Director's Forum

Pharmacy Leader's Role in Hospital Emergency Preparedness Planning

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The *Director's Forum* column is designed to guide pharmacy leaders in establishing patient-centered services in hospitals and health systems. Environmental disasters and terrorist attacks demonstrate that it is imperative for both a hospital and community to have an emergency preparedness plan. The goal of this article is to provide health-system pharmacy leaders with a practical approach in developing an emergency operations plan (EOP) that can be activated in the event of a disaster. Pharmacy leaders should (1) review government and community disaster responses and understand the movement of drug supply for each response, (2) create a pharmacy disaster plan, (3) list the essential medications and determine their inventory levels, and (4) establish a staff training program to enhance understanding and implementation of the EOP. If successfully developed and executed, a hospital pharmacy department's EOP has a high rating of success in meeting patient-centered needs in the unforeseen event of a disaster

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Emergency preparedness planning or disaster planning has become a focus area for pharmacy departments given the recent environmental disasters, such as the 2008 river floods in Iowa or the 2011 tornadoes in Missouri, and the 2013 Boston Marathon bombing. These events highlighted the importance of effective emergency preparedness by hospitals and the communities they serve.¹ Communities rely on hospitals to provide essential services during a disaster, including appropriate vaccinations (eg, hepatitis B, tetanus) and prescribed medications and medication refills.² During disasters, hospital pharmacy departments are a source of medication supply and information.

Disasters are unpredictable and therefore are difficult to prepare for. Pharmacy departments should be involved in hospitalwide emergency planning efforts; during a disaster, pharmacy departments are responsible for handling medication procurement and storage. The director of pharmacy makes plans for the handling and storage of medications during a disaster based on regulatory concerns; an understanding of costs and storage and stability requirements; and a unique expertise in managing the supply chain to

ensure effective distribution of medications.³ As a result, it is vital that the pharmacy director understands how to prepare a pharmacy department, the hospital, and the community for a possible disaster.

The American Society of Health-System Pharmacists (ASHP) and The Joint Commission (TJC) have published guidelines and accreditation standards that guide the pharmacists' role in disaster planning.^{4,5} Unfortunately, most of this information does not provide the practical steps that are needed for developing a disaster plan for the pharmacy. There is a paucity of literature to guide the pharmacy's effort in disaster planning.

The goal of this article is to provide health-system pharmacy leaders with a practical guide to developing an emergency operations plan (EOP) that can be activated in the event of a disaster. This article focuses on pharmacy planning for an event that impacts the surrounding community; a pharmacy plan to address a disaster that impacts a hospital building is not discussed. Pharmacy leaders should (1) review government and community disaster responses and understand the movement of drug supply for each response, (2) create a pharmacy disaster plan, (3) list

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the essential medications and determine their inventory levels, and (4) establish a staff training program to enhance understanding and implementation of the EOP. If successfully developed and executed, a hospital pharmacy department's EOP has a high rating of success in meeting patient-centered needs during a disaster.

DISASTER RESPONSE AND THE DRUG SUPPLY

Local, state, and federal governments offer support during times of a declared disaster. Health-system pharmacy leaders need to understand how drug and medical supply assistance is provided to develop an EOP and effectively respond to a disaster. In the event of an emergency event, a state's governor is tasked with the duty of ensuring appropriate response. According to the National Association of Boards of Pharmacy, a governor's responsibilities include, but are not limited to, coordinating state resources to prevent, prepare for, respond to, and recover from acts of terrorism, natural disasters, and other emergencies; providing leadership in communicating how to cope with the consequences of any declared emergency within state jurisdiction; and requesting federal assistance when state capabilities are insufficient or have been exhausted.³ For example, a governor may authorize the use of state-level emergency medication caches for city or county use.

Mayors and other local officials have similar responsibilities at the city or county level. These officials coordinate first responders, who are typically law enforcement, fire fighters, and emergency medical teams. Subsequent to first-responder coordination, local officials notify higher levels of government who then declare a state of emergency and determine whether to deploy additional resources. The typical response time for the federal government to declare a state of emergency is 72 hours; for this reason, it is important for hospitals to work with the local and state governments to allocate medical supplies appropriately in the period before federal aid arrives.³

Federal Emergency Management Agency

The federal government's response to a disaster is coordinated at the local level through the Federal Emergency Management Agency (FEMA). The National Incident Management System (NIMS), a division of FEMA, provides disaster planning and preparation services. NIMS is a comprehensive, nationwide, systematic approach to incident management. It provides concepts and principles that are scalable and applicable to any emergency situation, and

it works hand in hand with the National Response Framework (NRF) that provides the processes, policies, and procedures for incident management.⁶ This system provides the framework that allows federal, state, and local governments and private sector and nongovernmental organizations to work together to respond to disasters.^{6,7}

Strategic National Stockpile

In addition to these federal resources, the Centers for Disease Control and Prevention (CDC) operate the Strategic National Stockpile (SNS). The SNS is a supply of antibiotics, chemical antidotes, antitoxins, life-support medications, intravenous (IV) administration devices, airway maintenance supplies, and medical and surgical supplies. It was developed to supply state and local entities with drugs and supplies in the event of a public health emergency, such as an environmental disaster, epidemic, or terrorist attack.⁸ The SNS is not an immediate source of medications, but instead it supplements and re-stocks local and state public health agencies with drugs and medical supplies when local resources are depleted.

When the SNS is activated by a certified official, the first allotment is a 12-hour Push Package.^{5,8} Push Packages are caches of drugs and medical supplies located strategically across the United States that can arrive at a disaster area in 12 hours. A single Push Package weighs approximately 50 tons and contains almost 90 medications that offer "broad spectrum support" in the early hours of a disaster when all the details are not known.⁹ If a disaster requires medications or supplies in addition to the 12-hour Push Packages, vendor-managed inventory (VMI) supplies are shipped to arrive within 24 to 36 hours.^{5,8} These VMI supplies can, in cases of known biological or other chemical agent exposure, be used in lieu of a 12-hour Push Package.

CHEMPACK

Although the SNS has a fairly quick response time, the time to delivery is not quick enough to manage a chemical terror attack with a nerve agent such as organophosphates. As a result, the SNS also operates a voluntary program called CHEMPACK to quickly respond to a chemical attack. Atropine sulfate, pralidoxime chloride, and diazepam (available as auto-injectors and vials) are stored within CHEMPACK containers. The CHEMPACK stockpile is maintained by the SNS and placed in strategic locations that are determined in conjunction with the state and local governments; the stockpile is kept under

controlled and monitored storage conditions.^{10,11} If the CHEMPACK agents are stored in local hospitals, the director of pharmacy (or designee) is responsible for assisting in managing the CHEMPACK expiration dates and supply. The storage area is inspected regularly to ensure proper medication storage conditions and security. Because the federal government owns the products contained within the CHEMPACK, the contents qualify for the Shelf Life Extension Program (SLEP), a cost-effective method for extending expiration dates.¹¹ The SLEP allows the expiration date of these products to be extended, based on criteria set forth by US Food and Drug Administration (FDA) stability studies, as long as the contents remain unopened and under specific environmental conditions (proper temperature, humidity, and light based on the drug product requirements for storage).¹¹ Not all hospitals participate in the CHEMPACK program, but pharmacy directors should know the process for the emergency use of a CHEMPACK container for their hospital.

Local Wholesalers

Local wholesalers and distributors often work with the federal, state, and local governments in the event of a disaster to provide critical drugs and supplies to areas in need. To facilitate this, priority areas may be established and “base” hospitals determined by the local government.¹² Base hospitals have trauma-level 1 designation, burn units, and other disaster preparedness capabilities that give them priority over facilities with lower acuity thresholds with regard to drug shipments.¹² Hospitals should work with drug wholesalers to establish an emergency order process to facilitate ordering medications during an emergency.¹²

The pharmacy director must have a clear understanding of the local, state, and federal responses to a disaster and how drug supply is managed through each of these responses. The pharmacy director can use this knowledge in writing the pharmacy portion of the EOP that coordinates the availability of the drug supply with all other aspects of the EOP.

STEPS IN CREATING THE EOP

Step 1: Involve the director of pharmacy (or designee) as an active member of the EOP team. As a key first step in creating a department EOP, the pharmacy director should join the hospitalwide emergency or disaster preparedness planning group. As a member of this group, the pharmacy director will learn about any designations their hospital may have, such as

being a base hospital. This will help determine the pharmacy's response. For example, as a base hospital, the institution will receive priority over others in receiving relief supplies from local and state governments.¹² Consequently, the quantity and types of medications the pharmacy keeps on hand for emergency situations may need to be adjusted.

The director of pharmacy is ultimately responsible for developing the EOP for medication management, including inventory control measures; however this activity may be delegated to another staff member. The planning process for obtaining and supplying medications in the event of a disaster is different than the process for obtaining medical materials, such as gauze and bandages. The EOP must be consistent with the pharmacy department's ability to adequately respond while maintaining compliance with required rules and regulations. Emergency medication storage boxes (with cardiac medications) must be handled in the same manner as hospital emergency crash carts, including storage in a secure location and periodic review for expired medications.¹³ By being directly responsible for the EOP for medication management, the pharmacy director can avoid situations in which the medication stockpiles may have expired and adulterated medications are placed in areas that are not known to the pharmacy.

Step 2: Identify key stakeholders in developing the pharmacy portion of the EOP. In developing an EOP, the pharmacy director needs to identify key stakeholders, such as emergency medicine and infectious disease physicians, and solicit their recommendations for specific medication stockpiles. Formulary availability and drug shortages also need to be taken into account. Adequate inventory of emergency medications must be available for disaster response, with at least a 72-hour supply available to meet the delivery response of the SNS. The director of pharmacy must take the CHEMPACK program into consideration when developing the EOP. All pharmacy staff should be educated on the location, contents, and procedures for accessing the CHEMPACK, and deployment plans or plans for receiving these containers should be in place. For example, a facility may not be authorized to stock CHEMPACK containers, therefore it will need to be prepared to receive these containers from a participating facility during a disaster.

Step 3: Develop a plan for activating the EOP in the event of a disaster. The pharmacy department's EOP needs to coordinate with the organizational EOP. **Figure 1** describes the communication pathways

Figure 1. Disaster plan communication process.

between the pharmacy department and the hospital incident command system (HICS); this pathway is used to manage the hospitalwide disaster response. In the event that a hospital disaster or emergency occurs and is communicated to the pharmacy department, a designated pharmacist on duty (or designated pharmacist shift) is responsible for setting in motion a chain of events and utilizing specific lines of communication. The pharmacist on duty is responsible for contacting the designated on-call pharmacy administrator who will act as the initial point of contact for the event. Pharmacy department staff should maintain normal operations unless otherwise directed by the administrator. This administrator should contact the HICS for any additional directions or response needs. Based on the response from HICS, the administrator will utilize a department call scheme to contact staff members as needed.

The HICS will inform the pharmacy department about the nature of the event and whether additional medication resources are needed and where they

should be allocated. If there is the need for special medications outside of emergency medication stores (eg, different antibiotics, other medications), the on-call administrator coordinates procurement and allocation with the pharmacist on duty. The administrator should also re-allocate staff as appropriate. For example, critical care pharmacists may be assigned to the emergency department to assist with the admission of patients. Throughout the process, there should be open communication between the pharmacy administrator, the pharmacy staff, and the HICS. Without such communication, full coordination of supplies and personnel would be difficult and likely impossible to achieve.

MEDICATIONS AND INVENTORY MANAGEMENT

Neither ASHP nor TJC specify which medications or inventory par levels are necessary in preparation for a disaster.^{4,5} The CDC is a good resource for an initial list of medication therapeutic categories that are needed based on the type of disaster. This

list helps the pharmacy director in creating a list of institution-specific medications to be kept on hand. The major classes of drugs that need to be stocked include analgesics; anxiolytics; antipsychotics; antibiotics (including anthrax treatments); IV fluids, burn care agents; ear, nose, and throat medications; ocular medications; tetanus and hepatitis vaccines; and drugs used for emergency intubations. Table 1 lists medications that are useful in most disasters.

Emergency medications are also needed for patient transport kits. These kits should be small and easily carried by staffs who are accompanying patients to transfer locations – whether to a different institution or to a different unit. Examples of drugs in transfer kits include adenosine, atropine, epinephrine, and lidocaine. In addition to medications and medication supplies, department carts should be stocked with basic disaster supplies, such as batteries, portable 2-way radios, and flashlights.¹⁴

The amount of on-hand supplies and medications depends on the size of the institution and the population of the community served. The number of patients or victims will vary based on the disaster and geographic location. The pharmacy department

should work with local and state emergency preparedness divisions to determine the baseline level of supplies that should be maintained. Most authorities recommend that a pharmacy keep as much as possible on hand and then rely on drug wholesalers and local, state, and federal governments to provide additional supplies as needed. Therefore, a 72- to 96-hour supply of necessary medications is a reasonable inventory value to maintain, given the potential 72-hour time frame before the federal government makes the decision to declare an emergency.³

During a disaster, the emergency room will undoubtedly need overflow space for patients. Surge areas could be designated for ambulatory patients, lower acuity patients requiring hospitalization, or critical patients. The acuity of the patients in designated areas will dictate the types of medications and inventory that should be stocked. A plan must be in place to ensure delivery of emergent medications to any such areas. This will help the pharmacy department avoid having a surplus of inventory in unnecessary locations as well as narrow the medications that may need to be delivered to particular units and/or areas during an emergency situation.

Table 1. Commonly used medications during disasters

Therapeutic class	Medications
Analgesics	PO: hydrocodone/acetaminophen, oxycodone, acetaminophen, ibuprofen IV: morphine, fentanyl
Antibiotics, broad-spectrum with low allergy risk	PO and IV: levofloxacin PO: doxycycline, ciprofloxacin
Antibiotics, others	PO and IV: penicillin, clindamycin, metronidazole IV: vancomycin
Antiemetics	PO and IV: ondansetron
Antipsychotics	PO and IV: haloperidol
Anxiolytics	PO and IV: lorazepam
Burn care agents	Topical: silver sulfadiazine, bacitracin
Ear, nose, and throat agents for tympanic membrane perforation	Otic: neomycin, polymixin B, and hydrocortisone otic suspensions
Intubation medications	IV: etomidate, succinylcholine, and vecuronium
IV fluids	0.9% sodium chloride Dextrose 5% in water Lactated Ringer's solution
Ocular medications	Proparacaine ophthalmic ointment, erythromycin ophthalmic ointment
Respiratory	Inhalation: albuterol
Vaccines	Tetanus toxoid vaccine

Note: IV = intravenous; PO = oral.

The physical space available in the pharmacy affects decisions on the amount of disaster medication that can be stocked and stored. To prevent large numbers of expired medications or stockpiling, it may make be prudent to incorporate these emergency medications into normal inventory. This allows for more effective recall tracking. Inventory in automated dispensing cabinets (ADC) as well as overstock inventory housed in the pharmacy should be considered when creating an emergency medication inventory listing. This inventory can be reallocated to different areas of need if centralized medication supplies begin to be depleted.

It is not always feasible or necessary to store emergency medications with the normal inventory. Creating an emergency medication cache located within the main pharmacy or other nearby storage locations for ready retrieval and deployment is a potential option for pharmacy departments. ASHP currently recommends against stockpiling medication without regard to local emergency preparedness plans, so it is important to engage the community in an emergency preparedness plan if choosing to store inventory in this manner.⁵ Hospitals that are part of health systems with multiple facilities may store medications at each facility and transfer medications to locations affected by a disaster. Inventory management should be approached from a systems perspective to make the most of resources. One complicating factor of such a model is expiration date tracking. Any such medication cache should be reviewed as part of the pharmacy department's regular review of medication storage areas.

Pharmacy departments should also be mindful about using automation or an off-site location to store emergency medications, because of the possibilities for the loss of power or the inability to transport supplies from one location to another. The department EOP should have provisions for a loss of power in these situations. It is important to know which automated devices and other equipment within a facility have generator back-up; there should also be a plan for safely and quickly removing medications from automated devices in the event of generator failure. For example, a hospital that uses ADCs as a primary dispensing mechanism should have a clearly labeled and easily known storage location for keys to ADCs. Without such plans, pharmacy and hospital staff may go to extreme measures to remove medications from any automation device carrying medications, which may lead to delay in obtaining the medications and the destruction or damage to equipment.

STAFF TRAINING ON THE EOP

It is just as important to train staff on what to do in the event of an emergency or disaster as it is to have an effective EOP. In a disaster situation, it may be difficult to think clearly about the best way to handle staffing and drug distribution. A pharmacy EOP should outline the specific duties required from pharmacist or technician shifts so that there is no confusion.¹⁵ In a hospital setting, clinical pharmacists should focus on delivering pharmacy care to victims of a disaster. This includes code blue response and provision of drug information and transitions of care services. Pharmacist staff can be deployed to clinical areas to directly participate in patient care efforts. They should also assist in medication selection, delivery, and distribution to patients in need; administration of vaccinations is a great method of utilizing pharmacists within their scope of practice.^{1,15} Other health care disciplines may be unaware of the roles pharmacists can play in a disaster, so it is the responsibility of the pharmacy director or designee on the hospital emergency preparedness team to relay this information to other departments.

To ensure that the pharmacy staff is prepared to handle a disaster, pharmacy directors should ensure that they complete a series of mandatory training modules. A live mandatory training session can be used to review all of the emergency preparedness plan components.¹⁵ This live session can then be incorporated into department orientation for new employees. Ongoing training can include computer-based learning modules that become part of the regular competencies required for all pharmacy staff. Emergency preparedness competencies should be completed annually due to the high risk of these types of events and their rare occurrence. The department EOP and any supportive information should be located in readily assessable areas in the pharmacy. They can be stored in a computer-based file storage system, but they should also be located in paper format inside a binder stored in the main pharmacy for easy access in the event that power is lost and computer storage systems are unavailable. Knowing where to find the plan is essential for a timely, low-stress response during a disaster situation.

Pharmacy employees should participate in hospitalwide emergency preparedness drills. It may be practical for certain staff members, such as emergency or critical care pharmacists, to attend disaster training within the organization and even regional or national disaster training sponsored by government or organizational entities if at all possible. Pharmacists

should be expected to understand the pharmacology as well as dosing information for all medications that may be used in an emergency. This includes medications used for bioterrorism and chemical warfare. For example, pharmacists should be familiar with nerve agent antidotes, as these medications are contained in CHEMPACK and may be used if the public is exposed to an organophosphate. A comprehensive training plan complete with policies, annual required competencies, and participation in hospitalwide drills is an effective way to ensure staff are prepared for any type of disaster.

CONCLUSION

Preparing for disasters can be a daunting task. They are, by nature, unpredictable, which makes it difficult to plan for every possible scenario. However, having a plan in place to manage pharmacy resources is extremely important in delivering care to victims of a disaster. It is important to think about all of the possible obstacles to acquiring and delivering medications to prepare for the worst case scenario. Creating a plan for pharmacy staff to follow in the event of an emergency is extremely important to mitigate the high stress of a disaster situation and maintain the quality of care delivered to patients.

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