Current Hospital Disaster Preparedness

Amy H. Kaji, MD, MPH
Kristi L. Koenig, MD
Roger J. Lewis, MD, PhD

Since the attacks of September 11, 2001, substantial resources have been devoted to improving disaster preparedness in the United States, with an emphasis on mitigating terrorist threats. Adequate preparedness can only be achieved with a comprehensive approach that connects local, state, and federal programs. At the local level, planning should include all critical disaster health care resources, including hospitals, clinics, nursing homes, alternate care facilities, public health departments, and emergency medical services systems.[1]

Although hospitals are only one component of a regional program for disaster management, they represent a critical link in the system. In 2002, the US Department of Health and Human Services Health Resources and Services Administration (HRSA) established the National Bioterrorism Hospital Preparedness Program (NBHPP)[2] to improve the preparedness of hospitals. The program's priorities included improving hospital surge capacity, decontamination capability, and isolation capacity, as well as supplementing pharmaceutical supplies, and supporting training and education.[3] When President Bush reauthorized the Pandemic and All Hazards Preparedness Act (Pub L No. 109-417) in 2006, oversight of the NBHPP was moved from HRSA to the Assistant Secretary of Preparedness and Response, and the NBHPP was renamed the Hospital Preparedness Program (HPP).[3]

Hospital Disaster Preparedness Efforts

Efforts to enhance hospital preparedness have appropriately focused on improving surge capacity, defined by the American College of Emergency Physicians as the "healthcare system's ability to manage a sudden or rapidly progressive influx of patients within the currently available resources at a given point in time."[4] Surge capacity is influenced by 3 essential elements: staff, supplies and equipment, and structure.[5,6] Structure refers to both the location for patient care and the organizational infrastructure, such as the hospital incident command system.

The HPP benchmarks for surge capacity include the ability to care for 500 patients per 1 million for infectious disease events and 50 patients per 1 million for other mass casualty incidents.[3] These recommended surge benchmarks are based on expert opinion rather than a quantitative probabilistic assessment of risk,[3] and valid methods for measuring preparedness are lacking. This makes it difficult to assess the adequacy or effectiveness of interventions aiming to improve preparedness.[6] Surge planning is further complicated by the diversity of potential hazard types and by the inability to predict the number of victims or severity of injuries.

In 2006, the federal government granted $474 210 000 for HPP recipients to improve communication systems, network among community stakeholders, conduct training, and to stockpile supplies and equipment.[7] Among other items, awardees were required to purchase medical-surgical supplies, personal protective equipment, mobile decontamination trailers, ventilators, high-efficiency particulate air filters, pharmaceutical agents (including antidotes to nerve agent and antibiotics), water, portable generators, evacuation equipment, monitors, fluid warmers, tents, tables, cots, chairs, lights, heaters, hand-washing sinks, ultrasound machines, toilets, walkie-talkies, and an automated call-back notification system.[7]

The acquisition of supplies, equipment, and pharmaceuticals is a necessary step toward preparedness but is not sufficient to ensure adequate hospital surge capacity. Simply stockpiling materials fails to address important existing deficiencies in the US health care system that limit an effective disaster response.

Diminished Local Hospital Capacity

"Disasters are local" is a basic tenet of preparedness, because the initial response to a disaster always begins at the local level. State or federal resources can only be requested once local and regional resources are exceeded. However, local hospital capacity has diminished markedly during the past 20 years. According to an American Hospital Association 2007 survey, the majority of US hospitals routinely function at more than 100% capacity.[8] The nationwide nursing shortage also limits hospital surge capacity and, as of December 2006, hospitals had an estimated 116 000 nurse vacancies.[8]

Author Affiliations: Department of Emergency Medicine, Harbor-UCLA Medical Center, Torrance, David Geffen School of Medicine, University of California, Los Angeles, and Los Angeles Biomedical Research Institute, Torrance, California (Drs Kaji and Lewis); The South Bay Disaster Resource Center, Harbor-UCLA Medical Center, Torrance (Dr Kaji); and University of California-Irvine School of Medicine, Orange (Dr Koenig).
Corresponding Author: Amy H. Kaji, MD, MPH, Department of Emergency Medicine, Harbor-UCLA Medical Center, 1000 W Carson St, Box 21, Torrance, CA 90509 (akaji@emedharbor.edu).

The demand on hospital emergency departments (EDs) is increasing. According to the Centers for Disease Control and Prevention, the number of ED visits increased 26% (90.3 million visits in 1993 to 114 million in 2003), but during the same period the number of EDs decreased by 14%.[9] According to Press Ganey Associates, the average waiting time is 3 hours 42 minutes before a patient in the ED is seen by a physician.[10] A majority of urban EDs routinely divert ambulance traffic and, for urban EDs reporting diversion, approximately 1 in 8 is on diversion more than 20% of the time.[8] According to the American Hospital Association survey, the lack of nurse-staffed critical care beds is the leading reason for ED diversion.[8] Approximately 55% of community EDs have gaps in physician specialty coverage, particularly in orthopedics and neurosurgery,[8] likely due to limited reimbursement for ED services and the additional liability associated with caring for patients in the ED.

According to the California Medical Association, 75 California EDs have closed since 1991, a loss of 11%.[11] Closures have been attributed to high numbers of uninsured patients (20% of California residents lack health coverage), low Medicaid reimbursement rates, unfunded mandates requiring hospitals to meet nurse-to-patient staffing ratios, and structural retrofitting to meet seismic standards (expected to cost $24 billion).[11,12] In Los Angeles County during the last 5 years, 10 EDs have closed, 1 major public hospital has closed its trauma services, and other hospitals have continually downsized.

In an assessment of ED crowding based on a national simultaneous survey of 250 EDs conducted in 2001, 22% of patients in the ED were already admitted but were boarded in the ED and waiting for an inpatient bed, 38% of ED directors reported doubling up patients in examination rooms, and 59% of ED directors reported using hallways as patient care areas.[13] Due to ED crowding, an estimated 500 000 ambulance transports annually are diverted from EDs that are full and sent to more distant hospitals.[14,15]

The Emergency Medical Treatment and Active Labor Act (EMTALA), a national mandate passed in 1986 to help ensure access to emergency care, ironically may have indirectly reduced surge capacity and access to care. The EMTALA requires hospital EDs and hospital-based ambulance services to provide a medical screening examination and emergency care to anyone requesting treatment, regardless of citizenship, legal status, or ability to pay.[16] Although guaranteed access to ED care, the uninsured are less likely to seek care unless severely ill,[17] thus increasing the acuity of these patients in the ED compared with those with insurance. These patients contribute to higher ED costs, as well as higher inpatient admission rates, even as the number of hospital beds is decreasing.[14] When the medical bills of the uninsured are unpaid, hospitals are forced to absorb the costs, reduce other expenses, or risk bankruptcy. One strategy for eliminating this financial drain is to close hospital EDs or convert them to urgent care facilities that fall outside the scope of EMTALA. This is one factor contributing to the reduction in the number of EDs across the country.

Improving Preparedness and Surge Capacity

The lack of hospital surge capacity must be addressed to improve disaster preparedness. Stockpiled supplies and written plans are of little use without sufficient available ED capacity and inpatient hospital capacity. Although the current focus on tangible and measurable parameters is well intentioned, a strategy based on stockpiling alone as an effective disaster preparedness strategy is misguided. In the aftermath of a catastrophic disaster, effective use of stockpiled supplies, pharmaceutical agents, and equipment also requires adequate patient care space and qualified personnel.[18]

Tangible steps can be taken at the local level to enhance surge capacity to some extent and do not require building new hospitals or expanding existing ones. Hospitals constitute only one part of a larger community. By working with other community organizations such as schools and churches, hospital personnel can identify alternate sites for patient treatment and storage of equipment and supplies. Neighboring hospitals may work together to enhance regional health care surge capacity by developing mutual aid agreements for patient transfers and for the sharing of personnel, equipment, and supplies.[19] For example, a community hospital may agree to accept medical patients from an overwhelmed regional trauma center so the trauma center can care for additional patients with trauma. Hospitals may also work together to estimate their collective surge capacity, sharing information about each hospital's bed capacity, staffing, and equipment stockpiles. If the resulting estimate of community-wide surge capacity is found to be insufficient, a credible request for more resources from state and federal governments can be made.

Additional steps that can be taken locally include developing plans and procedures to address staff needs (dependent care), ensure security by working with local law enforcement to control ingress and egress,[19] and expand morgue capacity (such as having agreements with refrigerated trucks and mortuary support). Plans for staffing during a significant surge event can be developed using employee callback protocols, as well as procedures for immediately credentialing medical and nonmedical volunteers from other hospitals.[20]

During a mass casualty event, the least serious casualties generally arrive at the hospital first and hospital personnel are often unaware that more serious patients are yet to arrive. To maximize the effective capacity of the hospital, staff should be instructed to expect the arrival of more serious casualties and to avoid filling existing beds with minor injuries.[19]

Although optimizing local surge capacity is paramount, lack of hospital capacity is a pervasive national problem and finding comprehensive solutions will require leadership and funding at the federal level. The formation of the US De-

partment of Homeland Security was the largest government transformation since the formation of the Department of Defense after World War II.[21] One goal of the Department of Homeland Security is to integrate efforts across multiple levels of government by endorsing the National Incident Management System and the National Response Plan.[22] The HPP, under the auspices of the US Department of Health and Human Services, is a logical programmatic structure for enhancing hospital preparedness.

Achieving sufficient surge capacity will be difficult in the face of real and ongoing daily deficiencies in the national health care system, independent of any particular disaster scenario—the nursing shortage, the closure of hospitals and EDs, and the lack of access to both primary and specialty care. It is also unrealistic to expect the private health care sector to create standing surge capacity given the current structure of financial incentives and reimbursements. Although fiscal pressures often appropriately motivate the downsizing of hospitals and the alignment of capacity with average demand, these fiscal forces should not completely eclipse the importance of maintaining surge capacity (staffed hospital beds are a critical aspect of surge capacity) and thereby preparedness. For example, federally funded incentives could be paid to hospitals that maintain given levels of surge capacity, with additional incentives to those that meet HPP benchmarks.

The nursing shortage also must be addressed, beginning with expanding faculty for nursing education. According to a 2006-2007 American Association of Colleges of Nursing report, US nursing schools turned away 42 866 qualified applicants from baccalaureate and graduate nursing programs in 2006 due to insufficient faculty and preceptors, classroom space, and budget constraints.[23] Seventy-one percent of the nursing schools responding to a 2006 survey pointed to faculty shortages as a reason for not accepting all qualified applicants into nursing programs.[23] Policy makers should seek innovative ways to attract and keep nurse educators, such as providing instructors with compensation levels that rival salaries offered in the private sector.[23-25]

In conclusion, many hospitals and EDs function at or above their designed capacity and fiscal pressures discourage the creation and maintenance of hospital surge capacity. Although ED closures and downsizing of hospitals are logical strategies for improving efficiency, these efforts to decrease health care costs run counter to simultaneous efforts to enhance or maintain surge capacity. These opposing considerations must be programmatically reconciled to achieve meaningful preparedness. At a local level, hospitals and their surrounding communities should be encouraged to implement strategies to expand effective capacity. However, substantial enhancements to hospital and surge capacity will require an effective and appropriately funded national strategy to address hospital and ED crowding.

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