

Center for Biosecurity of UPMC

Hospitals Rising to the Challenge:

The First Five Years of the U.S. Hospital Preparedness Program
and Priorities Going Forward

Evaluation Report | March 2009

Center for Biosecurity

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Contents

List of Tables and Figures	iii
Executive Summary	v
I. Project Overview	
Summary.....	1
Methodology.....	2
II. State of U.S. Hospital Preparedness Prior to the Hospital Preparedness Program	
Historical Context.....	7
Pre-HPP Hospital Preparedness Research	11
III. History of the Hospital Preparedness Program	
Legislative and Funding History	17
Program Guidance (FY2002–FY2008).....	19
Impact of Guidance Evolution on Data Collection and Reporting.....	20
Hospital Preparedness Research Conducted after HPP Implementation.....	21
IV. Key Findings	
1. Disaster preparedness of individual hospitals has improved significantly throughout the country since the start of the HPP.....	23
2. The emergence of Healthcare Coalitions is creating a foundation for U.S. healthcare preparedness.	36
3. Healthcare planning for catastrophic emergencies is in early stages; progress will require additional assistance and direction at the national level.....	46
4. Surge capacity and capability goals, assessment of training, and analysis of performance during actual events and realistic exercises are the most useful indicators for measuring preparedness.	55
V. Conclusions	
1. The HPP has improved the resilience of U.S. hospitals and communities and increased their capacity to respond to “common medical disasters.”	57
2. The HPP should focus on building, strengthening, and linking Healthcare Coalitions to lay the foundation for a national disaster health and medical response system.	58
3. Administrative adjustments to the HPP could improve the program’s effectiveness and efficiency.	59
4. To prepare the nation to respond to catastrophic emergencies, HHS should provide continued leadership to assist states in their efforts to address the many procedural, ethical, legal, and practical problems posed by a shift to disaster standards and ACFs that is required when demand for care overwhelms available resources.	60
5. Catastrophic emergency preparedness is a national security issue and requires the continued funding of the HPP.....	61

Appendix A.	List of Acronyms	63
Appendix B.	Center for Biosecurity Descriptive Framework for Healthcare Preparedness for Mass Casualty Events: The Framework and Crosswalk of Elements of Preparedness.....	65
Appendix C.	Map of Working Group Participants Contacted for Participation	79
Appendix D.	HPP Guidance Terminology by Year.....	81
Appendix E.	Summary of HPP Program Guidance: FY2002–FY2008.....	83
Appendix F.	Summary of Studies on Hospital Preparedness Since the Establishment of the HPP by Year.....	87

List of Tables and Figures

Table 1. Number of Virtual Working Group Participants by Sector	4
Table 2. Studies on Pre-HPP Hospital Preparedness by Year	12
Table 3. Hospital Preparedness Program Funding: FY2002–FY2009	18
Figure 1. Timeline of Significant Events for Healthcare Preparedness: 1989–2007	9
Figure 2. Percent HPP Hospital Participation by Reporting States, Municipalities, and Territories: 2006 (n = 58)	19
Figure 3. Percentage of Hospitals with Redundant Communications Capabilities by Number of HPP-Participating States, Municipalities, and Territories: 2006 (n = 58)	30
Figure 4. Percent Hospital Use of Corrective Actions/Improvement Plans Following a Drill or Exercise by Number of HPP-Participating States, Municipalities, and Territories: 2006 (n = 58).....	36
Figure 5. HHS Medical Surge Capacity and Capability (MSCC) Framework	39
Figure 6. Multi-Agency Coordination (MAC) Model for Regional Healthcare Emergencies	42
Figure 7. Percentage of HPP-Participating States, Municipalities, and Territories with a Functional ESAR-VHP System that Allows Volunteer Health Professionals to Register for Work in Hospitals or Other Facilities during Emergencies: 2006 (n = 62)	45
Figure 8. Administrative and Clinical Adaptations to Resource-Poor Situations	48

Executive Summary

Hospitals are the backbone of the healthcare response to common medical disasters (i.e., mass casualty events that occur with relative frequency, overwhelm a single hospital, and require a communitywide health response) and, in particular, to catastrophic emergencies, such as an influenza pandemic or large-scale aerosolized anthrax attack. The need for hospitals to be prepared to respond to disasters has increasingly become a priority for hospital leaders. They have been influenced by events such as the 2001 terrorist attacks and Hurricane Katrina and the increased emphasis placed by accreditation organizations and regulatory agencies on the importance of such disasters.

Established by the U.S. Department of Health and Human Services (HHS) in 2002, the goal of the Hospital Preparedness Program (HPP)¹ is to enhance the ability of hospitals and healthcare systems to prepare for and respond to bioterror attacks on civilians and other public health emergencies, including pandemic influenza and natural disasters. Current HPP priorities include strengthening hospital capabilities in the areas of interoperable communication systems, bed tracking, personnel management, fatality management planning, and hospital evacuation planning. Past priorities include improving bed and personnel surge capacity, decontamination capabilities, isolation capacity, pharmaceutical supplies, training, education, drills, and exercises.

The HPP was initially administered by the Health Resources and Services Administration (HRSA). Congress directed the transfer of the HPP to the Office of the Assistant Secretary for Preparedness and Response (ASPR) under the 2006 Pandemic and All-Hazards Preparedness Act (PAHPA).² All 50 states, as well as the District of Columbia, the nation's three largest municipalities (Chicago, Los Angeles, and New York City), the Commonwealths of Puerto Rico and the Northern Mariana Islands, three territories (American Samoa, Guam, and the U.S. Virgin Islands), Micronesia, the Marshall Islands, and Palau, have received over \$2 billion in HPP funding through grants, partnerships, and cooperative agreements since 2002.

In 2007, ASPR contracted with the Center for Biosecurity of the University of Pittsburgh Medical Center (UPMC) (Center) to conduct an assessment of U.S. hospital preparedness and to develop recommendations for evaluating and improving future hospital preparedness efforts. The first deliverable was the Center's *Descriptive Framework for Healthcare Preparedness for Mass Casualty Events*,³ which is a description of the most important components of preparedness for mass casualty response at the local and regional hospital and healthcare system levels (Appendix B). *Hospitals Rising to the Challenge: The First Five Years of the U.S. Hospital Preparedness Program and Priorities Going Forward* is the second deliverable under the contract. It is the Center's assessment of the impact of the HPP on hospital preparedness from the time of the program's establishment in 2002 through mid-2007, as well as our preliminary recommendations for improving the state of U.S. hospital preparedness going forward. This evaluation report is based on extensive analyses of the published literature, government reports, and HPP program assessments, as well as on detailed conversations with 133 health officials and hospital professionals representing every state, the largest cities, and major territories of the U.S.

1 The original name of the program was the National Bioterrorism Hospital Preparedness Program (NBHPP).

2 Public Law No. 109-417.

3 Toner E, Waldhorn R, Franco C, et al. *Descriptive Framework for Healthcare Preparedness for Mass Casualty Events*. Prepared by the Center for Biosecurity of UPMC for the U.S. Department of Health and Human Services under Contract No. HHSO100200700038C. 2008.

Key Findings

Disaster preparedness of individual hospitals has improved significantly throughout the country since the start of the HPP.

Since 2002, individual hospitals throughout the U.S. have made considerable progress in disaster preparedness. For the most part, hospital senior leadership is actively supporting and participating in preparedness activities, and disaster coordinators within hospitals have given sustained attention to preparedness and response planning efforts. Hospital emergency operations plans (EOPs) have become more comprehensive and, in many locations, are coordinated with community emergency plans and local hazards. Disaster training has become more rigorous and standardized; hospitals have stockpiled emergency supplies and medicines; situational awareness and communications are improving; and exercises are more frequent and of higher quality.

The emergence of Healthcare Coalitions is creating a foundation for U.S. healthcare preparedness.

One of the most significant factors contributing to strengthened healthcare preparedness is the emergence of Healthcare Coalitions, which, since the establishment of the HPP, have involved collaboration and networking among hospitals and between hospitals, public health departments, and emergency management and response agencies. These coalitions represent the beginning of a coordinated communitywide approach to medical disaster response. If they can continue to be developed and strengthened around the country, coalitions would logically become the foundation of a more robust national disaster health and medical response capacity, as envisioned in Homeland Security Presidential Directive 21 (HSPD-21),⁴ to respond to catastrophic emergencies in which one community's Healthcare Coalition could come to the assistance of another's coalition. The HPP has played a critically important role in catalyzing the creation of these coalitions, which did not exist in most communities before the program's establishment.

Healthcare planning for catastrophic emergencies is in early stages; progress will require additional assistance and direction at the national level.

The U.S. healthcare system is not currently capable of effectively responding to a sudden surge in demand for medical care that would occur during catastrophic events, such as those described in the Department of Homeland Security (DHS) National Planning Scenarios.⁵ Emergencies of this magnitude would overwhelm the medical capabilities of communities, regions, or the entire country and require drastic departures from customary healthcare practices. Such a "phase shift" in the provision of care to disaster standards would be unlike anything that has ever been done in the U.S. It also is extremely difficult to plan for because it involves the development of clinical standards of care for disasters and a process for implementing such standards, both of which raise complex clinical, legal (federal and state), and ethical issues. Most hospitals and states have begun to address this problem and have found the Agency for Healthcare Research and Quality (AHRQ)/ASPR guidance documents,^{6,7} to be very useful, but none are adequately prepared. While many issues related to developing and implementing disaster standards are ultimately state responsibilities, continued national leadership and direction are essential for sustained state and local progress in catastrophic emergency planning.

4 The White House. Homeland Security Presidential Directive/HSPD-21. October 18, 2007. <http://www.whitehouse.gov/news/releases/2007/10/print/20071018-10.html>. HSPDs were issued by President Bush to communicate decisions about the nation's homeland security policies.

5 U.S. Department of Homeland Security (DHS). National Preparedness Guidelines. http://www.dhs.gov/xlibrary/assets/National_Preparedness_Guidelines.pdf. September 2007.

6 Agency for Healthcare Research and Quality (AHRQ), Assistant Secretary for Preparedness and Response (ASPR). *Altered Standards of Care in Mass Casualty Events*. Prepared by Health Systems Research Inc. under Contract No. 290-04-0010. AHRQ Publication No. 05-0043. Rockville, MD: Agency for Healthcare Research and Quality. April 2005.

7 Phillips SJ, Knebel A, eds. *Mass Medical Care with Scarce Resources: A Community Planning Guide*. Prepared by Health Systems Research, Inc. under Contract No. 290-04-0010. AHRQ Publication No. 07-0001. Rockville, MD: Agency for Healthcare Research and Quality 2007.

Surge capacity and capability goals, assessment of training, and analysis of performance during actual events and realistic exercises are the most useful indicators for measuring preparedness.

The most useful metrics for measuring individual hospital preparedness were those that were clearly defined and not overly burdensome for hospitals. Useful HPP metrics included numerical surge capacity and capability goals (e.g., targets for staff, supplies, and space), training of personnel, and performance during actual events and structured exercises. Measuring individual hospital preparedness should also be based on the Joint Commission Standards for Emergency Management, which already significantly overlap with HPP guidances. Assessment of Healthcare Coalition preparedness should be based on the ability of coalitions to perform critical coalition functions, such as providing situational awareness during an event and maintaining and operating reliable and redundant communications systems.

Conclusions

The HPP has improved the resilience of U.S. hospitals and communities and increased their capacity to respond to “common medical disasters.”

Prior to 2002, most hospitals did not have adequate plans to handle common medical disasters, much less catastrophic emergencies comparable to the National Planning Scenarios. Over the course of six years, the HPP has catalyzed significant improvements in hospital preparedness for common medical disasters. Hospitals have implemented communications systems, incident command system concepts, stockpiles of medicines and supplies, situational awareness tools, and memoranda of understanding for sharing assets and staff during disasters.

The HPP should focus on building, strengthening, and linking Healthcare Coalitions to lay the foundation for a national disaster health and medical response system.

The development of Healthcare Coalitions has been the single most important step toward preparing the U.S. healthcare system to respond to catastrophic disasters that require the healthcare assets of an entire region or the country. A national system of functional Healthcare Coalitions capable of responding to such disasters is unlikely to develop without further federal support and guidance. To be able to respond collectively to these types of catastrophes, the coalitions would need to be coordinated and linked with each other through a nationwide system that could effectively call upon and coordinate all necessary national assets. The development of such a system would clearly need to be integrated with existing federal and state disaster response programs and with the development of a more robust national disaster health and medical system, as outlined in HSPD-21.⁸

Administrative adjustments to the HPP could improve the program’s effectiveness and efficiency.

These changes include: transitioning the HPP grant to a multi-year project cycle, where awardees would have at least two years to complete grant work; streamlining and coordinating all federal grants that contain guidance for hospitals and public health agencies; creating or adopting a healthcare-specific National Incident Management System (NIMS) training program for use by hospitals and public health agencies that participate in the HPP; and continuing to phase in the Homeland Security Exercise and Evaluation Program (HSEEP) standards for hospital exercises and drills in the HPP guidance.

⁸ The White House (2007).

To prepare the nation to respond to catastrophic emergencies, HHS should provide continued leadership to assist states in their efforts to address the many procedural, ethical, legal, and practical problems posed by a shift to disaster standards and alternate care facilities (ACFs) that is required when demand for care overwhelms available resources.

Hospitals and Healthcare Coalitions are struggling with how best to prepare for catastrophic emergencies that may require a shift to disaster standards of care. While many of these issues must ultimately be addressed and resolved at the state and local levels, states continue to struggle with some fundamental issues, including developing clinical guidelines and procedural or legal frameworks for shifting to and using disaster standards. HHS should continue to provide leadership and direction on these issues by: creating a resource for planners across the U.S. to share information on approaches, guidelines, and tools for disaster standards that have been developed by states, medical experts, professional societies, and others; convening a working group specifically focused on implementing disaster standards of care and ACFs and on exploring the development of model legislation or draft executive orders that states could use as templates and adapt; and developing a comprehensive list and description of the common federal and state legal, regulatory, and reimbursement issues associated with creating and implementing disaster standards of care and ACFs to facilitate state and local level planning efforts.

Catastrophic emergency preparedness is a national security issue and requires the continued funding of the HPP.

Significant decreases in annual HPP funding levels would likely stall or impair progress in hospital preparedness and indefinitely delay the country's ability to cope with mass numbers of sick and injured individuals following catastrophic emergencies. Hospitals are already investing their own resources in preparedness. It should not be expected that they can independently maintain and improve upon their levels of readiness for events of national significance without sustained funding. Building a distinct, robust national disaster health and medical system—a national network of healthcare and public health institutions capable of reorienting and coordinating existing resources to respond to mass casualty disasters, as described in HSPD-21—will require planning, staff, supplies, equipment, time, and, in all likelihood, increases in federal funding.

I. Project Overview

Summary

In 2007, the U.S. Department of Health and Human Services' (HHS) Office of the Assistant Secretary for Preparedness and Response (ASPR) contracted with the Center for Biosecurity of the University of Pittsburgh Medical Center (Center) to conduct a two-year, comprehensive assessment of hospital preparedness in the U.S. from the time of the establishment of the Hospital Preparedness Program (HPP) in 2002 through mid-2007 and to develop tools and recommendations for evaluating and improving future hospital preparedness efforts. *Hospitals Rising to the Challenge: The First Five Years of the U.S. Hospital Preparedness Program and Priorities Going Forward* is the second major deliverable for the project. It includes our assessment of the impact of the HPP on hospital preparedness from 2002 through 2007 and our preliminary recommendations for improving the state of U.S. hospital disaster preparedness.

Key project activities include:

1. Developing and delivering to HHS the Center for Biosecurity *Descriptive Framework for Healthcare Preparedness for Mass Casualty Events* (Descriptive Framework), a conceptual model of local and regional hospital and healthcare system preparedness for mass casualty events that outlines the essential elements of hospital disaster preparedness (delivered February 2008). (Appendix B)
2. Convening a Virtual Working Group (Working Group) of local, state, and regional hospital preparedness experts to:
 - a. Assess the accomplishments of the HPP⁹ from 2002 through 2007 and the impact of the program on hospital and community preparedness using the Descriptive Framework as the basis for the analysis. This assessment and accompanying June 2008 Issue Analysis Meeting, which comprised a sub-group of the Working Group, culminated in *Hospitals Rising to the Challenge: The First Five Years of the U.S. Hospital Preparedness Program and Priorities Going Forward* (Evaluation Report) (delivered March 2009).
 - b. Develop a definition (i.e., a goal or vision of success) of preparedness for the U.S. healthcare system moving into the future, and recommend short- and long-term steps that should be taken to achieve the new vision of preparedness. The Working Group findings from the Evaluation Report will inform, but will not be the sole source of information and analysis for, this definition. The definition and recommendations will comprise the forthcoming Preparedness Report (to be delivered Summer 2009).
 - c. Develop Provisional Assessment Criteria for evaluating the program and determine the feasibility of adopting its elements as a tool for routine HPP reporting and assessment, based on the Descriptive Framework and Evaluation Report (to be delivered Summer 2009).

⁹ The program's name has changed over time. It was initially the "National Bioterrorism Hospital Preparedness Program" (NBHPP), but was renamed the "Hospital Preparedness Program" (HPP). Recently, the name changed to the "National Healthcare Preparedness Program" (NHPP). Throughout this report, we refer to the program as the "HPP." The HPP was originally administered by HHS's Health Resources and Services Administration (HRSA), but was moved to HHS's Office of the Assistant Secretary for Preparedness and Response (ASPR), where it now resides, pursuant to the December 2006 Pandemic and All-Hazards Preparedness Act (PAHPA).

4. Testing and refining the Provisional Assessment Criteria for collecting qualitative and quantitative data about hospitals and communities throughout the U.S. for future hospital preparedness evaluations.
5. Evaluating the effectiveness, efficiency, and impact of nine of the 11 demonstration grant projects in the competitive Healthcare Facilities Partnership Program (HFPP) and developing policy recommendations for the HFPP moving forward.
6. Evaluating the effectiveness, efficiency, and impact of the five demonstration projects in the Emergency Care Partnership Program (ECP) and developing policy recommendations for the ECP moving forward.

Methodology

Overview

This Evaluation Report is based on the Center's February 2008 Descriptive Framework, which was developed for and approved by HHS. The Descriptive Framework is a conceptual model of local and regional hospital and healthcare system preparedness for mass casualty events that outlines the essential elements of hospital disaster preparedness. It is based on the Center's comprehensive review and analysis of hospital disaster preparedness documents, including reports, evaluations, handbooks, and studies that were produced before and after the 2002 establishment of the HPP.¹⁰

The project team selected preparedness topics from the Descriptive Framework to structure the Evaluation Report research. Research for the report involved: (1) a comprehensive review of the literature on and history of U.S. hospital preparedness, FY2002-2008 HPP guidances, and HPP data; (2) in-depth conversations through the Working Group with HHS staff and leadership and with hospital preparedness experts in every U.S. state, the District of Columbia, the nation's three largest municipalities (Chicago, Los Angeles, and New York), Puerto Rico, and the U.S. Virgin Islands; and (3) an in-person discussion with Working Group participants during an Issue Analysis Meeting convened in June 2008 by the Center.

Examples of key elements of hospital preparedness from the Descriptive Framework that were addressed in the Working Group and Issue Analysis Meeting discussions include the organization and leadership of preparedness efforts; progress in emergency drills, exercises, and training; situational awareness and communications capabilities; and allocation of scarce medical resources during catastrophic emergencies.

The formal time frame of analysis for the evaluation was limited to the first five HPP program years (FY2002 through FY2006) because many Working Group participants did not receive their FY2007 funding until after our data collection began. However, because many participants had reviewed and may have begun to implement activities from the FY2007 HPP guidance, their responses may also reflect FY2007 planning efforts.

¹⁰ See, e.g., Davis LM, Ringel JS, Cotton SK, et al. *Public Health Preparedness: Integrating Public Health and Hospital Preparedness Programs*. RAND. 2006; Department of Veterans Affairs. *Survey Assessment of VA Medical Centers' Emergency Preparedness*. Final Report. Booz Allen Hamilton. 2005; Agency for Healthcare Research and Quality (AHRQ). *Preparedness for Chemical, Biological, Radiological, Nuclear, and Explosive Events: Questionnaire for Health Care Facilities*. Prepared by Booz Allen Hamilton: Contract No. HHS29020050005C. April 2007; U.S. Department of Health and Human Services (HHS). *Medical Surge Capacity and Capability Handbook*. 2nd ed. <http://www.hhs.gov/disasters/discussion/planners/mscc/index.html>. September 2007; U.S. Department of Homeland Security. Top Officials 4 (TOPOFF 4) full-scale exercise (FSE) after action quick look report. DHS National Exercise Program. November 19, 2007. http://www.fema.gov/pdf/media/2008/t4_after%20action_report.pdf.

Literature Review

To assess the impact of the HPP and to develop a baseline understanding of the state of hospital preparedness prior to the program's implementation in 2002, the project team used PubMed to conduct a comprehensive review of the published U.S. literature from 1995 through 2007 to identify studies that examined hospital preparedness before the establishment of the HPP. The team also conducted a thorough Internet search using the Google search engine as a supplement to the research. Through our review, we identified 10 important surveys of hospital emergency preparedness conducted in the five years before and one year after September 11, 2001 (9/11).

While the literature review for this report focuses on hospital preparedness research conducted before HHS established the HPP in 2002, the project team collectively considered all of the materials identified in the development of the Descriptive Framework (i.e., before and after the implementation of the HPP) to frame the report's evaluation of hospital preparedness from FY2002 through FY2006. The team also reviewed HPP program guidance issued since 2002 and mid- and end-of-year HPP participant data reported to HHS through 2006.¹¹

Virtual Working Group

The project team then used the Descriptive Framework and findings from the literature review to develop a set of discussion topics and questions for analyzing, through a Virtual Working Group (Working Group), the status of hospital preparedness efforts and the major factors that have contributed to hospital preparedness progress. The Working Group phase of the evaluation involved 91 in-depth telephone or in-person conversations with 133 individuals from all states, the District of Columbia, the nation's three largest municipalities (Chicago, Los Angeles, and New York), Puerto Rico, and the U.S. Virgin Islands who had firsthand experience with hospital preparedness efforts (including but not limited to HPP experience).¹² The entire group of participants did not meet together at any one time. A minimum of two project team staff, including at least one senior team member, participated in all conversations. Working Group participants contributed information on a not-for-attribution basis, and all participants were informed that their call was being recorded solely to maintain accuracy for reference purposes. The conversations occurred between January 2008 and August 2008, but the vast majority were held before the June 2008 Issue Analysis Meeting.

The project team identified and recruited Working Group participants by contacting grant coordinators and HPP leaders from each of the 62 jurisdictions participating in the HPP (Appendix C).¹³ Participants included: HPP grant coordinators; state hospital preparedness coordinators; disaster coordinators from academic medical centers, public hospitals, nonprofit community hospitals, for-profit hospitals, small independent hospitals, and hospitals belonging to multi-hospital organizations; emergency medical services (EMS) representatives; healthcare preparedness experts; leaders in healthcare and public health; and leaders of key government preparedness and evaluation efforts (Table 1). Hospital representatives were selected from various types and sizes of institutions in an attempt to assess progress toward preparedness in the range of hospital systems, from rural to urban.

Using open-ended questions, project team members prompted Working Group participants to discuss selected key areas of preparedness identified in the Descriptive Framework, such as: organization, exercises, situational awareness, and surge capacity; the extent to which progress was achieved in those areas; and the extent to which

11 Of the 62 states, municipalities, and territories participating in the HPP, 58 (94%) provided 2006 end-of-year data to ASPR. Of the 5,922 hospitals in those 58 jurisdictions, 5,155 (87%) were identified as HPP participants.

12 While the Northern Marianas, Guam, American Samoa, Palau, Micronesia, and the Marshall Islands also received HPP funding, they are not included in this evaluation because the project team was unable to schedule conversations with their HPP representatives.

13 According to the 2006 HPP data, 13% of U.S. hospitals did not participate in the HPP at the time; many of these hospitals were small, critical access facilities located in rural areas.

the HPP played a role in that progress. Conversations varied based on the participant's position, the history and organization of the HPP in each location, and the degree of progress in preparedness that had been achieved before and during the program at each location.

All participants were asked whether their hospital, community, or state is better prepared now than it was in 2002 and, if so, in what ways. Participants were also asked to comment on how the HPP has contributed to that change. At the end of each conversation, participants were given an opportunity to discuss the HPP's strengths and weaknesses and how they have changed over time, and they were invited to offer suggestions for the program moving forward.

Table 1. Number of Virtual Working Group Participants by Sector

Sector	Number of Participants
Department of Health—Municipality	6
Department of Health—State	31
Department of Health—Territory	2
EMS	3
Hospital	28
Hospital Association	4
Hospital Region	4
Hospital System	6
National Preparedness Leaders	7
Total	91

Issue Analysis Meeting

The Center invited 30 Working Group participants to participate in an Issue Analysis Group to discuss specific hospital preparedness topics in more detail through a structured, in-person Issue Analysis Meeting, *Issue Analysis: Progress in Preparedness and Goals for the Future*. The meeting was held on June 26, 2008, at the Center for Biosecurity in Baltimore, Maryland. The 21 participants who attended were provided with the Descriptive Framework and other background materials to review in advance of the meeting. The meeting was facilitated by Center leadership and senior members of the Center's HPP project team on a not-for-attribution basis and recorded for reference purposes only.

Meeting discussions were organized around the following five key findings from the Working Group conversations to confirm the validity of the findings and allow for further comment:

1. Real progress in individual hospital preparedness has been accomplished.
2. Emerging Healthcare Coalitions are preparedness keystones.
3. Situational awareness and communication tools are improving.
4. More emphasis and rigor in drills and exercises has occurred.
5. Mega-disaster planning is in its early stages.

Participants were also asked to comment on the optimal ways to measure hospital disaster preparedness. That topic will be addressed in greater detail as part of the Provisional Assessment Criteria component of the project, which is a deliverable to be provided to HHS by the Center in 2009. Discussions on each of the meeting topics ranged from approximately 30 to 60 minutes.

Analysis

After each conversation with Working Group participants, the project team compiled notes taken during the discussions and, if needed, reviewed the recordings for verification. The Center identified key themes, novel approaches, successes, and barriers from each conversation, and organized them into topic areas (e.g., hospital leadership, situational awareness, and communications) derived from the Descriptive Framework.

Team members who participated in each call presented a synopsis of the notes to the full project team on a weekly basis and identified comments to track as common themes (e.g., level of overall preparedness, funding, successes, and challenges) or as innovative practices. The project team applied semi-quantitative frequency distributions (i.e., few, some, most, or all) for the common responses, but catalogued novel responses by topic areas that largely corresponded with categories of preparedness in the Descriptive Framework. Particularly creative, successful, or illustrative responses were explored in more detail by team members (e.g., through follow-up phone conversations or by reviewing print or Internet materials) and are used in this report as examples or case studies; the Center obtained permission from applicable Working Group participants to use these examples in the report.

After the majority of discussions were completed, the project team further refined and analyzed the topic areas and themes from the Working Group comments. Through that process, the team identified the five most significant findings or areas that they believed were in greatest need of further exploration and Working Group dialogue. These became the key topics for the June 2008 Issue Analysis Meeting. As with the individual Working Group discussions, the team reviewed, analyzed, and categorized the comments and themes that emerged from the Issue Analysis Meeting. The key findings for the Evaluation Report were derived from both the Working Group and Issue Analysis Meeting discussions. Because the meeting participants were a sub-group of the full Working Group, the findings are referenced throughout this report as being from the Working Group participants. They are described in detail in *Section IV: Key Findings*.

Limitations

Our methodology has several limitations. First, the key findings are based on qualitative data and on impressions of the Working Group participants, whose experience in hospital disaster preparedness varies. Second, the Working Group was not comprised of a statistically representative sample of HPP participants. To understand the experience with the HPP across the country, Working Group participants were selected by the project team to maximize diversity of participants from hospitals, communities, and geographic areas. For these reasons, the findings are likely not generalizable to every hospital throughout the U.S. A third limitation is that while all of the discussions were conducted on a not-for-attribution basis, many of the participants were employed by healthcare institutions receiving HPP funds or were in positions (e.g., state HPP coordinators) directly supported by HPP funds. This might have introduced bias in responses due to perceived concern about loss of funding if responses reflected challenges. Also, while our analysis focused on HPP activities from FY2002 through FY2006, our discussions occurred in 2008. Therefore, participants may have also reported on program and planning activities that took place during FY2007, which was not part of the formal study period.

II. State of U.S. Hospital Preparedness Prior to the Hospital Preparedness Program

To more thoroughly understand and evaluate the current state of hospital disaster preparedness in the U.S., we first conducted research on the historical context that set the stage for the establishment of the HPP and on the published literature of hospital preparedness prior to the program's inception in 2002. This section provides an overview of that history, summarizes the key themes from our review of the 10 studies that examined hospital preparedness before and shortly after the terrorist events of 9/11, and highlights the critical gaps in hospital preparedness before the HPP was implemented.

Historical Context

Events and Threats Stimulating Hospital Preparedness

Disaster preparedness has traditionally focused on meeting the food, shelter, and economic needs of displaced persons and on repairing the physical destruction of infrastructure and has not typically focused on healthcare issues. Historically, some focus was directed to first aid and field triage, but little attention was given to other crucial activities, such as: strengthening the ability of hospitals to effectively provide care when there is a large, sudden surge in patient volume; working with local hospitals and response agencies to optimize patient care during a disaster; and changing the delivery of patient care to ensure the best possible outcome for the greatest number of patients. The lack of focus on hospitals was understandable, given that few disasters in modern U.S. history involved very large numbers of seriously sick or injured individuals. The devastating experiences of the 1900 Galveston hurricane, 1906 San Francisco earthquake, and 1918 influenza pandemic were also largely forgotten.

The focus of hospital disaster planning was historically on protecting facilities and ensuring continuity of operations during natural disasters (e.g., floods and hurricanes). For example, before 2001, the emergency preparedness standards issued by the Joint Commission,¹⁴ an independent, not-for-profit organization responsible for accrediting and certifying more than 15,000 U.S. healthcare institutions and programs, focused primarily on physical threats to the facility. These threats included fire, floods, and loss of utilities and were grouped with the security, safety, and infection control standards rather than in an independent category.^{15,16} Hospital planning for multiple casualties generally focused on the response of individual hospital emergency departments.

Just before and during the 1990s, critical events raised awareness of the increased need for hospital disaster planning (Figure 1). While the threat of nuclear war abated with the dissolution of the Soviet Union, concern about the possibility of mass casualty terrorism on U.S. soil grew. The use of chemical weapons by Iraq against the Iranians and Kurds in the 1980s and the 1995 use of sarin gas by Aum Shinrikyo as a terrorist weapon in Tokyo raised the specter of chemical weapons use against civilians. Revelations in the early 1990s about the massive, secret Soviet bioweapons program and the uncovering of Iraq's biological weapons program after the first Gulf

14 The original name of the Joint Commission is the "Joint Commission on Accreditation of Hospitals" (JCAH). In 1987, the organization changed its name to the "Joint Commission on Accreditation of Healthcare Organizations" (JCAHO) to reflect an expanded scope of activities; this was later abbreviated to the "Joint Commission" (JC). The Joint Commission. *A Journey through the History of the Joint Commission*. Updated March 2008. http://www.jointcommission.org/AboutUs/joint_commission_history.htm. Accessed September 8, 2008.

15 Joint Commission accreditation and certification is recognized nationwide as a symbol of quality that reflects an organization's commitment to meeting certain performance standards. Hospitals pay close attention to the standards because accreditation by the organization enables hospitals to participate in the Medicare program, which is essential to their financial viability. To be accredited, hospitals must pass periodic site visits that assess adherence to JC standards, which address nearly every aspect of hospital operations.

16 See, e.g., Joint Commission on Accreditation of Healthcare Organizations. 1998 Comprehensive Accreditation Manual for Hospitals: Section 2, Management of the Environment of Care. Oakbrook Terrace (IL): JCAHO; 1998.

War convinced many that these types of weapons were more readily available than previously thought. In addition, “loose” nuclear materials became an increased concern, and the threat of nuclear and radiological terrorism emerged as a possibility.

In 1993, Al Qaeda attacked the World Trade Center with a truck bomb that killed six and injured more than 1,000 individuals. Two years later, the terrorist attack on the Alfred P. Murrah Building in Oklahoma City killed 168 and injured more than 800 people, although fewer than 100 were hospitalized overnight. Other natural disasters, such as Hurricane Andrew in 1992 and the 1989 Loma Prieta and 1994 Northridge earthquakes in California, reinforced the critical role of hospitals during catastrophic emergencies.

However, the attacks on the World Trade Center on September 11, 2001, and the anthrax attacks of the same year provided the most significant examples of the threat of mass casualty terrorism in the U.S. and highlighted the importance of healthcare system preparedness. On 9/11, hospitals in New York City initiated their disaster response plans, but found that their previous disaster drills did not adequately prepare staff for the magnitude of the event.¹⁷ After the attack at the Pentagon, hospitals in the Washington, DC, area also responded by activating their respective disaster plans to prepare for potential victims. But the plans were insufficient, as hospitals encountered challenges with communication, patient tracking, data management, staff support, personnel identification, and overcrowding.¹⁸

In October 2001, envelopes filled with *Bacillus anthracis*, the bacterium that causes anthrax, were mailed to media outlets and U.S. Senate offices. Twenty-two illnesses, including five deaths, resulted from these attacks, but thousands of individuals were advised to take antibiotics, and emergency response personnel were asked to investigate countless incidents of “suspicious powder.” Few physicians at the time were familiar with the clinical manifestations, treatment, and prophylaxis of the disease,¹⁹ and the anthrax experience revealed a level of fragility in public health and hospital preparedness. Moreover, the ability to respond effectively to public health emergencies was recognized as a vital component of national security.²⁰

Federal Emergency Preparedness and Response Programs

In the 1990s and in response to 9/11, the federal government developed and strengthened several programs aimed at improving the country’s medical and public health response to disasters (Figure 1). For example, it strengthened the deployable assets of the **National Disaster Medical System (NDMS)**, a federally coordinated system to temporarily supplement federal, tribal, state, and local medical and public health capabilities by providing personnel, supplies and equipment, patient transport, and definitive medical care.²¹ This included increasing the number of NDMS Disaster Medical Assistance Teams (DMATs), which are self-sufficient groups of healthcare professionals and support personnel who are capable of working in austere environments and who can quickly be deployed to a disaster scene to provide short-term medical care to victims.²²

Addressing the increasing concern about terrorism, the federal government created the **Metropolitan Medical Response System (MMRS)** in 1996 to “further enhance and sustain a comprehensive regional mass casualty

17 Feeney JM, Goldberg R, Blumenthal JA, et al. September 11, 2001, revisited: a review of the data. *Arch Surg* 2005;140:1068-1073.

18 Wang D, Sava J, Sample G, et al. The Pentagon and 9/11. *Crit Care Med* 2005;33(1):S42-S47.

19 Quintiliani R Jr, Quintiliani R. Inhalational anthrax and bioterrorism. *Curr Opin Pulm Med* 2003;9:221-22.

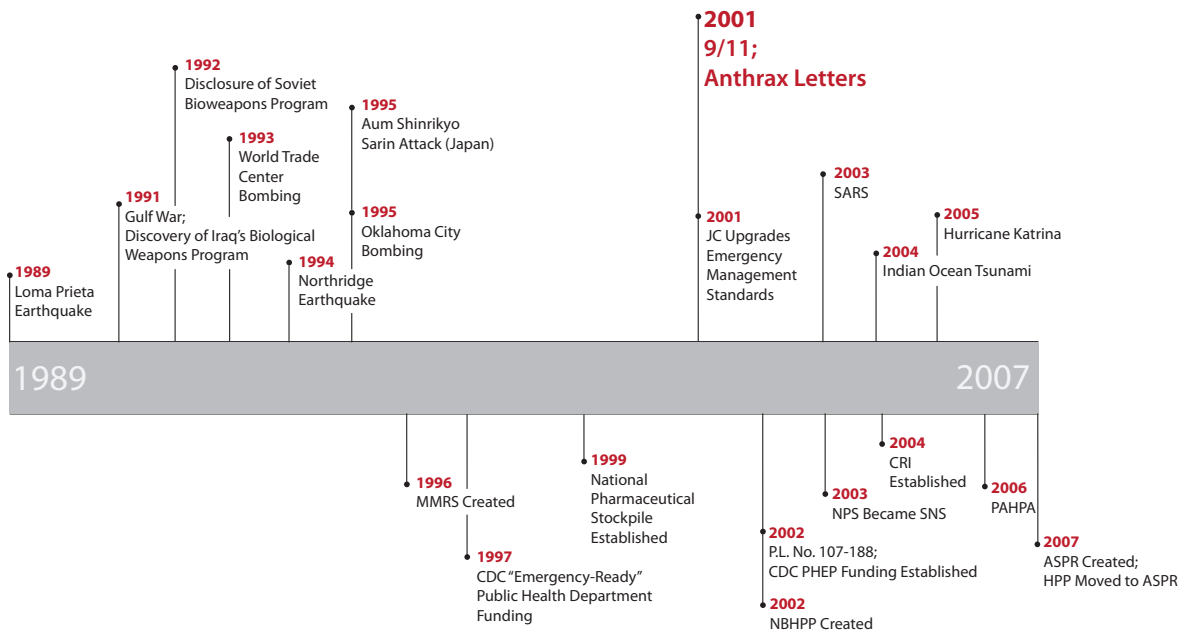
20 Gursky E, Inglesby TV, O’Toole T. Anthrax 2001: observations on the medical and public health response. *Biosecur Bioterror* 2003;1(2):97-110.

21 U.S. Department of Health and Human Services. National Disaster Medical System (NDMS). <http://www.hhs.gov/aspr/oepo/ndms/index.html>.

22 U.S. Department of Health and Human Services. Assistant Secretary for Preparedness and Response. Disaster Medical Assistance Teams (DMAT). <http://www.hhs.gov/aspr/oepo/ndms/teams/dmat.html>.

incident response capability during the first crucial hours of an incident.”^{23,24} MMRS is intended to prepare 124 highly populated jurisdictions for responding to all-hazards mass casualty incidents, such as terrorism, natural disasters, and large-scale hazardous materials incidents.²⁵ While cities and states had the authority to use MMRS program funding to improve hospital preparedness, few did.

Figure 1. Timeline of Significant Events for Healthcare Preparedness: 1989–2007



The events of 2001 also highlighted the significant role that the nation's public health system plays during catastrophic emergencies, as well as the system's weaknesses in responding to crises. The Centers for Disease Control and Prevention (CDC) began providing public health preparedness funds to state and local health departments in 1997,²⁶ but this funding significantly increased after 9/11 and the anthrax attacks.²⁷ In FY2002, CDC granted \$918 million to states, territories, and four large cities for all-hazards preparedness activities through

23 U.S. Department of Homeland Security (DHS). FY 2008 Overview: Homeland Security Grant Program (HSGP), State Homeland Security Program Tribal (SHSP Tribal), Nonprofit Security Grant Program (NSGP), Operation Stonegarden (OPSG), Regional Catastrophic Preparedness Grant Program (RCPPG). July 25, 2008. <http://www.dhs.gov/xlibrary/assets/grant-program-overview-fy2008.pdf>.

24 MMRS is currently part of DHS's Homeland Security Grant Program (HSGP), which also includes the: State Homeland Security Program (SHSP) to enhance state and local capabilities through planning, equipment, training, and exercises and implement goals and objectives included in state homeland security strategies and initiatives in the State Preparedness Report; Urban Area Security Initiative (UASI) to build capabilities in 60 high-threat, high-density urban areas; and Citizen Corps Program (CCP) to engage citizens in personal preparedness, exercises, ongoing volunteer programs, and surge capacity response.

25 DHS (2008).

26 National Association of County and City Health Officials (NACCHO). *Federal Funding for Public Health Emergency Preparedness: Implications and Ongoing Issues for Local Health Departments*. August 2007.

27 U.S. Centers for Disease Control and Prevention. *Public Health Preparedness: Mobilizing State by State*. February 2008. <http://emergency.cdc.gov/publications/feb08phprep/pdf/feb08phprep.pdf>.

the **Public Health Emergency Preparedness (PHEP) Cooperative Agreement**.²⁸ Under the program, funding has been provided to help develop the capacity and capability of public health departments to be “emergency-ready” for a variety of hazards, such as pandemic influenza and anthrax.^{29,30}

Prior to 9/11, CDC had also established programs to improve the nation’s **electronic communications and bio-surveillance systems**. For example, the Health Alert Network (HAN) was created as a nationwide program to ensure that every community has rapid and timely access to emergent health information, a cadre of highly trained professional personnel, and evidence-based practices and procedures for effective public health preparedness, response, and service on a 24/7 basis.³¹ While HAN was established in 1998, the system was only fully activated for the second time since its inception on 9/11.^{32,33,34} Surveillance programs implemented by CDC prior to 9/11 include the Laboratory Response Network (LRN) to maintain a network of laboratories that can respond to biological and chemical terrorism and other public health emergencies,³⁵ the Epidemic Information Exchange (Epi-X) to enable CDC officials, state and local health departments, poison control centers, and other public health professionals to quickly access and share preliminary health surveillance information,³⁶ and the National Electronic Disease Surveillance System (NEDSS) to detect outbreaks rapidly, monitor the health of the nation, and facilitate the electronic transfer of appropriate information from clinical information systems in the healthcare system to public health departments.³⁷ All of these public health programs and funding initiatives have had a beneficial effect on hospital preparedness and situational awareness and, in many jurisdictions, have been conducted in coordination with hospitals.

While these federal programs have had a medical or public health focus, their impact on hospital preparedness is unclear. By enhancing the capabilities of first responders and augmenting emergency medical response, certain programs (e.g., NDMS and MMRS) likely supplemented the ability of many hospitals to care for patients during disasters. Improvements in public health surveillance and preparedness also may have contributed to hospital preparedness in some locations. However, it was not until the 2001 terrorist attacks that the need became clear for healthcare organizations to be prepared to respond to mass casualty events and that existing programs were insufficient to support achieving the necessary level of hospital preparedness. Therefore, the HPP was established in spring 2002 as the first federal program to focus primarily on strengthening the capacity of hospitals to prepare for and respond to disasters. The program will be discussed in detail in *Section III: History of the Hospital Preparedness Program*.

28 NACCHO (2007).

29 Centers for Disease Control and Prevention. Cooperative Agreement Guidance for Public Health Emergency Preparedness. <http://emergency.cdc.gov/cotper/coopagreement/#07>.

30 For example, the Cities Readiness Initiative (CRI) program was established in FY2004 as part of the PHEP program and designed to enhance the ability of 72 CRI cities and metropolitan statistical areas (MSAs) to rapidly dispense medical countermeasures from the Strategic National Stockpile (SNS)—formerly the National Pharmaceutical Stockpile (NPS)—to an entire population within 48 hours of a decision to do so after an anthrax attack. Centers for Disease Control and Prevention. Key Facts about the Cities Readiness Initiative (CRI). April 2, 2008. <http://emergency.cdc.gov/cri/facts.asp>.

31 U.S. Centers for Disease Control and Prevention. Health Alert Network. 2002. <http://www2a.cdc.gov/han/index.asp>.

32 O’Carroll W, Halverson P, Jones DL, Baker EL. The Health Alert Network in action. *Northwest Public Health* 2002; Spring/Summer:14-15.

33 Baker EL, Porter J. The Health Alert Network: partnerships, politics, and preparedness. *J Public Health Manag Pract* 2005;11(6):574-576.

34 U.S. Department of Health and Human Services. Assistant Secretary for Legislation. Testimony of Edward L. Baker. Bioterrorism preparedness: CDC efforts to improve public health information at federal, state, and local levels. December 14, 2001. <http://www.hhs.gov/asl/testify/t011214.html>.

35 U.S. Centers for Disease Control and Prevention. Facts about the Laboratory Response Network. <http://www.bt.cdc.gov/lrn/factsheet.asp>.

36 U.S. Centers for Disease Control and Prevention. Epi-X: the Epidemic Information Exchange. <http://www.cdc.gov/epix/>.

37 U.S. Centers for Disease Control and Prevention. National Electronic Disease Surveillance System. <http://www.cdc.gov/NEDSS/>.

Pre-HPP Hospital Preparedness Research

Summary

To assess the impact of the HPP and develop a baseline understanding of the state of hospital preparedness prior to the program's implementation in 2002, we conducted a comprehensive review of the published literature from 1995 through 2007 to identify studies that examined hospital preparedness before the establishment of the HPP. While we were unable to identify any comprehensive national studies of U.S. healthcare preparedness prior to the HPP, we did identify 10 important surveys of hospital emergency preparedness conducted in the five years before and one year after 9/11 (Table 2).

While each of these 10 studies examined different aspects of preparedness in various geographic areas, collectively they provide a picture of hospital preparedness prior to 2002.³⁸ Overall, hospital preparedness was in the early stages before 9/11. Shortly after the terrorist events of 2001, hospitals significantly increased their preparedness efforts, but these activities focused more on planning than on conducting exercises, drills, and training or on stockpiling necessary equipment and supplies. Despite advances in planning, gaps in preparedness, as defined by our Descriptive Framework, remained in the period immediately before the HPP was implemented in 2002. Following is a summary of these key themes.

Key Themes from the 10 Studies

Hospital preparedness was in the early stages before 9/11.

Of the 10 studies of hospital emergency preparedness that we identified, seven were conducted before 9/11 (i.e., between 1995 and mid-2001).^{39,40} Early research focused on the threats of chemical and hazardous materials (HAZMAT) because the threat of bioterrorism was not yet widely recognized. Studies conducted between 1998 and 2001 expanded the focus by including bioterrorism and, in some cases, radiological and nuclear threats. In these later studies, weapons of mass destruction (WMD) referred to chemical, biological, and nuclear weapons. We also identified four surveys of hospital emergency preparedness that were conducted within one year of 9/11.^{41,42} Although the HPP was initiated in early 2002, most hospitals did not receive their first funding awards until late 2002, so it is reasonable to conclude that surveys conducted before September 2002 reflect pre-HPP activities.

It should also be noted that, prior to 2001, the emergency preparedness standards of the Joint Commission, which has a strong influence on hospital operations, were primarily focused on physical threats to hospital facilities (e.g., bomb threats, floods, and loss of utilities).⁴³

38 However, these studies do not address the quality (e.g., depth and breadth) of planning and training, rigor of exercises and degree to which lessons learned from exercises were incorporated into plan improvement, or the extent of hospital involvement in collaborative planning and response with others in the local community.

39 Cone DC, Davidson SJ (1997); Burgess JL, Blackmon GM, Brodtkin CA, Robertson WO (1997); Wetter DC, Daniell WE, Treser CD (2001); Greenberg MI, Jurgens SM, Gracely EJ (2002); Treat KN, Williams JM, Furbee PM, et al. (2001); Davis LM, Blanchard JC (2002); Braun BI, Darcy L, Divi C, et al. (2004).

40 The Braun et al. (2004) study was conducted in two stages: pre-9/11 (spring 2001) and post-9/11 (spring 2002).

41 Braun BI, Darcy L, Divi C, et al. (2004); Higgins W, Wainright C, Lu N, Carrico T (2004); U.S. General Accounting Office (2003); Niska RW, Burt CW (2003).

42 The Braun et al. (2004) study was conducted in two stages: pre-9/11 (spring 2001) and post-9/11 (spring 2002).

43 See, e.g., Joint Commission on Accreditation of Healthcare Organizations. 1998 Comprehensive Accreditation Manual for Hospitals (1998).

Table 2. Studies on Pre-HPP Hospital Preparedness by Year

Year	Reference	Description
1995	Cone DC, Davidson SJ. Hazardous materials preparedness in the emergency department. <i>Prehosp Emerg Care</i> 1997;1(2):85-90.	Survey of 38 hospitals in the five-county Philadelphia metropolitan area to examine emergency department (ED) preparedness to safely receive, decontaminate, and treat chemically contaminated patients.
1996	Burgess JL, Blackmon GM, Brodtkin CA, Robertson WO. Hospital preparedness for hazardous materials incidents and treatment of contaminated patients. <i>West J Med</i> 1997;167(6):387-391.	Survey of 95 hospital-based facilities providing emergency care in the state of Washington to determine their levels of preparedness for hazardous materials incidents, including the treatment of contaminated patients.
1998	Wetter DC, Daniell WE, Treser CD. Hospital preparedness for victims of chemical or biological terrorism. <i>Am J Public Health</i> 2001;91(5):710-716.	Survey of 186 hospital EDs in four northwestern states (AK, ID, OR, WA) examining hospital preparedness for chemical or biological weapons incidents by reviewing administrative plans, training, physical resources, and representative medication inventories.
2000	Greenberg MI, Jurgens SM, Gracely EJ. Emergency department preparedness for the evaluation and treatment of victims of biological or chemical terrorist attack. <i>J Emerg Med</i> 2002;22(3):273-278.	Survey of preparedness among 54 EDs in the greater Philadelphia area to evaluate and treat victims of a terrorist biological or chemical agent release.
2000	Treat KN, Williams JM, Furbie PM, et al. Hospital preparedness for weapons of mass destruction incidents: an initial assessment. <i>Ann Emerg Med</i> 2001;38(5):562-565.	Assessment of hospital preparedness for weapons of mass destruction (WMD) incidents among 22 rural and eight urban hospitals in FEMA Region III (DC, MD, PA, VA, WV) by examining level of preparedness, mass decontamination capabilities, training of hospital staff, and facility security capabilities.
2001	Davis LM, Blanchard JC. <i>Are Local Health Responders Ready for Biological and Chemical Terrorism?</i> Santa Monica, CA: RAND. 2002.	Nationwide survey of 147 local public health departments and 105 general acute care hospitals (public and private) on their emergency response preparedness in general and specifically for WMD incidents, including bioterrorism.
2001-2002	Braun BI, Darcy L, Divi C, et al. Hospital bioterrorism preparedness linkages with the community: improvements over time. <i>Am J Infect Control</i> 2004;32(6):317-326.	Joint Commission pilot study assessing changes in linkages between hospitals and key community entities related to preparedness for a bioterrorism event before (April-May 2001; 68 hospitals) and after (May-June 2002; 97 hospitals) the events of 9/11.
2002-2003	Higgins W, Wainright C, Lu N, Carrico T. Assessing hospital preparedness using an instrument based on the Mass Casualty Disaster Plan Checklist: results of a statewide survey. <i>Am J Infect Control</i> 2004;32(6):327-332.	Survey based on the Mass Casualty Disaster Plan Checklist and a supplemental bioterrorism preparedness questionnaire (based on an AHRQ checklist) of 116 short-term and long-term hospitals in Kentucky to assess preparedness for mass casualty events.
2002	U.S. General Accounting Office. <i>Hospital Preparedness: Most Urban Hospitals Have Emergency Plans but Lack Certain Capacities for Bioterrorism Response</i> . GAO-03-924. 2003.	Survey of 1,482 urban hospitals with EDs across the U.S. on emergency preparedness, including hospital preparedness for bioterrorism (e.g., data on planning activities, staff training, and capacity for response).
2003	Niska RW, Burt CW. Bioterrorism and mass casualty preparedness in hospitals: US, 2003 (No. 364). U.S. Department of Health and Human Services. <i>Advance Data from Vital and Health Statistics</i> . September 2005.	Survey of 399 hospitals in a supplement of the National Hospital Ambulatory Medical Care Survey (an annual survey of approximately 500 non-federal general and short-stay hospitals) to examine: terrorism preparedness/response plan content; whether plans were updated since 9/11; collaboration with outside organizations; training in managing biological, chemical, explosive, and nuclear exposures; drills; and equipment and bed capacity.

The one study that addressed the basic elements of hospital emergency preparedness at the time, such as general disaster planning, security, drills, and communications, suggests that many, if not most, hospitals probably met those standards.⁴⁴ In January 2001, the Joint Commission significantly broadened the scope of the emergency preparedness standards to emergency management.⁴⁵ For example, the revised standards included requirements for coordinated planning and exercising with local community response agencies, implementation of the incident command system and a hazard/vulnerability assessment (HVA), and planning for four phases of emergency management (i.e., mitigation, preparedness, response, and recovery).⁴⁶ The extent to which these new standards improved hospital preparedness before 9/11 is unclear because they had not yet been widely adopted, but they may have had some positive effect on readiness.

The seven pre-9/11 studies of hospital preparedness collectively show that the level of preparedness among individual hospitals varied throughout the U.S. before 9/11, but was generally in the early stages. Little hospital planning for WMD incidents and other large-scale events occurred, and much of the planning that had taken place focused on chemical incidents. Some hospitals conducted WMD drills and exercises, but few provided WMD education and training to their staff, conducted WMD drills and exercises, or had the capacity for decontamination. In addition, formal inter-hospital and community collaboration on disaster preparedness was uncommon during this time.

WMD planning. Relatively few hospitals incorporated WMD incidents into their emergency planning activities before 9/11, and those that did tended to be in larger urban areas and focused on decontamination after chemical exposures. While a 1995 study of 38 Philadelphia-area hospitals found that 63% of the hospitals had a written plan for decontamination and treatment of chemically contaminated patients in the emergency department,⁴⁷ a later study of 30 rural and urban hospitals in Federal Emergency Management Agency (FEMA) Region III⁴⁸ found that only 27% of the facilities had incorporated WMD preparedness into their disaster plans.⁴⁹ In a 1998 study of hospital preparedness for chemical and biological terrorism conducted among 186 hospital emergency departments in four northwestern states, fewer than 20% had plans for responding to chemical or biological terrorism.⁵⁰

Preparedness for bioterrorism incidents was not as commonly included in hospital disaster plans as was preparedness for chemical incidents. Just prior to 9/11, the RAND Corporation conducted a WMD preparedness study of one acute-care hospital and the public health departments in each of 200 randomly selected counties throughout the U.S.⁵¹ While 54% of the 105 general acute care hospitals reported having written plans for chemical incidents, only 32% had written plans for biological incidents.⁵² In addition, a Joint Commission study on bioterrorism preparedness of 68 hospitals across the country in April and May 2001 found that only 47% had a hospital plan that addressed bioterrorism.⁵³ Preparedness for epidemics and pandemics was not typically addressed in hospital disaster plans before 9/11.

44 Treat KN, Williams JM, Furbee PM, et al. Hospital preparedness for weapons of mass destruction incidents: an initial assessment. *Ann Emerg Med* 2001;38(5):562-565. This study of 30 primarily rural hospitals in West Virginia and the western regions of Pennsylvania, Maryland, and Virginia in 2000 found that all of the responding facilities reported having dedicated telephone lines and radios for use during a disaster and had staff call-in systems that used either a telephone call list or a paging system. In addition, 77% reported having a security plan, with one-half stating that they were able to perform a hospital-wide lockdown without outside assistance.

45 Joint Commission on Accreditation of Healthcare Organizations (JCAHO). 2001 Comprehensive Accreditation Manual for Hospitals: Management of the Environment of Care Standard, E.C. 1.4. Oakbrook Terrace (IL): JCAHO; 2001.

46 JCAHO (2001).

47 Cone DC, Davidson SJ. Hazardous materials preparedness in the emergency department. *Prehosp Emerg Care* 1997;1(2):85-90.

48 District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia.

49 Treat KN, Williams JM, Furbee PM, et al. Hospital preparedness for weapons of mass destruction incidents: an initial assessment. *Ann Emerg Med* 2001;38(5):562-565.

50 Wetter DC, Daniell WE, Treser CD. Hospital preparedness for victims of chemical or biological terrorism. *Am J Public Health* 2001;91(5):710-716.

51 Davis LM, Blanchard JC. *Are Local Health Responders Ready for Biological and Chemical Terrorism?* Santa Monica, CA: RAND. 2002.

52 Ibid.

53 Braun BI, Darcy L, Divi C, et al. Hospital bioterrorism preparedness linkages with the community: improvements over time. *Am J Infect Control* 2004;32(6):317-326.

WMD exercises, training, and education. The research also shows that hospital WMD exercises and drills, training, and education were not widespread before 9/11. For example, the 1995 Philadelphia-area study found that only 34% of the 38 hospitals surveyed had conducted a drill of their plans for decontaminating and treating chemically contaminated patients in the previous year.⁵⁴ The study of 186 hospital emergency departments in four northwestern states in 1998 found that only about 20% of the hospitals had offered any training for staff on incidents involving biological or chemical weapons.⁵⁵ In 2000, the survey of 30 hospitals in FEMA Region III found that less than 25% had provided any education to staff or had conducted any drills related to WMD,⁵⁶ and a study of preparedness among 54 emergency departments in the Philadelphia area found that 61% of the hospitals had conducted a drill involving chemical or biological agents within the previous three years.⁵⁷ However, in 2001, the Joint Commission found that only 19% of the 68 hospitals studied had conducted a drill involving a bioterrorism scenario,⁵⁸ and the RAND Corporation study found the same year that only one out of 10 hospitals with a response plan for a biological incident had exercised their response plans within the past year.⁵⁹

Decontamination capacity. In addition, the studies of hospital preparedness found that hospitals had limited capacity to decontaminate patients before 9/11. For example, only 53% of the 38 hospitals with emergency departments surveyed in the Philadelphia area in 1995 had a specific treatment area for chemically contaminated patients, and only 34% had any type of respiratory protection available for emergency department staff.⁶⁰ In a 1996 study of 95 hospitals providing emergency care in the state of Washington, only 44% of facilities reported having the ability to receive chemically exposed patients, and 41% had no designated decontamination facilities.⁶¹ In addition, the 1998 survey of 186 northwestern hospitals found that while 45% had a decontamination unit, less than one-quarter of the hospitals had the appropriate personal protective equipment (PPE) for chemical decontamination.⁶² By 2000, the situation appeared to have improved moderately. The 2000 assessment of hospital preparedness in FEMA Region III found that most of the 30 hospitals surveyed reported having some decontamination capability.⁶³ However, 73% of the hospitals indicated that this would involve setting up a single decontamination room to handle one victim at a time.⁶⁴ Also in 2000, the survey of Philadelphia-area emergency department preparedness found that 90% of the 54 respondent hospitals reported having some decontamination capacity, but only 7% reported having the ability to decontaminate more than 10 patients per hour.⁶⁵

Collaboration with other healthcare organizations. Before the events of 9/11, formal collaboration between and among hospitals and the community was not widespread. For example, in 2000, the Philadelphia-area emergency department preparedness study found that only 18% of hospitals had mutual aid agreements with neighboring hospitals,⁶⁶ and the FEMA Region III research found that none of the 30 facilities in the study had specific agreements in place for managing large-scale mass casualties that required patient overflow to other facilities.⁶⁷ In 2001, the RAND Corporation study found that 85% of the 105 general acute care hospitals surveyed had informal or formal mutual aid agreements with organizations for disaster and emergency response in general, but

54 Cone DC, Davidson SJ (1997).

55 Wetter DC, Daniell WE, Treser CD (2001).

56 Treat KN, Williams JM, Furbee PM, et al. (2001).

57 Greenberg MI, Jurgens SM, Gracely EJ. Emergency department preparedness for the evaluation and treatment of victims of biological or chemical terrorist attack. *J Emerg Med* 2002;22(3):273-278.

58 Braun BI, Darcy L, Divi C, et al. Hospital bioterrorism preparedness linkages with the community: improvements over time. *Am J Infect Control* 2004;32(6):317-326.

59 Davis LM, Blanchard JC (2002).

60 Cone DC, Davidson SJ (1997).

61 Burgess JL, Blackmon GM, Brodtkin CA, Robertson WO. Hospital preparedness for hazardous materials incidents and treatment of contaminated patients. *West J Med* 1997;167(6):387-391.

62 Wetter DC, Daniell WE, Treser CD (2001).

63 Treat KN, Williams JM, Furbee PM, et al. (2001).

64 Ibid.

65 Greenberg MI, Jurgens SM, Gracely EJ (2002).

66 Ibid.

67 Treat KN, Williams JM, Furbee PM, et al. (2001).

only 12% had such agreements that specifically addressed WMD-related incidents.⁶⁸ Furthermore, the April-May 2001 Joint Commission study found that only 29% of the hospitals studied had participated in the development of community emergency management plans, and only 38% of the hospitals had developed their bioterrorism plans in collaboration and coordination with other entities.⁶⁹

Between 9/11 and early 2002, hospital preparedness activity significantly increased and largely focused on planning.

Immediately after 9/11, hospital efforts to prepare for disaster response substantially increased. Most of these activities focused on hospital planning and began to more comprehensively address WMD events. At the same time, and coinciding with the January 2001 revision and broadened scope of the Joint Commission emergency preparedness standards,^{70,71} many hospitals began to plan and conduct exercises in collaboration with other healthcare organizations in the community. Large-scale purchasing of emergency equipment and supplies (e.g., PPE) and training (e.g., on decontamination procedures) did not appear to have been undertaken until after the start of the HPP in 2002. Hospitals also began to recognize the need for additional funding during this time.

An example of the significant improvement in hospital preparedness elements is found in the follow-up to the April-May 2001 Joint Commission study, which was conducted among 97 hospitals in May-June 2002 (i.e., before hospitals received HPP funds).⁷² The most progress was made in planning during the first few months after 9/11. For example, the study found an 82% relative increase in the percentage of hospitals that had a bioterrorism plan (47% vs. 91%), a 70% increase in the percentage of hospitals that had developed their bioterrorism plan in collaboration with other entities (38% vs. 81%), and a 58% increase in the percentage of hospitals that had participated in the development of community emergency management plans (29% vs. 70%).⁷³ The study also found relative improvements in the occurrence of bioterrorism training and drills. Researchers reported a 51% increase in the percentage of hospitals that had participated in community bioterrorism training (21% vs. 61%) and a 36% increase in the percentage of hospitals that had conducted a bioterrorism drill (19% vs. 48%).⁷⁴ In this study, preparedness elements related to equipment and information sharing showed much less improvement.⁷⁵

A 2002 study of hospital emergency preparedness among 116 hospitals in Kentucky found similar results.⁷⁶ As in the Joint Commission study, most of the improvements in preparedness pertained to planning, with 81% of the hospitals reporting that they had revised their disaster plans after 9/11.⁷⁷ In addition, a bioterrorism preparedness survey of 1,482 urban hospitals conducted by the U.S. General Accounting Office (now the U.S. Government Accountability Office, or GAO) between May and September 2002 found that 81% of the hospitals had bioterrorism plans, most had participated in community planning to some degree, and most had conducted some training on biological agents.⁷⁸ Fewer than half had conducted bioterrorism drills, however, and few hospitals had purchased medical equipment to care for a large surge of patients.⁷⁹

68 Davis LM, Blanchard JC (2002).

69 Braun BI, Darcy L, Divi C, et al. (2004).

70 JCAHO (2001).

71 While much of the improvement that was found in the research was likely spurred by the perceived threat of terrorism, it should also be noted that the Joint Commission revised its emergency preparedness standards in January 2001 to require collaborative planning with other healthcare organizations in the community.

72 Braun BI, Darcy L, Divi C, et al. (2004).

73 Ibid.

74 Ibid.

75 Ibid.

76 Higgins W, Wainright C, Lu N, Carrico T. Assessing hospital preparedness using an instrument based on the Mass Casualty Disaster Plan Checklist: results of a statewide survey. *Am J Infect Control* 2004;32(6):327-332.

77 Higgins W, Wainright C, Lu N, Carrico T (2004).

78 U.S. General Accounting Office (GAO). *Hospital Preparedness: Most Urban Hospitals Have Emergency Plans but Lack Certain Capacities for Bioterrorism Response*. GAO-03-924. August 2003.

79 GAO (2003).

Furthermore, in line with the findings of the previous studies, a 2003 study examining bioterrorism and emergency preparedness of 399 U.S. hospitals found that the vast majority (97%) of hospitals had developed emergency response plans for natural disasters.⁸⁰ While 77% to 85% of the hospitals also had plans for chemical, biological, nuclear/radiologic, or explosive/incendiary incidents, only 63% had plans for natural disasters and all of these incidents.⁸¹ Three-quarters of the hospitals had engaged in some degree of communitywide planning, but less than one-half had a formal memorandum of understanding (MOU) with other local healthcare facilities.⁸² Only 66% of hospitals studied had been involved in any disaster drill involving external organizations, and only a small minority had conducted a drill involving a WMD, explosives, or a severe epidemic.⁸³ Of those involved in external drills, more than one-half of the drills included EMS, police, or fire, but less than one-half included public health, the American Red Cross, or medical suppliers.⁸⁴ The survey did not assess the quality of the plans or address when they were written.

As planning efforts increased after 9/11, hospitals began to recognize the need for additional funding to support such efforts. For example, the 2002 study of hospital preparedness in Kentucky found that the 116 hospitals participating in the survey reported having collectively spent \$1.7 million (an average of \$15,000 per hospital) to increase preparedness in the previous 10 months, but estimated needing \$18.5 million (\$160,000 per hospital) in additional funds, primarily for training and equipment.⁸⁵

Despite progress in planning, significant hospital preparedness gaps remained after 9/11.

As a whole, the post-9/11 studies indicate that even though significant advances in hospital planning had occurred, by 2002 much work still remained for hospitals to improve their disaster readiness. While the studies conducted prior to 9/11 showed a gradual tendency toward more WMD awareness and planning over time, the level of planning greatly increased—particularly with respect to WMD response—immediately after the 2001 terrorist attacks. To a lesser extent, activity increased in the areas of training for hospital staff to respond to WMD events, drilling and exercising plans, and collaborating with community partners, such as emergency response agencies and competing healthcare entities. The least amount of progress seems to have been made in the purchasing of equipment needed to increase surge capacity, decontaminate patients, and protect staff. These findings make sense because developing plans is generally an early step in preparedness efforts and may be less time-intensive or less expensive⁸⁶ than some of the other activities, such as collaborating with community partners, developing and conducting exercises, and purchasing equipment.

However, by early 2002, gaps remained in each of the key areas of preparedness. Although not addressed in the 10 preparedness studies, our analytic work for the Descriptive Framework and our previous research on hospital preparedness suggest that gaps also remained in the areas of leadership and coordination at all levels (i.e., individual hospital, local, regional, state, and federal), situational awareness at all levels, incident management, hospital and community-based surge capacity, and infectious disease isolation capacity.

In addition to the lack of generalizability of the research, the 10 studies have some important limitations. For example, because little guidance on hospital disaster preparedness existed at the time, the quality and consistency of the planning that was reported to have occurred was not addressed. Also, it is difficult to assess the degree of collaboration reported in these studies, particularly because close cooperation between hospitals, especially those that were competitors, and local and state agencies did not typically occur before 2002.

80 The survey was fielded before HPP funds had been fully awarded to hospitals. Niska RW, Burt CW. Bioterrorism and mass casualty preparedness in hospitals: US, 2003 (No. 364). U.S. Department of Health and Human Services. *Advance Data from Vital and Health Statistics*. September 2005.

81 Niska RW, Burt CW (2005).

82 Ibid.

83 Ibid.

84 Ibid.

85 Higgins W, Wainright C, Lu N, Carrico T (2004).

86 Lack of funding appeared to be one of the major barriers for further preparedness. See, e.g., Ibid.

III. History of the Hospital Preparedness Program

Legislative and Funding History

Legislation

In response to the events of 9/11 and the anthrax attacks, President Bush signed into law in January 2002 the *Department of Defense and Emergency Supplemental Appropriations for Recovery from and Response to Terrorist Attacks on the United States Act, 2002*,⁸⁷ which appropriated \$2.9 billion in funding to HHS for bioterrorism preparedness.⁸⁸ The legislation specifically authorized \$135 million in funding through the *Public Health and Social Services Emergency Fund* to improve the capacity of hospitals to respond to bioterrorism.⁸⁹

On February 15, 2002, HRSA issued the first guidance for the NBHPP and announced that \$125 million of the funds would be made available to hospitals through state, territorial, and selected municipal offices of public health in the form of cooperative agreements for FY2002.⁹⁰ State public health departments were used as conduits for these funds because HHS had no point of connection to hospitals other than through the Medicare and Medicaid programs. Creating individual cooperative agreements with approximately 5,000 hospitals was inconceivable.

The original purpose of the NBHPP was:

*“to upgrade the preparedness of the Nation’s hospitals and collaborating entities to respond to bioterrorism. This will also allow the health care system to become more prepared to deal with nonterrorist epidemics of rare diseases. The prime focus will be on identification and implementation of bioterrorism preparedness plans and protocols for hospitals and other participating health care entities. Development of statewide or regional models for such protocols is encouraged, as is collaboration with other States and expert national organizations.”*⁹¹

In June 2002, Congress authorized a continuing response to bioterrorism and other public health emergencies by passing the *Public Health Security and Bioterrorism Preparedness and Response Act of 2002* (Public Law No. 107-188) to improve the ability of the U.S. to prevent, prepare for, and respond to these events.⁹² Among other things, the legislation amended the Public Health Service Act by requiring the HHS Secretary to make available awards of cooperative agreements or grants to improve hospital preparedness for and response to bioterrorism and other public health emergencies; this included awards for partnerships for hospital preparedness. Funding was provided under the *Consolidated Appropriations Resolution, 2003* (Public Law No. 108-7).⁹³

87 Public Law No. 107-117. Department of Defense and Emergency Supplemental Appropriations for Recovery from and Response to Terrorist Attacks on the United States Act, 2002. January 10, 2002.

88 U.S. Department of Health and Human Services. Bioterror funding provides blueprint to build a strong new public health infrastructure [news release]. January 25, 2002. <http://www.hhs.gov/news/press/2002pres/20020125.html>. Accessed September 8, 2008.

89 Public Law No. 107-117. Department of Defense and Emergency Supplemental Appropriations for Recovery from and Response to Terrorist Attacks on the United States Act, 2002. January 10, 2002.

90 Health Resources and Services Administration (HRSA). U.S. Department of Health and Human Services. Bioterrorism Hospital Preparedness Program, Cooperative Agreement Guidance. Washington, DC. 2002.

91 Ibid.

92 Health Resources and Services Administration (HRSA). U.S. Department of Health and Human Services. National Bioterrorism Hospital Preparedness Program, Cooperative Agreement Guidance. Washington, DC. 2003.

93 Ibid.

In concert with the DHS National Preparedness Goal,⁹⁴ the aim of the NBHPP was broadened in FY2005 and FY2006 to include all-hazards preparedness. In addition, the 2006 *Pandemic and All-Hazards Preparedness Act* (PAHPA) (Public Law No. 109-417) had broad implications for a range of disaster preparedness and response activities in addition to hospital preparedness. For example, PAHPA established the Assistant Secretary for Preparedness and Response (ASPR) within HHS and shifted the cooperative agreement program for hospital preparedness from HRSA to ASPR. The legislation also amended section 319C-2 of the Public Health Service Act by authorizing the Secretary of HHS to directly award competitive grants to eligible Healthcare Facilities Partnerships to improve surge capacity and to enhance community and hospital preparedness for public health emergencies, in addition to continuing to authorize the HPP formula grants to states, territories, and the nation's three largest municipalities. Funding for the awards was provided by the *Revised Continuing Appropriations Resolution, 2007* (Public Law No. 110-5).

As noted earlier, the original name of the hospital program was the National Bioterrorism Hospital Preparedness Program, or NBHPP. In FY2007, the name was shortened to the Hospital Preparedness Program, or HPP. Recently, the HPP was renamed as the National Healthcare Preparedness Program (NHPP). The program is currently based in ASPR's Office of Preparedness and Emergency Operations (OPEO).

Funding Awards

As mentioned, the FY2002 NBHPP grants totaled approximately \$135 million; HHS made \$125 million of this amount available in FY2002 to hospitals through cooperative agreements with awardees, which included state, municipal, and territorial health departments. From FY2002 to FY2007, the federal government provided a total of approximately \$2.6 billion in HPP funds (Table 3).

Sixty-two entities, including the 50 states, the District of Columbia, the nation's three largest municipalities (Chicago, Los Angeles, and New York City), the Commonwealths of Puerto Rico and the Northern Mariana Islands, three territories (American Samoa, Guam, and the U.S. Virgin Islands), Micronesia, the Marshall Islands, and Palau, have received hospital preparedness funding as awardees (Figure 2). The funding that these individual awardees have received for each fiscal year is the sum of a fixed base amount and a variable amount that is proportional to each awardee's population. In addition, the awardees have determined which hospitals to fund, how many to fund, and the level of funding to provide to each hospital.

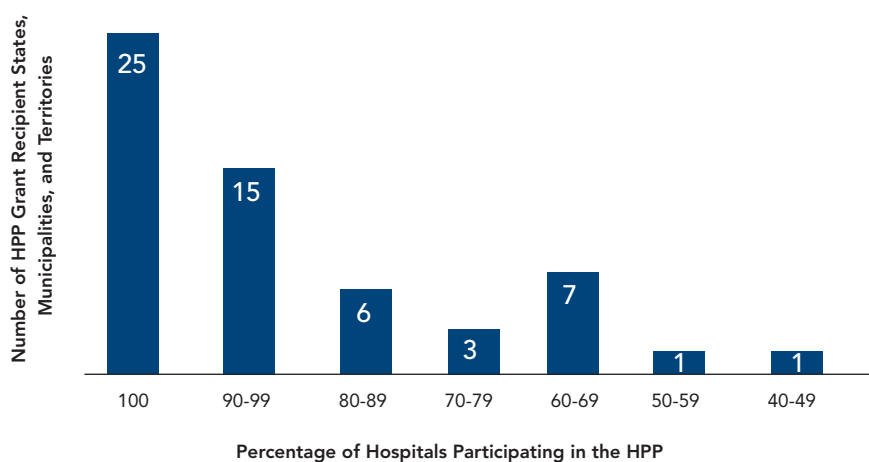
Table 3. Hospital Preparedness Program Funding: FY2002–FY2009⁹⁵

Fiscal Year	Funding (millions)
2002	\$135
2003	\$515
2004	\$515
2005	\$487
2006	\$474
2007	\$474
2008 (estimate)	\$423
2009 (budget)	\$362
Total	\$3,385

94 The goal guides entities at all levels of government in the development and maintenance of capabilities to prevent, protect against, respond to, and recover from major events, including Incidents of National Significance. U.S. Department of Health and Human Services. Assistant Secretary for Preparedness and Response. The Hospital Preparedness Program (HPP). <http://www.hhs.gov/aspr/oepo/hpp/>.

95 Assistant Secretary for Preparedness and Response (ASPR). U.S. Department of Health and Human Services. Announcement of Availability of Funds for the Hospital Preparedness Program. Washington, DC. 2007.

Figure 2. Percent HPP Hospital Participation by Reporting States, Municipalities, and Territories: 2006 (n = 58)⁹⁶



The *Public Health Security and Bioterrorism Preparedness and Response Act of 2002* (Public Law No. 107-188) stipulated that funds received by an awardee could be provided directly to hospitals and other healthcare organizations to enable them to undertake a variety of preparedness-oriented activities in accordance with the awardee's overall preparedness plan. While awardees are currently permitted to use a percentage of allocated funds for certain direct and indirect costs, program guidance has recommended a specific pass-through amount to hospitals. The pass-through amount has varied over time, but, starting in FY2003, the grant guidance has recommended that awardees give hospitals and localities most of their funding (i.e., approximately 75% to 85% of the total funds allocated to each state).⁹⁷ HHS has proposed that the states provide a match of 5% of the HPP award amount for FY2009, and a match amount of 10% starting in FY2010 for the duration of the program.⁹⁸

Program Guidance (FY2002–FY2008)

HHS has issued guidance for each HPP program year as part of the grant application process. This guidance has evolved significantly since FY2002. Originally, the guidance consisted of preparedness benchmarks, such as having 500 hospital beds per million population that could be made available for treating bioterrorism victims. The benchmarks represented the best judgment of the program leaders at the time. Over the years, these benchmarks shifted to sentinel indicators and, later, to performance measures that were thought to be more representative of actual emergency response capacities and capabilities within the healthcare system.

The evolution was not unexpected given that the HPP was a new program that was created quickly in response to unprecedented events of national significance; changes in the program reflected experience that grew over time. It also reflected an attempt by HHS to align the program with other national preparedness and response guidance that was developed during the same period, including the White House Homeland Security Presidential Directives and the DHS National Preparedness Goal and National Response Framework. In addition, within the HPP guidance, there was a growing emphasis on the importance of community-based preparedness and a gradual shift away from the focus on individual hospitals.

⁹⁶ Based on Center for Biosecurity analysis of 2006 ASPR end-of-year grant data.

⁹⁷ HRSA (2003).

⁹⁸ Department of Health and Human Services. Hospital Preparedness Program (HPP). Office of the Assistant Secretary for Preparedness and Response. Notice. 73 FR 28471 (May 16, 2008).

Appendix D defines HPP guidance terminology and lists the years that these terms were used. Appendix E includes a summary of program guidance for each year of the program (FY2002 through FY2008).⁹⁹

Impact of Guidance Evolution on Data Collection and Reporting

The significant changes in the HPP program guidance since the program's inception in FY2002 have both resulted from and led to an evolving understanding of what constitutes the most important elements of hospital preparedness. While these changes were necessary and to be expected with the accumulation of experience, the rapidly evolving complexity and scope of HPP guidance has made it difficult for hospitals to achieve and assess progress toward the program's goals.

Early data collection efforts by the HPP and by awardees reporting to the program were varied and difficult to interpret. The data reported to the HPP provide only a snapshot of the changes that have occurred in selected hospitals and communities as a result of the funding for emergency preparedness activities.¹⁰⁰ Based on our research, observations, and discussions, difficulties in assessing the HPP are the result of the following problems:

1. HPP assessment programs have relied predominantly on qualitative, self-reported data from awardees to monitor progress toward hospital preparedness, which has made it difficult to assess the validity or comparability of responses.
2. Early guidance focused on measuring capacity (e.g., equipment and supplies purchased and personnel hired), but the required level of capacity was unrealistic for some settings, such as rural or critical access hospitals.
3. Definitions used in assessing capacities have not been precise or uniform across institutions and states, which has made execution and evaluation of the program challenging.
4. Awardees have not always covered all capabilities or all aspects of each capability in their reports, which has made assessing the level of preparedness difficult and has complicated data validation efforts and reporting trends or progress across years.
5. No standardized analyses have occurred that would enable CDC and ASPR to compare data across recipients, measure collective progress in public health and hospital preparedness, or provide consistent feedback to recipients.¹⁰¹
6. Ongoing modifications and additions of benchmarks, combined with short grant cycles, have made it difficult for awardees to produce meaningful and representative reports on progress toward preparedness. Burdensome reporting requirements have caused some hospitals to decline to participate in the program.
7. HPP, CDC, and DHS grants have had different requirements and different reporting demands for hospital preparedness that often are not well aligned.

⁹⁹ While our research focuses on hospital preparedness from 2002-2007, we have included the FY2008 HPP guidance for reference.

¹⁰⁰ See, e.g., U.S. General Accounting Office. *HHS Bioterrorism Preparedness Programs: States Reported Progress but Fell Short of Program Goals for 2002*. Briefing for Congressional Staff. GAO-04-360R. February 10, 2004; Healthcare Resources and Services Administration. *NBHP 2005 Program Accomplishments*. August 2006; *Ready or Not? Protecting the Nation's Health from Diseases, Disasters, and Bioterrorism*. Trust for America's Health. Washington, DC. December 2007; U.S. Government Accountability Office. *Emergency Preparedness: States Are Planning for Medical Surge, but Could Benefit from Shared Guidance for Allocating Scarce Resources*. GAO-08-668. June 2008.

¹⁰¹ U.S. Government Accountability Office (GAO). *Public Health and Hospital Emergency Preparedness Programs: Evolution of Performance Measurement Systems to Measure Progress*. GAO-07-485R. March 23, 2007.

8. The short, single-year HPP funding cycle has made it difficult for hospitals to complete planning, implementation, and evaluation of emergency preparedness programs within each cycle.

Hospital Preparedness Research Conducted after HPP Implementation

Several surveys of hospital and public health preparedness have attempted to assess the state of hospital preparedness since the establishment of the HPP in 2002 (Appendix F). This research was based on data from a variety of sources, including state emergency preparedness documents, HPP awardee self-reported mid-year and end-of-year progress reports, surveys of infection control professionals involved in individual hospital preparedness, and surveys of overall public health preparedness efforts that included elements relevant to hospital preparedness.

Similar to the pre-HPP studies on hospital preparedness, none of these studies individually provides a comprehensive assessment of the state of hospital disaster preparedness. Collectively, though, the studies indicate gradual progress toward better preparedness as judged by the HPP guidance and our Descriptive Framework. For example, they provide evidence of progress in collaboration between hospitals and public health departments, integration of hospitals into communitywide planning and drills, and building of hospital surge capacity. The studies also indicate that significant gaps remain in a number of areas, including plans for staffing, large-scale isolation of infectious patients, and disaster standards of care.

IV. Key Findings

This section outlines the project team's most significant observations and analyses concerning U.S. hospital preparedness since the establishment of the HPP in 2002. These findings are based on our discussions from the Virtual Working Group and Issue Analysis Meeting. A total of 133 individuals from all 50 states and the largest municipalities and territories participating in the HPP engaged in these discussions. All of these individuals have firsthand experience with the HPP and with hospital disaster preparedness and response. The project team selected preparedness topics from the Descriptive Framework to structure these conversations. Topics of discussion included, but were not limited to: the organization and leadership of preparedness efforts; progress in emergency drills, exercises, and training; situational awareness and communications capabilities; and surge capacity and allocation of scarce medical resources during catastrophic emergencies. Participants were asked to assess the extent to which progress has been achieved in those areas and the extent to which the HPP has played a role in that progress.

These discussions and project team analyses revealed the following findings: (1) the disaster preparedness of individual hospitals has improved significantly throughout the country since the start of the HPP; (2) the emergence of Healthcare Coalitions is creating a foundation for U.S. healthcare preparedness; (3) healthcare planning for catastrophic emergencies is in the early stages and progress will require additional assistance and direction at the national level; and (4) surge capacity and capability goals, assessment of training, and analysis of performance during actual events and realistic exercises are the most useful indicators for measuring preparedness. These findings are described in detail below.

1. Disaster Preparedness of Individual Hospitals Has Improved Significantly Throughout the Country Since the Start of the HPP.

Our assessment is that individual hospitals throughout the U.S. have achieved considerable progress in disaster preparedness since the inception of the HPP. The Descriptive Framework identifies hospitals as the backbone of the medical response to mass casualty emergencies and outlines key preparedness and response activities. These activities include engaging senior leadership in disaster planning, appointing hospital disaster coordinators, conducting emergency operations planning and training, stockpiling and tracking equipment and supplies, establishing systems for achieving situational awareness and communications capabilities, conducting rigorous exercises, and making dynamic improvements to emergency operations plans. Our research suggests that hospital preparedness has significantly improved in each of these areas since 2002.

Of note is that not all hospitals participate in the HPP. According to the 2006 HPP data, 13% of U.S. hospitals did not participate in the HPP during that year. Working Group participants informed us that many of the nonparticipating hospitals are small, critical access facilities located in rural areas; they do not participate either because the grant requirements are not applicable to them or because they do not have the resources to fulfill the requirements. Many of these hospitals do participate in preparedness and response activities, but not in an official capacity through the HPP. Other nonparticipating hospitals may include Indian Health Service hospitals and U.S. Department of Veterans Affairs (VA) hospitals; Working Group participants expressed confusion about whether Indian Health Service hospitals or VA hospitals were permitted to participate in the program. We also heard that a small number of hospitals elected not to participate in the HPP because they were unconvinced about the value of the program when weighed against the necessary investment of their time and resources. Only a very small number of hospitals have dropped out of the HPP.

Hospital Senior Leaders Have Increasingly Recognized the Importance of Disaster Preparedness Activities.

We found that, since 2002, hospital leadership, including chief executive officers (CEOs) and members of senior management, have increasingly considered hospital disaster preparedness to be an important issue that is worthy of their attention. Gaining the buy-in and support of hospital leadership, especially CEOs, is critical to hospital participation in preparedness activities. Prior to the HPP program, many CEOs did not view disaster preparedness as a critical issue and were reluctant to collaborate with other hospitals that they regarded principally as competitors, not allies. Concerns about sharing proprietary information, such as bed availability, hampered hospitals' participation in communitywide disaster preparedness efforts. The CEOs who did recognize the importance of disaster preparedness prior to 2001 typically had firsthand experience with the impact of disasters on their own hospitals. The reported reasons for increased CEO interest and participation since the beginning of the HPP include a heightened perception of the threat of disasters to hospital operations, the need to adhere to Joint Commission preparedness standards for accreditation, and the HPP, which has facilitated planning efforts.

Hospital leaders have a more realistic perception of the threat of disasters.

Nearly every Working Group participant indicated that hospital senior management has become increasingly convinced of the need for hospital disaster preparedness and that, in recent years, hospital leaders have become significantly more engaged in the preparedness process. For many, this interest and involvement is due to a heightened perception of risk to hospital operations resulting from events such as the terrorist attacks of 2001, Hurricanes Katrina and Rita, and other natural disasters (e.g., California wildfires and Iowa floods).

Preparedness efforts occurring in Oklahoma illustrate this shift in CEO involvement. The 1995 Oklahoma City bombing, which resulted in more than 500 injured patients requiring hospital care in Oklahoma, and the May 1999 tornados, during which Oklahoma hospitals treated more than 700 injured patients, pushed hospital disaster response capacity "to the maximum"¹⁰² and spurred the CEOs of Tulsa, Oklahoma, hospitals to become very involved in mass casualty preparedness and response activities. In Tulsa, the disasters led to the formation of Regional Medical Planning Groups (RMPGs). In these groups, hospital CEOs or other senior-level hospital representatives participate in monthly meetings to work on regional medical response plans and other preparedness projects.¹⁰³ Hospital leadership also represents Tulsa hospitals at the local Medical Emergency Response Center (MERC), a medical version of an emergency operations center (EOC) that facilitates hospital collaboration and response decisions and provides resources to hospitals during a disaster.

Joint Commission preparedness standards provided a stimulus for the engagement of senior hospital leadership and investments in preparedness.

Accreditation from the Joint Commission, which is the principal U.S. hospital accreditation organization, is a key condition for hospitals to participate in the Medicare program.¹⁰⁴ More than 90% of U.S. hospitals are accredited by the organization.¹⁰⁵ Therefore, another impetus for increased hospital leadership engagement in preparedness efforts is the greater emphasis on emergency preparedness mandated by the Joint Commission. The 2008–

102 Special report. The Oklahoma City bombing: mass casualties and the local hospital response. *Hosp Secur Saf Manage* 1995 Sep;16(5):5-10. <http://www.ncbi.nlm.nih.gov/pubmed/10151262>. Accessed September 10, 2008.

103 Oklahoma State Department of Health. Regional Medical Planning Groups (RMPG). http://www.ok.gov/health/Disease_Prevention_Preparedness/Public_Health_and_Medical_Systems_Preparedness_and_Response/Hospital_&_Medical_System_Partners/Regional_Medical_Planning_Groups/index.html#2008. Accessed September 10, 2008.

104 Under the Social Security Act (42 USC § 1395bb), "a hospital that meets Joint Commission accreditation is deemed to meet the Medicare Conditions of Participation, a requirement for Medicare reimbursement."

105 Ibid.

2009 Joint Commission Emergency Management Standards for hospitals focus heavily on emergency planning and exercising with community partners,¹⁰⁶ which were not major focal points in previous years. Hospital CEOs and disaster coordinators around the country have commented that while the new requirements are challenging, hospitals will work to comply with them in order to maintain their Joint Commission accreditation.

The HPP created a forum for hospitals to participate in communitywide planning.

The HPP grant provided a framework and a driver and seed money for preparedness efforts that otherwise would have gone unfunded and undone. — State Public Health Department Official

The presence of the Hospital Preparedness Program grant money really serves as the incentive, as the glue, as the impetus to drawing people together on a monthly basis...to hammer out issues around setting priorities, and putting budgets together, and looking at training and drills and exercises. — Hospital Disaster Coordinator

The HPP provided a critical impetus for hospital leadership to engage in preparedness efforts and has galvanized hospital preparedness. Participants reported that HPP funds gave hospitals an initial reason to collaborate with one another, even if simply to determine how to divide and spend the grants allocated to the states. The grant program has also provided useful guidance, which has given structure to preparedness efforts that were largely amorphous before 2002. While legitimate critiques of HPP funding levels, grant mechanisms, and guidance have been reported, the overwhelming majority of Working Group participants reported that the progress made in hospital preparedness to date would not have been as substantial without the HPP.

For example, in Houston, Texas, it was reported that hospital executives would not have invested their own resources or time in preparedness without the HPP grants. Prior to 2001, only the 10 largest hospitals in the Houston area had committed time and money to preparedness. Leaders of the approximately 75 remaining hospitals in the area did not see the need for preparedness or have the resources to commit to preparedness efforts. It was not until the HPP grants were initiated that other hospitals in Houston became engaged and began to prepare. Now, nearly all Houston-area hospitals are involved in preparedness activities, which are more advanced and coordinated than before the HPP.

Appointments of Disaster Coordinators within Hospitals Have Increased the Quality of Planning Efforts.

Working Group participants agreed overwhelmingly that hospital preparedness took a major step forward in recent years with the establishment of full- or part-time hospital disaster coordinator¹⁰⁷ positions, and that HPP funding for these positions has been essential to making them possible. Hospital disaster coordinators are hospital employees who provide sustained and expert attention to and knowledge of preparedness and response planning efforts. In many cases, hospitals have used their HPP grant funds to appoint such coordinators.

Responsibilities of hospital disaster coordinators include interacting with the hospital CEO to obtain executive-level endorsement of activities, coordinating preparedness activities at the facility and/or health system levels and with regional hospital organizations, and interacting with the state-level HPP coordinator. In some hospitals, the disaster coordinator is an administrator who has regular access to hospital executives and significant influence

106 The Joint Commission. History Tracking Report: 2009 to 2008 Requirements. Accreditation Program: Hospital. Chapter: Emergency Management. 2008. http://www.jointcommission.org/NR/rdonlyres/D5607767-744C-462D-9527-B9B0E464C524/0/HAP_EM_09_to_08.pdf. Accessed August 13, 2008.

107 For the purposes of this report, “hospital disaster coordinators” refer to the staff who are engaged in emergency planning and response within individual hospitals. They are distinguished from the state-level HPP designees, whose titles vary by state (e.g., bioterrorism, hospital preparedness, or emergency preparedness coordinators).

on the preparedness policy decisions at the highest levels of management. In other hospitals, the coordinator is situated at the practitioner level (e.g., infection control nurse) with minimal access to the facility's executive-level decision makers. Most participants agreed that disaster coordinators are the most effective when they are both involved in day-to-day preparedness activities (e.g., planning, drills, stockpile management) and have access to hospital leadership.

Working Group participants identified several barriers to hiring hospital disaster coordinators using HPP grant funds, including delays associated with state-level contracting and hiring procedures, delays in states' distribution of HPP funds to hospitals, insufficient HPP funds, state funds being spread too thinly across multiple hospitals, and confusion about whether the HPP allows the funds to be used for the coordinator positions (e.g., in some states, the HPP guidance was interpreted as prohibiting such hiring unless the coordinator represented more than one hospital). Because the HPP funding is not always sufficient to cover the full costs of the positions, many hospitals provide additional support for the coordinators through supplemental funding, staff time on the hospital payroll, and/or training provided by or paid for by the hospital. Some hospitals, however, have found it difficult to allocate the necessary funding and staff time for this position.

According to Working Group participants, hospitals that have used the funds for these positions have been the most successful in maintaining the positions and ensuring that they are dedicated to hospital preparedness. Participants urged continued HPP funding for the appointment of these disaster preparedness coordinators.

Hospital Emergency Operations Plans Have Become More Rigorous and Coordinated with Community Emergency Plans.

Over the course of the last six years [hospitals] have taken [preparedness planning] much more seriously...doing hazard vulnerability analyses, seeing what their local threat really is.

— Hospital Disaster Coordinator

While most hospitals had facility disaster plans before the HPP, those plans were primarily focused on the individual hospital facility itself and did not account for local hazards or existing emergency plans in the surrounding community. Since 2002, hospital disaster planning has become more rigorous and comprehensive as a result of the HPP funds. The 2006 end-of-year HPP data, which was self-reported to ASPR from HPP states, municipalities, and territories, indicated that 81% of hospitals participating in the program had integrated their individual facility emergency response plans with community planning efforts.¹⁰⁸ Hospitals have also worked with key response partners, such as public health agencies, EMS, emergency management agencies, fire departments, law enforcement agencies, and others to delineate hospital roles in an emergency response.¹⁰⁹ This finding is consistent with findings from a 2003 study by the RAND Corporation on general acute care hospitals' and local health departments' participation in the HPP and/or the CDC PHEP Cooperative Agreement Program.¹¹⁰ RAND found that 98% of 103 general acute care hospitals surveyed had an emergency response plan in place, and 82% of those plans addressed integration with local community organizations.¹¹¹ The report concluded that their results were "consistent with the hypothesis that the influx of bioterrorism funding following the 9/11 attacks helped facilitate adoption of such...coordination mechanisms."¹¹²

108 U.S. Department of Health and Human Services. Assistant Secretary for Preparedness and Response (ASPR). Hospital Preparedness Program 2006 End-of-Year Data. Data provided by HPP grantees to ASPR.

109 Ibid.

110 Davis LM, Ringel JS, Cotton SK, et al. (2006).

111 Ibid.

112 Ibid.

Working Group participants emphasized, though, that simply having a plan is not enough. Significant preparedness gains have occurred when the plans are tested frequently by announced and unannounced drills and exercises. Preparedness is also enhanced when plans and exercises are realistically grounded in a hazard vulnerability analysis, which is an examination of the local dangers that threaten a community (i.e., natural hazards, such as floods, tornados, hurricanes, and earthquakes; terrorism; and infrastructure failure, such as power failures, bridge collapses, and water main breaks), as required by the Joint Commission.¹¹³

Disaster Training at Individual Hospitals Is More Detailed, Realistic, and Better Tailored to Specific Roles and Responsibilities of Hospital Staff.

Interest is up; [hospital] assets have increased, which is increasing our capability, but from my perspective...it's not enough just to have staff; you have to have staff who are capable of doing that in-depth, sophisticated, critical thinking on how you're going to mobilize, track, and use all these assets. — Hospital Administrator

There has been the need to implement an incident command structure within your hospital and your hospital system... That was something new for many... [For] those...from fire and law enforcement, this is second nature, but it is not so for hospitals and not for public health. — Hospital Disaster Coordinator

The implementation of more comprehensive disaster training at hospitals is another factor contributing to improved individual hospital preparedness. The HPP has funded training for hospital personnel in every grant year since 2003. Disaster preparedness requires that hospital personnel be trained in multiple response elements, ranging from disaster clinical care to the Incident Command System (ICS), and be familiar with responses for a variety of scenarios, including epidemics, WMD incidents, and natural disasters. Working Group participants recognized that the HPP grants have contributed significantly to training healthcare personnel in critical areas, including bioterrorism-specific threats, medical response, behavioral health consequences of public health emergencies, the Hospital Incident Command System (HICS), volunteer management, disaster triage, decontamination, patient isolation, and the National Incident Management System (NIMS).¹¹⁴

NIMS training, which is an HPP program element, has presented particular challenges to hospitals. According to many Working Group participants, NIMS has been difficult to implement due to its considerable time requirements, associated costs, and the fact that it is designed for traditional first responders (i.e., police and fire) and not healthcare workers. Many participants voiced the opinion that the NIMS training requirement—particularly the upper-level training (e.g., ICS-300 and ICS-400 courses), which require off-site classes lasting up to three days—are too long and are not appropriate for all members of hospital senior leadership. Nonetheless, hospitals have invested heavily in assimilating NIMS. Participants noted that NIMS training was valuable for the subset of hospital personnel with significant incident command responsibilities; those who had been trained in NIMS

113 McLaughlin SB. Hazard vulnerability analysis summary: Joint Commission on Accreditation of Healthcare Organizations. *Healthcare Facility Management Series*. February 2001. <http://www.gnyha.org/23/File.aspx>. Accessed September 12, 2008.

114 NIMS provides a consistent, nationwide template for federal, state, tribal, and local governments and private sector and nongovernmental organizations to work together effectively and efficiently to prepare for, prevent, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. NIMS benefits include a unified approach to incident management; standard command and management structures; and an emphasis on preparedness, mutual aid, and resource management. FEMA. Frequently Asked Questions. July 12, 2007. <http://www.fema.gov/emergency/nims/faq/compliance.shtm>.

were better able to respond effectively according to their defined role during an exercise or actual disaster than those without NIMS training. According to the 2006 end-of-year HPP data, 79% of HPP-participating hospitals demonstrated the ability to collect, collate, and communicate public health and clinical health information to key response partners in compliance with NIMS.¹¹⁵

Some healthcare systems have shortened and shaped the NIMS trainings for their employees to provide a more specific healthcare context. In 2007, for example, Kaiser Permanente created a training course for hospitals and healthcare providers that encompasses the NIMS ICS-100 Healthcare, ICS-200 Healthcare, and IS-700 Incident Command course requirements. Kaiser Permanente has made the course available to other hospitals at no cost.¹¹⁶ A number of Working Group participants reported taking this course and found that it provided succinct explanations of how hospitals fit into the NIMS structure and the roles of hospital personnel during a disaster. They also suggested that HHS consider building on this experience and develop hospital-specific NIMS courses for all states and HPP participants.

Hospitals Have Purchased and Stockpiled Equipment, Supplies, and Medicines.

Since the HPP began in 2002, the program has recommended that hospitals purchase and stockpile certain items for mass casualty events. Working Group participants indicated that the funding and guidance has greatly assisted hospitals in making these purchases and stockpiling the items. In many instances, hospital disaster planners identified stockpiling as a major step forward in making their institutions better prepared to respond to a disaster, particularly because most operate within just-in-time delivery systems with limited reserves of equipment, supplies, and medicine. The 2006 end-of-year HPP hospital data show that 79% of participating hospitals reported having stockpiled, per federal guidelines, appropriate PPE for staff and volunteers who would be at risk during a public health emergency.¹¹⁷

In Nevada, the State Health Division sub-granted HPP funds for the purchase of pharmaceutical caches, decontamination equipment, and PPE to be stored and utilized by acute care hospitals. Each of these purchases has improved the capability of the state's healthcare system to respond to biological and chemical incidents. The Nevada State Health Division also used HPP funds to purchase an information management system (Hospital Available Beds for Emergencies and Disasters, or HAvBED) for hospitals and healthcare facilities to electronically maintain and track the status of beds that are available on a daily basis. Training is currently being provided to hospitals on the HAvBED tracking system with the expectation that it will be utilized as a tool to share information (e.g., available beds and emergency/event status) and possible resources (e.g., staff and supplies) if needed during an event that requires the evacuation of a facility or redirection of incoming patients. Through the HPP grant, the state has also begun the process of upgrading interoperable communications within hospitals by purchasing equipment that will allow for redundant and dependable communications. Without the HPP funding, this scale of purchasing and stockpiling would not have been possible.

Although a majority of HPP hospitals around the country have stockpiled equipment, supplies, and pharmaceuticals, a number of participants reported that hospitals have a difficult time maintaining the stocks and replacing used or dated products. It was suggested that HHS consider developing a mechanism to help organize and finance the rotation of hospital disaster preparedness stockpiles.

115 ASPR. Hospital Preparedness Program 2006 End-of-Year Data.

116 Kaiser Permanente. National Incident Management System (IS 700), Incident Command System (IS 100 HC and 200 HC): Course for Hospitals and Healthcare Providers. <http://www.uha-utah.org/Disaster%20Prep%20Materials/01.%20%20NIMS-ICS%20Course%20Introduction%20Letter.pdf>. Published March 19, 2007. Accessed September 12, 2008.

117 ASPR. Hospital Preparedness Program 2006 End-of-Year Data. The data did not indicate which federal guidelines recommended the PPE stockpiling.

Situational Awareness and Communications Are Critical to Hospital Responses and Are Improving.

Access to accurate and timely situational information and the ability to communicate are critical components of effective hospital responses to emergencies. Based on our research, these capabilities are improving. Situational awareness, a term that was originally developed and used by the military, is defined as:

*“The knowledge and understanding of the current situation which promotes timely, relevant and accurate assessment of friendly, competitive and other operations within the battlespace in order to facilitate decision making. An information perspective and skill that fosters an ability to determine quickly the extent and relevance of events that are unfolding.”*¹¹⁸

In the Descriptive Framework, we applied this concept to healthcare emergency response:

*“An optimal response to a healthcare emergency requires: (1) an ongoing flow of information (as reliable, complete, and near-real time as possible) about the nature and unfolding consequences of the event; (2) the ability to interpret that information and understand its implications for the healthcare institution and its community; and (3) the ability to use that analysis to anticipate what may happen next. To be of greatest use, the information and analysis must be shared with appropriate personnel within the institution and with appropriate members of the community. Therefore, this description of situational awareness includes not only the gathering of information, but also its analysis, distribution, and influence on response actions. It also includes communications with hospital staff, community partners, the media, and the public.”*¹¹⁹

Working Group participants agreed that situational awareness is essential in a crisis. The elements of situational awareness that the healthcare sector would need during a crisis include, at a minimum, knowledge of available resources (e.g., quantity and location of hospital beds, personnel, and supplies) and number and types of patients. Individual hospitals need to know the number and types of patients that they can expect to see at their facility, the resources that they have available, and the resources that might be available from neighboring hospitals and local or state agencies. Local and state emergency response and public health agencies need to know similar information about each hospital in their jurisdiction in order to effectively manage the response.

For example, in responding to the 2003 Station nightclub fire in Rhode Island, each hospital needed to know how many patients it might receive and the extent and type of injuries involved to be ready for an influx of patients. Unfortunately, this information was not available to many hospitals when they needed it. They also needed to know how many available beds they had and how many beds they could quickly make available. Furthermore, the hospitals needed to know how many physicians and nurses were available to treat and provide care to incoming burn victims, where these personnel were, and how to reach them. The state’s emergency management and EMS agencies needed to know the total number of patients, types of injuries, and the number of beds and type of personnel available at each hospital in order to optimally distribute the patients to the facilities. They also needed to know the quantity and location of ambulances, helicopters, and emergency responders available for transporting injured victims. Because both the communication infrastructure and plans for sharing information were inadequate at the time, much of this critical information was not available to the decision makers when and where it was needed. As a result, some hospitals were overwhelmed while others were underutilized, and more patients than necessary required inter-hospital transfers.¹²⁰

118 Army Business Transformation Knowledge Center. About situational awareness (citing Army Field Manual 1-02, September 2004). <http://www.army.mil/armyBTKC/focus/sa/about.htm>.

119 Center for Biosecurity. Descriptive Framework (2008).

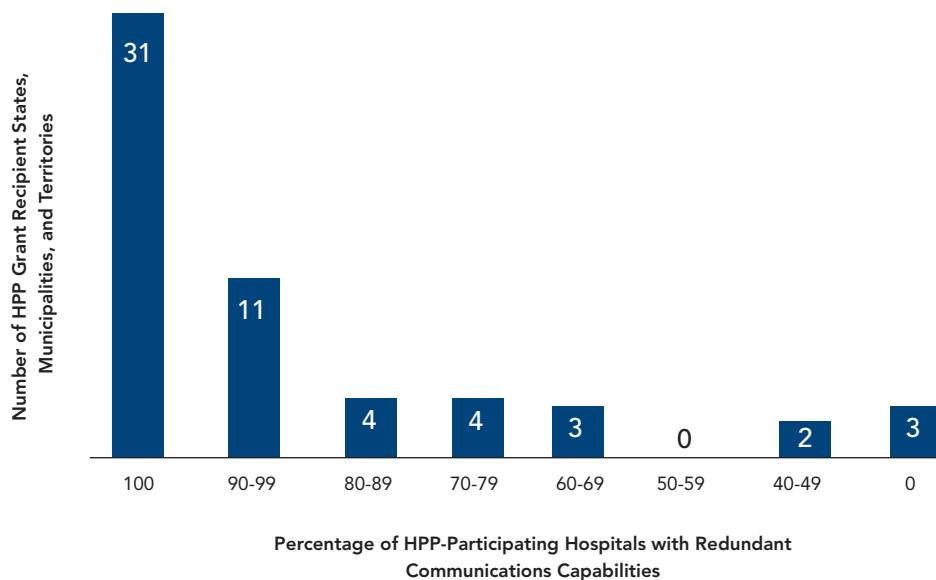
120 Gutman D, Biffi WL, Suner S, Cioffi WG. The Station nightclub fire and disaster preparedness in Rhode Island. *Med Health R.I.* 2003;86(11):344-346.

Reliable and redundant communications systems are the essential infrastructure that makes situational awareness possible. These systems enable information flow within, among, and between hospitals and public health, EMS, police, fire, and emergency management agencies. We found that many HPP recipients are making real progress in the implementation and testing of communications systems. Most hospitals participate in statewide bed reporting and emergency notification systems, and some facilities are able to track assets in near-real time.

Many hospitals now have reliable emergency communications systems.

Many participants reported that they have implemented and tested reliable and redundant systems for communication at their hospitals. The 2006 HPP end-of-year data indicate that 89% of HPP-participating hospitals demonstrated redundant communications capability during every exercise that they undertook (Figure 3).¹²¹ Before 9/11, many, if not most, hospitals had some capability for disaster communications in place, such as cellular telephones and email. However, 9/11 and Hurricane Katrina both showed that, in many cases, these systems were inadequate and impeded response efforts. Service for landline and cellular telephones, as well as email, failed in both events because of excess demand and equipment failure. Therefore, hospitals, EMS, and other responders had difficulty communicating with each other during the response.^{122,123}

Figure 3. Percentage of Hospitals with Redundant Communications Capabilities by Number of HPP-Participating States, Municipalities, and Territories: 2006 (n = 58)¹²⁴



Current HPP guidance and Joint Commission standards both require hospitals to have redundant and reliable disaster communications systems. Most Working Group participants reported that HPP funds were used to improve communications capabilities. For example, most hospitals now have multiple landline telephones, pagers, fax machines, private telephone lines reserved solely for emergencies, and cellular telephones dedicated to emergency communications. Some hospitals have also installed telephone or pager systems that are capable of “blast” messaging (i.e., sending a single message to multiple people at the same time) to personnel during crises, and many have the capability to communicate with staff through mass emails. Web-based communication tools,

121 ASPR. Hospital Preparedness Program 2006 End-of-Year Data.

122 Franco C, Toner E, Waldhorn R, et al. Systemic collapse: medical care in the aftermath of Hurricane Katrina. *Biosecur Bioterror* 2006;4(2):135-146.

123 Kirschenbaum L, Keene A, O'Neill P, et al. The experience at St. Vincent's Hospital, Manhattan, on September 11, 2001: preparedness, response, and lessons learned. *Crit Care Med* 2005;33(1):S48-S52.

124 Based on Center for Biosecurity analysis of 2006 ASPR end-of-year grant data.

such as emergency web pages and web portals, have also been implemented by some hospitals to communicate with staff and the public. In addition, two-way, 800 MHz, and ham radios, as well as satellite telephones, have been used to ensure back-up communications capabilities with responding hospitals and agencies.

Working Group participants noted, however, that communication is more than technology. The importance of establishing clear processes for developing and coordinating messages during disasters has become widely recognized. This concept is one of the principles of incident command and is incorporated into HICS,¹²⁵ the organizational structure and process for managing a crisis in a hospital. Both the HPP guidance and Joint Commission standards require hospitals to adopt such an incident command system.

Coordination of information flow among various organizations and agencies is another important function necessary for situational awareness that was identified by Working Group participants. Some states and municipalities have developed healthcare-specific emergency operations centers (HEOCs). In other states, hospitals or Healthcare Coalitions have designated seats at local or state EOCs; these are in addition to the public health department's seat as an Emergency Support Function #8-Public Health and Medical Services (ESF-8) representative. In some states, linking local HEOCs together and to their local and state EOCs has been a challenge. Without such linkages, particularly during a disaster that is expanding in scale and impact, command and control functions will likely become isolated and dysfunctional. Many states have also employed web-based emergency response applications, such as WebEOC, to facilitate the efficient and timely flow of information to and from hospitals, other healthcare facilities, and state and local EOCs and to help ensure situational awareness during emergency events. EOCs take incoming information flows from multiple sources, such as hospitals or a disaster scene, prioritize them, and route them to the appropriate recipient. If the EOC works well, the appropriate decision maker has the information needed without being overloaded with extraneous information.

In both the 2007 Virginia Tech shootings and the Minneapolis bridge collapse, EOCs—built in part with HPP funds—enabled rapid and accurate processing of incoming information from the disaster scenes and determination of the size and nature of the incidents, number and location of transportation vehicles, and available emergency department capacity at each hospital. As a result, on-scene responders were able to quickly direct patients to the most appropriate locations. Working Group participants from the involved states believed that the responses would not have been as effective before 9/11, and that HPP funds and guidance were the key to better situational awareness and improved medical response.

All hospital representatives in the Working Group reported that they now know exactly who to contact at their local health department during a crisis and are in regular communication with that individual; communication is typically by Internet, fax, and telephone. They also reported having access to the CDC's HAN, the primary function of which is to provide public health departments, hospitals, and physicians with 24/7 access to emergent health information.¹²⁶ Through this system, CDC and state health departments are able to send alerts to hospitals and healthcare providers. Hospital representatives in the Working Group reported that this information is timely and very useful.

Most hospitals use electronic reporting and notification systems; some track assets in near-real time.

All state representatives reported that their state was able to report, as recommended in the HPP guidance, hospital bed data consistent with the national HAvBED system, a model for reporting hospital bed capacity to HHS.¹²⁷ However, some participants stated that the HAvBED definitions were not specific enough to be useful

125 See, e.g., California Emergency Medical Services Authority. Disaster Medical Services Division-Hospital Incident Command System (HICS). <http://www.emsa.ca.gov/HICS/default.asp>.

126 Centers for Disease Control and Prevention. Health Alert Network (2002).

127 Agency for Healthcare Quality and Research. National Hospital Available Beds for Emergencies and Disasters (HAvBED) System. <http://www.ahrq.gov/prep/havbed/>.

and suggested that the bed categories be more narrowly defined (e.g., they should distinguish pediatric intensive care beds from neonatal intensive care beds).

Most hospital representatives stated that their facility participates in electronic bed status reporting to state or local authorities; most use commercial, web-based software applications, such as EMSystems.¹²⁸ As reported by states in the 2006 HPP data, 82% of hospitals in the program had the ability to report available beds according to HAvBED definitions to the state EOC within 60 minutes of a state request.¹²⁹ Some hospitals use computer systems that they have developed independently for reporting, and some hospitals still report bed data to state or local authorities by telephone. Many hospitals lack automation for collecting hospital bed data. The data is collected manually by calling each nursing unit or actually walking the floors in the hospital to count empty beds, which results in delays in information reporting and analysis. In most hospitals, bed data is reported directly to the state health department. In locations that have an EOC specifically for healthcare, resource data might also be reported to that entity if it is activated during an incident. Some participants reported that they use the same system for reporting bed data to the health department and NDMS,¹³⁰ while others use two parallel systems for reporting similar data.

Some Working Group participants noted the continued reluctance among some hospitals to fully share bed data—which they view as sensitive, proprietary information—with competitors, even during a disaster. For example, hospitals are concerned about the potential loss of referrals if it is perceived in the community that their facility is always at or near capacity. Some hospitals overcame such concerns by developing bed reporting systems to which all local hospitals report, but which can be viewed only by a single honest broker, such as the local health department. Other participants reported that they do not share their bed data under normal circumstances, but do openly share the information with other hospitals during emergencies. In one Gulf state, competitiveness among hospitals disappeared after Hurricane Katrina. Hospitals in that area now, without worry about competition, transparently share bed availability through a system that is visible to all other neighboring institutions and plan together to prepare for emergencies.

All respondents participated in emergency notification systems designed to alert hospitals and provide details and updates about events. Many hospitals have also installed electronic systems for the real-time tracking of supplies and pharmaceuticals; some Working Group participants stated that this information could be shared electronically with other hospitals or agencies. While the asset tracking systems have been implemented primarily to support normal day-to-day operations, these systems will have useful applications during disasters and provide an example of how improving routine systems can strengthen emergency operations. Finally, some locales reported that they have developed electronic systems for tracking staff availability and skills to facilitate the use and assignment of personnel during a disaster.

Despite significant progress, some technical gaps and human factors still impede communications and situational awareness.

While considerable progress has been made in strengthening hospital situational awareness and communications, some key capabilities are still lacking. One of the main challenges associated with hospital situational awareness is that even when communication technology is in place, individuals sometimes fail to initiate communication and information sharing. For example, during Hurricane Katrina, emergency responders and incident commanders did not notify hospitals in New Orleans about the failure of the levies, and hospitals did not know whom to call

128 EMSystems. <http://corp1.emsystem.com/?home>.

129 ASPR. Hospital Preparedness Program 2006 End-of-Year Data.

130 The NDMS, which is an HHS program, collects hospital bed data from participating hospitals.

for assistance once the flooding started.^{131,132} Working Group participants emphasized that effective communication is not only about equipment; it is also about creating a culture in which information is shared routinely among hospitals, emergency responders, and response agencies. Lines of communication will flow more effectively during times of crisis when early notification and information sharing become commonly used for normal, as well as off-normal, events.

Real-time tracking of a community's medical resources is not possible in the majority of locales because most local and state authorities are not able to electronically report resource data (e.g., personnel, supplies, and equipment). Also, even though interoperable intrastate communication systems have improved, many areas in the country are still unable to communicate across state lines because they use different equipment or radio frequencies. This creates significant problems for hospitals that draw patients from across state lines and during events requiring a multi-state response.

In addition, systems for tracking patients in hospitals are often not interoperable with EMS patient tracking systems, which allow EMS dispatchers to know where a patient was picked up, which ambulance transported the patient, and where the patient was taken. EMS patient tracking systems are often not seamless or interoperable between jurisdictions or across state lines. Some Working Group participants indicated that this could be solved by creating a national patient tracking system.¹³³

Increased Exercise Rigor Is Strengthening Hospital Readiness.

An increase in the frequency and quality of exercises at the local, state, and regional levels was reported by most Working Group participants. For example, from 2002 to 2008, New York City conducted 273 HPP-funded drills and exercises; 237 of these were hospital-based and 36 involved community health centers. Exercises are conducted to improve and maintain preparedness for emergencies, operationalize disaster plans and equipment, clarify roles and responsibilities, and reinforce teamwork. The variety of exercises, which are outlined in the Descriptive Framework, improves hospital preparedness by requiring hospital personnel to think through the different responsibilities and actions needed during various disasters and to adjust EOPs to improve the institution's response during a real emergency. The value of exercises depends upon careful planning and execution, objective evaluation, incorporation of actionable corrective actions, and subsequent exercises to test the improvements made. We found that use of the Homeland Security Exercise and Evaluation Program (HSEEP) can improve hospital exercises. Challenging and realistic exercises have a higher impact on preparedness than superficial and artificial scenarios. In addition, objective evaluations and after action reports (AARs) are useful for revealing problem areas in hospital disaster plans.

HPP and HSEEP guidance have improved the quality of hospital exercises.

Most preparedness coordinators reported that hospital exercises are becoming more frequent and of higher quality, and they believe that these improvements have, in many cases, significantly strengthened healthcare preparedness. HPP funding and guidance, the implementation of the HSEEP requirements,¹³⁴ and a shift to exercising jointly with other hospitals and community partners are largely responsible for these gains in preparedness.

131 Franco C, Toner E, Waldhorn R, et al. (2006).

132 Meitrodt J. For dear life: how hope turned to despair at Memorial Medical Center. *Times-Picayune*. August 23, 2006. <http://www.nola.com/news/t-p/frontpage/index.ssf?/base/news-6/1156318837183270.xml&coll=1>. Accessed October 15, 2008.

133 Rich T, Biddinger P, Zane R, et al. *National Mass Patient and Evacuee Movement, Regulating, and Tracking System: Recommendations*. Prepared by Abt Associates under Contract No. 290-00-0003/Task Order No. 12. Agency for Healthcare Research and Quality (forthcoming Summer 2009). The goal of the project was to develop recommendations and decision support for a National Mass Patient and Evacuee Movement, Regulating, and Tracking System ("National System") that could be used during a mass casualty or evacuation incident for the purposes of locating, tracking, and regulating patients and evacuees.

134 Federal Emergency Management Agency (FEMA). Homeland Security Exercise and Evaluation Program: HSEEP Mission. https://hseep.dhs.gov/pages/1001_HSEEP7.aspx.

While the Joint Commission has required hospitals to conduct two emergency preparedness exercises per year since the 1980s,¹³⁵ Working Group participants reported that HPP funding and guidance, which began including a strong focus on exercises in 2003,¹³⁶ have been instrumental in motivating hospitals to design and conduct better exercises for disaster preparedness. The exercises improved because hospitals and other healthcare entities became full partners in planning, participation, and evaluation, and also because, in response to the HPP guidance, they have participated in regional and state exercises and used lessons learned from AARs to further enhance their EOPs. The more stringent 2001 Joint Commission emergency management requirements have also contributed to this trend. However, participants indicated that budgetary restraints have been a restricting factor in conducting exercises, with a majority of hospitals reporting that they dedicate staff time and resources beyond the funding provided by the HPP for such activities.

HSEEP, which is a FEMA program designed to provide “standardized policy, methodology, and terminology for exercise design, development, conduct, evaluation, and improvement planning,”¹³⁷ is also improving exercise quality. HSEEP provides guidance and tools for designing, conducting, and evaluating exercises. Online tools give exercise planners access to planning and evaluation templates, calendars, lessons learned, and specific guidance on how to make exercises better. Compliance with HSEEP guidance is required of all DHS grant recipients, including emergency management agencies, police and fire departments, and EMS. Community-based exercises, which may include hospitals and public health agencies, conducted by these agencies must be HSEEP-compliant.

The 2007 HPP guidance¹³⁸ suggested that awardees and participating hospitals begin to adopt the HSEEP guidelines in their own exercises in anticipation of the 2008 HPP requirement to adhere to the exercise and evaluation program.¹³⁹ Some state and local public health departments, Healthcare Coalitions, and hospital disaster coordinators have started to use HSEEP in anticipation of the new requirement, but this has typically been done at the state or sub-state level due to the resource-intensive nature of the program. Working Group participants reported that complying with the HSEEP guidance involves much more time and effort than hospitals have traditionally invested in disaster exercises because the program requires a high level of detail in the design, observation, and analysis of exercises. However, the locales that have adopted HSEEP agreed that despite the effort involved in its implementation, it is a valuable resource because it forces exercise planners and participants to think through exercises in a more systematic and detailed manner and determine how to change EOPs to make the participating institutions more ready for the real event. Some institutions have used HPP funds to hire exercise coordinators, whose job is to design, conduct, and evaluate exercises, and have suggested that the HPP should provide funding for exercise coordinators who are proficient in HSEEP.

Participating in joint exercises with other healthcare facilities and community partners, such as emergency management and public health agencies, is also contributing to improvements in hospital exercises. Before the HPP’s implementation, individual hospitals rarely participated in local community, state, or national level exercises. Today, because of requirements in the HPP and Joint Commission standards, all Working Group participants reported that they have taken part in joint local, state, and national level exercises with institutions and individuals involved in disaster response, which strengthens coalition formation by building relationships. Performing joint exercises also brings efficiencies in cost, time, and effort among the multiple participating partners.

135 American Hospital Association. *Hospital Preparedness for Mass Casualties: Summary of an Invitational Forum*.

<http://www.hospitalconnect.com/ahapolicyforum/resources/disaster.html>. Published August 2000. Accessed September 8, 2008.

136 HRSA (2003).

137 FEMA. Homeland Security Exercise and Evaluation Program: HSEEP Mission.

138 ASPR (2007).

139 Assistant Secretary for Preparedness and Response (ASPR). U.S. Department of Health and Human Services. Announcement of Availability of Funds for the Hospital Preparedness Program (HPP). Washington, DC. 2008.

Lessons learned from actual events and realistic exercises have the highest impact on preparedness.

Working Group participants noted that real events are the best way to test EOPs. They agreed that in the absence of real events, exercises must be as realistic as possible to have the greatest impact on preparedness. Realistic exercises involve conducting unannounced exercises, designing exercises to coincide with planned events, and stressing hospital emergency response capability to the point of failure as a mechanism for identifying weaknesses.

Some participants expressed concern that the nearly universal practice of announcing exercises before they occur creates an artificial environment that detracts from their value. Participants go through the motions as they are required but do not necessarily learn from the experience or evaluate their performance. As a result, they are no more prepared for a real event than before the exercise. Some Working Group participants also indicated that exercises that test systems to the point of failure are especially valuable because they force institutions to determine what they can and cannot handle. During such exercises, institutions can identify the breaking point for their individual hospital and determine how best to improve their own plans or work with community partners to share the burden. For example, to observe the types of improvised solutions that develop, a hospital might conduct an exercise that increases the number of patients per hour requiring decontamination beyond the capacity of the facility's standard decontamination protocol.

Developing realistic and effective exercises is difficult and time-consuming. Planning, executing, and evaluating large-scale exercises can sometimes take several years, and hospitals face a constant tension between maintaining their daily operations and allocating staff time to participate in exercises. Many Working Group participants said that exercising plans for catastrophic emergencies, such as an influenza pandemic or other events in the National Planning Scenarios, can seem "too hard." In part, this is because the spectrum of potential responses has not yet been developed and planners and personnel are, therefore, paralyzed by their inability to determine effective responses. In these catastrophic scenarios, participants feel completely handcuffed and do not know where to start planning or responding. Because our nation has limited experiences in disasters of this magnitude, individual institutions struggle to grasp what their role might be and what capacity they might have to respond. Effective exercises for catastrophic disasters have not progressed much, largely due to the fact that there are too many perceived barriers and inadequate plans.

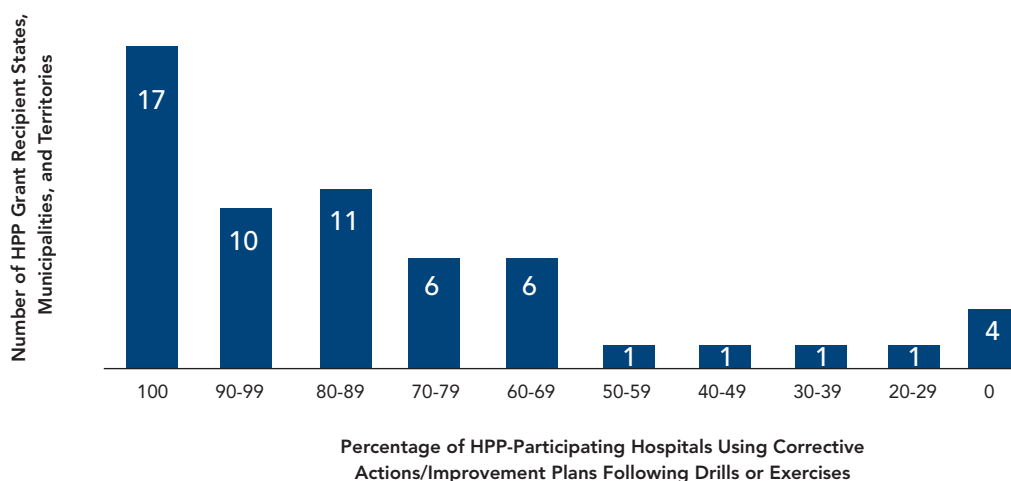
Objective evaluations and AARs reveal problem areas for improvement in hospital EOPs.

Participants reported that ensuring the objectivity of exercise evaluations and implementing AAR findings improve emergency plans. In the 2006 HPP end-of-year report data, states reported that 78% of participating hospitals had developed corrective actions/improvement plans and initiated execution of corrective actions following a drill or exercise (Figure 4).¹⁴⁰ Working Group participants reported that AARs were often improved by using external evaluators to provide objective, critical, and constructive feedback on exercises. In some cases, hospitals invited disaster coordinators from neighboring hospitals or public health departments to serve as external evaluators. In Los Angeles County, for example, some hospitals have used local police officers and firefighters as evaluators. Other participants reported that they have hired consultants as external evaluators. For exercises involving multiple entities in a community, some reported that each participating institution used an evaluator from one of the other participating entities to ensure objectivity and comprehension of the exercise. Working Group participants also found that the HSEEP tools for AARs were particularly useful for objective evaluation of exercises and actual events.¹⁴¹

140 ASPR. Hospital Preparedness Program 2006 End-of-Year Data.

141 See, e.g., FEMA. Homeland Security Exercise and Evaluation Program: HSEEP Mission.

Figure 4. Percent Hospital Use of Corrective Actions/Improvement Plans Following a Drill or Exercise by Number of HPP-Participating States, Municipalities, and Territories: 2006 (n = 58)¹⁴²



Participants frequently noted that their planning would benefit from the establishment of a mechanism for sharing best practices and lessons learned from healthcare preparedness exercises. Access to information from other hospitals that have conducted similar exercises was regarded as highly useful for hospital planning, exercise implementation, evaluation, and corrective actions. Such access could further increase efficiency in conducting exercises and establish connections among locations that exercise around similar disasters. HSEEP offers an online tool for sharing best practices, but it is limited by the number of participating hospitals that use it and the limited information that is uploaded on the tool. Expansion and promotion of the use of the HSEEP tool could eventually serve the purpose of sharing best practices and lessons learned for exercises among all HPP-participating hospitals.

2. The Emergence of Healthcare Coalitions Is Creating a Foundation for U.S. Healthcare Preparedness.

People who were involved in our initiative ... would tell you that the relationships that they've built have been far better than the stuff. The stuff is important ... but those relationships have really made things successful. — State Public Health Department Official

In the Descriptive Framework, we identified community-based collaboration among institutions and agencies in the healthcare sector as essential to preparedness for mass casualty events. Mass casualty events, by definition, require the response of more than one hospital, and optimal response requires the cooperation of other healthcare entities as well. The Medical Surge Capacity and Capability (MSCC) handbook,¹⁴³ Joint Commission standards, and HPP guidelines also emphasize the importance of such cooperation. Without a mechanism for coordinating response activities that require a multi-facility effort, it would be impossible for healthcare institutions to respond optimally. In order to respond in a collaborative way, planning and other preparedness activities must also be coordinated so that, for example, emergency plans are synchronized with one another and communication links are established in advance. However, prior to the HPP, such collaboration did not exist in most communities.

¹⁴² Based on Center for Biosecurity analysis of 2006 ASPR end-of-year grant data.

¹⁴³ HHS (2007).

The Healthcare Sector Is Chaotic, Fractured, and Not Traditionally Responsible for Disaster Preparedness.

The U.S. healthcare sector comprises two distinct and mostly disconnected parts: medicine and public health. Historically, neither has played a major role in disaster response, which had been the responsibility of police, fire, EMS, and emergency management agencies.

The U.S. medical system is a highly fractured and fiercely competitive collection of approximately 5,000 hospitals and innumerable outpatient clinics, ambulatory care centers, long-term care facilities, medical practices, and allied healthcare entities. The vast majority of it is privately owned and, for the most part, the federal government has little authority or influence over how it operates. Hospitals, which are the most important healthcare resources for disaster response, as a group are financially precarious, overburdened, and understaffed. Until recently, mass casualty preparedness had not been considered a core mission of most hospitals.

Working in parallel with the medical care system, but historically largely disconnected from it, is the nation's public health system. Under the jurisdiction of local and state governments, the system consists of 50 state health departments and many more city, county, tribal, and territorial health departments. However, the federal government has some involvement in the system, such as through cooperative agreements awarded by CDC to states. The roles, responsibilities, and authorities of the various parts of the public health system and their organizational structure are highly variable, and the system has been underfunded, understaffed, and overburdened for decades. Historically, disaster preparedness had not been a part of its mission.

Prior to 2002, little preparedness collaboration occurred among hospitals, public health, and other response agencies, and coordination among competing healthcare institutions was even more unusual. Working Group participants reported that, before the HPP, hospitals rarely worked together on preparedness issues primarily because they were worried that sharing proprietary information, such as bed availability, could compromise business operations. Public health and emergency management agencies also did not work closely together on a regular basis, as emergency preparedness and response were not traditional public health responsibilities. Hospital and public agency disaster plans were not harmonized or even shared in many cases, training was not coordinated, and exercises were not jointly conducted. Therefore, in times of crisis, it was impossible for most hospitals to coordinate their response with other healthcare organizations and agencies in their community. In many cases, hospital personnel responsible for emergency preparedness did not even know the name or telephone number of key contacts at other hospitals or local agencies before the HPP was established. They also did not know the type of outside assistance that they could expect from government agencies or what the agencies expected from them during responses.

Creating Effective Collaborative Coalitions in This Environment Has Been a Major Accomplishment of the HPP.

One of the most significant factors contributing to strengthened healthcare preparedness throughout the U.S. is the relationship building—or networking—that is occurring among individual hospitals and between hospitals, public health, and emergency management agencies. This collaboration has led to the emergence of Healthcare Coalitions, which are quickly becoming the foundation of national healthcare preparedness.

These coalitions are a collaboration of healthcare institutions and emergency response agencies within a community working together to plan for and respond to mass casualty events. In this context, the term “community” must be flexible. Frequently, the jurisdictional boundaries of cities and counties do not correspond to the boundaries of public health, EMS, or emergency management regions or the way in which traditional medical referral patterns have self-organized. For this reason, individual locations have independently defined the size and geographic boundaries that make the most sense for the coalition in their community.

Every Working Group participant indicated that some sort of coalition of healthcare facilities and preparedness and response agencies in their community has developed. For the most part, these coalitions have been self-organized and grown organically. The HPP has been one of the key factors driving the development of Healthcare Coalitions. In many locations, the HPP grants provided an initial reason for hospitals to begin talking with one another because the grant money was a catalyst for collaboration if for no other reason than to determine how to spend the funds. This transition has occurred as hospitals recognized their own limitations and the necessity of collaborating with others to ensure healthcare system resilience in the face of disaster. Many of these relationships subsequently developed into more formal planning and response partnerships (i.e., Healthcare Coalitions) that are guided by the HPP. Existing coalitions currently range from informal groups that meet regularly for joint planning to formal, legal entities that not only plan together, but also conduct joint training, drills, and purchasing and have a formal role in incident management with functioning medical EOCs.

The MSCC handbook uses the term "Healthcare Coalition" to refer to a group of individual healthcare facilities (Tier 2) working together to maximize healthcare surge capacity across the coalition through cooperative planning, information sharing, and emergency management coordination.¹⁴⁴ As described in the Descriptive Framework, the definition of Healthcare Coalition has evolved to increasingly include local or state response agencies, such as EMS, emergency management, and public health, and other private, non-hospital-based healthcare partners (e.g., pharmacies, professional associations, medical equipment vendors) in addition to healthcare facilities. For the most part, Healthcare Coalitions correspond with the first three MSCC healthcare response tiers (Figure 5). They serve as organizations that facilitate interaction among the tiers, which is essential for effective community surge capacity planning and response.

Tier 1: Individual healthcare facilities

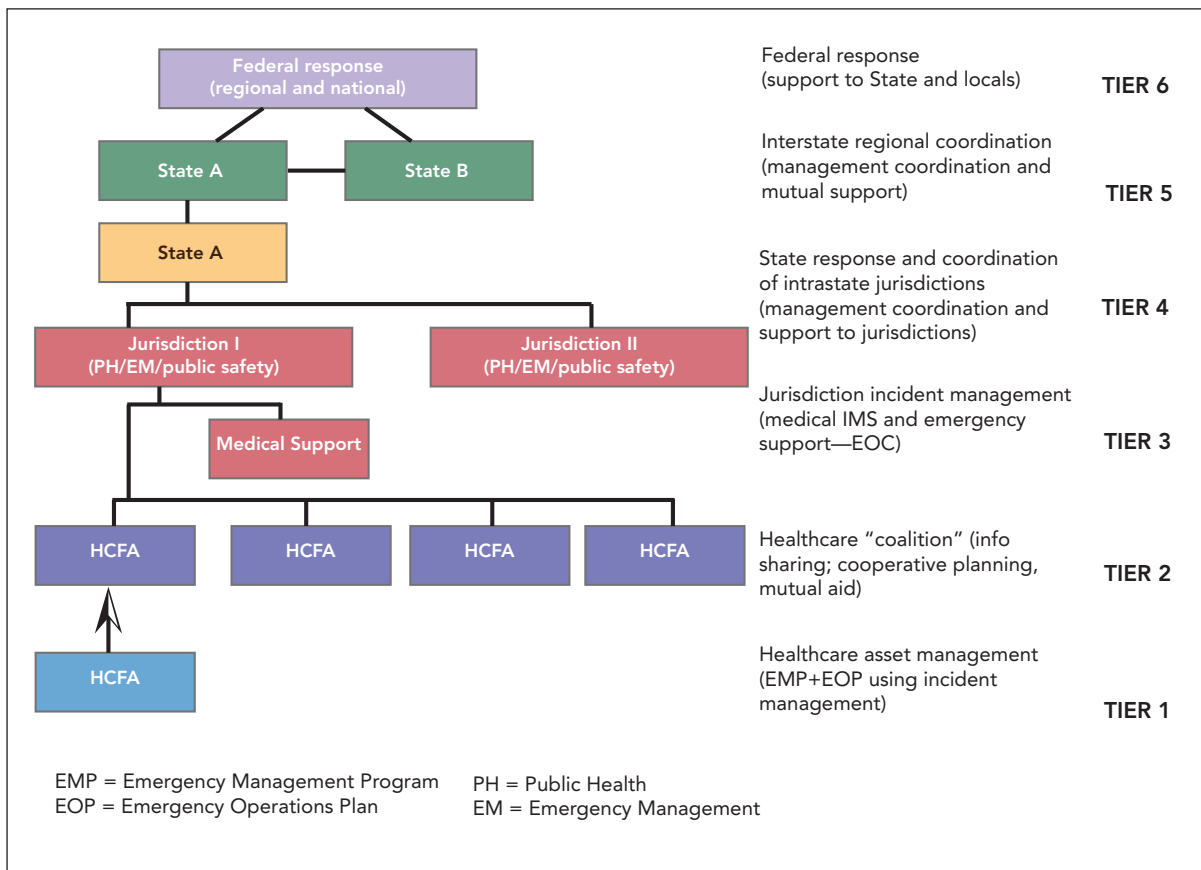
Tier 2: Collaborative groups of healthcare facilities

Tier 3: Local jurisdictions, specifically local response agencies
(e.g., emergency management, public health, and EMS)

Collaborating through a coalition creates a response capability that is greater than the sum of its parts. In addition to the distinct functions that the Healthcare Coalitions fulfill, many Working Group participants commented that the most important outcome of these coalitions has been the creation of an emergency healthcare preparedness and response community that did not previously exist. This community, which is built upon strong professional relationships between emergency planners and responders in hospitals and in public health and emergency management agencies, has been critical to progress in preparedness and effectiveness of response.

144 Ibid.

Figure 5. HHS Medical Surge Capacity and Capability (MSCC) Framework¹⁴⁵



In addition to enabling a more effective response to common medical disasters, such as tornados, mass shootings, and structure collapses, most participants agreed that coalitions are essential to building the capability of the nation's healthcare system to prepare for and respond to catastrophic emergencies, such as those described in the National Planning Scenarios.¹⁴⁶ In addition, certain components of Healthcare Coalitions, such as bed tracking, information sharing, and emergency alerting, have been put into everyday use and enhance communities' ability to deal with day-to-day stresses on overtaxed hospitals. Furthermore, many Working Group participants noted that collaboration around emergency preparedness has led to an increase in cooperative efforts among hospitals around other issues, including working with hospital associations on statewide healthcare issues, preparing for Joint Commission visits, planning for community events, and sharing information about state and federal regulatory issues.

¹⁴⁵ Ibid.
¹⁴⁶ DHS (2007).

Examples of Emerging Healthcare Coalitions

Los Angeles County. The Disaster Resource Centers (DRC) program in California was developed after Los Angeles County, which has more than 100 acute care hospitals for 10 million people, received a direct HPP grant to coordinate planning, training, exercises, and participation in developing a regional disaster plan.¹⁴⁷ The DRC coordinates surge capacity planning, facilitates drills and exercises, stockpiles pharmaceutical caches, procures supplies, coordinates staff sharing, conducts PPE and decontamination training, and facilitates communications planning. The coalition has also developed regional disaster plans and a software system for resource and bed tracking, facilitated increased inter-hospital communication, and provided funding for staff and disaster coordinators at participating hospitals. In the program, 13 hospitals have been designated as Disaster Resource Centers; each serves as a hub for eight to 10 additional umbrella hospitals.

New York City. The New York City Department of Health and Mental Hygiene hosts a coalition of hospitals, primary care centers, long-term care facilities, emergency management services, professional associations, and medical university partners to coordinate emergency preparedness activities through the New York City Healthcare Emergency Preparedness Program (HEPP), a government-healthcare partnership that has been funded primarily by the HPP since 2002. Currently, the program includes 65 hospitals and acute care facilities, 400 outpatient centers, 73 Emergency Medical Services organizations, and representatives from public safety, emergency management, public health, medical societies, and hospital associations. The program has built an integrated and coordinated emergency planning and response effort. Achievements include utilization of hazard vulnerability analysis, implementation of an incident command system, development of linkages with unaffiliated medical facilities and city agencies, performance of exercises, and participation in citywide drills for integration into the city's emergency response system. The coalition works together to meet critical benchmarks identified as gaps in needs assessments, such as isolation capacity, trauma and burn care, and pharmaceutical capacity. All hospitals receive core funding for essential emergency preparedness activities; these funds are supplemented by other funds, based on certain deliverables.¹⁴⁸

Rhode Island. In Rhode Island, hospitals and the state hospital association work with the state Department of Health¹⁴⁹ and other agencies to coordinate HPP and other federally funded preparedness activities. The statewide Hospital Preparedness Planning Committee (HPPC), which consists of 16 hospitals (including 10 acute care emergency departments and one Level-1 trauma center) and others involved in emergency response and covers a population of approximately one million, is the forum for developing a networked plan of cooperation and interaction among all hospitals in the state to respond to public health crises.¹⁵⁰ The group, which meets on a monthly basis, developed an MOU after the 2003 Station nightclub fire, in which 100 people died and more than 200 people were injured.

The HPPC is a focal point for community hazards assessment and planning, and is used to coordinate response efforts with community health centers, the National Guard, and DMATs, which are under the direction of the NDMS. The coalition has improved situational awareness and communication by having hospitals use consistent emergency terminology and assigning one hospital per month to manage the Hospital Capacity System, a web-based resource management system. Additionally, the group has developed a unified exercise calendar in partnership with the state emergency management agency, assigned a surge goal to each hospital, and has each hospital plan and manage an alternate care facility.

Seattle-King County. The King County Healthcare Coalition in Seattle is a coalition of approximately 25 hospitals, more than 100 other member healthcare organizations (e.g., clinics, nursing homes, and dialysis centers) working with the county public health department, and more than 30 other agencies and professional and trade associations. The coalition developed in 2006 to ensure coordination, communication, and effective use of health resources in response to disasters, and covers a population of 1.8 million people.¹⁵¹ Using King County HPP funds and local resources, this Healthcare Coalition coordinates joint training, exercises, and surge

147 Los Angeles County. Disaster Resource Centers: National Bioterrorism Hospital Preparedness Program. <http://ems.dhs.lacounty.gov/Disaster/DRCBrochure.pdf>. Accessed September 19, 2008.

148 New York City Department of Health and Mental Hygiene. Mission of the Healthcare Emergency Preparedness Program (HEPP). <http://www.nyc.gov/html/doh/html/bhpp/bhpp-about.shtml>.

149 Rhode Island does not have local public health departments, but rather has a single, statewide public health agency, the Rhode Island State Department of Health.

150 Rhode Island State Department of Health. Hospital Preparedness Planning. www.health.state.ri.us/disease/communicable/epi/pt4.ppt. Accessed September 19, 2008.

151 Public Health-Seattle and King County. King County Health Care Coalition. <http://www.metrokc.gov/health/hccoalition/>. Updated April 22, 2008. Accessed September 19, 2008.

planning (e.g., call centers, evacuation, and volunteer management). The group facilitates members' meeting of more than one-half of the Joint Commission emergency management standards. Through its Regional Medical Resources Center (RMRC), it coordinates communications and the sharing of medical assets for the healthcare sector. During times of disaster response, the RMRC serves as an information conduit between the healthcare facilities and the Public Health Emergency Operations Center.

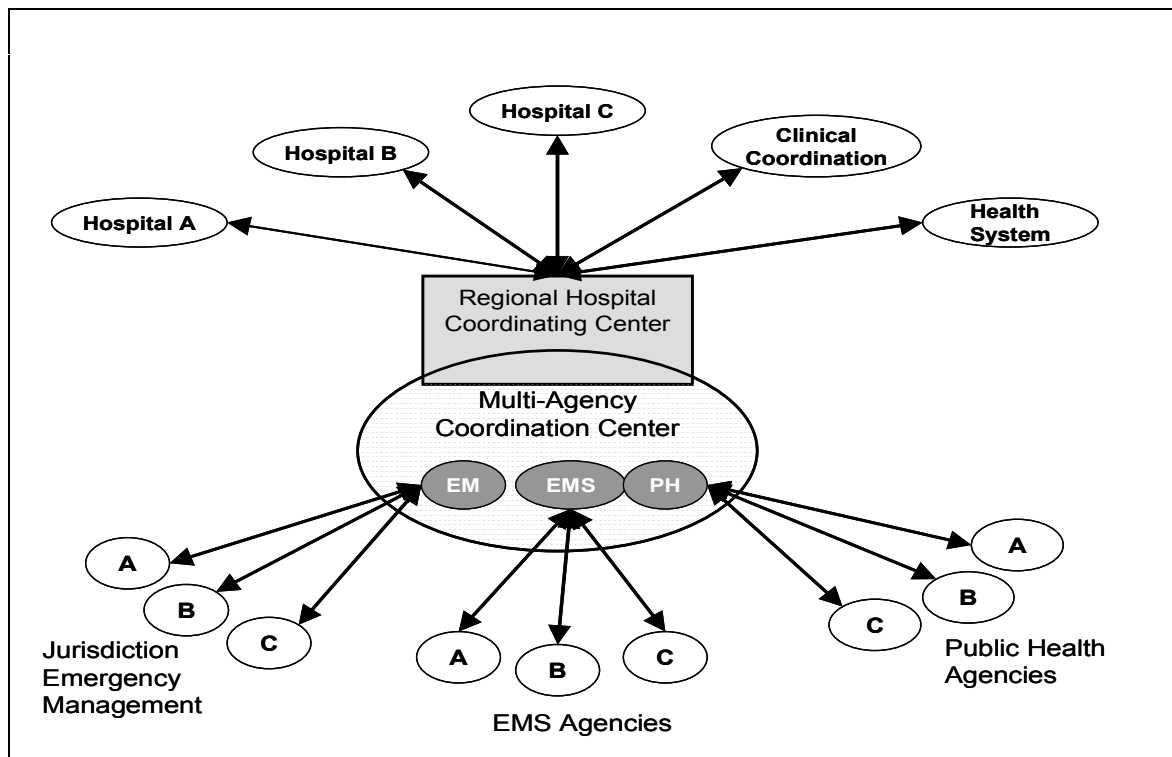
Effective Healthcare Coalitions Have Taken Various Forms Throughout the U.S.

While communities have been incentivized to increasingly collaborate with community partners as a result of HPP program guidance and Joint Commission emergency management standards, the way in which that collaboration has been accomplished varies throughout the country and is largely dependent upon local factors. For example, in a location with a particularly strong public health department, that department became the organizing body. In another location that has one dominant hospital system, that system called the neighboring hospitals together to organize the coalition. In a city with a strong and well-functioning MMRS program, that program became the entity from which the coalition grew. Our research suggests that Healthcare Coalition effectiveness is not dependent upon the way in which the coalition evolves, but rather on the leadership and degree of commitment of coalition member organizations. To provide a sense of how these coalitions have developed, this section summarizes their organizational structures and geographic characteristics. The critical functions of successful Healthcare Coalitions will be described in the following section.

Different organizational structures have emerged.

The organization of Healthcare Coalitions, including names, memberships, governance structures, authorities, and functions, vary greatly and reflect local realities. Many coalitions, such as the Regional Hospital Preparedness Group in Ohio, started because of the need to coordinate the HPP grant, but subsequently became a forum for other joint preparedness activities. Some, such as the Denver coalition, used pre-existing structures or entities (e.g., MMRS) to form the partnership. For regional planning, Minnesota developed a Multi-Agency Coordination (MAC) approach with a Regional Hospital Coordinating Center that links hospitals to a Multi-Agency Coordination Center; the Multi-Agency Coordination Center represents emergency management, EMS, and public health agencies from jurisdictions in the region (Figure 6).

However, two common organizational structures have emerged. The *Hospital Coalition Model* parallels the MSCC structure, with a distinct Tier 2 entity comprised solely of hospital representatives. In this model, hospitals plan and sometimes respond collaboratively within the construct of a coalition, which is the primary interface with the public health department. The public health agency, in turn, links the coalition to the emergency management agency. An example of this model is the Northern Virginia Hospital Alliance. In some locations, such as New York City and Washington, DC, the local hospital association plays a key role in organizing or hosting the coalition. In the other paradigm, which we refer to as the *Public Health Hub Model*, the public health agency serves as the coalition's nexus by hosting meetings that are the primary mechanism for inter-hospital collaboration. This model, employed in Seattle and in North Carolina, does not use an intermediary Healthcare Coalition to link individual hospitals (Tier 1) and public health (Tier 3). We found no evidence that either model is necessarily better than the other.

Figure 6. Multi-Agency Coordination (MAC) Model for Regional Healthcare Emergencies¹⁵²

Geographic characteristics are not uniform.

The geographic size of Healthcare Coalitions and their relationship to city, county, or state jurisdictional boundaries are also variable and typically reflect local conditions, but we did not find a correlation between these characteristics and coalition effectiveness. In some small or low population density states (e.g., Rhode Island and Alaska), the Healthcare Coalition comprises all hospitals and relevant partners in the entire state. Conversely, in some large cities, such as Los Angeles and New York City, the jurisdiction is divided into more manageable sub-municipal regions, with some coalition functions carried out at those levels. In that case, there are multiple Healthcare Coalitions within a single city. Throughout the country, individual locations have found the coalition size that best fits their particular circumstances.

In many locations, we found that Healthcare Coalitions cross jurisdictional borders and are not aligned with the normal geographic boundaries of all individual coalition members. This is because, in many locations, public health, EMS, and emergency management regions are not aligned with one another or with political boundaries. Also, the normal referral patterns and alliances among hospitals rarely follow jurisdictional maps. Most often, Healthcare Coalitions cross intrastate (e.g., city or county) borders, but in some locations they also cross state lines. This occurs in communities where the metropolitan area or traditional healthcare referral patterns straddle state borders. Kansas City (in Kansas and Missouri) and metropolitan Philadelphia (in Pennsylvania and New Jersey) are two examples of communities that overlap state borders. Working Group participants reported that these types of cross-border issues are often significant barriers to effective development and operation of Healthcare Coalitions. In these circumstances, the coalition must deal with differing jurisdictional budgets, priorities, and processes. In many cases, there is no tradition of close collaboration across jurisdictional boundaries.

¹⁵² Based on Metropolitan Hospital Compact MAC model – Minneapolis/St. Paul, Minnesota, in Phillips SJ, Knebel A, eds. (2007).

Healthcare Coalitions Share Common, Critical Functions that Contribute Significantly to Preparedness and Response.

Despite their differences in evolution and organization, Healthcare Coalitions share common critical functions. Few, if any, of the coalitions that we identified incorporate all of the functions that we believe are the most important to preparedness, but many fulfill the majority of these roles. In the Descriptive Framework, our proposed vision of a fully functional and mature Healthcare Coalition includes *planning and process* (i.e., coalitions of healthcare institutions to address emergency preparedness and response challenges that cannot be addressed by individual institutions acting alone); *reliable communications* among emergency response partners; *situational awareness*, so that decision makers have an accurate understanding of a disaster as it unfolds to make informed judgments about how best to manage the response; *people, supplies, and equipment*; and *healthcare for affected populations*.

The Working Group discussions about Healthcare Coalitions were organized around the key coalition functions that we identified in the Descriptive Framework. These functions are summarized below. While we have identified common Healthcare Coalition functions, the way in which individual locations accomplish them cannot be prescribed. The community's history, politics, and culture contribute to developing the optimal structure in a given jurisdiction. In addition, the strength of the healthcare institutions and public health agencies and the success of pre-existing programs, such as the MMRS, have an impact on structure.

Planning and process

At a minimum, a Healthcare Coalition includes all or most of the local acute care hospitals within the geographic area of the coalition, public health departments, emergency management agencies, and EMS. In many locations, the inclusion of additional healthcare entities, such as specialty hospitals, long-term care facilities, dialysis centers, free-standing clinics, and surgical centers, has been valuable. Some Healthcare Coalitions have also benefited from including private healthcare-related businesses, such as medical equipment vendors, private ambulance companies, and pharmacies.

Working Group participants reported that a defined governance structure is critical to the success of Healthcare Coalitions because an individual or distinct body must be driving the effort; this goes beyond simply signing mutual aid agreements. We found that the governance structures of and legal authorities vested in Healthcare Coalitions are quite variable. In some locations, for example, members are linked by formal agreements, such as MOUs. Some coalitions are legal entities, such as nonprofit corporations, with paid executive officers; in these groups, representatives of member organizations vote on policy decisions. Others act as committees that are impaneled by and derive official authority from the public health department. More informal coalitions do not have a governance structure or official authority; the members participate on a purely voluntary basis and work by consensus. However, Working Group participants confirmed that a formal governance structure that has, at a minimum, formal agreements between member organizations and defined leadership is important to successful coalitions.

Healthcare Coalitions fulfill the important function of facilitating joint preparedness activities. All respondents reported that their location engages in collaborative planning with other healthcare organizations in their community. This may mean joint decision making about HPP grant priorities and sharing individual emergency preparedness plans, or engaging in a more comprehensive and collaborative community planning process. The strongest coalitions conduct joint threat assessments and create community emergency response plans that inform the planning process at individual hospitals.

Communication and situational awareness

All hospitals in our research reported having a mechanism for connecting to the local or state incident management structure, but the way in which this connection occurs varied. Many Working Group participants said that Healthcare Coalitions can and should be the link between hospitals and the ESF-8 seat in the local or state EOC by serving as the clearinghouse for patient volumes, healthcare assets, and other critical healthcare information. All hospitals in our research reported having a mechanism for connecting to the local or state ICS, but this function varied.

While NIMS requires all states to have a state incident management structure, it does not incorporate the concept of a local Healthcare Coalition. Therefore, in many jurisdictions, the coalition does not have a formalized role in disaster response. Emergency information flows directly to and from individual hospitals and public health agencies, and the public health department acts as the liaison between the health sector and the rest of the ICS through the ESF-8 seat in the local or state EOC. However, some locations, such as the Medical Emergency Response Center (MERC) in Tulsa and the Catastrophic Emergency Medical Operation Center (CEMOC) in San Antonio, have created healthcare EOCs or command centers that act as an intermediary between the individual hospitals and the ESF-8 seat. During events, such as an epidemic, where response from outside the healthcare sector is not needed or is minimal, the healthcare EOC can be activated independently from the local or state EOC.

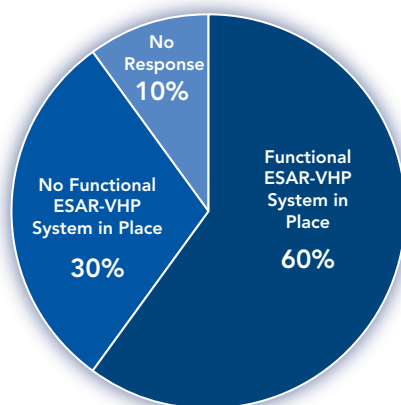
People, supplies, and equipment

All locations reported participating in joint exercises, as required by the HPP and Joint Commission. Exercises are typically designed and conducted by public health and emergency management agencies or EMS. Some locations have even hired exercise coordinators at the state or regional level to improve quality and ensure compliance with HSEEP. Healthcare Coalitions are also involved in joint training activities funded by the HPP; this results in cost efficiencies and training uniformity. Many coalitions engage in joint purchasing. Most often, this involves using HPP grants to purchase equipment, supplies, or pharmaceuticals. These purchases have also been used to develop joint stockpiles to create economies of scale and interoperability of materiel.

Many locations have also implemented or are developing programs, including Medical Reserve Corps (MRC), Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP) (Figure 7),¹⁵³ local DMATs, and MMRS, to organize healthcare volunteers for disaster responses. It is unclear, however, how these programs relate to the developing Healthcare Coalitions, but the goal of ESAR-VHP, for example, is to assist state recipients of HPP grants in establishing a pre-registration system of volunteer health professionals. It is also unclear how these programs will be coordinated at the local and state levels and connect to the overall incident command structure during a disaster. While Healthcare Coalitions could play a key function in addressing the coordination challenge, few locations reported having accomplished that.

¹⁵³ In 2002, Congress authorized the development of ESAR-VHP through Pub. Law No. 107-188. Each state-based system will include verifiable information about the identity, licensing, credentialing, and accreditation of individual volunteers, which will give states the ability to quickly identify, better utilize, prioritize, and facilitate interstate sharing of volunteer health professionals during emergencies. HPP guidance requires HPP participants to accomplish certain goals for ESAR-VHP as a state-level performance measure, and states have been encouraged to use HPP funding to support the implementation of ESAR-VHP. Initially administered by HRSA, the program is now administered by ASPR.

Figure 7. Percentage of HPP-Participating States, Municipalities, and Territories with a Functional ESAR-VHP System that Allows Volunteer Health Professionals to Register for Work in Hospitals or Other Facilities during Emergencies: 2006 (n = 62)¹⁵⁴



Healthcare for affected populations

Healthcare Coalitions also provide a forum for hospitals to plan for the key challenges associated with catastrophic emergencies: how to allocate scarce healthcare resources and use ACFs. We found consensus among participants that developing a process for allocating scarce resources, changing clinical care guidelines, and coordinating the implementation of such plans to ensure uniformity across a community must include the input of multiple segments of the community to be accepted by the public and healthcare providers. Healthcare Coalitions facilitate that process in many locales. In addition, many locations reported that these coalitions engage in some level of ACF planning, and we found that they could play an important function in coordinating the optimal use of ACFs. For example, Healthcare Coalitions could ensure the use of uniform triage criteria for patients being referred to ACFs, coordinate ACF staffing if drawn from member organizations, and coordinate the use of ACF volunteers with hospital volunteers. Relatively few locations, though, reported significant collaboration between healthcare institutions and public health agencies around ACF planning or operation. In some cases, the public health department coordinates planning. In other cases, individual hospitals fill that role.

Despite Much Progress, Challenges Remain in the Development of Healthcare Coalitions.

Even though progress toward greater healthcare preparedness has been made in the emergence of Healthcare Coalitions, participants identified several common challenges in their development. Despite the challenges, nearly all Working Group participants stated that the creation and continued development of Healthcare Coalitions was critically important. Challenges include:

Sharing of proprietary information

Many hospitals have been reluctant to share potentially sensitive proprietary information, such as bed status, with their competitors. Some hospitals remain unconvinced that the benefits of preparedness outweigh the potential risks associated with sharing information and investing in what they view as low-probability events. Many Working Group participants, however, said that the leaders of their healthcare organizations now recognize that it is in their best interest to collectively prepare for and respond to mass casualty events as a community. This was especially true in locations, such as New York City and New Orleans, that have had firsthand experience with large-scale disasters.

¹⁵⁴ Based on Center for Biosecurity analysis of 2006 ASPR end-of-year grant data.

In one large western state, some hospitals are not eager to participate in planning beyond their own institution and have been unable to move past competitiveness. This has made progress on standardized community or regional preparedness goals difficult. However, in other areas of that state, hospitals have shifted to a collaborative approach by engaging in joint planning, training, drills and exercises, and response.

Hospital funding and public health staffing shortages

Some hospitals in difficult financial situations, particularly the smaller facilities, have been reluctant to authorize their emergency preparedness personnel to attend regularly scheduled Healthcare Coalition meetings. In addition, some public health departments are very short-staffed, which makes it difficult for officials from such agencies to organize or participate in a Healthcare Coalition, and some are reluctant to assume the role of coalition coordinator because they believe this is beyond their public health mission.

On top of making their own financial contributions to individual hospital preparedness above the HPP funding that they receive, facilities contribute staff time and other resources to Healthcare Coalition work. For example, in one large coalition with more than 20 member organizations, each facility contributes an average of \$10,000 per year in salaries alone for coalition-related work; individual hospitals in another coalition of similar size each spend an average of \$4,800 per year in salaries for such work.

HPP grant allocation

In some states, a large proportion of HPP funds are used by the state or sub-state regions for joint activities, with a relatively small percentage being directly allocated to participating hospitals. As HPP requirements have become more rigorous, some hospitals in these states have withdrawn or threatened to withdraw from the coalition because of insufficient funding to effectively adhere to program guidance.

Varying geographic regions

As mentioned, the inconsistent municipal, public health, emergency management, and EMS regional boundaries that many states have, and the fact that Healthcare Coalitions may cross intrastate and interstate lines, contribute to the complexities and inefficiencies in collaborative planning. For example, New Hampshire's Dartmouth-Hitchcock Medical Center is approximately one mile from the Vermont border. As a major regional academic medical center, it receives HPP funding and an almost equal number of patients from both states. However, limited HPP, public health, and emergency management coordination and information exchange occurs between the states; each state even sets different HPP spending priorities.

3. Healthcare Planning for Catastrophic Emergencies Is in Early Stages; Progress Will Require Additional Assistance and Direction at the National Level.

It's not a question of surging to a certain percentage...but instead a question of shifting to a different paradigm of preparedness. — Hospital Disaster Coordinator

The U.S. healthcare system is not currently capable of effectively responding to the sudden surge in demand for medical care that would occur during catastrophic events.¹⁵⁵ Examples of surge events include those described in the National Planning Scenarios,¹⁵⁶ such as a bioattack, detonation of a nuclear weapon, or large earthquake, and

155 Institute of Medicine (IOM). *The Future of Emergency Room Care in the United States Health System: Report Brief*. <http://www.iom.edu/Object.File/Master/35/014/Emergency%20Care.pdf>. 2006.

156 DHS (2007).

could be single, protracted events (e.g., influenza pandemic) or a series of events causing immediate casualties (e.g., blast trauma) or delayed casualties (e.g., acute radiation sickness). Most hospitals are operating at or near capacity on normal days, and they routinely have overcrowded emergency departments; even a large car accident can strain an individual hospital's resources.¹⁵⁷ During a catastrophic emergency, hospitals will likely be unable to respond adequately to the projected demand for increased medical services or to sustain a response to such extraordinary demands beyond a few days.^{158,159} It would be especially difficult to provide critical care services during these events, because this type of care is so resource-intensive and because hospitals will be experiencing severe shortages of staff, equipment, supplies, and pharmaceuticals.¹⁶⁰ Non-hospital sources of healthcare, such as nursing homes, home health agencies, and rehabilitation facilities, cannot be relied on to absorb the increases in demand for services because they do not have significant excess capacity.¹⁶¹

A catastrophic emergency that overwhelms the medical capabilities of communities, regions, or the entire country would necessitate drastic departures from customary healthcare practices. This "phase shift" in the provision of care would resemble nothing that has ever been done in the U.S. (Figure 8). Such a shift is extremely difficult to plan for or execute because it encompasses complex operational, legal, ethical, and clinical issues and concepts across multiple healthcare facilities and government agencies for a situation wherein there are insufficient medical and other resources to care for massive numbers of critically ill patients. These issues are further complicated by requirements set forth in federal regulations and by state-by-state variations in law, regulations, and standards of medical practice. Preparing for such a shift also involves addressing two distinct issues: developing clinical standards or guidelines for use during disasters and a framework or process for implementing such standards.

Different terms have been used to refer to the multitude of changes in healthcare practice that would occur in a catastrophic emergency once all efforts to augment and expand existing resources have been exhausted. These terms include disaster standards, altered standards of care, situational standards of care, delivery of care during a disaster, crisis care, crisis standards of care, modified practices of care, allocation of scarce resources, and many others. According to AHRQ and ASPR, this departure from usual practice is "generally assumed to mean a shift to providing care and allocating scarce equipment, supplies, and personnel in a way that saves the largest number of lives in contrast to the traditional focus on saving individuals."¹⁶² We will use "disaster standards" to refer to this total phase shift in triage priorities, clinical practice standards, legal frameworks, ethical considerations, etc. that would be necessary to provide the most benefit for the greatest number of people during catastrophic emergencies.

The Descriptive Framework recognized that planning for a shift to disaster standards is a critical component of preparedness for catastrophic emergencies. Working Group discussions thus focused on the clinical, legal, and ethical challenges associated with preparing to execute such a phase shift in the provision of medical services. The Descriptive Framework also highlighted the importance of consistent planning and implementation across communities, the role of Healthcare Coalitions as honest brokers in discussing and deciding how to approach disaster standards, and the need for state and national assistance and direction to provide legitimacy, ensure consistency to the extent possible, and help resolve pressing legal dilemmas.

157 IOM (2006).

158 Zane RD, Biddinger P, Ide L, et al. Use of "shuttered" hospitals to expand surge capacity. *Prehosp Disaster Med* 2008;23(2):121-127.

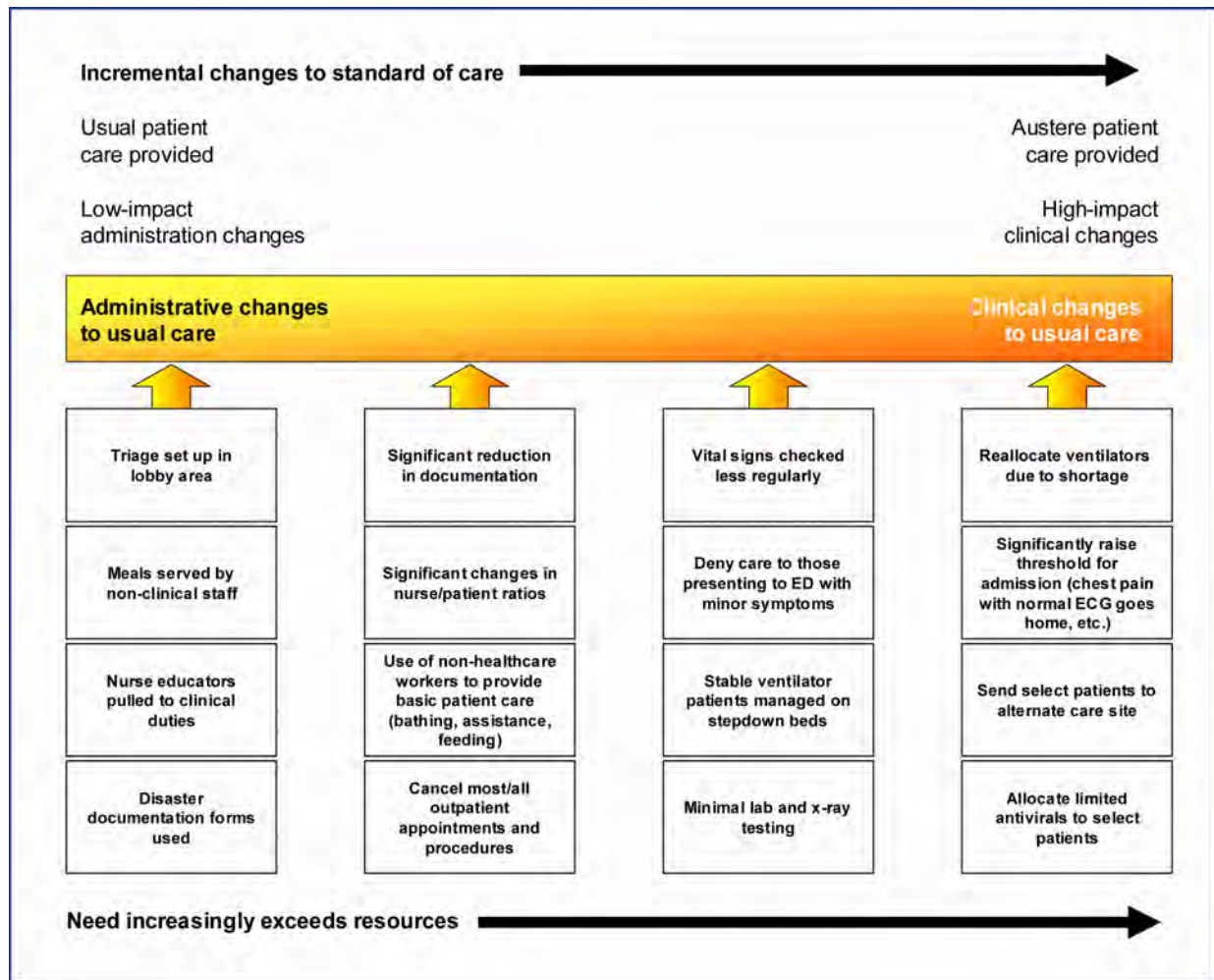
159 For example, while HHS estimates that 9.9 million Americans could require hospitalization during an influenza pandemic, the U.S. only has 1 million hospital beds. Matheny J, Toner E, Waldhorn R. Financial effects of an influenza pandemic on U.S. hospitals. *J Health Care Finance* 2007;34(1):58-63.

160 Christian MD, Devereaux AV, Dichter JR, et al. Definitive care for the critically ill during a disaster: current capabilities and limitations. *Chest* 2008;133(5):8S-17S.

161 Zane RD, Biddinger P, Ide L, et al. (2008).

162 AHRQ, ASPR (2005).

Figure 8. Administrative and Clinical Adaptations to Resource-Poor Situations¹⁶³



Continued National Assistance and Leadership on the Development of Disaster Standards of Care and the Implementation of These Standards Are Needed.

We won't be able to come up with enough resources to meet national planning scenarios, so there needs to be a systematic approach set prior to a mega-disaster to adjust standards of care.

— Hospital Disaster Coordinator

Nobody wants to take that risk right now. — Hospital Disaster Coordinator

Most hospitals have begun to plan for their response to catastrophic emergencies, but none reported being sufficiently prepared. Working Group participants stated that they would like to have additional assistance and leadership from HHS in planning for these overwhelming events (particularly those that could affect the entire country at one time, such as an influenza pandemic) and developing and implementing disaster standards. They are also interested in HHS establishing a mechanism to facilitate the sharing of information and tools for disaster standards that have been developed by states, hospitals, Healthcare Coalitions, professional societies, and other experts.

¹⁶³ Phillips SJ, Knebel A, eds. (2007).

Current status of planning

All Working Group participants recognized that developing disaster standards of care and a framework or process for implementing the standards are essential to catastrophic emergency preparedness and reported that they have begun to address these issues at the individual hospital or state level. Planning efforts for disaster standards vary greatly in their level of development, but no participants reported that their hospital or state plan is sufficient to ensure the provision of basic—or even any—medical care during catastrophic emergencies.¹⁶⁴ Existing plans range from informal discussions about the need to plan to sophisticated, multidisciplinary, statewide work groups of physicians, lawyers, and public health planners that have begun to develop comprehensive plans and to draft executive orders. Most efforts fall somewhere in the middle of this range. Some hospitals cannot move planning forward until discussions and decisions occur at higher levels in their state, such as the governor's office or statewide committees, or at higher levels in their healthcare system.

While Working Group participants recognized that many of the issues must ultimately be addressed at the state or individual hospital level, they agreed that continued federal assistance and leadership on planning for disaster standards of care—building on the valuable framework outlined in the 2007 AHRQ/ASPR document on the allocation of scarce resources¹⁶⁵—is essential for sustained state and local progress in preparedness for catastrophic emergencies.

Among the few states that have addressed the issue more comprehensively, serious gaps in planning still exist. Critical issues include planning for pediatric populations and the provision of routine medical services (i.e., care for trauma, chronic conditions, etc.). Plans for disaster standards for catastrophic emergencies other than pandemic influenza are largely undeveloped, even in the most advanced locales.

Development of disaster standards

Working Group participants recognized that each state determines the standard of care to which it holds its providers; such standards are generally not a matter for federal government comment. Standards can arise from multiple sources, including professional societies, evidence-based guidelines, customary medical practice, and case law. While participants recognized that disaster standards would need to be developed or adopted at the state or local level, they suggested that planning for catastrophic events would progress much more efficiently if the federal government encouraged or facilitated the development of disaster standards among national entities (e.g., professional societies or multidisciplinary working groups), and if they could assist in sharing or disseminating disaster standards that have been developed (with the understanding that HHS would not be in the position to officially endorse the standards). Participants felt that it was inefficient for every hospital, Healthcare Coalition, or state to independently develop complex clinical guidelines for disaster care, and that as much of this work as possible should be done at the national level and subsequently adapted at the state or local level. This would also help to alleviate some of the concerns about consistency in the content of the standards.

Implementation of disaster standards

Many Working Group participants expressed concern about the implementation of disaster standards, including when they should implement them (i.e., identifying a trigger/activation point), who in the community or state should make the decision to implement the standards, and when use of the standards should be deactivated. There was widespread interest among Working Group participants in creating a means by which plans for disaster standards could be implemented consistently across an affected community or region, including across state lines,

¹⁶⁴ This finding was similar to those in a 2008 GAO report, which reported that only seven of 20 states surveyed by the GAO had adopted or were drafting altered standards of care to be used in a mass casualty event. GAO (2008).

¹⁶⁵ Phillips SJ, Knebel A, eds. (2007).

because hospitals are concerned about becoming disadvantaged or stigmatized if they implement disaster standards while their competitors and neighbors fail to do so. The trigger/activation issue was viewed as particularly concerning during catastrophes that involve multiple government jurisdictions, cross state borders, or affect the entire country. To provide equitable care and reduce liability exposure, Working Group participants supported the concept of having all hospitals in a disaster area implement protocols for disaster standards during the same or similar time frames.

Because patient volume and resource shortages may differ among healthcare institutions and communities within a region during an emergency, there was also a belief that Healthcare Coalitions could play an important role in the regional application of disaster standards plans. In addition, through the coalition, member hospitals and other key stakeholders, such as officials from the state department of public health and attorney general's office, could jointly develop protocols that are fundamentally similar from one hospital to another.

Information sharing

Participants also expressed interest in having access to a website or other forum in which states and hospitals could post their approaches to disaster standards to assist others in developing their own plans. Many Working Group participants who have initiated planning for disaster standards reported basing their efforts on the limited available published literature, including materials from AHRQ/ASPR, Minnesota,¹⁶⁶ New York,¹⁶⁷ Ontario,¹⁶⁸ and the Task Force for Mass Critical Care.¹⁶⁹ However, most participants stated that it was difficult to locate information. They recommended that HHS should develop a central and easily accessible clearinghouse for sharing disaster standards information across the country. Planners from other states could access the information and determine for themselves which information would be helpful and instructive for their planning efforts, which could decrease unnecessary duplication of effort. This recommendation was similar to one suggested by the GAO in its June 2008 report on medical surge that called for "the Secretary of HHS [to] ensure that the department serve as a clearinghouse for sharing among the states altered standards of care guidelines that have been developed by individual states or medical experts."¹⁷⁰

Liability, Regulatory Compliance, and Reimbursement Concerns about Using Disaster Standards Are Also Impeding Planning.

Regionally, it's so important that there's a consistent standard of care delivered...or you are going to have inequities of care that are unethical...and you are going to get yourself into tremendous legal difficulties because you are providing a different standard of care than other hospitals in the area.

— Hospital Disaster Coordinator

We need to address EMTALA and liability before any doctor will address the altered standards of care. — Hospital Administrator

Most Working Group participants were concerned about the complex legal, regulatory, and reimbursement issues that they would face during the phase shift to disaster standards during catastrophic emergencies. These concerns are significantly impeding the progress of catastrophic emergency planning efforts in many locations across the country.

¹⁶⁶ See, e.g., Hick JL, O'Laughlin DT. Concept of operations for triage of mechanical ventilation in an epidemic. *Acad Emerg Med* 2006;3(2):223-229.

¹⁶⁷ See, e.g., New York State Department of Health and New York State Task Force on Life and the Law. *Allocation of Ventilators in an Influenza Pandemic: Planning Document*. March 15, 2007.

¹⁶⁸ See, e.g., Ontario Ministry of Health and Long-Term Care. *Ontario Health Plan for an Influenza Pandemic*. 2007.

¹⁶⁹ Devereaux A, Christian MD, Dichter JR, et al. Summary of suggestions from the Task Force for Mass Critical Care Summit, January 26-27, 2007. *Chest* 2008;133(5):1S-7S.

¹⁷⁰ GAO (2008).

Liability

Many participants commented that the liability issues are the most significant barriers to catastrophic disaster planning. In some states, planning has been paralyzed by liability fears, such as being sued for malpractice for providing care in a way that differs from routine professional standards of care or failing to adhere to federal and state healthcare laws and regulations. Some participants reported that healthcare workers in their facilities have stated that they will not report to work and operate under disaster standards unless they are offered, in advance of an emergency, protection from liability. To address some of these issues, some Working Group participants reported that their states are developing legislation to provide liability protection for healthcare providers specifically when they use disaster standards plans during catastrophic emergencies.

Participants were also concerned about liability if there were major inconsistencies across neighboring communities, regions, and states in the disaster standards and in the implementation of those standards (e.g., when and how they are triggered, when to shift back to usual care practices). While they recognized that some level of inconsistency—even among hospitals in the same community—would be inevitable, Working Group participants were concerned primarily about their exposure to liability if they shifted to their own plan for disaster standards, but other hospitals in the same community or neighboring jurisdictions or states did not also shift to a disaster standards plan or had a significantly different plan. They believed that their risk of liability would decrease with greater consistency in the standards themselves and in their implementation across jurisdictional and state lines. In other states, the message to hospitals from state leadership is that they should not be concerned about the legal issues and should move forward with planning, but some believed that such an approach potentially places hospitals in jeopardy of large liability risks.

Compliance with healthcare laws and regulations

Working Group participants expressed doubt about the ability of their hospitals to adhere to complex federal and state healthcare regulatory and legal requirements during overwhelming disasters. The most frequently cited barrier to planning for or implementing disaster standards was the Emergency Medical Treatment and Labor Act (EMTALA), which has significant penalties for noncompliance (e.g., Medicare exclusion). EMTALA was intended to ensure public access to hospital emergency medical services regardless of an individual's ability to pay for such services. Under the law, Medicare-participating hospitals with dedicated emergency departments must provide a medical screening examination to any individual requesting one and must stabilize any medical conditions within their capability.¹⁷¹ Recognizing that it might be impossible for hospitals to comply with EMTALA during public health emergencies, the HHS Secretary may waive sanctions for noncompliance with EMTALA by issuing an 1135 waiver.^{172,173} However, while they supported the waiver concept, some participants reported that the 1135 waivers are confusing and not always very useful because they are typically issued days after they are actually needed. Some recommended that HHS should change its process and issue waivers earlier or at least provide hospitals at the earliest opportunity with a sense of whether they plan to issue waivers. Other participants were completely unfamiliar with 1135 waivers and were interested in learning more about them.

Reimbursement

Reimbursement was also identified by several participants as critical to an effective response to a catastrophic disaster. Working Group participants were concerned about whether hospitals and clinicians would be reimbursed by public and private insurers for providing hospital care in a way that deviates from existing clinical standards or regulatory guidelines, or for providing care at ACFs. To address these issues, some states have begun working

171 42 U.S.C. § 1395dd (2008).

172 42 U.S.C. § 1320b-5 (2008).

173 Courtney B. Waiving EMTALA sanctions in response to public health emergencies. *Biosecur Bioterror* 2008; 6(3):213-217.

with large insurers and third-party payors. Because most large insurers and payors operate in multiple states, participants agreed that a national approach for negotiating the reimbursement process with insurers would be more efficient and effective than a state-by-state approach.

Case Study: Minnesota

Minnesota has developed innovative approaches to planning for situations necessitating difficult medical resource allocation decisions. Several years ago, the Minnesota Department of Health (MDOH) formed the Science Advisory Team to facilitate discussions about what the state would do if it experienced a catastrophic health emergency and how standards of care might be changed. A concept of operations plan was subsequently developed to outline necessary steps for adjusting standards of care, particularly for mechanical ventilator triage, during a catastrophic disaster.¹⁷⁴

MDOH developed several tools for healthcare preparedness and scarce resource situations. One color-coded tool outlines specific steps that may be taken for administration/planning, operations, training/education, and communications during each of five pandemic influenza phases. Another lists key resources, such as oxygen, medication administration, and nutrition, and a summary of strategies and tactics (e.g., conservation, reuse, reallocation) for addressing each resource during times of scarcity. For oxygen use during scarce resource situations, a third tool identifies potential trigger events, such as “internal surge to hospital capacity” and “internal disruption of hospital medical gas systems,” strategies, and recommendations.¹⁷⁵

The state also recognizes the importance of healthcare providers and institutions feeling confident that they have the support of the state to protect them from liability during catastrophic health emergencies and has worked with the Office of the Minnesota Attorney General to address such concerns.

The Usefulness of Alternate Care Facilities for Augmenting Hospital Care during Catastrophic Emergencies Is Questionable.

We have not put a tremendous emphasis on alternate care facilities. I'm still trying to figure out how I will staff an ACF when I can't staff my own hospitals. Although we are developing one state alternate care facility, in general we've not focused on that. — State Public Health Department Official

Current status of ACF planning

Many hospitals are developing or participating in plans to use ACFs to increase healthcare access during events such as earthquakes or hurricanes, but many Working Group participants thought the use of ACFs during catastrophic emergencies is untenable. The concept of ACFs, which are sometimes referred to as alternative care facilities or alternate care sites, was developed to expand a community's ability to provide medical care when a hospital's infrastructure has been rendered inoperable or when it has reached its capacity (i.e., the hospital has no available beds or other space left for incoming patients) and other hospitals in the area are also unable to admit new patients during a catastrophic emergency. This typically means providing medical treatment outside of the acute hospital setting at a nearby site, such as a school, nursing home, church, convention center, mall, or shuttered hospital, or in a mobile healthcare facility.^{176,177} ACFs have the potential to provide a range of services,

174 Hick JL and O'Laughlin DT (2006).

175 Minnesota Department of Health. Healthcare Emergency Preparedness: Standards of Care for Scarce Resources. <http://www.health.state.mn.us/oep/healthcare/index.html>.

176 Zane RD, Biddinger P, Ide L, et al. (2008).

177 Hassol A, Zane R. *Reopening Shuttered Hospitals to Expand Surge Capacity*. Prepared by Abt Associates Inc., under IDSRN Task Order No. 8. AHRQ Publication No. 06-0029. Rockville, MD: Agency for Healthcare Research and Quality. February 2006.

including inpatient care, chronic disease management, primary triage, expanded ambulatory care, patient isolation, palliative care, or vaccine dispensing.^{178,179,180} ACFs will generally operate under disaster standards of care, with the possible exception being cases in which a small community hospital is off-line and its patients are cared for in a portable or mobile hospital that can enable care to be provided in a way similar to the manner in which it is provided in a hospital.

Most ACF plans are in the initial stages of development, with hospitals just starting to identify and convene individuals to write the plans. In some areas, individual hospitals have developed their own ACF plans. In other areas, the community or region has jointly-developed ACF plans. Some communities are farther along in the planning stages and have developed written treatment protocols, identified and surveyed sites, signed MOUs, established staffing plans, and stockpiled supplies. A few jurisdictions have even exercised their ACF plans or used their ACF for real events, such as winter storms.

Most Working Group participants reported that they are engaged in ACF planning in large part because of the HPP guidance, which has emphasized the importance of ACF planning for supplemental healthcare surge capacity,^{181,182} and the Joint Commission emergency management standards, which have specified that hospitals should establish alternative sites for care, treatment, or service and should identify these sites in their EOPs.^{183,184} Specific events have also spurred some locations to plan for ACFs. In Florida, preparation for a potential mass migration from Cuba played a large role in ACF development. In Alaska, ACFs are the state's major mechanism for handling hospital surge due to geographic and climate challenges and a lack of hospitals.

The majority of the HPP locations are planning to use ACFs as overflow hospitals that would provide a full range of patient care, or as a place for patient isolation, expanded ambulatory care, care for recovering patients, limited supportive care for noncritical patients, primary triage, rapid patient screening, or quarantine.¹⁸⁵ Some communities will use the sites for palliative and respite care, and others are planning to use ACFs to help increase the availability of acute care hospital beds by caring for hospitalized individuals who are already close to being discharged. Staffing plans include drawing volunteers from public health departments, MRC, MMRS, ESAR-VHP, local hospitals, and NDMS teams.

Many participants believe that expanding and concentrating care within their existing hospitals, in areas such as available clinical space, conference rooms, or cafeterias, would leverage staff and simplify logistics, thereby representing a more feasible approach than dispersing their resources to provide care at community ACFs. Using such areas within the walls of the hospital would also ensure greater access to key medical assets, including clinicians, medical supplies and equipment, labs, and hospital administrators.

178 GAO (2008).

179 For a more complete history and description of ACFs, see, e.g., Phillips SJ, Knebel A, eds. (2007).

180 Lam C, Waldhorn R, Toner E, et al. The prospect of using alternative medical care facilities in an influenza pandemic. *Biosecure Bioterror* 2006;4(4):384-390.

181 ASPR (2007).

182 ASPR (2008).

183 Crosswalk for The Joint Commission's Emergency Management Standards 2008 to 2007. SMS, Inc.; 2007.

<http://www.safemgt.com/Crosswalk/EM%20Crosswalk%20Complete%2007211.pdf>. Accessed: September 8, 2008.

184 According to GAO, 18 of 20 states studied were in the process of selecting ACF sites that use either fixed or mobile medical facilities, and 10 of the 18 states reported that they had also developed staffing and equipment plans. GAO (2008).

185 Lam C, Waldhorn R, Toner E, et al. (2006).

Key issues with ACF implementation

Working Group participants identified the following key issues associated with implementing ACFs:

Staffing. Many Working Group participants believe that staffing is the primary issue that makes ACFs unsustainable during catastrophic emergencies. Because hospitals will likely face shortages of clinical and support staff during catastrophic disasters, participants are concerned about whether they will be able to sufficiently staff these supplemental facilities. Although they are developing plans to use volunteers to supplement their staffing, Working Group participants were concerned about how realistically they could rely on the availability of these volunteers during a catastrophic emergency because individuals on those rosters might be deployed for other purposes. The sense was that volunteers will be in short supply and most will lack experience in caring for sick patients.

Legal and regulatory. Legal and regulatory barriers, as well as concerns about Joint Commission compliance, were also cited as major impediments to the development of ACFs. Planners are concerned about how they will be protected from liability when they provide care off-site and when the scope of practice for various types of practitioners changes or broadens, how to develop ACF patient care protocols, and which regulations they will need to comply with and which can be waived.¹⁸⁶

Site selection and reimbursement. Another problem that Working Group participants identified is selecting appropriate alternate sites where healthcare can be provided and determining the level and scope of care that can be provided at each site since the treatment of some patient conditions requires specific electrical, plumbing, and other infrastructure capacity. Hospital disaster coordinators are also concerned and unclear about how they will obtain reimbursement from the government and health insurance companies for care provided at ACFs and who will pay for and manage the stockpiles of medical equipment, supplies, and pharmaceuticals necessary for opening ACFs during emergencies. Planning for each of these issues is extremely challenging and time-consuming.

Examples of Innovative ACF Planning

In 2007, the **State of California** developed a manual that addresses the legal and regulatory considerations affecting ACF development and implementation.¹⁸⁷ The manual identified four broad existing statutes that apply to ACF operations: Emergency Services Act, Good Samaritan Statutes, California Government Code-Disaster Services Workers, and Civil Code Statutes regarding care in an emergency. The reference manual cites relevant regulations, standards, and compliance requirements for ACFs and provides citations and summaries of state privacy laws pertaining to government-authorized ACFs. This publication is a useful tool for other states that are tackling the legal and regulatory issues.

New York State has funded four ACF demonstration projects. Each project was required to deliver a concept of operations, plans, a list of supplies, MOUs, and a list of identified barriers by August 2008. Three levels of care were to be addressed: primary triage and rapid patient screening; patient isolation and alternatives to home care for influenza patients; and limited supportive care.

The **University of California at Davis** is exploring the feasibility of using large veterinary hospitals for treating humans during catastrophic emergencies. This project also explores the use of veterinarians as providers of healthcare for humans.

¹⁸⁶ GAO (2008).

¹⁸⁷ California Department of Public Health. *Standards and Guidelines for Healthcare Surge During Emergencies. Volume II: Government-Authorized Alternate Care Sites*. 2008. Available at: <http://bepreparedcalifornia.ca.gov/EPO/CDPHPrograms/PublicHealthPrograms/EmergencyPreparednessOffice/EPOProgramsServices/Surge/SurgeStandardsGuidelines/>.

4. Surge Capacity and Capability Goals, Assessment of Training, and Analysis of Performance during Actual Events and Realistic Exercises Are the Most Useful Indicators for Measuring Preparedness.

Working Group participants were asked to comment on attempts to assess progress in preparedness and develop meaningful metrics. General characteristics of metrics that participants found to be most useful were those that focused on a clearly defined element of preparedness, the measurement of which was not overly burdensome to the hospital or disaster coordinator. Among the HPP program metrics that participants found most useful were:

- **Use of numerical surge capacity and capability goals.** Working Group participants found numerical targets for the staff, supplies, and space required for responding to increased numbers of patients to be useful points of reference for planning, purchasing, and assessing progress. While states and hospitals did not all find targets to be realistic or attainable, the concept of numerical goals was supported.
- **Assessment of training.** Some participants found that the effectiveness and extent of personnel training correlated with developing the capacity to respond to patient needs in a variety of scenarios defined in hazard vulnerability analyses. The number of people trained or certified, length of training, and level of training attained over time were viewed as being helpful measures of preparedness for hospitals.
- **Analysis of performance during actual events or structured exercises.** Working Group participants reported that the use of structured AARs that were incorporated into a continuous improvement process was the most useful evaluation and assessment activity. Through tracking items that require corrective actions, including demonstrating that problems uncovered during earlier events or exercises were actually corrected, progress toward preparedness could be meaningfully measured for institutions, Healthcare Coalitions, states, or regions.

Measurement of Preparedness for Individual Hospitals Should Be Based on the Joint Commission Standards for Emergency Management.

Participants in the Working Group reported that Joint Commission emergency management standards were a good basis for developing individual hospital preparedness metrics. HPP guidance and Joint Commission requirements already overlap to a significant degree (Appendix B), and hospitals accredited by the Joint Commission are motivated to maintain compliance with these standards. Basing metrics on the Joint Commission standards, rather than on developing an entirely independent set of standards, would also serve to improve efficiency in individual hospital reporting and to reduce reporting burdens on hospital disaster coordinators.

Assessment of Healthcare Coalitions Should Be Based on Their Ability to Perform Critical Coalition Functions.

Working Group participants suggested that the measurement of preparedness should focus on the ability of Healthcare Coalitions to perform certain critical functions, such as engaging in effective planning and governance; providing situational awareness during a disaster; maintaining and operating reliable and redundant communications; ensuring the availability of adequate staff, supplies, and equipment across the coalition; and providing sound healthcare decision making for affected populations when resources are scarce. The assessment criteria should reflect the diverse nature of challenges and priorities of coalitions in urban, rural, dense population, low population, and large land mass areas. Participants noted that the most useful metrics for preparedness were based on assessments of their performance in actual events or in structured, realistic exercises.

V. Conclusions

1. The HPP has improved the resilience of U.S. hospitals and communities and increased their capacity to respond to “common medical disasters.”

Prior to the launch of the HPP in 2002, most hospitals did not have adequate plans in place to handle “common medical disasters” (i.e., mass casualty events that occur with relative frequency, overwhelm a single hospital, and require a community health response), much less catastrophic disasters comparable to the DHS National Planning Scenarios.¹⁸⁸ Disaster preparedness was not a top priority for hospitals operating on tight financial margins. Few hospitals spent time and money on comprehensive disaster plans, training, stockpiling equipment and supplies, or quality drills and exercises. Collaborative disaster planning among competing hospitals was rare, and few hospitals were linked to public health or emergency management agencies.

A few hospitals did invest in disaster preparedness before the terrorist attacks of 2001 and before the emergence of concerns about a possible influenza pandemic. These facilities were primarily those that had directly experienced local disasters, and their early commitment explains, in part, why some hospitals are currently more prepared than others. Other factors have also induced hospital leaders to pay greater attention to preparedness needs. In 2001, the Joint Commission, which accredits more than 90% of U.S. hospitals, issued more rigorous and comprehensive requirements for hospital disaster preparedness. The country’s experience with Hurricane Katrina and warnings about pandemic influenza also highlighted the potential for disasters to have an impact on hospital operations. Nonetheless, the project team repeatedly heard from communities across the country that HPP guidance and funds were essential to advancing individual hospital preparedness.

Over the course of six years, the HPP has catalyzed significant improvements in hospital preparedness for common medical disasters. In the early years of the program, funding and guidance to hospitals supported increases in stockpiles of equipment, supplies, and pharmaceuticals that would not have been purchased by financially strained institutions without the program. The HPP also guided hospitals in making improvements in communication systems, implementing hospital incident command concepts, establishing MOUs for sharing assets and staff during disasters, launching bed reporting and other situational awareness capabilities, and conducting quality drills and exercises.

One of the most important outcomes of the HPP has been the emergence of coalitions of hospitals and public health and emergency response agencies working together to plan for and respond to mass casualty events. These Healthcare Coalitions have emerged in every state and municipality that we contacted. Healthcare Coalitions currently embody a range of structures, membership, and functional capacities, but several core functions critical to preparedness are shared in common by the most successful ones. These core functions include:

- Joint planning and purchasing
- Joint training and exercises
- Coordination of healthcare response during a crisis
- Coordination of volunteers identified through multiple programs, such as MMRS, ESAR-VHP, and DMATs, to provide care in medical facilities, in the field, and at ACFs
- In some coalitions, planning for the implementation of a coordinated approach to the allocation of scarce resources.

¹⁸⁸ DHS (2007).

2. The HPP should focus on building, strengthening, and linking Healthcare Coalitions to lay the foundation for a national disaster health and medical response system.

Healthcare Coalitions are essential to preparing for and executing an adequate response to common medical disasters, which, by definition, require a collaborative response that exceeds the capabilities of a single healthcare facility. Individual hospitals will likely continue to maintain the preparedness needed to cope with common medical disasters in order to comply with Joint Commission emergency management requirements. It is less likely that all hospitals or communities will be able to maintain stockpiles of emergency equipment or supplies without federal funds. The development of Healthcare Coalitions has been the single most important step toward preparing the U.S. healthcare system to respond to large-scale mass casualty disasters. However, a national system of fully functional coalitions capable of effectively responding to large-scale disasters that require the healthcare assets of an entire region or the country is unlikely to develop without federal direction and support.

The Healthcare Coalitions that have emerged since 2002 are in various stages of development. Their varied structures, membership, and missions reflect the different needs of diverse communities and the highly fragmented and competitive U.S. healthcare landscape. Coalitions can include membership from an area as small as a city or as large as a state, depending on geography, demographics, state governance structure, and existing infrastructure. However, all developing coalitions include, at a minimum, the participation of multiple hospitals, public health departments, and emergency management agencies, and they share the common core functions listed above.

HPP guidance should continue to recognize and encourage the development of Healthcare Coalitions and outline the critical functions that established coalitions need to perform to provide the basis for a more robust national disaster health and medical system. The guidance should build upon the varied structures and compositions of existing Healthcare Coalitions, which reflect the on-the-ground realities of the highly variable U.S. healthcare delivery sector. Guidance and funding mechanisms should be flexible enough to support coalitions convened by groups of private healthcare institutions or hospital associations, as well as those that are organized by state or local public health departments. They should also be applicable to coalitions that are in the early stages of development, as well as those that are well-established and more advanced. A fully functional, robust Healthcare Coalition would include the common core functions; have an expanded membership of all healthcare-related entities in the community, including public health and emergency management agencies; have a clear governance structure; and participate in a healthcare EOC. HHS should cultivate lessons learned from the more advanced coalitions and make them publicly available so that others may learn from the excellent work being done around the country.

National preparedness for mass casualty disasters of a catastrophic nature will require that Healthcare Coalitions be linked together in a nationwide system that can effectively call upon and coordinate all necessary national assets. While many Healthcare Coalitions now have communication equipment and procedures, the ability to develop an accurate understanding of the scope and pace of an emergency throughout a local community, state, region, or the nation, and to execute an appropriate and adequate response, remains an enormous challenge. Horizontal communication and collaboration of Healthcare Coalitions across state, geographic, and jurisdictional borders would create a strong and resilient national response that would complement the existing vertical connection to state, multistate, and federal officials.

The emergence of Healthcare Coalitions across the country presents an important opportunity for the development of a more comprehensive national disaster health and medical response system. The challenge will be to knit all of these different coalitions together into a system that can tap into all applicable national resources dur-

ing a catastrophic emergency rapidly and efficiently. This will entail integrating Healthcare Coalitions with existing federal and state disaster response programs to build a more robust national disaster health and medical system, as outlined in HSPD-21. The next phase of this project will focus on how to build, link, and integrate Healthcare Coalitions into such a system.

3. Administrative adjustments to the HPP could improve the program's effectiveness and efficiency.

Consider consolidation of grant cycles and guidance.

Ongoing efforts to transition the HPP grant to a multi-year project cycle, where awardees will have at least two years to complete grant work (even if the funding remains on a single-year cycle), would greatly strengthen the program. Early in the program, grant guidance evolved each year as both HHS and grant recipients redefined their needs and learned from successes and challenges. While this process was necessary and useful in the first few grant years, it made measuring progress toward preparedness from year to year difficult, and awardees found it hard to keep up with the changes. The program is now well-established, and successful practices are better defined. A longer grant and guidance cycle would give states, Healthcare Coalitions, and hospitals more time to implement their preparedness activities and to collect data from which to measure their progress, and allow them to spend less time and resources on preparing grant proposals.

ASPR should consider leading a federal effort to streamline and coordinate all grants containing requirements of hospitals and public health agencies. More engagement and further collaboration and communication among the federal agencies that offer grants that are handled by the same state health departments would conserve scarce resources and make evaluation of federal programs more efficient. State health departments are heavily burdened by paperwork and reporting requirements from DHS, CDC, and HPP grants. A common format and timeline for these grants would alleviate a great deal of the strain induced by the requirements of the individual grants. Additionally, HHS could facilitate the administrative work required for these programs by synchronizing the funding and reporting cycles of the HPP and CDC grants in coordination with state fiscal years.

Establish a NIMS training program for healthcare and public health.

ASPR should consider creating or adopting a healthcare-specific NIMS training program for use by hospitals and public health agencies that participate in the HPP. NIMS training is required for relevant hospital personnel in the current HPP guidance. However, the higher-level NIMS training, which is now required for hospital leaders who will be involved in responses, was originally intended and designed for traditional first responders (e.g., firefighters and police officers), not hospital staff. Although incident management is an important role that hospital leaders will have in a disaster, hospital CEOs and chief operating officers are now being required to attend multiday, off-site, higher-level NIMS training courses that have little significance to their roles in their institutions. A shorter, healthcare-specific NIMS training course should be adopted for the executive-level training. Some hospitals and public health agencies have already developed their own healthcare-specific versions of the lower-level NIMS courses that are more appropriate and less burdensome to hospital personnel.

Continue implementation of HSEEP standards.

The HPP guidance should continue to phase in the HSEEP standards for hospital exercises and drills. HSEEP is the DHS program that sets standards for emergency preparedness exercises conducted by recipients of DHS preparedness grants. Implementation of HSEEP standards, though resource-intensive, has led to better quality exercises and facilitates the incorporation of corrective actions.

4. **To prepare the nation to respond to catastrophic emergencies, HHS should provide continued leadership to assist states in their efforts to address the many procedural, ethical, legal, and practical problems posed by a shift to disaster standards and ACFs that is required when demand for care overwhelms available resources.**

While certain documents, including those developed by ASPR and AHRQ,^{189,190} have been extremely helpful for planning purposes, hospitals and Healthcare Coalitions still struggle with how best to prepare for catastrophic emergencies that overwhelm staff and resources on a scale necessitating a drastic departure from customary practice. Hospitals and the public have grown familiar with emergency department diversions, long waits to be evaluated, and hospital overcrowding. Americans have no frame of reference, however, for the sea change in medical care delivery that will occur following a catastrophic disaster such as a major earthquake, a bioterrorism attack, the detonation of a nuclear device, or an influenza pandemic. Faced with patient needs that exponentially outstrip staff, supplies, and facilities, usual healthcare practice standards will be untenable. New medical care priorities will have to be implemented, shifting from the provision of resource-intensive care for every patient—no matter how slim the possibility of survival—to giving priority to doing the greatest good for the greatest number. In other words, the focus would be on treating those patients who stand the best chance to survive if provided with medical assistance, or shifting from individual-based care to population-based care (i.e., disaster standards). Recognizing that some level of inconsistency in the provision of care is inevitable during a disaster, hospitals and coalitions are also very concerned about developing and implementing disaster standards and ACFs that significantly differ from approaches used in neighboring jurisdictions and states.

Current gaps in planning for large-scale catastrophes are due largely to the complexity and the social implications of these issues; lack of direction, clarification, and consensus on clinical guidelines for mass casualty care at the national level; absence of an identified framework or process by which hospitals, states, and regions should shift to or implement disaster standards during or in anticipation of an emergency; and reimbursement, legal, and regulatory issues (i.e., compliance with federal laws, in particular Medicare, EMTALA, and the Health Insurance Portability and Accountability Act [HIPAA], as well as state laws) associated with these changes in the provision of healthcare. Without national direction and assistance, the necessary progress for effectively addressing each of these issues in a timely way will not be achieved at the local, Healthcare Coalition, state, and regional levels. Therefore, HHS should provide continued leadership on this issue and should consider addressing the following issues:

- **Information sharing.** Collect information on best practices for approaches, guidelines, and tools for developing and implementing disaster standards and ACFs that individual states, medical experts, and professional societies have established, and share that information broadly to offer or identify suggestions and resources that could be useful for states and planners in their planning efforts in support of national preparedness.^{191,192}
- **Implementation.** Convene a working group specifically focused on the implementation of disaster standards of care and of ACFs. The working group could, for example, develop a model framework or process for implementing disaster standards and for implementing ACFs that could be adapted at the state or hospital level to reflect local conditions and include recommendations for “triggering” a shift to disaster standards (e.g., declaration of a state or

189 AHRQ, ASPR (2005).

190 Phillips SJ, Knebel A, eds. (2007).

191 U.S. Department of Health and Human Services. Agency for Healthcare Research and Quality. Public Health Emergency Preparedness. <http://www.ahrq.gov/prep/>. Accessed on November 24, 2008.

192 The GAO supported a similar concept in its 2008 medical surge report. GAO (2008).

national emergency, sustained surge in patient volume, severe ventilator shortages) and shifting back to usual care practices in a manner that is practical, ethical, and legal.¹⁹³

- **Legal/regulatory/reimbursement.** This working group should also develop a comprehensive list and description of the common legal, regulatory, and reimbursement issues associated with creating and implementing disaster standards and ACFs for planners at various levels (e.g., individual hospital, state, professional society) and their lawyers, elected officials, state legislators, health officers, and others for framing discussions about addressing a shift to disaster standards. Possible solutions, such as model disaster standards legislation—which states could adapt—for the purpose of providing qualified immunity to healthcare workers who adhere to protocols for using disaster standards during catastrophic emergencies, or draft executive orders to provide protections and waive certain laws, should also be explored by the group.

5. Catastrophic emergency preparedness is a national security issue and requires the continued funding of the HPP.

HPP funding has both enabled preparedness efforts on the part of individual hospitals and catalyzed the formation of Healthcare Coalitions. The HPP awards funds to 50 states, the District of Columbia, three municipalities, and eight territories. Currently, the 62 awardees use a percentage of appropriations before distributing the remainder to hospitals. Allowing states some flexibility in how they distribute funds is an important ingredient of success for the HPP. Because of the highly fragmented, mostly private, and very diverse nature of the U.S. health-care system, states have administered these grants in multiple ways. Some states send funds directly to hospitals, while others engage hospital associations or regional groups to coordinate use of the funds.

In addition to HPP funds, hospitals are already investing their own resources, particularly in-kind resources, such as staff time, in preparedness activities. Continued funding for hospitals is needed to pay for training of hospital staff, employment of hospital disaster coordinators, and maintenance or replacement of stockpiled supplies and pharmaceuticals purchased through the HPP. Healthcare Coalitions would not have been developed without the HPP grant funding, and coalition development has required the use of a substantial portion of HPP funds in recent years. It is difficult to determine the amount of money that is currently being spent on the development of Healthcare Coalitions versus the amount spent on developing and maintaining capabilities at individual hospitals. Although the emphasis on coalition development is critical, it is clear that progress will be lost and individual hospitals will drop out of the HPP if they do not continue to receive some support for stockpiling, replenishing caches, and training. Therefore, future grant funding should not be directed solely toward Healthcare Coalitions; as the focus shifts to development of coalitions, support for individual hospital preparedness must be maintained to some degree for hospitals to remain engaged and prepared.

Significant decreases in annual HPP funding levels would likely stall or impair progress in hospital preparedness and indefinitely delay the country's ability to adequately cope with a large number of civilian casualties. Building a national network of healthcare and public health institutions capable of responding to mass casualty disasters will require planning, staff, supplies equipment, time, and, in all likelihood, increases in federal funding.

¹⁹³ Some states surveyed by the GAO also suggested that the federal government could help the states' efforts in developing disaster standards by convening groups of national experts in medicine, public health, and law to specifically address the complex issues associated with disaster standards. GAO (2008).

Appendix A. List of Acronyms

AAR	After Action Report
ACF	Alternate Care Facility
AHRQ	Agency for Healthcare Research and Quality
ASPR	Assistant Secretary for Preparedness and Response
CBRNE	Chemical, Biological, Radiological, Nuclear, Explosive
CDC	Centers for Disease Control and Prevention
DHS	Department of Homeland Security
DMAT	Disaster Medical Assistance Team
ECP	Emergency Care Partnership Program
EMS	Emergency Medical Services
EMTALA	Emergency Medical Treatment and Labor Act
EOC	Emergency Operations Center
ESAR-VHP	Emergency System for Advance Registration of Volunteer Health Professionals
FEMA	Federal Emergency Management Agency
HAN	Health Alert Network
HAvBED	Hospital Available Beds for Emergencies and Disasters
HAZMAT	Hazardous materials
HFPP	Healthcare Facilities Partnership Program
HHS	Department of Health and Human Services
HICS	Hospital Incident Command System
HPP	Hospital Preparedness Program
HRSA	Healthcare Resources and Services Administration
HSEEP	Homeland Security Exercise and Evaluation Program
HSGP	Homeland Security Grant Program
HVA	Hazard Vulnerability Assessment
ICS	Incident Command System
JCAHO	Joint Commission on Accreditation of Healthcare Organizations (now referred to as the JC)
MMRS	Metropolitan Medical Response System
MOU	Memorandum of Understanding
MRC	Medical Reserve Corps
MSCC	Medical Surge Capacity and Capability Handbook
NBHPP	National Bioterrorism Hospital Preparedness Program (now referred to as the NHPP)
NDMS	National Disaster Medical System
NHPP	National Healthcare Preparedness Program (formerly the HPP)

Appendix A. List of Acronyms (cont.)

NIMS	National Incident Management System
NRF	National Response Framework
OPEO	Office of Preparedness and Emergency Operations
PAHPA	Pandemic and All-Hazards Preparedness Act (Public Law No. 109-417)
PHEP	Public Health Emergency Preparedness
PPE	Personal Protective Equipment
UASI	Urban Area Security Initiative
VA	Department of Veterans Affairs
WMD	Weapons of Mass Destruction

Appendix B. Center for Biosecurity Descriptive Framework for Healthcare Preparedness for Mass Casualty Events: The Framework and Crosswalk of Elements of Preparedness

The following is an excerpt from the Center for Biosecurity Descriptive Framework for Healthcare Preparedness for Mass Casualty Events (February 2008).¹⁹⁴

Section 3: The Framework

Healthcare Preparedness for Mass Casualties: Key Elements, Actions, Resources, and Capabilities

This section represents the Center's preliminary synthesis of a comprehensive vision of healthcare preparedness for mass casualty disasters. It is derived from the preceding analysis, our own previous research on regional hospital collaboration and hospital preparedness for large scale disasters, and other sources as noted above. The Framework is organized by tiers, as described in the MSCC. The list of capabilities for individual healthcare institutions has much in common with the Joint Commission's 2008 Emergency Management Standards, and the list of capabilities for community-based coalitions reflects many ideas contained in AHRQ's Community Guide for Mass Care with Scarce Resources. Some of the response capabilities described in this Framework can be accomplished by individual healthcare institutions; other capabilities can be achieved only by communitywide coalitions of institutions. Thus, there is some overlap and repetition among the items listed for different tiers. Some elements of the Framework are already well established and widely implemented. Other capabilities are in formative stages and implementation varies across the country. Some important elements, such as assurance of situational awareness at the community level or higher, remain notional. This Framework will evolve as the project proceeds and input is garnered from the Working Group.

Tier 1. Individual Healthcare Institutions

Planning and Process

The appropriate extent of planning and preparedness efforts will vary among healthcare institutions. What is reasonable for a large, urban, academic medical center may not be reasonable for a small, isolated, rural hospital. Thus, the list of preparedness capabilities must be appropriately scaled for the particular circumstances of the individual institution. No one template or set of capabilities will fit all institutions and not all institutions will fulfill the capabilities in the same way.

- **Organization and Authorities**
 - **Senior leaders** from each healthcare institution (e.g., CEO, Chief Medical Officer, Chief Nursing Officer, president of the medical staff, department heads) are active participants in emergency management planning.
 - A **Disaster Coordinator** with appropriate training and experience, appointed by the healthcare institution and given requisite authority and budget, directs the emergency preparedness program. This individual is fully familiar with local, state, and federal emergency response plans and actively participates in the development and updating of local and state plans. In the case of some small hospitals, one individual may fulfill this role for several facilities. At very large medical centers with multiple facilities, more than one individual may be needed. Responsibilities include:

¹⁹⁴ Toner E, Waldhorn R, Franco C, et al. (2008).

- Creating and updating Emergency Operations Plans (EOP)
- Devising, conducting, and evaluating drills
- Designing, coordinating, and conducting training and education
- Chairing a multi-disciplinary Emergency Preparedness Committee
- Collaborating with other hospitals, state and local agencies, and businesses in planning and response.
- A **local healthcare coalition**, in which the healthcare institution actively participates and which includes all of the hospitals, public health departments, emergency management agencies (EMA), and Emergency Medical Services (EMS) (i.e., the community partners), organizes collaborative emergency preparedness and response.
- An “**all-hazards” incident command structure** (ICS) for coordinating critical functions during an emergency is used by the healthcare institution and is integrated into and consistent with the community’s ICS. In most cases, the ICS will be headquartered in a designated command center(s) located in a non-clinical area; however, web-based tools may allow for this function to be distributed to many separate locations.
- **Hazard Analysis**
 - A **Hazard Vulnerability Analysis** (HVA) is conducted yearly by the healthcare institution to identify: (1) events that could significantly affect demand for its services and its ability to provide those services; (2) the likelihood of those events occurring; and (3) the probable consequences of those events.
 - The HVA is informed by threat information provided by local and state agencies. The threats considered should include both internal (e.g., fire, utility outage) and external events (natural and manmade disasters) and disasters in which the facility is cut off from outside support and/or in which basic infrastructure is disrupted.
 - The healthcare institution (together with its community partners) prioritizes the hazards identified in its HVA.
 - The healthcare institution does the following for each emergency identified in its HVA:
 - Creates strategies for mitigation, preparedness, response, and recovery
 - Conducts assessments of the assets and resources that would be needed during that emergency (e.g., staffing, supplies, food, water, personal protective equipment, and pharmaceuticals).
 - The healthcare institution communicates its needs and vulnerabilities to its community partners and identifies the capabilities of its community partners in meeting its needs.
- **Emergency Operations Planning and Training**
 - An **Emergency Operations Plan** (EOP) is maintained by the healthcare institution. The EOP addresses all of the hazards and vulnerabilities in the HVA, is widely available within the healthcare institution, is shared with its community partners, and is updated at least annually.
 - The EOP establishes plans for emergencies that prevent the organization from receiving outside support for at least 96 hours.
 - The EOP identifies (in collaboration with its community partners) alternative care sites to be used in emergencies that overwhelm or impede normal function and determines the types of patients and services that could be handled at alternative sites.
 - The EOP clearly describes processes (“triggers”) for initiating and terminating the emergency response and recovery phases, and clearly identifies those persons who have the authority to activate the EOP and the circumstances under which that authority may be invoked.
 - **Education and training** are provided for all healthcare institution personnel and are tailored to their particular roles and responsibilities in the EOP.

- **Exercises and Dynamic Improvement**

- **Exercises to test the EOP** are conducted by the healthcare institution at least twice per year.
 - Hospitals with emergency departments conduct at least one exercise per year that includes an influx of patients.
 - At least one exercise per year evaluates how effectively the healthcare institution performs when it receives outside assistance.
 - At least one exercise per year involves collaboration with other healthcare facilities and community partners.
 - The exercise scenarios are realistic and related to the priority emergencies identified in the healthcare institution's HVA.
 - During exercises, performance is monitored, documented, and critiqued through a multi-disciplinary process to identify opportunities for improvement.
 - Lessons learned from exercises and actual emergencies are shared with appropriate personnel within the healthcare institution and the healthcare coalition.
- **Modifications** of the EOP are made by the healthcare institution in response to critiques of exercises.
- **Ongoing education and training** of healthcare institution personnel are conducted in response to the critiques of the exercises and/or modifications of the EOP.
- **Subsequent exercises** evaluate the effectiveness of the modifications that were made.

Situational Awareness

The optimal response to an emergency requires: (1) an ongoing flow of information (as reliable, complete, and near-real time as possible) about the nature and unfolding consequences of the event; (2) the ability to interpret that information and understand its implications for the healthcare institution and its community; and (3) the ability to use that analysis to anticipate what may happen next. To be of greatest use, the information and analysis must be shared with appropriate personnel within the institution and with appropriate members of the community. Thus, this description of situational awareness includes not only the gathering of information but also its analysis, distribution, and influence on response actions. This category includes communications with hospital staff, community partners, the media, and the public.

- **Suspect cases are rapidly reported** to healthcare institution leaders and to appropriate community partners during an emergency, or during normal times if the cases may herald the onset of an emergency.
- **The healthcare coalition is immediately notified** when the healthcare institution's EOP is activated.
- **External information is rapidly verified, analyzed, and forwarded** by the appropriate individuals in the healthcare institution to decision makers within the institution's ICS. External information may include such data as the number of anticipated victims and the expected severity of their illnesses and/or injuries.
- **Patient load and location data are tracked.** The healthcare institution establishes methods for tracking the number, types, and locations of patients and for sharing that information with response agencies and other facilities. The organization establishes methods for tracking similar information from other facilities.
- **Medical assets and resources are tracked.** The healthcare institution establishes methods for monitoring quantities and locations of assets and resources such as staffing, medical supplies, food, and fuel during an emergency and sharing that information with the healthcare coalition.

Communications

Reliable communications systems and messages that are appropriately targeted to various audiences are both essential to effective emergency response. Effective communications, therefore, include both: (1) redundant and interoperable communication systems and equipment that allow rapid exchange of information both within and outside the hospital; and (2) the ability to craft and deliver messages and information that are appropriate for each key audience, including decision makers, the general public, and emergency and healthcare institution staff.

- The healthcare institution establishes emergency communications strategies and systems to support crucial communication activities, including:
 - Staff notification of EOP activation
 - Ongoing information and instructions for staff throughout the period of emergency response and recovery
 - Information for patients and their families throughout the event
 - Reuniting incoming patients with their families (this requires coordinating with the coalition and other authorities as well the families of missing victims)
 - Information for the news media throughout an event
 - Communication with essential suppliers
 - Exchange of information with other members of the healthcare coalition and other authorities to enable situational awareness, as described above
 - Provision of back-up modes of communication (e.g., text messaging, ham radios).

People, Supplies, and Equipment

Adequate manpower and materiel are needed to maintain healthcare institution operations throughout the periods of emergency response and recovery, including the surge in demand for services resulting from the emergency.

- **People**
 - The healthcare institution has a management plan for staff (including medical staff personnel not employed by the hospital and volunteers) that assigns roles and responsibilities during the emergency.
 - **Staff are trained for their assigned roles** during emergencies and know to whom to report during an emergency.
 - **Roles are easily identifiable.** The organization establishes a process for identifying the assigned roles of personnel (such as identification cards, wrist bands, vests, hats, badges, computer printouts) assigned to particular areas during emergencies.
 - **Staff are supported** (e.g., food, housing, transportation, incident stress debriefing).
 - **Staff families are supported** (e.g., child care, elder care).
 - **Healthcare workers are protected.** This includes:
 - Stockpiling and maintaining adequate supplies of personal protective equipment and training in its use
 - Processes for rapidly providing prophylaxis or vaccination to staff
 - Acquiring and maintaining decontamination equipment and training of staff in proper decontamination procedures.
- **Supplies and Equipment**
 - The healthcare institution has strategies for managing resources and assets during emergencies, that include:

- **Stockpiling supplies** needed immediately at the onset of an emergency response (medical and non-medical). The quantities needed are derived from the HVA and should be sufficient to last 96 hours without resupply.
- **Replenishing medical and pharmaceutical supplies and equipment** that will be required throughout the response and recovery, including access to caches stockpiled by the healthcare coalition or by local, state, or federal sources.
- **Replenishing non-medical supplies** that will be required throughout the response and recovery including food, linens, water, and fuel.
- **Sharing of resources and assets** (e.g., personnel, beds, transportation, linens, fuel, personal protective equipment, medical equipment, and supplies) with other healthcare organizations.

Security and Maintenance of Hospital Infrastructure

A safe, secure, and functional facility is required to provide patient care. A sudden, large surge of victims could overwhelm a facility and create a hazard, especially if the patients are contaminated or contagious. Plans should address external hazards, such as floods, earthquakes, and/or tornadoes that could damage the facility at the same time as causing mass casualties.

- The healthcare institution has strategies for managing safety and security during emergencies, including the following:
 - **Internal security** and safety operations
 - **The roles of external security agencies** (e.g., police, National Guard) and how the organization will coordinate security activities with these agencies
 - **Decontamination** of incoming patients, first responders, staff, and families with possible radioactive, biological, or chemical exposure
 - **Traffic and perimeter control:**
 - Entrance into and exit from the facility during emergencies
 - Movement of individuals within the healthcare facility during emergencies
 - Traffic accessing the healthcare facility during emergencies
- The healthcare institution establishes strategies for sheltering in place, ensuring alternative means of providing the following:
 - **Power:** Electricity and fuel for generators
 - **Water:** Both potable and non-potable
 - **Medical gases**
 - **Fuel** for vehicles
- The healthcare institution establishes strategies for:
 - **Partial evacuation** when a portion of the facility cannot support services
 - **Complete evacuation** when the entire facility is unusable including transporting patients, medications, equipment, staff, and pertinent clinical information to other facilities or alternative care sites.

Patient Care

By definition, any mass casualty disaster will create a surge of patients. Depending upon many factors, including the number of patients, the nature and severity of injuries or illness, the proximity of the healthcare institution to the site of the disaster, and the duration of the emergency, the healthcare institution could be overwhelmed and unable to provide patient care in the usual way. Care will be needed by victims of the disaster, as well as by the healthcare institution's usual patients and by patients who cannot access their normal site of care.

- **A variety of services must be maintained.** The healthcare institution establishes strategies for maintaining and augmenting essential patient services:
 - Specialized services for disaster victims (e.g., burn, trauma, critical care), including victims from vulnerable populations (e.g., pediatric, geriatric, disabled, or those who have serious chronic conditions or addictions)
 - Routine clinical and support services for non-disaster-related patients including services for vulnerable populations
 - Mental health services for disaster victims and others
 - Mortuary services
 - Medical records and patient tracking. Provisions should be made for maintaining minimal but sufficient records during emergencies to optimize limited personnel resources.
- **Surge capacity and capability must be augmented.** The healthcare institution establishes and tests plans to increase its capacity (the number of beds) and capabilities (the ability to care for patients) when confronted by a sudden surge of patients. The amount of increase in surge capacity that can be achieved is a function of time, and different surge strategies require different amounts of time.
 - Possible strategies to augment surge capacity include:
 - Adding extra beds by using hallways or other non-clinical areas, increasing the number of patients per patient room, and utilizing outpatient or specialty units for inpatient care;
 - Expediting the discharge of stable patients to their homes or other facilities; and
 - Cancelling elective admissions and procedures.
 - Possible strategies to augment surge capability include:
 - Shifting staff to areas of need;
 - Working overtime/cancelling leave;
 - Utilizing non-clinical personnel;
 - Using outside assistance (e.g., mutual aid, volunteers, government assistance);
 - Adjusting staffing ratios;
 - Altering patient care standards; and
 - Rationing resource or time intensive services.
- **Scarce resources must be optimally allocated.** The healthcare institution has a process, devised and implemented in coordination with the healthcare coalition and local and state authorities, for allocation of scarce medical resources.
 - The process should be used only in the event of a dire emergency and after consultation with the healthcare coalition partners.
 - Evidence-based criteria should be applied where possible.
 - It should be objective, but allow for clinical judgment and mitigating circumstances.
 - Review and oversight processes should be included.
 - The process should be consistent with criteria used by other healthcare institutions in the community.

Tiers 2 and 3. Community-Based Healthcare Coalitions

Hospitals in many, but not all, communities have begun efforts at collaboration around emergency preparedness. This is largely driven by the requirements of the HPP and the Joint Commission standards. Each coalition is different. Some are quite nascent while others are fairly well developed. Some include only hospitals, while others include public health agencies and other community partners. In some jurisdictions, the coalitions have grown out of, or are tied into, multiagency coordination centers. Few coalitions have been tested by exercises or actual events.

Planning and Process

Coalitions of healthcare institutions are needed to address emergency preparedness and response challenges that cannot be addressed by individual institutions acting alone. These challenges include distribution of patients, sharing of assets and resources, use of volunteers, operation of alternative care facilities, and allocation of scarce resources. Given the great diversity in communities, these coalitions will take on many different forms, but each should encompass the key capabilities listed below.

- **Organization and Authorities**
 - **Every community** has a local coalition of healthcare facilities and their community partners. The definition of "community" must remain flexible; in some places it may be a county or city, in others it may be a single town or an entire state. Some coalitions, such as the National Capitol Region, may encompass multiple political jurisdictions. The essential feature is that every hospital in the community is included.
 - **Membership includes representatives from all hospitals** in the community, as well as representatives from public health departments, local or state EMA and EMS, and other community partners, as appropriate. Optimal response to large scale disasters may require the inclusion of non-traditional partners in the private sector such as large retailers.
 - **Compacts and or mutual aid agreements** are used to establish the coalitions. Cooperative mutual aid agreements enable resource reallocation and sharing, patient redistribution, and coordinated utilization of alternate care sites.
 - **A connection to the local/state ICS**, in collaboration with public health authorities through the ESF-8 function of the National Response Framework, enables integration into the overall disaster response.
 - **Operational authority** to compel action on the part of coalition members, if needed during an emergency, may be derived from and contingent upon the local or state government's emergency police powers when the state or locality declares a public health or other type of emergency or disaster.
- **Hazard Vulnerability Analysis**
 - **Threats to the community are jointly analyzed and prioritized.** As a result, all members use the same hazard assumptions in developing their individual HVAs and EOPs. At a minimum, each HVA should consider (1) local natural hazards (e.g., hurricanes in the South east, tornadoes in the Midwest, and earthquakes in the West), (2) the National Planning Scenarios (within the context of the federal, state, and local planning), and (3) disasters in which the community is cut off from outside support and/or in which basic infrastructure is disrupted. The HVA should consider the impacts of a large, geographically remote event wherein the community becomes a refuge for displaced or evacuated patients.
 - **HVAs of each member are shared.** Each member is aware of the each other's needs and the type of mutual aid that may be available or needed.
 - **Special needs** populations are considered by the coalition and plans are created to ensure appropriate care across the community.
- **Emergency Operations Planning and Training**
 - **Collaborative planning**, based on the shared HVAs, enables a coordinated response. The collaborative planning process informs the development of EOPs of the individual institutions.
 - **Joint training**, based on the collaborative planning, facilitates the creation of an interoperable workforce enabling the efficient sharing of personnel in an emergency.
- **Exercises and Dynamic Improvement**
 - **Joint exercises**, based on the joint planning and training, enables the testing and refinement of plans for a coordinated community-based response.

Situational Awareness

Situational awareness is an essential aspect of disaster response. Decision makers must have an accurate understanding of a disaster as it unfolds to be able to make informed judgments about how best to manage the response. For example, to optimally distribute patient load within a community, real-time data on the number of available beds and the estimated surge capacity of each healthcare institution is needed. This information must be in a standard format that can be quickly compiled and used by the coalition in cooperation with the local EMS. Similarly, real-time data from the member institutions on the availability of assets and resources is needed by the coalition to facilitate the sharing of scarce resources. The coalition plays an essential role in informing the larger local and state ICS about what is going on in the healthcare institutions, what the institutions' capacities and capabilities are, and what they need. Conversely, the coalition is an essential information conduit from the larger ICS to the healthcare institutions, relaying information about the number and types of patients to expect and the availability of outside help. The coalition also plays an important role, in cooperation with public health agencies, EMA, and elected officials, in keeping the public informed. Lastly, the coalition should provide information and advice to the local and state ICS and to elected officials.

- **Serving as information clearinghouses** for healthcare institution data, the coalition:
 - Facilitates the optimal distribution of patient load by directing ambulance traffic to hospitals and coordinating patient transfers
 - Coordinates the inter-facility sharing of resources
 - Provides the state/local ICS with information about what is going on in the hospitals
 - Provides the healthcare institutions with information coming from the state/local ICS
 - Provides expert medical advice to the local government authorities.

Communications

Reliable communications among emergency response partners and unified messages to various audiences are essential for effective emergency response. Reliable communication requires redundant and interoperable communication systems and equipment that allow rapid exchange of information among the member institutions, and to and from local/state agencies and ICS. The coalition provides a platform for the joint crafting of messages appropriate for decision makers and the public. In very large emergencies involving more than one community, the sharing of patient load and resource data among neighboring coalitions is needed.

- **Internet-based systems** are used for tracking patient load and assets within the coalition and for interconnection with similar coalitions in other communities. Redundant systems should exist in the event that the Internet is down.
- **A communications link** exists to local and state ICS and key agencies. This link should be reliable with appropriate back-up systems.

People, Supplies, and Equipment

Healthcare institutions vary considerably in their surge capacity and capabilities as well as in the amount of personnel, supplies, and equipment they have. An optimal medical response to an emergency requires a matching of the patient load with the available resources. Individual institutions are likely to be hesitant to share resources that they might need later in the course of an emergency.

- Healthcare coalitions serve as an honest broker and trusted source of information for decisions regarding allocation of resources in an emergency such as:
 - Utilization of local, regional, and national bed capacity and appropriate shifting of patients
 - Redistribution of scarce resources in an emergency.

- Procedures for recruitment, credentialing, training, and deployment of volunteer healthcare workers in conjunction with local MRCs and state ESAR-VHP programs are maintained by the healthcare coalitions.
- Joint purchasing agreements to insure interoperability of supplies and equipment and achieve economies of scale are organized and executed where feasible by the coalitions.
- Standards for interoperable equipment, communications equipment, training, and drills are maintained by the coalitions.

Healthcare for Affected Populations

When optimal distribution of patient load, sharing of resources, and mutual aid are insufficient to relieve the mismatch between patient load and scarce resources in overwhelmed healthcare institutions in an emergency, alterations in the way that patient care is provided must be implemented. Such decisions are inherently difficult and fraught with ethical and legal challenges. It is essential that, to the greatest extent possible, these changes in patient care are consistent across a community. The development of a consistent approach to the allocation of scarce life-saving resources requires considerable time and effort prior to an emergency and should consider the role of elected officials.

- **Healthcare coalitions should serve as an honest broker** for discussions regarding the institution of altered patient care routines and or the use of alternate care facilities in an emergency. Because patient load and resource shortages may differ from one healthcare institution to another during an emergency, the healthcare coalition should facilitate discussions among its members as to how decisions to alter standards of care routines will be made and by whom. The coalition's role in hosting this discussion is to ensure that load and resources are shared optimally and that the members use consistent triggers.
- **Guidance for allocation of scarce resources** in a mass casualty event, developed jointly by the coalition members in conjunction with expert panels or planning groups, provides the basis for similar protocols within the member institutions.
- **Alternate care sites** are identified, and operating procedures (including types of patients to be treated, the treatment modalities provided, staffing, and logistics) are maintained by the coalition in cooperation with local and state agencies.
- **The "worried well,"** concerned individuals seeking evaluation for potential effects of the disaster, are to be managed with a consistent approach across a community as coordinated by the coalition. The coalition also coordinates the fair distribution of these patients across the healthcare facilities in the community including the possible use of alternative care facilities.

Tiers 4, 5, and 6. State and Federal Governments

U.S. experience with mass casualty events that have required a national or large regional medical response is limited. Federal and state governments have many responsibilities in disaster response beyond healthcare, but in this section we focus only on what governments can do to facilitate and support the care of patients in communities and individual healthcare institutions. This Framework does not directly discuss the National Disaster Medical System (NDMS) or other medical teams, medical evacuation, or multistate regional coordination. These are important government functions which will be addressed in the Preparedness Report. The focus of this document is on the capabilities that are needed, but this document does not address the means by which they are to be achieved. That will be discussed later in this project.

Planning and Process

A mass casualty disaster of sufficient size (measured either by the number of patients or geographic area affected) to overwhelm an individual community requires a coordinated response from several coalitions, as well as the use of the emergency response assets of the state and possibly other states and the federal government.

- **Organization and Authorities**

- Every state ensures that every healthcare institution in the state is part of a healthcare coalition. State incident management plays a primary role in managing the response to events that involve multiple communities.
- Every state agency involved in emergency healthcare response, including at a minimum the public health department and EMA, participates in each local health coalition, either directly or through local agencies.
- A connection between neighboring coalitions to enable information exchange and mutual aid is ensured by state authorities (and federal authorities where these connections cross state borders).

- **Hazard Analysis**

- State-specific hazard assessments, informed by local conditions and federal threat assessments, are maintained by state agencies. Pertinent hazard analyses are shared with local community coalitions to inform their hazard assessments. Each state hazard assessment should consider (1) local natural hazards (e.g., hurricanes in the Southeast, tornadoes in the Midwest, and earthquakes in the West), (2) the National Planning Scenarios (within the context of the federal, state, and local planning), and (3) disasters in which the state is cut off from outside support and/or in which basic infrastructure is disrupted. The assessments should consider that the state could be adversely affected by a large geographically remote event if the state becomes a refuge for displaced or evacuated patients.

- **Emergency Operations Planning and Training**

- State-specific concepts of operations (ConOps) for healthcare institutions, informed by a national ConOps for healthcare institutions, are maintained to provide a basis for EOPs developed by healthcare coalitions and individual institutions. The ConOps should be consistent with the state hazard assessment and should integrate the state and federal response assets (e.g., EMA, National Guard, NDMS teams).

- **Exercises and Dynamic Improvement**

- Multi-jurisdictional exercises, both intra-state and across state borders, involving several coalitions are conducted to test and refine the healthcare ConOps.

Situational Awareness

Federal and state emergency response resources are limited and therefore timely and accurate data is needed to be able to allocate the resources so as to do the most good. In order for each medical response tier to make decisions wisely, a common operation picture of the unfolding emergency is needed.

- **Real-time data on patient load and resource location and availability** is provided by each coalition, through the state ICS, to state decision makers and, where appropriate, to federal agencies. These data are collated at the state and federal levels to create an overall picture of the emergency. This overall picture is continuously shared and regularly updated up and down the tiers.
- **Event-specific information** pertaining to the number or types of casualties is provided from the federal and state authorities to the coalitions as quickly as possible to facilitate local response.

Communications

Reliable and redundant communications capabilities are required to connect vertically all tiers and horizontally across each tier. In addition, state and federal agencies (e.g., National Guard) should be able to quickly backfill lost communication capability.

- Interoperable Internet-based systems are used for reporting patient load and resource data throughout all tiers.
- Reliable communications links exist between all tiers.
- Rapidly-deployable communications teams should be available at the state and federal levels to provide emergency back-up communications capability.

People, Supplies, and Equipment

States and the federal government must stockpile and be able to rapidly deploy caches of medical equipment and supplies. States must be able to efficiently share resources, including personnel, across state lines utilizing pre-established MOUs and the Emergency Management Assistance Compact.

- Stockpiles of medical supplies and equipment, consistent with their hazard assessments, are maintained by states and the federal government. All tiers are able to distribute the stockpiles in a timely fashion.
- Procedures for recruitment, credentialing, training, and deployment of volunteer healthcare workers, consistent with the ESAR-VHP program, and in conjunction with local MRCs and the healthcare coalitions, are maintained by the states.
- Joint purchasing agreements to insure interoperability of supplies and equipment and achieve economies of scale are organized and executed where feasible by the states.
- Standards for interoperable equipment, communications equipment, training, and drills are maintained by the states and, to the extent possible, by the federal government.

Patient Care

In order for local communities to be able to develop plans for allocating scarce medical resources in an emergency, including altering patient care practices and using alternative care sites with limited capabilities, state and federal guidance is needed to provide legitimacy and consistency.

- Guidelines for allocation of scarce resources in a mass casualty disaster, developed by the states in conjunction with expert panels and following federal guidance, provide the basis for local guidelines to be maintained by local healthcare coalitions.
- Guidelines for alternate care sites (including types of patients to be treated, the treatment modalities provided, staffing, and logistics) are maintained by the states.

Crosswalk of Elements of Preparedness

Element	APIC ^a	CDC ^b	AHRQ ^c	JC ^d	HPP ^e
Planning and Process:					
A written disaster plan	x	x	x	x	x
Leaders and medical staff involved				x	
A multidisciplinary disaster committee	x				x
All-hazards planning				x	x
CBRNE plans		x	x		x
Includes mitigation activities				x	
Collaborate with EMA for planning	x	x	x	x	x
Collaborate with suppliers for planning	x	x			
Collaborate with EMS for planning	x	x		x	x
Collaborate with public health for planning	x	x		x	x
Collaborate with other hospitals	x	x		x	x
MOU with other hospitals/facilities		x	x		x
Plans for both internal and external events	x			x	
A hazard-vulnerability analysis				x	x
Coordinated with community				x	x
Disaster coordinator	x		x		x
Annual reviews of plan				x	
Command and Control:					
An incident command system	x	x	x	x	x
Integrated with community				x	x
A command center	x			x	
Plan activation—how and who	x		x	x	x
Regional sharing of assets and resources				x	x
Surge:					
Early discharge of patients	x	x	x		x
Cancellation of elective surgery	x	x	x		x
Open ancillary space	x	x	x		x
Use alternative care facilities		x	x	x	x
Consider special populations				x	x
Consider psychosocial needs of patients and families	x			x	x
Bolster medical records capacity	x			x	
Stockpile specific countermeasures	x	x	x	x	x
Stockpile disaster-related supplies			x	x	x
Manage volunteers	x			x	x
Bolster mortuary capacity			x	x	x
Augment staffing			x		
Altering patient care routines/ratios			x		

Element	APIC ^a	CDC ^b	AHRO ^c	JC ^d	HPP ^e
Staff:					
Staff support (housing, transportation)			x	x	
Critical incident stress management			x	x	x
Family support			x	x	x
Situational Awareness:					
Staff levels			x		
Bed tracking			x		x
Status of other hospitals			x		
Epidemiological surveillance	x				x
Communications:					
Emergency notification (staff)	x		x	x	
Plan for communication failures	x			x	x
Internal communications plan (staff)	x			x	x
External communications plan (agencies)	x			x	x
Media communications plan	x			x	x
Patient and families communications plan				x	x
Suppliers communications plan				x	
Other healthcare organizations communications plan				x	x
Facilities:					
External traffic flow	x			x	
Manage visitors	x				x
Internal traffic flow	x			x	x
Facility security	x			x	x
Decontamination	x			x	x
Training and Drills:					
Disaster specific training	x	x	x	x	x
Regular drills	x	x	x	x	x
Community-based drills		x		x	x
Cut-off-from-support drills				x	
Continuous improvement cycle			x	x	
Evacuation:					
Evacuation plan	x			x	x
Destination	x				x
Route	x				x
Logistics	x				x
Transportation	x			x	x
Reentry of evacuated facility					
Patient identification and medical records				x	
Operating in Isolation:					
Sheltering in place plan				x	

Element	APIC ^a	CDC ^b	AHRQ ^c	JC ^d	HPP ^e
Asset Management:					
Inventory of assets (equipment, supplies, water)	x	x	x	x	
Tracking of assets				x	
Resupply during disaster		x		x	x
Supplies for >48-96 hours:	x		x		x
Back-up power/fuel	x			x	x
Food and water	x		x	x	x
Meds	x		x	x	x
Regional caches			x		
Recovery:					
Plan for recovery	x			x	

- a. Association for Professionals in Infection Control and Epidemiology (APIC), Center for the Study of Bioterrorism and Emerging Infections. *Mass Casualty Disaster Plan Checklist: A Template for Healthcare Facilities*. October 2001. Available at <http://bioterrorism.slu.edu/bt/quick/disasterplan.pdf>.
- b. Niska RW, Burt CW. Bioterrorism and mass casualty preparedness in hospitals: US, 2003 (No. 364). U.S. Department of Health and Human Services. *Advance Data from Vital and Health Statistics*. September 2005.
- c. *Bioterrorism Emergency Planning and Preparedness Questionnaire for Healthcare Facilities*. Prepared by Booz-Allen & Hamilton for AHRQ under Contract No. 290-00-0019. 2002. <http://www.ahrq.gov/about/cpcr/bioterr.pdf>.
- d. Joint Commission. *Emergency Management Standards*. 2008.
- e. Combined HPP benchmarks, sentinel indicators, and performance measures: 2002-2006 [personal communication, Melissa Sanders, 2007].

Appendix D. HPP Guidance Terminology by Year

Term	Description	Year(s) Utilized
Critical benchmark	High-level organizational structure that describes specific functions and goals.	2002-2005
First priority planning area	Critical equipment and ability to use such equipment in a disaster setting.	2002-2003
Second priority planning area	Additional need that addresses personnel-related preparedness issues.	2002-2003
Cross-cutting benchmark	Preparedness activity that coordinates response among state and local health departments, hospitals, and other healthcare entities.	2003-2005
Minimal level of readiness	The mechanism for achieving the critical benchmarks, often in a phased approach to reaching each benchmark.	2004-2005
Sentinel indicator	Data that relate directly to the achievement of a critical benchmark.	2004-2006
Program measure	A mixture of program activities and process/outcome measures to be used for oversight and future program improvement.	2006
Performance measure	Data designed to demonstrate and measure progress toward healthcare system preparedness; reported semi-annually.	2006-2008

Appendix E. Summary of HPP Program Guidance: FY2002–FY2008

Initial Grant Guidance–Establishment of Critical Benchmarks (FY2002)

The initial NBHPP guidance issued in 2002 focused on the provision of \$125 million in federal funding for specific *critical benchmarks* focused on expanding systemic and structural capacity.¹⁹⁵ These benchmarks laid the foundation for the program's development in subsequent years. Emphasis was placed on improvements that could be rapidly developed, and states and cities were therefore requested to focus on information and plans that were already in existence. The program's focus was on responding to a biological attack rather than on an all-hazards approach, with the program guidance stating that "[t]he plan may address other hazards to the extent that bioterrorism response can be generalized to those hazards, but an all-hazards approach must not overshadow the planning for biological agents."

Several critical benchmarks were highlighted in the guidance, including the appointments of a state/awardee hospital preparedness coordinator, medical director for each state's program, and hospital preparedness planning committee (which would include the jurisdictional public health department, emergency medical services, emergency management agency, state hospital association, primary care associations, and VA or other military hospitals, if applicable), and the development of broad regional hospital plans for addressing bed capacity, isolation and quarantine, and communications. Additional priority areas included the distribution of medicine and vaccines, stockpiling of PPE and decontamination equipment, training and exercises, and licensing and credentialing. The guidance requested descriptions of current plans, needs assessments, and plans for improvement, but the program benchmarks outlined few specific requirements for each of these areas.

Shift to Improved Capacity Building and Cross-Cutting Benchmarks (FY2003)

In 2003, the NBHPP guidance provided additional details explaining its benchmark requirements for improved capacity-building (e.g., hospitals would be required to plan for the care of 500 additional patients per 1,000,000 in population and have at least one negative pressure isolation facility available) and called for increased integration with other federal programs, such as CDC's PHEP Cooperative Agreement and DHS's MMRS.¹⁹⁶ The guidance introduced specific *cross-cutting benchmarks* that correlated with CDC program guidance. These included the adoption by hospitals of NIMS; the joint advisory committee, which was an evolution of the hospital preparedness planning committee from 2002; laboratory connectivity and data standards; surveillance; training; information technology; and academic health center involvement. The critical benchmarks specific to the NBHPP fell within six broad priority areas;¹⁹⁷ some of these overlapped with the cross-cutting benchmarks (e.g., mental health, information technology, laboratory connectivity and standards, surveillance, and training). However, certain benchmarks, such as bolstering of trauma care capacity, remained optional.

Addition of Minimal Levels of Readiness and Sentinel Indicators (FY2004)

The 2004 program guidelines expanded the 2003 introduction of specific critical benchmarks and included requirements for *minimal levels of readiness* and *sentinel indicators*.¹⁹⁸ The introduction of the minimal levels of readiness reflected the realization that the levels of preparedness among states and municipalities varied widely and that certain baseline criteria should be met by hospitals across the U.S.

¹⁹⁵ HRSA (2002).

¹⁹⁶ HRSA (2003).

¹⁹⁷ The six broad priority areas included: Administration, Regional Surge Capacity for the Care of Adult and Pediatric Victims of Terrorism, Emergency Medical Services, Linkages to Public Health Departments, Education and Preparedness Training, and Terrorism Preparedness Exercises.

¹⁹⁸ Health Resources and Services Administration. U.S. Department of Health and Human Services. National Bioterrorism Hospital Preparedness Program, FY2004 Continuation Guidance. Washington, DC. 2004.

Specifically, requirements for the critical benchmarks became more specific (e.g., the guidance provided more detailed requirements for pharmaceutical caches) and greater correlation was provided for the benchmarks (e.g., planning for additional personnel during disasters was now tied to number of additional beds that were needed per 1,000,000 in jurisdictional population). The guidance added pandemic influenza preparedness as a new cross-cutting benchmark and required completion of the prior year's cross-cutting benchmarks. Notably, consideration was given for pharmaceutical caches to be made available not only to healthcare workers, but also to the broader community. Several of the minimal levels of readiness reflected an effort to incrementally increase standards, and a 75% compliance requirement was introduced. Sentinel indicators were also required from each applicant to provide a general preparedness snapshot for each critical benchmark.

Transition to Capabilities-Based Planning (FY2005)

Before 2005, the guidance emphasized measuring *capacity* (e.g., quantities of surge beds or PPE) rather than the *capability* to use hospital staff and resources to provide care in the event of a real or simulated event. Most HPP funds were used to acquire resources to augment hospital capacity to accommodate a surge in the number of victims in response to a natural or manmade disaster.¹⁹⁹ For example, hospitals purchased caches of pharmaceutical countermeasures for chemical and biological agents, procured and deployed communications equipment, acquired PPE for staff, built decontamination facilities, and used training activities to increase staff awareness of potential consequences of disasters and procedures for dealing with them. The program also examined strategies for increasing the availability of hospital beds to accommodate potential victims of a disaster.

In 2005, the NBHPP guidance reflected the program's transition from capacity-based planning to capabilities-based planning. The guidance emphasized all-hazards preparedness and response and required states to conduct HVAs of their region/jurisdiction. The intrastate response planning that was first required in 2003 was supplanted by interstate planning requirements, and sentinel indicators were revised to require mid-year and end-of-year progress reports that included far greater specificity of the critical benchmarks. Increased emphasis was also placed on NIMS, and states were encouraged to use funds for activities necessary to implement NIMS.

In addition, cross-cutting benchmarks were reincorporated into the critical benchmarks, which were strengthened. For example, additional bed capacity had to be made available within three hours and more specific decontamination requirements were provided. Minimal levels of readiness were strengthened to require compliance by all facilities within each award region, rather than in only 75% of them. Finally, references to the concept of expanding pharmaceutical caches for the use by the greater community from earlier guidance were removed.

Shift to Capabilities in a Tiered Response System (FY2006)

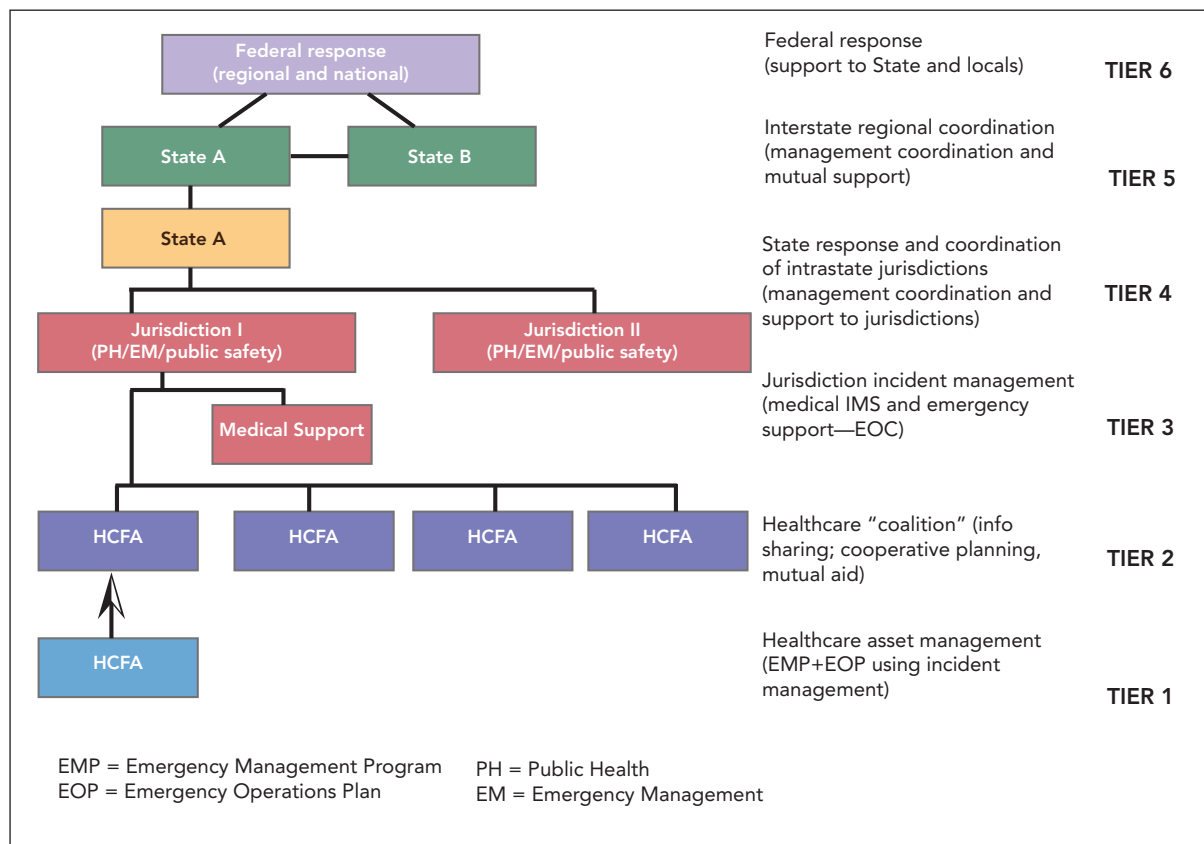
With the issuance of the Interim National Preparedness Goal in March 2005, the 2006 NBHPP guidance shifted from focusing solely on capabilities and a tiered response system.²⁰⁰ The guidance began to stress the importance of cooperation with other organizations within a community. It also revised the data collection plan to focus more attention on hospital participation in drills, tabletops, and full-scale exercises, whether conducted alone or with other community partners. Previous areas of emphasis, such as bed capacity, personnel, licensing, credentialing, and training, remained the same. However, the descriptive updates requested of applicants were far more subjective than the detailed objective requirements of prior years. While some specific quantitative measurements were removed, new qualitative measures were introduced (e.g., requirements for additional staff to vacant or available bed ratios and reporting of bed availability by bed type).

199 Health Resources and Services Administration. U.S. Department of Health and Human Services. National Bioterrorism Hospital Preparedness Program, FY2005 Continuation Guidance. Washington, DC. 2005.

200 Health Resources and Services Administration. U.S. Department of Health and Human Services. National Bioterrorism Hospital Preparedness Program, Program Guidance. Washington, DC. 2006.

In addition, in 2006, HHS developed the Tiered Medical Response System as part of the MSCC management system (see below).²⁰¹ Tiers included individual healthcare facilities, local healthcare coalitions, state and local jurisdictions, interstate regional coordination, and, ultimately, federal response. NBHPP applicants were required to describe how their jurisdictions and preparedness activities integrated with each tier of the response system and with other federal grant programs, including the DHS Urban Area Security Initiative (UASI) and Homeland Security Grant Program (HSGP). States were also requested to describe the interface and collaborative interactions (e.g., mutual aid agreements and sharing of personnel and other resources) between all tiers of the response system.

Medical Surge Capacity and Capability (MSCC) Response Tiers²⁰²



Focus on the National Preparedness Goal (FY2007)

In the 2007 HPP guidance, previous capabilities-based planning priorities were relabeled as *Level One Required Sub-Capabilities*, which included interoperable communications systems, bed tracking, ESAR-VHP, fatality management, and hospital evacuation.²⁰³ Past priorities, such as plans for alternate care sites, pharmaceutical caches, PPE, and decontamination, were categorized as *Level Two Sub-Capabilities*, which were lower than Level One in terms of priority. Other past benchmarks, including NIMS, education and training, and exercises, were incorporated as overarching requirements within each sub-capability. Additionally, emphasis was placed on funding activities that supported the National Preparedness Goal (in particular, collaboration with DHS-sponsored activities) and on goals outlined in the amended Public Health Service Act, such as increased integration, medical preparedness

201 HHS (2007).

202 Ibid.

203 ASPR (2007).

and response, care of at-risk individuals, greater coordination, and continuity of hospital operations. Similar to prior years, qualitative descriptions were required to assess each sub-capability. Applicants were also permitted to identify and request funds for specific sub-capabilities for further improvement and development.

Integration with National Response Framework (FY2008)

The HPP program guidance shifted in 2008 to fund activities that “integrate response plans into the broader National Response Framework” released by DHS earlier in 2008.²⁰⁴ The overarching requirements were refined to include implementation of NIMS, education and preparedness training, exercises, evaluation and corrective actions, and addressing the needs of at-risk populations. An important addition to the Level One sub-capabilities is the requirement to develop partnerships and coalitions, which include hospitals, healthcare facilities, political subdivisions, and HPP grant awardees, for engaging in joint planning, building relationships, and eliminating inefficiencies and duplication of effort. The 2008 guidance also reflects major changes in the Level Two sub-capabilities by placing a new emphasis on alternate care sites, mobile medical assets, pharmaceutical caches, PPE, and decontamination. In addition, the use of the MRC and protection of critical infrastructure are promoted, and, after being recommended in the 2007 guidance, the use of HSEEP for HPP exercises, drills, and corrective actions is required. Mid-year and end-year targets are provided as performance measures for state and hospital level participants.

²⁰⁴ ASPR (2008).

Appendix F. Summary of Studies on Hospital Preparedness Since the Establishment of the HPP by Year

Year	Reference	Description
2003	Davis LM, Ringel JS, Cotton SK, et al. <i>Public Health Preparedness: Integrating Public Health and Hospital Preparedness Programs</i> . RAND. 2006.	Analysis of preparedness activity coordination among public health departments and hospitals, including: a literature review and conceptual framework; a review of 2001 and 2003 national surveys of 3,141 local public health departments and general acute care hospitals (public and private) in the RAND Surveys of Federal Preparedness Programs for Combating Terrorism; and site visits to six locations. From 2001 to 2003, coordination among public health departments and hospitals improved, and a range of models for coordination and improvement were used by these entities. Recommendations for HHS included: clearly state public health preparedness mission and goals, ensure that CDC and NBHPP grants are flexible, and coordinate grant guidance with DHS and other federal agencies.
2003-2004	U.S. General Accounting Office. <i>HHS Bioterrorism Preparedness Programs: States Reported Progress but Fell Short of Program Goals for 2002</i> . Briefing for Congressional Staff. February 10, 2004.	Evaluation of states' completion of 2002 NBHPP and CDC Co-operative Agreement requirements based on early semi-annual state progress reports. Nearly all (number not designated) states reported that they had met two of the three NBHPP critical benchmarks: the designation of a coordinator for hospital preparedness planning and establishment of a hospital preparedness planning committee. The 3rd critical benchmark (development of a plan for the hospitals in the state to respond to an epidemic involving at least 500 patients) was not met by any state.
2004	Braun BI, Wineman NV, Finn NL, et al. Integrating hospitals into community emergency preparedness planning. <i>Ann Intern Med</i> 2006;144:799-811.	Random sample survey of 575 U.S. hospitals to assess the extent of emergency preparedness linkages among hospitals, public health departments, and other first responder agencies. Substantial integration of hospitals into community emergency preparedness planning was found: 88% of hospitals surveyed had participated in communitywide drills and exercises, and 82% had conducted vulnerability analyses with community responders.
2005	U.S. Department of Health and Human Services. Healthcare Resources and Services Administration. <i>NBHPP 2005 Program Accomplishments</i> . August 2006.	Review of the 2005 NBHPP accomplishments, including a review of funding for the program through FY2005, a list of 2005 critical benchmarks, and an evaluation of states' progress in meeting those benchmarks. For the 2005 NBHPP program year, states made progress in the following areas: ability to isolate at least one infectious disease patient in a negative pressure isolation room; access to pharmaceuticals; PPE availability; decontamination systems; networking capacity; training of health care professionals; redundant communication systems; and establishment of mutual aid agreements.
2006	U.S. Department of Health and Human Services. Health Resources and Services Administration. <i>National Bioterrorism Hospital Preparedness Program: 2006 Awardee Application Analysis</i> . Prepared by Booz Allen Hamilton. November 2006.	Analysis of 2006 NBHPP awardee application data for 61 participating jurisdictions that focused on capabilities for personnel, planning, equipment and systems, training and exercises, ESAR-VHP implementation, alternate care site planning, etc. Gaps in preparedness were mainly in staffing and personnel coordination during an emergency. Interstate communication, data sharing, and formal agreements for coordination across borders in an emergency (e.g., MOUs) were in the planning stages or absent. Exercises were conducted in participation with other healthcare facilities and across jurisdictional and state boundaries.

Year	Reference	Description
2007	<i>Ready or Not? Protecting the Nation's Health from Diseases, Disasters, and Bioterrorism.</i> Trust for America's Health. Washington, DC. December 2007.	Analysis of U.S. progress in public health and medical preparedness for 2007 that cited a Hospital Emergency Preparedness Survey conducted by the Association for Professionals in Infection Control and Epidemiology (APIC) among 630 hospitals on hospital surge capacity. 76% of the hospitals surveyed had a plan to use alternate care facilities in a major health emergency, but 20% of hospitals with plans to care for patients at alternate care sites did not have realistic plans to staff those sites.
2007-2008	U.S. Government Accountability Office. <i>Emergency Preparedness: States Are Planning for Medical Surge, but Could Benefit from Shared Guidance for Allocating Scarce Resources.</i> GAO-08-668. June 2008.	Study of U.S. medical surge capacity based on a review of preparedness documents from the 50 states and GAO interviews with 20 state emergency preparedness officials. FY2006 mid-year HPP progress reports indicated that more than one-half of the states had met or were close to meeting all five medical-surge related sentinel indicators (statewide HPP participation, regional negative pressure isolation, hospital negative pressure isolation, surge beds, and pharmaceutical caches). Some states reported difficulty in starting or completing work on altered standards of care and requested additional assistance and guidance. GAO recommended that HHS serve as a clearinghouse for states and hospitals to share altered standards of care information and best practices.