

Strong as the Weakest Link: Medical Response to a Catastrophic Event

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OVERVIEW — *Natural disasters and acts of terrorism have placed a spotlight on the ability of health care providers to surge in response to catastrophic conditions. This paper reviews the status of efforts to develop the capacity and capabilities of the health care system to respond to disasters and other mass casualty events. Strategies for adapting routine medical practices and protocols to the demands posed by extraordinary circumstances and scarce resources are summarized. Existing federal roles, responsibilities, and assets relative to the contributions of state and local government and the private sector are described, including specific programmatic activities such as the Strategic National Stockpile, the National Disaster Medical System, and the Hospital Preparedness Program. Opportunities for federal policymakers seeking to strengthen and expedite preparations for medical disaster response are highlighted.*

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As storms, flooding, and brush fires threaten property and lives across the country, concerns about the adequacy of disaster medical response linger in the public consciousness. When Hurricane Katrina slammed into the Gulf Coast in August 2005, Americans were shocked by grave deficiencies in disaster response efforts. This tragedy—coupled with the Minneapolis bridge collapse, the looming potential of an influenza pandemic, catastrophic natural disasters around the globe, and the omnipresent threat of terrorism—underscore the urgency of developing more robust and flexible capacity for responding to major medical emergencies. While significant progress has been made in recent years, additional work remains. Many experts have voiced concern that funding for, and commitment to, medical preparedness development are lagging. Ensuring that progress made to date is sustained and that unresolved weaknesses are addressed will require the renewed focus and attention of policymakers at all levels of government.

BEYOND SURGE

Surge capacity—the health care system’s ability to quickly expand normal service capacity in response to a sharp increase in demand for medical care—is a familiar, but evolving, concept for most health care organizations. Performance expectations, as articulated by state regulations, the Joint Commission standards, and Medicare and Medicaid Conditions of Participation, have long required hospitals to develop and assess plans for managing emergency situations. However, traditional “disaster plans” have typically focused on emergency events (such as major transportation accidents) likely to yield *multiple casualties*, rather than catastrophic events resulting in *mass casualties*.¹ In the past, these plans often focused solely on general trauma victims and did not consider the specialty care needs generated by biological, chemical, or radiological events. Furthermore, hospitals have historically developed their own institution-specific plans in isolation without considering broader community-wide capabilities. Non-hospital medical resources have rarely been challenged to consider their role in disaster response.² Traditional approaches to emergency preparedness seek to stretch the capacity of the existing system—not restructure the fundamental nature and interoperability of that system.

Health care organizations are beginning to shift their approach to disaster management in order to prepare for casualty loads measured in thousands, rather than tens. In doing so, they must consider practices and protocols that significantly depart from “business as usual” models. As acknowledged in the President’s Homeland Security Directive-21 on Public Health and Medical Preparedness,³ the structure and operating principles of routine health care delivery are poorly suited to meet the needs created by a catastrophic health event. The Directive calls on medical service providers to develop “an operational concept for the medical response to catastrophic health events that is substantively distinct from and broader than that which guides day-to-day operations.”

This transformed vision of disaster response necessitates a redefinition of how and by whom medical services should be delivered. Conventional approaches to health care delivery likely could not be sustained under the scale and severity of a major disaster or catastrophic event. Under such circumstances, with staggering numbers of casualties and the possibility that the health care service infrastructure would itself be compromised, the goal becomes “graceful degradation” of service capabilities.⁴ In essence,

It is unlikely that conventional approaches to health care delivery could be sustained in a catastrophic event.

Defining Disaster Medical Response

Taxonomy for defining the magnitude of a public health emergency and its impact on demand for medical services is not well established. The terms “emergency” and “major disaster” have specific meanings in the Stafford Act,* which provides authority for federal assistance to states and communities pending a presidential declaration.

The statute provides for greater levels of assistance under a major disaster declaration, but statutory language limits this designation to natural catastrophes or other incidents resulting in severe physical destruction (such as fire, floods, or explosions).

Emergency declarations provide less assistance, but the President has broader discretion in defining the circumstances that constitute an emergency. Statutory language does not establish clear parameters for differentiating events based on the magnitude of medical needs.

For the purposes of this paper, the terms catastrophe, disaster, and public health emergency are used to describe urgent events that are likely to overwhelm a community’s entire health care system. The intent is to distinguish the health care needs relating to these incidents from normal fluctuations in health care demand, which can at times overwhelm the capacity of individual provider organizations.

* Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 100-707, signed into law November 23, 1988; amended the Disaster Relief Act of 1974, P.L. 93-288. This Act constitutes the statutory authority for most federal disaster response activities especially as they pertain to Federal Emergency Management Agency (FEMA) and FEMA programs.

health care organizations would seek to “engineer system failure” in a deliberate, rational manner in order to protect the most critical services and optimize patient outcomes under exceptionally challenging conditions.

Effective performance during a major disaster relies on a variety of strategies that are not routinely practiced during normal operations, but require advance planning and clear communication. Regionalized deployment of medical assets, coordinated decision making through an incident command system, use of alternate care sites, altered standards of care, expanded scope of practice authorities for health care professionals, and triage-based protocols for allocating scarce resources are examples of strategies with significant potential to maximize the capacity and effectiveness of medical response. These approaches can require hospitals and other health care organizations to work with public officials—and each other—in ways that are often radically different from their day-to-day relationships.

Developing these plans in advance of a catastrophic emergency is extremely challenging in large part because many of these strategies have limited utility in achieving immediate, normal objectives and may, in fact, conflict with routine priorities. Yet because a community’s preparedness ultimately rests on the strength of the “weakest link” in its planning chain, all parties have an obligation to confront these difficult decisions.

CONTINGENCY PLANNING

The uncertain nature of future emergencies further complicates planning efforts. Different threats place different types of demands on medical response capacity, and these contingencies must be carefully considered. Public health emergencies can take many forms, varying in the number and acuity of casualties, the nature of victims’ medical needs, the time frame for impact and recovery, the degree to which medical assets are compromised, and the scope of the affected area. As summarized in Figure 1, the National Preparedness Guidelines issued by the Department of Homeland Security (DHS) have identified 15 scenarios depicting a diverse set of high-consequence, high-risk events to help focus contingency planning.⁵

The manner and degree to which medical surge response practices would deviate from routine norms would depend greatly on the nature, scale, and severity of the public health emergency. While the threats identified in the National

FIGURE 1
National Planning Scenarios



Source: DHS, National Preparedness Guidelines, September 2007, p. 31; available at www.dhs.gov/xlibrary/assets/National_Preparedness_Guidelines.pdf.

Planning Scenarios have the potential to result in large casualty loads, it is important to note that even a relatively small number of exotic, communicable disease cases can place extraordinary strains on health care organizations and seriously disrupt normal operations. As the SARS outbreak demonstrated, novel infectious agents have the potential to cause widespread contagion and fear and can be difficult to characterize. Therefore, treatment protocols demand scarce specialized resources (such as personal protective equipment, patient isolation facilities, and dedicated laboratory capabilities), as well as rigorous infection control practices to minimize exposure and transmission risks. Intentional incidents, whether involving bio-agents or other health threats, also raise specific demands for the health care system in order to allow for successful coordination with law enforcement activities, as well as to address purposeful efforts to undermine medical response capabilities.

The short-term incentives for tackling the diverse challenges of disaster planning are low for both health care organizations and policy officials, and the immediate risks of addressing these concerns in advance of a disaster are high. Prospective planning can be costly, both financially and politically, as private sector organizations and government agencies confront difficult decisions that *may* arise at some point in the future. One's willingness to address these questions proactively in a meaningful way is often governed by the perceived probability of a catastrophic event actually occurring. This perception is, in turn, influenced by prior disaster experience, the credibility of threat assessment processes, and the level of leadership committed to building medical response capacity.

Developing medical response capacity and capabilities to address catastrophic threats is a collective responsibility. This shared responsibility involves both private and public sector health care organizations (such as hospitals and nursing homes), individual health care providers (such as physicians, nurses, and emergency medical technicians), private sector assets outside of the health domain (such as transportation fleets, food service vendors, and child care providers), local and state health and emergency management agencies, and various components of the federal government. Much of this nation's medical services infrastructure resides in the private sector, and state governments are primarily responsible for coordinating and regulating private sector efforts to prepare for medical emergencies. However, the federal government has a critical role to play in encouraging state and local officials to pursue these objectives proactively, as well as in facilitating inter-state collaboration through funding incentives and policy guidance.

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THE CURRENT FEDERAL ROLE

Measured in terms of financial investment, the role of the federal government in developing medical disaster response capabilities is largely focused on creating new and improved medical countermeasures against particular public health threats, such as pandemic influenza, anthrax, smallpox, and nuclear explosions. Relatively fewer resources have been directed at providing financial support and technical assistance to state governments or developing federal personnel capacity to assist in medical response activities.

This section of the paper provides a brief overview of federally sponsored activities to develop medical preparedness, including a synopsis of federal assets that could be deployed in the event of a major medical disaster and a summary of the funding programs that provide financial and technical support to states. (More detailed descriptions of select federal disaster medical response programs are provided in the Appendix.) The subsequent section reviews the perceived status of preparedness development efforts by private, local, state, and federal stakeholders and identifies concerns and tensions that have been raised by these stakeholders and expert observers.

Response Resources

The federal role in providing direct, operational support for disaster medical response is defined by the National Response Framework (NRF).⁶ The NRF assumes that state authorities will be primarily responsible for coordinating all disaster response activities, but acknowledges that federal assistance may be requested if state resources are exceeded or exhausted. Federal responsibilities specific to medical response are delineated by the Plan's Emergency Support Function #8: Public Health and Medical Services Annex.⁷

The Annex identifies the Department of Health and Human Services (HHS) as the primary agency responsible for coordinating and implementing federal public health and medical assistance to states and localities. The Office of the Assistant Secretary for Preparedness and Response (OASPR) has primary responsibility for carrying out this function by utilizing the resources of that office, managing other HHS assets, and coordinating with other federal agencies. These federal public health and medical activities are nested within the broader NRF, which incorporates a range of response functions including mass care and housing, transportation, communications, and public works. Overall coordination of the federal response is implemented by the DHS. Coordination is extremely important in that effective medical treatment may depend on support provided through mass care, transportation, and other functions.⁸

Key federal assets that could be deployed to support state and local medical response include:

- The Strategic National Stockpile (SNS), a repository of pharmaceutical agents and medical supplies
- The National Disaster Medical System (NDMS), a federally coordinated network of private sector medical personnel and inpatient facilities, as well as military medical transportation resources
- The Public Health Service (PHS) Commissioned Corps Rapid Deployment Teams, consisting of clinical and support staff employed by the federal government who can be mobilized to assist in disaster medical response

Over the last several years, HHS has taken a variety of steps to enhance the capacity and capabilities of these response resources.

The federal government has made a significant investment in developing and acquiring additional medical countermeasures for inclusion in the SNS.⁹ The stockpile includes a variety of commonly available medications and supplies, but substantial resources have been devoted to creating and purchasing new and improved medical countermeasures for which commercial demand is limited. HHS has established both “push” and “pull” incentives to spark development of the priority medical countermeasures needed to respond to high-risk threats (Figure 2).

Push — The National Institutes of Health supports a variety of research and development activities focused on biological, radiological, and chemical countermeasures. NIH devoted approximately \$1.7 billion in fiscal year (FY) 2008 funding to biodefense-related research focused on a range of public health threats including traditional agents with the potential to cause mass casualties (such as *Bacillus anthracis*), enhanced agents that

FIGURE 2
Medical Countermeasures Pipeline



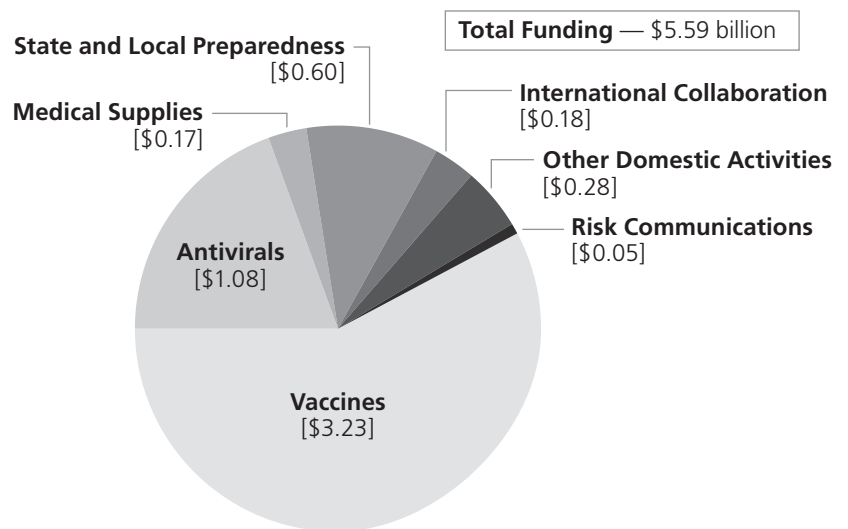
Source: Adapted from Office of Public Health Disaster Medical Countermeasures, Project Bioshield, Annual Report to Congress: July 2004 through July 2006, Office of Public Health Disaster Preparedness, HHS, July 31, 2006, p. 19; available at www.hhs.gov/aspr/barda/documents/bioshieldannualreport.pdf.

have naturally evolved to circumvent available countermeasures (such as multi-drug resistant plague), emerging agents (such as H5N1 avian influenza), and advanced agents that have been artificially engineered to be more severe or less vulnerable to traditional treatments (such as multi-drug resistant *B. anthracis*).¹⁰ Because there is little to no current market demand for these products, public funds are needed to seed research and early development activities.

Pull — Dedicated federal funds have also been designated to support the advanced development and procurement of medical countermeasures for the SNS. These funding mechanisms assure pharmaceutical manufacturers that a market will exist for their products to encourage private sector investment in late-stage development. The \$5.6 billion Project Bioshield fund was established in the FY 2004 Department of Homeland Security Appropriations Act and is administered by the Biomedical Advanced Research and Development Authority (BARDA) within the OASPR. Approximately \$1.8 billion was drawn from this fund between July 2004 and July 2006 for the acquisition of anthrax vaccine, anthrax therapeutics, botulinum antitoxin, and pediatric formulations of potassium iodine.¹¹ In addition to these Bioshield-related procurements, substantial resources have also been devoted to enhancing the SNS inventory in preparation for an influenza pandemic. Congress appropriated \$5.6 billion in emergency supplemental FY 2006 funding to support pandemic influenza preparedness, and this funding has largely been committed to vaccine and antitoxin stockpiles.¹² (See Figure 3.)

In addition to the funding increases for specialized product acquisition, general funding for the SNS has also risen in recent years. The SNS is operated by the Centers for Disease Control and Prevention (CDC). The stockpile was established at CDC in 1999. Although budgetary authority for the program was transferred to DHS by the Homeland Security Act of 2002¹³ and transferred back to HHS in 2004 by the Project Bioshield Act,¹⁴ CDC has managed the SNS since its inception. General SNS funding is used to support the basic management, storage, rotation, and security of stockpile inventories and to augment stockpile holdings for the many types of products not covered by specialized procurement programs (such as psychotropic medications). SNS funds have also been used to support the development of Federal Medical Stations (FMS), mobile facilities that

FIGURE 3
FY 2006 Pandemic Influenza
Supplemental Funding [\$ billions]

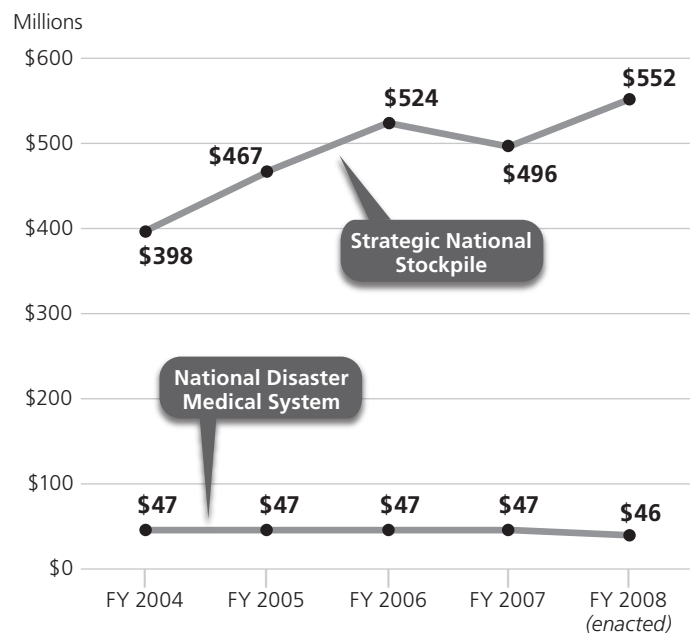


Source: HHS, "Report to Congress: Pandemic Influenza Preparedness Spending," prepared in response to request in conference report 109-359, December 2007, p. 4; available at www.hhs.gov/aspr/barda/mcm/panflu/spending.html.

are designed to provide low- to mid-acuity hospital bed surge capacity.

Financial investments in the workforce-based components of federal disaster medical assistance have been less substantial than those directed at fortifying the SNS (Figure 4), but HHS has pursued enhancements to the NDMS and PHS Commissioned Corps Rapid Response Teams. In light of perceived inadequacies in the federal response to Hurricane Katrina, the Pandemic and All-Hazards Preparedness Act¹⁵ (PAHPA) authorized transfer of the NDMS to HHS from DHS. This transfer was initiated in 2007, and a comprehensive review of NDMS functionality has been conducted by HHS, DHS, the Department of Defense, and the Veterans Administration.¹⁶ Similarly, policies and procedures for deploying the PHS Commissioned Corps have been reviewed, and HHS has proposed some enhancements to the training and management of Rapid Deployment teams within the Corps.

FIGURE 4
Strategic National Stockpile and National Disaster Medical System Funding, FY 2004–2008 [\$ millions]



Support for State and Local Preparedness

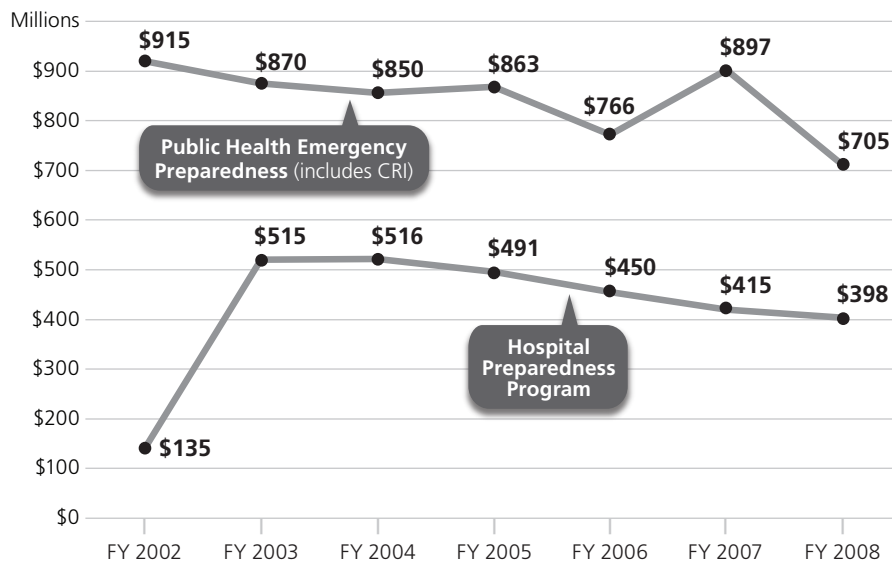
The operationally oriented programs described above often receive a high level of visibility and critique, but federal officials stress that these assets are designed to supplement state and local capabilities and are not independently sufficient to support response to a mass casualty event. Major efforts to strengthen the ability of states and localities to mount their own disaster medical response include the Hospital Preparedness Program (HPP), the Public Health Emergency Preparedness Program (PHEP), and the Metropolitan Medical Response System (MMRS).

- **HPP** provides grants to states to aid hospitals and health care systems in preparing for and responding to bioterrorism and other public health emergencies. This program is the dominant source of federal preparedness dollars for health care provider organizations, as states are required to redistribute a majority of HPP funds to participating hospitals and other clinical sites. Originally instituted in 2002 within the Health Resources Services Administration as the National Bioterrorism Hospital Preparedness Program, the program was transferred to OASPR in 2007.¹⁷

The grant program has identified the following priority areas for FY 2008 funding: developing interoperable communications systems, tracking bed availability, registering and mobilizing health care volunteers, managing fatalities, implementing medical evacuations and shelter in

Source: HHS, "Budget in Brief," 2006, 2007, 2008, and 2009; and HHS, "Justification for Estimates for Appropriations Committees FY 2009: General Departmental Management"; available at www.hhs.gov/budget.

FIGURE 5
Hospital Preparedness Program and Public Health
Emergency Preparedness Funding, FY 2002–2008 [\$ millions]



Source: Health Research Institute (HRI), *Closing the Seams: Developing an Integrated Approach to Health System Disaster Preparedness*, PricewaterhouseCoopers, 2007; and HHS, *Public Health Emergency Preparedness guidance*, May 29, 2008, p. 24, and *Hospital Preparedness Program Cooperative Agreement guidance*, 2008, p. 22.

place protocols, and developing partnerships and coalitions. Past priority areas that grantees can continue to enhance after priority funding areas are addressed include developing alternate care sites, securing mobile medical assets, building pharmaceutical caches, purchasing protective personal equipment, developing decontamination capacity, and protecting critical infrastructure. (See Figure 5.)

- **PHEP** provides funds to state health departments to build public health preparedness capabilities at both the state and local level. Administered by the CDC, the PHEP is largely used to support public sector, population-based preparedness functions (such as disease surveillance systems), rather than private sector medical response capacity. However, public health agencies utilize PHEP funds to improve their own emergency medical management and response capabilities, to plan and conduct mass prophylaxis (such as the mass distribution of antibiotics to counter aerosolized anthrax), and to more broadly support the receipt and distribution of the SNS.¹⁸ While these types of countermeasure distribution activities are likely to be conducted in concert with private health care providers, PHEP funds are not typically redistributed to community-based health care organizations.

■ **MMRS** provides funding to 124 urban jurisdictions to help prepare for mass casualty events. Created within HHS in 1996 following the Sarin nerve agent gas attack in Tokyo and the bombing of the Alfred P. Murrah Federal Building in Oklahoma City,¹⁹ the MMRS officially became part of DHS in 2003.²⁰ Most jurisdictions have focused these funds on the needs of first responders, such as fire and rescue personnel, emergency medical technicians, and emergency management agencies, rather than hospitals, physician organizations, or other clinical sites. However, local jurisdictions receiving MMRS funds have a significant degree of flexibility in how they utilize these resources, and variability across grantees exists.

These core preparedness assistance programs have been augmented by a number of smaller, more targeted capacity building efforts. For example the Cities Readiness Initiative (CRI), which is incorporated into PHEP funds, was initiated in 2004 to improve the efficiency of major metropolitan areas in delivering SNS medicines and medical supplies within 48 hours during a large-scale public health emergency.²¹ Initially, 21 cities had been selected to receive direct funding and assistance. By 2006, the initiative had expanded to include 72 metropolitan areas, with at least one funded city in every state. Approximately \$64.2 million were allocated to the CRI in FY 2008.

Targeted federal funds have also been focused on helping state and local governments mobilize volunteer health care providers in the event of a disaster. The Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP) assists states in registering health professionals willing to serve as volunteers in order to expedite confirmation of credentials, licensing, accreditation status, and hospital privileges should a disaster occur. Administered as part of the HPP, successful implementation of an ESAR-VHP is a condition of the HPP grant award. In FY 2008 \$3.9 million were allocated to ESAR-VHP. HHS also provides a modest level of funds directly to local communities through the Medical Reserve Corps (MRC) to aid in the recruitment and training of health care volunteers. (For more details on the ESAR-VHP and MRC programs, see Appendix.)

Technical assistance provided through these various funding programs is enhanced by research and development activities intended to inform and facilitate the management of disaster medical response. The Agency for Healthcare Research and Quality (AHRQ) has played an important role in developing guidance and tools that can assist states, localities, and health care organizations in improving medical preparedness. For example, AHRQ published a guide to help community planners address the range of logistical, legal, and ethical challenges inherent in providing mass medical care with scarce resources,²² convened an expert panel to develop recommendations for the use of altered standards of care during mass casualty events,²³ and developed a tool that hospitals can use to evaluate disaster drills.²⁴ AHRQ has also supported the development of the National Hospital Available Beds for Emergencies and Disasters System (HAvBED),

an electronic tracking system to monitor inpatient bed availability which includes standardized definitions for types of beds (such medical-surgical, pediatric, critical care, psychiatric, and burn beds).²⁵ In addition to these tools and guidelines, AHRQ has also supported the creation of a variety of continuing education training modules to build the preparedness skills of health care professionals.

The CDC has supported complementary health services research activities related to disaster medical response. For example, CDC convened an expert panel to explore the surge capacity needs generated by terrorist events using conventional weapons. The panel highlighted critical resource constraints related to imaging and blood bank services.²⁶ The agency also developed FluSurge, a modeling software program for the prediction of surge capacity needs related to an influenza pandemic based on a range of variables including disease incidence, morbidity, severity, and transmission rates. CDC also created an interactive self-study training module to provide clinical education pertinent to a radiological or nuclear terrorism incident.

OASPR has released playbooks for 2 of the 15 scenarios identified in the National Preparedness Guidelines (hurricanes and aerosolized anthrax) and is close to completing several others. These playbooks provide a strategic overview of the key decisions points, actions, capabilities, and assets that could be initiated in the provision of federal assistance. Working with the HHS Office of Disability, OASPR has also developed a training toolkit to help emergency managers better anticipate and address the needs of at-risk populations in their preparedness planning.

[For a comprehensive inventory of federal guidance and technical assistance published for state use in preparing for medical surge, please see Appendix III, Table 3 in the recent report by the Government Accountability Office (GAO), “Emergency Preparedness: States Are Planning for Medical Surge, but Could Benefit from Shared Guidance for Allocating Scarce Medical Resources,” GAO-08-668, June 2008 (www.gao.gov/new.items/do8668.pdf).]

OPPORTUNITIES FOR IMPROVEMENT

These federal initiatives, together with preparedness efforts undertaken by states, localities, and private sector organizations, have improved disaster medical response capabilities over the last several years, but gaps remain. A variety of deficiencies persist and experts believe that the amount of progress made varies significantly across jurisdictions.²⁷ Although numerous studies and expert panels have raised concerns about the adequacy of medical preparedness, efforts to both evaluate incremental improvements and gauge the magnitude of jurisdictional differences are limited by the nascent nature of performance standards.²⁸

Developing meaningful performance measures for medical preparedness is challenging, in part, because preparedness planning depends on

establishing new and largely untested types of functional relationships. Interdependency is necessary for achieving preparedness goals, but it also leads to a diffusion of responsibility and ambiguity regarding the appropriate “unit of analysis” for evaluative studies. Although individual organizations each have responsibility for contributing to medical preparedness and response, these capacities and capabilities ultimately rely on collective action. The following narrative describes attempts to refine performance expectations for key players in disaster medical response and highlights concerns that have been raised regarding the need for further improvement.

Hospitals: Divided They Fall

For a variety of reasons, hospitals have typically served as the focal point of discussions about medical preparedness. Hospitals have historically served as a hub of community medical resources; most are not-for-profit organizations with legally binding community benefit obligations²⁹ that include emergency services; hospitals maintain ongoing relationships with a variety of health professionals through both employment contracts and medical staff privileges; and the public has traditionally viewed hospital emergency departments as the place to go in the event of a life threatening injury or illness. Hospitals are undoubtedly key players in disaster medical response, but their effectiveness often hinges on how well the disaster plans of individual hospitals are integrated into robust community-wide and regional planning efforts.

Hospitals are undoubtedly key players in disaster medical response, but their effectiveness hinges on integrating their individual plans with community-wide efforts.

The Joint Commission has revised its emergency management standards for hospitals over the last several years and continues to explore additional changes in order to encourage collaboration across institutions and with other community assets. Prior to 2001, Joint Commission standards assumed that hospitals implementing plans would be operating within the context of an intact community and did not clearly acknowledge the need to coordinate with external planning efforts. In revising these standards in January 2001, the Joint Commission began requiring hospitals to (i) integrate hospital-based planning efforts with community-wide coordination of resources, (ii) complete a hazard vulnerability analysis, (iii) involve hospital leaders in disaster planning, (iv) utilize an all-hazards approach, and (v) address mitigation, preparation, response, and recovery goals in their plans. In order to fully implement these standards, the Joint Commission explored the experience of hospitals in communities that had previously encountered some type of disaster, either natural or man-made.

The Joint Commission determined that the hospitals that performed best under emergency conditions were those that had planned most carefully concerning logistical issues.³⁰ Most frequently, these hospitals were

members of larger hospital networks and able to rely on the broader system for supplies (such as large generators, fuel, food, water, staff, and medications). In one example, a disaster-affected community lost power for one week and the community hospital required 85,000 gallons of fuel to run the hospital's power generators. Nearly 90 percent of this fuel was supplied by the network's headquarters, located 500 miles away from the affected community; only 10 percent was provided through public sector assistance.

Numerous studies and expert panel recommendations have echoed the importance of developing collaborative disaster management plans that rely on regional coordination and asset sharing.³¹ Unfortunately, the Joint Commission determined that few hospitals had the benefit of strong community-wide planning that could serve as a foundation for individual facility plans. The competitive tensions inherent in day-to-day operations can often undermine cooperative disaster planning across health care organizations in the absence of strong public sector leadership. Hospitals that are not part of a broader system face particular challenges in developing regional relationships through memoranda of understanding (MOUs) and other formal agreements for mutual aid. While network-based hospitals have some advantages in arranging "intra-system" cooperation and coordination, working with unaffiliated hospitals and non-hospital resources can pose challenges similar to those faced by independent institutions.

Routine capacity constraints in hospital emergency department (ED) capacity may further compound market-based disincentives to collaborative planning. Medical response to a disaster would likely mobilize resources well beyond the ED. However, the individuals poised to take on leadership roles in preparedness planning and response functions are often ED managers and clinical staff with specialized expertise in patient triage and trauma care. EDs are struggling to meet daily surge demands, and crowding is widespread.³² This daily pressure limits the time, attention, and resources that ED personnel can devote to disaster planning efforts and undermines cooperation across health care organizations. Similar constraints in staff capacity in nursing and other professional disciplines utilized by health care organizations limit the availability of personnel to train for public health emergencies.

The hospital industry has argued that insufficient resources are available to support preparedness efforts. The Center for Biosecurity estimates that the minimum costs of developing and maintaining pandemic influenza surge capacity for an average size hospital are close to a \$1 million one-time investment with additional \$200,000 annually in maintenance expenses.³³ PricewaterhouseCoopers' Health Research Institute (HRI) calculates that the HPP provided an average of roughly \$82,500 per hospital nationally in 2007,³⁴ and reports that some hospitals have not applied for funding because the financial demands of grant requirements significantly exceed funding levels.³⁵ The actual amount of HPP funding distributed to individual facilities varies considerably. Less than half of all hospitals receive any HPP

funds, as some states restrict funding to “lead” institutions.³⁶ Despite this variation, an HRI survey of hospital managers, state and local officials, and health care professionals found that 83 percent of respondents believed that preparedness funding was insufficient, and over one-third reported major unmet planning needs due to funding constraints.³⁷

The hospital industry has suggested that additional public funds should be made available to support preparedness, but others contend that not-for-profit hospitals are obligated to make these investments themselves in light of the preferential tax status they enjoy as charitable organizations. The Internal Revenue Service (IRS) established the community benefit standard that currently guides determinations of charitable intent in 1969. IRS ruling 69-545 suggests that tax-exempt hospitals should provide emergency care to all persons requiring such services regardless of their ability to pay. While disaster planning is a recognized community-building activity for hospitals that supports broadly defined community benefit obligations, federal tax law does not explicitly require tax-exempt hospitals to engage in such activities.

The financial condition of hospitals and their ability and willingness to absorb the costs of preparedness planning vary significantly across institutions. HRI highlighted the low margins of the public hospitals in which trauma centers and burn centers are frequently housed. Echoing these concerns, a recent hearing by the House Committee on Oversight and Government Reform explored the potential impact of proposed reductions in Medicaid payments on hospital preparedness efforts.³⁸ While not all hospitals are financially vulnerable, a study by the Center for Studying Health System Change suggests that most hospitals in the sentinel markets studied rely heavily on federal funds to support their disaster planning activities.³⁹

Government Role in Planning and Response

State and local government officials recognize the need for a more coordinated approach to disaster medical planning, but face challenges in orchestrating private sector efforts. Government regulators are often uncertain about how to constructively increase performance expectations for hospitals and other health care organizations.

Public sector efforts to coordinate regional approaches to medical preparedness are critically important. As stated previously, many key decisions related to preparedness development such as triage protocols, altered standards of care; interoperable standards for communications, equipment, and training; and patient transfer plans cannot be made by individual hospitals acting in isolation. The lack of dedicated preparedness

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planning staff in public health agencies and hospitals has been cited as an important barrier to the development of regional disaster medical response plans.⁴⁰

States have pursued a variety of different strategies to develop disaster medical preparedness. Both the level of state leadership exhibited to guide and coordinate planning efforts and the mechanisms used to redistribute federal grant funds across provider organizations have varied substantially from state to state.

The state of California has been at the forefront of the development of disaster medical response capacity. California has made major investments in preparedness development beyond the federal grant dollars it has received and was the first state to release detailed standards and guidance for health care surge during emergencies.⁴¹ The guidance clearly acknowledges that the delivery of care during a disaster will differ from routine practices, identifies the legal and administrative mechanisms to support this shift, and clarifies the anticipated roles of hospitals, government-authorized alternate care sites, clinics, long-term care facilities, and other non-hospital providers. Similar efforts are under way elsewhere, but some states have been less proactive in facilitating hospital preparedness planning and coordinating state and regional collaboration.

Federal officials are seeking to clarify expectations and strengthen performance objectives for states in order to stimulate a more coordinated approach to planning. These performance objectives have shifted over time, evolving from structural measures (such as personnel added, equipment acquired, and plans developed) to process measures that seek to assess program capabilities. These revised expectations include requirements related to compliance with National Incident Management System (NIMS) principles, education and training standards, evaluation of drills and exercises, and attention to the needs of at-risk populations. Although some disconnects between PHEP and HPP measures continue, goals for these complementary programs have become more tightly integrated over time with increased cross-references to each other's objectives.

Grantees have also been charged with meeting increasingly specific, quantifiable measures of performance. Performance measures for the FY 2008 HPP grants are summarized in the text box (see next page). FY 2009 awards will be contingent on achieving these objectives. A recent report by the GAO suggests that most states are well positioned to meet performance objectives related to bed tracking and the electronic registration of volunteers.⁴² Yet, in light of heightened performance expectations, state officials are calling for more support from the federal government not only in terms of funding, but also in the development of more explicit, detailed policy guidance and improved operational assistance for disaster response.

Performance Measures for the FY 2008 HPP Grants

Performance measures for the FY 2008 HPP grants are summarized below. FY 2009 awards will be contingent on achieving these objectives. A recent report by the GAO suggests that most states are well positioned to meet performance objectives related to bed tracking and the electronic registration of volunteers.

MEASURES

State can report available beds for at least 75 percent of participating hospitals according to HAvBED definitions.

State can query their ESAR-VHP system during a functional drill, exercise, or actual event to generate a list of potential volunteer health professionals, by discipline and credential level, within 2 hours or less of a request

State can compile an initial list of volunteer health professionals by discipline and credential level, within 12 hours or less of a request and report a verified list of available volunteers within 24 hours of a request.

State conducts statewide and regional exercises including hospitals that incorporate NIMS concepts and principles.

Proportion of participating hospitals that...

- Can report available beds according to HAvBED definitions within 60 minutes of a request.
- Demonstrate dedicated, redundant communications capability during an exercise or incident as evidenced by evaluations or after-action reports.
- Demonstrate sustained two-way communications capability with the local Disaster Operations Command and other health coalition partners during an exercise or incident.
- Have written plans to address mass fatalities.
- Have written plans to address medical evacuation.
- Incorporate NIMS concepts and principles
- Have identified appropriate personnel for training and verified their completion of required courses.

Source: *Federal Register*, 73, no. 96 (May 16, 2008): pp. 28472–28478.

Funding levels — Health care executives and state and local government officials have been vocal in raising concerns that federal funding levels have diminished as performance requirements have grown. Funding available through the HPP cooperative agreement has decreased by over 20 percent since 2003. The President’s proposed 2009 budget calls for an additional decrease of \$60 million, consistent with a number of other proposed reductions in assistance to states and localities for homeland security preparedness.⁴³ After the National Strategy for Pandemic Influenza Implementation Plan was released in July 2007, experts and local officials were sharply critical of the plan’s failure to adequately address the financial needs of the health care system in providing care to the sick.⁴⁴

Federal officials have maintained that public health and medical preparedness is primarily a function of state and local government as defined in our nation’s constitutional framework and stress that significant federal resources have been invested to help states fulfill their responsibilities. HHS published a proposal in the *Federal Register* in May 2008 to require recipients of the HPP cooperative agreement to contribute matching funds in an amount equal to 5 percent of their award beginning in 2009.⁴⁵ For 2010 and subsequent years, a 10 percent match is proposed.

Policymakers have also considered the need for a risk-based allocation of preparedness dollars. Some have argued that the mechanism used to distribute HPP funds across states should incorporate a more meaningful assessment of the risk of a major medical emergency within a given jurisdiction, including the risk of natural disasters and intentional acts of terrorism. Others argue that some risks, such as the threat of influenza pandemic, are pervasive and attempts to define relative risk across jurisdictions would be highly subjective and difficult to defend.

Policy guidance and technical assistance — Although critiques of federal leadership are often framed around perceptions of funding insufficiency, these concerns have also been more broadly articulated to include a call for more explicit guidance on the difficult decisions raised by disaster medical response. Disaster response will require difficult decisions regarding the allocation of scarce resources and alteration of care standards. Although some states and localities have begun to tackle many of these thorny issues, many would welcome the protection and standardization that national guidelines would confer. A recent report by the GAO noted that only 7 of the 20 states sampled have made progress in defining altered standards of care during a mass casualty event.⁴⁶ Some states indicated that federal efforts to convene medical, public health, and legal experts to address these complex issues would be helpful.

A public-private Task Force for Mass Critical Care recently released guidance for the allocation of scarce resources during a mass casualty event.⁴⁷ The guidance establishes a clinically based algorithm on which triage

Federal officials have maintained that public health and medical preparedness is primarily a function of state and local government.

and resource allocation decisions could rest to ensure uniformity across provider organizations. Experts have noted the confusion and animosity that could arise if jurisdictions apply disparate assumptions and priorities in rationing care or altering quality standards. While the Task Force's guidance provides organizational models for the implementation and oversight of triage protocols, the need for further government action was highlighted. The Task Force encouraged policymakers to endorse a clearly defined algorithm process and to develop mechanisms for monitoring compliance during a mass casualty event.

Some have also called for the federal government to take a more active role in brokering cooperation and assistance among states. A number of metropolitan areas have already begun to establish inter-state regional partnerships, but additional federal support might enhance the spread and strength of these medical compacts. The \$18.1 million award made by HHS to 11 emergency medical partnership collaboratives in September 2007 has been hailed as a positive step in building regionalized medical response capacity. However, the decision to fund these Healthcare Facility Partnerships through a reduction in HPP cooperative agreement dollars has added to discontent over funding adequacy.

State and local officials have sought more federal support for peer-to-peer learning across states. Many jurisdictions are tackling similar challenges (such as integrating various volunteer resources like the MRC and the American Red Cross, recruiting and training emergency management personnel, and developing interoperable communications systems). Federal efforts to broker consensus on best practices are often viewed as lacking.

A need for increased federal engagement in resolving legal and operational conflicts across states has also been noted. For example, some believe that increased federal involvement could help to resolve a range of issues that hamper inter-state sharing of personnel (such as those related to reciprocal recognition of professional licensure and credentialing, workers' compensation coverage, and malpractice liability protections). Similarly inter-state differences regarding Medicaid coverage and payment for displaced persons have been cited as creating administrative hurdles that could benefit from federal intervention.

States have also sought more explicit policies regarding the suspension or relaxation of federal requirements concerning the provision of health care services during a disaster. Section 319 of the Public Health Service Act gives the Secretary of HHS broad authority to determine that a public health disaster exists and also confers power to waive or streamline a range of administrative and certain statutory requirements when a Presidential declaration of emergency or disaster has been made.⁴⁸ Authority exists for the waiver of some requirements, such as Conditions of Participation for Medicare, Medicaid, and the State Children's Health Insurance Program (SCHIP); certain provisions of the Emergency Medical Treatment and Active Labor Act (EMTALA); and the Health Insurance

Portability and Accountability Act (HIPAA). However, the circumstances necessary to trigger such a waiver are unspecified. The Centers for Medicare & Medicaid Services (CMS) recently waived certain documentation requirements for providers in flood-stricken areas of Iowa and Indiana. The limited application of these waivers to date, including those related to Hurricanes Katrina and Rita, make it difficult to interpret the extent to which Medicare is prepared to accommodate significant alteration of care standards and other regulatory standards under catastrophic conditions. Clearer processes and parameters related to petitioning for, and granting of, emergency federal waivers could further expedite state efforts to develop pragmatic approaches to medical preparedness.

Operational assistance — Calls to strengthen the federal role in medical response during a disaster have generally focused on improving the nature, rather than expanding the scale, of federal assistance. Although some have argued that the capacity of federal response assets should be increased, most recognize that the federal government is unlikely to develop a significant level of reserve medical capacity that could be leveraged in the event of a disaster. More concerns have been raised about the capabilities of federal response resources currently available, as well as the ability to integrate these resources into local response efforts.

Medical response to Hurricane Katrina revealed numerous problems in capabilities at the local, state, and federal levels. Federal officials have taken a variety of steps to resolve deficiencies in federal assistance as required by both administrative and legislative directives. A clear and overarching weakness in federal medical response to Katrina stemmed from ambiguity and miscommunication within the federal chain of command. In response to this issue, the PAHPA authorized the transfer of NDMS from DHS back to HHS, consolidated a number of medical response responsibilities under the OASPR, and mandated a comprehensive review of NDMS management and implementation.

Although federal personnel provided valuable medical assistance in the Gulf Coast area following Hurricane Katrina, numerous problems were encountered.⁴⁹ Travel difficulties delayed the arrival of both NDMS teams and equipment and, once in place, teams had trouble coordinating with local emergency management and with HHS, which was responsible for managing federal medical assets. NDMS staffing models were geared toward the provision of trauma care while patient needs were often characterized by lapsed chronic disease management and mental health crises. Military medical evacuation capacity was limited and not well configured to short-haul transportation needs. PHS Commissioned Corps staff was insufficiently prepared to deploy and serve in a response capacity.

The ongoing review of NDMS is likely to identify the need for additional changes, but steps have already been taken to address some of the

Most recognize that the federal government is unlikely to develop a significant level of reserve medical capacity that could be leveraged in the event of a disaster.

shortcomings observed in the Katrina response. The President's FY 2009 budget requested a \$7 million increase in NDMS funding to enhance regional coordination efforts, improve training, bolster logistical support, and complete implementation of an electronic patient medical record that was pilot tested during the California wildfires in 2007.

A recent GAO investigation found that DHS and HHS have successfully collaborated with states to more clearly delineate the federal role in patient evacuation from health facilities, although additional clarity is needed to address evacuation of nursing home residents.⁵⁰ Consolidation of authorities under OASPR have been beneficial, but some ambiguities in federal responsibilities remain, including those related to intersections between medical and mass care functions (such as sheltering disaster victims).

Some federal responsibilities remain ambiguous, including those related to intersections between medical and mass care functions (such as sheltering disaster victims).

Enhancements to PHS Commissioned Corps capabilities have also been proposed. The President's FY 2009 budget includes a \$26 million increase to support the transformation of Commissioned Corps capabilities, including expanded recruitment and training, as well as the development of two dedicated Health and Medical Response (HAMR) teams. Each team will be designed for rapid deployment (within 12 hours) and will be composed of 105 highly trained, dedicated staff members who will not have concurrent responsibilities for staffing other PHS activities.

Deployment of SNS resources in the Gulf Coast region following Katrina was generally viewed as successful, although some problems were noted. Federal investigators determined that more SNS supplies should have been placed in the region before the hurricane made landfall, given the advance warning provided by storm tracking data. Concerns were also raised that inventories of pre-packaged SNS supplies were overly oriented toward biological threats and therefore some supplies went unused. In contrast, supplies for chronic care medications, such as antihypertensive and psychotropic drugs, were in short supply. Some experts have cautioned that the content of the SNS should be adjusted to better address pediatric needs as required by PAHPA. Some also believe that stockpile request procedures should be revised to minimize the potential for inter-state competition for resources. The CRI effort has markedly improved most participating cities' ability to distribute SNS supplies, but some jurisdictions are still working to fully establish this capacity.

State and local officials are encouraged by developments to improve federal response assistance, but many harbor lingering concerns about the reliability and utility of federal medical assets. Some have suggested that more drills and exercises need to include federal participants in order to provide valid assessments of preparedness levels. State and local stakeholders hope the OASPR playbooks are part of a continuing evolution toward improved interoperability and effective partnership.

CONCLUSION

The willingness of federal, state, local, and private planners to confront the realities of a potential public health emergency, acknowledge weaknesses in the existing infrastructure, and adapt to the challenges of catastrophic medical response is both necessary and remarkable. It is human nature to avoid difficult decisions, particularly those that do not demand immediate action. Overcoming this inertia involves complex economic, political, and ethical challenges. Yet across the country, significant progress is being made to develop a more realistic, integrative approach to preparedness planning. These efforts will require ongoing support, policy oversight, and leadership to address the pitfalls that are sure to arise, mediate conflicting priorities, and galvanize tenuous links in the chain of disaster response capabilities.

Federal policymakers are being called on to play an even more proactive role in addressing these “weak links.” Unresolved concerns regarding the structure, priorities, and utility of federal medical response assets have been identified. The adequacy of existing funding levels, the suitability of performance expectations, and the rigor of accountability mechanisms for both states and providers have been questioned. Furthermore, the need for more explicit federal law sanctioning acceptable approaches to altered medical practices during disaster response has been raised. Planning for the dire circumstances posed by disaster scenarios exposes many of the unseen fissures and unspoken compromises inherent in the health care system. Preparing for these demanding contingencies, particularly in the face of day-to-day pressures, will require ongoing public-private collaboration and cooperation across all levels of government.

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APPENDIX
Descriptions of
Select Federal
Disaster Medical
Assistance Programs

Strategic National Stockpile (SNS)

The SNS is a repository of medications, equipment, and supplies, such as antibiotics, chemical antidotes, antiviral agents, antitoxins, and airway maintenance supplies. The SNS is designed to supplement and resupply jurisdictions at the request of the Governor(s) of the affected state(s). The SNS is administered by the Centers for Disease Control and Prevention (CDC) and includes two major components:

- **Push-Packs** — A relatively small proportion of the total SNS inventory is pre-packaged in push-packs which are designed to be delivered within 12 hours of a federal decision to deploy. These push packs are maintained by HHS at regional caches in undisclosed locations. Upon arrival at a designated receiving and storage site, SNS assets are transferred to state and local authorities for breakdown and distribution.
- **Specific Material Support** — The bulk of the SNS stockpile is maintained through Vendor Managed Inventory (VMI) and inventory managed directly by the CDC. These inventories can make a wider, more flexible range of supplies available to affected communities within 24 to 36 hours. CDC contracts with a select group of vendors to maintain inventories of defined supplies and medications which can be called upon if initial push-pack supplies are exhausted or if specialized supplies not included in the push packs are needed. Because specialized resources (such as anthrax and smallpox vaccines, antitoxins, and ventilators) are not included in the push packs, these specialized resources may serve as the initial response from the SNS program depending on the nature of the incident.

Procurement of some specialized medical countermeasures included within the SNS, such as anthrax and smallpox vaccines, has been funded through the Project Bioshield special reserve fund. This \$5.6 billion fund was established in the FY 2004 Department of Homeland Security Appropriations Act and is administered by the Biomedical Advanced Research and Development Authority (BARDA) within the Office of the Assistant Secretary for Preparedness and Response (OASPR). Approximately \$1.8 billion was drawn from the Project Bioshield fund between July 2004 and July 2006.*

National Disaster Medical System (NDMS)

NDMS was formed in 1984 in order to provide medical evacuation and care to military and civilian casualties returning from overseas wars.[†] Never deployed for its original purpose, the NDMS has since evolved to provide civilian support to communities experiencing major disasters. Originally housed in the U.S. Public Health Service within HHS, the program was transferred to the Department of Homeland Security (DHS) in 2003, and transferred back to HHS in 2007. NDMS is now coordinated by the OASPR and has three distinct components:

- **Response teams** can be deployed to disaster sites to provide emergency triage and care. Several types of teams are designed to respond to specific needs (see sidebar). Teams are mobilized within 6 hours of notification, are capable of arriving on-site within 48 hours, come with equipment, supplies, and logistical support

APPENDIX – continued >

Descriptions of Select Federal Disaster Medical Assistance Programs

APPENDIX > National Disaster Medical System

to sustain medical operations without external support for 72 hours, and are designed to remain deployed for two-week periods. The federal government is in the process of developing Federal Medical Stations (through the SNS program), which will further support response team functionality by providing deployable medical facilities complete with equipment, supplies, and a limited inventory of pharmaceuticals.

Although designed to be self-sustaining, NDMS response teams are intended to supplement local and state response assets at the direction of the local incident commander. While deployed, team members are paid as part-time federal employees and are protected from malpractice claims under the Federal Tort Claims Act. Although team members become federalized once deployed, most serve as practicing civilian health care providers in their home communities when not activated under NDMS.

- **Patient Evacuation** includes communication and medical transportation of disaster victims from identified mobilization centers to NDMS treatment facilities in unaffected areas by Department of Defense aircraft and vehicles. Transportation of patients from the disaster site to the mobilization centers or to local care sites is considered a responsibility of state and local authorities.

- **Definitive Hospital Care** provides for inpatient medical treatment beyond emergency stabilization. Approximately 2,000 hospitals, including private, Veterans Administration, and Department of Defense facilities,

TYPES OF NDMS RESPONSE TEAMS

A **Disaster Medical Assistance Team (DMAT)** is designed to provide general medical assistance. Approximately 55 regionally organized DMATs are in place across the country. Each team includes about 35 health care professionals including physicians, nurses, medical technicians, as well as additional logistics and support staff. If teams are providing care to patients requiring treatment comparable to the type delivered in inpatient settings, all the DMATs working together could serve about 1,400 patients per day.

A **National Medical Response Team (NMRT)** is designed to provide medical care following a nuclear, biological, or chemical incident and has specialized expertise in mass casualty decontamination, medical triage, and care provision in a hazardous material environment. Each team typically consists of 50 staff members, and four teams are in place nationwide.

Approximately 21 **Specialty Care Teams** are organized to provide specific types of response capabilities including burn teams, pediatric DMATs, and mental health teams.

A **Disaster Mortuary Operational Response Team (DMORT)** provides assistance in identifying and processing deceased victims. Eleven DMORTs have been established nationwide.

APPENDIX – continued >

Descriptions of Select Federal Disaster Medical Assistance Program

APPENDIX > National Disaster Medical System

participate in NDMS and have offered roughly 1,000 patient care beds for definitive care through the system.[‡] Hospitals participating in NDMS do not receive financial support for entering into this commitment, but are eligible for compensation for services rendered through the NDMS during emergency response at a rate equal to 110 percent of Medicare's payment rates.

Public Health Service (PHS) Commissioned Corps Teams

The teams include approximately 6,000 public health professionals trained in clinical disciplines and other related fields, such as engineering. Commissioned Corps officers serve in managerial and clinical positions throughout HHS. Although the Corps was not designed as a deployable medical response asset, select Commissioned Corps personnel with relevant skills have been organized into five Rapid Deployment Teams each with a 105 multidisciplinary staff complement.[§] Teams serve on a rotating call basis, and on-call teams are available to support states and localities within 12 hours of notification. A specialized Mental Health Team and an Applied Public Health Team have also been established with the Commissioned Corps.

Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP)

The ESAR-VHP program assists states in registering health professionals willing to serve as volunteers in order to expedite confirmation of credentials, licensing, accreditation status, and hospital privileges should a disaster occur. Administered as part of the HPP, successful implementation on an ESAR-VHP is a condition of the HPP grant award. In FY 2008, \$3.9 million were allocated to ESAR-VHP. States have some flexibility in structuring their system, but these designs must be consistent with HHS guidelines. The Pandemic and All-Hazards Preparedness Act (PAHPA) requires that state-based ESAR-VHP systems be linked through a national database to allow for inter-state verification of volunteer credentials. A number of states have integrated the registry of health professionals with broader efforts to proactively identify and certify emergency volunteers from a variety of nonmedical service sectors.

Medical Reserve Corps (MRC)

The Office of the Surgeon General within HHS began implementing the MRC in March 2002 as part of the White House's USA Freedom Corps Initiative. In FY 2008 the MRC program provided \$9.6 million in grant funds to communities across the country to help organize and utilize volunteers (such as physicians, nurses, pharmacists, and others) to provide and support medical services. These

APPENDIX – continued >

Descriptions of Select Federal Disaster Medical Assistance Program

APPENDIX > Medical Reserve Corps

services can be provided in response to public health emergencies, as well as on a routine basis to promote population health. As of January 2008, over 720 MRC units have been established with almost 150,000 volunteers. Although the majority of these units receive federal grant awards (\$5,000 to \$10,000 per unit), some communities have established MRC units without receiving direct federal funds to do so.

MRC units are organized locally to meet the needs in their community. Unlike the medical response teams organized under NDMS, the structures of MRC units are not standardized, team members are not compensated for services provided during disaster response, and training requirements are less prescriptive. While MRC units are primarily intended to support disaster response in the locality in which they are organized, the PAHPA authorized deployment capacity which is currently being developed. MRC units receive funding through a cooperative agreement established with the National Association of County and City Health Officials, which also provides technical and logistical support for the units. MRC volunteers can be incorporated into the ESAR-VHP registry, but states report problems in coordinating these programs.[¶]

Appendix Endnotes

- * Office of Public Health Disaster Medical Countermeasures, *Project Bioshield, Annual Report to Congress: July 2004 through July 2006*, Office of Public Health Disaster Preparedness, U.S. Department of Health and Human Services (HHS), July 31, 2006; available at www.hhs.gov/aspr/barda/documents/bioshieldannualreport.pdf.
- † Crystal Franco *et al.*, "The National Disaster Medical System: Past, Present, and Suggestions for the Future," *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 5, no. 4 (2007): p. 320.
- ‡ Franco *et al.*, "The National Disaster Medical System," p. 321.
- § HHS, "Federal Public Health and Medical Assistance"; available at www.hhs.gov/disasters/discussion/planners/medicalassistance.html#usp#usp.
- ¶ U.S. Government Accountability Office (GAO), "Emergency Preparedness: States Are Planning for Medical Surge, but Could Benefit from Shared Guidance for Allocating Scarce Medical Resources," GAO-08-668, June 2008, p. 26; available at www.gao.gov/new.items/d08668.pdf.