

4. A HEALTHY MEDICAL RESPONSE SYSTEM

Shortfalls are evident in the national capability to deal with stresses that would be placed on the medical system by large-scale terrorist attacks, particularly those involving chemical and biological materials. Even though programs to enhance these capabilities were initiated after September 11, they have yet to solve fundamental weaknesses in the medical response system. There is one respect in which September 11 was a poor teacher. The attacks left few wounded. Doctors and nurses who arrived on scene had few patients to treat; emergency rooms that stood by on full alert had few admissions. This would not be the case for a range of other likely attacks. Timely medical treatment could save thousands of lives in the event of a chemical, biological, radiological, or major conventional attack. Yet in most cities, hospitals and first responders do not have the necessary surge capacity to transport and treat large numbers of victims.

While terrorist groups have traditionally used conventional bombs and guns to achieve their objectives, an attack using chemical or biological weapons should be considered a realistic possibility. Groups including al Qaeda have expressly stated their intention to acquire these weapons. Midhat Mursi al-Sayid Umar, a member of the al Qaeda leadership who may have been killed in the January 13, 2006, missile strike in Pakistan, was a chemical weapons expert. CIA Director George Tenet has testified that documents found in Afghanistan showed that the al Qaeda terrorist network also was pursuing sophisticated biological weapons research. Sub-national actors used chemical and biological substances mostly as tools of assassination or in other small-scale crimes. Chemical or biological hoaxes have also been used to harass local authorities or scare the public. Out of 1,018 worldwide incidents involving chemical and biological substances from 1980 to 2005, only fifty-one incidents involved a chemical or biological substance that was fatal or near fatal.¹

This all changed in 1995, with Aum Shinrikyo's sarin gas attack on the Tokyo subway. Though casualties were fairly low from the attack, with twelve deaths and fifty-four critically injured, they could have been much higher. Last-minute cold feet by the perpetrators caused the group to dilute the agent and use a fairly primitive dispersal device to allow for a safe getaway. What is most remarkable about this attack is that a sub-state actor was able to manufacture one of the world's most deadly chemical agents with no support from a nation-state. That they did it over ten years ago, before more recent advances in remote laboratory facilities and techniques, is even more alarming.

For biological terrorism, the 2001 anthrax attacks in the United States could be a harbinger of things to come. Though the attacks infected only twenty-two victims and caused five deaths, this death toll also could easily have been much higher. Given the limited number of people exposed, our healthcare system was able to treat all victims and provide life-saving intensive care to the critically ill. As the case remains unsolved, we may never discover the true motivation of the perpetrators. What is clear is that the dispersal device used, letters sent through the U.S. mail, was not chosen to maximize the number of casualties. The highly refined powder sent in the second round of letters to the Senate offices could have been used for aerial dispersal infecting thousands. Such an attack would have severely strained our medical system. As with the sarin attacks, no nation-state support was required. While contested by some experts, FBI analysis concluded that a "lone individual" could have made the highly potent variety in a makeshift laboratory for as little as \$2,500.²

These two attacks underscored the different challenges that chemical and biological terrorism present for healthcare providers and the public health system as a whole. Unlike conventional attacks, chemical and biological attacks (and pandemic diseases) require specialized protective equipment and treatment capabilities. These can be used effectively only if our public health and hospital systems have an "all hazard" surge capability to treat thousands of victims. At this time, few metropolitan areas have sufficient hospital beds or basic medical equipment for such an influx. According to former Health and Human Services Secretary Tommy Thompson there are just 100,000 ventilators in the country, of which 85 percent are in daily use.³

The Trust for America's Health recently issued a report concluding that our public health system and hospitals are unprepared for a major terrorist attack or pandemic disease.⁴ Rating each state on ten key indicators of public health and emergency preparedness, the report found that:

- ◆ most states are unable to meet basic preparedness goals and are struggling to manage additional health priorities with current levels of resources;
- ◆ only seven states and the cities of Chicago and New York have plans in place to distribute vaccines and antidotes from the Strategic National Stockpile;
- ◆ only ten report adequate lab capabilities to respond to a chemical attack;
- ◆ only nineteen have pre-positioned repositories of nerve agent antidotes;
- ◆ nearly one-third of states do not have adequate plans in place to build surge capacity in the event of a catastrophic terrorist attack or pandemic flu; and
- ◆ only two states have taken the steps necessary to ensure health care workers will show up to care for the ill in the event of a major disease outbreak.

As with other efforts in homeland security, our public health and hospital preparedness is hampered by an ill-defined strategy, a lack of standards, and too few resources. As the Trust for America's Health report concluded, "Four years after September 11, there are still no official, agreed upon, measurable performance standards of accountability for state bioterrorism and emergency public health preparedness programs and activities."⁵ The Department of Health and Human Services and the Centers for Disease Control and Prevention promise that these standards are being developed. They still have not been implemented. Setting standards and developing a strategy would make clear the resource gap between what we are spending and what we need to spend to achieve the goals of the strategy.

In keeping with our other recommendations for preparedness, we recommend that efforts to bolster public health and hospital preparedness focus on metropolitan areas. While additional funding is needed,

current funding should be targeted at our largest population centers, which are most likely to be attacked by terrorists and will receive the brunt of any pandemic. Metropolitan public health and hospital plans should be developed based on federally set standards. Spending should be tailored to meet the objectives of these plans. In the following sections, we look at current detection, mitigation, and surge capabilities in detail and make recommendations to bolster them.

DETECTION

CHEMICAL DETECTION

When a chemical agent is dispersed, its presence is likely to be apparent within minutes as its first victims are exposed and then succumb to its effects. The goal of detection for chemical agents is to give people in the vicinity of a release a few additional minutes to flee or shelter-in-place. The technology to detect most chemical weapons is readily available and battle-tested. Because chemical weapons are deadliest in closed environments, detection systems for chemical weapons should be installed in subways and metro stations, convention and athletic centers, and other public areas where large numbers of people congregate. Rapid detection, along with rapid response (discussed in the next section), can greatly reduce mortality from chemical attacks.

BIOSURVEILLANCE

In sharp contrast to a chemical attack and without investment in advanced warning capabilities, authorities may not recognize for several days, or even weeks, that a disease agent has been deliberately released. The first signs will likely be a trickle of victims visiting emergency departments, clinics, and personal physicians to complain of symptoms that are likely to be generic and flu-like. If no dispersal device is found and patients do not have a secondary common link (for example, attendance

at the same event, or consumption of the same foodstuffs), doctors may not discern a pattern indicative of a major disease outbreak, much less of a bioterrorist attack, until the symptoms and/or the number of incoming patients become more pronounced. This quandary could be amplified if terrorists released an endemic disease at a time of year when it would ordinarily occur.⁶

Biosurveillance programs are designed to alert public health officials to a bioterror attack or disease outbreak before the onset of widespread illness. The federal government and the public health community are pursuing two types of biosurveillance programs, environmental and syndromic. If fully developed and implemented, such a two-track system could lead to reduced contagion, improved response coordination, and better deployment of federal assets. Unfortunately, as is the case so often in the arena of homeland security, efforts are under way to develop these systems, but they are either not operational or not widely implemented.

ENVIRONMENTAL SURVEILLANCE

BioWatch is designed to provide early warning of biological events by detecting trace amounts of biological materials, such as anthrax and smallpox, in the air. BioWatch is currently operational in thirty cities in the United States. However, in the cities where the system has been deployed, systems analysis suggests there are too few monitoring stations to be effective. The BioWatch filters were retrofitted to existing Environmental Protection Agency (EPA) air quality monitoring stations. There are about ten of these in most major American cities. To be effective for biosurveillance, forty to sixty open-air monitoring stations are needed plus additional monitoring stations in public indoor spaces.⁷

Expanding the system would be cumbersome and costly, however, as the technology employed requires technicians to collect samples and bring them to a lab for testing. A fast-track research effort is desperately needed to develop real-time bioweapon detection. Better technology alone, however, will not make BioWatch an effective program. Local officials suggest that the program is managed from the top down,

with little input from those in our cities who will have to respond to any bioterrorism event. The locations of the BioWatch systems are kept secret even from city officials who need to be prepared to conduct plume modeling and quarantine planning for any release detected by the arrays. The program needs to be redesigned with local input and cooperative agreements reached for the maintenance of the systems and the use of the data.

SYNDROMIC SURVEILLANCE

The early signs of a bioterror attack are likely to look a lot like an average case of the flu. Patients will report respiratory trouble, fever, diarrhea, and vomiting. Being able to recognize a spike in reports of these symptoms could provide a valuable jump-start on getting a bioterror or natural disease outbreak under control. Syndromic surveillance systems are designed to do this by gathering data on hospital admissions, emergency room visits, perscriptions filled by pharmacies, and other health information to look for emerging patterns of a disease outbreak. Syndromic surveillance was pioneered by the New York City Department of Public Health in the 1990s.⁸ This early warning allows authorities to aggressively pursue a diagnosis while also mobilizing the requisite resources for lifesaving intervention.

Other cities, including Baltimore, Boston, and Washington, D.C., have invested in syndromic surveillance systems. Unfortunately, the capability of federal systems to tie these together does not always match the claims made by federal officials about them.⁹ According to a June 2005 Government Accountability Office (GAO) report, there are over half a dozen programs and systems in place attempting to do this, including the National Biosurveillance Integration System, Biosense, and the Biological Warnings and Incident Characterization System. All initiatives are in development and not yet operational.¹⁰ Getting these systems in all major metropolitan areas and tying them together through a federal system should be a top priority of the Department of Homeland Security and the Centers for Disease Control and Prevention.

MITIGATION

THE STRATEGIC NATIONAL STOCKPILE (SNS)

As a cost-saving measure, most hospitals maintain only a few days of supplies. In a major natural outbreak or bioterrorism attack, these local supplies would be quickly depleted and the Strategic National Stockpile would be needed. The SNS program guarantees delivery of its supplies by air to any jurisdiction within six to twelve hours after the order for deployment. The materials are pre-configured in “push-packs,” roll-on-roll-off air cargo containers, with the necessary medicines and material to treat or vaccinate against exposure to any number of potential biological outbreaks, including anthrax, smallpox, tularemia, and other viruses or infectious agents. The stockpile also contains quantities of standard medical equipment for an all-hazard response, including ventilators, intravenous fluid, and first aid supplies.¹¹

The SNS was conceived in 1999 as the National Pharmaceutical Stockpile (NPS) during the Clinton administration as part of the spate of new initiatives that followed the Oklahoma City bombing. After September 11, officials expanded the program to include medical equipment in addition to pharmaceuticals. The name change to the SNS was made to recognize the evolving nature of the program. With the creation of the Department of Homeland Security, ownership of the SNS was transferred to the new department, with the Centers for Disease Control and Prevention (CDC) maintaining technical control through a working agreement. There are indications that this working agreement is less than optimal.

Planning for SNS delivery is somewhat hampered because the list of what is in the SNS stockpile is kept secret even from local public health officials.¹² As one contributor to the Trust for America’s Health report commented, “In concept, the SNS is a critically valuable resource. In operation, the SNS is shrouded in mystery and the worst kind of bureaucracy.”¹³ We understand the security concerns that prompted such a policy. They are legitimate concerns. A savvy terrorist organization might get hold of the formulary and choose what disease to weaponize based on what medications are not in the SNS. This is, however, an unlikely

prospect and protecting against it comes at a cost. Local public health officials must be able to plan for the worst. They can only do that if they know what tools will be at their disposal. The formulary should be released to all local officials with a legitimate need to know, including city medical directors, local emergency management agency officials, and the directors of major hospitals.

City public health officials have also been critical that the program does not have enough basic medical equipment to create surge capacity in the event of catastrophic attack. The program also does not include medications to treat radiation sickness, an oversight that should be corrected in the near term. One of the lessons of Hurricane Katrina is that food, water, and other basic supplies are just as important to emergency relief as pharmaceuticals. The federal government should not rely on Wal-Mart to supply these. The SNS has relationships with a number of pharmaceutical companies to supply material in real time under their Vendor Managed Inventory program. This aspect of the SNS should be expanded for food, water, and other basic supplies.

THE CHEMPACK PROGRAM

The CHEMPACK program is a forward-deployed component of the SNS. In order for chemical agent antidotes to be effective, they must be administered within minutes of exposure. This means that if federal assets are not already close to the release site they are not going to save lives. The CDC developed the CHEMPACK program within the SNS to store containers of nerve agent antidotes in cities around the country. In order to maintain the “economic feasibility”¹⁴ of this program, program designers established the Shelf-Life Extension Program, a rigorous set of storage requirements that allow the antidotes to be maintained well beyond their normal expiration dates. These requirements dictate that the containers be stored at a hospital in a controlled access location with specific ranges for light, humidity, and temperature. If the seal on a CHEMPACK container is broken, the Shelf-Life Extension Program is violated and the original expiration dates take effect. Distribution of the material is mandated to take place post-event and only with the authorization of the hospital pharmacy director.

Unfortunately, given the restrictions placed on the program, the antidotes will still not reach victims in time to save lives. Because these antidotes need to be administered within ten minutes of exposure, there is little chance the supplies in the CHEMPACKs could make their way from hospital basements to the exposure site in that time. While the cost-saving objectives are laudable, their effect is to render the investment useless. The CHEMPACK program should be redesigned to put the antidotes in the only places where they stand a chance of reaching victims in time: ambulances, fire trucks, police cars, and other mobile emergency units. Fixed storage sites should also be considered for stadiums, train stations, and other large public places.

THE CITIES READINESS INITIATIVE (CRI)

Despite the problems that plague the SNS program, the capacity to deliver life-saving pharmaceuticals to any airport within twelve hours is an impressive achievement. Federal efforts rate less well on delivering these antibiotics, vaccine, and other supplies from the airports to sick and exposed citizens. The Cities Readiness Initiative (CRI) was launched as a pilot in 2004 to help cities build the capacity to deliver antibiotics to entire populations within forty-eight hours.¹⁵ While the CDC has “green-lighted” seven states and two cities as being ready to administer and distribute SNS material, one senior official at the Department of Health and Human Services went on the record last summer stating that no city in the nation had the capability.¹⁶

Again, as with so many other programs, CRI was conceived, piloted, and expanded with little input from practitioners. A plan to use postal workers to distribute antibiotics has gone nowhere due to a lack of interest from their union. The initial development of the program may in part explain why so few cities have gotten a green light from the CDC. The challenge is not small, however, nor is it solely a matter of inadequate funding or federal intransigence. There are indications that the program has been a success in cities with more competent and professional public health departments. To distribute antibiotics to all residents of New York City in a timely manner would require a minimum of 40,000 volunteers trained and equipped to show up under the worst of circumstances.

Public communication and intra-government coordination will be fraught with difficulty. Recognizing these challenges, grants for the CRI should include funding to hire a full-time CRI coordinator with the singular mission of implementing a workable plan within one year. This individual should have ultimate responsibility for the success or failure of the program and should be given sufficient support staff and lines of communication to relevant local, state, and federal officials.

PROJECT BIOSHIELD

Even the best plans for stockpiling and distribution will not help with a bioweapon for which there is no vaccine or treatment. In 2004, Project BioShield was launched to accelerate research to discover, develop, and test new vaccines, next-generation antibiotics, and antiviral medications. BioShield also provides avenues for speedier research and, in the event of an emergency, the use of medications that may not have received final approval from the Food and Drug Administration.¹⁷ Spending was set at \$5.6 billion over the next decade. It sounds like a lot of money, but BioShield's incentives are still insufficient to attract serious private interest in developing medical countermeasures given the expense of drug development and the expectation that little or no profits are to be made.¹⁸ Additional policy and fiscal adjustments will probably be needed to cement a robust public-private partnership to field new drugs.

QUARANTINE

Quarantine is an age-old concept that does not easily fit into the rubric of our modern lives. Yet it is an essential capacity for preventing the spread of a disease for which treatment is ineffective or unavailable. Decision makers at local, state, and national levels must enact graduated quarantine measures to interrupt the chain of transmission for a catastrophic outbreak of disease. In the first level, nonessential public gatherings (such as concerts and sporting events) might be cancelled, use of

public transportation might be curtailed, and schools could be closed. More drastic measures might include quarantine of possibly exposed individuals at home at predetermined locations. Executing quarantine will pose tremendous challenges for local law enforcement, public health, health care, and emergency management officials. Plans to carry out quarantine must be prepared and drilled. To the extent that a legal framework is necessary for such emergencies, state and local law should be amended. Over thirty states have revised their public laws in recent years for the purpose of clarifying lines of authority for mandatory health screening and quarantine measures.¹⁹ The other twenty states and the District of Columbia should follow suit.

SURGE CAPACITY

As with any other private sector enterprise, market imperatives have forced our hospital systems to cut waste, reduce duplication, and operate on just-in-time delivery systems and razor-thin profit margins. This system provides some of the best medical care in the world, including advanced procedures available nowhere else. As a nation, there are many reasons to be proud of our medical system. However, its capacity to deliver critical care to large numbers of people in a catastrophe is not one of them.

In the Trust for America's Health survey, hospital administrators in all fifty states were asked if their hospitals could provide a minimal surge capacity of being able to handle ten additional patients requiring mechanical ventilation.²⁰ Aggregated answers showed that, on average, the hospitals in twenty states did not have this capability. Yet there are scenarios in which hospitals could need far more additional capacity.

The interim Public Health and Healthcare Supplement to the National Preparedness Goal sets minimum goals for metropolitan-area hospital systems. These include the capability to expand capacity by five hundred patients per million population for acute infectious diseases; fifty patients per million population for ventilator support; fifty patients per million population for burn and trauma; and fifty cases per million for radiation injuries.²¹ The goals are reasonable and should be achievable. The resources dedicated to meeting them are not. As the Trust for

America's Health points out, in a country that spends \$515 billion a year on health care, \$500 million is not going to expand capacity significantly. We endorse their recommendation to double these funds and further recommend they be targeted at major metropolitan areas.

RECOMMENDATIONS

As with other areas of homeland security, a great deal of activity is occurring in the field of medical preparedness, but not much progress can be identified. The overarching conclusion of this task force is that current programs need to be reengineered based on practitioner feedback, that standards must be set, and that a timeline for meeting these standards be put in place. Appropriate resources must be made available to meet these goals. The task force endorses the following specific recommendations:

4.1. METROPOLITAN HEALTH AND HOSPITAL PLANS SHOULD BE DEVELOPED BASED ON FEDERALLY SET STANDARDS; federal funding initially should be targeted at our largest cities.

4.2. DETECTION SYSTEMS FOR CHEMICAL WEAPONS SHOULD BE INSTALLED in subways and metro stations, convention and athletic centers, and other public areas where large numbers of people congregate.

4.3. BIOWATCH MUST BE REDESIGNED to include developing cooperative agreements for the maintenance of the systems and the use of the data; increasing the number of air monitoring stations in each city to 40 to 60; and the fast-tracking of research for real-time detection.

4.4. BUILDING SYNDROMIC SURVEILLANCE SYSTEMS IN ALL MAJOR METROPOLITAN AREAS AND TYING THEM INTO A FEDERAL BACKBONE SHOULD BE A TOP PRIORITY of the CDC and Department of Homeland Security.

4.5. THE STRATEGIC NATIONAL STOCKPILE SHOULD REVERT TO THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WITH A DHS LIAISON RELATIONSHIP; the SNS formulary should be released

to local officials with a legitimate need to know; the program should be expanded to include treatment for radiation sickness and additional all-hazards material; and the Vendor Managed Inventory should be expanded to include food, water, and other basic supplies.

4.6. THE CHEMPACK PROGRAM SHOULD BE REDESIGNED TO PUT ANTIDOTES IN MOBILE EMERGENCY UNITS.

4.7. THE CITIES READINESS INITIATIVE SHOULD BE REDESIGNED BASED ON INPUT FROM THE PUBLIC HEALTH COMMUNITY; or funding should be provided to hire a full-time CRI coordinator for each metropolitan area with the goal of implementing a plan within one year.

4.8. ADDITIONAL FINANCIAL INCENTIVES AND POLICY ADJUSTMENTS MUST BE MADE TO BRING PRIVATE SECTOR INTEREST TO THE BIOSHIELD PROGRAM.

4.9. DECISIONMAKERS AT LOCAL, STATE, AND NATIONAL LEVELS MUST PREPARE GRADUATED QUARANTINE MEASURES; plans to carry out quarantine must be prepared and drilled; and states that do not have the authority to quarantine should make necessary legal modifications.

4.10. HOSPITAL SURGE CAPACITY MUST BE BUILT, STARTING WITH THE NATION'S LARGEST METROPOLITAN AREAS. Funding should be increased to meet the goals set by the Department of Health and Human Services in the National Preparedness Goal.

