



New York City's Premier Multi-Specialty Group!

Emergency Medicine Physicians New York, NY

Physician Affiliate Group of New York (PAGNY) is comprised of over 3,000 physicians and healthcare professionals who provide services to NYC Health + Hospitals, the largest public health system in the United States. Our practitioners are highly skilled professionals with outstanding credentials who deliver the highest level of quality healthcare to patients throughout New York City.

We currently have opportunities available for the following:

**Chief of Emergency Services • Vice Chair of Emergency Medicine
Attending Physician • Director Psychiatric Emergency Services**

North Central Bronx Hospital/ Jacobi Medical Center

Located in Bronx, NY and academically affiliated with Albert Einstein Medical College

**Director of Pediatric Emergency Medicine • Attending Physician
Attending Physician – Pediatrics • Attending Physician – Express Care**

Lincoln Medical Center

Located in the Bronx, NY – affiliated with Weill Cornell

Pediatric Emergency Medicine Attending • Attending Physician

Harlem Hospital

Located in NY – affiliated with Columbia University

Associate Chief Emergency Medicine

Metropolitan Hospital Center

Located in New York, NY and academically affiliated with New York Medical College

In addition to offering competitive wages, attractive benefits packages, 401 k plans, and performance rewards, our professionals enjoy a sense of accomplishment brought on by a work environment that promotes collaborative learning and team-based effort. For immediate consideration, please email a copy of your CV, along with position of interest, to:

<http://e-mailer.link/100035274839>

www.pagny.org

Characteristics of Medical Surge Capacity Demand for Sudden-impact Disasters

Samuel J. Stratton, MD, MPH, Robin D. Tyler, RN, MSN

Abstract

Objectives: To describe the characteristics of the demand for medical care during sudden-impact disasters, focusing on local U.S. communities and the initial phases of sudden-impact disasters.

Methods: Established databases and published reports were used as data sources. Data were obtained to describe the baseline capacity of the U.S. medical system. Information for the initial phases of a sudden-impact disaster was sought to allow for characterization of the length of time before a U.S. community can expect arrival of outside assistance, the expected types of medical surge demands, the expected time for the peak in medical-care demand, and the expected health system access points.

Results: The earliest that outside assistance arrived for a community subject to a sudden-impact disaster was 24 hours, with a range from 24 to 96 hours. After sudden-impact disasters, 84% to 90% of health care demand was for conditions that were managed on an ambulatory basis. Emergency departments (EDs) were the access point for care, with peak demand time occurring within 24 hours. The U.S. emergency care system was functioning at relatively full capacity on the basis of data collected for the study that showed that annually, 90% of EDs were boarding admitted inpatients, and 75% were diverting ambulances.

Conclusions: As part of planning for sudden-impact disasters, communities should be expected to sustain medical services for 24 hours, and up to 96, before arrival of external resources. For effective medical surge-capacity response during sudden-impact disasters, there should be a priority for emergency medical care with a focus on ambulatory injuries and illnesses.

ACADEMIC EMERGENCY MEDICINE 2006; 13:1193–1197 © 2006 by the Society for Academic Emergency Medicine

Keywords: disaster, emergency medicine, emergency medical services, health care capacity, health services, health care, public health services, surge capacity

A sudden-impact disaster such as an earthquake, hurricane, flooding, or terrorist bombing can damage the infrastructure of a community, leading to disruption of transportation, power, communication, shelter, and sanitation. This infrastructure damage can cause difficulty in making contact with state and federal agencies and delay movement of relief resources into the disaster zone. In addition, the disruption caused by a sudden-impact disaster can lead to injuries, disease outbreaks, and worsening of chronic medical conditions, resulting in an increased demand for health care services.

From the University of California, Los Angeles, Center for Public Health and Disasters (SJS), Los Angeles; the University of California, Irvine, Department of Emergency Medicine (SJS), Orange; and the Los Angeles County Department of Health Services (SJS, RDT), Los Angeles, CA.

Received February 28, 2006; revision received May 5, 2006; accepted May 11, 2006.

Address for correspondence and reprints: Samuel J. Stratton, MD, MPH, Department of Emergency Medicine, UC Irvine Medical Center, Route 128-01, Orange, CA 92868. Fax: 714-456-3712; e-mail: Sam.Stratton@uci.edu.

Medical capacity is a term that is used to describe the number of persons that can be evaluated or treated within the health care system at any given time (not simply bed capacity).¹ *Medical surge capacity* is the maximum number of persons that the health care system can evaluate or treat on sudden demand.¹ The term *sustainability* describes the ability of a local health care system to tolerate an extreme event until significant outside assistance arrives.²

To develop tactics for coping with the medical surge capacity required during a sudden-impact disaster, it is useful to explore the characteristics of the initial demands for medical care that have occurred during these types of events. To explore these characteristics, this study examined statistics that described the baseline capacity of the U.S. health care system. For sudden-impact disasters, data for the following characteristics were evaluated: 1) the length of time a community must sustain itself before outside relief can be expected, 2) the time from disaster impact to peak in health care demand, 3) the types of injuries and illnesses that can be expected, and 4) the access points for health care delivery immediately after impact.

METHODS

Study Design

This was a literature search study that used established databases and published reports as data sources.

Study Setting and Population

We included data sources relevant to all communities within the United States.

Study Protocol

Data were obtained for sudden-impact disasters that included bombings, earthquakes, hurricanes, and floods. Medical literature databases including The National Library of Medicine, Emergency Medical Abstracts, and Science Direct were queried for published information regarding sudden-impact emergencies occurring in the United States.³⁻⁵ In addition, the U.S. Centers for Disease Control and Prevention (CDC) Morbidity and Mortality Weekly Report database; the U.S. National Center for Health Statistics' annual Health, United States With Chartbook on Trends in the Health of Americans databases; the U.S. National Center for Health Statistics National Hospital Ambulatory Medical Care Survey; and the World Health Organization's Countries: United States of America database were searched for study data.⁶⁻⁹ When available, more than one data source for a specific data point was sought to allow for verification of data.

Data were retrieved for the number injured or made ill as a result of a disaster event, number treated in an ambulatory care setting, number treated in a hospital ED, number admitted to a hospital, number admitted to an intensive care unit, and number died. Times for treatment from disaster onset and peak patient volume were included in the data search. In addition, information was sought to allow for estimates of specific categories of injuries and medical problems encountered in sudden-impact disasters.

Key Outcome Measures

Outcome measures included the following: 1) baseline health services capacity within the U.S. health system; 2) the length of time before arrival of medical relief from outside a local community after a sudden-impact disaster; 3) the type of health care demand expected during the initial phase of a sudden-impact disaster; 4) the health system access points; and 5) the peak time for health care demand after the onset of a sudden-impact disaster.

Data Analysis

Temporal and categorical data points from different data sources were reported with ranges. Observational information was tabulated.

RESULTS

Baseline U.S. Health System Capacity

In 2004, the United States resident population was 294 million.¹⁰ In the United States during 2003, there were a total of 5,764 hospitals with 965,256 hospital beds.¹⁰ Of these U.S. hospitals, there were 4,919 community acute care hospitals with a total of 808,127 hospital beds.¹¹ Of the community acute-care U.S. hospitals, 3,900 (79.3%) have EDs and were expected to be available for disaster

response.¹² For the total time in 2003, the average U.S. hospital occupancy rate was 68.1%.¹⁰ Occupancy rate increased with the size of a hospital: 100- to 199-bed hospitals were occupied 62.6% of the time, and those with 500 beds or more were occupied 74.2% of the total time available in the year.¹⁰ In August 2005, during the Hurricane Katrina disaster, 40,000 staffed hospital beds (4.9% of all potential community hospital beds) were identified by the U.S. Department of Health and Human Services as being available for evacuees.¹³ Detailed U.S. health system demographic data are summarized in Table 1.

From 1997 to 2000, the number of ED visits in the United States increased by 14%, although the number of EDs decreased by 2%.¹² Seventy-five percent of the 3,900 nonfederal U.S. EDs diverted ambulance patients because of lack of capacity to accept more patients at some point during fiscal year 2001.¹² Ten percent of U.S. EDs were functioning at full capacity and diverted ambulance traffic 20% of the time during year 2001.¹² In addition to diverted ambulances, 90% of U.S. EDs reported periods of boarding patients admitted to inpatient beds for two or more hours during fiscal year 2001.¹² During the same year, 20% of U.S. EDs reported average boarding times of eight hours or more.¹²

Time from Disaster Impact to Arrival of External Aid

In two data sources, it was reported that medical assistance teams arrived to the disaster site within four days of the impact of 1992 hurricanes Iniki and Andrew.^{14,15}

Table 1
Daily (Baseline) U.S. Health Care Capacity

Registered nurses	78.9	
Pharmacists	69.5	
Dentists	59.5	
Physicians	29.6	
Active in patient care	23.5	
Internal Medicine	3.4	
General and Family Practice	2.5	
General Surgery	0.9	
Orthopedic Surgery	0.6	
Emergency Medicine	0.6	
U.S. community emergency departments (3,900 total)	1 per 75,385 persons	
Diverting ambulances at some point in year 2001 (%)	75	
Diverting ambulances 20% of total time in year 2001 (%)	10	
Boarding inpatient admissions 2 h or more (%)	90	
Boarding inpatient admissions 8 h or more (%)	20	
	<u>Average</u>	<u>Range</u>
Open hospital beds available per 10,000 population	10.5	8.5 to 12.3
Open community hospital beds per 10,000 population	8.8	7.1 to 10.3

All data are per 10,000 population unless otherwise indicated. Data are pooled national information and may vary from region to region, as well as between rural and urban population areas. Open hospital beds were calculated by considering the total beds available and occupancy rate and dividing by total U.S. population. Data sources included reference numbers 7, 10, 11, and 12.

Preliminary data for Hurricane Katrina indicated that 24 hours after landfall, Charity and Tulane Hospitals functioned in austere modes without outside relief.¹³ Although evacuations of these hospitals were delayed because of street violence, outside aid and movement of patients to external hospitals was not initiated until 72 to 96 hours after hurricane landfall.¹³ Early warning of Hurricane Katrina as a major storm allowed for pre-event mobilization of disaster medical-assistance teams, urban search and rescue teams, and the American Red Cross, with the earliest arrival of these relief resources to the disaster area 24 to 72 hours after impact.⁵

During the 1994 Northridge earthquake, disaster medical assistance teams located in the same state (California) responded within approximately 24 hours, and out-of-state teams responded in approximately 48 hours after the initial quake.¹⁶ In response to the World Trade Center attacks of 2001, U.S. Public Health Service Disaster Medical Assistance Teams and Commissioned Corps were deployed to the disaster site and were operational 72 hours after the event.¹⁷

Health Care Issues and Access Points for Medical Care

Initial reports for Hurricane Katrina included the observation that one of the most common post-hurricane health issues was stepping on nails or other sharp storm debris.¹³ Among 1,600 persons evacuated to the Houston area in the first week of post-Katrina response, "medical ailments," breathing problems, chest pain, broken bones, and infected wounds were the most common conditions that presented to hospital EDs.¹³ Of 7,508 health-related events monitored at acute care facilities by the CDC during the first month of the Hurricane Katrina response, 146 (1.9%) presented for both illness and injury, 4,169 (55.6%) presented with illnesses, and 2,018 (26.9%) presented with injuries.¹⁸ Of the 7,508 cases, 90% were managed as ambulatory, 9% admitted to hospitals, and 5 (0.07%) died.¹⁸

After the impact of four hurricanes in Florida in 2004, it was noted that 4.6% of the population reported injuries, 5.4% reported worsening of existing medical problems, and 13.6% of those with health conditions reported that they were delayed from obtaining medications.¹⁹

One analysis of injuries and fatalities resulting from the 1995 Alfred P. Murrah Federal Building bombing in Oklahoma reported that 759 persons sustained injuries with 167 persons dying, 83 (14.0%) survivors were hospitalized, and 506 (85.5%) survivors were treated as outpatients.²⁰ In a different analysis of the Murrah Federal Building bombing, it was reported that of the 759 injured, there were 163 immediate deaths at the scene.²¹ Of the 596 remaining victims, 438 (73.5%) sought medical evaluation in EDs, with 85 (14.3%) of those hospitalized, and with 5 (0.8%) delayed deaths.²¹ Among those treated as outpatients, soft-tissue injuries, fractures, sprains, and head injuries were most common.²⁰

Assessment of the 2001 World Trade Center attacks showed that during the first 48 hours of the event, there were 1,103 survivors who presented to hospital EDs in Manhattan.²² Of these, 16% were hospitalized, and 0.4% died during emergency care.²² For the World Trade Center attacks, soft-tissue injuries (including burns), eye

injuries and irritation, and ambulatory acute respiratory conditions were the predominant medical conditions encountered.^{17,22}

During the Northridge earthquake, there were an estimated 8,000 to 24,000 minor injuries related to the event, with confirmed data for 138 serious earthquake-related injuries and 33 deaths.²³ Data for the 1989 Loma Prieta earthquake showed 3,757 injuries and 62 confirmed deaths.²³

Peak Time for Acute Health Care Demand after a Sudden-impact Disaster

The evacuation of New Orleans during Hurricane Katrina caused difficulty in organized health surveillance, resulting in lack of data for determining the peak time in acute care demand.¹⁸ It was noted that during Hurricane Katrina, local public hospitals were not functioning or were providing only basic ambulatory care in austere conditions as of 24 hours after landfall of the storm.¹³

During the 2001 World Trade Center attacks, arrival of injured persons at emergency facilities peaked two to three hours after the initial event.²² Within 12 hours, 71% of the 723 survivors of the World Trade Center attacks had sought and received emergency care.²² In the Murrah Federal Building bombing, the median time from blast to ED arrival was 91 minutes.²⁴ Within three hours of the Murrah Federal Building bombing, 62.5% of the 363 patients triaged as requiring ambulance transport by emergency medical services had arrived at hospitals.²⁴ Although the most severely injured Murrah Federal Building victims were transported by ambulance, those who were not transported by ambulance from the scene arrived at EDs by private vehicles within two hours of the blast.²⁵

Northridge earthquake data showed that demand for quake-related emergency care peaked at about 95 persons per hour in the first 24 hours after the first quake activity and dropped to 25 persons per hour within 48 hours.¹⁶ For the Northridge event, emergency ambulatory care dominated the health demand pattern, with Los Angeles County-area hospital beds never fully filled with patients.¹⁶ During Northridge, six of eight hospitals that evacuated patients initiated the process within 24 hours.²⁶ Further reports of Northridge related that the majority of patients with traumatic injuries presented to EDs within the first 48 hours, and that on the day that the earthquake occurred, one ED in the impacted area experienced an increase in patient load from a baseline 110 patients per day to 343.^{27,28}

DISCUSSION

Emergency department diversion and boarding data support the concept that during the time of this study, the U.S. emergency care system was often operating at capacity. This was particularly true for urban areas. Annual data show that 90% of U.S. EDs reported episodes of boarding patients for two or more hours and that 20% reported boarding patients for eight or more hours and suggest that the acute-care system occasionally may lack the baseline capacity to provide for demand.¹² With the emergency-care system functioning near capacity at times, it can be assumed that there are

periods when there is little elasticity for absorbing a surge in demand for care.

Data suggested that for sudden-impact disasters, there was a predictable period of time that a local community would need to sustain health care delivery before arrival of external relief resources. Extrapolating from the data presented, a community was dependent on internal resources for 24 hours before the earliest external medical relief arrived. Data further indicated that relief could be delayed up to 72 to 96 hours.^{13,17}

In the United States, neighborhood-based disaster medical-response resources have been developed to provide relief within local communities.²⁹⁻³¹ These local resources include the U.S. Medical Reserve Corps and community emergency response teams.^{30,31} Although local volunteers, community emergency response teams, first responders, and the Medical Reserve Corps would be expected to augment the resources available within a community, it currently is uncertain to what degree these internal community resources would add to surge capacity.

The principal demand for health care after sudden-impact disasters was for conditions that could be managed on an ambulatory basis. These conditions included soft-tissue injuries or lacerations, fractures, eye conditions, respiratory conditions, acute medical illnesses, and acute exacerbation of chronic medical problems.^{13,17,18,20} Data suggested that to maximize local resources to respond to a sudden-impact disaster, basic emergency services should be the focus. Basic medical supplies such as suture materials, sterile saline for wound irrigation, splinting materials, tetanus immunizations, dressings, insulin, oral hypoglycemic agents, diuretics, beta-blockers, aspirin, nitroglycerine tablets, and common antihypertensives would allow for management of the majority of sudden-impact disaster victims seeking initial medical care.

The data reviewed for this article suggested that hospital EDs were the access point for health care in a sudden-impact disaster. This concept is supported by the 73% emergency department use by victims of the Murrah Federal Building bombing.²¹ Experience during the Northridge earthquake was that injured and ill persons converged to EDs because they had no other alternative because of the closing of clinics and physician offices.¹⁶ In further support of EDs being the primary access for medical care were the types of medical conditions found, with data showing a predominance of acute ambulatory problems that commonly are managed by EDs in the U.S. health care system. There were no data found for this study that showed that during the initial phase of a sudden-impact disaster there were primary access points for medical care other than community EDs. As noted, baseline capacity in U.S. EDs is limited, and it can be assumed that emergency care services are vulnerable to breakdown should a demand for medical surge capacity occur.

For sudden-impact emergencies, it can be expected that the peak time in demand for surge capacity will be within 24 hours. This peak time demand occurs before external aid can be mobilized and available. The rapid increase in demand allows little time for adjustment to provide for the demand in medical surge capacity. Of note was that medical-surge demand was decreasing by the time that external resources arrived during the

Northridge earthquake, Murrah Federal Building bombing, and 2001 World Trade Center events.^{16,17,20,24} Data suggested that local health emergency planners should anticipate that during sudden-impact disasters, the local community must be in a position to manage the maximum in medical surge demand for at least 24 hours while medical relief outside the community is mobilized.

LIMITATIONS

Limitations to this article were multiple and must be considered in the interpretation of the findings presented. As a retrospective study of observational data, there was an inherent risk for over- or underinterpretation of the data and concepts presented. It was intended that there be multiple sources for the study data, but this most often was not possible and led to difficulty in corroboration of the information presented. Early sudden-impact event data were often lacking, because there was limited documentation performed while health providers concentrated on providing patient care. Disappointingly, we were unable to locate any applicable flood-event data.

Data that were found to be suitable for this study involved only a few events. Conclusions were based on data that were skewed toward the Northridge earthquake, Murrah Federal Building bombing, 2001 World Trade Center attacks, and Hurricane Katrina. The focus on data for these four events limits the general validity of the conclusions.

Another significant limitation for this type of study was the lack of standards for reporting disaster data and the limited depth of the current disaster literature. Many published articles were located that could have been a benefit to the analysis but that were not used because of lack of appropriate epidemiologic reporting techniques. Lack of standards for disaster research and failure to use established epidemiological reporting techniques limited the data sources available.

The data presented in this article were limited to events that have occurred in the United States. Therefore, there may be lack of validity for the concepts presented when applied to areas external to the United States.

CONCLUSIONS

As part of planning for sudden-impact disasters, communities should be able to sustain medical services for 24 or more hours before expected arrival of external resources. For effective medical surge capacity response during sudden-impact disasters, there should be a priority for emergency medical care with a focus on ambulatory injuries and illnesses. Our data were limited to the United States, and readers should be aware that conclusions may not be relevant in other countries.

References

1. CNA Corporation. Medical surge capacity and capability: a management system for integrating medical and health resources during large-scale emergencies. Washington DC: Department of Health and Human Services, 2004. Publication contract no. 233-03-0028.

2. Mileti DS. A sustainability framework for natural and technological hazards. In: *Disasters by Design*. Washington, DC: John Henry Press, 2001. pp 17–39.
3. National Library of Medicine. Pubmed. Available at: <http://ncbi.nlm.nih.gov/entrez/query.fcgi>. Accessed May 4, 2006.
4. The Center for Medical Education. Emergency Medical Abstracts. Available at: <http://ccme.org/EMA/>. Accessed May 4, 2006.
5. Elsevier B.V. Science Direct. Available at: <http://www.sciencedirect.com/>. Accessed May 4, 2006.
6. U.S. Center for Disease Control and Prevention. Morbidity and Mortality Weekly Report database. Available at: <http://www.cdc.gov/mmwr/>. Accessed May 5, 2006.
7. U.S. Department of Health and Human Services. Health, United States with Chartbook on Trends in the Health of Americans (2003–2005 databases). Available at: <http://cdc.gov/nchs/data/hs/hs05.pdf>. Accessed May 5, 2006.
8. U.S. Department of Health and Human Services. National Hospital Ambulatory Medical Care Survey (NHAMCS). Available at: <http://www.cdc.gov/nchs/about/major/ahcd/ahcd1/htm>. Accessed May 5, 2006.
9. World Health Organization. Countries: United States. Available at: <http://www.who.int/countries/usa/en/>. Accessed May 5, 2006.
10. National Center for Health Statistics. Health, United States, 2005 with Chartbook on Trends in the Health of Americans. Hyattsville, MD: U.S. Department of Health and Human Services, 2005. Publication no. 2005-1232.
11. American Hospital Association. Resource Center. Available at: http://www.aha.org/aha/resource_center/fastfacts/. Accessed May 5, 2006.
12. U.S. General Accounting Office. Hospital Emergency Departments: Crowded Conditions Vary among Hospitals and Communities. Washington, DC: U.S. General Accounting Office, 2003. Publication no. GA0-03-460.
13. Kuepper GJ. Emergency Disaster Management Report: Hurricane Katrina August 2005. Los Angeles, CA: Emergency and Disaster Management, Inc, 2005. Available at: <http://www.edmus.info>. Accessed May 11, 2006.
14. Henderson AK, Lillibridge SR, Salinas C, Graves RW, Roth PB, Noji EK. Disaster medical assistance teams: providing health care to a community struck by Hurricane Iniki. *Ann Emerg Med*. 1994; 23:726–30.
15. Nufer KE, Wilson-Ramirez G. A comparison of patient needs following two hurricanes. *Prehosp Disaster Med*. 2004; 19:146–9.
16. Stratton SJ, Hastings VP, Isbell D, et al. The 1994 Northridge earthquake disaster response: the local emergency medical services agency experience. *Prehosp Disaster Med*. 1996; 11:172–9.
17. Perritt KR, Winifred LB, The Helix Group. Injuries and illnesses treated at the World Trade Center, 14 September 20 November 2001. *Prehosp Disaster Med*. 2005; 20:177–83.
18. Centers for Disease Control and Prevention. Surveillance for illness and injury after Hurricane Katrina—New Orleans, Louisiana, September 8–25, 2005. *Morb Mortal Weekly Rep*. 2005; 54:1018–21.
19. Centers for Disease Control and Prevention. Epidemiologic assessment of the impact of four hurricanes—Florida, 2004. *MMWR Morb Mortal Wkly Rep*. 2005; 54:693–7.
20. Mallonee S, Shariat S, Stennes G, Waxweiler R, Hogan D, Jordan F. Physical injuries and fatalities resulting from the Oklahoma City bombing. *JAMA*. 1996; 27:382–7.
21. Arnold JL, Halpern P, Tsai MC, Smithline H. Mass casualty terrorist bombings: a comparison of outcomes by bombing type. *Ann Emerg Med*. 2004; 43:263–73.
22. Centers for Disease Control and Prevention. Rapid assessment of injuries among survivors of the terrorist attack on the World Trade Center—New York City, September 2001. *MMWR Morb Mortal Wkly Rep*. 2002; 51:1–5.
23. Seligson HA, Shoaf KI. Human impacts of earthquakes. In: Chen WF, Scawthorn C, editors. *Earthquake Engineering Handbook*. Boca Raton, FL: CRC Press, 2003, pp 28–9.
24. Hogan DE, Waeckerle JF, Dire DJ, Lillibridge SR. Emergency department impact of the Oklahoma City terrorist bombing. *Ann Emerg Med*. 1999; 34:160–7.
25. Teague DC. Mass casualties in the Oklahoma City bombing. *Clin Orthop Relat Res*. 2004; 422:77–81.
26. Schultz CH, Koenig KL, Lewis RL. Implications of hospital evacuation after the Northridge, California, earthquake. *N Engl J Med*. 2003; 348:1307–8.
27. Salinas C, Salinas C, Kurata J. The effects of the Northridge earthquake on the pattern of emergency department care. *Am J Emerg Med*. 1998; 16:254–6.
28. Kazzi AA, Langdorf MI, Handly N, White K, Ellis K. Earthquake epidemiology: the 1994 Los Angeles earthquake emergency department experience at a community hospital. *Prehosp Disaster Med*. 2000; 15:12–9.
29. National Disaster Medical System. Home Page. Available at: <http://ndms.dhhs.gov/>. Accessed Feb 25, 2006.
30. United States Medical Reserve Corps. Home Page. Available at: <http://www.medicalreservecorps.gov/page.cfm?pageID=12>. Accessed Feb 25, 2006.
31. Citizen Corps. United States Citizen Corps Teams (CERT). Available at: <http://www.citizencorps.gov/programs/cert.shtm>. Accessed Feb 25, 2006.