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Emergency Response Planning in Hospitals, United States: 2003–2004

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Abstract

Objective—This study presents baseline data to determine which hospital characteristics are associated with preparedness for terrorism and natural disaster in the areas of emergency response planning and availability of equipment and specialized care units.

Methods—Information from the Bioterrorism and Mass Casualty Preparedness Supplements to the 2003 and 2004 National Hospital Ambulatory Medical Care Surveys was used to provide national estimates of variations in hospital emergency response plans and resources by residency and medical school affiliation, hospital size, ownership, metropolitan statistical area status, and Joint Commission accreditation. Of 874 sampled hospitals with emergency or outpatient departments, 739 responded for an 84.6 percent response rate. Estimates are presented with 95 percent confidence intervals.

Results—About 92 percent of hospitals had revised their emergency response plans since September 11, 2001, but only about 63 percent had addressed natural disasters and biological, chemical, radiological, and explosive terrorism in those plans. Only about 9 percent of hospitals had provided for all 10 of the response plan components studied. Hospitals had a mean of about 14 personal protective suits, 21 critical care beds, 12 mechanical ventilators, 7 negative pressure isolation rooms, and 2 decontamination showers each. Hospital bed capacity was the factor most consistently associated with emergency response planning and availability of resources.

Keywords: bioterrorism • terrorism • emergency preparedness • hospital preparedness

Introduction

The 2003 and 2004 National Hospital Ambulatory Medical Care Survey (NHAMCS) included a Bioterrorism and Mass Casualty Preparedness Supplement to assess a nationally representative sample of hospitals for their ability to respond to mass casualties. A separate report on clinician training for various terrorism-related exposures has been published (1). This paper reports on preparedness in terms of planning for emergency response and having appropriate equipment and intensive care capacity, as functions of residency and medical school affiliation, hospital size, ownership, metropolitan statistical area (MSA) status, and accreditation by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO).

The recent history of hospital preparedness funding has been discussed briefly elsewhere (2). The information gained from a nationally representative survey about strengths and limitations of hospital disaster preparedness is crucial for planning how future funding should be used to improve hospital emergency medical care.

The objective of this study is to provide a baseline assessment of hospital characteristics associated with better disaster preparedness, because these surveys were fielded at a time when federal funding was not yet well established at the hospital level.

Methods

The NHAMCS is conducted by the Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS) with yearly review and approval by the NCHS Ethics Review Board. The Bioterrorism and Mass Casualty Supplement, conducted in 2003 and 2004, was funded by the U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and

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Evaluation. The multistage survey design involving geographic primary sampling units and hospitals within those units has been described previously (2). Because the data were weighted according to the inverse probability of hospital selection, estimates are considered representative of similar hospitals over the entire Nation. Survey information is available from http://www.cdc.gov/nchs/about/major/ahcd/nhamcsds.htm.

The NHAMCS annually surveys nonfederal general and short-stay hospitals with emergency and outpatient departments supervised by physicians. The sample frame was taken from the Verispan (formerly SMG) Hospital Database, whose universe includes hospitals from the 50 states and the District of Columbia. Of 1,110 hospitals sampled in 2003 and 2004, 874 were within this scope. Data were received from 739 hospitals, for an unweighted response rate of 84.6 percent.

The preparedness supplement was a self-reported written questionnaire that was given to the hospital administrator during an induction interview by a U.S. Census Bureau interviewer. Completion of the survey instrument was by the staff person responsible for the hospital's emergency response plan for bioterrorism or mass casualties. The completed instrument was then collected by the interviewer. A copy of the supplement is available from http://www.cdc.gov/nhamcs/data/NHAMCS-905.pdf. It included questions about updates of the hospital's emergency response plan since September 11, 2001; whether that plan addressed biological, chemical, nuclear-radiological, explosive-incendiary, and natural disaster incidents; and key plan elements in the areas of collaboration with outside organizations, expanding patient care capacity, and obtaining supplies. Hospitals were asked about the content of their emergency response plans, including these 10 components: integration into community-wide planning, cooperative planning with other health care facilities, memoranda of understanding with outlying hospitals to accept inpatients during a disaster, alternate care sites, cancellation of elective procedures and admissions, conversion of post-anesthesia unit to augment intensive care, activation of decommissioned wards, utilization of nonclinical space for medical purposes, antibiotic and supply stockpiles, and coordinated supply-chain management of pharmaceuticals and other supplies.

Survey respondents were asked to provide total numbers of mechanical ventilators, personal protective (hazardous materials) suits, negative pressure isolation rooms, critical care unit beds (including intensive, pediatric intensive, coronary, and post-anesthesia care), and decontamination showers in each hospital that would be useful in a mass casualty incident.

Dichotomous categorical and continuous dependent variables were cross-tabulated to determine their associations with selected hospital characteristics: residency and medical school affiliation, hospital size (fewer than 100, 100–199, 200–299, or 300 or more beds), ownership (state or local government, proprietary, or nonprofit), location in MSAs (urban or rural), and accreditation by JCAHO.

Missing values (0.3 to 2.0 percent) were recoded into unknown or negative responses as appropriate. Chi-square tests for categorical variables and *t*-tests for continuous variables were performed using SAS-callable SUDAAN–9.0.1 to adjust for the complex sample design (3). Results with nonoverlapping 95 percent confidence intervals were considered significant.

Results

Emergency response plans for specific types of incidents

About 91.9 percent of hospitals reported revising their emergency response plans since September 11, 2001. Nearly all hospitals affiliated with medical schools (99.1 percent) had revised their plans. Other characteristics associated with revised plans included having a residency program, bed capacity, and ownership (Table 1).

About 63.2 percent of hospitals addressed natural disasters as well as all four types of terrorism incidents (biological, chemical, nuclear-radiological, and explosive-incendiary) in their plans. Proprietary and nonprofit hospitals addressed all hazards more frequently than state or local government hospitals. Other associated characteristics included JCAHO accreditation, bed capacity, and urban location (Table 1).

Hospitals with residency programs addressed biological, chemical, and explosive incidents more frequently than those without residencies. Hospitals affiliated with medical schools addressed chemical exposures more often than unaffiliated hospitals (Table 1).

Hospital bed capacity was associated with addressing biological, chemical, radiological, and explosive incidents in the hospital emergency response plan. Hospitals with fewer than 100 beds addressed biological, radiological, and explosive incidents less frequently than hospitals with 100 or more beds and addressed chemical incidents less frequently than hospitals with 200 or more beds (Table 1).

Hospital ownership was associated with addressing each of the biological, chemical, radiological, and explosive incidents in their response plans. State and local government hospitals addressed biological, chemical, radiological, and explosive incidents less frequently than proprietary and nonprofit hospitals. Nonprofit hospitals addressed biological exposures less frequently than proprietary hospitals (Table 1).

Urban hospitals addressed biological, chemical, radiological, and explosive incidents more frequently than rural hospitals. JCAHO-accredited hospitals addressed natural disaster, biological, chemical, radiological, and explosive incidents more frequently than nonaccredited hospitals (Table 1).

Content of emergency response plans

Few hospitals (8.8 percent) had provided for all 10 content elements studied in their emergency response plans. Hospitals in urban areas provided for all 10 elements more frequently than their counterparts. Hospitals with 300 or more beds provided for all 10 more frequently than those with fewer than 100 beds (Table 2).

Hospitals provided for a mean of 5.8 of the 10 components in their response plans. JCAHO-accredited hospitals included more components than nonaccredited hospitals. Urban hospitals included more components than rural hospitals. Hospitals with fewer than 100 beds included fewer components than hospitals with 200 or more beds (Table 3).

More than three-quarters of hospitals (78.8 percent) reported defining their role in community-wide planning, and where appropriate, being integrated into this planning; and 77.6 percent engaged in cooperative planning with other local health care facilities. Only 52.1 percent had entered into memoranda of understanding that allowed transfer of inpatients during a disaster. JCAHO-accredited hospitals provided for all three of these elements more frequently than nonaccredited hospitals. Hospitals with 300 or more beds planned with other health facilities more frequently than those with fewer than 100 beds. State and local government hospitals were integrated into community plans less frequently than nonprofit hospitals and planned with other health facilities less frequently than both nonprofit and proprietary hospitals (Table 2).

As to expansion of capacity during an emergency, 73.1 percent of hospitals had planned for cancellation of elective procedures and admissions, 65.5 percent had plans to establish an alternate care site, 59.8 percent had plans to make medical use of nonclinical space, 39.9 percent planned to convert their post-anesthesia care unit to accommodate intensive care needs, and 27.9 percent planned to activate decommissioned wards (Table 2). One of these (utilization of nonclinical space) showed no significant differences by any hospital characteristics. JCAHO-accredited hospitals were more likely to provide for all the rest of these elements than nonaccredited hospitals. Urban hospitals were more likely than rural hospitals to convert their post-anesthesia unit and activate decommissioned wards space (Figure 1). Nonprofit hospitals were more likely to cancel elective procedures and admissions than state and local government hospitals.

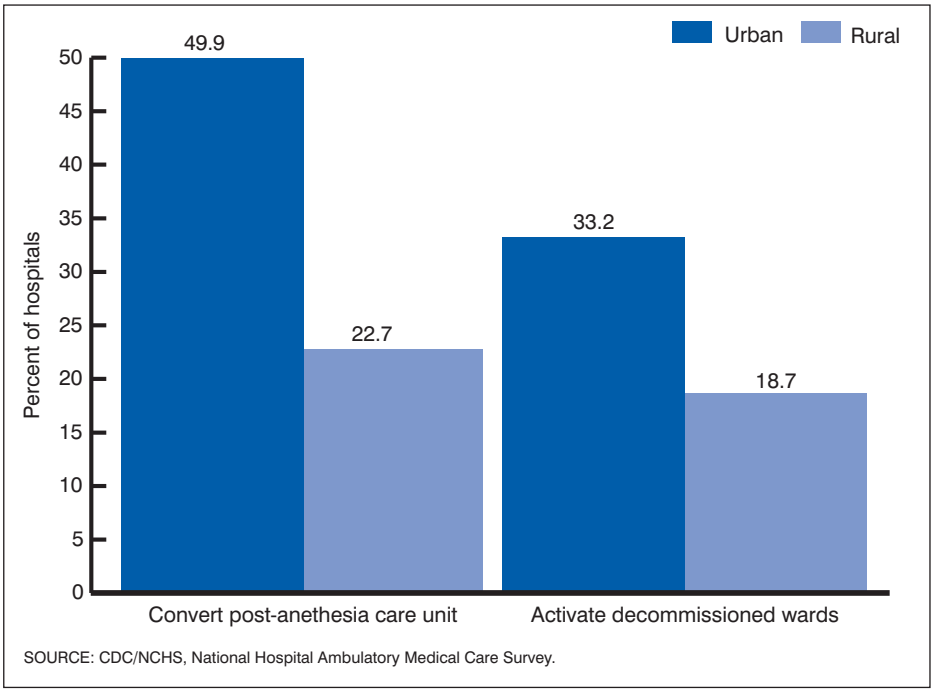

Figure 1. Percent of hospitals with selected surge capacity plans by urban or rural status: United States, 2003–2004

Hospitals with fewer than 100 beds were less likely to convert their post-anesthesia units or activate unused ward space than hospitals with 200 or more beds and less likely to cancel elective procedures and admissions than hospitals with 200–299 beds (Table 2).

As to medical supplies, 58.9 percent of hospitals provided for coordinated supply-chain management of critical supplies and medications, and 45.3 percent provided for stockpiles of antibiotics and supplies. JCAHO-accredited hospitals were more likely to provide for both elements than their counterparts. Hospitals with fewer than 100 beds were less likely to provide for either of these elements than those with 200 or more beds (Table 2).

Mass casualty resources

On average, there were 12.0 mechanical ventilators, 14.1 personal protective suits, 6.6 negative pressure isolation rooms, 20.5 critical care beds, and 1.7 decontamination showers per hospital. Urban hospitals had more of each resource than rural hospitals (Figure 2). Larger hospitals, hospitals with residencies or medical school affiliations, and JCAHO-accredited hospitals also had more of each resource than their counterparts. Nonprofit hospitals had more of each resource, except for decontamination showers, than government hospitals (Table 4).

Because the sample of hospitals was nationally representative, estimates were made of the total supply of these resources within nonfederal general short-stay hospitals. There were about 97,600 critical care beds, about 54,400 mechanical ventilators, about 31,200 negative pressure isolation rooms, about 64,500 personal protective suits, and about 8,200 decontamination showers available in hospitals nationwide during 2003 and 2004. Allocation of this supply to urban and rural hospitals is shown in Figure 3. Using U.S. Census 2003–2004 population figures, Figure 4 shows estimated numbers of each resource available per 10,000 people, with allocation to urban and rural areas.

Discussion

Emergency response plans

Preparedness planning in urban hospitals may have improved somewhat in recent years. The U.S. General Accounting Office (GAO, now the Government Accountability Office) studied urban hospitals across the country in mid-2002. They found that

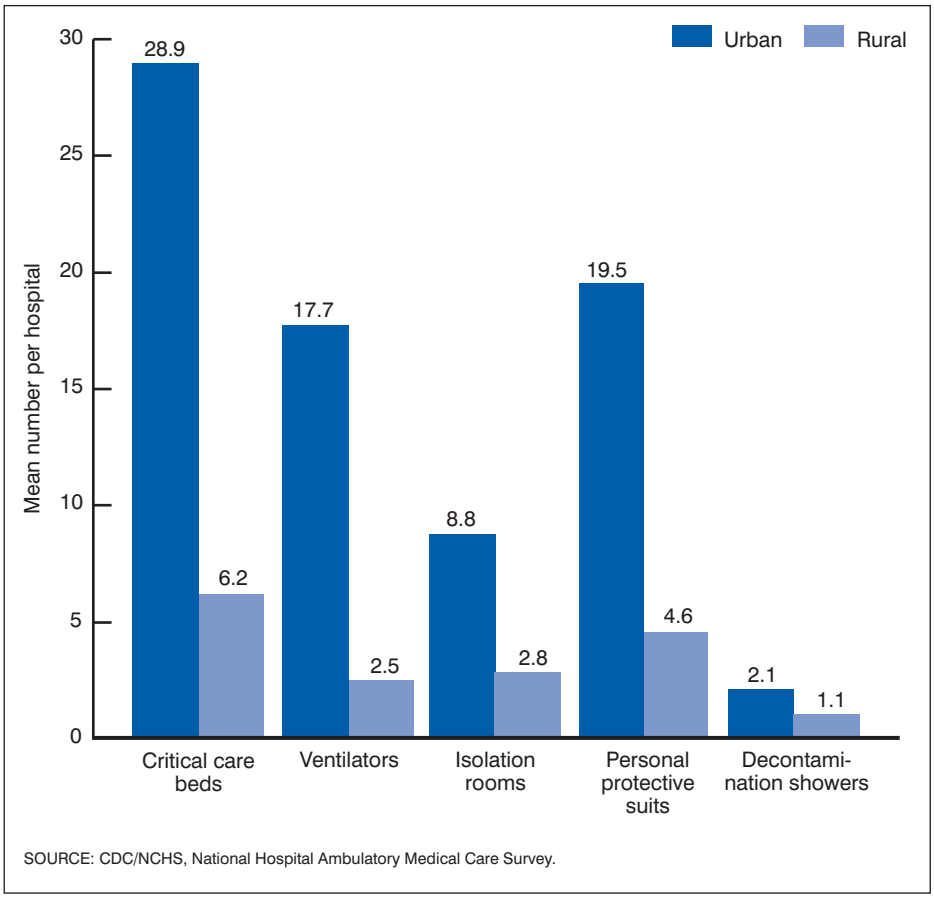

Figure 2. Mean number per hospital of resources available to hospitals: United States, 2003–2004

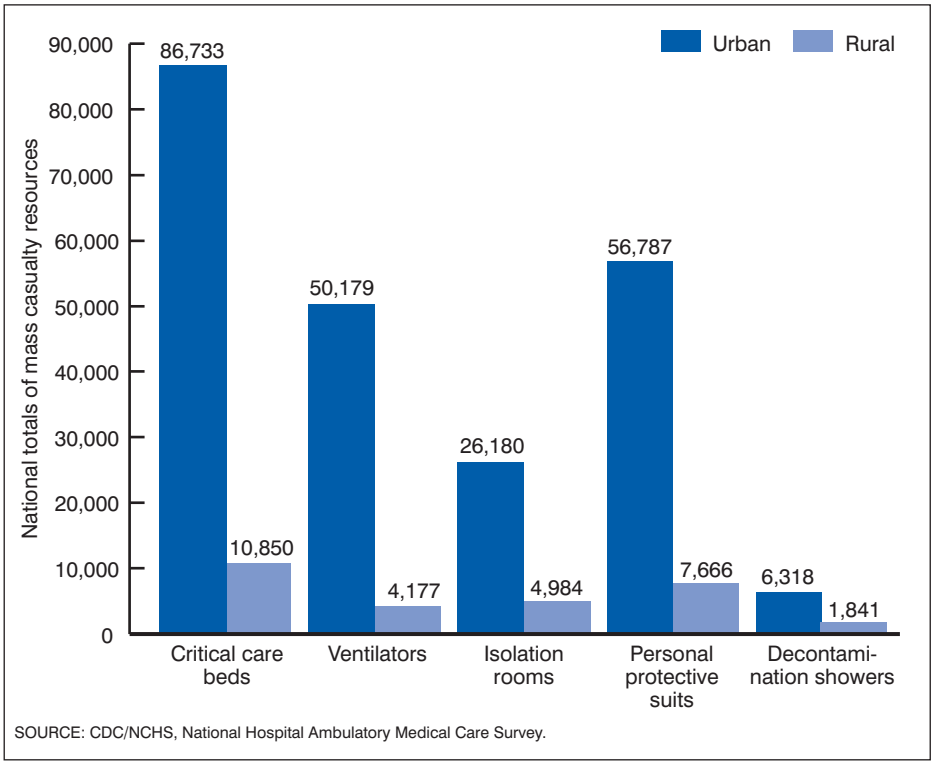

Figure 3. National totals of mass casualty resources available to hospitals: United States, 2003–2004

81 percent of urban hospitals had an emergency response plan addressing biological terrorism. The current study covering the next 2 years showed an increase to 88 percent for biological terrorism plans, with 95 percent confidence intervals that excluded the GAO percentage. The finding that hospitals with 100 or more beds planned for biological terrorism more frequently than smaller hospitals replicates the GAO observation that hospitals that had such plans were about 15 percent larger than those that did not (4).

This study found that urban hospitals were ahead of rural hospitals in planning for explosive attacks. This is not surprising, given recent historical experience with explosions in urban areas (the World Trade Center, the Pentagon, and Oklahoma City). Urban and rural hospitals did not differ in planning for natural disasters.

Cooperative planning

This study found that although 79 percent of hospitals engaged in cooperative planning with other facilities, only 52 percent had actual written agreements to be able to transfer patients during a disaster. This is consistent with other recent literature. In a pre–September 11 study of 30 hospitals in the mid-Atlantic states, Treat et al. found that 97 percent had plans to deal with seasonal increases in patient census by transferring patients to other facilities, but that no hospitals had such agreements with respect to mass casualty disaster management (5). In 2002, the GAO found that about 69 percent of urban hospitals had agreements with other hospitals to share resources during a bioterrorism attack (4). However, this study found that only about 57 percent of urban hospitals had memoranda of understanding with other facilities for transfer of inpatients.

Stockpiles

McIntyre et al. pointed out that treating large numbers of patients with antidotes, vaccinations, antibiotics, or other equipment, such as ventilators, would result in depletion of existing

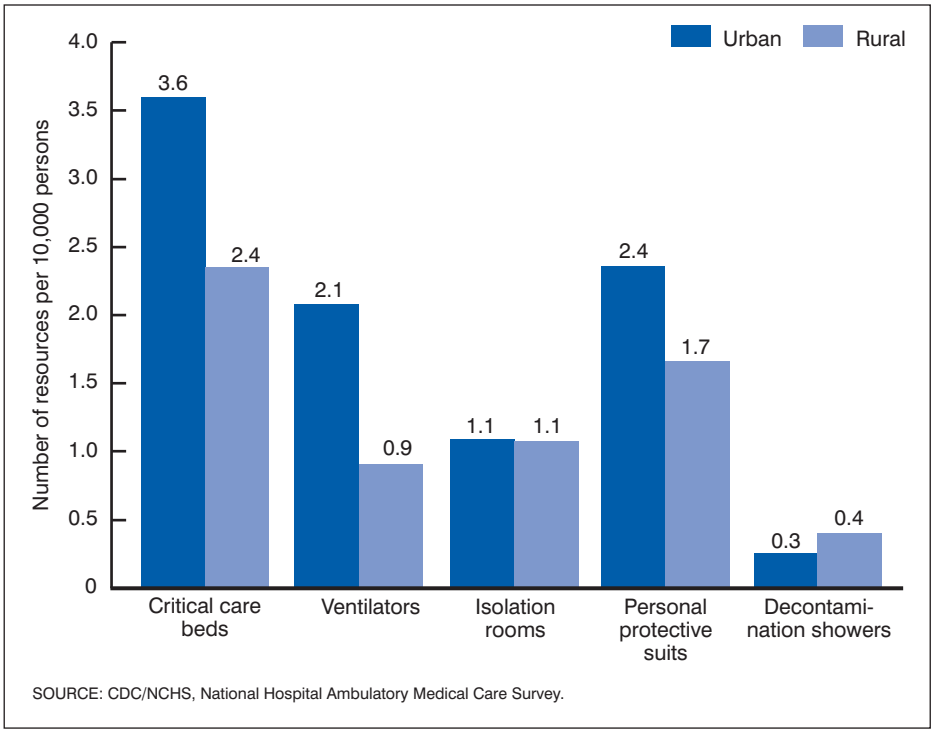

Figure 4. Selected mass casualty resources available in hospitals per 10,000 population: United States, 2003–2004

supplies in short order (6). Treat et al. found that 3 percent (one hospital) stockpiled ciprofloxacin for anthrax, and that no hospitals stockpiled vaccines other than tetanus (5). This post–September 11 study found that about 45 percent of hospitals had plans to stockpile antibiotics and supplies. The situation is better in urban hospitals. The GAO found, in a nonrepresentative national sample in 2002, that about 87 percent had descriptions in their emergency response plans of how to obtain additional pharmaceuticals for surge capacity (4). This finding was not replicated in the current study, however. Only about 50 percent of a nationally representative sample of urban hospitals had response plans that provided for stockpiling of antibiotics and supplies. It is possible that greater awareness of anthrax exposure from the October 2001 outbreak, along with specific federal hospital preparedness funding targeted to issues such as stockpiles, is partly responsible for this increase (7).

Mechanical ventilators

This study reveals that hospitals nationwide have available an average of only 12 mechanical ventilators each. Hick and O'Laughlin underscored the difficulties that intensive care settings would experience in an epidemic involving a disease likely to cause respiratory failure (8). In a hypothetical pneumonic plague epidemic involving 400 patients, the regional 27–hospital system in the Minneapolis area rapidly experienced a major shortage of ventilators. Although 480 intensive care beds were available in that system, one would presume that many of these were already in use. The drill also revealed little potential for backup, with only 16 ventilators available for purchase from regional vendors. The authors therefore proposed a three-stage triage system for either instituting or continuing mechanical ventilation, based on objective clinical factors related to survival potential and available resources, but not on patient age or subjective value judgments. The system, which would involve a change in the standard of care, would be implemented through the health department and supported by a declaration from the state governor with professional liability protections (8). The CDC Strategic National Stockpile is designed to augment local capacity and has ventilators in its managed inventory (9). But the Hick discussion is interesting as a prototype for practical guidelines on ethical dilemmas that would arise when managing large numbers of sick patients in a natural or bioterrorist-related epidemic.

Decontamination and personal protective equipment

McIntyre et al. published recommendations on a concept of operations for decontamination that illustrated the complexity and potential expense of such a system for a hospital dealing with rare events without supplemental support (6). Health care providers involved in chemical decontamination, as well as nonmedical staff such as security personnel who would participate in triage of potentially contaminated patients, would need to be outfitted with personal protective equipment. The consensus at the time was that, in most cases, Level C personal protective equipment would be appropriate. This would include chemically resistant suits with gloves and boots and full face masks with filtration canisters. Decontamination facilities would need to accommodate large numbers of patients, as the authors pointed out instances where otherwise full-service emergency departments had to shut down to deal with one or two contaminated patients. The complexity increases when one considers the authors' recommendation for a four-stage washdown, especially when additional staff resources are needed to wash incapacitated patients who cannot shower on their own (6).

We found that urban hospitals had about twice the decontamination capacity of rural hospitals, similar to previous literature. Treat et al. found that 73 percent envisioned a decontamination procedure whereby just one patient would be handled at a time in a single-room facility (5). Reanalysis of their results showed that one-half of their urban hospitals had single-stage decontamination stations and one-half had multistage (10–15 patients at a time) mobile decontamination stations. In contrast, 82 percent of their rural hospitals had single-stage facilities, and

the remaining 18 percent had no decontamination capability at all (5).

Hospital ownership

State and local government hospitals were behind nonprofit and proprietary hospitals in planning for biological, chemical, nuclear, and explosive attacks, and behind nonprofit hospitals in levels of all types of disaster preparedness resources except decontamination showers. Government hospitals, by virtue of their mandate to see patients regardless of their ability to pay for their care, may see the brunt of epidemic infectious diseases or chemical exposures.

Limitations

Because this survey was designed to generate nationally representative estimates of nonfederal hospitals with emergency or outpatient departments, the findings are not applicable to federal and military hospitals, or those without emergency or outpatient departments. Hospitals located in the five U.S. territories were also excluded from the sample. Although hospitals were surveyed at different times throughout the year and only during one 4-week period, the results are presented as average over the year. This approach could have contributed to underestimation of preparedness at the end of the year or overestimation if a hospital discontinued a program started earlier. Finally, the accuracy of the responses depended upon the knowledge and motivation of the hospital personnel filling out the survey.

Conclusions

This study presents baseline data on emergency response planning and the resources available to hospitals in responding to natural disasters and biological, chemical, radiological, and explosive incidents. The findings may inform hospitals and health care professionals involved in future planning efforts.

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Table 1. Percentage of hospitals having revised emergency response plans since September 11, 2001, and having plans for all and selected incidents, by hospital characteristics: United States, 2003–2004

Characteristic	Number of hospitals	Revised		All incidents		Biological		Chemical	
		Percent	95% confidence interval	Percent	95% confidence interval	Percent	95% confidence interval	Percent	95% confidence interval
All hospitals	5,014	91.9	87.7–94.7	63.2	57.7–68.5	83.6	79.6–86.9	85.2	80.9–88.7
Residency									
Yes	1,062	97.9	95.1–99.1	71.5	60.0–80.8	93.9	87.6–97.1	95.2	92.1–97.2
No	3,952	90.2	85.0–93.8	61.0	54.5–67.1	80.8	75.9–84.9	82.6	77.2–86.9
Medical school									
Yes	1,469	99.1	97.2–99.7	69.4	57.3–79.3	91.3	82.8–95.8	94.9	90.4–97.3
No	3,545	88.9	83.2–92.8	60.7	54.1–66.9	80.4	74.7–85.1	81.2	75.7–85.8
Bed capacity									
Less than 100	2,941	88.0	81.3–92.6	53.8	45.7–61.7	76.0	69.5–81.5	79.6	72.7–85.1
100–199	980	96.1	90.9–98.4	76.1	67.5–83.0	94.6	87.7–97.8	91.6	83.8–95.8
200–299	530	98.9	95.3–99.7	80.0	70.6–86.9	94.8	86.7–98.1	93.0	86.7–96.5
More than 300	563	98.0	93.8–99.4	74.3	66.1–81.0	93.6	86.0–97.2	96.2	92.1–98.2
Ownership									
Nonprofit	3,286	95.4	92.2–97.3	69.2	62.8–74.9	87.0	82.0–90.8	90.7	86.6–93.6
State or local government	1,247	81.3	69.1–89.5	42.9	31.1–55.6	69.7	56.9–80.1	67.4	54.8–77.8
Proprietary	481	95.1	87.5–98.2	75.2	63.3–84.1	96.0	92.5–97.9	94.6	87.8–97.7
Metropolitan statistical area									
Urban	3,166	91.6	86.1–95.1	70.2	64.0–75.7	88.0	82.7–91.9	89.9	84.7–93.4
Rural	1,848	92.3	85.1–96.2	51.3	41.5–61.1	76.0	68.1–82.5	77.3	68.3–84.3
Joint Commission									
Accredited	4,072	94.2	90.8–96.4	68.9	62.9–74.3	87.8	83.3–91.3	90.7	86.9–93.4
Not accredited	943	81.6	66.0–91.1	38.9	28.0–51.1	65.3	50.7–77.5	61.8	47.6–74.3

Table 1. Percentage of hospitals having revised emergency response plans since September 11, 2001, and having plans for all and selected incidents, by hospital characteristics: United States, 2003–2004—Con.

Characteristic	Nuclear-radiological		Explosive-incendiary		Natural disaster	
	Percent	95% confidence interval	Percent	95% confidence interval	Percent	95% confidence interval
All hospitals	74.8	69.0–79.9	77.9	72.2–82.6	96.2	93.9–97.6
Residency						
Yes	83.1	69.3–91.5	88.8	82.7–92.9	97.4	94.0–98.9
No	72.6	65.7–78.6	75.0	68.1–80.8	95.8	93.0–97.6
Medical school						
Yes	86.1	75.7–92.5	82.8	70.6–90.6	98.0	95.6–99.1
No	70.2	63.0–76.4	75.8	68.9–81.7	95.4	92.2–97.3
Bed capacity						
Less than 100	65.5	56.7–73.4	69.8	61.2–77.2	94.8	90.9–97.1
100–199	83.9	76.0–89.5	90.6	85.1–94.2	98.8	95.9–99.6
200–299	93.6	86.3–97.1	91.4	83.4–95.8	96.2	89.6–98.7
More than 300	90.0	83.2–94.2	85.2	78.1–90.2	98.9	96.1–99.7
Ownership						
Nonprofit	81.4	75.2–86.4	85.2	80.3–89.1	97.6	94.5–98.9
State or local government	51.3	39.0–63.5	56.0	41.7–69.4	92.4	83.8–96.7
Proprietary	90.8	81.9–95.5	84.2	72.8–91.4	96.4	84.8–99.2
Metropolitan statistical area						
Urban	81.7	75.6–86.6	86.1	81.6–89.6	96.3	93.4–97.9
Rural	63.0	51.2–73.4	63.8	52.5–73.7	96.0	89.5–98.6
Joint Commission						
Accredited	82.7	77.6–86.9	83.1	77.8–87.4	97.9	95.9–98.9
Not accredited	40.8	29.3–53.4	55.2	41.3–68.4	88.9	78.0–94.7

Table 2. Percentage of hospitals having emergency response plans providing for selected elements, by hospital characteristics: United States, 2003–2004

Characteristic	Number of hospitals	All 10		Community role		Cooperative plans		Inpatient transfer		Alternate site	
		Percent	95% confidence interval	Percent	95% confidence interval	Percent	95% confidence interval	Percent	95% confidence interval	Percent	95% confidence interval
All hospitals	5,014	8.8	6.5–11.9	77.6	72.3–82.1	78.8	73.2–83.6	52.1	45.3–58.7	65.5	60.7–70.0
Residency											
Yes	1,062	13.3	8.8–19.8	85.6	78.4–90.7	86.5	78.9–91.7	63.0	52.1–72.7	66.8	58.8–73.9
No	3,952	7.6	5.0–11.4	75.4	69.1–80.8	76.8	69.8–82.5	49.1	41.6–56.7	65.1	59.6–70.3
Medical school											
Yes	1,469	13.4	8.7–20.1	80.3	69.8–87.8	85.2	73.3–92.3	58.5	47.4–68.8	73.7	66.2–80.0
No	3,545	6.9	4.5–10.6	76.5	70.4–81.6	76.2	69.5–81.8	49.4	41.7–57.1	62.1	56.3–67.6
Bed capacity											
Less than 100	2,941	6.9	4.0–11.7	73.3	65.0–80.3	72.8	63.6–80.3	45.2	36.0–54.7	64.9	57.8–71.4
100–199	980	8.6	4.8–14.9	81.9	72.5–88.6	86.1	77.3–91.9	65.0	54.0–74.5	58.2	48.3–67.5
200–299	530	10.9	6.5–17.6	83.7	74.6–90.0	84.9	75.9–90.9	59.1	48.1–69.2	73.2	63.8–80.9
More than 300	563	17.4	12.8–23.2	86.3	78.6–91.6	92.2	86.2–95.7	59.0	47.9–69.2	74.0	66.8–80.1
Ownership											
Nonprofit	3,286	9.0	6.7–12.1	81.6	76.2–85.9	84.5	79.9–88.2	54.8	47.5–61.9	65.6	59.4–71.4
State or local government	1,247	*10.7	5.0–21.2	63.4	49.5–75.4	59.2	44.5–72.4	41.9	29.5–55.4	68.3	57.3–77.6
Proprietary	481	*2.8	0.7–10.3	87.1	75.1–93.8	91.0	76.8–96.8	59.6	44.7–72.9	57.1	44.4–68.8
Metropolitan statistical area											
Urban	3,166	12.6	9.1–17.1	79.7	74.0–84.5	82.5	77.0–87.0	57.2	49.5–64.6	64.9	59.0–70.4
Rural	1,848	*2.4	1.2– 4.8	73.9	63.2–82.3	72.5	60.3–82.1	43.3	32.6–54.6	66.5	57.3–74.5
Joint Commission											
Accredited	4,071	10.3	7.6–13.7	81.5	76.2– 5.8	84.3	79.2–88.3	56.4	49.3–63.3	70.0	65.1–74.4
Not accredited	942	*2.7	0.4–16.8	60.8	46.5–73.4	55.3	38.5–71.0	33.2	22.7–45.6	46.2	33.0–59.9

See footnote at end of table.

Table 2. Percentage of hospitals having emergency response plans providing for selected elements, by hospital characteristics: United States, 2003–2004—Con.

Characteristic	Cancel electives		Post-anesthesia		Ward activation		Nonclinical space		Stockpiles		Supply chain	
	Percent	95% confidence interval	Percent	95% confidence interval	Percent	95% confidence interval	Percent	95% confidence interval	Percent	95% confidence interval	Percent	95% confidence interval
All hospitals	73.1	67.4–78.2	39.9	34.5–45.6	27.9	24.0–32.1	59.8	54.8–64.7	45.3	39.9–50.7	58.9	53.3–64.2
Residency												
Yes	75.1	65.9–82.5	47.8	37.1–58.6	31.8	24.3–40.4	62.1	53.5–70.0	44.6	34.8–54.9	60.9	49.8–71.1
No	72.6	65.8–78.5	37.8	31.5–44.5	26.8	22.3–31.8	59.2	53.2–65.0	45.5	39.4–51.7	58.3	51.8–64.5
Medical school												
Yes	73.2	62.4–81.8	50.4	40.0–60.8	29.8	22.7–38.0	61.1	51.0–70.4	52.6	42.8–62.1	60.7	49.4–70.9
No	73.1	66.6–78.8	35.5	29.4–42.2	27.1	22.3–32.4	59.3	53.3–65.1	42.3	35.7–49.1	58.1	51.3–64.6
Bed capacity												
Less than 100	69.6	60.9–77.2	29.5	22.2–38.0	22.4	17.2–28.6	54.9	47.2–62.3	39.5	32.3–47.2	49.6	41.4–57.8
100–199	72.0	61.7–80.4	47.2	37.6–57.0	31.0	23.1–40.1	63.9	55.0–71.9	46.0	36.0–56.3	65.0	56.1–72.8
200–299	87.4	79.6–92.5	64.2	53.1–73.9	41.9	32.6–51.8	68.8	58.0–77.8	60.0	47.6–71.3	80.2	72.5–86.1
More than 300	80.1	67.3–88.7	58.5	47.3–69.0	37.9	30.5–46.0	70.3	60.1–78.9	60.4	48.3–71.3	76.5	68.0–83.3
Ownership												
Nonprofit	78.2	72.2–83.3	44.3	37.9–51.0	26.8	22.1–32.0	62.7	56.2–68.7	45.7	38.9–52.6	61.3	53.8–68.2
State or local government	59.1	45.5–71.4	26.7	16.2–40.7	27.3	18.2–38.8	53.9	40.7–66.5	43.8	32.0–56.4	48.4	36.5–60.5
Proprietary	74.7	59.4–85.7	43.8	29.4–59.2	36.5	25.8–48.8	56.0	44.9–66.6	46.5	35.2–58.1	69.4	57.4–79.3
Metropolitan statistical area												
Urban	74.5	68.6–79.7	49.9	43.8–56.1	33.2	28.4–38.4	63.2	57.6–68.4	49.7	43.3–56.0	63.8	58.2–69.0
Rural	70.8	58.8–80.4	22.7	14.4–33.8	18.7	12.9–26.3	54.2	44.5–63.6	37.7	28.6–47.9	50.4	39.2–61.5
Joint Commission												
Accredited	79.7	74.2–84.2	46.3	40.5–52.1	31.4	26.9–36.4	62.6	57.1–67.8	49.6	43.1–56.0	63.5	56.8–69.7
Not accredited	45.0	29.9–61.1	*12.5	5.7–25.2	*12.5	6.2–23.5	47.9	33.3–62.8	26.7	17.2–39.1	38.8	27.6–51.3

*Figure does not meet standards of reliability or precision (relative standard error greater than 30%).

Table 3. Mean number of terrorism preparedness elements provided for in emergency response plans, by hospital characteristics: United States, 2003–2004

Characteristic	Number of hospitals	Mean	95% confidence interval
All hospitals	5,014	5.8	5.5–6.1
Residency			
Yes	1,062	6.2	5.7–6.8
No	3,952	5.7	5.3–6.0
Medical school			
Yes	1,469	6.3	5.6–6.9
No	3,545	5.6	5.3–5.9
Bed capacity			
Less than 100	2,941	5.2	4.8–5.6
100–199	980	6.2	5.6–6.7
200–299	530	7.0	6.5–7.6
More than 300	563	7.0	6.3–7.6
Ownership			
Nonprofit	3,286	6.1	5.7–6.4
State or local government	1,247	4.9	4.1–5.7
Proprietary	481	6.2	5.6–6.9
Metropolitan statistical area			
Urban	3,166	6.2	5.8–6.5
Rural	1,848	5.1	4.6–5.6
Joint Commission			
Accredited	4,071	6.3	6.0–6.5
Not accredited	942	3.8	3.0–4.5

Table 4. Mean number of selected mass casualty equipment items per responding hospital, by hospital characteristics: United States, 2003–2004

Characteristic	Mechanical ventilators			Personal protective suits			Negative pressure isolation rooms		
	Number of hospitals[1]	Mean	95% confidence interval	Number of hospitals[2]	Mean	95% confidence interval	Number of hospitals[3]	Mean	95% confidence interval
All hospitals	4,511	12.0	10.1–14.0	4,583	14.1	11.9–16.3	4,732	6.6	5.7– 7.5
Residency									
Yes	916	30.7	22.4–38.9	963	26.9	19.8–34.1	952	13.8	11.3–16.3
No	3,595	7.3	6.1– 8.5	3,619	10.6	8.6–12.7	3,780	4.8	3.9– 5.6
Medical school									
Yes	1,293	23.5	19.2–27.7	1,371	24.4	18.5–30.3	1,356	11.2	9.3–13.2
No	3,218	7.5	5.3– 9.7	3,212	9.7	7.7–11.6	3,376	4.7	3.8– 5.7
Bed capacity									
Less than 100	2,676	3.6	2.6– 4.6	2,696	5.9	4.4– 7.5	2,807	2.5	2.0– 2.9
100–199	914	12.2	10.4–14.1	907	14.7	11.2–18.1	927	8.4	6.2–10.6
200–299	445	22.5	19.6–25.5	483	26.0	19.9–32.1	481	12.2	10.4–14.1
More than 300	476	49.5	37.2–61.8	497	45.6	33.7–57.5	516	20.5	17.6–23.5
Ownership									
Nonprofit	2,983	13.7	11.0–16.5	3,041	16.2	13.3–19.1	3,134	7.5	6.3– 8.8
State or local government	1,094	7.5	4.4–10.5	1,091	9.5	6.0–13.0	1,140	3.9	2.5– 5.2
Proprietary	434	12.0	7.7–16.2	450	10.6	6.1–15.0	458	6.7	4.8– 8.7
Metropolitan statistical area									
Urban	2,832	17.7	14.5–20.9	2,910	19.5	16.0–23.0	2,983	8.8	7.5–10.0
Rural	1,679	2.5	1.9– 3.0	1,672	4.6	3.3– 5.9	1,749	2.8	1.4– 4.3
Joint Commission									
Accredited	3,702	14.1	11.8–16.5	3,754	16.0	13.4–18.6	3,891	7.7	6.5– 8.8
Not accredited	809	2.5	1.2– 3.8	829	5.4	3.1– 7.7	841	1.6	0.9– 2.3

See footnotes at end of table.

Table 4. Mean number of selected mass casualty equipment items per responding hospital, by hospital characteristics: United States, 2003–2004—Con.

Characteristic	Critical care beds			Decontamination showers		
	Number of hospitals[4]	Mean	95% confidence interval	Number of hospitals[5]	Mean	95% confidence interval
All hospitals	4,751	20.5	18.2–22.9	4,689	1.7	1.5–1.9
Residency						
Yes	976	42.0	35.4–48.5	959	2.5	2.0–3.1
No	3,775	15.0	12.9–17.0	3,729	1.5	1.3–1.7
Medical school						
Yes	1,378	36.2	30.6–41.8	1,368	2.4	1.8–2.9
No	3,373	14.1	12.0–16.3	3,321	1.5	1.3–1.7
Bed capacity						
Less than 100	2,794	7.5	6.0– 8.9	2,744	1.1	0.9–1.4
100–199	943	24.9	20.9–28.9	921	1.8	1.6–2.1
200–299	490	39.3	35.0–43.5	497	2.7	2.2–3.1
More than 300	524	64.8	56.9–72.7	525	3.8	3.0–4.6
Ownership						
Nonprofit	3,095	23.7	20.9–26.6	3,094	1.8	1.6–2.1
State or local government	1,198	12.2	7.7–16.8	1,132	1.5	1.1–2.0
Proprietary	458	20.8	16.4–25.2	463	1.7	1.2–2.2
Metropolitan statistical area						
Urban	2,996	28.9	25.5–32.4	2,954	2.1	1.8–2.4
Rural	1,755	6.2	4.5– 7.9	1,735	1.1	0.8–1.3
Joint Commission						
Accredited	3,878	23.8	21.4–26.3	3,830	1.9	1.7–2.2
Not accredited	873	6.0	2.8– 9.2	858.5	0.9	0.7–1.1

[1]Based on 90.0 percent response from weighted total of 5,014 hospitals.
[2]Based on 91.4 percent response from weighted total of 5,014 hospitals.
[3]Based on 94.4 percent response from weighted total of 5,014 hospitals.
[4]Based on 94.8 percent response from weighted total of 5,014 hospitals.
[5]Based on 93.5 percent response from weighted total of 5,014 hospitals.

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