Notes from the Field

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Clinical Pharmacy in the Air National Guard

Deployment for Stateside Disasters

As we embarked upon another hurricane season last month, I recalled the events of August 29, 2005 when Hurricane Katrina struck the Gulf Coast. Katrina, one of the costliest and deadliest natural disasters to strike the continental United States (CONUS), caused more than 1,800 fatalities and produced more than $75 billion worth of damage. It heavily damaged—if not totally destroyed—the vast majority of local infrastructure necessary for sustainment and recovery operations, as well as physician offices, clinics, hospitals, and pharmacies across a large section of the Gulf Coast.

As a result, patient records, medications, and other supplies were simply unavailable. The exacerbation of chronic diseases (such as diabetes, asthma, and coagulation disorders) and the potential for widespread infectious disease were serious concerns. As a result, a multitude of military medical assets, ranging from hospital ships to mobile field hospitals, were dispatched to the affected region. The Air National Guard (ANG) provided substantial medical assets, establishing the first 25-bed Expeditionary Medical Support (EMEDS +25) deployed within the CONUS, and set up as a bare base within the civilian community.

The EMEDS +25 unit type code packages consist of approximately 86 medical personnel. This provides medical and surgical capability as well as ancillary support (pharmacy, radiology, and laboratory resources). This does not, however, include the significant personnel footprint of security forces, civil engineers, or communications troops required to set up and maintain a bare base. The ANG has authorizations for pharmacy technicians and a very limited number of pharmacy officers (Air Force Specialty Code [AFSC] 43P). Under the ANG medical service reorganization, the number of pharmacy officers is to be capped at 15 forcewide, which means each ANG/Federal Emergency Management Agency region is authorized to employ only one or two pharmacy officers, provided that all billets are fully manned.[1]

My primary AFSC is Medical Service Corps 41A. I deployed to EMEDS in my secondary AFSC capacity (43P). For me, the Joint Task Force-Katrina CONUS deployment highlighted the significant demand for deployed pharmacy services as well as the obvious shortage of ANG pharmacy officer assets.

OUR "HOSPITAL"

By now, most people are familiar with the images of the hurricane's aftermath: closed hospitals, demolished roads and bridges, displaced medical providers, destroyed medical records, and minimal supplies and medications. Our team established the EMEDS +25 hospital at Bay Saint Louis, MS, just right of the storm's eye wall (the northeast quadrant) at landfall. The EMEDS was set up in what had been the parking lot of the only local hospital, which was closed because of severe storm surge damage. In fact, the site, which sits at 36 feet above sea level, was under more than five feet of water only a day or two before we arrived.

The EMEDS at Bay Saint Louis remained operational for nearly three months and treated nearly 2,400 patients. The pharmacy needs of these patients ranged from inpatient intravenous admixtures and discharge prescriptions to refills of maintenance medications. Our team had to be mindful of polypharmacy and anticoagulation management issues. During the first month and a half of operations, we dispensed 125 to 150 prescriptions per day—all on a completely manual system.

On overseas deployments, the patient population typically is comprised of active duty 18- to 45-year-old service members with minimal chronic medical problems or acute combat injuries, as well as some local civilians receiving minimal medical treatment. Within our patient population, however, the civilian to military ratio was nearly 10 to 1 and focused primarily on the treatment of chronic diseases and their complications. Patients required maintenance medications that aren't normally stocked in an EMEDS or even in a military treatment facility (MTF). Frequently, the EMEDS stock contained no clear substitutes, and the required medications were not easily obtained through fledgling supply channels. We saw a significant number of geriatric and pediatric cases with needs extending beyond the capabilities of

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a typical EMEDS unit. These patients required a wider selection of liquid medications; vaccines; expanded cardiac, diabetic, Alzheimer, and Parkinson medications; as well as medical equipment appropriate for a broad range of age groups.

The diagnostic and therapeutic functions of laboratory, radiology, and pharmacy were housed in one module of the EMEDS facility. To help providers find medications, I set up the pharmacy section to resemble an active duty MTF pharmacy: I separated the medications by route of administration (injectable, topical, oral, and inhaled) and, within each category, arranged medications alphabetically by generic name.

Dedicated 43P pharmacy officer support was available only during the first month of operations; a pharmacy technician was generally available at other times. In my opinion, CONUS-type deployments of EMEDS +25 are staffed effectively with one officer and two technicians. The pharmacy was physically staffed from 6:30 AM to 8:00 PM daily, and a night call shift was posted for significant intravenous admixture needs or access to extra controlled substances. All controlled substances were maintained in accordance with Air Force Instruction 44-102 and hard copy prescriptions (written on form AF 781) were obtained for all medications classified by the Drug Enforcement Agency as CII through CV. This greatly facilitated back tracking and adjustments during routine audits. Compliance with these standards required some quick in-service training in the emergency department, dental clinic, and the wards because many ANG health care providers had no prior active duty experience and weren't familiar with the basic accountable Air Force forms. Once this was accomplished, the process was exceptionally smooth and accurate.

CLINICAL INNOVATION

As with most deployments, clinical innovation was key. The tremendous volume of patients and their unique characteristics afforded me numerous opportunities to provide clinical services in drug information, anticoagulation, and infectious disease (the area of my postgraduate specialty training). The EMEDS package came with no pharmacology reference materials and most EMEDS medications did not contain the manufacturers' package inserts. This left many health care providers with questions regarding dosing (especially for pediatric and elderly patients), compatibility, drug interactions, and equivalence to nonavailable medications. The noncommissioned officers and I had anticipated that this might occur (call it experience or old age!) and had brought with us personal copies of a variety of reference texts, including *American Hospital Formulary Service Drug Information, Sanford Guide to Antimicrobial Therapy, A Practical Approach to Infectious Diseases,* and *Mosby's Nursing Drug Reference*.[2–5] These were vital to our patients' safety and should be considered for any EMEDS deployment.

I relied upon a professional network of major medical centers in the Gulf Coast region as potential recipients of our transfer patients. We maintained 24-hour contact with trauma centers, pediatric emergency rooms, poison control centers, and drug information hotlines. Such contact was most useful when additional information or clinical experience was needed to deal with off-label medication use, potential drug interaction, tablet and capsule identification, product equivalence, or neonatal and pediatric care.

In spite of a bare base deployed environment, I had requests from several physicians to establish a warfarin clinic. Many patients presented with subtherapeutic and supratherapeutic international normalized ratio (INR) values and episodes of frank bleeding. The combination of lost medications, sporadic regimens, drastic changes in diet, and medication nonadherence related to basic survival concerns played a major role in these anomalies.

> *We saw a significant number of geriatric and pediatric cases with needs extending beyond the capabilities of a typical EMEDS unit.*

Patients were referred to me by the on duty emergency department provider. During initial patient visits, I elicited private, in-depth medication and diet histories and reviewed potential drug interactions. I obtained INR values through our I-Stat machine (Abbott Diagnostics, Abbott Park, IL), making every effort to reduce polypharmacy and eliminate major drug interactions.

Because they lived in a rural area, many patients in this region regularly visited several physicians in multiple towns and had prescriptions filled at various pharmacies—all factors that tend to exacerbate polypharmacy. I discovered and resolved several cases

of major—and completely avoidable—warfarin drug interactions.

Adjustments to anticoagulation regimens were conservative and designed to not change weekly warfarin dosing by more than 20% or up to 7.5 mg. Regimens were designed for simplicity and ease of adherence. Follow-up appointments for consultation and INR recheck were scheduled for all patients treated through the anticoagulation service. Each patient encounter was charted through formal notes, and the on-duty emergency provider was briefed on all recommendations and medication adjustments. As a result of these efforts, all patients treated through the anticoagulation service had therapeutic INR values between 2 and 3 by their first follow-up visit!

On average, a full anticoagulation encounter—including laboratory tests, patient history, medication adjustment and refilling, and charting—required approximately 30 to 40 minutes of clinical pharmacist time. To facilitate continuity of care after the deployment period, patients were provided with a written summary of any changes to medications or warfarin dosing. These services were exceptionally well received by our patients.

Our EMEDS facility saw a large number of soft tissue infections related to injuries sustained during the cleanup and recovery effort, upper and lower respiratory tract infections, and urinary tract infections. Community-acquired methicillin resistant Staphylococcus aureus (caMRSA) was a concern and certainly influenced the treatment of soft tissue infections. Empiric regimens had to be altered since we had no readily available antibiotic sensitivity testing or rapid laboratory methods for identification of caMRSA. Patients whose response to cephalexin or dicloxacillin was suboptimal were treated with such oral EMEDS stock alternatives as clindamycin, trimethoprim, sulfamethoxazole, or doxycycline. We maintained stocks of these medications because we lacked the ability to do more detailed minimal inhibitory concentration E-testing or D-testing for clindamycin activity. Once a stable cellular telephone system became available in the area, we were able to have discussions with operational hospitals within the region, and this confirmed the prevalence of caMRSA.

Medical epidemiology intelligence covering such issues as local and regional rates for caMRSA and penicillin resistant pneumococci (PRP) or estimated rates of extended spectrum beta-lactamase production would have been quite useful for this deployment. There are significant regional differences for resistance rates and our providers came from medical units all over the country. Incidentally, we learned that the south-central region of the United States has the highest overall PRP rates in the country at approximately 40% (intermediate and high level resistance combined).[6]

LOOKING FORWARD

Hindsight being 20:20, this issue probably could have been resolved quickly and easily by either the Joint Task Force Katrina (forward) medical cell or the military and civilian medical liaisons within the Mississippi State Emergency Operations Center. Timely access to crucial information would have influenced empiric therapy and the types and volumes of antibiotics requested through the supply chain.

I was fortunate to have completed infectious diseases specialty residency training in Mississippi and to have maintained contacts within the division of infectious diseases at University Medical Center in Jackson. Because of this experience, I had a good general idea of the regional antibiotic resistance trends as well as first-line and alternative therapies. Without this background, the need for medical epidemiology support would have been even more critical.

For future deployments, I would suggest that ANG health care providers take the following steps:

- Along with your EMEDS deployment package, be prepared to bring pharmacology, medicine, and nursing reference materials. Selected texts should cover adult, pediatric, and geriatric dosing regimens as well as key medication admixture and administration issues. Since many medications in the EMEDS stock do not have package inserts, such references are crucial.
- Maintain a laptop computer preloaded with software for drug interaction screening, tablet and capsule identification, and other pharmacology references to help in identifying patients' unknown medications and in screening large numbers of medications for specific interactions.
- Once deployment orders are received, obtain and deploy with contact phone numbers for: (1) the nearest regional poison control center, (2) the CDC, (3) the State Health Departments for the affected areas, (4) the nearest regional referral emergency department, and (5) the nearest children's medical center and drug information center. Keep these contact numbers available in the EMEDS pharmacy, emergency department, and command section.
- Deploy with a contact list of active duty bases and MTFs (all service branches) in the region. These may become quite useful for issues of supply, advice, or transport.

In addition, it would be helpful for the ANG to develop and assemble a standardized, CONUS national

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disaster response drug package. This package should contain additional pediatric and geriatric medications and would be shipped only if EMEDS is being deployed for a Katrina-like disaster within the CONUS.

The need for comprehensive expeditionary pharmacy services was clearly demonstrated and validated during our CONUS EMEDS operation. An experienced and fully qualified pharmacy officer should be assigned to any EMEDS deployment of this size, especially if the EMEDS will be serving large numbers of local civilians. This officer should be deployed early to ensure proper pharmacy setup, controlled substance accountability, and training of providers. Deployed pharmacy personnel are presented with a rewarding opportunity to serve and to make a difference in the lives of many patients. ●

The opinions expressed herein are those of the author and do not necessarily reflect those of Federal Practitioner, *Quadrant HealthCom Inc., the U.S. government, or any of its agencies. This article may discuss unlabeled or investigational use of certain drugs. Please review complete prescribing information for specific drugs or drug combinations—including indications, contraindications, warnings, and adverse effects—before administering pharmacologic therapy to patients.*

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