The Public Health Service's Response to Hurricane Andrew

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A DISASTER OR EMERGENCY may overwhelm the capabilities of a State or its local governments in providing a timely and effective response to meet the needs of the situation. The occurrence of a large or catastrophic hurricane, such as Andrew, in a high-risk, high-population area will cause casualties, property loss, and disruption of normal life support systems and will affect the regional, economic, physical, and social support systems. A hurricane-related disaster or emergency has the potential to cause substantial health and medical problems, with scores, hundreds, or even thousands of deaths and injuries, depending on the time of occurrence, severity of impact, existing weather conditions, area demographics, and the nature of home and building construction. Deaths and injuries will occur principally from the collapse of manmade structures and collateral events, such as fires and mudslides, and during rescue activities.

The Public Health Service (PHS) has the lead Federal Government role in ensuring that the public health and medical care needs of the nation are met after a major disaster. This paper will outline how this responsibility is currently conceptualized, and how PHS responded during Hurricane Andrew.

The Federal Response Plan

The Federal Response Plan, developed as a result of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288, as amended), establishes the basis for Federal assistance to a State and its affected local governments impacted by a catastrophic or significant disaster or emergency that results in the need for Federal response assistance. The Plan is based on the primary assumption that the consequences of a significant disaster or emergency will overwhelm the capability of State and local governments to carry out far-reaching emergency operations to save lives and protect property.

Under the Plan, which becomes effective upon a Presidential Declaration of a Federal Disaster, a State will receive sufficient Federal assistance to permit it to once again be responsible for the health, welfare, and safety of its citizens. The plan is applicable to natural disasters such as earthquakes, hurricanes, typhoons, tornadoes, and volcanic eruptions as well as technological and other manmade emergencies such as radiological and hazardous material releases or terrorist incidents.

The Plan applies to all Federal Government departments and agencies that are tasked to provide response assistance in a disaster or emergency situation. It describes actions taken by the Federal Government to provide immediate response assistance to one or more affected States, as requested. A State, under the Stafford Act means any State of the United States, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, the Trust Territory of the Pacific Islands, the Commonwealth of the Northern Marianas, the Federated States of Micronesia, or the Republic of the Marshall Islands.

The Plan does not specifically address recovery assistance, including the provision of temporary housing, loans, and grants to individuals; business loans; and grants to local and State government entities provided under disaster assistance programs of the Federal Emergency Management Administration (FEMA) and other agencies. In most instances, however, recovery activities will be conducted concurrently with response activities.

The Plan does describe the basic mechanisms and structures by which the Federal Government will mobilize resources and conduct activities to augment State and local response efforts. The Plan uses a functional approach to group the types of Federal assistance that a State is most likely to

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need under 12 Emergency Support Functions (ESF) (see box). Each ESF is headed by a primary agency that has been selected based on its statutory authorities, resources, and capabilities in a particular functional area. Other agencies have been designed as support agencies for one or more ESFs, based on their resources and capabilities to support the functional area. The 12 ESFs serve as the primary mechanism through which Federal response assistance will be provided to assist the State in meeting response requirements in an affected area. The FEMA Director, on behalf of the President, appoints a Federal Coordinating Officer to provide overall coordination to the affected State(s).

Under the Federal Emergency Response Plan, Emergency Support Function 8 is responsible for the provision of Federal health and medical services. ESF 8 is designed to provide Federal health and medical assistance to supplement State and local resources in response to unmet needs following a disaster or major emergency. Assistance provided under ESF 8 is directed by the Department of Health and Human Services (HHS), through its Executive Agent, the Assistant Secretary for Health, who heads the Public Health Service. The action agent for ESF 8 is the Director, Office of Emergency Preparedness (OEP)/National Disaster Medical System (NDMS), PHS; the operating agent is the appropriate Regional Public Health Administrator in any of the 12 PHS regions. Resources will be furnished only when State and local resources are overwhelmed and medical or public health assistance, or both, is requested from the Federal Government. ESF 8 provides a "menu" of 16 functional areas that has been pre-identified to simplify requests for Federal health and medical assistance. These functional areas include

1. Assessment of health and medical needs
2. Health surveillance
3. Medical care personnel
4. Health and medical equipment and supplies
5. Patient evacuation
6. In-hospital care
7. Food, drug, and medical device safety
8. Work health and safety
9. Radiological hazards
10. Chemical hazards
11. Biological hazards
12. Mental health
13. Public health information
14. Vector control
15. Potable water, waste water, and solid waste disposal
16. Victim identification and mortuary services.

The Public Health Service, in its primary agency role for ESF 8, directs the provision of Federal health and medical services to fulfill the requirements identified by the affected State or local authorities having jurisdiction. Included in ESF 8 is an overall public health response and the triage, treatment, and transportation of victims of the disaster and the evacuation of patients from the disaster area, as needed, into a network of pre-enrolled non-Federal hospitals located in the major metropolitan areas of the United States. The intent of ESF 8 is to supplement and assist the State and local governments affected by the disaster by using resources primarily available from the following sources:

1. The Department of Health and Human Services' Public Health Service, Administration on Children and Families, Social Security Administration, Health Care Financing Administration, and Administration on Aging.
2. Supporting departments and agencies assigned to ESF 8.
3. The National Disaster Medical System.
4. Specific non-Federal sources such as major pharmaceutical suppliers, hospital supply vendors, the National Funeral Directors Association, certain international disaster response organizations, and Department of Health and Welfare–Canada.

Disaster medical care functions. They differ from day-to-day field emergency medical services that generally involve two medical functions only—initial rescue and first aid (and in areas with paramedic programs, with field resuscitation as well). Disaster casualty care, in contrast, may involve five distinct medical care functions—field rescue and first aid; casualty clearing (triage and medical stabilization); medical (or aeromedical) evacuation and staging; emergency surgical stabilization; and definitive care.

The National Disaster Medical System. NDMS provides medical assistance to a disaster area in the form of Disaster Medical Assistance Teams (DMATs), medical supplies, and equipment; evacuation of patients who cannot be cared for on-scene to selected locations elsewhere in the nation; victim identification and mortuary services; and provides definitive medical care in a nationwide network of hospitals that have agreed to accept patients in the event of a national emergency.

The Disaster Medical Assistance Team. DMAT is a volunteer, locally sponsored community-based organization, affiliated with NDMS, that brings together the necessary medical, nursing, and administrative skills to provide a self-sufficient medical care unit during a medical disaster. Each team is generally composed of 35 to 37 people with both hospital-based and emergency service-response based skills and experience. The team must be mobile and willing to travel to a disaster area. The team must have limited (48–72 hours) self-sufficiency to shelter and feed itself and its patients in a disaster area. They must not become an additional burden to the existing limited resources in the affected area.

The team is sponsored through a memorandum of understanding with the Public Health Service to respond rapidly and provide services when called. Members are pre-enrolled in a special Federal personnel system that allows them to become temporary Federal employees on activation. In addition to general purpose DMATs, special teams have been formed that are able to provide pediatric, burn, and disaster mortuary services, urban search and rescue medical services, and mental health assistance.

Hurricane Andrew Activities

Weather forecasters, several days prior to landfall in southern Florida, began to predict a severe tropical storm that soon reached hurricane wind strength and became Hurricane Andrew. The initial briefing on the impending storm occurred on Thursday, August 20, 1992, in Public Health Service Region IV (the region that includes Florida). Two days later, the Public Health Service Office of Emergency Preparedness established a hurricane watch. On Sunday, August 23, the Acting Assistant Secretary for Health was briefed, the NDMS was placed on alert, and the Advance Element of the Emergency Response Team was dispatched to Tallahassee to work closely with the State government.

The 12 Emergency Support Functions (ESF) of the Federal Response Plan and the Lead Agency for Each ESF

1. Transportation—Department of Transportation
2. Communications—National Communications System
3. Construction management—Department of Defense
4. Fire fighting—Department of Agriculture
5. Damage information—Federal Emergency Management Administration
6. Mass care—American Red Cross
7. Resources support—General Services Administration
8. Health and medical services—Department of Health and Human Services, Public Health Service[1]
9. Urban search and rescue—Department of Defense
10. Hazardous materials—Environmental Protection Agency
11. Food—Department of Agriculture
12. Energy— Department of Energy

[1] Supporting departments and agencies for this ESF are the Agency for International Development (Office of U.S. Foreign Disaster Assistance); American Red Cross; Departments of Agriculture, Defense (U.S. Army Corps of Engineers), Interior, Justice, Transportation, and Veterans Affairs; Environmental Protection Agency; Federal Emergency Management Agency; General Services Administration; U.S. Postal Service.

In addition, 10 DMAT teams were identified, alerted, and placed on standby status for possible deployment within 24 hours. An advance element of ESF 8 Medical Support Unit (MSU) was deployed to Miami several hours before the storm hit.

The hurricane struck southern Florida on Monday, August 24. It was subsequently categorized as the most destructive natural disaster ever to affect the United States.

FEMA agreed to the immediate deployment of two DMAT teams and one MSU to the southern Florida region. The Department of Defense was requested to provide airlift capability to ensure that the DMATs and MSU were able to reach the affected areas as quickly as possible. The Fort Wayne, IN, and Winston-Salem, NC, DMAT teams were airlifted and operational by Tuesday, August 25. On the same day, two DMAT teams

from Albuquerque, NM, and one each from Tulsa, OK, and Worcester, MA, were activated.

A base camp, with water and kitchen support, was approved on Thursday, August 27. Three additional DMAT teams (two additional units from Albuquerque, and one from Fort Thomas, KY), and a preventive medicine team were also activated that day. These teams arrived in southern Florida on the following day, Friday. On Friday, two additional teams, from northern Florida (Pensacola and Ft. Charlotte) were activated along with a Mental Health Special Team. On Saturday, the Toledo, OH, DMAT team was activated.

On Saturday, advance elements of the 18th Airborne Corps and the 44th Medical Brigade arrived. The following day, the 82nd Airborne Division and 10th Mountain Division military sectors for management and security were established. Over the next week, the DMAT teams that had arrived immediately after the hurricane struck were rotated home and replaced by other units. Other government agencies involved with individual health (Centers for Disease Control and Prevention) and environmental health (Environmental Protection Agency) began to play more significant roles in managing the cleanup of the devastation caused by the hurricane.

On Thursday, September 10, 1992, Neighborhood Family Support Centers, or tent cities, were created within some areas to manage better the special needs of those who could not or would not relocate from the most affected areas. The following day, Friday, the local emergency medical system was able to resume all emergency transports as the Metro-Dade Fire and Rescue Department provided services to all of the Life Support Stations and Neighborhood Family Support Centers. A precautionary "boil order" for tap water that had been in effect for all customers in the Miami-Dade County Water and Sewer Authority's service area south of 104th Street was lifted. Customers in the City of Homestead and Florida City distribution system remained under a "boil order." One week later, on September 17, 1992, the water sources for the City of Homestead were declared potable. The following day, a FEMA 90-day grant for $10.4 million for restoration and recovery of health, mental health, and substance abuse services was approved.

By September 23, 1992, the transition from the Emergency Response Phase to the Recovery Phase was proceeding well. During this entire period, FEMA and the Public Health Service maintained 24-hour Emergency Operations Centers to ensure that field and support personnel were able to obtain the necessary supplies and equipment to perform their mission assignments. Throughout the entire emergency response phase to Hurricane Andrew, PHS deployed 16 DMATs consisting of 460 personnel for a total of 3,300 person-days of on-site effort. In all, 17,290 patients were treated by the DMATs.

While no disaster response program is free either from criticism or programmatic or technical errors, the lessons learned from prior responses to Federal disasters requiring medical services (principally Hurricane Hugo) helped minimize the confusion and inefficiencies. More lessons were learned from ESF 8 response to Hurricane Andrew since it was the largest medical response, under the Federal Response Plan, ever required and managed. These lessons learned have been recorded and reviewed, and an action plan is currently being prepared to improve further health and medical responses to future disasters. The next time, and there will be a next time, we hope to be even more effective.