

AORN Guidance Statement: Mass Casualty, Triage, and Evacuation

Introduction

This document is intended as a guide for perioperative registered nurses who are developing processes to facilitate a methodical response to disaster situations. This guidance statement may be used by health care organizations in developing policies and procedures related to responding to natural and man-made disasters and correlating hospital-wide disaster plans with specific perioperative challenges. This guidance statement addresses mass casualty, triage, and evacuation as it relates to the perioperative setting.

AORN recognizes that a health care facility's disaster plan, while required by accrediting and state agencies, may not include situational challenges specific to the perioperative setting during a disaster response. AORN also recognizes that the perioperative setting and available resources are varied and dependent on geographic location, ranging from large metropolitan trauma centers, ambulatory surgery centers, and specialty centers for invasive procedures (eg, cardiac catheterization laboratories, endoscopy suites, radiology departments) to small rural health care facilities.

Background

Perioperative registered nurses experience daily schedule changes based on staffing, supplies, and the emergent status of surgical patients and procedures. In recent years, however, these schedule changes have involved more than this. The terrorist attacks of Sept 11, 2001, and the 2005 hurricane disasters in the southeastern United States have challenged perioperative registered nurses to adapt to and overcome difficult new situations.

Perioperative registered nurses must be prepared to handle local and regional casualties from man-made disasters (eg, biological, chemical, nuclear attacks) to natural disasters (eg, hurricanes, tornadoes, earthquakes, fire). Hospitals should have a disaster plan that is accessible to all members of the surgical team. New employees and members of the staff should be familiar with the disaster plan. Updates should be incorporated as new information is acquired and shared with the surgical team.

Traditionally, hospital disaster drills involve a community disaster, such as a mass casualty automobile or airplane accident or hazardous waste spill. Dis-

aster "patients" are triaged and "tagged" for disposition to various hospital departments. Those tagged for "surgery" are shown to the lounge to relax until the disaster scenario is completed. The question now has become: "How do you prepare for the worst, when the 'worst' may be unknown?"

The world in which we live has changed. An approaching disaster can occur at any time, in any place. There may be warnings (eg, hurricanes), or it may come unexpectedly (eg, terrorist attack). Disasters are not selective and can affect any department in the hospital. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) modified its disaster preparedness standards in 2003 to include requirements for health care facilities to develop disaster plans that include identifying, preparing for, responding to, and recovering from potential disasters.¹ In 2003, the US Department of Health and Human Services (HHS) National Center for Health Statistics conducted a survey that revealed 97.3% of the hospitals that participated were in compliance with disaster plans for responding to natural disasters. The survey also revealed that 75% of the hospitals had plans for chemical, biological, and nuclear incidents, as well as for incidents involving bombs. Hospitals conducting disaster drills involved natural disaster scenarios 69% of the time, while only 27% involved scenarios of weapons of mass destruction. Less than 60% of the hospitals surveyed had contingency plans for obtaining critical supplies, including pharmaceuticals, during a disaster.²

It is imperative that a hospital's disaster plan and drills include scenarios that involve the surgery department. Incidents such as flooding, loss of electricity, and fire also need to be part of the planning. Perioperative registered nurses are resourceful and flexible. Their skills, from basic nursing assessment skills to handling advanced surgical technology, can support many aspects of the disaster planning, response, and recovery.

Guidance Statement

Mass Casualty

The US Agency for Healthcare Research and Quality (AHRQ) defines a mass casualty event (MCE) as "an act of bioterrorism or other public health or medical emergency involving thousands, or even tens of thousands, of victims."³ It is imperative for the perioperative registered nurse to be knowledge-

able about his or her health care organization's disaster preparedness plan and ability to provide safe, quality care for patients, family members, and staff members, because disasters and other emergency events can strike with an unexpected and devastating force. Mass casualty templates should be developed and disseminated in all health care settings. They should include, but not be limited to,

- ◆ an emergency management task force committee that includes a member from each hospital department;^{4,5}
- ◆ a plan to coordinate with outside agencies before, during, and after an MCE;^{4,6}
- ◆ a reliable internal and external communication protocol within the facility;^{6,7,8}
- ◆ a command center within the facility that can be activated when emergencies occur to provide responses that are organized for the whole facility;^{6,3}
- ◆ clinical care protocols to include triage, patient care, patient flow, patient tracking, and evacuation plans;
- ◆ adequate security protocols;^{6,8}
- ◆ appropriate staffing to meet emergency needs and to continue to maintain current patient care;^{5,8}
- ◆ supplies and equipment lists that incorporate possible prolonged demands;^{6,8}
- ◆ adequate training of all staff members to enable them to respond to MCE emergencies;^{6,7}
- ◆ MCE drills to be scheduled at least twice a year for hospitals and ambulatory surgery centers with a real emergency or a pre-arranged drill;^{6,7}
- ◆ decontamination and containment protocols;^{3,6,7} and
- ◆ checklists/tool kits for each department.^{6,3}

Using the experiences in past MCEs, the Centers for Disease Control and Prevention (CDC) found that there are patterns that involve the use of hospitals. The CDC developed a mass casualty predictor that can be a very useful tool in determining casualty volume and patterns following an MCE. Research by the CDC revealed patterns experienced by hospitals participating in an MCE and demonstrated the following.

- ◆ Ninety minutes after an MCE, 50% to 80% of acute casualties that will arrive are at the health care facility nearest the incident. Hospitals farther from that area may receive very few or no casualties.

- ◆ Individuals who are not severely injured may leave the scene on their own and go to the closest health care facility. They may not be triaged at the scene by emergency medical services, and these individuals often arrive at the health care facility before the most severely injured patients.
- ◆ It may take three to six hours, on average, for casualties to be taken care of in an emergency department.

After an MCE, casualties present quickly; about half of the casualties arrive at the health care facility within one hour of the event. Important points to remember include

- ◆ doubling the number of casualties that arrive within the first hour to assist the health care facility in predicting the total number of casualties the facility will receive from the MCE, and
- ◆ beginning the one-hour window when the first casualty arrives.⁹

Triage

Triage, as it pertains to the surgical management of casualties from emergencies and disasters, is defined as "the system for prioritization of patients requiring surgical management based on severity of injury, while using available resources for optimal outcome." The word *triage* originates from the French verb *trier*, meaning "to sort." Triage was developed during the time of Napoleon to provide rapid evaluation and evacuation of wounded patients who could be treated. The US military adopted a four-tiered system of casualty triage during the Korean War. By the Vietnam War, the mortality rate of wounded soldiers decreased from 4.7% to 1%, primarily "due to the advances in rapid triage and transport."¹⁰

Today, the goal for triage is to accomplish the greatest good for the greatest number of casualties in emergent situations. Using their assessment and thorough planning skills during realistic drills, perioperative registered nurses can identify available resources required to effectively triage surgical casualties for optimal survival of the majority of patients. All nurses should have basic nursing knowledge and the ability to respond to an MCE. Educational competencies for responding to an MCE should be in place to validate preparedness. Competencies may include

- ◆ critical clinical judgment skills (eg, able to make decisions; determine event needs; plan and care for individuals, family, or community);

- ◆ assessment skills for individuals or a group of individuals who have injuries resulting from chemical, biological, radiological, nuclear, or incendiary incidents;
- ◆ technical skills to care for an individual or groups of patients;
- ◆ communication skills appropriate for emergency situations for individuals, families, media, and first responders;
- ◆ knowledge and the ability to keep in perspective health issues that may be prevalent in the community;
- ◆ ability to apply knowledge of language and processes used for MCEs;
- ◆ ability to demonstrate an understanding of the legal, ethical, and regulatory ramifications present during an MCE;
- ◆ knowledge of containment and decontamination; and
- ◆ ability to discuss comprehensive community response to an MCE based on cultural, spiritual, and social issues.¹¹

There should be an emphasis on the need to establish systems that can render triage treatment and initial stabilization within three hours of an MCE for a specified number of casualties above the daily bed capacity for a health care facility.⁶ Unfortunately there remains no clear guidance for initial surgical triage in the field with a coordinated system at an incident command center or for segregation of surgical casualties to different hospitals, based on surgical surge capacity. This preferred system would maximize community resources (ie, available neurosurgical, thoracic, abdominal, orthopedic, or other surgical specialty resources) for optimal survival of the greatest number of casualties requiring immediate surgical intervention.

Development of a comprehensive surgical management plan for casualties is essential for improved outcomes. Prioritizing surgical patients is essential, and a standard system should be used to facilitate effective communication at the incident scene among all caregivers. Health care facilities should establish a system of patient prioritization for triage based on the CDC's color coding or other triage-scoring systems for surgical patients with categories (eg, red = critical or emergent needing immediate surgical care; yellow = semi-critical or delayed, needing surgical care within 6 to 8 hours).¹⁰ Developing policies for effective communication of surgical triage is important to meet a facility's immediate surgical capacity (eg, triage tags, tracking

system). Instructing caregivers to complete competencies for surgical triage training is imperative as extensive literature review documents the occurrence of repeated incidents of inexperienced staff members unable to adequately triage casualties during drills.¹²

Creating a surgical plan and involving multidisciplinary caregivers (eg, surgeons; nursing staff members; laboratory, radiology, anesthesia, security, admissions, decontamination team personnel) should include

- ◆ identifying surgical surge capacity (eg, two neurosurgery red cases, four general abdominal red cases, one open chest red case, two obstetric trauma red cases, two pediatric red cases, four orthopedic red cases, 14 delayed yellow cases) based on available resources;
- ◆ creating easy-to-follow, laminated trauma case cards as guides for trauma procedures with required equipment and supplies listed;
- ◆ establishing training modalities, to include both "tabletop" and actual drills, with documentation of competencies that include measurable outcomes. (Two practice scenarios are provided in **Exhibit A**.) Some data exist regarding the ineffectiveness of tabletop drills when compared to actual drills, but more research is warranted to validate this.¹²

Evaluation of resources required for the surgical emergency management plan is vital for the execution of the plan. Numerous disaster drills identifying critical deficiencies in resources for the numbers of presenting casualties have been documented in the literature.⁶ Planning needs include

- ◆ adequate space available to conduct initial assessments and triage for surgical patients;
- ◆ determining availability of ORs (eg, plan for preoperative, intraoperative, and postoperative placement of casualties);
- ◆ monetary resources available through annual budget planning and acquisition;
- ◆ sufficient staffing to meet immediate surgical surge capacity;
- ◆ required equipment, instrumentation, and supplies;
- ◆ availability of immediate blood and blood products; and
- ◆ estimation of maximum output (ie, surgical caseload) before resupply is needed.

The health care facility should use outcome determinations for the triage of surgical patients

that have been measured using the historical data of past events and drills, which include categorizing casualties as over-triaged and under-triaged patients.¹² Post-event outcomes should be analyzed and variations to the emergency plan considered for future events. Patients, community members, and staff members all need to be considered when evaluating outcomes.

Nurses should evaluate patients' individual situations for adequate discharge planning to ensure that they have appropriate care and facilities for recuperation upon discharge. There also should be a system to ensure that counseling for posttraumatic stress disorder and other psychiatric issues is available. Community resources also need to be available for support, rebuilding, and recovery. The facilities and agencies involved in providing these services should be accessible to provide feedback to the various emergency agencies.

It is important to have several levels of input from staff members to evaluate the outcome from emergency situations. Debriefing sessions are highly effective and often are used to assist staff members in voicing concerns and identifying positive issues, and for offering closure on stressful situations. Post-incident counseling may be necessary for staff members.

Troubleshooting different areas of concern is necessary to avoid similar concerns in the future. Even if it is not possible to address every situation, care should be taken to focus on the ones that do present and to revise the emergency plan as needed. Resuming routine functions is the main goal of recovery. Rescheduling cancelled elective surgical procedures and restocking supplies are necessary for a return to customary roles and activities.¹³

Evacuation

A facility evacuation plan is an essential component of emergency management. It is imperative that health care facilities be compliant with plans for vertical and horizontal evacuation of patients in the event they cannot sustain safe and appropriate patient care.^{14,15} Fires (internal or external), earthquakes, floods, hurricanes, utility outages, human threats, and spilling of hazardous materials (internal or external) are examples of incidents that may necessitate a facility-wide evacuation.¹⁶ Strategies that should be addressed include, but are not limited to the following.

- ◆ Determine the type of patient population and consider the special resources needed to evacuate to an appropriate receiving facility.¹⁴ The facility chosen may not be the closest, but if possible it should have the available resources for the patient population being evacuated.¹⁷
- ◆ Identify patient needs during transfer (eg, basic life support, advanced cardiac life support, trained care providers), mode of transportation (eg, ambulance, helicopter, bus, private car), and evacuation routes.¹⁶
- ◆ Provide supervision of health care team members for safe use of supplies and equipment during patient evacuation to areas of safety.¹⁴
- ◆ Initiate a multidisciplinary transport team comprising nurses, physicians, and ancillary personnel to move patients safely to awaiting land or air transportation.¹⁷
- ◆ Provide properly trained staff members who can respond appropriately to clear and specific directions when evacuation orders are received, including approximate time of departure.¹⁴
- ◆ Prepare patients' medical records and medications for the transport process.¹⁴
- ◆ Maintain effective communication between affected facility and receiving facility to ensure patient care continuity.^{13,14,17}
- ◆ Initiate a system that has flashlights with functioning batteries available on nursing units and stairway lights and exit signs that also are functioning.
- ◆ Provide paper documentation reflecting activities pre-, intra-, and post-patient transfer that can be used in an emergent situation.¹⁷
- ◆ Ensure that the affected health care facility has a plan in place to provide patient care outside if receiving hospitals become overwhelmed with patient influx or sustain damage in a natural disaster.¹⁸
- ◆ Maintain a master log of all patients evacuated; include receiving health care facility, patient name, date of birth, hospital number, physician name, and admission date.^{15,17}
- ◆ Equipment sent with patients must be tracked to ensure return.¹⁷

Types of evacuation. To facilitate the evacuation process, periodic assessments should be done so there are no obstructions blocking exits, doors, corridors, and stairways.

- ◆ Horizontal evacuation is used to move patients to the closest safe area on the same floor.¹⁴
- ◆ Vertical evacuation is used to move patients to a safe lower level or down a flight(s) of stairs when the horizontal method is thought to pose a danger to the patients.¹⁴
- ◆ Total evacuation is used to move patients to receiving health care facilities or areas outside the affected institution.¹⁴

Order of patient evacuation. Staff members should assemble ambulatory patients together and designate one or more staff members to lead patients to the designated safe area.¹⁴ When evacuating nonambulatory patients (eg, those who are wheelchair-bound or who have mobility deficits or critical care needs), staff members should use appropriate evacuation techniques (eg, sliding patient on bath blanket or mattress, one- or two-person carries, use of back boards or canvas stretchers).¹⁹

Critical care patients need to be prioritized from least to most critical. Three- to four-member extraction teams, including a nurse and respiratory therapist, may be necessary to evacuate critical care patients.²⁰ The following items, in addition to others as determined by the facility, should be assessed and available when evacuating critical care patients:

- ◆ patient assessment (ie, vital signs, IV lines, airways) by health care team member(s);
- ◆ patient weight;
- ◆ stability;
- ◆ minimizing equipment needed (eg, ambu bag rather than a ventilator);¹⁰
- ◆ oxygen tanks and portable suction apparatus;^{20,21}
- ◆ transport monitors;
- ◆ consolidation of medication pumps;²¹
- ◆ emergency medications;¹⁸ and
- ◆ ease of movement in stairwells.²⁰

Evacuation plans should be in place and scenarios for evacuation should be used to develop staff member consistency and comfort in the evacuation process for each health care facility.

Summary

Disasters are not expected, but they do occur. Perioperative teams must be prepared to implement disaster plans before a disaster occurs. Planning and preparation, including drills and knowledge of the

disaster plan, will serve the health care facility and the community well in preventing increased morbidity and mortality. The ability of health care personnel to anticipate and respond to disasters is important in successfully managing emergent events.

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RESOURCES

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Exhibit A: Mass Casualty Practice Scenarios

Scenario 1: Explosions occurring at the same time in several areas.

Several homemade bombs, which may contain pathogens, have exploded in a train terminal. The trauma hospital nearby also has been a target and is unable to receive casualties. There are approximately 5,000 casualties.

Scenario 2: Release of a biological agent.

A biological agent has been released in a concert hall. The pathogen's identity and incubation period is unknown, and laboratory tests must be performed to determine this. Health care facility staff members receiving the casualties must wear personal protective equipment that includes gowns, masks with eye protection, and gloves. From the first responder's initial report, patient treatment is determined to be isolation and ventilators because of the pathogen's undetermined identity. The treatment regimen's effect is not known.

Triage efforts for both scenarios will include the following:

- ◆ saving as many lives as possible,
- ◆ determining what resources are available throughout care,
- ◆ providing care for current patients in facility,
- ◆ using all standards of care that apply,
- ◆ maintaining supplies and equipment that may need to be rationed to save lives,
- ◆ identifying the number of staff members available who are trained to handle this type of emergency,
- ◆ controlling backlog of patients to reduce delays,
- ◆ using clinical judgment to make treatment decisions,
- ◆ documenting any standards that cannot be met, and
- ◆ processing the backlog of fatalities as soon as possible.

Identify how decisions will be made. Questions that need to be asked include the following.

- ◆ How do you ensure training of care providers and support staff?
- ◆ How are patients triaged by condition, ability to treat, and available resources?
- ◆ How are infections controlled and prevented?
- ◆ How are supplies and equipment used and reused, if necessary?
- ◆ How are supplies that are in short supply and specific to clinical needs allocated?
- ◆ How are resources (eg, surgical, laboratory, bed capacity) allocated?
- ◆ How are patients with specific conditions identified and cared for?
- ◆ How are medications best used?
- ◆ How are health care workers and their families safeguarded?
- ◆ How are documentation standards adapted to obtain sufficient information to address care given?
- ◆ How are a large number of casualty deaths handled?

For further information, consult the following publications and Web sites.

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