

A PHS pharmacist team's response to Hurricane Katrina

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The Gulf coast of Mississippi and southeast Louisiana were struck on August 29, 2005, by category 4 hurricane Katrina, which caused widespread infrastructure damage, flooding, and loss of life. Teams of commissioned officers of the U.S. Public Health Service (PHS) were deployed to the affected and neighboring areas to provide relief assistance.¹

Our team arrived on September 3 and 4 to establish a 480-bed federal medical station (FMS) in an aircraft hangar at the naval air station (NAS) in Meridian, Mississippi. The purpose of the FMS was to (1) provide a medically supervised location where low-acuity hospitalized patients could receive care until discharge or until additional care necessitated transport to another medical facility and (2) care for evacuees with special health care needs. Staffing of the FMS was provided by a multidisciplinary detachment of 79 PHS officers. Surrounded by structural dam-

Purpose. The challenges and victories that a team of Public Health Service (PHS) pharmacists experienced in establishing pharmacy operations at a federal medical station and conducting outreach missions are described.

Summary. The Gulf coast of Mississippi and southeast Louisiana were struck on August 29, 2005, by Hurricane Katrina, which caused widespread infrastructure damage, flooding, and loss of life. A team of 70 officers, which included 8 pharmacists, arrived on September 3 and 4 to establish a 480-bed federal medical station in an aircraft hangar at the naval air station (NAS) in Meridian, Mississippi. Numerous challenges were encountered, including identifying a secure space for a pharmacy, determining how to manage the immediate shortage of medications, devising a dispensing system specific to controlled medications, handling personal medications brought in by patients, and maintaining adequate phar-

macy staffing to provide for hospital needs. Two outreach efforts were also undertaken. The first was to assist the NAS pharmacy department, which was overwhelmed with nearly 800 Navy and Coast Guard personnel who were displaced to the Meridian NAS. The second outreach effort was to augment the staff at a local free clinic in Meridian, which needed help to set up their clinic so they could handle the influx of hurricane victims who were arriving daily.

Conclusion. A team of PHS pharmacists established a pharmacy, provided pharmaceutical care, and conducted outreach programs to aid victims of Hurricane Katrina.

Index terms: Controlled substances; Disasters; Dispensing; Drug distribution; Personnel, pharmacy; Pharmaceutical care; Pharmaceutical services; Pharmacists; Public Health Service; Volunteers

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age and widespread debris, we were tasked with meeting a multitude of new public health challenges.

Establishing a makeshift pharmacy

As a team of eight pharmacists, we were to establish a fully functional

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pharmacy and provide services to patients and staff. Before our clinical skills could be put to work, we had to address certain issues, namely the cleaning of an aircraft storage and repair area that was identified as a suitable structure for our hospital. The FMS was located on a naval base, so establishment of hospital security was not an issue. Part of the team that had arrived a day earlier took on the grueling job of cleanup, with assistance from the Navy. Rank, degree, and title were put aside, with the primary goal of establishing an area that could receive displaced hurricane victims within 48 hours. Our FMS was a prepackaged unit of field hospital equipment purchased by the Centers for Disease Control and Prevention (CDC) from a vendor specializing in disaster response. The FMS was established and accepted its first hurricane victims on September 5.

The pharmacy received a limited supply of pharmaceutical products from the Strategic National Stockpile (SNS). This supply had been predetermined and compiled according to past disaster experiences. Unfortunately, supplies were not specifically tailored to the type of patients we expected to serve. There were very small amounts of insulin and no tetanus toxoid vaccines or any other vaccines. Basic pharmacy supplies used for dispensing were not available, except for one medication counter, a spatula, and some labels and zip-lock bags, insufficient to support a 480-bed FMS.

We faced numerous challenges when establishing the FMS, including the following:

- Identify a secure space for a pharmacy,
- Establish interdisciplinary communication to avoid duplication of efforts,
- Determine how to manage the immediate shortage of medications,
- Obtain shelving for medications,
- Handle the absence of prescription forms for providers to order medications from the pharmacy,
- Provide a concise list of medicines for patient care that was available to health care workers,
- Lack of medical reference materials,
- Devise a dispensing system specific to controlled medications,
- Provide refrigeration for certain medications in a 100 °F+ hangar,
- Establish a dispensing area,
- Work without telephone services, electricity, and sufficient lighting,
- Obtain accurate medication information from patients who arrived in a tired, confused, and scared state,
- Handle personal medications brought in by patients that may be laced with toxins from flood waters,
- Identify personal medications not in their original containers,
- Establish a safety system for pharmacists to follow when handling such packages and medications,
- Track individual inpatient drug therapies,
- Provide medication regimen continuity when all of our patients would eventually be relocated to different parts of the country, and
- Maintain adequate pharmacy staffing to provide for hospital needs.

With little time to prepare for our first wave of casualties, the pharmacy team began to brainstorm and prioritize solutions to these challenges. It became an ongoing project that changed daily, depending on the situation at hand. Early on, we recognized that maintaining flexibility was key to the successful development of pharmacy operations. Points of contact were established with identified team leaders who would be responsible for communicating with other groups and the command staff. A lockable caged area within the aircraft hangar was identified by the first pharmacy officer who arrived in Meridian as the most secure space for a pharmacy. The NAS provided us with additional medications, shelving, tables, and chairs. An order of controlled medications later arrived from the SNS. Controlled drugs were

obtained under an umbrella Drug Enforcement Administration number, and a list of providers' names with signatures was obtained by the pharmacy to be filed as a reference. A system to reorder medications through a national wholesaler was established, with a representative on-site to meet our needs and train the pharmacy staff in online medication ordering once we had Internet access. Purchases made by the NAS from local vendors aided in the procurement of additional administrative supplies, including a printer/copier/scanner/fax machine. A laptop computer became the information technology station for our pharmacy. We created standard operating procedures for many pharmacy functions and prescription forms for providers to use, with a specially designed form for Schedule II medications. Procedures for picking up medication orders and delivering prescriptions quickly followed. At the next staff meeting with the command staff, such procedures were further developed and adopted by providers and nursing staff.

A pharmacy and therapeutics committee was formed and meetings among pharmacy, medical, and nursing staffs were conducted periodically to discuss processes for requesting additional cost-effective medications not currently covered by our formulary. Additional meetings were held to determine how self-administration versus nursing administration of medications would be tracked, how to ensure medication security at the nursing stations, and how many days of medication would be dispensed to each patient since we had limited supplies. Tackle boxes secured with bicycle locks and chains were purchased locally to secure controlled substances at the nursing stations. Additional issues resolved at such meetings included the development of a patient triage system and a system to minimize medication and treatment order

transcription and duplication errors. Because we were treating elderly patients with chronic illnesses, including cardiac-related diseases, the availability of crash carts and all the necessary medications and equipment for advanced cardiac life support became a critical priority. Several backpacks were purchased because of their easy access and mobility, and they were stocked with most of the i.v. medications and equipment necessary to support a cardiac emergency and distributed to central locations within the hangar.

The original formulary was refined as our inventory grew to meet the needs of the facility and included the generic and brand names of each drug, dosage forms, strengths, medication expiration dates, and onhand quantity information. Two versions of the formulary were created: one was sorted in alphabetical order by generic drug name and the other by therapeutic category to facilitate medication substitution and help with identifying medications available within a specific therapeutic class. Both were quickly distributed to the entire staff and nursing stations for reference. The formulary was updated daily as new medications arrived from wholesalers and dated daily to help staff determine whether they had a current version. This was necessary until most of the medications needed by the medical staff had arrived.

Two refrigerators soon arrived, along with the insulin that had been ordered. Additional lighting was provided by the NAS, as was an electric typewriter to use instead of handwriting patient medication labels. Personal medical references brought in by pharmacy officers were initially our only means of referencing information to answer medication-related questions until we obtained Internet access. Once that was accomplished, we could contact the local poison control center and subscribe to Identidex (Thomson Micromedex,

Greenwood Village, CO) to help identify unknown medications. Through the Internet, we acquired a free subscription to the Micromedex health care series to use as an additional medical reference.

Managing medication administration

As part of the triage and admission processes for incoming patients and evacuees and their families, the pharmacy developed a standard operating procedure for handling personal medications brought in by patients. As patients and their caregivers and families arrived, they were triaged by a clinician before admission. General information from the patients was obtained at the admissions desk, and patients then moved to the pharmacy triage area. Since the majority of patients were expected to require intermediate care, we anticipated that they would be on multiple medications and have many of these medications with them upon arrival. Assessment and monitoring of the patients were critical to maintaining safety and order within the FMS. Some of the patients who arrived were disoriented and confused, making resolution of medication questions difficult. Interpretation of prescription labels was often difficult since many bottles were wet. If the labels were legible, many of the phone numbers listed were not in service or no longer existed. Thus, it was impossible to resolve medication questions directly with patients' providers. Regardless of these setbacks, the pharmacy triage area obtained all the self-administered medications the patients had in their possession. All medications and narcotics were examined, counted, and recorded by the pharmacy staff in front of each patient or caregiver. In some cases, medication identification was necessary since some medications were not in their original container. It was the pharmacy's decision whether a particular medication was still safe

for patient use. All pharmacists exercised universal safety precautions when handling seemingly contaminated containers and medication bags. During triage, pharmacists were responsible for interviewing patients and creating a medication log containing directions for medication use as provided on the prescription bottles. Nonprescription medications and patient drug allergies were recorded on the medication and treatment history sheet that we had designed. Pharmacists also provided recommendations for patients' current drug regimens for use by hospital staff during admission. Later, pharmacy patient discharge procedures were developed in collaboration with social workers and nursing staff.

Since many of the patients were ambulatory and lucid, and because of our limited nursing staff, some patients were allowed to administer their own noncontrolled medications. These medications were placed in labeled bags and tied to their bed for easy access. To reduce the amount of work required by the limited nursing staff, nurses had to document only the time at which these patients took their medications. Logbooks for this purpose were placed at the nursing stations, along with all the narcotics secured in the tackle boxes.

Patients or their caregivers and families received counseling from pharmacists if the patients were admitted with a myriad of medications and would thereby benefit from the establishment of a medication regimen. We provided drug education and dispensed medication boxes to help establish a routine that patients could follow based on their lifestyle.

When discharged from the FMS, patients and their caregivers and families received specific pharmacy discharge written and oral instructions to ensure that they had a clear understanding of changes that may have been made to their medication regimen. This allowed them to relay

this information to their next health care provider upon relocation.

Outreach efforts

The first outreach effort was to assist the NAS pharmacy department. Because of the hurricane, a number of Navy and Coast Guard family homes were destroyed on the Mississippi Gulf coast, and nearly 800 personnel were displaced to the Meridian NAS. The increased workload of extra patients placed a large burden on the NAS pharmacy staff. They requested assistance for their pharmacy department, and three PHS pharmacists volunteered and assisted the NAS staff for five days.

The second outreach program began when the FMS received a request from the city of Meridian to augment the staff at a local free clinic called Wesley House. Two pharmacy officers volunteered to help. Wesley House had been providing food, clothing, counseling, and medical services to displaced hurricane victims and local citizens, since many members of the community were now homeless. Upon our arrival at the clinic, the full-time staff requested help in setting up their clinic so they could handle the influx of hurricane victims who were arriving daily. Some of the tasks we accomplished at Wesley House included (1) the cleaning and setup of a medication closet and arrangement of medications in alphabetical order by generic name, trade name, and therapeutic

category for cross-reference, (2) establishing a dispensing area within the medication closet with all necessary equipment to count, label, and dispense medications within arms' reach, and (3) providing education to the clinic staff on the importance of monitoring the temperature in the refrigerator used to store medications. Not all medications necessary for complete patient care were available at the clinic since it relies on donations of medications from local pharmacies and drug companies. Local pharmacies were contacted, and the services they were able to provide to Katrina victims free of charge were documented. All volunteers received a pharmacy information table upon arrival, which contained the contact information of the pharmacies providing free services and the names of pharmaceutical manufacturers willing to absorb costs if their products were distributed by local pharmacies. After the establishment of these procedures, the operation was turned over to another FMS group, which was attached to the Air National Guard.

The initial assessment and setup performed by our FMS group allowed approximately 200 patients to be treated in the first three days of clinical efforts at the facility. The NAS FMS later used the pharmacy information table originally developed for the Wesley House clinic when patients began being discharged from our facility.

Completing the mission

Our field pharmacy and hospital continued to operate until September 16. A decision was made to relocate the facility to an area closer to the damaged Gulf coast. On September 14, the hospital staff began disassembling the pharmacy and hospital, which involved inventorying and packing all supplies and medications onto trucks for delivery to Baton Rouge, Louisiana, where a new FMS was to be established in the parking lot of a local hospital. The pharmacy provided copies of all forms and standard operating procedures that had been developed at the NAS FMS. All of our patient records, medication inventories, and controlled drug records were turned over to the administrative officers of the FMS for safekeeping. By September 17, we had successfully completed all phases of our mission.

This experience challenged us all and made us grow both personally and professionally. Team effort and good communication were key to the success of the mission. The medical staff provided us with great insight and communicated their needs and expectations of the pharmacy in a way that helped us succeed and be effective.

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