a high-performance respirator and is usually equipped with both eye protection and air supply protection or treatment. A hood, helmet, or headgear is generally worn to protect the skin, eyes, airways, and respiratory systems. Protective clothing is made to guard against mild irritants and even serious lethal materials. Some protective suits are disposable, intended for one use only. Others are durable, multilayered fabrics that are completely impermeable and are reusable. The Occupational Safety and Health Administration (OSHA) has issued guidelines to inform healthcare workers and first responders about the correct level of PPE for various situations. The Chemical, Biological, Radiological, and Nuclear (CBRN) Personal Protection Equipment Selection Matrix for Emergency Responders and other information specific to PPE can be located online at the OSHA website.

In addition to the isolation of clients, special air handling systems are used in the isolation rooms to prevent the spread of the contaminated droplets into the general hospital air vents. Many hospitals also have the capability to shut off airflow in contaminated areas to prevent the spread of contaminants to other "clean" areas of the hospital. The heating, ventilation, air conditioning, and refrigeration (HVAC) systems are closely monitored and can be shut down in designated areas to avoid air intake from the outside as well, especially in cases of outdoor environmental contamination.

Recording Victim Data

The CDC has created a Mass Trauma Data Instrument (Figure 7–2 ■) to record data about victims of disasters. The categories on the data sheet include demographics, circumstances of the injury, injury conditions, and disposition and details of the conditions. The completion of this form will be initiated by the triage nurse and completed by the nurse who implements the treatment or transfers the client to another unit/department.

Crowd Control

When a disaster occurs, many people converge on the site. Those who come are the curious and those who truly mean to assist in the rescue and recovery of victims. However, this crowd of people needs to be controlled by authorities in charge of the site and rescue and recovery. Similarly, crowds may arrive at the hospital or healthcare delivery sites when injured or even when they just think they may be injured or contaminated in some way. The job of crowd control is not under the auspices of nurses or other healthcare personnel. The agency's security personnel and/or the local police force must control these crowds. If control is not maintained, chaos ensues and those in greatest need of medical assistance may be unable to reach healthcare providers in order to avoid further declines in their health status. In fact, nurses, physicians, and other healthcare workers should not enter an area that has not been secured. To put one's safety at risk jeopardizes the potential treatment of many. Additionally, social services personnel or psychiatric service providers should be available to assist the "worried well" cope with the trauma they have experienced or witnessed or simply heard about through the news media.

MEDIALINK OSHA PPE Guidelines

Psychosocial Needs

The importance of mental health services for victims, the public, first responders, and healthcare workers cannot be overstated. Both those persons directly affected by the disaster as well as those indirectly affected will seek medical care and advice. Many who seek medical attention are simply anxious about the threat of injury. At times, reassurance is all that is necessary. However, with large numbers of people seeking health care, the system is quickly overwhelmed. Mental health experts may quickly assess individual needs, offer immediate advice, and refer for follow-up care if deemed appropriate.

People react to disasters in a variety of ways, both physically and behaviorally. Their reactions depend on the severity of the threat and their proximity to the area of direct impact. The closer the person is to the area of impact and the longer the exposure, the greater the likelihood of a more severe reaction to the event. Table 7–3 summarizes the normal initial responses aimed at survival (Ganong, 1999; Murray & Zentner, 2001; Selye, 1965, 1980).

TABLE 7–3 **Responses to Stress: General Adaptation Syndrome (Gas) and Levels of Anxiety**

GAS STAGE	PHYSICAL RESPONSE	BEHAVIORS RELATED TO ANXIETY
Alarm Stage	Pupils dilate; blurred vision. Hearing sharper or diminished.	Misinterpret stimuli. Confusion. Poor concentration. Selective inattention. Need for assistance.
Severe Anxiety or Panic	Stronger, faster heart rate and respirations. Palpitations, arrhythmias, elevated blood pressure.	Feeling of impending doom. Terror. Fearful. Agitation. Irritability. Demanding. Impulsive. Paresthesias.
	Muscle tone increased. Headaches.	Muscle tension. Excitable, restless movements. Tremors. Rigidity. Weakness.
	Basal metabolism rate increased. Body temperature elevated. Perspiration. Altered glucose, protein, and lipid metabolism. Increased startle response.	Insomnia. Urgency of speech and movement. Fatigue. Dehydration. Weight loss. Appetite changes. Smooth muscle of gastrointestinal and urinary tracts less motile, interfering with digestion and elimination of wastes.
	Hypoglycemia from glycogenolysis due to high energy demands.	Blood glucose increase. Appetite changes. Dehydration. Fatigue. Poor concentration.
	Increased blood clotting and suppressed immune response if Stage persists.	Blood stasis; thrombus formation. Resistance to infection and disease reduced.

Abstractor _____ Case#_____

Mass Trauma Data Instrument

Demographics

Facility: _____ **Date:** ____ / ____ / ____ **Time**:_____ (24 hour)

Last Name: _____ **DOB:** ____ / ____ / ____ **Age**: _____ Yrs Months

First Name: _____ **Sex**: M F No Data

Medical Record #: _____ **Other**:_____

Circumstances of Injury

Reason for Visit: _____

How did the injury happen? _____

What was s/he doing? _____

Where did the injury occur? _____

Was the injury caused by the event? ☐ Direct Effect ☐ Indirect Effect ☐ Not Event Caused ☐ No Data

How Patient Arrived: ☐ Ambulance ☐ Walked / Carried ☐ Public Transportation ☐ Other: _____ ☐ Private Vehicle ☐ No Data

Summary Information

Injury Condition(s): (Check all that apply)

☐ Amputation
☐ Brain Injury (concussion)
☐ Burn: ____% ___Degree
☐ Crush
☐ Cut / Open Wound
☐ Drowning / Submersion
☐ Foreign Body
☐ Fracture
☐ Overexertion
☐ Poisoning: _____
☐ Smoke Inhalation
☐ Sprain / Strain / Dislocation
☐ Superficial (scrape/bruise)
☐ Other: _____
☐ No Data

Other Condition(s): (Check all that apply)

☐ Abdominal Pain / N / V / Diarrhea
☐ Altered Mental Status / Coma
☐ Breathing Problem
☐ Chest Pain
☐ Eye / Vision Problem
☐ Fever
☐ Hearing Problem
☐ Neurologic Problem
☐ Pregnancy
☐ Psychological Problem
☐ Rash
☐ Other: _____
☐ No Data

Disposition: ☐ Hospitalized ☐ Discharged Home ☐ Transported to Other Medical Facility ☐ Left / AMA ☐ Died ☐ Other: _____ ☐ No Data

Details of Conditions

Condition #1: _____ **Body Part(s):**_____

Condition #2: _____ **Body Part(s):**_____

Condition #3: _____ **Body Part(s):**_____

Condition #4: _____ **Body Part(s):**_____

Figure 7–2 ■ The CDC's Mass Trauma Data Instrument.
Retrieved from http://www.bt.cdc.gov/masstrauma/word/rapidassessmentform.doc

Most people exhibit great coping mechanisms and resilience in the aftermath of a disaster. However, mechanisms should be developed for identifying and referring those who need psychologic counseling. After the September 2001 terrorist attacks on the World Trade Center and the Pentagon, it was reported that 71% of the persons surveyed felt depressed, 49% had difficulty concentrating, and 33% had trouble sleeping at night. Most (92%) felt sad when watching news coverage of the event, yet 63% stated a compulsion to continue to watch the news (Pew Research Center for the People and the Press, 2001). Reactions to terrorist events and disasters in general are influenced by developmental level and maturity, prior experiences with disasters, and cultural background (McLaughlin et al., 2005).

NURSING CARE

The Role of the Nurse in Disaster Relief

Because nurses have an obligation to keep current in new and emerging trends in health care and threats to society, learning about the prevention and mitigation of disasters is essential. Nurses must be aware of the roles they play in all aspects of disaster preparedness and response (Box 7–5.) It is imperative that nurses first know how to take care of themselves in order to assist others. By educating oneself and being proactive in regular drills and practice of skills, nurses take an active role in helping others to save lives and fulfill an important obligation to society.

Applying basic first aid skills can be very helpful in immediate disaster relief efforts until emergency help can be obtained. The American Red Cross invites nurse volunteers and will provide the necessary training. Many nurses have taken advantage of online disaster certificate programs, and efforts are being made to integrate disaster preparedness content into nursing courses.

BOX 7–5 Roles of Nurses in Disasters

1. Prepare selves, families, friends, and communities for disasters in conjunction with the local disaster preparedness plan.
2. Continue educating self on various types of disasters and appropriate response.
3. Provide emergency services with consideration of victims' abilities, deficits, culture, language, or special needs.
4. Assist in the mobilization of healthcare personnel, food, water, shelter, medication, clothing, and other assistive devices.
5. Collaborate with agencies in authority including local, state, and federal representatives to deploy resources based on the greatest good for the greatest number.
6. Consider needs of victims including shelter both temporary and permanent, as well as psychologic, economic, legal, and spiritual factors.
7. Become involved with local, state, and national disaster planning agencies to schedule regular meetings to continually review and modify disaster plans.

In many different practice settings, nurses serve on disaster preparedness and response planning committees. Nurses are receiving in-service education on biologic, chemical, and radiologic threats to client health as well as surveillance and reporting of suspicious activities. Although nursing professionals may not be asked to don decontamination gear to decontaminate victims, nurses should be aware of decontamination basics so that they will remain safe from exposure and be able to direct others when threatened with contamination. Some nurses choose to be actively involved with disaster medical assistance teams as part of the National Disaster Medical System.

In a true mass casualty event, it is impossible to have physicians present at every station where they are needed. Nurses may have to assume expanded roles in making decisions for the most appropriate treatment of casualties. Discussions should take place among physicians, nurses, and policy makers regarding the necessity of the nurses' expanded roles in crisis situations. As noted earlier in the chapter, these agency policies must be documented in the agency-wide plan. Additionally, all healthcare personnel must receive any specialized training required to be safe and competent practitioners of the expanded duties. This training must be practiced and updated and those participating in the training must be tracked and notified of additional requirements as necessary. See the Nursing Research box on page 138.

Implications for Nurses Working with Victims of Disasters

The role of the nurse in a disaster depends greatly on a number of variables including the nature of the disaster, the number of victims and severity of injuries, the location of the disaster as well as the location of the nurse, the availability of supplies, rescue and command personnel, and other necessary resources. The nurse must be able to perform under stressful conditions but will not be expected to endanger self, other nurses, or other rescuers.

If it is safe to do so, the nurse begins by triaging and assessing the victims for the best care and best use of available resources. Very quick, direct treatment may be given, or the nurse may be involved in extended periods of time with a mobile surgical unit. Local authorities such as the police, fire, and emergency medical services will guide the nurse in securing the area and determining the safe zone for the nurse and others to work. The National Disaster Medical System is the agency responsible for coordinating disaster relief with local fire, police, and emergency medical services to provide overall disaster assistance. Victim assistance may be offered in the field in mobile shelters, in local clinics, in hospitals, or in makeshift buildings.

Nurses take on a variety of roles based on their expertise and the needs of the victims. Nurses will be expected to follow the emergency preparedness plans outlined in their communities and in their agencies of employment. When a disaster occurs, it is not a time for individual creativity. However, individual nurses should be the leaders in their communities in discussing emergency preparedness and contingency plans.

NURSING RESEARCH Evidence-Based Practice: Disaster Education

The nursing profession has recognized the need to develop resources to teach practicing and future nurses to improve their response to victims of radiologic, biologic, and chemical terrorism. However, nursing students may have different perceptions about working with disaster victims. The purpose of a descriptive study (Young & Persell, 2004) was to identify student nurses' major concerns and learning needs in working with victims of terrorism. Ninety-five junior and senior baccalaureate nursing students participated in the study by completing an anonymous questionnaire regarding their concerns about terrorism and how their lives had changed following September 11, 2001. The students' main concern was for the safety of themselves and their families. The students indicated they would not be willing to care for victims if there was a lack of protection for all types of terrorist agents for themselves and their families. The students did not demonstrate an accurate understanding of the pathogenic nature of many terrorist agents even though the nursing faculty members had provided self-education articles for the students. The students' concerns for specific infectious agents appeared to be based on unnecessary fear or inappropriate confidence.

IMPLICATIONS FOR NURSING

If nurses do not believe that a terrorist event is a real threat in their communities, they may not be motivated to become more prepared for terrorist events. The nation's emergency healthcare planners and trauma nurses will have a major challenge preparing more nurses for disasters, especially mass casualty events. During a terrorist attack, the general public will seek information about the event from all healthcare providers. The public will also expect nurses to deliver safe and competent care to the victims of terrorism. Disaster care information should be a part of the curriculum in all basic nursing education schools. Continuing education and elective courses should continue to be planned. Basic disaster preparedness competencies should be required for all new graduate nurses so that they have a solid foundation on which to build.

CRITICAL THINKING IN CLIENT CARE

1. Make a list of all the barriers that nursing students and practicing nurses might express as reasons they do not need or value disaster/terrorism education and preparation.
2. Discuss the rationale for including basic disaster preparedness content in all basic nursing education programs.
3. Consider the results of this study. What could have been done differently to assist the nursing students in learning facts and the pathogenic nature of the terrorist agents presented in the articles?

Source: Adapted from "Biological, Chemical, and Nuclear Terrorism Readiness: Major Concerns and Preparedness of Future Nurses" by C. F. Young & D. Persell, 2004, *Disaster Management & Response, 2*(4), pp. 109–114.

Clients who have experienced disasters will present with a variety of individualized needs. Nursing diagnoses that may apply include:

- *Anxiety*
- *Communication, Verbal, Impaired*
- *Coping, Ineffective*
- *Fear*
- *Post-Trauma Syndrome, Risk for*
- *Powerlessness*
- *Injury, Risk for*
- *Trauma, Risk for*

Special Considerations

Older Adults

It is not appropriate to generalize needs to all older adults. Many are quite independent and active into their 90s. However, some older persons lack the physical stamina to recover quickly from disastrous events. The nurse must assess the individual's ability to cope with and recover from unexpected events, socioeconomic factors, support systems, potential healthcare needs, and resources. See the accompanying Nursing Care Plan.

Teaching about disaster preparedness is important in all communities. Older adults need to determine the appropriateness of "sheltering in place" should there be an environmental event outside of their homes, or of being evacuated if they are unable to care for themselves for extended periods of time. This becomes a very real issue when roads become impassable or usual modes of transportation and communication are disrupted.

A current list of medications, doses, and times of administration should be kept in an easily accessible, secure place. The names and phone numbers of significant persons, relatives, those with power of attorney, healthcare providers, or any others to be notified in case of emergency should also be kept in an easily accessible place. Additionally, the following materials should be considered essential in keeping with the person should evacuation to a shelter be necessary: eyeglasses and eyeglass prescriptions, style and serial numbers of medical devices such as pacemakers, healthcare policies and numbers, identification, list of allergies, blood type, checkbook, credit cards, insurance agent's name and number, driver's license, 72-hour supply of medications, dentures, list of special dietary needs, sturdy shoes, warm clothing, blankets, incontinence briefs, prostheses, hearing aids, hearing aid batteries, extra wheelchair batteries, oxygen, and other assistive devices (American Red Cross, n.d.).

Immunocompromised Clients

Clients who are immunocompromised pose special problems to the healthcare community especially if these persons are unable to access health care quickly in a disaster situation. A compromised immune system may be due to treatments such as chemotherapy or immunosuppressants or from an underlying disease such as HIV. The immunocompromised population would be at greater risk for complications and death than the general population should a bioterrorist attack occur. For example, a potential complication following smallpox vaccination is generalized vaccinia. It is believed to result from a

NURSING CARE PLAN A Client with Injuries to Hands, Foot, and Suffering from Trauma of Natural Disaster

Mr. Ed Jones, a 75-year-old widower, is retired from his job as a cabinetmaker. He continues to work with wood as a hobby in the basement of his home located on the banks of the Deep River. He sells small toys at craft fairs and flea markets in nearby communities. His daughter lives approximately 20 minutes away and checks in on him at least every weekend. Mr. Jones is independent and sees his primary care physician occasionally for monitoring of his blood pressure, which is controlled with antihypertensive medications. Following a week of heavy rainstorms, flash flooding occurred in the area and Mr. Jones's basement sustained much water damage and ruined most of his stored wood, wooden toy products, and the woodworking machinery. Mr. Jones waded through the waist-deep water to get to the rescue boat rather than wait for the boat to get to him. He is subsequently admitted to the medical/surgical unit due to concerns from the EMTs who triaged him at the fire station 5 miles inland from Mr. Jones's neighborhood.

ASSESSMENT

Lisa Smith, RN, obtains a nursing assessment. Mr. Jones states that he has been on antihypertensive medications for "a few years" but only takes his medication "once in awhile" since it has been some time since his last office visit and he wants his remaining pills "to last" until he can get back to the doctor. He has had numerous cuts to his hands from his woodworking and has had a big ulcer on his right foot "for a few weeks" caused by a tool that fell on his foot. He did not seek medical care because he believed it would get better on its own. "It looks worse than it is. It really doesn't even hurt."

When asked about his home he stated, "Everything is gone. My wife is gone, my wood, my tools . . . it's all over."

Physical assessment findings include T 100.7°F PO, P 96, R 20, and BP 178/100. Skin cool and dry with multiple lesions on both hands and a Stage II ulcer on his right dorsal foot with yellow-green exudate. Pain rated at a 2 on a 10 scale with 10 being the worst pain there could be. Lungs are clear, heart rate regular. No edema noted. Abdominal assessment is normal. Neurologically intact. Weight is normal for height and frame. A culture is ordered and taken of the yellow-green exudate of the right foot.

Preliminary blood work results show WBCs at 15,000/mm^3. A peripheral IV is initiated with continuous fluids and IV antibiotics are ordered every 6 hours. An antihypertensive medication is ordered on a regular schedule plus a prn antihypertensive for systolic >180 and diastolic >90.

DIAGNOSES

- *Impaired Skin Integrity* of the right foot and hands related to lesions (cuts) on the hands and Stage II ulcer with exudates on the right foot
- *Powerlessness* related to perceived loss of control over life situation
- *Ineffective Thermoregulation* related to trauma
- *Acute Pain* related to expression of pain secondary to skin lesions

EXPECTED OUTCOMES

- Regain skin integrity—ulcer on right foot and lesions on hands will heal.
- Identify aspects of his life still under his control.
- Maintain body temperature at normothermic levels.
- Express feeling of comfort and relief from pain.

PLANNING AND IMPLEMENTATION

- Inspect skin every shift; describe and document skin condition; report changes.
- Perform prescribed treatment regimen for skin condition. Clean lesions on hands and right foot every 8 hours and assess healing.
- Arrange psychosocial consult(s).
- Guide the client through a life review. Encourage reflection on past achievements.
- Help the client identify the aspects of his life that are still under his control.
- Allow the client the right to express feelings.
- Monitor client's body temperature every 4 hours, more often if indicated.
- Monitor and record client's heart rate and rhythm, blood pressure, and respiratory rate every 4 hours.
- Administer analgesics, antipyretics, and medications as indicated. Monitor and record their effectiveness.
- Maintain hydration; monitor intake and output.
- Assess client's signs and symptoms of pain and administer pain medication as prescribed. Monitor and record the medication's effectiveness and adverse effects.

EVALUATION

Mr. Jones was hospitalized for 3 days, receiving intravenous antibiotic therapy, analgesics, an antidepressant, monitoring of his cardiac response to a new antihypertensive medication, wound care, and sessions with the social services representative and his daughter. His hand lesions are healed, the foot ulcer has developed new granulation tissue with no signs of infection, he is afebrile, and his blood pressure is maintained within normal limits. He will be discharged to his daughter's home until his home can be assessed for the extent of the water damage and feasibility of repair. He has agreed to visit a therapist to work through his feelings of grief and loss. He has expressed an interest in attending monthly support group meetings with his neighbors who also experienced losses in this disaster.

CRITICAL THINKING IN THE NURSING PROCESS

1. What action did Mr. Jones take that probably exacerbated his skin lesions?
2. What other testing might you anticipate related to Mr. Jones's delayed healing?
3. What were the contributing factors to Mr. Jones's fever?
4. What life situations contributed to Mr. Jones's attitude about life?

See Evaluating Your Response in Appendix C.

vaccinia viremia with skin manifestations. In noncompromised persons, generalized vaccinia consists of vesicles or pustules appearing on normal skin distant from the vaccination site. The rash is generally self-limited and usually requires only supportive therapy. However, immunocompromised clients may have a toxic course and require vaccinia immune globulin (VIG), available only from the CDC (Cono et al., 2003).

An additional issue the nurse should discuss with this population is their preparation for disaster events related to infection control. Clients should carry treatment calendars with them at all times so that any healthcare provider can determine where they are in their treatment program and disease process. Clients should plan a backup location to visit for chemotherapy if their usual office is inaccessible. Nurses should also assess their clients' knowledge level regarding the avoidance of raw seafood or possibly contaminated water. Bottled water should be ready so the client can avoid drinking water of questionable purity. Bone marrow transplant clients are instructed not to eat fresh fruits and vegetables due to the risk of contamination and subsequent infection. It is safest for this population of clients to consume processed or canned foods if they can be heated to the proper temperatures.

Clients with Sensory, Speech, or Literacy Deficits

Persons who have sensory deficits, speech or language impairments, or who are illiterate must be assessed for the most effective means of communicating steps to be taken in the case of a disaster. One cannot generalize that all people with hearing impairments or speech impairments will choose a particular means of communication. This may be an individual preference. A multitude of communication means are available through technological support systems as well as written and visual cue boards. Public service announcements may inform the general public about impending natural disasters and about proper steps to be taken to be safely rescued or sheltered. Nurses are in the position of alerting community leaders about special needs of members of their communities. Public service personnel, including fire, police, and emergency services, should be alerted to extenuating circumstances and needs of specific individuals in the community. The collaborative planning efforts of the individual, family members, caregivers, and emergency service personnel will help alleviate any undue pain and suffering caused by the lack of understanding of emergency messages and directives.

Clients with Mobility and Sensory Deficits

The U.S. Department of Health and Human Services (2005) has estimated that 13% of the U.S. population experiences some form of activity limitation due to a chronic condition. Many persons require the use of assistive technology devices (ATDs) to accommodate mobility and other impairments. Careful planning must be in place in order to provide necessary support during and after a disaster. Arrangements must be made in advance to provide adequate numbers of volunteers or staff to assist when this group must be relocated or regrouped in a safe room or shelter. These individuals or their caregivers must provide input to service personnel to determine what kind of support services would be necessary in an emergency or disaster. Emergency personnel or rescue teams may need to learn a few basic phrases in American Sign Language. Something as simple as carrying a notepad and pencil or directions in large print may be just what is necessary to share information with people who have hearing impairments or visual impairments, respectively.

Non-English-Speaking Clients

The literacy of non-English-speaking clients should be assessed in both their own language and in English. One cannot assume that individuals are literate in their own language. It is ideal to obtain the assistance of an interpreter, preferably an interpreter with whom the client is familiar, to assist in translating information for the client. Communication aids can be prepared in advance of disasters to be used during emergencies. The communication aids or disaster preparedness and response procedures should be practiced on a regular basis prior to an emergency. The use of visual aids is very helpful. Do not use children as interpreters if adults are available. The stress of interpretation can be overwhelming to the children and place an unnecessary burden on them.

Spiritual Considerations

Religion tends to be a source of comfort for those who are experiencing the threat of loss of life, property, or way of living. Churches, synagogues, and clergy become active in supporting their congregations in times of disaster. Religious leaders should be actively involved in community planning for disaster preparedness especially if certain religious considerations should be strictly followed. For example, in some religions, the human body and all of its parts are considered sacred. To be sensitive to this religious belief, all tissues and blood would be collected at the site of a disaster by those trained to collect such material versus washing this matter away from the scene. In general, rescue personnel would need to be informed of specific religious obligations or rights to be able to be sensitive to the individual's religious beliefs and practices.

Summary

Nurses are invaluable in disaster relief efforts whether they are answering questions from their neighbors regarding the water supply in their communities or assisting in complex care using their advanced practice knowledge in a hospital.

Nurses have a responsibility to the public to maintain competence in nursing practice and to be cognizant of evolving threats to the public's health. Nurses must learn about anticipated and unexpected disasters as well as their vital roles in emergency preparedness and response. Nurses will play a role in disaster response whether they work in acute care settings, long-term care, ambulatory care or in the community, and at home.

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CHAPTER HIGHLIGHTS

- Disasters require extraordinary efforts beyond those needed to respond to everyday emergencies.
- Nurses have an obligation to keep current in new and emerging trends in health care and threats to society.
- Learning about the prevention and mitigation of bioterrorism and disasters in general is essential.
- Reverse triage is used in mass casualty events instead of traditional triage in order to do the greatest good for the greatest number.
- Nurses will be actively engaged in assessing the physical as well as the mental needs of victims, their families, first responders, and other healthcare personnel.
- Nurses need to have their own family disaster plans in place to be able to assist others in times of disasters.
- Nurses are actively involved in disaster mitigation, planning, and response efforts by learning and practicing their communities' and agencies' disaster preparedness systems.

TEST YOURSELF NCLEX-RN® REVIEW

1 The key difference between emergencies and disasters is that:
   1. emergencies are controlled.
   2. disasters result from man-made errors.
   3. emergencies can typically be handled by available emergency services.
   4. disasters typically involve the local emergency services and no other agencies.

2 Which of the following is NOT true regarding nurses' responsibilities in disaster preparedness?
   1. Nurses have a responsibility to the public to be knowledgeable about disaster preparedness and response.
   2. Nurses must have a personal and family plan as a part of their disaster preparedness and response plan.
   3. Nurses will be the leaders in the incident command structure set up at the site of the disaster.
   4. Nurses who are prepared for disasters will be better able to help themselves, their families, and their communities in a disaster situation.

3 The purpose of reverse triage is to:
   1. save scarce resources for future use.
   2. test first responders on their triage classification categories.
   3. save those persons who are in the most critical condition.
   4. do the greatest good for the greatest number with limited resources.

4 It is important to assess clients' literacy in their primary language because:
   1. they are most comfortable speaking in their primary language.
   2. they are most comfortable reading in their primary language.
   3. they may not be able to read and comprehend in their primary language.
   4. they may be too shy to communicate in English if it is not their primary language.

5 Which of the following is true about personal protective equipment (PPE)?
   1. PPE protects by creating a barrier against hazards.
   2. Eye, face, head, foot, and hand protection are addressed in PPE programs.
   3. PPE should reduce the likelihood of occupational injury and/or illness.
   4. Healthcare workers do not need to wear PPE if they follow strict hand washing protocol and universal precautions.

6 Which of the following is NOT true about decontamination?
   1. Decontamination corridors should be set up in an area downwind from the hospital entrance.
   2. Decontamination begins in the hot zone, closest to the site of the disaster.
   3. Decontamination must take place before the client enters the hospital.
   4. Decontaminating a person should be done by sweeping strokes away from you and the client.

7 Another name for a radiological dispersion bomb is:
   1. a dirty bomb.
   2. an ionization radiation bomb.
   3. a nonfiltered bomb.
   4. a radio-controlled remote bomb.

8 One of the results of DNA mutation inside cells exposed to ionizing radiation that can be deadly, but is survivable with bone marrow transplantation, is a description of:
   1. ionizing sickness.
   2. radiation sickness.
   3. TNT sickness.
   4. compromised immune sickness.

9 Nurses should assess the special needs of older adults as part of the emergency preparedness plan because:
1. all older adults will need some kind of special support.
2. some older adults will take the lead in evacuation efforts in nursing homes.
3. not all older adults need the same level of support in emergencies and disasters.
4. some older adults will be unable to evacuate even with multiple support agencies.

10 Nurses may need the assistance of a mental health worker following a disaster because:
1. all nurses need the help of a mental health worker at one point or another in their nursing careers.
2. nurses are often suffering from loss during a disaster while caring for survivors.
3. the nurse may feel as overwhelmed and traumatized as the population for whom she or he is caring.
4. b and c.

See Test Yourself answers in Appendix C.

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UNIT 2 BUILDING CLINICAL COMPETENCE
Alterations in Patterns of Health

FUNCTIONAL HEALTH PATTERN: Health Perception-Health Management

Think about clients with altered health perception or health management for whom you have cared in your clinical experiences.

- What were the clients' major medical diagnoses (e.g., a surgical procedure, terminal illness, impending death, substance abuse, or victim of multiple or mass casualty incident)?
- What manifestations did each of these clients have? Were these manifestations similar or different?
- How did the clients' healthcare behaviors interfere with their health status? Have the clients had surgery before? Did the clients experience any complications due to having surgery? Did they have any problems with anesthesia? What medications were the clients taking? Did they take medications as prescribed? Did they use any substances other than prescribed medications and over-the-counter medications? If so, what substances and how much were used? How much alcohol did the clients drink? Has substance abuse caused a problem for the clients or their family, friends, finances, and health? Were the clients exposed to environmental hazards? Did the clients have sensory deficits or sight or speech impairments? What language did they speak? What spiritual or religious considerations did they verbalize? Did they have living wills, do-not-resuscitate orders, or powers of attorney? Have end-of-life issues been discussed with the family?

The Health Perception-Health Management Pattern includes healthcare behaviors, such as health promotion and illness prevention activities, medical treatments, and follow-up care. Individuals may or may not have the ability to change their healthcare practices. Health perception and health maintenance are affected by perceived health status in two primary ways:

- Factors that interfere with health care are lack of understanding of basic health practices (e.g., altered cognition, altered coping), inability to take responsibility for meeting health needs (e.g., alcoholism, substance abuse), or lack of communication skills (e.g., non-English-speaking, illiterate).
- Factors that interfere with the desire to seek a higher level of wellness are inability to change declining health status (e.g., cancer, kidney failure, impending death), need for treatment (e.g., surgery), catastrophic events (e.g., motor vehicle crash injuries, weather-related event injuries, thermal or chemical burns).

A client's perceived pattern of health and well-being affects how health is managed. Unexpected events can alter the client's health status, leading to manifestations such as:

- Anxiety (uneasy feeling of the unknown ▶ resulting in sympathetic nervous system responses)
- Grief (physical and emotional responses ▶ due to loss or impending loss ▶ resulting in withdrawal of attachment)
- Death (irreversible condition ▶ resulting from cessation of circulatory and respiratory functions or irreversible cessation of all functions of the brain).

Priority nursing diagnoses within the Health Perception and Health Management Pattern that may be appropriate for clients include:

- *Impaired Skin Integrity* as evidenced by surgical incisions, injuries due to accidents or falls, physical immobility, and skin changes in older adults
- *Risk for Injury* related to misuse of drugs and alcohol, environmental hazards, intraoperative complications, and inadequate postoperative care
- *Ineffective Therapeutic Regimen Management* as evidenced by economic difficulties, lack of knowledge of health care, and mistrust of healthcare personnel
- *Powerlessness* as evidenced by expressed inability to carry out treatment regimen, loss of control due to chronic or debilitating conditions, and dependency on others.

Two nursing diagnoses from other functional health patterns often are of high priority for the client with deficits in Health Perception-Health Management:

- *Impaired Verbal Communication* (Cognitive-Perceptual)
- *Ineffective Individual Coping* (Coping-Stress-Tolerance)

Directions: Read the clinical scenario below and answer the questions that follow. To complete this exercise successfully, you will use not only knowledge of the content in this unit, but also principles related to setting priorities and maintaining client safety.

CLINICAL SCENARIO

You have been assigned to work with the following four clients for the 0700 shift on a hospital medical-surgical unit. Significant data obtained during report are as follows:

- Peter Black is a 46-year-old who was admitted from the emergency department 2 hours ago for observation after being thrown 50 yards during a tornado. His vital signs on admission were stable: T 99.8°F, P 86, R 24, and BP 140/ 86. He had multiple abrasions and lacerations that were sutured in the emergency room. He is now complaining of numbness in both legs.
- Mary Black is the 44-year-old wife of Peter Black. She was admitted 1 hour ago with a fracture of the left ankle, multiple abrasions, and ecchymotic areas. She is scheduled to go to surgery at 0900 for an open reduction of the fracture. Current vital signs are T 99°F, P 90, R 26, BP 134/88. She is requesting pain medication and wants to see her children, who were admitted to the pediatric unit, before going to surgery.
- John Linzer, age 67, was admitted 1 week ago in the terminal stages of colon cancer. Vital signs are T 96.8°F, P 54, R 10, BP 88/68. The family is requesting that a nurse check on Mr. Linzer because they feel that death is imminent.
- Paul Goetz, age 47, was admitted 3 days ago after being found unconscious in his car. On admission his alcohol level was 0.45. Current vital signs are T 100°F, P 110, R 30, BP 168/94. He is diaphoretic, disoriented, complaining of nausea, and seeing spiders on the wall.

Questions

1 In what order would you visit these clients after report?

1. _____
2. _____
3. _____
4. _____

2 What top two priority nursing diagnoses would you choose for each of the clients presented above? Can you explain, if asked, the rationale for your choices?

	Priority Nursing Diagnosis #1	Priority Nursing Diagnosis #2
Peter Black		
Mary Black		
John Linzer		
Paul Goetz		

3 You need to complete preoperative preparation on Mrs. Black. In which order would you complete nursing interventions? (Arrange your choices in order from first to last.)

1. Remove nail polish.
2. Have client void.
3. Get operative permit signed.
4. Administer preoperative medication as ordered.
5. Document all preoperative care.

4 Mrs. Black understands the postoperative teaching done by the nurse when she states:

1. "I will need to stay still in the bed to prevent pain."
2. "I will need to cough frequently to remove fluids from my lungs."
3. "Since I will have a PCA machine for pain medication, I will not have to ask for pain medication."
4. "I will be able to eat and drink as soon as I return from surgery."

5 The nurse explains to Mrs. Black that a diet of protein, increased calories, and vitamins are necessary for healing wounds after surgery. Mrs. Black understands this diet when she picks which meal plan?

1. hamburger, french fries, and a cola beverage
2. tossed salad, chocolate pudding, and iced tea
3. fried chicken, broccoli and cheese, and lemonade
4. salmon patty, baked potato, and milk

6 After assessing Mr. Black, which nursing intervention should the nurse perform first?

1. Call the physician to report the numbness in his legs.
2. Have Mr. Black perform active exercises to prevent thrombosis in his legs.
3. Ambulate Mr. Black in the hall to promote circulation to his legs.
4. Medicate Mr. Black for pain so he can move his legs better.

7 With a history of alcoholism for 5 years, what is a priority nursing intervention in the plan of care for Mr. Goetz?

1. Identify maladaptive behaviors that may contribute to the alcoholism.
2. Encourage participation in therapeutic group activities.
3. Teach the effects of alcohol on the body.
4. Use a respectful, nonjudgmental approach to gain trust.

8 A prescription for naltrexone (ReVia) is given to Mr. Goetz upon discharge. He voices understanding of how to take the medication when he states:

1. "I must avoid all forms of alcohol and narcotics while taking this medication."
2. "It is all right to take over-the-counter cold medications if I catch a cold."
3. "This medication will keep me from having withdrawal symptoms."
4. "I can get physically ill if I drink alcohol while taking this medication."

9 When Mr. Goetz was admitted to the emergency department, which laboratory studies would you expect to have been drawn? (Select all that apply.)

1. UDS
2. electrolytes
3. ALK
4. complete blood cell count
5. AST
6. BAL

10 To prepare the family for Mr. Linzer's death, the nurse institutes the following interventions:

1. Teach the stages of coping with the loss of their family member.
2. Explain the physical symptoms they may see as death approaches.
3. Discuss funeral and burial arrangements with the family.
4. Refer family to appropriate support groups to assist in dealing with death.

11 When preparing for the role the nurse will play in disaster relief, the nurse must first:

1. be able to apply basic first aid skills.
2. be aware of decontamination procedures.
3. serve on disaster preparedness committees.
4. know how to take care of himself or herself.

12 Older adult clients are at increased risk for complications from surgery. Which complications does the nurse need to be prepared to treat, if they occur?

1. hypotension, hypothermia, and hypoxemia
2. hypertension, hyperthermia, and aspiration
3. tachycardia, hypertension, and tachypnea
4. bradycardia, hypotension, and bradypnea

CASE STUDY

Mrs. Maria Rodriguez is admitted to the emergency department with open left fractures of the tibia and fibula, left upper quadrant pain, and reddened areas across the left shoulder, neck, and chest. According to the paramedics, she was involved in a multiple-car crash on an icy highway. On initial assessment she is found to be a non-English-speaking Hispanic, 28 years of age, is 5′ 2″ in height, and weighs 120 pounds. Her vital signs are T 100°F, P 100, R 28 and shallow, BP 150/86. She indicates her pain scale level as 9 out of 10, even after being medicated with morphine in the ambulance.

After chest, abdominal, and leg x-rays, Mrs. Rodriguez is diagnosed with crushing injury and comminuted fractures of the left tibia and fibula, a hematoma on her spleen, and bruising across the shoulder, neck, and chest due to the seat belt. With the use of a translator, the physician explains that she will have to have surgery to repair her fractures. Mrs. Rodriguez begins crying and wringing her hands after speaking with the physician.

Blood is drawn for the following laboratory studies: complete blood count (CBC) with differential, electrolytes, prothrombin time (PT), partial thromboplastin time (PTT), and blood gases. A urine specimen is sent to the laboratory for a urinalysis. Preoperative preparation is completed. The nurse tries to calm the client and answer any questions she has regarding the surgery and what will happen in the postoperative period. The nurse attempts to contact family members and a priest to see the client before she goes to surgery. At the ordered time, the nurse administers prescribed preoperative medication and Mrs. Rodriguez is sent to the operating room.

Due to difficulty understanding the English language, pain, and the need for surgery, Mrs. Rodriguez is very anxious. The nursing diagnosis of *Anxiety* is appropriate for guiding preoperative nursing care. Anxiety is an uneasy feeling of not knowing what is going to happen. The pathophysiology of anxiety is anticipation of danger or a threat to health status that leads to a "fight-or-flight" response from the sympathetic nervous system. Manifestations of anxiety are restlessness, tachycardia, rapid breathing, facial flushing, increased perspiration, weakness, tremors, and impaired attention and concentration. Complications of anxiety are nausea, vomiting, diarrhea, loss of appetite, insomnia, immobility, and powerlessness that can lead to panic or phobias.

Based on Mrs. Rodriguez's medical diagnosis and treatment plan, *Anxiety* is identified as the priority nursing diagnosis at this time.