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Bioterrorism and Mass Casualty Preparedness in Hospitals: United States, 2003

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Abstract

Objectives—This study examined the content of hospital terrorism preparedness emergency response plans; whether those plans had been updated since September 11, 2001; collaboration of hospitals with outside organizations; clinician training in the management of biological, chemical, explosive, and nuclear exposures; drills on the response plans; and equipment and bed capacity.

Methods—The National Hospital Ambulatory Medical Care Survey (NHAMCS) is an annual survey of a probability sample of approximately 500 non-Federal general and short-stay hospitals in the United States. A Bioterrorism and Mass Casualty Supplement was included in the 2003 survey and provided the data for this analysis.

Results—Almost all hospitals have plans for responding to natural disasters (97.3 percent). Most have plans for responding to chemical (85.5 percent), biological (84.8 percent), nuclear or radiological (77.2 percent), and explosive incidents (76.9 percent). About three-quarters of hospitals were integrated into community-wide disaster plans (76.4 percent), and 75.9 percent specifically reported a cooperative planning process with other local health care facilities. Despite these plans, only 46.1 percent reported written memoranda of understanding with these facilities to accept inpatients during a declared disaster. Hospitals varied widely in their plans for re-arranging schedules and space in the event of a disaster. Training for hospital incident command and smallpox, anthrax, chemical, and radiological exposures was ahead of training for other infectious diseases. The percentage of hospitals training their staff in any exposure varied from 92.1 percent for nurses to 49.2 percent for medical residents. Drills for natural disasters occurred more often than those for chemical, biological, explosive, nuclear, and epidemic incidents. More hospitals staged drills for biological attacks than for severe epidemics. Despite explosions being the most common form of terrorism, drills for these were staged by only one-fifth of hospitals. Hospitals collaborated on drills most often with emergency medical services, fire departments, and law enforcement agencies.

Keywords: bioterrorism • emergency response plans • medical training • mass casualty drills • medical equipment

Introduction

In response to the terrorism incidents of September 2001, the Office of the Assistant Secretary of Planning and Evaluation, Department of Health and Human Services, requested that the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS) survey hospitals regarding their preparedness for treating patients from bioterrorism attacks or mass casualty incidents. It provided funding to field a special supplement to the 2003 National Hospital Ambulatory Medical Care Survey (NHAMCS).

Data from the 2003 NHAMCS supplement will serve as a baseline for hospital terrorism preparedness because there were no major funding programs directed toward hospitals for this purpose prior to the start of the Bioterrorism Hospital Preparedness Program of the Health Resources and Services Administration (HRSA) in fiscal year (FY) 2002. Even these funds had not yet been fully awarded to hospitals at the time this survey was fielded in 2003 (1,2). Prior to the inception of the HRSA program, the Domestic Preparedness Program of the Department of Defense had not allocated any funding for hospitals, although it funded emergency response agencies (3).

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Because the NHAMCS terrorism supplement was also repeated in 2004, it will be possible to study changes in preparedness as a function of the funding made available through major Federal programs. Information about strengths and limitations of terrorism preparedness in the Nation's hospitals will be crucial for appropriate Federal agencies that are charged with planning how future funding should be used to improve domestic defensive posture.

Hospitals would be among the first institutions affected after deployment of a weapon of mass destruction. They would treat those injured in terrorist attacks in ways not unlike those used for other incidents where large numbers of patients are involved. After a biological attack, emergency departments might be the first to note changes in the epidemiology of an infectious disease, to initiate a public health department referral to identify the causative organism, and to treat patients affected by the exposure. After a chemical or radiological attack, patients might require decontamination at the hospital if they have bypassed the firefighters or emergency medical technicians at the exposure site. After an explosion, large numbers of injured patients might be brought to emergency departments for treatment. In any of these scenarios, hospitals would experience an influx of patients who may have been exposed and have medical or psychological issues to be addressed.

Because of the heavy demand placed on their services at the time of an attack, hospitals need to be prepared to handle the workload. Because the most common terrorist attacks to date have been explosive or incendiary (car bombs, airplanes full of fuel, etc.), hospitals must be prepared to treat an influx of trauma cases. Hospitals must also be prepared to diagnose and treat diseases caused by CDC Class A bioterrorism agents (smallpox, anthrax, plague, botulism, tularemia, and hemorrhagic fever). Although hospitals are required to have disaster response plans to be accredited by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), the standard elements of these plans are still quite general regarding terrorism (4).

The 2003 NHAMCS Bioterrorism and Mass Casualty Preparedness Supplement surveyed hospitals on their preparedness for such attacks by asking about the content of emergency response plans, training for terrorism response, experiences with internal and external disaster drills, and availability of specialized equipment such as decontamination showers, personal protective suits, and negative pressure isolation rooms.

This report provides a descriptive summary of the responses to the supplement from which national estimates of preparedness can be generated for the overall universe of U.S. hospitals. Other current research efforts involving the survey go beyond the descriptive work reported here and delve into hospital characteristics associated with greater preparedness in the areas of emergency response planning, training and practicing for terrorism, and equipment and specialized care units for terrorism-related incidents.

Methods

The NHAMCS is an annual probability sample survey of non-Federal general and short-stay hospitals (those with an average length of stay of less than 30 days) within the 50 States and the District of Columbia. Children's hospitals were included in the sampling frame. Federal hospitals, hospital units of institutions, and hospitals with less than six beds were ineligible for the NHAMCS. Hospitals with a 24-hour emergency department (ED) or outpatient department (OPD) supervised by a physician were included. Hospitals without an ED or whose OPD was comprised solely of ancillary clinics (e.g., radiology, laboratory services, physical rehabilitation, renal dialysis) were ineligible to participate. The sampling frame consisted of hospitals listed in the 1991 Verispan Hospital Database (VHD), which was updated using the 2000 VHD to allow the inclusion of hospitals that opened or changed their eligibility status since the previous sample in 1991. The VHD was formerly known as the SMG Hospital Database. An additional sample of 66 hospitals (identified as proprietary or as located in nonmetropolitan statistical areas) was selected from the 2002 VHD. Hospitals were randomly assigned to 1 of 13 4-week reporting periods scattered over the entire year. The data were weighted according to the inverse probability of hospital selection and a nonresponse adjustment factor. Thus, estimates are considered representative of similar health care facilities over the entire Nation.

Terrorism preparedness items were added to the 2003 NHAMCS in a special supplement (see "Technical Notes"). This was administered to the same hospitals as those sampled for the NHAMCS. The supplement used the first 2 stages of the regular NHAMCS design involving 112 geographic primary sampling units (PSU) and hospitals that have emergency or outpatient departments within PSUs. For this analysis, the supplement included questions about updates of the hospital's emergency response plan since September 11, 2001; whether that plan addressed natural disasters and biological, chemical, nuclear-radiological, and explosive-incendiary terrorism incidents; collaboration with outside organizations for planning; key elements of the plans such as establishment of alternate care sites; clinician training in the management of exposures to weaponizable infectious diseases, chemicals, and nuclear materials; drills on aspects of the response plans; and equipment and bed capacity available at the hospital. The content of the questionnaire was based on the JCAHO list of elements that are important to have in an emergency response plan, training questions about the CDC Class A bioterrorism agents, and drill scenarios suggested by bioterrorism researchers at HRSA, Johns Hopkins University, George Washington University, the American Hospital Association, the Office of Emergency Preparedness at the Department of Health and Human Services, the Government Accountability Office, the Office of Management and Budget, and the Centers for Medicare and Medicaid Services. The collection form was pilot tested in October 2002 and refined and

implemented in December 2002. During the 2003 NHAMCS induction interview with the administrator of each sampled hospital, the supplement was left for the bioterrorism coordinator to complete and return to the interviewer. Of 546 hospitals sampled in 2003, 462 were in scope for the NHAMCS. Data were received from 399 hospitals, for a response rate of 86.4 percent. This represented a weighted national total of approximately 5,000 hospitals. The percentage of missing values (re-coded into "no" or "blank" responses for any one variable) was less than 3%, except where noted in the tables. Descriptive statistics with their corresponding measures of sampling error were generated using SUDAAN-9.0 software (RTI International), which takes into account the complex sample design of the NHAMCS (5). Analyses involving comparisons across subgroups used a chi-square test statistic evaluated at a 0.05 level of significance.

Results

Emergency Response Plans

Nearly all hospitals had emergency terrorism response plans. The majority had revised their plans since September 11, 2001 (92.3 percent), but 6.3 percent had not. Few hospitals had no response plan (1.5 percent). Table 1 shows the percent distribution of all hospitals (with or without plans) and the percentage of hospitals with revised plans by selected hospital characteristics. Only teaching hospital status was associated with a greater likelihood of having a revised plan ($p < 0.05$). Among hospitals with a response plan, 97.3 percent addressed natural disasters, 85.5 percent addressed chemical terrorism, 84.8 percent addressed biological terrorism, 77.2 percent addressed nuclear or radiological terrorism, 76.9 percent addressed explosive or incendiary incidents, and 63.5 percent addressed all five of these incident types (table 2).

Almost all hospitals (95.4 percent) had provisions in their plans to contact outside entities. The most frequent outside entities were State or local public health departments (81.9 percent), State or local law enforcement (77.7 percent), emergency medical services (71.9 percent), and fire departments (65.7 percent) (table 3). About three-quarters of hospitals (76.4 percent) defined their role in community-wide planning in their response plans, and 75.9 percent provided for cooperative planning with other area health care facilities. However, only 46.1 percent of hospitals had memoranda of understanding with outlying hospitals to accept inpatients during a declared disaster (table 4).

In the area of internal disaster planning, 73.1 percent of hospitals planned to cancel elective procedures and admissions during an emergency, 66.8 percent had plans for establishing an alternate care site, and 60.8 percent had plans for medical utilization of nonclinical hospital space. However, only 36.6 percent of hospitals planned to convert their postanesthesia care unit (where postoperative patients are monitored as they awake from anesthesia) to augment intensive care capacity. Only 27.3 percent planned to activate decommissioned ward space (i.e., opening closed hospital bed capacity) during an emergency. The majority of hospitals (60.1 percent) provided for coordinated supply-chain management of critical supplies and pharmaceuticals in their response plans, which includes such methods as vendor-managed pharmaceutical inventories to ensure that supplies are replaced before becoming outdated. Less than half (44.1 percent) of hospitals had plans to stockpile antibiotics and other supplies (table 4).

Most hospitals (87.4 percent) were members of a regional interagency disaster preparedness task force. Only about one-third of hospitals (34.3 percent) were designated to receive patients through the National Disaster Medical System (NDMS). Another one-third of hospitals were unaware of their NDMS designation status (table 5).

Training in Emergency Response

Three-quarters (75.0 percent) of hospitals had key hospital personnel trained to implement a formal incident command system, which is an organized procedure for managing resources and personnel during an emergency (table 5).

Staff members at most hospitals (88.5 percent) had received training since September 11, 2001, in the identification, diagnosis, and treatment of any of the biological agents studied in this survey (smallpox, anthrax, plague, botulism, tularemia, viral hemorrhagic fever, viral encephalitis) (figure 1). Training on individual diseases or conditions received by hospital staff physicians, interns, residents, physician assistants, registered nurses, licensed practical nurses, laboratory staff, and others was most frequent for smallpox (86.7 percent), anthrax (83.7 percent), and chemical exposures (80.2 percent) (table 6 and figures 1 and 2). Data on training by professional category are shown in table 7 and figure 3. The most frequent sources of preparedness training were hospitals (61.4 percent) and State or

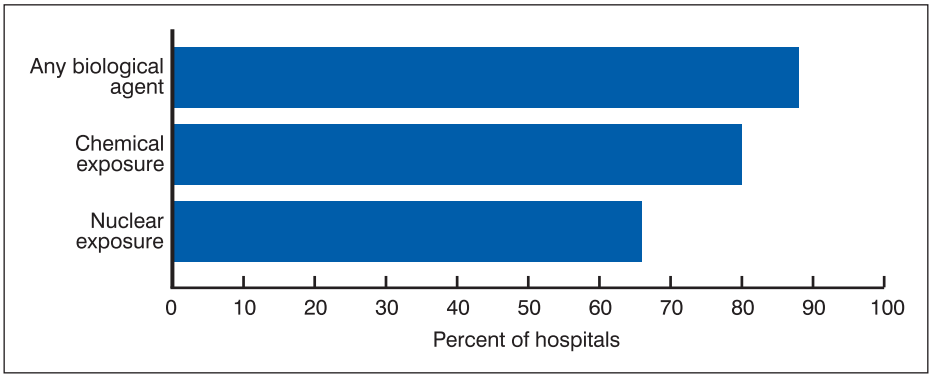

Figure 1. Percentage of hospitals that trained their staff in emergency response, by selected subject areas: United States, 2003

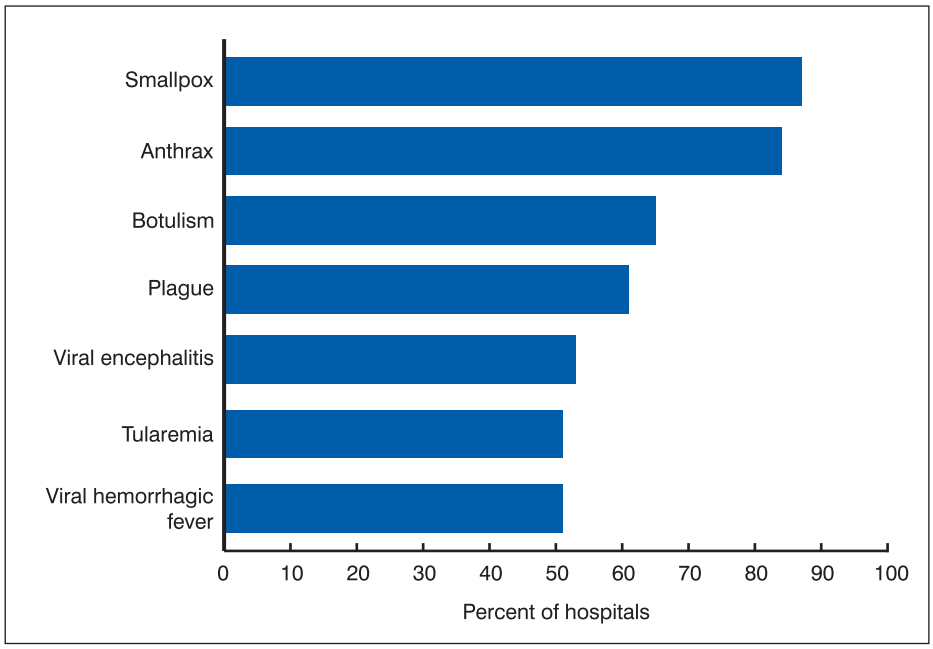

Figure 2. Percentage of hospitals that trained their staff in bioterrorism response, by biological agent: United States, 2003

local public health departments (44.8 percent) (table 8).

Mass Casualty Drills

Nine out of 10 hospitals (88.4 percent) participated in an internal mass casualty drill since September 11, 2001, and 87.1 percent conducted a mass casualty drill in collaboration with other organizations. For the internal drills, the most common scenario was a general disaster and emergency response (69.7 percent). Other scenarios included chemical release (44.9 percent), biological attack (37.5 percent), explosive or incendiary attack (21.3 percent), and nuclear or radiological attack (15.4 percent). In contrast to biological attacks, drills involving severe epidemics were staged by only 7.1 percent of hospitals (table 9). Scenarios for collaborative drills followed a similar pattern. The organizations with which hospitals collaborated most often for mass casualty drills were emergency medical services (70.9 percent), fire departments (67.1 percent), and State or local law enforcement (64.5 percent) (table 10).

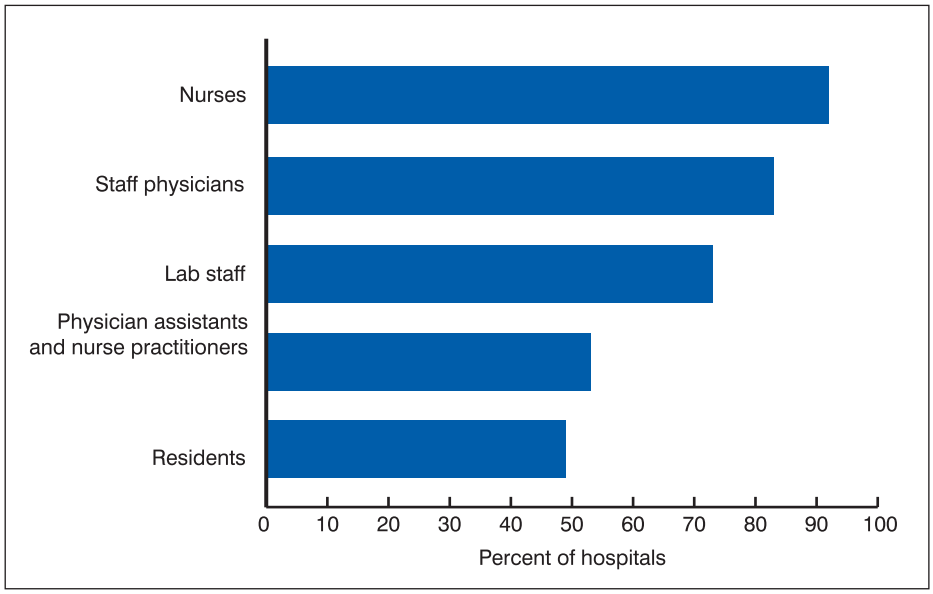

Figure 3. Percentage of hospitals that trained their staff in terrorism response, by professional category: United States, 2003

Mass Casualty Resources

Hospitals were asked to quantify certain available resources that would be useful in a mass casualty incident. Among hospitals with mechanical ventilators, there was an average of 7.8 per 100 beds (table 11). Among hospitals with personal protective hazardous materials suits, there was an average of 9.4 per 100 beds. On average, there were 4.3 negative pressure isolation rooms and 13.8 critical care beds per 100 beds, including those in adult and pediatric intensive care, coronary care, and postanesthesia care units. Among hospitals with decontamination showers, there was an average of 1.5 per 100 beds, but the capacity of these showers was not ascertained in this survey.

Discussion

Almost all hospitals have natural disaster plans because it is a JCAHO accreditation requirement (4) to hold annual disaster drills on scenarios such as floods, hurricanes, earthquakes, tornados, or others that have stressed health care systems on a regular basis. Although it is natural to focus on natural disasters during preparedness planning, some gaps in preparedness for man-made disasters would be expected because terrorism is not within the usual experience of U.S. hospitals. In a convenience sample of 30 hospitals from West Virginia, Pennsylvania, Maryland, Virginia, and the District of Columbia, Treat et al. (6) found that only 27 percent had addressed weapons of mass destruction in their disaster plans. In this pre-September 11 survey, none of the rural hospital respondents believed that their hospitals were prepared for biological, chemical, or nuclear disasters. Most of the urban hospital respondents believed their hospitals were only somewhat prepared. In a 1998 survey of 186 emergency

departments in Alaska, Idaho, Oregon, and Washington, Wetter et al. (3) found that 80 percent of the hospitals had hazardous materials response plans. However, only 17 percent had chemical weapons plans, and only 12 percent had plans for biological weapons response.

The NHAMCS supplement was conducted throughout 2003 and reflects a heightened level of urgency due to the airline terrorist attacks of September 11, 2001, and the anthrax outbreak of 2001. Planning for biological scenarios was quite common despite the rarity of these events in actual experience. The Government Accountability Office (GAO) surveyed 1,482 urban hospitals between May and September 2002 as to their preparedness for biological terrorism. Approximately 81 percent of these hospitals had a written emergency response plan that addressed bioterrorism (7). The NHAMCS results for 2003 show a further increase to 94 percent for urban hospitals having revised emergency response plans for terrorism in general (table 1). Because funding from the Bioterrorism Hospital Preparedness Program of the Health Resources and Services Administration was focused exclusively on biological preparedness until FY 2003, this may have also played a role in the emphasis on this contingency (8). However, because funds from that program had not been fully distributed to hospitals by the time the 2003 NHAMCS was fielded, it will be interesting to follow up on this issue in the 2004 iteration of this survey (1,2).

Planning for chemical attacks is similar to that for biological attacks and ahead of nuclear-radiological exposures. Many communities have hazardous materials teams because of the high potential for industrial or farming exposures. Also, there has been experience in recent history with chemical attacks, such as the sarin incident in Tokyo (9). Wetter et al. (3) found that hospitals within 35 miles of a military chemical weapons depot were five times as likely as other hospitals to have a chemical weapons response plan, but no more likely to have a plan for biological weapons.

Plans for explosive or incendiary incidents were reported the least frequently of all the scenarios in this survey. However, one would expect planning for explosions to rank much higher than for other forms of terrorism because this is the most frequent means employed by terrorists, both domestically (e.g., World Trade Center) and internationally (e.g., Iraq, Madrid, and London). But the $125 million of funding from the HRSA Bioterrorism Hospital Preparedness Program did not cover explosions or fires in FY 2002, and separate HRSA funding for Statewide trauma systems nationwide has been level at approximately $2 million per year from FY 2001 to FY 2004 (10).

The majority of hospitals had provisions in their response plans for cooperation with appropriate outside entities. However, less than half reported having actual written memoranda of understanding with other facilities on at least one dimension of mutual aid—being able to transfer patients elsewhere when their surge capacity is exceeded. This replicated the pre-September 11 findings of Treat et al. (6), who found that although 97 percent of their hospitals had patient overflow plans involving other facilities, none of them had specific agreements in place for mass disaster casualties. The post-September 11 GAO study was more optimistic for urban hospitals in that 69 percent of their sample had agreements to share resources during a biological incident (7). One area for future research might be to frame the questions in terms of actual arrangements in place instead of plans to do so.

One interesting anomaly in the results was the high percentage of hospitals that were unaware of whether they were designated by NDMS to receive patients in a disaster. It is possible that the NDMS designation had been granted at some time in the distant past, but never actually tested because of the low prevalence of mass casualty disasters. Given that, it may not be surprising that the institutional memory of such a designation might have been lost, especially if the hospital had undergone changes in ownership or administration since it was granted. This finding suggests that hospital drills might be crafted to reflect the NDMS designation status, thus encouraging the hospital to review its status.

It is encouraging that such a high percentage of registered and licensed practical nurses had received training in at least one area of terrorism preparedness, and that staff physicians were not far behind. However, it is puzzling that interns and residents lag so far behind their senior colleagues because one might expect that physicians in training would be at the forefront of acquiring new knowledge. The high percentage of nurses who received training is reassuring because the pre-2001 survey done by Treat et al. (6) found that staff at less than one-quarter of hospitals in the States surrounding Washington, DC, had received education on weapons of mass destruction. Wetter et al. (3) found that only 23 percent of hospitals in the Northwest had offered training before September 11 on chemical weapons response, and only 19 percent had offered biological weapons response training.

In their 2002 survey, the GAO found that 70 percent of urban hospitals had trained their staff for all six of the CDC Class A biological agents (smallpox, anthrax, plague, botulism, tularemia, and hemorrhagic fever) (7). However, in a separate analysis of urban hospitals responding to the 2003 NHAMCS supplement, none of the sample had trained their staff in all six agents. It is possible that differing methodologies might be partially responsible for this discrepancy. The GAO used a mailed survey with followup reminders by mail and telephone, and the NHAMCS survey was presented to the bioterrorism coordinators by on-site field representatives during personal interviews. However, although the GAO report was more optimistic than the NHAMCS for five of the six agents individually (smallpox being equal), the discrepancies were not as marked. For example, at the high end of the scale, GAO found that 93 percent of urban hospitals had offered training for anthrax, and 86 percent of the NHAMCS urban sample had. At the low end, GAO found that 71 percent of

urban hospitals had offered training for viral hemorrhagic fever, and only 53 percent of the NHAMCS urban sample had.

The top training priorities that are demonstrated in this study are interesting because they are a mix of more likely occurrences (such as chemical incidents) and less likely, but high profile occurrences (such as smallpox and anthrax). Training for the rest of the infectious diseases is perhaps more reflective of their rarity. Again, this demonstrates a post-September 11 shift in thinking. The Treat et al. (6) survey found that only 10 percent of hospitals drilled on chemical or nuclear attacks, and only 3 percent drilled on biological weapons.

It is interesting to note the discrepancy between hospital drills for biological attacks and those for severe epidemics. The percentage of hospitals drilling on biological scenarios more closely approximates that for chemical attacks. Future research might define more precisely what skills are being drilled in a biological attack response, especially whether biological response is being thought of in terms of acute decontamination of a known aerosol exposure rather than in terms of an infectious disease epidemic beginning some days after an apparent exposure.

In the aftermath of the devastation wrought by Hurricane Katrina, this report provides information that may assist in the formulation of future policies and procedures on preparedness for such natural disasters. Hospitals reported that their drills lagged behind their written response plans, formal patient transfer arrangements lagged behind cooperative planning with other hospitals, and drills that included public health departments and volunteer organizations lagged behind drills that included emergency medical services and fire departments. Knowledge of these shortfalls may offer opportunities for future improvement efforts. As hospitals review their plans in light of the problems experienced during this disaster, the lessons learned may also affect future data collection on the ability of hospitals to respond to all types of emergencies.

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Table 1. Percent distribution of all hospitals and percentage of hospitals having revised emergency response plans since September 11, 2001 (with standard errors), by hospital characteristics: United States, 2003

Hospital characteristic	Percent distribution	Standard error	Percent with plan revised since September 11, 2001	Standard error
All hospitals	100.0	. . .	92.3	2.3
Geographic region				
Northeast	16.3	1.6	92.3	3.5
Midwest	28.3	2.8	91.3	4.5
South	37.7	2.9	90.5	4.6
West	17.8	2.7	97.5	1.7
Metropolitan status				
Metropolitan statistical area	60.0	3.6	94.2	2.5
Nonmetropolitan statistical area	40.0	3.6	89.4	4.3
Ownership				
Voluntary, nonprofit	62.0	4.3	94.1	2.1
Government	26.3	4.2	84.5	6.2
Proprietary	11.7	2.1	99.8	0.2
Teaching hospital				
Yes	6.3	0.8	100.0	0.0
No	93.7	0.8	91.7	2.4
Number of hospital beds				
Less than 100	59.0	2.7	88.6	3.7
100–199	20.4	2.4	97.7	2.0
200–299	10.0	1.6	97.6	1.8
300 or more	10.7	1.2	97.0	2.2
Has a 24-hour emergency department				
Yes	92.7	2.9	91.7	2.4
No	*7.3	2.9	99.2	0.9

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0.0 Quantity more than zero but less than 0.05.
* Figure does not meet standards of reliability or precision.
NOTE: Numbers may not add to totals because of rounding.

Table 2. Percentage (with standard errors) of hospitals with emergency response plans for selected types of incidents: United States, 2003

Type of incident	Percent of hospitals	Standard error
Natural disaster	97.3	1.0
Chemical	85.5	2.4
Biological	84.8	2.6
Nuclear or radiologic exposure	77.2	3.5
Explosive or incendiary exposure	76.9	4.0
All types of incidents	63.5	4.3

Table 3. Percentage (with standard errors) of hospitals having provisions in their emergency bioterror response plans for contacting outside entities, by type of outside entity to be contacted: United States, 2003

Type of outside entity contact	Percent of hospitals	Standard error
Any entity	95.4	1.6
State or local health departments	81.9	3.4
State or local police	77.7	2.9
Emergency medical services	71.9	3.9
Fire department	65.7	4.1
Other State or local government	59.9	3.5
Hazardous materials teams	58.3	3.9
Centers for Disease Control and Prevention	52.4	4.1
Other hospitals	50.7	4.0
Federal Bureau of Investigation	42.5	4.1
Utilities	32.0	3.6
Vendors	28.9	4.1
Local political official	19.7	2.4
Other Federal agency	11.7	1.7
Other laboratories	8.4	2.2

Table 4. Percentage (with standard errors) of hospitals having specific components in their emergency response plans, by type of plan component: United States, 2003

Type of plan component	Percent of hospitals	Standard error
Definition of role in community planning	76.4	3.5
Cooperative planning with other health care facilities	75.9	3.8
Cancellation of elective procedures and admissions	73.1	4.2
Establishment of an alternate care site	66.8	3.0
Medical utilization of nonclinical space	60.8	3.7
Coordinated supply-chain management	60.1	3.8
Memoranda of understanding with hospitals to accept inpatients	46.1	4.1
Stockpiling antibiotics and supplies	44.1	3.5
Conversion of post-anesthesia unit to intensive care unit	36.6	3.6
Activation of decommissioned wards	27.3	2.7

Table 5. Percent distribution (with standard errors) of hospitals involved in interagency task forces, designated by the National Disaster Medical System, and trained in incident command: United States, 2003

Hospital characteristic	Percent distribution	Standard error
All hospitals	100.0	. . .
Interagency task force		
Member	87.4	4.0
Not a member	*8.0	3.7
Unknown	*4.6	1.9
National Disaster Medical System		
Designated to receive patients	34.3	2.9
Not designated	32.2	4.1
Unknown	33.5	3.3
Key personnel in incident command system		
Trained	75.0	3.8
Not trained	20.8	3.7
Unknown	*4.2	1.6

. . . Category not applicable.

* Figure does not meet standards of reliability or precision.

NOTE: Numbers may not add to totals because of rounding.

Table 6. Percentage (with standard error) of hospitals whose staff have received training, by disease or exposure: United States, 2003

Disease or exposure	Percent of hospitals	Standard error
Smallpox	86.7	2.4
Anthrax	83.7	3.1
Chemical exposure	80.2	2.7
Nuclear or radiologic exposure	66.4	3.3
Botulism	65.0	3.7
Plague	61.0	4.0
Viral encephalitis	53.2	3.7
Tularemia	51.3	3.9
Viral hemorrhagic fever	51.2	3.4

NOTE: Staff members include staff physicians, interns or residents, physician assistants or nurse practitioners, nurses, laboratory staff, and others.

Table 7. Percentage (with standard errors) of hospitals that trained their staff in any terrorism-related disease or condition, by type of profession: United States, 2003

Type of clinician	Percent of hospitals	Standard error
Nurses	92.1	2.2
Staff physicians	82.5	3.0
Laboratory staff	72.9	3.8
Physician assistants or nurse practitioners	53.1	5.2
Residents or interns	49.2	5.6

NOTE: Terrorism-related diseases or conditions include smallpox, anthrax, plague, botulism, tularemia, viral hemorrhagic fever, viral encephalitis, and chemical, nuclear, and radiologic exposures.

Table 8. Percentage (with standard errors) of hospitals that used selected terrorism-preparedness training sources, by training source: United States, 2003

Training source	Percent of hospitals	Standard error
Hospital	61.4	3.3
State or local public health department	44.8	3.7
Professional association	33.9	3.8
Other State or local government agency	24.5	3.5
Federal agency	10.1	2.2
Private vendor	8.4	1.7
Insurance organization	*0.1	0.1
Other	19.3	3.8

* Figure does not meet standards of reliability or precision.

Table 9. Percentage (with standard errors) of hospitals participating in internal and external mass casualty drills, by type of drill scenario: United States, 2003

Scenario	Internal drills		External drills	
	Percent of hospitals	Standard error	Percent of hospitals	Standarderror
Hospitals staging drills	88.4	2.7	87.1	2.8
General disaster or emergency response	69.7	3.7	66.4	4.0
Chemical release	44.9	3.9	44.1	3.5
Biologic attack	37.5	3.5	33.9	3.2
Explosive or incendiary attack	21.3	3.2	24.2	3.4
Nuclear or radiologic attack	15.4	2.1	15.2	2.2
Severe epidemic	7.1	1.4	4.8	0.9

Table 10. Percentage (with standard errors) of hospitals collaborating in external mass casualty drills, by type of collaborating organization: United States, 2003

Type of collaborating organization	Percent of hospitals	Standard error
Emergency medical services	70.9	4.0
Fire department	67.1	3.9
State or local law enforcement	64.5	3.7
Other State or local government agencies	52.0	4.0
Other hospitals or hospital associations	45.9	3.6
State or local public health department	45.6	4.0
Hazardous materials teams	43.8	3.5
American Red Cross	21.3	2.4
Other volunteer organizations	15.6	1.7
Key vendors of medical supplies	*7.0	3.0
Other	17.5	3.9

* Figure does not meet standards of reliability or precision.

Table 11. Mean number and rate (with standard errors) of selected specialized equipment per responding hospital: United States, 2003

Type of equipment	Mean	Standard error	Mean per 100 hospital beds	Standard error
Intensive care beds	20.3	1.4	13.8	0.9
Personal protective suits	12.7	1.5	9.4	1.3
Ventilators	11.0	0.8	7.8	0.9
Isolation rooms	6.0	0.4	4.3	0.3
Decontamination showers	1.5	0.1	1.5	0.2

Technical Notes

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FORM **NHAMCS-905**
(4-21-2003)

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU
ACTING AS DATA COLLECTION AGENT FOR THE
U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
National Center for Health Statistics

NATIONAL HOSPITAL AMBULATORY MEDICAL CARE SURVEY
BIOTERRORISM AND MASS CASUALTY PREPAREDNESS SUPPLEMENT
2003 PANEL

NOTICE – Public reporting burden of this collection of information is estimated to average 25 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to CDA/ATSDR Reports Clearance Officer; 1600 Clifton Road, MS D-24, Atlanta, GA 30333, ATTN: PRA (0920-0278).

Assurance of confidentiality – All information which would permit identification of an individual, a practice, or an establishment will be held confidential, will be used only by persons engaged in and for the purpose of the survey and will not be disclosed or released to other persons or used for any other purpose without consent of the individual or the establishment in accoradance with sention 308(d) of the Public Health Service Act (42 USC 242m).

BACKGROUND INFORMATION

A. Hospital name	**B.** Hospital number		
C. Hospital contact name	**D.** Hospital contact telephone	Area code	Number
E. Census contact name	**F.** Census contact telephone	Area code	Number

This year we are conducting a special survey supplement on bioterrorism and mass casualty preparedness in hospitals. Please answer the following questions. We appreciate your time on this important public health concern.

1. Has your hospital's emergency/bioterror response plan been revised since September 11, 2001?

1 ☐ Yes
2 ☐ No
3 ☐ *Mark (X) this box if hospital has **no emergency/ bioterror response plan** and SKIP to item 5.*

2. Does your emergency/bioterror response plan specifically address each of the following types of incidents?

If "No" – *Indicate whether or not your hospital is **currently developing** a response for the type of incident. Mark (X) one box for each type of incident.*

	Does your plan address this type of incident? (1)	**Are you currently developing a response for the incident?** (2)
a. Biological	1 ☐ Yes 2 ☐ No →	1 ☐ Yes 2 ☐ No
b. Chemical	1 ☐ Yes 2 ☐ No →	1 ☐ Yes 2 ☐ No
c. Nuclear/Radiologic	1 ☐ Yes 2 ☐ No →	1 ☐ Yes 2 ☐ No
d. Explosive/Incendiary	1 ☐ Yes 2 ☐ No →	1 ☐ Yes 2 ☐ No
e. Natural disaster	1 ☐ Yes 2 ☐ No →	1 ☐ Yes 2 ☐ No
f. Other – *Please specify* ____	1 ☐ Yes 2 ☐ No →	1 ☐ Yes 2 ☐ No

PLEASE CONTINUE WITH QUESTION 3 ON NEXT PAGE

3a. Does your hospital's emergency/bioterror response plan specify contacting any entity in the context of a bioterrorism incident?

1 ☐ Yes
2 ☐ No – *SKIP to item 4*
3 ☐ Don't know – *SKIP to item 4*

b. Which of the following entities does your hospital's emergency/bioterror response plan specify contacting in the context of a bioterrorism incident? *Mark (X) all that apply.*

1 ☐ Centers for Disease Control and Prevention (CDC)
2 ☐ Federal Bureau of Investigation (FBI)
3 ☐ Other Federal agency
4 ☐ Emergency medical services (EMS)
5 ☐ Fire department
6 ☐ HAZMAT teams
7 ☐ Key vendors of medical materials/supplies
8 ☐ Local political official
9 ☐ Other hospitals/local hospital association
10 ☐ Other laboratories
11 ☐ Public or private utilities (e.g., water, power)
12 ☐ State or local public health department
13 ☐ State or local law enforcement
14 ☐ Other state or local government agencies (e.g., Office of Emergency Management)
15 ☐ Other – *Please specify* ↓

_____
_____
_____

4. Does your hospital's emergency/bioterror response plan provide for . . .

Mark (X) all that apply.

1 ☐ definition of and, where appropriate, integration of the hospital's role in community-wide planning?
2 ☐ cooperative planning with other health care facilities in your area?
3 ☐ a memorandum of understanding (MOU) with outlying hospitals to accept inpatients during a declared disaster?
4 ☐ establishment of an alternate care site?
5 ☐ cancellation of elective procedures and admissions?
6 ☐ conversion of the post-anesthesia care unit to augment intensive care capacity?
7 ☐ activation of decommissioned ward space?
8 ☐ utilization for medical purposes of non-clinical space within the hospital?
9 ☐ stockpiling antibiotics and supplies?
10 ☐ coordinated supply-chain management of critical supplies and pharmaceuticals?

5. Is your hospital a member of an interagency disaster preparedness committee, task force, or working group that exists in your jurisdiction or region?

1 ☐ Yes
2 ☐ No
3 ☐ Don't know

6. Is your hospital designated to receive patients through the National Disaster Medical System (NDMS)?

1 ☐ Yes
2 ☐ No
3 ☐ Don't know

PLEASE CONTINUE WITH QUESTION 7 ON NEXT PAGE

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7. Have key personnel in your hospital been trained in how to implement a formal incident command system (e.g., HEICS [Hospital Emergency Incident Command System] or comparable platform) during emergencies?

1 ☐ Yes
2 ☐ No
3 ☐ Don't know

8. TRAINING

a. Have your hospital staff received special training (e.g., in-service or other courses, CME, Grand Rounds, or self-guided study) since September 11, 2001 in the identification, diagnosis, and treatment of the following diseases/conditions?

Type of personnel who received training
*Mark (X) appropriate columns **OR** mark (X) N/A box, if your hospital does not have this type of personnel.*

	☐ N/A Staff physicians (a)	☐ N/A House officers (intern/ resident) (b)	☐ N/A PA/NP (c)	☐ N/A RN/LPN (d)	☐ N/A Lab staff (e)	☐ N/A Other (f)
(1) Smallpox						
(2) Anthrax						
(3) Plague						
(4) Botulism						
(5) Tularemia						
(6) Viral Hemorrhagic Fever						
(7) Viral Encephalitis (WNV, SLE, EEE, VEE, etc.)						
(8) Chemical exposure						
(9) Nuclear/Radiologic exposure						

NOTE **If no training received** – *Please SKIP to item 9. Otherwise, continue with item b.*

b. Indicate who conducted the training.

Mark(X) all that apply.

1 ☐ Professional association (e.g., medical, physician assistant, nursing, laboratory)
2 ☐ State or local public health department
3 ☐ Other state or local government agency
4 ☐ Federal agency
5 ☐ Hospital
6 ☐ Insurance organization
7 ☐ Private vendor
8 ☐ Other –*Specify*

PLEASE CONTINUE WITH QUESTION 9 ON NEXT PAGE

9a. Has your hospital participated in any internal mass casualty drill(s), simulation(s), or exercise(s) since September 11, 2001?

1 ☐ Yes – *Go to item 9b*
2 ☐ No – *SKIP to item 10a*

b. What scenario(s) did the drill(s)/ simulation(s)/ exercise(s) address?
Mark (X) all that apply.

1 ☐ General disaster and emergency response
2 ☐ Biologic attack
3 ☐ Severe epidemic
4 ☐ Chemical release
5 ☐ Nuclear/radiologic attack
6 ☐ Explosive/incendiary attack

10a. Has your hospital conducted any of mass casualty drill(s)/simulation(s)/exercise(s) in collaboration with other organizations?

1 ☐ Yes – *Go to item 10b*
2 ☐ No – *SKIP to item 11*

b. Indicate the content of the drill(s)/ simulation(s)/exercise(s)
Mark (X) all that apply.

1 ☐ General disaster and emergency response
2 ☐ Biologic attack
3 ☐ Severe epidemic
4 ☐ Chemical release
5 ☐ Nuclear/radiologic attack
6 ☐ Explosive/incendiary attack

c. With which organizations were the drill(s)/simulation(s)/ exercise(s) performed?
Mark (X) all that apply.

1 ☐ State or local law enforcement
2 ☐ State or local public health department
3 ☐ Other state or local government agencies (e.g., Office of Emergency Management)
4 ☐ Fire department
5 ☐ Emergency medical services (EMS)
6 ☐ HAZMAT teams
7 ☐ Other hospitals/local hospital association
8 ☐ American Red Cross
9 ☐ Other volunteer organizations
10 ☐ Key vendors of medical materials/supplies
11 ☐ Other – *Please specify* ➘

_____

_____

11. To help us understand what resources and capabilities your hospital has available in the event of a mass casualty incident
Please provide the following information for your hospital.

	Total number
a. Mechanical ventilators on hand	
b. Personal protective (HAZMAT) suits – *Include all levels.*	
c. Negative pressure isolation rooms	
d. Combined ICU/PICU/CCU/PACU beds	
e. Decontamination showers	

12. What is the total number of hours that your hospital's emergency department was on ambulance diversion in 2002?

_____ Total number of hours

1 ☐ Not applicable, no ED
2 ☐ Data not available

13. Is your hospital accredited by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO)?

1 ☐ Yes – *Specify* →
2 ☐ No – **END**

Date issued	
Month	Year

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