

States of Preparedness

Health Agency Progress, Second Edition

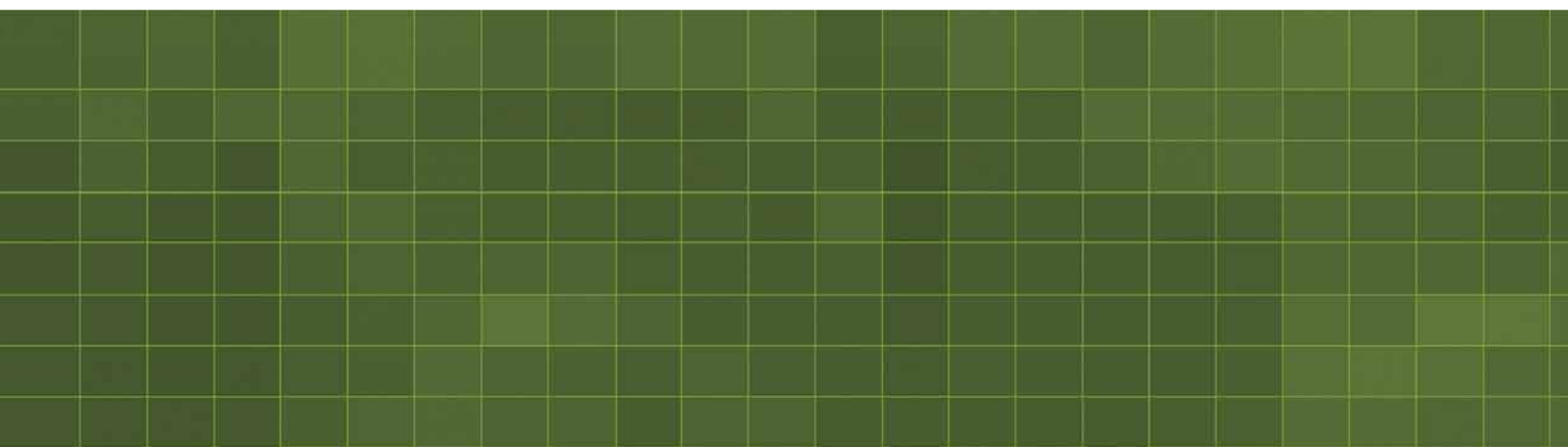


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States of Preparedness: Health Agency Progress, Second Edition

In fall 2006, ASTHO published its first *States of Preparedness* report describing how state and territorial health agencies were working to meet public health preparedness goals. The report highlighted some of the great progress made by health agencies during the early years of the federal public health and health system preparedness programs in improving their ability to prepare for public health emergencies. Progress continues to be made and health agency preparedness planning has matured to the point that it informs and guides activities occurring every day for all types of hazards.

Since 1999, the federal government has invested more than eight billion dollars in public health and health system preparedness at the state and local levels. Approximately 80 million dollars of these funds were first provided to a select, pilot group of states as security experts began to recognize vulnerabilities in the under-resourced public health system to threats such as bioterrorism. The September 11, 2001 and anthrax attacks brought these vulnerabilities into sharp focus, leading to a larger infusion of funding to all states, as well as implementation of funding for health system preparedness.

As described in *States of Preparedness: Health Agency Progress 2006*, state health agencies have used this investment in public health and health system preparedness to enhance capacities, build new capabilities, and strengthen the overall public health infrastructure nationwide. This investment has paid dividends. Whether a federally-declared disaster or an everyday occurrence, state and local public health agencies are able to respond faster and more effectively to meet the needs of their populations. While *States of Preparedness: Health Agency Progress 2006* primarily focused on what health agencies were doing to prepare for emergencies, this second edition of *States of Preparedness* shines a spotlight on how they are responding to real-life incidents.

For some of the incidents described in the following pages, public health agencies are at the forefront, just as anyone would expect. Core public health functions, such as disease outbreak investigations, are traditional responsibilities of state and territorial health agencies. Yet, health agencies play surprising and critical roles in all types of incidents. Natural disasters, environmental emergencies, infrastructure failures, foodborne outbreaks and mass acts of violence all have one thing in common: large numbers of people who must be protected.

Since the first *States of Preparedness* report, state and territorial health agencies have played integral roles in responding to a wide range of emergencies. In 2007 alone, there were 63 federally-declared disasters and health agencies played a role in responding to almost all of them.¹ During the 2007 calendar year, nearly 90 percent of state health agencies were involved in a response that required activation of their Incident Command System or participation in an Emergency Operations Center.² More than a quarter did this six times or more.³ Emergency preparedness and response has become an integral service provided by state and territorial health agencies.

This edition of *States of Preparedness* offers a closer look at how public health agencies responded to ten different emergencies:

- A snowstorm in New York
- A *Mycoplasma pneumoniae* cluster in Rhode Island
- A mass shooting in Virginia
- A tornado in Kansas
- A bridge collapse followed by flooding in Minnesota
- Flooding in Ohio
- A series of pediatric disease outbreaks in Alaska
- Wildfires in California
- A contaminated drinking water system in Colorado
- A meningitis scare in Illinois

All 50 states, the District of Columbia, five territories, three freely-associated states and three large metropolitan areas (New York City, Chicago, Los Angeles County) receive Public Health Emergency Preparedness funding from the Centers for Disease Control and Prevention (CDC) and Hospital Preparedness Program funding from the U.S. Department of Health and Human Services (HHS) Assistant Secretary for Preparedness and Response (ASPR) in the form of cooperative agreements. The CDC and ASPR cooperative agreements are the primary source of preparedness funding for state and territorial health agencies. The CDC began funding several state health agencies in 1999 and expanded its cooperative agreement to 62 grantees following the September 11, 2001 terrorist attacks and the anthrax attack that soon followed. The CDC Public Health Emergency Preparedness cooperative agreement supports more than 3,500 state and local public health agency staff working on preparedness activities nationwide.⁴ Funding under the ASPR Hospital Preparedness Program cooperative agreement to the same 62 jurisdictions began following the 2001 terrorist attacks. While CDC and ASPR distribute preparedness funds to state and territorial health agencies and four large local health departments, 75 percent of the funds directly or indirectly support local public health departments and hospitals.⁵ State health agencies use ASPR cooperative agreement funds to support preparedness activities for more than 5,000 hospitals nationwide.⁶ Additionally, state health agencies provide non-financial support to many of the local health departments and other partners within their jurisdictions. According to a National Association of County and City Health Officials (NACCHO) survey of local health departments, “64 percent received technical assistance for planning; 56 percent received laboratory support; 55 percent received surveillance support; and 53 percent received support for exercise planning and administration.”⁷ Thus, federal public health and health system preparedness funds are used to improve response capabilities at all levels in communities across the country.

These incidents cover the time period of October 2006 to April 2008 and are told chronologically, with the exception of the Alaska example. It focuses on how the state health agency improved its response to a series of disease occurrences over time. The stories reflect the geographic diversity of ASTHO's membership, the variety of threats that health agencies encounter, and the multitude of capabilities they have built to respond effectively.

States of Preparedness: Health Agency Progress 2006 only provided a snapshot of the myriad activities at the state, territorial, local, regional and federal levels to prepare our nation for bioterrorist attacks, catastrophic natural disasters and other public health threats and emergencies. Similarly, the emergency responses described in this second edition are only a sampling of the work being done in health agencies across the nation every day to protect the lives and health of Americans. For example, as this report is being finalized, historic floods are ravaging the Midwestern states. The response of public health agencies to this flooding will be featured in a separate document. ASTHO will continue to collect success stories from public health emergencies and display these stories on its Web site. Highlighted stories will also be featured in future editions of *States of Preparedness*.

Health agencies are incorporating emergency management principles into their activities to be consistent with the National Response Framework (NRF). The NRF details response principles, roles and structures for all-hazards national response and how they should be applied at the state, local, tribal and federal levels as well as by private sector and nongovernmental partners.⁸ Health agencies in 48 states plus the District of Columbia and Puerto Rico have reached National Incident Management System (NIMS) compliance certification.⁹ NIMS is a systematic approach for seamless incident management at all levels of government. Incidents are natural or manmade occurrences or planned events that require a response to protect lives or property.¹⁰ When responding to incidents, state and territorial health agencies follow the Incident Command System (ICS), an organizational structure that integrates operations, logistics, planning, finance/administration, and command functions across all responders at the scene. The physical location where incident management activities are coordinated is the Emergency Operations Center (EOC). Depending on the scope of an incident, state health agencies may use their own agency-specific EOC or they may be integrated into the EOC of another entity, such as that of a state emergency management agency. In most states, the health department is the lead agency for Emergency Support Function 8 (ESF-8), meaning they are responsible for health and medical resources during an incident. Health agencies may also support some of the other 15 total functions, such as ESF-6, which is mass care, or ESF-10, which is oil and hazardous materials response. With trained staff who understand NIMS, health agencies are able to work side-by-side with their response partners, regardless of agency or jurisdictional boundaries.

Strained economic conditions combined with decreasing federal funding for public health and health system preparedness threaten the progress that state and territorial health agencies, along with their local, tribal and federal counterparts, have made within the last decade. State and territorial public health agencies are beginning to cut response personnel; limit opportunities for staff to train, plan and exercise with other first responders; lose their ability to maintain supplies and technology such as surveillance systems, laboratory

equipment and communications devices; and decrease their capacity to produce and distribute public safety information. These changes will make it difficult for state and territorial health agencies to duplicate the successful responses described in the following pages. A sustained commitment to public health preparedness will ensure that health agencies will continue to be able to protect the health and lives of the public by rapidly responding to all hazards.

Not Just Another Buffalo Snowstorm

When a snowstorm knocked out power to 400,000 homes and businesses, some for as long as a week, the New York State Department of Health successfully partnered with local health agencies to protect residents of western New York from carbon monoxide poisoning, foodborne diseases, and other health threats while working with local hospitals to shore up staffing by deploying 17 volunteer nurses.

Lake-effect snowstorms are usually routine in western New York, but not when two feet unexpectedly fall in mid-October. Beginning the afternoon of October 12, 2006 and continuing into the next day, a snow squall dropped nearly two feet of wet, heavy snow resulting in the two snowiest October days ever recorded in Buffalo.¹¹ Snow rapidly accumulated on tree branches, which had not yet lost their leaves. The heavy snow was too much and approximately 90 percent of Buffalo's trees were damaged.¹² Nearly 400,000 homes and businesses lost power as snapped tree limbs downed utility lines. Even though the snow melted by October 15, roads blocked by power lines and trees delayed the restoration of electricity. About 100,000 customers remained without power for a week after the storm.

State and local health agencies swung into action to assess potential health risks from the storm. Health agency staff knew from experience which injuries and health conditions to expect during snowstorms and power outages. Fortunately, they were able to call on several years of public health preparedness planning and training to guide their response efforts. The New York State Department of Health activated its crisis communication plan and jointly issued a press release with the New York State Emergency Management Office. The agencies cautioned the public on cardiac risks resulting from the physical exertion of shoveling snow, warned of carbon monoxide dangers due to the use of generators and alternate heating sources, reminded of the importance of the safe use of candles and heaters in preventing fires, and offered advice on the safety of perishable food unable to be kept cold due to electricity loss. As the extent of the storm damage became clear, the New York State Department



Figure 1. Carbon Monoxide Warning Flyer Distributed by the Erie County Department of Health. Flyers Were Also Distributed in English and Vietnamese. Courtesy of Erie County Department of Health.

of Health also issued advice for those with end-stage renal disease who might not be able to get to their dialysis treatments. Throughout the storm response, the New York State Department of Health monitored public water supplies, conducted water sampling, and sent guidance through county health departments to restaurants and food establishments on safe food handling.

The New York State Department of Health also activated its Health Emergency Response Data System (HERDS), a secure, electronic, Web-based system that provides real-time preparedness data exchange. The state health agency used HERDS to assess the status of potable water availability, staffing levels, electrical power service, and emergency generator fuel levels at hospitals and nursing homes in the impacted area.

Hundreds of patients arrived at hospitals with storm-related symptoms and injuries such as chest pains, carbon monoxide poisoning, and cuts and bruises. Dark, cold homes on streets strewn with power lines became danger zones rather than places of refuge. Local hospitals experienced overcrowding due to an inability to discharge patients who could not return to homes without electricity or due to tree-blocked roads, even as new storm-injured patients arrived. During the storm, heated shelters were opened to provide a place for the public to get warm and dry.



Downed Trees in Buffalo, New York Following October 13, 2006 Snowstorm. Photograph courtesy of Jason Safoutin.

Through HERDS, the New York State Department of Health identified a staffing shortage in one of the health systems. After several days of round-the-clock response, local hospital staff resources were exhausted. Even the most dedicated employees were overwhelmed by long hours at work and storm damage at home. For the first time, the state health agency activated its Emergency Medical Volunteer Database to identify and deploy nurses from other parts of the state. Using CDC cooperative agreement funds, the New York State Department of Health set up the Database following the September 11 attacks. From the registry

of 11,242 medical professionals throughout the state willing to volunteer during emergencies, the state health agency deployed 17 nurses from unaffected areas of the state. The state and county covered the cost of transporting and lodging the volunteers while some hospitals continued to pay the salaries of the deployed nurses. This seemingly small deployment of personnel made a tremendous difference at the local level by providing much-needed relief to staff and ensuring that the hospitals continued to function effectively until the crisis passed.

State health agencies face a workforce crisis. According to a recent ASTHO survey, 29 percent of the public health workforce will be eligible to retire within five years in the 28 states that reported data.¹³ The average state health agency vacancy rate is nearly 11 percent; survey respondents reported more than 13,000 open positions in their agencies.¹⁴ While state and local health agencies have been able to hire personnel to fill preparedness-related positions, the number of staff needed to respond to a major incident exceeds the capacity of most agencies. From staffing mass dispensing clinics to providing nursing care in special needs shelters to testing tremendous numbers of laboratory samples, public health emergencies require an extraordinarily large number of personnel. Volunteers are essential to supplement the available health agency staff. All states are required by the ASPR cooperative agreement to have an Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP) by 2009. State health agencies use these systems to register health and medical professionals who are willing to volunteer during emergencies and to verify the identity, credentials and qualifications of volunteers during an emergency. As of early 2008, 92 percent of states had a functioning system to register volunteers.¹⁵ State health agencies also work with their local partners to integrate community-level Medical Reserve Corps (MRC) members into their ESAR-VHP systems. This integration allows volunteers who are identified and trained through their local MRC unit to have their credentials verified by ESAR-VHP in the event of an emergency.

The state-based HERDS system was also widely used at the county level. The Erie County Department of Health detected an elevated number of carbon monoxide exposures using HERDS. The Erie County Department of Health worked with the media to publicize a carbon monoxide fact sheet. It also distributed 2,000 Generator Warning Notice flyers at gasoline purchasing sources and hung 200 of these notices in poster form at gas pumps. Using HERDS data, the Erie County Department of Health was able to prioritize communities for carbon monoxide detector distribution. The Erie County Department of Health distributed 2,277 carbon monoxide detectors in eleven municipalities through town emergency operations centers, the Buffalo Fire Department and other volunteer fire departments, and county legislator district offices.

By working together at the state and local level, carbon monoxide poisonings were prevented, injuries were reduced, and foodborne diseases were curtailed. Situational awareness of local needs and statewide resources was maintained, enabling the New York State Department of Health to supplement local assets as needed. These state and local health agency activities saved lives.

No Holiday from Disease in Rhode Island

When five children in the community were diagnosed with severe neurological illnesses, the Rhode Island Department of Health stopped a disease cluster in its tracks by activating its mass dispensing plan to provide drugs to more than one thousand people, launching an extensive risk communication effort, and closing schools to encourage social distancing.

In December 2006, the Rhode Island Department of Health learned of five school-aged children with a severe neurological illness. One of the children died. Further investigation revealed an unusual number of pneumonia-like illnesses in the adjacent municipalities, potentially caused by *Mycoplasma pneumoniae* infection. In this setting, with an unexpectedly high number of cases of pneumonia and in the absence of any other identifiable agent, it was suspected that the severe neurological illness may have been related to the suspected cluster of *Mycoplasma pneumoniae*.

Mycoplasma infection presents symptoms such as fever, cough, headache, sore throat and bronchitis. It often results in a mild form of pneumonia. During a contagious period of less than ten days, *Mycoplasma* is spread through close contact with an infected person or droplets from his or her nose or throat. The Rhode Island Department of Health contacted the CDC for assistance with the disease cluster on December 22, 2006. CDC laboratory testing confirmed the first positive results for *Mycoplasma pneumoniae* on December 29. *Mycoplasma* infection clusters are rare and there was an unusually large number of severe cases in a single school. As a precaution, the Rhode Island Department of Health offered antibiotics to all 275 students, 40 staff members and their families between December 31, 2006 and January 2, 2007. In total, 1,183 people received medication.

Operating within ICS, state health agency staff used the mass prophylaxis training they had received as part of their Strategic National Stockpile planning to dispense medication over the holiday weekend. One hundred percent of the affected population was accounted for and many participated in voluntary blood testing. State health officials and CDC personnel reviewed medical records from the school clinic and interviewed students and staff. Health officials, including the state health director, also held information sessions with parents to address their concerns and set up a telephone hotline and Web site for those seeking additional information. The school was closed until January 8, 2007 so that five-day antibiotic treatment courses could be completed before students and staff returned to school.



David Gifford, MD, MPH
Director, Rhode Island
Department of Health

"Overall, the effort was a great example of an effective partnership and collaboration between the state, CDC, EMA, Department of Education and the towns. If it weren't for the emergency preparedness funds that CDC has provided us and training all of our staff have received in ICS (which we utilized extensively during this episode), I don't believe we could have accomplished everything we did over a holiday weekend. ... In addition, the planning and training that we had for Pandemic flu was also instrumental in the success of this overall effort."¹⁶

Health officials also investigated reports of higher than normal absenteeism in other schools in the area. On January 4, 2007, the Rhode Island Department of Health recommended the closure of three school districts, impacting 20,000 students and their families. This was a precautionary measure to control disease and give the state health agency and the CDC time to further investigate potential cases. The CDC is using this incident to study the social and economic effects of school closures as part of a community containment strategy in the event of an influenza pandemic.

The *Mycoplasma* cluster impacted public health activities statewide. The Rhode Island Department of Health Director David Gifford issued a joint policy on hand sanitization with the commissioner of the Rhode Island Department of Elementary and Secondary Education. On January 5, 2007, the governor issued an executive order mandating the placement of alcohol-based hand gel stations in all Rhode Island school classrooms. The Rhode Island Department of Health worked with the state's emergency management agency to deliver alcohol-based hand gels over the next several days. Throughout the crisis, the state health agency engaged in extensive risk communication with the public. The Rhode Island Department of Health's success in containing this outbreak was, in part, due to the investments the Department made in its Medical Emergency Distribution plan, risk communication strategy, and ICS training of all staff as part of its all-hazards approach to emergencies.

State and territorial health agencies have been extensively engaged in planning efforts for a potential influenza pandemic. Disease experts have become increasingly concerned in recent years that a strain of deadly avian influenza, H5N1, that is widespread among the bird population in many areas of the world could mutate into a strain of influenza that could spread among humans. As of June 19, 2008, 385 humans have become infected with H5N1 influenza through direct contact with birds and 243 of them have died.¹⁷ Due to concerns about a potential pandemic, the federal government provided \$575 million to state and territorial health agencies in fiscal years 2005 to 2007 to support planning efforts. All states have initial CDC-reviewed pandemic influenza plans and have exercised them. All states also have antiviral distribution plans. In addition to the federal funding, state and territorial health agencies spent nearly \$300 million in state and other funds by September 2007 to purchase antiviral medication.¹⁸ As of June 27, 2008, state and territorial health agencies purchased more than 22 million antiviral treatment courses.¹⁹ Additionally, ASTHO is currently leading an exhaustive effort to develop guidance (http://www.astho.org/index.php?template=at_risk_population_project.html) for state, territorial, tribal, and local health officials on how to protect at-risk populations during an influenza pandemic. No additional federal funding has been identified to support state health agency pandemic influenza preparedness activities since federal fiscal year 2007.

Saving Lives Through Fast Response to the Virginia Tech Shooting

When a gunman killed 32 and injured 27 others at a university, the regional hospital and public health coordination systems established by the Virginia Department of Health enabled the rapid transport and care of victims and the swift deployment of state public health and medical resources.

State health agencies and the health system must often surge to deal with mass casualty incidents. Even on a normal day, many hospitals work at their maximum capacity and EMS crews are frequently diverted to alternate hospitals based on available beds and hospital personnel. State health agencies have used federal cooperative agreement funds to develop tools to help manage the health system response to emergencies and to provide resources to hospitals to improve their response capacity.

The Virginia Department of Health immediately responded when a gunman killed 32 and injured 27 others at Virginia Polytechnic Institute and State University (Virginia Tech) on April 16, 2007. Using ASPR cooperative agreement funds, the state health agency had previously set up Regional Healthcare Coordinating Centers in each of the state's six hospital regions. ASPR funds also support yearly upgrades to the WebEOC system installed in hospitals throughout Virginia, hospital staff training, purchase of redundant communications, and sustainment of the Regional Healthcare Coordinating Centers. Virginia was the first state in the country to link all of its hospitals and create a system to share competitive data to track hospital bed availability.²⁰

As of December 31, 2007, 96 percent of states have a system like Virginia's in place to communicate with hospitals in order to make real-time bed capacity assessments. In 2002, only 36 percent had a system to communicate with hospitals.²²

Using the statewide healthcare facility emergency preparedness and incident management system (WebEOC), the Virginia Department of Health, hospitals, and emergency management partners checked the diversion status of hospitals following the shooting and monitored and responded to resource needs of the affected hospitals. All of the injured victims were transported from the Virginia Tech campus within one hour of the mass shooting in Norris Hall. According to the report of the Virginia Tech Review Panel submitted to the governor, "the overall EMS response was excellent and the lives of many were saved".²¹

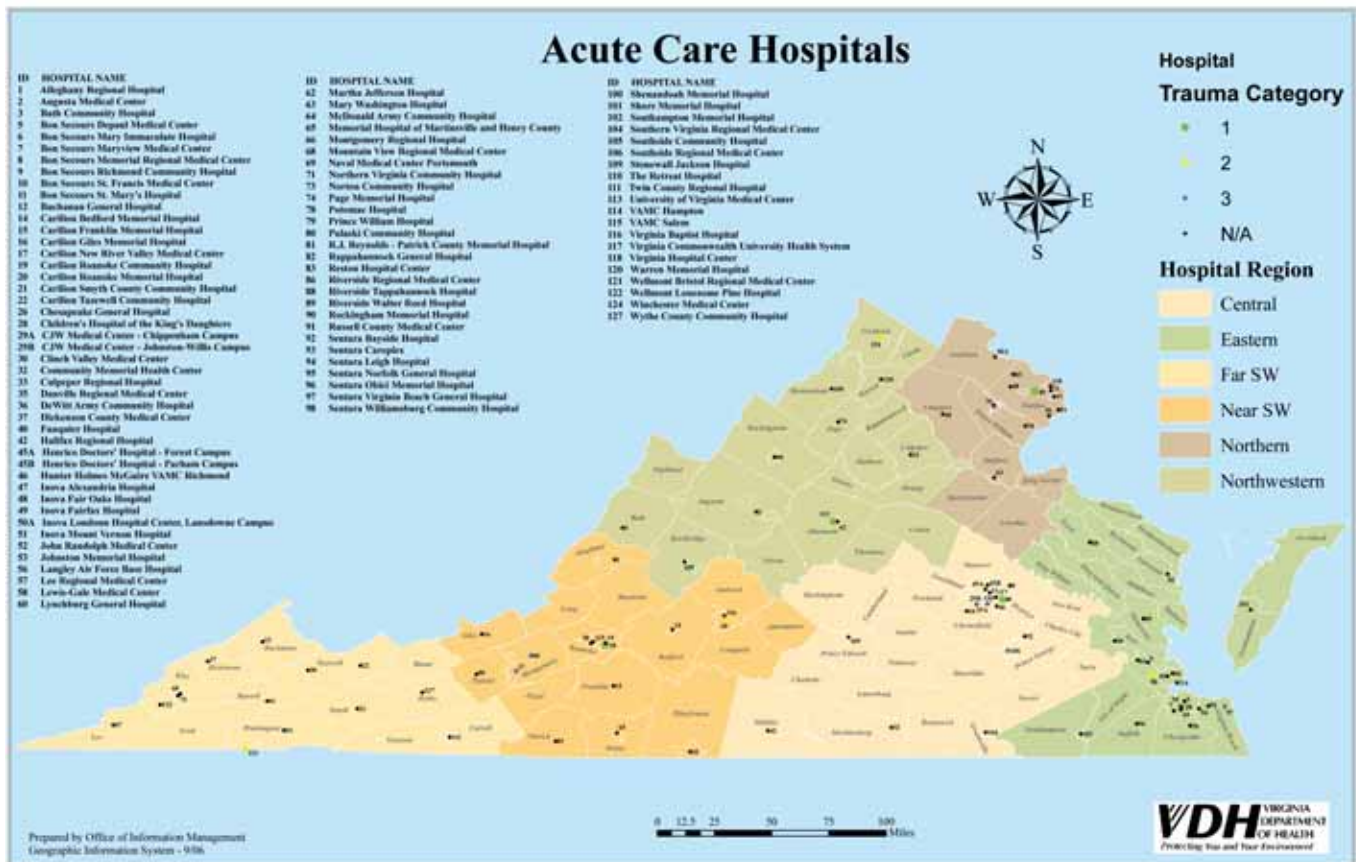


Figure 2. Map of the Virginia Department of Health's Regional Hospital System and Locations of Acute Care Hospitals Statewide. Courtesy of the Virginia Department of Health.

Using CDC cooperative agreement funds, the Virginia Department of Health also established five regional response teams as part of its statewide public health preparedness system. To assist the Southwest Regional team already in place in the Blacksburg area following the shooting, the Virginia Department of Health deployed three public information officers, a planner and a team of forensic scientists under the direction of the Chief Medical Examiner.

One of the unique circumstances of an event involving a deliberate act of violence is the need to coordinate with law enforcement to preserve evidence. As part of a medical-legal death investigation, each fatality required a careful autopsy, including retrieval of evidence such as bullets. Working with the Virginia State Police and the Fingerprints Division of the Department of Forensic Science, the state health agency's medical examiner team identified all of the victims and returned them to their families by April 19.

The Virginia Department of Health also provided risk communications to the public, supported family services established by the university, monitored behavioral health needs of the community and first responders, and kept federal and international entities informed. The regional public health and hospital systems set up by the Virginia Department of Health had a major impact in

the response to the Virginia Tech shooting. Although Blacksburg is located in a rural area, resources were immediately available in the southwestern region of the state to augment local resources as needed. Resources from the other five hospital regions were also available and could have been rapidly deployed as coordinated by the Virginia Department of Health through the Regional Healthcare Coordinating Centers. Despite challenges such as being 42 miles from the closest level one trauma center and being unable to transport patients by air due to strong wind conditions, all of those who survived being shot at Norris Hall also survived their hospital stays. This tragic incident is a reminder of the importance of coordinated, statewide public health and hospital preparedness systems for rapid responses to mass casualty incidents.

Blown Away: The Struggle to Recover from a Catastrophic Tornado

When a tornado killed 11 residents and destroyed the town of Greensburg, the Kansas Department of Health and Environment helped make the town livable again by assuring access to health and medical services, restoring personal forms of identity, and protecting residents and recovery workers from environmental and safety hazards.

For months after an EF5 tornado with winds greater than 200 miles per hour devastated the town of Greensburg, the Kansas Department of Health and Environment worked to protect the health and safety of Greensburg's residents and the recovery workers. Staff from all across the Department played a role in the response to and recovery from the May 4, 2007 tornado, which caused 11 deaths and \$268 million in damages.

The Greensburg tornado was one of four incidents in 2007 requiring the Kansas Department of Health and Environment to take on its ESF-8 lead response role. The Department's Center for Public Health Preparedness coordinated the public health and medical response each time. Staff from the Center was assigned to the EOC set up by the Kansas Division of Emergency Management. They also provided just-in-time training and coordinated public health and medical activities across the Division of Health while working with the Division of Environment to address environmental health issues. The Center for Public Health Preparedness was instrumental in helping to secure medical supplies, personal protective equipment and sanitation equipment for some of the response and recovery workers.

The tornado destroyed the Kiowa County Hospital. The Kansas National Guard deployed its mobile hospital facility, the Expeditionary Medical Support System (EMEDS), to Greensburg. As a state regulatory agency, the Department's Bureau of Child Care and Health Facilities assigned Kiowa County Hospital's license to EMEDS and worked with the federal Centers for Medicare and Medicaid Services (CMS) to enable EMEDS to provide Medicare services. This action assured that emergency medical care was available in the community during the recovery effort.

Devastating disasters are not the only reasons that state health agencies deploy mobile hospitals like the one used by the Kansas National Guard in Greensburg. They can also be effective in protecting public health during unusual circumstances or temporary disruptions of health facility operations. This was the case in New Haven, Connecticut on November 28, 2007. A malfunctioning boiler at the West Rock Health Care Center, a 90-bed nursing home, resulted in a complete failure of the heating system. The Connecticut Department of Health quickly responded by deploying assets from the 100-bed mobile hospital it purchased with state funds in 2005. ASPR cooperative agreement funds support the staff who oversee operations of the Otilie W. Lundgren Memorial Mobile Field Hospital, named for one of the victims of the 2001 anthrax attack. Two portable heating units and supporting generator capacity from the Otilie W. Lundgren Memorial Mobile Field Hospital's equipment cache kept the nursing home warm until the boiler was repaired. These mobile hospital assets enabled the nursing home to remain open rather than attempting an evacuation of the facility, always a risky prospect for nursing homes. As described by Governor Jodi Rell, "State public health officials quickly deployed assets from the mobile hospital to ensure the safety of residents at West Rock. Once again, use of the state's mobile hospital shows how it is a key asset to our level of preparedness and the ability to quickly respond to health emergencies anywhere in the state."²³

One of the immediate needs of Greensburg residents was met by the Department's Center for Health and Environmental Statistics. The tornado destroyed approximately 95 percent of the town, including personal records such as birth and marriage certificates that people need to prove their identities. Set up at the Disaster Recovery Center, Kansas Department of Health and Environment staff assisted Greensburg residents in filling out simple application forms that were printed and faxed to the Department's headquarters for overnight processing. The Kansas Department of Health and Environment reissued 355 birth and marriage certificates for Greensburg residents.

Also, the Department's Food Safety Program inspected vendors which fed the recovery and clean-up crews. Because there was a complete loss of electricity to the town, staff oversaw the voluntary destruction of all perishable items in food service and lodging establishments. They also worked with the Kansas Department of Agriculture to oversee the destruction of over-the counter drugs in retail establishments. Tetanus is a well-documented health risk in disaster recovery areas due to the amount of debris left laying around, including nails and other construction materials. The Department's Bureau of Disease Control and Prevention spent 140 hours distributing vaccines to protect workers from threats,

such as tetanus, and assisting residents in obtaining their immunization records through the Kansas Immunization Registry. In the month following the tornado, about 2,300 vaccinations were administered and entered in the Registry. The WIC Program provided counseling and replaced food vouchers for 67 clients, ensuring that the nutritional needs of these pregnant and new mothers and their young children were met.

The environmental component of the Kansas Department of Health and Environment also played a major role. Staff from the Bureau of Air and Radiation inspected commercial and public buildings for asbestos. Asbestos can cause serious lung diseases if airborne particles from damaged buildings are inhaled. Bureau of Air and Radiation staff labeled potential hazards with red tape to indicate the presence of asbestos. This triggered clean-up crews to use special precautions when removing debris within the marked boundaries. The Department's Bureau of Environmental Field Services supervised the removal of debris and made determinations about what could be burned as a means of disposal. In the two months following the tornado's touchdown, 25 of the Bureau's staff monitored the removal of tons of debris from the town. Other Kansas Department of Health and Environment bureaus dealt with remediation of various spills and water restoration.



Destruction Caused by Tornado in Greensburg, Kansas. Photo Courtesy of Kansas Department of Health and Environment.

While the Kansas Department of Health and Environment would have had the same responsibilities if the Greensburg tornado had occurred ten years earlier, what changed in 2007 was the way the Department was able to respond. Health agency staff trained in ICS were able to integrate into the emergency response structure alongside other responders such as police and firefighters who have been using ICS for years. The ICS training supported by preparedness funding gave health agency staff a clear picture of where they stood within the command structure and helped them better understand their roles, leading to better performance.

From a Bridge Collapse to Widespread Flooding – Helping Families Cope

When flooding impacted 3,500 homes just days after an interstate bridge collapse killed 13 and injured nearly 100, the Minnesota Department of Health activated its regional response plan and mobilized behavioral health volunteers to assist victims, their families and first responders.

In a world increasingly dependent upon technology for everyday life, an engineering flaw can be as destructive as a natural disaster. From the catastrophic failure of levees in New Orleans to the potentially crippling effect of routine power outages on healthcare facilities, state and local health agencies act to minimize the impact of technological disasters on lives and health.

The Minnesota Department of Health activated its regional response plan following the August 1, 2007 interstate bridge collapse that killed 13 and injured nearly 100. The Minnesota Department of Health used its Health Alert Network to notify agency staff, local health departments, hospitals and emergency management partners of the bridge collapse, inform recipients to be ready to respond, and provide updates throughout the response.

The Minnesota Department of Health, hospitals and EMS used the Minnesota System for Tracking Resources (MNTrac), a decision-making tool implemented with ASPR cooperative agreement funds, to monitor ambulance runs, status of patients, and coordination of patient care transport and emergency room/trauma care. Based on information provided through MNTrac and the Health Alert Network, area hospitals activated their response plans and were able to handle all of the bridge collapse victims. In less than two hours, 80 patients were transported to 20 Minneapolis-area hospitals.²⁴ The After Action Report discussions highlighted the need to develop a patient tracking module to assist responders in knowing where patients are transported and support family reunification. Fortunately, the Minnesota Department of Health had already begun developing this feature. Based on the experience of the bridge collapse and new interest among emergency response partners, the state health agency accelerated its launch of the system and associated training. The new system was piloted at the Minnesota State Fair in late August 2007 and is being incorporated into the MNTrac system as a new application.

Just days after the bridge collapse, the Minnesota Department of Health had to deal with a second disaster – flooding in six southeastern counties that affected or destroyed approximately 3,500 homes. Many of the same health agency assets were used in response to both disasters. The Workspace, a secure document sharing system that supports the Health Alert Network, was used to keep the

entire state informed of the status of the situation in the affected counties and what public health and healthcare system needs existed. Environmental health staff worked with partner agencies to assess potential health risks associated with both incidents. Communications staff launched Web sites to provide the public with information to prevent injuries and illnesses.

One of the primary assets used in both incidents was Minnesota Responds, the Minnesota Department of Health's version of an Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP). After the bridge collapse, the health agency used Minnesota Responds to identify and verify the credentials of behavioral health volunteers and provided that information to the City of Minneapolis and the family assistance center. These volunteers were called upon to assist the victims, their families and first responders in the immediate aftermath and the weeks that followed.

During the flood response, Minnesota Responds was activated again. Six member strike teams composed of Minnesota Responds volunteers and staff from local public health agencies, county human services agencies and community health centers deployed to the affected counties to provide behavioral health support. Working 12 hour shifts, 38 behavioral health strike teams were on the ground for two weeks. Team members provided door-to-door health and welfare checks, met with survivors, attended community meetings, and assisted victims in requesting disaster assistance. Approximately 500 residents received acute emotional support services from the teams. The importance of this work is exemplified by the situation of a ten-year-old boy who lost his home in the flooding. The behavioral health volunteers visited him and learned he was very anxious because he did not know what happened to his two friends whose homes were also destroyed. The behavioral health volunteer team helped him locate his friends, who also evacuated their homes safely. The boy was able to rejoin his family and support their recovery efforts.

The regional preparedness infrastructure created by the Minnesota Department of Health was very effective in the response to these incidents. The behavioral health strike teams were activated based on a request under a regional 11-county All-Hazard Behavioral Health Memorandum of Understanding. This and other regional planning efforts helped to reduce confusion, improve communications, and enable the deployment of additional personnel to hard-hit regions.

Follow-up discussions on the successes and challenges of response have highlighted the need for rapid and easy-to-understand information for victims of disasters, clarity about communication and decisions, more information about resources and responsible agencies, and more training and exercises. A particularly important lesson was that responses to smaller incidents should be consistent with responses

to larger incidents so skills are more practiced and responses more predictable. The Minnesota Department of Health is incorporating these lessons learned in ongoing planning and training efforts to improve future responses.

Flooded with Problems But Still Able to Respond

When flooding hit nine counties, the Ohio Department of Health maintained statewide situational awareness to support local public health agency response efforts and test new surveillance systems.

As in other states, the Ohio Department of Health works with local health departments on preparedness planning and supports their efforts through federal cooperative agreement funding from CDC and ASPR. This collaborative effort was effectively tested during flooding in nine Ohio counties in August 2007. The flooding also tested other capabilities that have been developed in recent years to improve statewide preparedness.

In Allen County, the local health department used its upgraded communications equipment to share information with state and local officials about flood damage and the needs of the community. Cell phones and radios purchased to ensure redundant communications were used by staff in the field assessing community needs. Public information staff, who had been trained with funding from the CDC cooperative agreement, worked with the media to get consistent health information to the public about building clean-up, mold prevention, and the appropriateness of tetanus and other vaccines. Mass dispensing plans developed as part of Strategic National Stockpile preparations were used to rapidly set up a tetanus vaccine clinic using volunteers from the Medical Reserve Corps. Mutual aid agreements established with other local health departments enabled a more efficient response to calls for assistance. All of these tools enabled the Allen County Combined Health District to maximize its personnel and other resources and to effectively determine resource gaps to be filled by the Ohio Department of Health and other local health departments.

The flood also tested the Ohio Department of Health's Real-time Outbreak and Disease Surveillance (RODS) System. RODS is a system used in several states and provides for real-time analysis of emergency department chief complaint data and over-the-counter drug sales information. The system is used by more than 300 health department and hospital personnel to detect and track health events such as bioterrorism, outbreaks, influenza, and seasonal illness. Currently, more than 85 percent of Ohio's emergency department visits and approximately 70 percent of over-the-counter drug sales are captured and analyzed by the system.

Using chief complaint data from the RODS system, the Ohio Department of Health's Early Event Surveillance Unit's analysis found a statistically significant five-fold increase in chief complaints related to insect bites in the flooded region two weeks after the flooding began. This is the same as the approximate amount of time it takes for a mosquito to reach maturity. Public health officials have long known that many diseases, such as West Nile virus, are spread among the human population by mosquito bites. They also know that standing pools of water, which are common following floods, are major breeding sites for mosquitoes and other insects. Data like that collected by RODS, in combination with mosquito borne disease surveillance data, are very useful to the Ohio Department of Health in assessing disease risk following flooding and in requesting federal assistance. It also reinforces the need to educate the public about the risk of disease and the need for personal protective measures after a flood in order to reduce the risk of vector-borne illness outbreaks.

The flood response serves as a good example of the varying roles of state and local health agencies and why statewide preparedness planning is important. The Ohio Department of Health distributes a significant portion of its federal preparedness funds to local health agencies and, importantly, holds the local agencies accountable to planning priorities. As a result, local health agencies immediately have the skills and assets to respond to incidents and know when to request assistance from the state health agency. Federal preparedness funds not distributed at the local level are used to implement statewide plans and assets such as RODS. The state health agency can maintain situational awareness during incidents and target resources to areas of need to supplement local efforts.

Learning Lessons, Saving Lives

When an RSV outbreak struck 53 infants in less than two months and heavily stressed the state's health system, the Alaska Department of Health and Social Services acted on lessons learned and implemented new techniques to limit the impact of future pediatric outbreaks.

Preparedness is a process, not an end state, and lessons learned from each emergency inform continued planning efforts. The Alaska Department of Health and Social Services followed this principle during a series of disease outbreaks among young children over the last year and a half. Based on an After Action Review of a 2007 Respiratory Syncytial Virus (RSV) outbreak, the Alaska Department of Health and Social Services implemented corrective actions that improved responses to subsequent RSV and enterovirus outbreaks.

Anchorage hospitals were stretched to the limit during the RSV outbreak in early 2007. RSV is a common cause of respiratory infection in infants and children. However, one hospital in rural Barrow, Alaska had three times more RSV cases in one month than it typically sees in a year. Between late January and the end of March 2007, 53 infants and young children were diagnosed at the small, ten-bed hospital in Barrow. The hospital went through nine months of supplies in six weeks. Due to the severity of the cases, 28 children had to be transported to Anchorage hospitals, more than 700 miles away by air, for intensive care and 19 required mechanical ventilation. Six other Alaskan communities also transported sick children to Anchorage.

The situation was challenging. Only two hospitals in Anchorage have pediatric critical care beds and they were beyond their combined total capacity of 16 beds. Older children were moved to ventilators meant for adult patients. Every pediatric intensive care bed in Alaska was in use during the outbreak.

Although state health agencies have developed robust capacities to respond to any threat, they remain committed to the fundamental public health principle of prevention. Rapidly identifying infectious diseases and implementing control measures saves lives and money. In 2005, one unvaccinated individual in Indiana caused a measles outbreak among 34 patients. Containment of this outbreak cost \$167,685.²⁵ Staff from the Indiana Department of Health, Illinois Department of Health and nine county health departments spent 3,650 hours, made 4,800 telephone calls, drove 5,500 miles and tested 550 laboratory specimens to contain the measles outbreak.²⁶ In 2006, an outbreak of 2,000 mumps cases in Iowa is estimated to have cost more than a million dollars to the public health system alone. The costs in school absenteeism, public anxiety and healthcare services were far greater. In a perfect world, disease outbreaks like these as well as foodborne outbreaks, like salmonella and E. coli, would not happen. Public health agencies continuously promote activities such as immunizations and safe food handling practices to prevent outbreaks from happening. When they do happen, state health agencies use core public health activities such as contact tracing in combination with modern response capacities such as the Health Alert Network and sophisticated laboratory analysis to contain the threat as soon as possible and limit the number of individuals who become ill.

RSV is not a reportable condition in Alaska and the state health agency did not become aware of the potential problem until late February when the outbreak was well underway. The Alaska Department of Health and Social Services activated its EOC to support the hospitals in Barrow and Anchorage. The state health agency led a series of interagency teleconferences throughout the duration of the outbreak to share information and identify needs and resources. Working with the hospitals, emergency management officials and the Alaska Native Tribal Health Consortium, the Alaska Department of Health and Social Services deployed medical staff with technical clinical expertise and supplies to Barrow and monitored the needs of the Anchorage hospitals. The state health agency also kept its federal Region X partners as well as its fellow state and provincial members of the Pacific Northwest Emergency Management Agreement (PNEMA) informed of the situation. If any additional children became

ill, the Alaska Department of Health and Social Services was prepared to request mutual aid from other states through PNEMA to obtain additional healthcare workers, particularly respiratory therapists.

The state health agency developed fact sheets and posters with information about RSV and distributed them to local public health centers, EMS providers and tribal entities. It used the Alaska Health Alert Network to send information to health care providers throughout the state. The Alaska Department of Health and Social Services also began enhanced hospital surveillance of RSV to identify potential problems in other communities. While no public health emergency was declared during the outbreak, the Alaskan health system surged to meet the need.

The lessons learned during the RSV outbreak were not forgotten during an outbreak of enterovirus in September 2007 or during the 2007-2008 RSV season. Rather than waiting until they were overwhelmed, hospital staff in Kotzebue notified the Alaska Department of Health and Social Services when four infants were admitted in a single week with an unknown illness that turned out to be enterovirus. The state health agency began monitoring the situation and sent epidemiologists to the region as the number of enterovirus cases increased. By mid-September, nearly a third of the 31 infants born since July 1, 2007 in the region became ill. Alaska Department of Health and Social Services staff distributed handwashing and respiratory hygiene posters to hospitals, monitored cases and laboratory results, consulted with CDC officials about similar disease clusters, and participated in an interview with local media about the public health response. The state health agency and healthcare community were similarly prepared when the RSV season intensified in February 2008. The Alaska Department of Health and Social Services maintained situational awareness as the number of RSV cases grew and kept the healthcare community and other partners informed of the situation. These actions prevented the health system from being stressed to the extent it had been the previous year.

As in Alaska, health agencies across the country have trained their staff in ICS, enhanced collaborative relationships with their partners, and instituted processes for completing After Action Reviews and corrective action plans. As a result, a culture of continuous quality improvement exists. Health agencies take a systematic approach to responding at the first hint that a circumstance might be problematic. This enables health agencies to handle things while they are still manageable, rather than reaching a crisis point requiring a more resource-intensive response.



Figure 3. Educational Poster Distributed by the Alaska Department of Health and Social Services to Public Health and Healthcare Providers throughout the State.

Fighting Fire with Shelter

When wildfires killed 10 and injured 139 others, the California Department of Public Health deployed resources, staffed shelters, and communicated environmental concerns to protect the public and responders from further harm.

Twenty-three wildfires struck southern California in October and November 2007. The wildfires caused ten deaths and 139 injuries, and forced the evacuation of 321,500 residents. This represents the largest evacuation in California's history. While 2007 was a more severe wildfire season than usual in many parts of the country, the scale of the fires in California and the size of the population impacted made them particularly challenging from a public health perspective.



2007 California Wildfires. Courtesy of California Department of Public Health.



View of Evacuees Outside Qualcomm Stadium. Courtesy of California Department of Public Health.



View of California Wildfires on October 24, 2007. Courtesy of NASA.

The California Department of Public Health responded to the wildfires immediately. It deployed 2,000 alternate care site beds from its cache to Qualcomm Stadium to support the primary shelter set up for evacuated residents. These beds are part of a 7,000-bed cache purchased through a state appropriation in 2006 to support preparations for pandemic influenza. Health agency staff, including Director Mark Horton, was at Qualcomm Stadium to ensure the shelter operated smoothly and that medical needs were adequately met. Disaster Medical Assistance Teams (DMATs) from New Mexico and Washington as well as a state-operated version (CALMAT) provided medical surge personnel to treat victims.

At the same time, the California Department of Public Health coordinated evacuations from threatened healthcare facilities, including 23 nursing homes, two acute care facilities and a psychiatric hospital. Due to the fast moving fires that changed direction without warning, some healthcare facilities had to be evacuated in an hour. Approximately 1,600 patients were moved from long term care facilities and hospitals, in some cases at the rate of one patient every 90 seconds. These evacuations succeeded in moving all patients safely to other facilities or temporary shelters along with their medical records and medications. Special medical needs individuals were evacuated to Qualcomm Stadium. In addition to being the governor's eyes and ears at Qualcomm, Director Horton accompanied the governor on his visits to Qualcomm Stadium, affected neighborhoods and the firefighter base.

Throughout the response, the California Department of Public Health provided critical information to local health agencies and providers through its Health Alert Network. The agency also provided information and health recommendations to the public and first responders. Many of these messages

were focused on air quality and were formed in coordination with the California Division of Occupational Safety and Health and the California Environmental Protection Agency.

When the fires were contained and people returned to their homes and businesses, the California Department of Public Health and local health agencies evaluated drinking water systems potentially contaminated by the wildfires. The state coordinated with local health agencies to issue “boil water notices” when needed.

Many of the state health agency assets used during the wildfires response did not exist prior to recent state and federal investments in preparedness. NIMS training required by the CDC and ASPR cooperative agreements allowed trained health agency staff to coordinate medical care and transportation more easily while participating in the Joint Operations Center. The governor and state legislature’s concerns about pandemic influenza led to the purchase of the alternate care site bed cache. All of these federal and state investments in public health and health system preparedness improve California’s readiness to respond to the multitude of natural disasters that threaten the state.



Mark Horton, MD, MSPH
Director, California
Department of Public Health

“Another lesson learned from the wildfires - and perhaps the biggest - is the importance of state and local officials working together in a coordinated fashion. This cannot be overstated: In the aftermath of a disaster, when events are unfolding rapidly, collaboration is key.”²⁷

The Health Alert Network (HAN) is a nationwide communications system for sharing information about public health threats. Every state health agency participates in the network and receives CDC cooperative agreement funds to support its statewide HAN. These state HANs link state and local health agencies, hospitals, healthcare providers, laboratories, emergency management agencies, and other critical response partners. State health agencies use their HANs to rapidly notify partners of urgent health threats, post information on secure Web sites, enable the sharing of information among partners, and deliver distance learning opportunities to support preparedness workforce development.

Water, Water Everywhere and Not a Drop to Drink

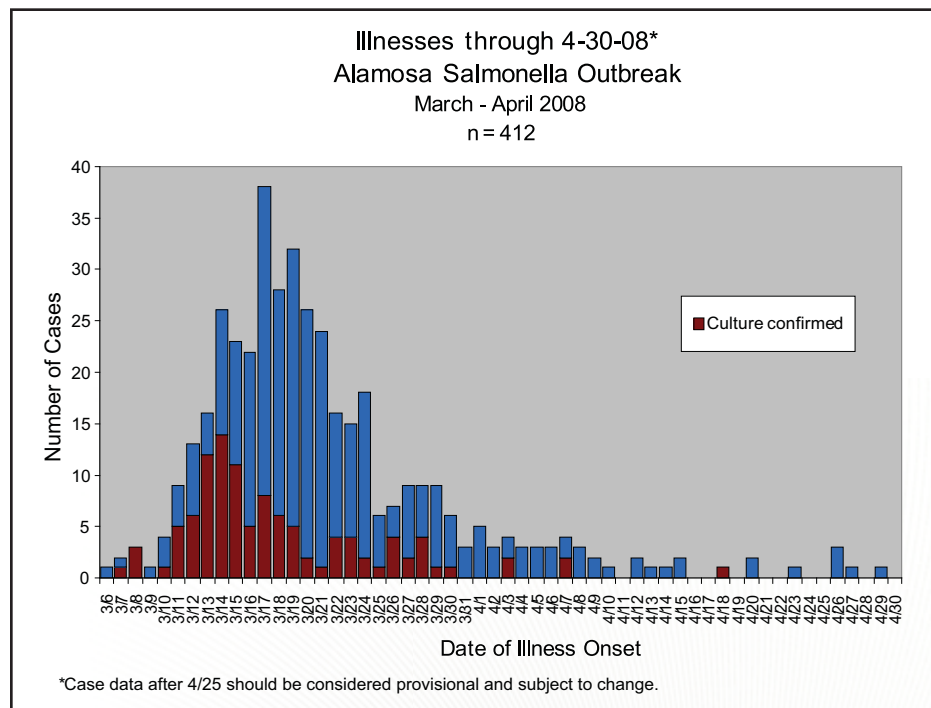
When the water distribution system for the city of Alamosa became contaminated with salmonella, sickening more than 400 people, the Colorado Department of Public Health and Environment used all its resources to identify the problem, provide extensive risk communications to the public, work with partners to implement a solution, and restore safe drinking water to homes and businesses.

The Colorado Department of Public Health and Environment faced the toughest test of its preparedness yet during a salmonella outbreak in Alamosa. A tight-knit, agricultural community, Alamosa is the largest city in the San Luis Valley,

located in southern Colorado about four hours from Denver. The area is rural and isolated, and has a high percentage of Spanish-speaking residents. Personnel, training and strengthened partnerships made possible through federal public health preparedness funding greatly aided the response to the outbreak.

The first case of salmonella was reported in Alamosa on March 6, 2008. The potential outbreak was reported to the Colorado Department of Public Health and Environment on March 14 after several other people required treatment. Through case interviews, epidemiologists discovered that breastfed infants were not getting sick, while those fed formula mixed with tap water were. This was the first clue that water caused the outbreak. Laboratory samples collected from individuals, from water in homes and from businesses confirmed that the same strain of salmonella was present in all. Further investigation determined that the aquifer supplying the drinking water was not contaminated. Epidemiologists and water experts had to conclude that the source of the salmonella was somewhere in the water distribution system. At the time of this writing, investigation is ongoing to determine the specific source of the salmonella contamination in the drinking water system.

Figure 4. Epidemic Curve of Salmonella Cases in Alamosa, Colorado Between March 6 and April 30, 2008. Courtesy of Colorado Department of Public Health and Environment.



On March 17, Alamosa County established its EOC and the Colorado Department of Public Health and Environment notified federal partners of the outbreak. Based on the epidemiological investigation and preliminary water testing, the Colorado Department of Public Health and Environment issued a bottled water order on March 19 and advised residents not to use their tap water. The health agency also activated its public information hotline and issued

a mutual aid request for water experts. The Colorado Department of Public Health and Environment, which had recently partnered with Wal-Mart and Sam's Club to promote home preparedness, applied its experience with the private sector to request donations of bottled water for the affected area. Colorado vendors responded wholeheartedly with huge shipments of water en route to Alamosa within two hours.

Alamosa jointly declared a city/county emergency and, two days later, the governor declared a state disaster. The governor was an active participant in the response, from the declaration, to his quick trip to the community to help distribute bottled water and his Easter morning visit with state health agency responders. By March 24, laboratory testing confirmed that water was the source of the salmonella outbreak. The state requested environmental, epidemiological, risk communication and water quality assistance from HHS. The first press conference was held in Alamosa and response partners developed a color-coded three-stage process for water system flushing. Dozens of local, state, federal and private partners operated under ICS.

Communication with the public is essential to an effective response to any public health emergency. However, this communication is most effective when a trusting relationship has already been established between a health agency and the public. The Colorado Department of Public Health and Environment has embedded this principle in the work it does year-round. Over the last year, the Colorado Department of Public Health and Environment expanded its risk communication activities to keep pace with twenty-first century technology. The agency maintains a library of success stories on its Web page illustrating the various public health preparedness activities occurring across the state. In 2007, they launched a public awareness campaign, "What If Colorado?" The highlight of the campaign was a reality competition in which Colorado residents submitted videos on YouTube describing how they were prepared. More than 2,500 votes were cast to choose nine contestants from among the video submissions. The winners lived together for three days in September while completing a variety of preparedness challenges. Building on the publicity from that event, the Colorado Department of Public Health and Environment partnered with Wal-Mart in March 2008 to raise awareness about assembling family preparedness kits. Another innovative communication tool used by the state health agency is its blog, Be Ready Be Healthy Be Informed, which launched in December 2007. All of these activities raise awareness among the public of what health agencies do and the need to prepare today for what could happen tomorrow.

Multiple divisions across the Colorado Department of Public Health and Environment played a role in the response. Using CDC cooperative agreement funds, the state health agency had placed regional epidemiologists in each of the state's nine all-hazards regions. These regional epidemiologists and others from the state's Disease Control and Environmental Epidemiology Division conducted case interviews and phone surveys to identify the source of the outbreak. They also tracked cases and hospitalizations. This incident was the first time that epidemiologists from all of the regions came together to support a response.

The state public health laboratory conducted sampling for salmonella, total coliform and heavy metals. This was the first time the laboratory had to conduct testing for human and environmental outbreaks at the same time. The experience gained from this outbreak also enabled the Laboratory Services Division to identify a gap in its system to test for food- and waterborne parasites.



Water Fountain in Alamosa, Colorado. Courtesy of Colorado Department of Public Health and Environment.

The Water Quality Control Division coordinated with the city to develop and implement a plan to flush the city municipal water system and conducted water sampling for bacteria and heavy metals before, during and after the system flushing. The division also provided guidance for water use during each stage of the system flush. The Colorado Department of Public Health and Environment is one of 47 members of CoWARN, the Colorado Water/Wastewater Agency Response Network. Within two hours of a request for assistance from the state health agency, three CoWARN water and wastewater utilities were ready to send personnel, equipment, water containers and a tanker truck to Alamosa. The state health agency continued to work with CoWARN throughout the crisis as CoWARN members throughout Colorado and from Nebraska provided mutual aid to Alamosa.

One of the greatest challenges during the outbreak was public communications. The municipal water system was disinfected with chlorine in a three-stage, color-coded process. During Stage One – Red – residents were not allowed to use water for anything other than flushing toilets. During Stage Two – Yellow – residents could not consume water, but they could use it to wash laundry and take quick showers. During Stage Three – Green – normal water usage could be resumed. The public had to be notified of the new water use guidelines during each stage of the flushing process. The Colorado Department of Public Health and Environment and the local Joint Information Center continually

updated Web sites, issued news releases, and developed information flyers and fact sheets to get the word out. Community volunteers delivered much of the information door-to-door.

Fortunately, the Colorado Department of Public Health and Environment also uses federal cooperative agreement funding to contract with the Rocky Mountain Poison and Drug Center to run the Colorado Health Emergency Line for the Public (COHELP). This information hotline was activated within three hours of the state health agency's request. During 14 days, COHELP handled 2,544 calls, including 486 in a single day. COHELP provided daily reports on call volume, frequently asked questions and call trend analysis as well as real-time reporting of emergency requests. Without COHELP, the local health department would have been overwhelmed with calls from the public.



Colorado Department of Public Health and Environment Chief Medical Officer Ned Calonge, MD, MPH and Colorado Governor Bill Ritter, Jr. at Alamosa EOC on Easter 2008. Courtesy of Colorado Department of Public Health and Environment.

Risk communications staff learned two key lessons during the response. First, the state and local health agencies have to think broadly and creatively about how to disseminate information. Alamosa does not have a local television station and response personnel had to rely on the local newspaper, local radio stations, Web sites and door-to-door information distribution. Second, communications plans need to reflect the needs of the community's at-risk populations. The state health agency thought that written information could be provided to the deaf community, but had to adapt when they learned that some members of that population could not read. They also learned the challenges associated with different dialects. While the Colorado Department of Public Health and Environment is fully equipped to provide Spanish translation and interpretation, it needed assistance to translate information in the Spanish dialect of the large Guatemalan population in Alamosa.

The CDC cooperative agreement funded 531 epidemiologists in health agencies across the country in 2006.²⁸

Other state health agency divisions also played key roles. The Consumer Protection Division inspected and provided guidance to restaurants, food retailers, childcare centers and schools. The division had to do this at the beginning of each stage of the flushing process. The Health Facilities and EMS Division contacted and provided assistance to hospitals, clinics and long-term care facilities. The Prevention Services Division assisted the Alamosa WIC Director in locating supplies of “ready to feed” infant formula. The Sustainability Program ensured that recycling facilities in Alamosa were ramped up to handle all of the empty plastic water bottles.

Throughout the entire response, the Emergency Preparedness and Response Division coordinated information and response activities from other state health agency divisions. The division monitored state and local staffing needs, provided COHELP with public information messages, tracked costs as necessary for disaster reimbursement, provided ESF-8 support to the state’s Division of Emergency Management, contacted private sector partners to request water donations, and tracked COHELP, epidemiology and laboratory reporting.

The boil-water order was finally rescinded by the Colorado Department of Public Health and Environment on April 11. As of April 30, there were 424 cases of salmonella, including 117 that were culture-confirmed. Twenty-two people were hospitalized and one death was attributed to the salmonella outbreak. Throughout the response, the Colorado Department of Health and Environment tested new capabilities, used traditional public health tools in new ways, and worked collaboratively under unified command with partners from other response agencies and the private sector. The important role of public health agencies was elevated among other first responders in the state to the point that one fire service partner noted that he could not imagine any kind of emergency in the state that would not have a public health component.

Deploying Vaccines Against a Deadly Outbreak

When meningitis sickened ten young people and killed two, the Chicago Department of Public Health launched a vaccination campaign to boost coverage rates and provide years of health protection to more than 7,200 children.

Similar to the Alaska Department of Health and Social Services’ experience with RSV and enterovirus, the Chicago Department of Public Health recognized a potential problem related to meningitis in spring 2008. The Chicago Department of Public Health used the situation to proactively reduce health risks to an at-risk

population. The Department also used the incident as an opportunity to test its mass vaccination planning and one of the core competencies it is building among Chicago Department of Public Health staff.

By April 23, 2008, the city of Chicago had ten cases of group C meningococcal invasive disease for the year. The city only had 13 cases in all of 2007. Even more troubling, two of the cases died in March and April 2008. Meningococcal disease is a bacterial infection that can cause meningitis and other infections.²⁹ Meningitis symptoms frequently include headache, stiff neck and fever and can rapidly progress to serious complications including hearing loss, brain damage, limb amputations and death.

A meningitis vaccine became available in 2005 and it is currently recommended to be given as early as possible to all children ages 11 to 18.³⁰ The vaccine protects against four types of meningococcal disease, including two of the three types most commonly found in the United States.³¹ The two individuals who died of the disease in Chicago lived in an area of the city with a low immunization rate for the new vaccine. The Chicago Department of Public Health decided to get ahead of the curve and pre-empt the situation before a disease outbreak occurred. To do so, they launched a mass vaccination campaign to accelerate vaccine coverage rates in the community.

Focused on children aged 11 to 18, vaccination teams targeted 10,000 children in 50 Chicago schools. Staff from the Chicago Department of Public Health and five suburban health departments administered vaccine to 7,213 children in two weeks. The vaccine coverage rate of more than 70 percent among the targeted population is an impressive improvement over the normal rate of 20 to 30 percent. No additional children died of the disease, and the success of the vaccine campaign will continue to protect the at-risk population from future outbreaks in the years to come.

In addition to protecting the community's health, the Chicago Department of Public Health seized on the opportunity to use the vaccine campaign to test the mass dispensing and mass vaccination planning it has developed with support from the federal preparedness cooperative agreements. The ability to vaccinate or dispense medication to large numbers of people is one of the core responsibilities and capabilities that health agencies across the country are working to develop. Being able to implement a mass vaccination or mass dispensing plan would be essential during a bioterrorism attack with an agent such as anthrax or smallpox, or a natural disease outbreak such as pandemic influenza. However, it is rare for a disease outbreak to require this type of mass response so it is uncommon for health agencies to truly test the effectiveness

of their planning. While state and local health agencies frequently exercise their plans, the artificialities of these exercises make it difficult for them to determine whether a response can be operationalized over an extended period of time. All of the artificialities were removed during the Chicago Department of Public Health's meningococcal vaccine campaign. The prolonged response allowed the department to fully test its depth and for staff to get into the rhythm of the response. The Chicago Department of Public Health rotated its staff, tested staff fatigue over long hours, and sought assistance from suburban health departments. The department also reacted to circumstances for which they had not planned, including the level of security needed for staff, as well as the idiosyncrasies of the Chicago education system, such as having more than one school in a single building.

Health agencies across the country continue to improve their plans to receive and deliver medical countermeasures from the Strategic National Stockpile (SNS). This stockpile is a federally-maintained cache of pharmaceutical and other medical supplies that can be deployed to any location in the nation in response to a terrorist attack or other public health emergency. Every state health agency has a plan to receive, store and distribute the SNS. According to a December 2007 ASTHO survey, 92 percent of responding state health agencies indicated that they had revised their SNS plan in 2007.³² State health agencies also support local health departments in developing mass dispensing and vaccination plans. Health agencies at all levels frequently conduct drills and exercises to test and improve their SNS plans.

The department also had an opportunity to test important concepts of its plan, such as the area transportation center (ATC). The ATC is a centralized location where staff report and are transported as a group to the mass vaccination locations. Use of an ATC allows the Chicago Department of Public Health to adjust staffing levels based on the number of staff available for a shift. Because everyone starts off at the same location, the department can provide just-in-time training to all of the staff involved so that a consistent message is delivered. Following their shifts, staff returns to the ATC. This allows the department to conduct a hot wash and collect information that can inform the following day's activities. Due to the investment in preparedness in recent years, the Chicago Department of Public Health and its partner agencies had enough trained staff to undertake a vaccination campaign of this size. A letter from the Commissioner of the Chicago Department of Public Health about the vaccination clinics was sent home with children in the targeted schools along with a vaccine information sheet for parents to sign to allow their children to participate. Staff was able to aggressively reach out to the community to get signed vaccine information sheets. In some schools, this included the use of phone consent. Throughout, the department was able to make real-time adjustments in staffing to target areas with fewer signed vaccine information sheets.

Prior to the heavy investment in public health preparedness, the Chicago Department of Public Health would not have been able to accomplish a response of this size in such a short amount of time. The department did not have the staff, the resources, the organizational framework or the well-thought through plans. The Chicago Department of Public Health learned through the vaccine campaign that ICS really works and enabled the department to function effectively over a prolonged period of time. They also learned that the training provided to staff was worth its weight in gold. Overall, the Chicago Department of Public Health was very pleased that the response proved that their preparedness plans work. The department will continue to refine its planning to ensure successful responses to future threats to the community.

Where Do We Go From Here?

State and territorial public health agencies have made tremendous progress in preparing for a wide variety of public health threats. As seen in the stories on the previous pages, they have enhanced their ability to respond to familiar circumstances, such as disease outbreaks, and successfully dealt with incidents that no one could have predicted, such as a bridge collapse. Through their focus on all-hazards preparedness, state and territorial health agencies have proven their ability to handle any threat they encounter. ASTHO will continue to collect examples of these public health and health system responses on its Web site and in future editions of *States of Preparedness*.

Yet, despite much progress, no health agency at the state, territorial, local, tribal or federal level is ever completely prepared. New disease threats such as a potential influenza pandemic continue to emerge. Old disease threats such as measles and tuberculosis continue to reemerge. All areas of the country are susceptible to some type of natural disaster. In 2008, record floods ravaged the Midwest, killer tornadoes touched down in many areas of the country, and wildfires scorched the earth and polluted the air in several states. Hurricane season has barely begun and the threat of a major earthquake is ever-present in some areas of the country. A salmonella outbreak sickening more than a thousand people is currently sweeping across the country, the latest and largest in a long string of foodborne outbreaks. The potential for infrastructure failures, industrial accidents and mass casualty incidents exists everywhere.

On top of the susceptibility to multiple threats, there is no way to control when or where an emergency will happen. Tornadoes can touch down in the middle of the night and foodborne outbreaks can occur during holidays. An earthquake can shake one region without warning, while another region anxiously tracks the

progress of a hurricane. State and international borders cannot contain disease outbreaks or environmental emergencies. Health agencies thoroughly plan and exercise so that they are able to effectively respond to all threats, regardless of when or where they occur.

These all-hazards preparedness efforts are supported through integrated planning and continuous quality improvement. State and territorial health agencies train their staff and set up their response structures to be consistent with the principles of the National Response Framework. Preparedness exercises and corrective action plans follow the Homeland Security Exercise and Evaluation Program (HSEEP) standards. Health agencies have embraced their states' use of the Emergency Management Assistance Compact (EMAC), an agreement among all 50 states, DC, Puerto Rico, Guam and the U.S. Virgin Islands to share mutual aid during governor-declared emergencies. Following Hurricanes Katrina and Rita, more than 2,000 public health and medical professionals from 28 states deployed through EMAC to the impacted area to treat more than 160,000 patients.³³

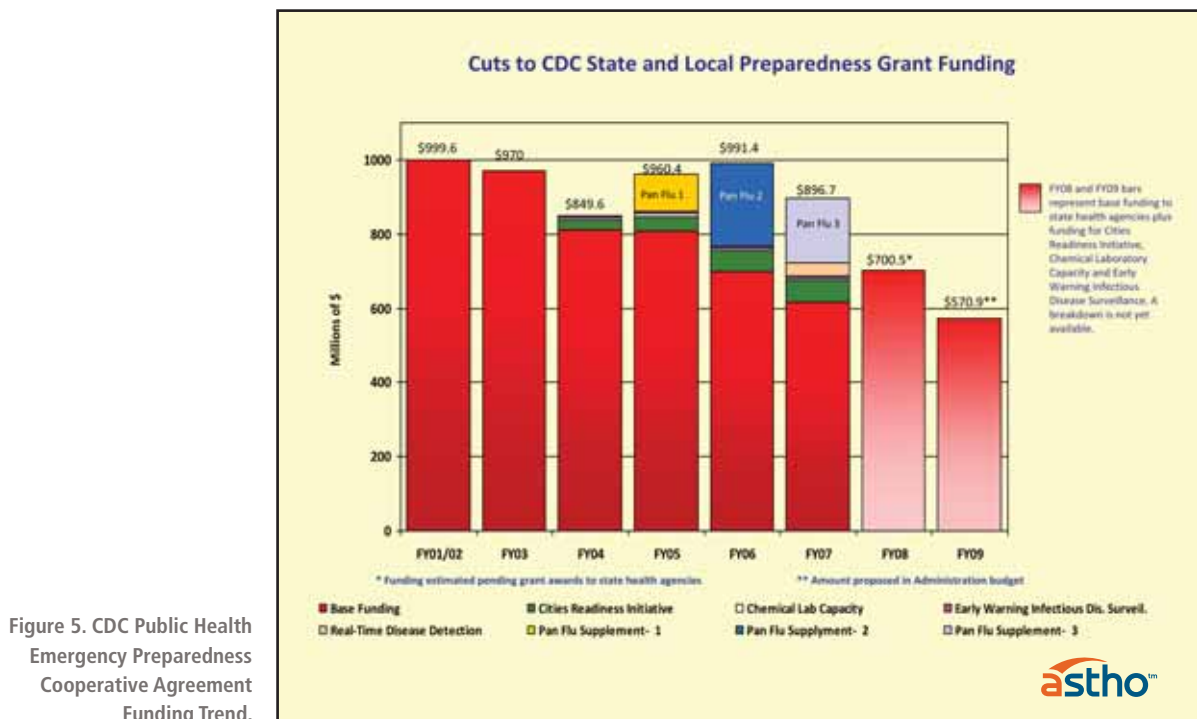


Figure 5. CDC Public Health Emergency Preparedness Cooperative Agreement Funding Trend.

Using these emergency management principles and methods ensures that state health agency staff, and the plans they create and exercise, can be fully integrated with the planning and response efforts of other partners involved in emergency management. These partners include not just state, territorial, local, tribal and federal agencies, but also the private sector. In planning for receipt of the Strategic National Stockpile alone, 83 percent of state health agencies are collaborating with the private sector.³⁴ State and territorial public health agencies

leverage the unique expertise, personnel and other resources of the private sector in many aspects of their emergency preparedness and response efforts. Jurisdictions are only as prepared as their most vulnerable members. State and territorial health agencies continually work with community-based organizations and various stakeholder groups to ensure the protection of at-risk populations.

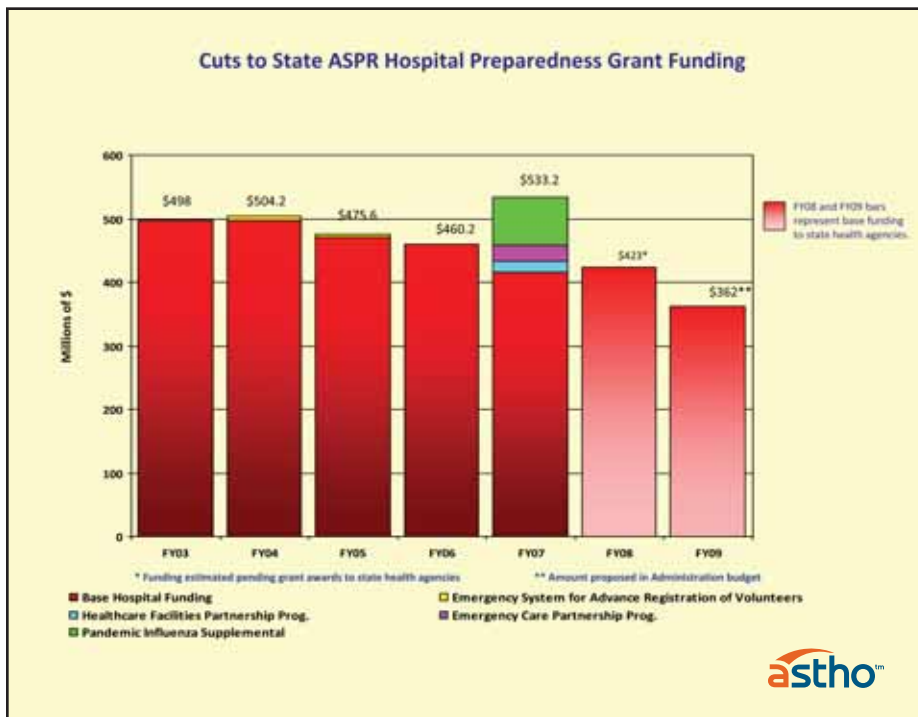


Figure 6. ASPR Hospital Preparedness Program Cooperative Agreement Funding Trend.

Health agencies are also committed to a strong quality improvement process. They are preparing to meet federal performance indicators that are currently under development. They share lessons learned and promising practices in order to build a culture of public health preparedness. These efforts inform the development of a National Health Security Strategy, provide accountability for the great investments being made in preparedness, and assure that lessons learned from each emergency are built into new planning and response efforts. State and territorial health agencies must continually adapt and improve their plans to address all threats. Public health personnel need ongoing training. Agencies must plan and exercise with their response partners, including hospitals, law enforcement, fire administration, emergency management, and the private sector. Technology such as surveillance systems and hospital bed tracking systems must be sustained and improved. Laboratory equipment needs to be replaced and upgraded. Resources to support these capabilities must be distributed throughout the public health and health system to ensure that a town in rural Iowa can respond to a tornado at a remote Boy Scout camp as readily as counterparts to one in downtown Atlanta.

Continued cuts to state and territorial public health and health system preparedness programs threaten the ability of jurisdictions to respond as rapidly and effectively to future events as to those that occurred over the last year and a half. There is no question that lives have been saved and that diseases and injuries have been prevented through the significant support that the federal government has provided public health agencies through the CDC and ASPR cooperative agreements. However, the proposed fiscal year 2009 budget calls for a funding level for the CDC cooperative agreement that is 33 percent less than in fiscal year 2005. The proposed funding for the ASPR cooperative agreement is 25 percent less over the same time period. These continued funding decreases, combined with the difficult economic conditions in many states, will hinder the ability of state and territorial health agencies to sustain and continue the progress that has been made in public health and health system preparedness. Only through sustained support can health agencies be truly prepared to protect the public against the health threats of tomorrow.

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The Association of State and Territorial Health Officials (ASTHO) is the national nonprofit organization representing the state and territorial public health agencies of the United States, the U.S. Territories, and the District of Columbia. ASTHO's members, the chief health officials of these jurisdictions, are dedicated to formulating and influencing sound public health policy, and to assuring excellence in state-based public health practice.



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