



Bioterrorism and Health System Preparedness



Optimizing Surge Capacity: Hospital Assessment and Planning



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Introduction

A bioterrorist attack from a biological, chemical, or radiological agent, as well as emerging new epidemics such as severe acute respiratory syndrome (SARS), are significant threats to public health in the United States. Yet most hospitals lack adequate beds, equipment, isolation facilities, and staff to respond to a large-scale bioterrorist attack or other public health emergency. During these crises, hospitals will have to convert quickly from their current care capacity to surge capacity—that is, the maximum patient load a hospital or medical system can handle.

A June 2003 Web-assisted audio-conference sponsored by the Agency for Healthcare Research and Quality (AHRQ) focused on surge capacity assessment and regionalization of resources to respond to large numbers of people requiring immunization, treatment, or quarantine; the event was aimed at local, State, and health systems policymakers. Panelists included:

- Commander Brad Austin, M.P.H.,
Hospital Bioterrorism Preparedness

Program, Health Resources and Services Administration (HRSA);

- Michael Allswede, D.O., University of Pittsburgh Medical Center Health System;
- Stephen Cantrill, M.D., Denver Health Medical Center; and
- Dena Bravata, M.D., M.S., Project Director of the Stanford–University of California San Francisco (UCSF) Evidence-based Practice Center.

The audio conference also included a question and answer period, during which listeners were invited to submit questions to the panelists.

This issue brief examines tools that can assist hospitals and other health care facilities to assess their current capacity and develop a plan to achieve surge capacity. A companion issue brief, titled “Optimizing Surge Capacity: Regional Efforts in Bioterrorism Readiness,” examines how to develop regional strategies to mobilize public health emergency resources; it is available at www.ahrq.gov.



Benchmarks for Surge Capacity

“In the event of a bioterrorist attack, we must prepare for an overwhelming number of patients,” said Commander Brad Austin. “Therefore, it’s very important for hospitals—emergency departments in particular—and the health care system as a whole to have a good idea of their maximum capacity and to plan how to respond to a major public health emergency.”

HRSA has set a critical benchmark for all States to establish a system that allows for the triage, treatment, and disposition of 500 adult and pediatric patients per 1 million population who suffer from acute illness or trauma requiring hospitalization from a biological, chemical, radiological, or explosive terrorist incident. HRSA also requires that States establish a response system that allows for the immediate deployment of 250 or more additional patient care personnel per million population in urban areas, and 125 or more additional personnel per million in rural areas. For the entire set of HRSA requirements for bioterrorism preparedness, please visit www.hrsa.gov and click on “Focus on Bioterrorism.”

Hospital leaders who want to assess their institution’s surge capacity may find the Rocky Mountain Regional Care Model for Bioterrorism Events (RMBT), which has set staffing and equipment benchmarks based on a 50-bed unit, a useful guide (www.denverhealth.org/bioterror).

Converting Current Capacity to Surge Capacity

Converting a hospital or hospital system’s current capacity into surge capacity, often within 6 to 12 hours, is a daunting task. Every day, hospital leaders must be prepared to receive large numbers of patients and plan to ensure a sufficient supply of ventilators, oxygen, medications, vaccines, personal protective equipment, and other supplies, as well as medical staff. They must also think through how to accommodate the needs of vulnerable groups such as children, the elderly, and the disabled.

Finally, they must make certain that essential hospital services such as food, water, and electricity are continuously available and that they are always able to rapidly communicate with emergency medical services and other regional support services.

In a recent presentation to the Department of Health and Human Service’s Secretary’s Council on Public Health Preparedness, Lyman Van Nostrand, M.P.A., Deputy Director of HRSA’s Office of Planning and Evaluation, suggested several potential strategies for hospitals to increase surge capacity. These are listed below.

Potential Strategies for Increasing Hospital Surge Capacity

- s Discharge patients early; establish discharge holding area.
- s Convert outpatient procedure beds into inpatient beds.
- s Use hallways or create alternate treatment areas (e.g., cafeteria).
- s Partner with local health department, emergency management agency, Red Cross, to create emergency treatment capacity outside the hospital.
 - Initiate mutual agreements with other health care facilities.
 - Include acute, long-term care, and rehabilitation facilities.
- s Consider other local facilities such as schools, armories.
- s Use automated surveillance and tracking systems.
- s Link information from physicians, clinics, and hospitals to the public health system and the first-responder community.
- s Implement communication systems to allow rapid dissemination of information to key players and planners in a mass-casualty event.



Determining the Type of Hospital Action

“The fundamental challenge for public policy in biodefense is to characterize the threat itself,” said Michael Allswede. He and Dr. Samuel Watson, of the University of Pittsburgh Graduate School of Public Health, developed a tool called the Pittsburgh Matrix to quantify the type and magnitude of a health care system’s response to a given bioterrorist event. The Pittsburgh Matrix is based on the idea that pathogen type, scale of attack, and time of detection affect hospital decisions such as the need to stockpile antibiotics or set up isolation units. This tool can be used to assess medical preparedness for a variety of potential scenarios and agents. For example, some biological agents such as smallpox warrant quarantine and isolation, while others do not. Some infectious agents are not amenable to treatment, while others like anthrax can be treated with several antibiotics. For others, such as botulism, there is an insufficient local supply of botulinum antitoxin.

“If you look at the matrix and rate pathogens across the timeline, better technology will move the response earlier,” said Dr. Allswede. In turn, better preparedness results in fewer lives lost and at less cost. “For example, if you’re going to save the lives of victims of smallpox, which is communicable and lethal, you use a vaccination strategy in the pre-release phase (within 4 days of exposure) before people contract smallpox,” he said. “After that it’s just containment.”

The AHRQ Pittsburgh Matrix workbook, “Workbook on Regional Bioterrorism Preparedness,” can guide other medical facilities. It is expected to be available in January 2004 from Lucy Savitz at savitz.rti.org.

Meeting the Special Needs of Children

HRSA’s Emergency Medical Services for Children Program was created to ensure that the health care system can meet the unique needs of children. Dr. Michael Shannon is Chief of Emergency Medicine at Children’s Hospital Boston and Director of the hospital’s newly created Center for Biopreparedness. He said that during a bioterrorist attack or other public health emergency, the reactions of children to agents may be more severe than adults, and their limited ability to communicate can complicate diagnosis and treatment. The Center for Biopreparedness has developed protocols for pediatric surge capacity and decontamination protocols for pediatric victims of chemical or radiation exposure. The Center is also preparing a series of best practice monographs on these and other topics that will be available from AHRQ by the summer of 2004.

In addition, the Center will establish guidelines for a pediatrics-focused hazardous materials response that can be used by emergency medical responders, schools, neighborhood health centers, community hospitals, and parents. The Center will also develop training protocols for emergency department physicians and staff, and continue to create syndromic surveillance and reporting tools. One

such tool, called EDScope (<http://edscope.tch.harvard.edu/edscope/actvsfore.htm>), identifies real-time changes in the visit pattern of the Boston Children’s Hospital Emergency Department.

Triage Challenges

HRSA advises hospitals to work closely with public health agencies, emergency response networks, and others to manage not only the acutely ill but also the “worried well” individuals who are uninfected but anxious that they may have contracted a disease. Dena Bravata remarked that, “Near ground zero at the World Trade Center in New York, the ‘worried well’ far exceeded those needing medical care.” To deal with the acutely ill, hospitals should form agreements with other medical sites, as well as schools, hotels, or convention centers, to establish off-site triage of patients and off-site acute care. Two recommendations were made for dealing with the “worried well.” To prevent an unnecessary surge of worried well patients, Stephen Cantrill stressed the importance of proper communication of risk. Brad Austin added that hospitals could interact with local mental health systems to create a system to take care of these individuals.

The University of Pittsburgh Medical Center Health System has developed a psychological SWAT team for the acutely anxious, quarantined people with cabin fever, and for staff (for example, cooks or custodians) who have become mutinous as a result of misinformation. This approach is briefly discussed in the “Workbook on Regional Bioterrorism Preparedness” (savitz.rti.org).



Cost Considerations

HRSA funding (\$518 million for fiscal year 2003) for hospital bioterrorism preparedness is expected to grow substantially and then taper off, as hospitals become better prepared.

Currently, the cost of caring for victims of bioterrorism, and preparing to care for them, are burdens for hospitals that are already in a financial crisis. The Pittsburgh Matrix incorporates cost factors by calculating, for example, the cost of antibiotic stockpiling, additional staff, or other key resources in terms of dollars per life saved for each public health crisis scenario. The RMBT is also set up to gauge the impact of bioterrorist attacks and other public health emergencies on hospital and health system costs.

Regional Resources

No hospital or medical system can manage a bioterrorist attack or other public health emergency by itself. Each hospital needs to identify and mobilize regional resources to help manage the crisis. The Stanford/UCSF Evidence-based Practice Center is currently performing a comprehensive review of the literature on the evidence to support various methods of regionalization of services for bioterrorism preparedness. This Evidence Report will be available from AHRQ by early 2004 (www.ahrq.gov).

For More Information

The audioconference on which this issue brief is based, “Surge Capacity Assessments and Regionalization Issues,” is available as a streaming presentation with text captioning on the AHRQ Web site (www.ahrq.gov/bioterbr.htm).

Information on the tools discussed in this issue brief, and other tools and publications related to health system preparedness for bioterrorism, will be posted on the AHRQ Web site as it becomes available. Please check the Web site frequently.

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