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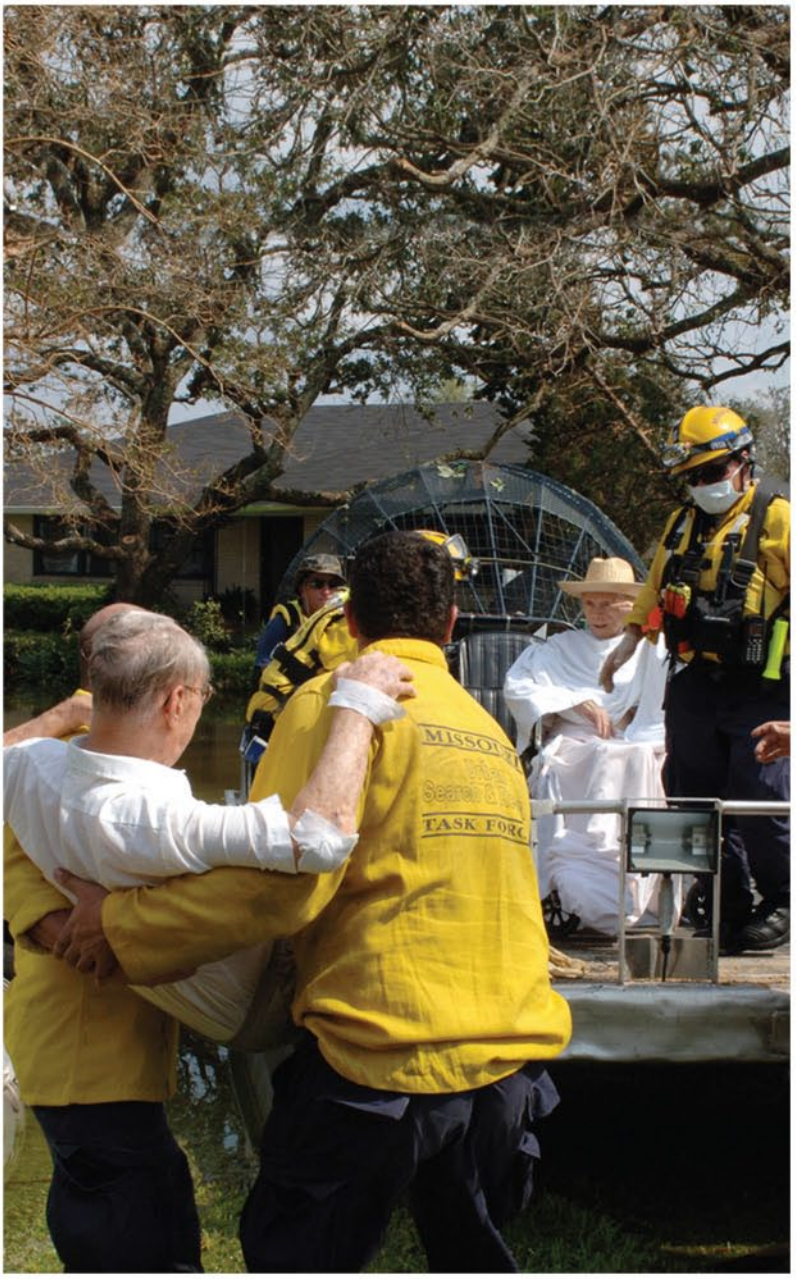
Surging Forward

Special Needs & Other Challenges

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Editor's Notes

By James D. Hessman, Editor in Chief

Fires, including a major conflagration in one of the nation's finest hospitals; killer ice storms and 20 earthquake scenarios; fly cars and AmbuBuses; pat-downs and whole-body imaging; the continuing good work done by ARC (American Red Cross) and MRC (Medical Reserve Corps) volunteers – and by the equally important but less publicized behind-the-scenes sanitarian teams in cities and states throughout the nation.

Plus: the very special guidelines required for the safe evacuation of the nation's special-needs population; the demonstrable successes of numerous public-private healthcare coalitions formed in recent years; the complicated, vitally essential, and respectful handling of mass-fatality incidents and events; an internationally important agro-terrorism symposium in Kansas City (Mo.); and, last but not least, two instructive "lessons learned" stories about the installation (in New Jersey and Texas) and careful use of new state-of-the-art public-health monitoring systems.

All are covered in detail in this month's printable issue of the DomPrep Journal (DPJ) – which starts out, appropriately, with an eloquent discussion by Bruce Clements of the importance of planning, well in advance, for what most responder teams would immediately classify as a "worst-case" situation – namely, the need to evacuate, on short or no notice, a large number of elderly, non-ambulatory, and/or "special needs" citizens from hospitals (or other healthcare facilities), retirement communities, or their own homes. Donald Brannen, Amy Schmitt, and Mark McDonnell then team up – in a grim but very timely example – to describe what went wrong, and why, both before and during the horrendous ice storm that swept through Ohio (and many other states) earlier this year, causing billions of dollars in damage and leaving many citizens dead – including several, it is suggested, that might have been saved.

This brings up what is arguably the worst-aspect component of most if not all worst-case situations: The proper care and handling of the remains of those killed in what are academically described as mass-casualty situations. Anthony Mangeri points out that a few hours before (or perhaps only a few minutes before) being retrieved, those "remains" were living, breathing human beings. These fellow citizens still deserve respect and so do their families. However, rules and regulations still have to be obeyed – and the first priority, necessarily, is to help those who are still living, but in danger of dying. Mangeri covers a difficult but extremely important topic.

Offsetting, to some extent, the difficulties, dangers, and dilemmas mentioned above are a few brighter and much more encouraging reports by such highly respected professionals as: (a) Ted Tully, who describes how the heroic members of the New York City Fire Department and the medical staff of Mount Sinai Hospital worked in close cooperation to extinguish one of the most dangerous, and life-threatening, three-alarm fires in the history of that great city; (b) Chad Priest and Bobby Courtney, who discuss the many ways in which the formation of new public-private healthcare coalitions are synergistically improving response capabilities in cities and states throughout the nation; and (c) JL Smither, whose "lessons learned" article focuses on the expanded use of public-health monitoring systems (specifically those now operational in New Jersey and Texas).

Rounding out the issue are informative reports by three other responder/emergency-management "insiders" – Rahul Gupta, Joseph Cahill, and Aaron Sean Poynton – who discuss, respectively: the much increased, and increasingly important, before-and-after healthcare tasks carried out by the nation's often overlooked corps of sanitarians; the need for first-responder agencies to "stockpile" – in advance – not only an adequate supply of equipment and other material supplies (including extra vehicles), but also a standby number of already trained on-call people; and the inescapable need of improved scanning systems (including "pat downs") for those, citizens and non-citizens alike, eager to fly the "friendly skies" of the United States. As always, Adam McLaughlin serves up incisive reports on recent events and happenings throughout the United States, with special attention this month on the great states of Delaware, Missouri, Tennessee, and Washington.

About the Cover: Members of an Urban Search and Rescue Team from Missouri rescue a husband and wife who had been trapped in their own house by the levee breaks and massive flooding that drenched New Orleans and the state of Louisiana after Hurricane Katrina made landfall in the late summer of 2005. (Federal Emergency Management Agency photo by Jocelyn Augustino)

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Mass Evacuation of Medical and Functional Needs Populations

By Bruce Clements, Public Health

A mass medical evacuation is initiated when local demand overwhelms the local healthcare infrastructure and/or when the infrastructure itself is compromised – which might easily, and inconveniently, occur in a variety of disaster scenarios ranging from hurricanes, for example, to incidents involving hazardous materials. Hospitals, long-term care facilities, and the houses or apartments of persons receiving health care or hospice support may be in the path of an oncoming tornado or other danger and therefore suffer direct damage from such a threat.

Even persons living in their own homes, or in healthcare facilities that suffer little or no physical damage, may still need to evacuate because of a loss of utilities, damage to highways or communications infrastructure, or the lack of available staff. Although U.S. healthcare facilities are almost always required to have evacuation plans in place, most of those plans focus primarily if not exclusively on fire evacuations that do not extend beyond the parking lot – and also do not address the full range of potential hazards threatening the surrounding area. Moreover, when other plans fail, the evacuation of a healthcare facility still requires tightly coordinated efforts between and among the facility staff, first responders, emergency management personnel, and other officials.

In some ways, an even greater challenge than the evacuation of healthcare facilities is the ability to identify and evacuate homebound persons known to be suffering from various medical or functional needs. Anyone requiring dialysis, oxygen, insulin, personal care support, and/or basic transportation may in fact survive the initial stage of a disaster but soon require additional support. When a major disaster blocks transportation routes or impedes basic communications capabilities, for example, many such persons may soon become isolated and vulnerable to the dangerous effects associated with not meeting their medical or functional needs. To protect these persons in such situations it is essential that local planners be quickly able to: (a) identify the current whereabouts of such individuals; and (b) provide for the full range of necessities – including transportation, sheltering, and unique support requirements – immediately required.

Search Tools and Data Sources – Plus Common Sense

There is a vast array of search tools and data sources available to planners to characterize their areas' at-risk populations. To develop an effective evacuation plan for such populations, many different data sources may be needed for a single jurisdiction. Public data sources provide a particularly helpful starting point for identifying populations at risk. Census data, for example: (a) identify some variables of interest –specifically including an individual's socioeconomic status, age, and race; and (b) highlight congregate settings such as long-term care facilities. State and local government data sources are often both relevant and quickly available, but consideration of nongovernmental data – frequently provided by faith- or community-based organizations –is also important because such information can often identify specific individuals who may be less likely to share personal details with government agencies.

As data sources are being explored, it is helpful to also consider sources that may be less direct. For example, when planners are seeking to identify persons with mobility impairments, they should also – rather than relying primarily or exclusively on social-services organizations – consider other agencies and organizations that have a direct interest in supporting at-risk populations: local transportation and/or mass-transit organizations, to cite but one example, often possess detailed information on local residents who require transportation assistance. In addition, most if not all utility companies maintain power-restoration priority lists for persons who use and must rely on powered medical devices. For planners just starting to collect such data, it may be necessary to "start small" by focusing on a highly specific type of population – e.g., dialysis patients, or those suffering from a sensory impairment – and then expand from there.

Individual information also may be available through special-purpose registries of residents with specific medical conditions or functional needs. As at-risk residents are identified, their residences should be plotted on a map for response planning purposes and given higher priority in preparedness outreach campaigns. Other residents who fall into the categories associated with existing registries also should be encouraged to register – but at the same time reminded that registering as an individual with a medical or functional need does not guarantee that assistance will be immediately available during weather-related or other types of disasters.

For both short- and long-term reasons, there are two common-sense rules that also should be remembered at all times: (a) Personal planning and preparedness should always be the first priorities of the individual citizen; and (b) Planners should be aware of the limitations, as well as the advantages, of registries and plan beyond them.

Fortunately, there continues to be rapid growth in geographic information system (GIS) applications in the field of emergency management, which range from free Internet resources to the growth of robust systems possessing multiple layers of data that can be queried for detailed reports. For resource-poor jurisdictions, there also are ample free resources that can be used to at least map the locations of facilities housing at-risk groups of local residents. It also would be helpful to identify local and state agencies that collect and analyze GIS-compatible data – much of which, including a number of maps, is often readily available and can be used to enhance local planning and response capacity.

Purvis, MS, 12-16-05 - Vicki Killingsworth, the incoming president of LIFE (Living Independence for Everyone), a Mississippi disability-rights group, discusses her observations with a FEMA employee. FEMA and various representatives for disabled groups were looking at trailers and mobile homes FEMA is providing as temporary shelter for Hurricane Katrina victims with special needs. Patsy Lynch/FEMA

Future Capabilities & Additional Growth Predicted

When planning for community residents who have unique medical and functional needs, it is important to include them personally in the planning process. Advocacy organizations and/or key members of these groups can provide invaluable insights into various local challenges that might impede effective preparedness and response operations. They can also provide helpful advice not only on how to quickly identify residents at risk but also how to communicate with them most effectively.

Cultivating these relationships may also vastly improve the receptiveness of the at-risk group to key messages by coordinating the messages through trusted leaders within their respective groups. As trust is promoted, members of the group will almost always become more willing to be involved in planning, training, and exercises. Without such personal participation, the emergency necessities

of various groups with medical or functional needs cannot be fully understood or adequately addressed. For that reason, as with other aspects of the planning process, it may be helpful to start with a small group and expand slowly, focusing primarily on priorities established through a local assessment of existing populations with unique needs.

In recent years, many public and private healthcare organizations throughout the United States have cobbled together enough funding to support the development and fielding of emergency health information technology tools – including Internet-based and data-exchange systems that can be used to manage critical data such as bed reports, healthcare worker credentials, and patient tracking. In fact – because security standards, common definitions, and minimum patient data elements are continually evolving – these reporting capabilities are often developing at so fast a pace that policymakers cannot always update and promulgate the guidelines and policies needed to keep up with them.

During a rapid evacuation of persons with specific medical needs, there is usually only limited time and less than adequate manpower available to gather health details beyond the basics needed to safely transport the patients at risk. However, as electronic health records (EHRs) become the new norm, more detailed data will be available to use in a broad spectrum of evacuation scenarios. Fortunately, the federal Medicare and Medicaid systems have established an EHR incentive program that, among other things, ensures that hospitals and other healthcare facilities will in the future receive paid incentives for demonstrating the meaningful use of approved EHR technology.

That change is intended, of course, to accelerate the availability and use of EHRs and thereby not only improve patient management during sudden times of disaster but also increase the effectiveness of the resource allocations provided. As technology expands and is used in the context of growing partnerships with community stakeholders, the future looks bright for even better management of the unique needs of at-risk populations during mass evacuations.

Bruce Clements is the Public Health Preparedness Director for the Texas Department of State Health Services in Austin, Texas. In that post he is responsible for health and medical preparedness and response programs related to matters ranging from pandemic influenza to the health impact of hurricanes. A well known speaker and writer, Clements also serves as adjunct faculty at the Saint Louis University Institute for BioSecurity. His most recent book, Disasters and Public Health: Planning and Response, was released last year.

Hospitals & Fire Departments

Three-Alarm Fires, MSH and Best-Practice Results

By Theodore "Ted" Tully, Fire/HazMat

On the northeast side of Manhattan in New York City is one of the nation's busiest, and best known, academic medical centers: the Mount Sinai Hospital (MSH). In the broad spectrum of men and women of all ages occupying the hospital's 1,171 beds are patients suffering from a mixed variety of medical conditions ranging in severity from "ambulatory" to "critical intensive-care"; most patients in the latter group cannot be moved from their beds. The hospital usually operates at 90 percent occupancy or higher and is highly respected for its broad spectrum of medical capabilities. One example: With over 50 active operating rooms and an emergency room that sees over 250 patients a day, it has one of the busiest cardiac catheterization labs in the entire United States.

The Fire Department of New York (FDNY), one of the busiest fire services in the world, has a similar reputation. The FDNY responds to literally thousands of fire alarms each year – including, significantly, over 300 alarms annually for hospital fires. The department's extensive experience with hospital fires, combined with the complicated rescue needs of hospitals, are therefore of particular interest not only to other fire departments throughout New York State but also to departments in many other states throughout the country.

On 21 January 2009, a fire broke out in the MSH's main hospital building. The FDNY response eventually reached three-alarm status, and over the course of the following 24 hours it became necessary to carry out one of the largest evacuations of hospital patients in FDNY's history. Eventually, close to 450 patients were evacuated – both horizontally as well as vertically – from the medical center. Fortunately, no patient experienced serious effects from the evacuation, and all were relocated to appropriate MSH patient-care areas within 24 hours after the start of the fire.

That fire and its effects, though, would be felt by both agencies for many months after the blaze was extinguished. One positive effect of the evacuation was that it led to an even closer relationship between MSH and the FDNY. Almost immediately following the fire, representatives of

MSH and FDNY met, not only to review what had happened but also to examine in much greater detail how hospitals and fire departments in general should respond to fires that break out in hospitals. The MSH and FDNY representatives looked at common practices throughout the hospital industry and, through a working committee, created a comprehensive list of "best practices" to improve the prevention of fires in hospitals and the emergency-response capabilities of fire departments.

A Plenary All-Agency Meeting; a Score Of Helpful Recommendations

The working committee – which included representatives from fire departments, hospitals, regulatory agencies, and hospital trade organizations – eventually scheduled a full one-day meeting to examine their findings and receive industry feedback. On 13 December 2010, that meeting was held (at MSH) and served, among other things, as a much-needed forum for evaluating industry best practices. The estimated 450 or so participants at the meeting represented fire departments and hospitals from 23 states. Hospital and fire officials from the City of London also took part, and shared their extensive experience from a 2009 study – by the United Kingdom's National Health Service – of five hospital fires and the various difficult issues associated with each.

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The results of the December 13 meeting have been summarized in a comprehensive White Paper – *"Hospital Fire Safety and Prevention"* – expected to be published later this year. Following is a list of some, but not necessarily all, of the best practices likely to be recommended from the experiences of both the United States and the United Kingdom:

- Install "high-rise building" types of systems/panels in hospitals;
- Use an effective patient tracking system during evacuations;
- Ensure that effective HVAC (heating, ventilation, air-conditioning) systems are available to the fire departments responding so that smoke can be controlled inside a facility;
- Cover all hospital areas with sprinklers (by a "reasonable" target date in the future);
- Ensure that a properly trained person, specifically designated to provide information (about both the fire and the hospital itself) to the fire department units responding, is available to meet the responders at a convenient location outside but close to the hospital when they arrive;
- Use the federal Hospital Incident Command System (HICS) as the predesignated standard at all hospitals for use during a fire, and ensure that the command staff are wearing easily recognized identity vests;
- Install and use a dedicated radio network that can be used throughout the hospital by fire-service command leaders upon their arrival at the hospital;
- Pre-position, in each hospital building, a number of large, conveniently located, and easily readable building information cards that can quickly identify particularly important and/or vulnerable areas, and potential dangers, in that specific building;
- Stock all hospitals, in advance, with the appropriate types and quantities of evacuation devices and systems likely to be needed by the hospital's patients;
- Schedule frequent in-depth meetings, on a continuing basis, between hospitals and fire departments, at all working levels, to discuss common problems and develop closer working relationships;
- Schedule and carry out a broad spectrum of staff educational meetings and training drills for "shelter in place" situations in addition to evacuations;
- Develop a viable hospital-recovery/business-continuity plan that involves the fire department as well as the hospital itself; and
- Establish a well identified "Fire Command Station" location in all hospital buildings.

Major Benefits Expected – Far Into the Future

It is expected that the White Paper will not only describe each of the preceding recommendations in much greater detail but also recommend other helpful ways in which the hospital and fire industries should evolve. It also seems likely, though, that at least some of the recommendations spelled out above will require code and standard change(s) at the local, state, and/or federal levels of government.

The meetings already completed confirm the fact that there is a complexity about hospitals in general – and hospital fires in particular – that demands, today more than ever before, the adoption of the numerous preventive planning measures recommended above. It will be highly recommended to communities throughout the nation that their hospital and FD leaders meet and approve the best-practice recommendations.

The goal here, of course, is to ensure that future fires and/or fire-related incidents and events will not result in injuries, deaths, or hospital-service capabilities lost from the community. The evacuation, shelter-in-place, business continuity, and HICS recommendations – especially the need for reliable patient tracking systems – are issues that will be increasingly valuable in helping healthcare institutions respond quickly and more effectively to many other emergencies, of all types, for many years to come.

Additional Information

A follow-up conference – *"Partnership to Prevent Tragedy - II"* – on Hospital Fire Safety is being planned by FDNY for 8-9 December 2011 in Manhattan.

For further information on the 9 December fire and its aftermath, visit fdnyfoundation.org.

Theodore "Ted" Tully, AEMT-P, is the Administrative Director for Emergency Preparedness at Mount Sinai Medical Center in New York City. He previously served as Vice President for Emergency Services at the Westchester Medical Center (WMC), as Westchester County Emergency Medical Services (EMS) Coordinator, and as a police paramedic/detective in Greenburgh, NY. He also helped create the WMC Regional Resource Center, which is responsible for coordinating the emergency plans of 32 hospitals in lower New York State.

The Expanding Role of Sanitarians in Public Health Emergencies

By Rahul Gupta, Health Systems

The Institute of Medicine defines public health as the sum of what society does collectively to assure the conditions for people to be healthy. The past decade has already provided an early preview of the many public-health challenges the United States will be facing in the foreseeable future – e.g., disease outbreaks, natural disasters, accidental events, and terrorist attacks, all of which possess the potential for large-scale health consequences. Preparing for and responding to these threats not only requires the commitment of, and cooperation among, all segments of society but also clearer identification of the core public-health professionals who can be developed to serve as first responders of the future.

For state and local health agencies across the United States, being prepared to prevent, respond to, and promptly recover from major public health threats is critical for protecting and securing the public's health. Generally speaking, the role of public health professionals in any emergency is an extension of the core missions of the public health community. However, an effective public health response begins with a prepared and effective public health system (local and state) staffed by trained and committed professionals.

Building Public Health Preparedness Capabilities

The Atlanta-based U.S. Centers for Disease Control and Prevention (CDC) recognized that, to use the congressionally appropriated preparedness funding more prudently, there remains a need for prioritization of activities assigned to state and local preparedness planners. More specifically, the CDC identified the following six "domains" *(italicized below)* and 15 public health preparedness capabilities as the basis for: (a) state and local public health preparedness; and (b) a new five-year Public Health Emergency Preparedness cooperative agreement scheduled to go into effect in August 2011:

- *Biosurveillance:* Public Health Laboratory Testing; and Public Health Surveillance and Epidemiological Investigations;
- *Community Resilience:* Community Preparedness; and Community Recovery;

- *Countermeasures and Mitigation:* Medical Countermeasures Dispensing; Medical Material Management and Distribution; Non-Pharmaceutical Interventions; and Responder Safety and Health;

- *Incident Management:* Emergency Operations Coordination;

- *Information Management:* Emergency Public Information and Warnings; and Information Sharing; and

- *Surge Management:* Fatality Management; Mass Care; Medical Surge; and Volunteer Management.

The above-mentioned public health preparedness capabilities represent a national public health standard, for state and local preparedness activities, that would help state and local health departments across the nation to respond more effectively to public health emergencies and threats while also supporting the 10 essential public health services that form the basis for the CDC's own national public health performance standards program (NPHPSP). In the modern public health environment, NPHPSP is a collaborative effort to enhance the nation's public health systems as a whole.

Sanitarians' Everyday Tasks Transfer to Emergency Situations

In most states, a "sanitarian" is a credentialed practitioner in the environmental, sanitary, and public health sciences whose daily work involves the evaluation and management of the numerous factors and systems that directly affect public health, quality of life, and determinants of risk. Sanitarians already play a vital role in the daily life of most communities: monitoring food, milk, and water safety, for example; conducting disease surveillance and monitoring; carrying out basic sanitation functions such as the evaluation of sewage disposal systems; providing vector control; or assisting in the management of shelter operations. Sanitarians usually are able to successfully achieve a fine balance between being the enforcers of public health laws and being educators for and about public health.

These same public health professionals may be the most critical component of the public health infrastructure responsible for developing and maintaining linkages within various organizations and sectors – and, therefore, in connecting people to resources. Unfortunately, the American Public Health Association has projected that 23 percent of the current public health work force will be eligible for retirement by 2012. Studies show, though, that: (a) sanitarians appear to be somewhat more satisfied and secure in their positions than their public-health counterparts; and (b) job satisfaction frequently results in a lower turnover of sanitarians than is typical of public health professionals in several other fields, even though the sanitarian positions are often underpaid.

Another factor to consider is that the role of sanitarians has traditionally been viewed as consultative, facilitative, and supportive (as opposed, for example, to being among the first responders called upon for public health emergencies). Over the past decade, however, sanitarians – in state and local health departments across the nation – have been more involved than ever before in various threat preparedness and response activities.

There are a number of reasons, including the following, why sanitarians are now viewed – not only by their co-workers but also by the general public – as particularly valuable assets:

(a) They are readily available and often already trained in the particulars of incident command structure;

(b) They usually incorporate various emergency essentials – e.g., planning, logistics, and security – into their routine work;

(c) They help enforce state and local public health laws;

(d) They often participate in several epidemiological activities – including but not limited to disease surveillance, outbreak investigations, and quarantines;

(e) They usually are knowledgeable, because of their daily work in local communities, of not only local vulnerabilities but also the local infrastructure and the availability of such resources as water, food, sewage, vector control, and medical wastes;

(f) They frequently not only respond to such local emergencies as chemical leaks, mining incidents, and weather-related incidents but also support various countermeasure dispensing and mitigation efforts;

(g) They typically have established helpful networking relationships at the local level (an important factor that improves not only outreach efforts to educate community members but also information sharing during an event); and, last but not least,

(h) They work effectively with post-disaster responder communities to identify and monitor public health, medical, and behavioral health system recovery needs.

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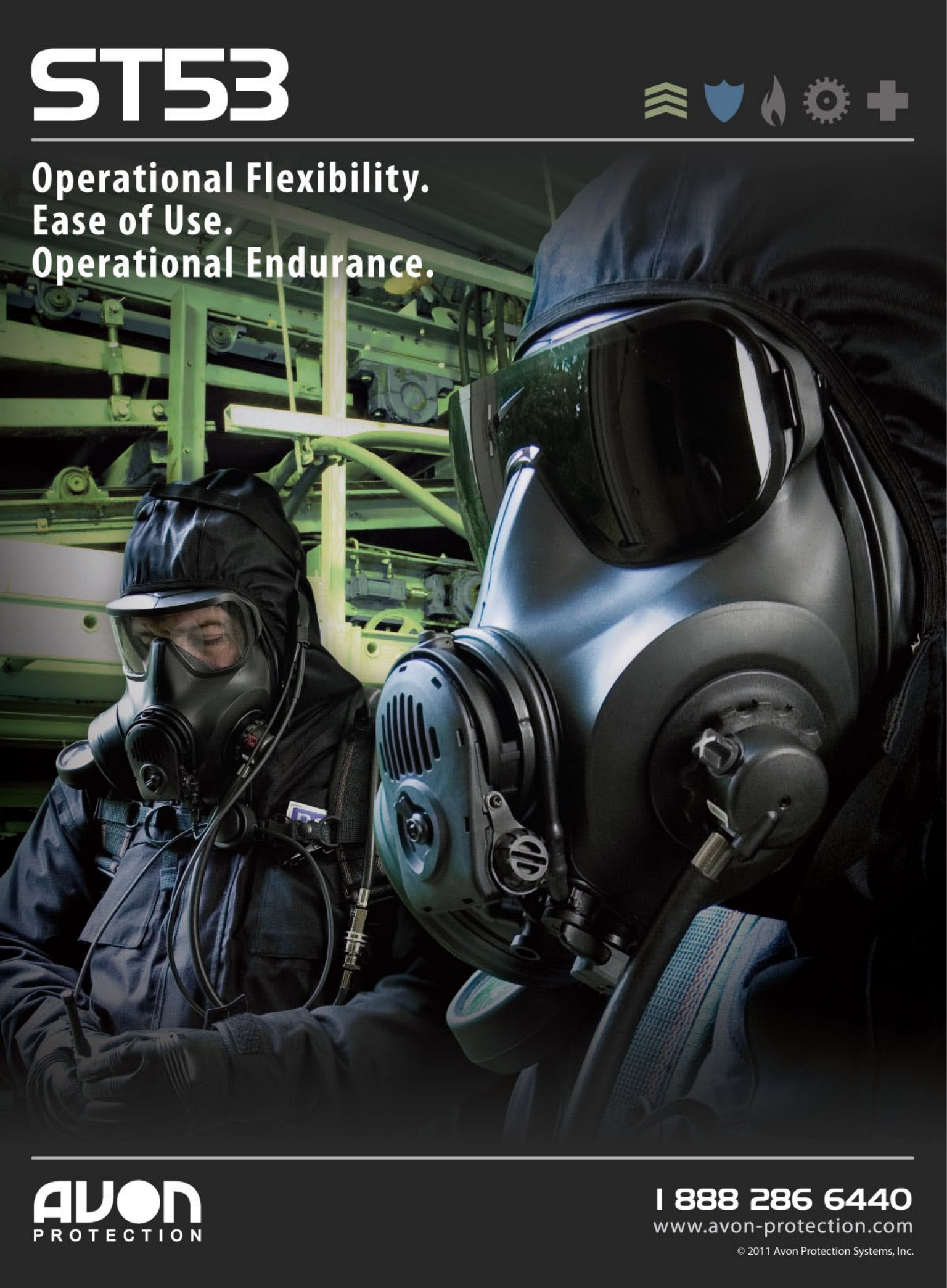

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Sanitarians' Contributions During H1N1 Pandemic in Kanawha County

When responding to a public health emergency, the combination of well coordinated efforts by local, state, and federal agencies and robust community responses usually results in improved health outcomes. Indeed, locally organized and coordinated community partnerships serve as the firm foundation for many successful preparedness and response efforts. In recognition of this fact, the recently released National Health Security Strategy (NHSS) has been structured to achieve two primary goals: (a) build community resilience; and (b) strengthen and sustain both health and emergency response systems.

During the 2009 H1N1 influenza pandemic, sanitarians in Kanawha County, West Virginia, played an essential role in the ability of the Kanawha-Charleston health department to launch successful response and recovery efforts. Following are some of the critical functions performed by field sanitarians during that difficult period:

- *Worked at clinics (130 clinics held from October 2009 to May 2010) offered at the health department:* managed vehicular traffic control; managed vaccination queues and crowd control; and managed both security and volunteers.
- *Provided outreach and education to organizations (information sharing):* state and city governments; local businesses; faith-based organizations; county schools and higher education institutions; law enforcement agencies; emergency management personnel; shelters and other facilities, permanent or temporary, occupied by high-risk populations.
- *Assisted in modified school-based vaccination clinics (over 150 clinics conducted from October 2009 to March 2010):* provided logistical support; acted as liaison for nurses/school officials/parents/volunteers; supported the set-up of school clinics; assisted in cold storage transport of vaccine; facilitated the flow of children scheduled to be vaccinated at each clinic.
- *Offered post-vaccination assistance:* inventory management; vaccine storage (in cold storage for transport); accounted not only for sharps containers but also for medical waste disposal (sharps, bloody bandages).
- Played a major support role in recovery operations and community resilience: identified priorities and services designed to improve and maintain public health, medical, and behavioral health in the post-pandemic phase of the virus; assisted in coordination of recovery efforts; played a critical role in community resilience through participation in the county's MPAC (Multi-agency Planning and Advisory Committee) operations.

Quick Prediction: An Increasingly Significant Role

Sanitarians are frequently undervalued for their role in public health emergency preparedness and response operations. Among the more important lessons learned from the 2009 H1N1 pandemic influenza was that sanitarians can and often do play a critical role in the response operations of state and local health departments across the nation.

Whether it is the overall task of determining the best methods to reduce or prevent conditions that are detrimental to the health of the public, or the act of taking steps to prevent the further spread of disease (and/or additional injuries) during an ongoing event or disaster, sanitarians are a well equipped and willing group of public health workers providing these important services within their home communities.

As state and local health departments remain committed to strengthening preparedness efforts, it is important to recognize the evolving role of sanitarians as first responders in public health incidents. Sanitarians are already heavily involved in most of the CDC's 15 specifically designated public health preparedness capabilities. Proper and timely recognition – and the appropriate investment of additional resources – into this field as a work force development priority would almost assuredly yield significant and consequential long-term results.

It is particularly important to ensure that, as agencies proceed to align their public-health preparedness capabilities planning model with that of the CDC, the exceptional and expanding role of sanitarians be not only recognized but also incorporated into the development and completion of their short-term and long-term goals. As these agencies build such capabilities, demonstrate additional performance successes, and ultimately help sustain even more capabilities and functions, it is appropriate that the sanitarians be recognized for the key roles they play in public health preparedness and response activities – and also be considered, therefore, as an appropriate investment in specific human capital available within state and local jurisdictions.

Dr. Rahul Gupta is the Health Officer and Executive Director of the Kanawha-Charleston Health Department; he also serves as clinical faculty at West Virginia University's School of Medicine and the University of Charleston's School of Pharmacy in Charleston, West Virginia. Dr. Gupta is one of the only two full-time local health officers in West Virginia and, as such, leads the largest local health department in the state.

Medical Surge Management: Public-Private Healthcare Coalitions

By Chad Priest & Bobby Courtney, Health Systems

The management of medical surge is a complex process requiring seamless integration between pre-hospital care providers, primary, secondary, and tertiary healthcare facilities, public health authorities, and emergency managers. The conventional management of medical surge usually has been limited, though, to increasing the capacity of hospital facilities to manage additional patients (creating additional "surge capacity," in other words). Many millions of dollars have been invested in the nation's hospitals and other healthcare facilities to build resilient institutions capable of quickly accommodating hundreds of additional sick and injured patients. Although this investment has led to more resilient individual institutions, it is not yet clear whether U.S. communities as a whole are more effectively prepared to manage medical surge.

This ambiguity is created, in part, because increasing a community's surge capacity necessarily requires a number of interdependent organizations and institutions to plan for disaster in an interdependent manner. Individual hospital resiliency is necessary, but is usually not sufficient to effectively manage surge capacity because it ignores healthcare system interconnectedness. The effective management of medical surge requires inclusion of disparate venues of care and integration between and among the public and private sectors. Coordinating the planning and operations of multiple healthcare institutions and achieving authentic public-private collaboration is a complicated process. One successful method that has been used to achieve public-private collaboration to manage medical surge is the development of a healthcare coalition.

Healthcare coalitions have become increasingly popular in recent years as local communities seek to bring together the stakeholders needed not only to engage in joint planning but also to share critical resources. Many coalitions have been funded through federal grant programs such as those under the Hospital Preparedness Program – which comes under the jurisdiction of the Office of the Assistant Secretary for Preparedness and Response at HHS (the U.S. Department of Health and Human Services). Moreover, although the range of programs and issues addressed is diverse, most focus on several broad mandates established therein. This article describes an approach to coalition building that encourages greater private-sector involvement in preparedness planning and response. More specifically, it focuses on the need for public-private coalitions, the essential elements of successful public-private coalitions, and developments in federal funding likely to realign incentives to encourage the development of public-private coalitions.

The Need for Public-Private Coalitions

The need for public-private coalitions is supported by the public sector's dependency on private resources during a major healthcare emergency. More specifically: The government has long been recognized as being largely responsible for the public's health and general welfare; however, the vast majority of the nation's healthcare assets are controlled by private enterprise. Private-sector engagement gives voice to those decision makers responsible for providing healthcare services before, during, and after an emergency event.

The interconnectedness of the healthcare system also necessitates the development of meaningful public-private partnerships. In a 2001 report, Crossing the Quality Chasm: A New Health System for the 21st Century, the Institute of Medicine (a highly respected non-profit organization created under the jurisdiction of the National Academy of Science) noted that, although systems "can be broken down into parts which are interesting in and of themselves, the real power lies in the way the parts come together and are interconnected to fulfill some purpose."

History also has shown that the lack of attention to this complexity can lead to catastrophic results. One need only look to the greatly reduced availability of health services in New Orleans in 2005 after Hurricane Katrina made landfall for proof that the traditional model for hospital preparedness alone is insufficient – not only was the area's only Level I trauma unit closed, but the number of staffed hospital beds in the city was still 80 percent lower six months after the hurricane made landfall near the Louisiana-Mississippi border.

The Key Elements of a Successful Public-Private Coalition

At present, no totally reliable metrics exist to measure the effectiveness of public-private coalitions; however, anecdotal evidence indicates the validity of a few consistent characteristics across successful entities. Most notably, these coalitions are led by the private sector and include consistent leadership and dedicated staff outside of the individual partner organizations represented. This approach ensures a stable, stakeholder-driven vision, and serves as a valuable framework for innovation and continuous improvement.

Successful public-public private coalitions also are supported, at least in part, with funding from the private healthcare sector. Coalitions that are "owned" by constituent facilities ensure stakeholder buy-in. They also provide the strong economic incentives needed to promote efficient and effective planning.

Finally, successful public-private coalitions appear to more readily adopt a network, or community-based, approach to preparedness. This approach allows for effective regional planning, data sharing, service coordination, and collaborative policy making, all of which help ensure a common operating picture and emphasize long-term viability of the healthcare system.

Realigning Incentives for Continued Progress

As previously noted, many healthcare coalitions have been funded through federal grant programs; however, it also is important for the government to find ways to "incentivize" the private healthcare sector to become an even more meaningful partner – by, perhaps, making greater investments in community preparedness through hospital general funds. Although grant programs such as the Hospital Preparedness Program have been vital in building institutional resiliency, they do not always or necessarily encourage individual hospitals to make substantial financial investments in community preparedness. Indeed, by providing direct funding, these programs have the potential to actually "dis-incentivize" such investments.

Here it is relevant to note that, in an HHS state-by-state review of the Hospital Preparedness Program carried out earlier this year, over 75 percent of participating hospitals met 90 percent or more of all of the program measures for all-hazards preparedness postulated in 2009. Despite these advances in all-hazards preparedness, the 2011 report highlights a number of successful public-private coalitions, and suggests that program participants focus on building coalitions "so that hospitals, government agencies, nongovernment organizations, businesses, and community residents work as a team to prepare for and respond to disasters." It is reasonable to hope that this recommendation may well signal a shift in program policy to realign the incentives needed to encourage the development of additional public-private coalitions.

To briefly summarize: The development of public-private healthcare coalitions has been effectively piloted and the concept is now more than ready for expansion. One need only look to the current and proposed federal budgets, though – both of which portend deep cuts in homeland security funding – to recognize the need for a new approach to successful emergency preparedness. Included in that new approach should be the creation and development of robust public-private coalitions that: (a) are led by the private sector; (b) receive, at least in part, private healthcare sector funding; and (c) focus on the entire healthcare sector.

Dr. Charles Miramonti, Assistant Professor and Director of the Out of Hospital Care Division at the Indiana University School of Medicine, contributed significantly to the preparation of this article.

For additional information on:
The HHS Hospital Preparedness Program (HPP), click on: http://www.phe.gov/preparedness/planning/hpp/Pages/default.aspx.

The HHS's Fiscal Year 2010 HPP Guidance, click on: http://www.phe.gov/Preparedness/planning/hpp/Documents/fy10_hpp_guidance.pdf.

The PricewaterhouseCoopers Health Research Institute's Closing the Seams: Developing an Integrated Approach to Health System Disaster Preparedness 12 (2007), click on: http://pwchealth.com/cgi-local/hregister.cgi?link=reg/closingtheseams.pdf.

U.S. Government Accountability Office's 2006 report, Status of the Health Care System in New Orleans 2 (2006), click on: http://www.gao.gov/new.items/d06576r.pdf.

A more recent (2011) HHS report – From Hospitals to Healthcare Coalitions: Transforming Health Preparedness and Response in Our Communities – click on: http://www.phe.gov/Preparedness/planning/hpp/Documents/hpp-healthcare-coalitions.pdf.

Chad Priest (pictured) is the Chief Executive Officer at MESH Inc. Prior to assuming that post, he was an attorney at the Baker & Daniels law firm – practicing public health and healthcare law in the firm's offices in Indianapolis and Washington, D.C., representing a broad spectrum of healthcare entities, and using his background in healthcare and emergency preparedness to provide specialized counseling to clients on public health-related matters. He also worked with healthcare and other social service clients on advocacy, public policy, and legislative matters at both the state and local levels. At an earlier stage of his career, he served on active duty in the U.S. Air Force as a family practice primary care optimization nurse specializing in issues related to emergency preparedness.

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Staffing, Stockpiling & Surging Forward

By Joseph Cahill, EMS

Surge planning for EMS (emergency medical services) duties and responsibilities focuses primarily on four separate but inter-related resources required for a typical mission: personnel; equipment; support/materials; and vehicles.

Staffing is perhaps the most problematic resource issue to resolve because an agency can seldom if ever "stockpile" enough people to deal with any and all possible contingencies. But that problem can be finessed to some extent – by recruiting, in advance, trained professionals who are not already in the regular staffing pool, a ready force for expansion can in fact be maintained, at least theoretically. Unfortunately, because many people qualified to work in and/or from an ambulance already serve in the emergency field (but for other agencies and/or in different fields of specialization), the number of such "reserve" personnel would have to be very large, somewhere on the order of 5:1 or even 10:1.

Staffing is perhaps the most problematic resource issue to resolve because an agency can seldom if ever "stockpile" enough people to deal with any and all possible contingencies; but that problem can be finessed to some extent – by recruiting, in advance, trained professionals who are not already in the regular staffing pool, a ready force for expansion can in fact be maintained, at least theoretically

Moreover, there are a number of potential problems that must be resolved prior to implementation of a call-up, including, for example: labor issues related to calling in "outside people" to fill staff positions; the additional pay and liability insurance required; providing workers' compensation for the additional recruits; and the possible policy problems involved in assimilating them into the existing system.

A further complication is that, because of financial constraints, it is unlikely that an agency has significant underused support resources available, such as extra mechanics and communications staff. It is possible, of course, to write additional contracts with car dealers and mechanic shops, but such contracts should be negotiated very carefully, in advance, to ensure that the "outside" vendor has agreed to the specific terms of service that might be required. This could be a difficult negotiation when a major event actually occurs because the purchasing rules would still apply, even under the most arduous circumstances imaginable.

Specialized Problems, Surge Capacities & the Stockpiling Dilemma

Several other support functions are too specialized to be contracted out, and must be dealt with in-house – communications, for example, which may be dealt with either in-house or contracted out to another government agency. In either case, maintaining an acceptable surge capacity for the support functions should be approached in the same way used for augmenting other in-house EMS resources.

The stockpiling of "things" rather than people presents a different type of complication. Many, perhaps most, perishable EMS supplies have an expiration date, and that unavoidable circumstance adds a new level of complexity to any plan to stockpile them. There are two approaches that should be considered in maintaining a surge capacity in supplies: one is maintaining a relatively large in-house stockpile; the other is using a vender-controlled stockpile. (Some agencies prefer a combination of these two options – using the in-house stockpile first, but having a vendor-controlled stockpile "on call" when the in-house supplies run out.)

An in-house stockpile of perishable supplies requires that staff use the supplies closest to their expiration date, a common-sense principle that will require some discipline on the part of the supply and line staff alike – but will, or should, work with little or no additional cost following the initial outlays for the various types of goods and/or equipment in the stockpile.

The point at which the stockpile quantity exceeds what is calculated to be the "normal" use of the item over its expiration period is the point where planners have to ask if the current

level of the various resources stockpiled is excessive. Whether it is or not, it is highly probable that at least some items in the stockpile will from time to time have to be discarded and replaced. This is especially true of items that are not used in day-to-day operations – nerve agent antidotes, for example.

Fly Cars – A More Affordable Necessity

One of the major constraints in maintaining an all-purpose surge capacity involves vehicles, most of which are too expensive to stockpile – but also too necessary to ignore. Many systems use non-transport vehicles outfitted with paramedic gear and staffed with paramedics in their day-to-day responses. In systems that typically transport their paramedic units in ambulances, additional units can shift into so-called "fly cars" – SUVs and/or station wagons, for example, that have ample carrying capacity but are not equipped with the medical gear that is standard equipment in most ambulances.

The fly-car option allows the thrifty planner to augment, at a reasonable cost, the transport capabilities with the paramedic ambulances initially available. In addition to using *all* available spare vehicles, including those not normally thought of as spare – e.g., parade pieces and other display vehicles – the fly-car/SUV/station-wagon pool is the most likely source of additional vehicles.

If either of these options is contemplated during the surge-planning sessions, it is important to ensure that the theoretically "spare" equipment is fully maintained so that *all* vehicles, the fly cars as well as the ambulances, are up to the minimum operational standards required.

In the long run, the principal and most common-sense measure of success for a surge plan are three relatively simple questions: (1) "Was the surge invisible to the patient?" (2) "Did the ambulance arrive in a timely manner?" (3) Was it adequately staffed with trained professionals who had with them the tools and supplies needed to do their jobs?" After all, the patient requires the same care whether he or she receives it from a line unit or a surge unit. In either case, it is the responsibility of the EMS agency responding to the emergency call to provide that care.

Joseph Cahill, a medicolegal investigator for the Massachusetts Office of the Chief Medical Examiner, previously served as exercise and training coordinator for the Massachusetts Department of Public Health, and prior to that was an emergency planner in the Westchester County (N.Y.) Office of Emergency Management. He also served for five years as the citywide advanced life support (ALS) coordinator for the FDNY - Bureau of EMS, and prior to that was the department's Division 6 ALS coordinator, covering the South Bronx and Harlem.

Critical Issues Faced by MRC In a Special Needs Shelter

By Donald Brannen, Amy Schmitt & Mark McDonnell, Health Systems

When the initial stage of a powerful North American storm started, on 31 January 2011, meteorologists predicted that within the first three days the system would affect over 100 million people throughout the United States. The storm brought cold air, heavy snowfall, blowing snow, and mixed precipitation on a path that stretched from New Mexico and northern Texas all the way to New England and Eastern Canada.

The greater Ohio Valley region experienced a potentially lethal mixture of snow, sleet, and freezing rain. Significant ice accumulations were observed north of the Cincinnati Tri-State region, into the Miami Valley region in Southwest Ohio. The national effects of the storm included: numerous power outages; flight, rail, and bus cancellations; airport, road, school, government, and business closures; and mail stoppages. The storm was blamed for an estimated 30 or more deaths, and damages totaled well over $1 billion – and possibly, depending on the cost parameters used, as much as $3.8 billion. The ice and snow, mixed with high winds, brought hundreds, probably thousands, of tree branches down and caused numerous power outages throughout the Miami Valley.

On February 2, the American Red Cross (ARC) opened six shelters across the Dayton area for persons affected by the storm and without electricity at their homes. The following day, the ARC requested support from the Greene County Medical Reserve Corps (MRC) for approximately 30 residents. When MRC volunteers arrived at the shelter, however, they found that the shelter staff had already been overwhelmed by the number of special-needs clients. All 30 of them were hypertensive, and one was epileptic. In addition, the shelter cots did not meet the oversized needs of a number of obese clients.

In addition, one client suffering from severe edema of the lower extremities required medical intervention. She could not get out of her wheelchair, and the height of the cots available prevented her not only from lying down but also from elevating her legs – so she slept in the chair. (Fortunately, the MRC volunteers were able to arrange for her to be transported to a hospital.)

Cognitive Impairments + Limited Privacy = Unlimited Frustration

Meanwhile, the local ARC agency was reasonably well prepared with both medical and emergency supplies, but many of

the people brought to the shelter had left their homes without bringing with them their medications (insulin, for example), oxygen equipment, adult diapers, and similar necessities. In addition, many of the more elderly clients suffering from various cognitive impairments were unable to inform volunteers about their specialized health conditions and/or medications. To make matters worse, the shelter bathrooms were not wheelchair-accessible, so the MRC volunteers had no choice but to ask some of the clients to use bedpans and urinals (in corners of the room with limited privacy). In short, the shelter was simply not equipped to properly care for the special-needs population that it housed.

To make matters worse, the MRC volunteers encountered additional difficulties in transferring clients out of the shelter and into better equipped facilities, such as nursing homes and assisted-living facilities. The coordinating and support agencies needed to authorize and/or provide for such transfers were closed after 5:00 p.m., so the shelter staff could not immediately access the resources needed to remedy an already difficult situation. (Some other facilities were in fact open, but were unable to admit the new clients because their own guidelines required incoming clients to have with them not only their recent medical histories but also physician orders and payer information, none of which were readily available.)

Additional MRC volunteers were first placed on standby to assist with shelter operations, and shortly thereafter were activated. Because of the limited space at the original shelter, an additional shelter, at a local university, also had to be opened. MRC nurses were assigned to both locations to help transport the clients, unload material, and check in the clients. However, because of various communication problems, some volunteers had to shuttle back and forth between the two shelters. The shelter originally planned was closed – after all materials and clients had been transported, of course – because it simply was not capable of providing the quantity and quality of care needed. In the meantime, scheduling was coordinated through both the ARC chapter and the MRC unit leader. Local emergency-management and state public-health agencies also were notified of the problems encountered and the remedial actions that had been taken.

The Standard Reasons for Limited Success

The "standard" ARC shelter medical kit is a relatively large first-aid kit, but is not equipped with all of the medications and specialized medical devices and equipment required to meet the needs of medically complex patients. For example, the standard kits available in Dayton had no blood pressure cuffs or stethoscopes, and there were no strips available for the glucometers used by diabetic patients. The MRC responders therefore had to supply, and use, some of their own medical equipment. However, to meet the special needs of a number of the more medically fragile clients, the MRC responders tried to arrange for them to be sheltered elsewhere – but, unfortunately, were unsuccessful in that effort.

Additional communication errors were encountered when the MRC responders were informed, erroneously, that other support agencies had been called and arrangements for transferring some patients to nursing homes had been made. However, after contacting the case managers of those agencies, the MRC responders discovered that the agencies had not yet been notified of the problems that had been encountered. That belated discovery further delayed nursing-home and assisted-living placement by at least one day. Nonetheless, the ARC staff maintained a positive work ethic and continued to go "the extra mile" despite the numerous hurdles encountered. Meanwhile, the MRC responders continued to care for the patients – but by that time many of the clients had been without essential medications and/or specialized treatment for several days.

There were several other difficulties and problems that had to be resolved. To begin with, MRC responders eventually were able to locate some pharmacies in the area, but could not get approval from insurance companies for the additional medications needed. In addition, certain U.S. Department of Veterans Affairs (VA) policies unintentionally hindered the MRC efforts, in two ways: (a) MRC nurses were not allowed to pick up medications from the VA without the client present; and (b) the VA was not able to authorize local pharmacies to provide "a temporary fill" of prescriptions because many of the VA physicians did not possess local licenses, and that unforeseen circumstance meant that local pharmacies were not legally permitted to process their orders.

Because of their lack of medical training, the standard shelter workers did not fully comprehend the needs of the clients brought to the shelter. Only one of the shelter managers, for example, had any incident training. The workers obviously wanted to do their best, and to help the clients in any and every way possible, but were feeling overwhelmed, understandably, because their training did not adequately prepare them for special-needs cases. The increased attention needed for the special needs of the shelter clients caused additional confusion about the incident command on the scene.

Access to adequate transportation was also lacking at the facility. The ARC and NCOA (National Council on Aging) volunteers continued to move clients out of the shelters. However, transportation was problematic because the shelter did not have

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DuoDote® Auto-Injector should be administered by emergency medical services personnel who have had adequate training in the recognition and treatment of nerve agent or insecticide intoxication. DuoDote® Auto-Injector is intended as an initial treatment of the symptoms of organophosphorous insecticide or nerve agent poisoning; definitive medical care should be sought immediately.

Important Safety Information

Individuals should not rely solely upon agents such as atropine and pralidoxime to provide complete protection from chemical nerve agents and insecticide poisoning. Primary protection against exposure to chemical nerve agents and insecticide poisoning is the wearing of protective garments including masks designed specifically for this use. Evacuation and decontamination procedures should be undertaken as soon as possible. Medical personnel assisting evacuated victims of nerve agent poisoning should avoid contaminating themselves by exposure to the victim's clothing.

In the presence of life-threatening poisoning by organophosphorous nerve agents or insecticides, there are no absolute contraindications to the use of DuoDote® Auto-Injector. When symptoms of poisoning are not severe, DuoDote® Auto-Injector should be used with extreme caution in people with heart disease, arrhythmias, recent myocardial infarction, severe narrow angle glaucoma, pyloric stenosis, prostatic hypertrophy, significant renal insufficiency, chronic pulmonary disease, or hypersensitivity to any component of the product. Elderly people and children may be more susceptible to the effects of atropine. DuoDote® Auto-Injector is Pregnancy Category C and should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. Safety and effectiveness in children have not been established.

Muscle tightness and sometimes pain may occur at the injection site.
The most common side effects of atropine can be attributed to its antimuscarinic action. Pralidoxime chloride can cause changes in vision, dizziness, headache, drowsiness, nausea, tachycardia, increased blood pressure, muscular weakness, dry mouth, emesis, rash, dry skin, hyperventilation, decreased renal function, excitement, manic behavior, and transient elevation of liver enzymes and creatine phosphokinase. When atropine and pralidoxime are used together, the signs of atropinization may occur earlier than might be expected when atropine is used alone.

DuoDote® AUTO-INJECTOR
(atropine and pralidoxime chloride injection)

READY TO RESPOND

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References: 1. Agency for Toxic Substances and Disease Registry. Medical Management Guidelines (MMGs) for nerve agents: tabun (GA); sarin (GB); soman (GD); and VX. http://www.atsdr.cdc.gov/MHMI/mmg166.html. Updated August 22, 2008. Accessed May 20, 2010. **2.** DuoDote Auto-Injector [package insert]. Columbia, MD: Meridian Medical Technologies, Inc.; 2007. **3.** Rebmann T, Clements BW, Bailey JA, Evans RG. Organophosphate antidote auto-injectors vs. traditional administration: a time motion study. *J Emerg Med*. 2009;37(2):139-143.

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THE DUODOTE™ AUTO-INJECTOR SHOULD BE ADMINISTERED BY EMERGENCY MEDICAL SERVICES PERSONNEL WHO HAVE HAD ADEQUATE TRAINING IN THE RECOGNITION AND TREATMENT OF NERVE AGENT OR INSECTICIDE INTOXICATION.

INDICATIONS AND USAGE

DuoDote™ Auto-Injector is indicated for the treatment of poisoning by organophosphorus nerve agents as well as organophosphorus insecticides.

DuoDote™ Auto-Injector should be administered by emergency medical services personnel who have had adequate training in the recognition and treatment of nerve agent or insecticide intoxication.

DuoDote™ Auto-Injector is intended as an initial treatment of the symptoms of organophosphorus insecticide or nerve agent poisonings; definitive medical care should be sought immediately.

DuoDote™ Auto-Injector should be administered as soon as symptoms of organophosphorus poisoning appear (eg, usually tearing, excessive oral secretions, sneezing, muscle fasciculations).

CONTRAINDICATIONS

In the presence of life-threatening poisoning by organophosphorus nerve agents or insecticides, there are no absolute contraindications to the use of DuoDote™ Auto-Injector.

WARNINGS

CAUTION! INDIVIDUALS SHOULD NOT RELY SOLELY UPON ATROPINE AND PRALIDOXIME TO PROVIDE COMPLETE PROTECTION FROM CHEMICAL NERVE AGENTS AND INSECTICIDE POISONING.

PRIMARY PROTECTION AGAINST EXPOSURE TO CHEMICAL NERVE AGENTS AND INSECTICIDE POISONING IS THE WEARING OF PROTECTIVE GARMENTS INCLUDING MASKS DESIGNED SPECIFICALLY FOR THIS USE.

EVACUATION AND DECONTAMINATION PROCEDURES SHOULD BE UNDERTAKEN AS SOON AS POSSIBLE. MEDICAL PERSONNEL ASSISTING EVACUATED VICTIMS OF NERVE AGENT POISONING SHOULD AVOID CONTAMINATING THEMSELVES BY EXPOSURE TO THE VICTIM'S CLOTHING.

When symptoms of poisoning are not severe, DuoDote™ Auto-Injector should be used with extreme caution in people with heart disease, arrhythmias, recent myocardial infarction, severe narrow angle glaucoma, pyloric stenosis, prostatic hypertrophy, significant renal insufficiency, chronic pulmonary disease, or hypersensitivity to any component of the product. Organophosphorus nerve agent poisoning often causes bradycardia but can be associated with a heart rate in the low, high, or normal range. Atropine increases heart rate and alleviates the bradycardia. In patients with a recent myocardial infarction and/or severe coronary artery disease, there is a possibility that atropine-induced tachycardia may cause ischemia, extend or initiate myocardial infarcts, and stimulate ventricular ectopy and fibrillation. In patients without cardiac disease, atropine administration is associated with the rare occurrence of ventricular ectopy or ventricular tachycardia. Conventional systemic doses may precipitate acute glaucoma in susceptible individuals, convert partial pyloric stenosis into complete pyloric obstruction, precipitate urinary retention in individuals with prostatic hypertrophy, or cause inspiration of bronchial secretions and formation of dangerous viscid plugs in individuals with chronic lung disease.

More than 1 dose of DuoDote™ Auto-Injector, to a maximum of 3 doses, may be necessary initially when symptoms are severe. **No more than 3 doses should be administered unless definitive medical care (eg, hospitalization, respiratory support) is available.**

Severe difficulty in breathing after organophosphorus poisoning requires artificial respiration in addition to the use of DuoDote™ Auto-Injector.

A potential hazardous effect of atropine is inhibition of sweating, which in a warm environment or with exercise, can lead to hyperthermia and heat injury.

The elderly and children may be more susceptible to the effects of atropine.

PRECAUTIONS

General: The desperate condition of the organophosphorus-poisoned individual will generally mask such minor signs and symptoms of atropine and pralidoxime treatment as have been noted in normal subjects.

Because pralidoxime is excreted in the urine, a decrease in renal function will result in increased blood levels of the drug.

DuoDote™ Auto-Injector temporarily increases blood pressure, a known effect of pralidoxime. In a study of 24 healthy young adults administered a single dose of atropine and pralidoxime auto-injector intramuscularly (approximately 9 mg/kg pralidoxime chloride), diastolic blood pressure increased from baseline by 11 ± 14 mmHg (mean ± SD), and systolic blood pressure increased by 16 ± 19 mmHg, at 15 minutes post-dose. Blood pressures remained elevated at these approximate levels through 1 hour post-dose, began to decrease at 2 hours post-dose and were near pre-dose baseline at 4 hours post-dose. Intravenous pralidoxime doses of 30-45 mg/kg can produce moderate to marked increases in diastolic and systolic blood pressure.

Laboratory Tests: If organophosphorus poisoning is known or suspected, treatment should be instituted without waiting for confirmation of the diagnosis by laboratory tests. Red blood cell and plasma cholinesterase, and urinary paranitrophenol measurements (in the case of parathion exposure) may be helpful in confirming the diagnosis and following the course of the illness. However, miosis, rhinorrhea, and/or airway symptoms due to nerve agent vapor exposure may occur with normal cholinesterase levels. Also, normal red blood cell and plasma cholinesterase values vary widely by ethnic group, age, and whether the person is pregnant. A reduction in red blood cell cholinesterase concentration to below 50% of normal is strongly suggestive of organophosphorus ester poisoning.

Drug Interactions: When atropine and pralidoxime are used together, pralidoxime may potentiate the effect of atropine. When used in combination, signs of atropinization (flushing, mydriasis, tachycardia, dryness of the mouth and nose) may occur earlier than might be expected when atropine is used alone.

The following precautions should be kept in mind in the treatment of anticholinesterase poisoning, although they do not bear directly on the use of atropine and pralidoxime.

- Barbiturates are potentiated by the anticholinesterases; therefore, barbiturates should be used cautiously in the treatment of convulsions.
- Morphine, theophylline, aminophylline, succinylcholine, reserpine, and phenothiazine-type tranquilizers should be avoided in treating personnel with organophosphorus poisoning.
- Succinylcholine and mivacurium are metabolized by cholinesterases. Since pralidoxime reactivates cholinesterases, use of pralidoxime in organophosphorus poisoning may accelerate reversal of the neuromuscular blocking effects of succinylcholine and mivacurium.

Drug-drug interaction potential involving cytochrome P450 isozymes has not been studied.

Carcinogenesis, Mutagenesis, Impairment of Fertility: DuoDote™ Auto-Injector is indicated for short-term emergency use only, and no adequate studies regarding the potential of atropine or pralidoxime chloride for carcinogenesis or mutagenesis have been conducted.

Impairment of Fertility: In studies in which male rats were orally administered atropine (62.5 to 125 mg/kg) for one week prior to mating and throughout a 5-day mating period with untreated females, a dose-related decrease in fertility was observed. A no-effect dose for male reproductive toxicity was not established. The low-effect dose was 290 times (on a mg/m^2 basis) the dose of atropine in a single application of DuoDote™ Auto-Injector (2.1 mg).

Fertility studies of atropine in females or of pralidoxime in males or females have not been conducted.

Pregnancy:

Pregnancy Category C: Adequate animal reproduction studies have not been conducted with atropine, pralidoxime, or the combination. It is not known whether pralidoxime or atropine can cause fetal harm when administered to a pregnant woman or if they can affect reproductive capacity. Atropine readily crosses the placental barrier and enters the fetal circulation.

DuoDote™ Auto-Injector should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Nursing Mothers: Atropine has been reported to be excreted in human milk. It is not known whether pralidoxime is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when DuoDote™ Auto-Injector is administered to a nursing woman.

Pediatric Use: Safety and effectiveness of DuoDote™ Auto-Injector in pediatric patients have not been established.

ADVERSE REACTIONS

Muscle tightness and sometimes pain may occur at the injection site.

Atropine

The most common side effects of atropine can be attributed to its antimuscarinic action. These include dryness of the mouth, blurred vision, dry eyes, photophobia, confusion, headache, dizziness, tachycardia, palpitations, flushing, urinary hesitancy or retention, constipation, abdominal pain, abdominal distention, nausea and vomiting, loss of libido, and impotence. Anhidrosis may produce heat intolerance and impairment of temperature regulation in a hot environment. Dysphagia, paralytic ileus, and acute angle closure glaucoma, maculopapular rash, petechial rash, and scarletiniform rash have also been reported.

Larger or toxic doses may produce such central effects as restlessness, tremor, fatigue, locomotor difficulties, delirium followed by hallucinations, depression, and, ultimately medullary paralysis and death. Large doses can also lead to circulatory collapse. In such cases, blood pressure declines and death due to respiratory failure may ensue following paralysis and coma.

Cardiovascular adverse events reported in the literature for atropine include, but are not limited to, sinus tachycardia, palpitations, premature ventricular contractions, atrial flutter, atrial fibrillation, ventricular flutter, ventricular fibrillation, cardiac syncope, asystole, and myocardial infarction. (See **PRECAUTIONS**.)

Hypersensitivity reactions will occasionally occur, are usually seen as skin rashes, and may progress to exfoliation. Anaphylactic reaction and laryngospasm are rare.

Pralidoxime Chloride

Pralidoxime can cause blurred vision, diplopia and impaired accommodation, dizziness, headache, drowsiness, nausea, tachycardia, increased systolic and diastolic blood pressure, muscular weakness, dry mouth, emesis, rash, dry skin, hyperventilation, decreased renal function, and decreased sweating when given parenterally to normal volunteers who have not been exposed to anticholinesterase poisons.

In several cases of organophosphorus poisoning, excitement and manic behavior have occurred immediately following recovery of consciousness, in either the presence or absence of pralidoxime administration. However, similar behavior has not been reported in subjects given pralidoxime in the absence of organophosphorus poisoning.

Elevations in SGOT and/or SGPT enzyme levels were observed in 1 of 6 normal volunteers given 1200 mg of pralidoxime intramuscularly, and in 4 of 6 volunteers given 1800 mg intramuscularly. Levels returned to normal in about 2 weeks. Transient elevations in creatine kinase were observed in all normal volunteers given the drug.

Atropine and Pralidoxime Chloride

When atropine and pralidoxime are used together, the signs of atropinization may occur earlier than might be expected when atropine is used alone.

OVERDOSAGE

Symptoms:

Atropine

Manifestations of atropine overdose are dose-related and include flushing, dry skin and mucous membranes, tachycardia, widely dilated pupils that are poorly responsive to light, blurred vision, and fever (which can sometimes be dangerously elevated). Locomotor difficulties, disorientation, hallucinations, delirium, confusion, agitation, coma, and central depression can occur and may last 48 hours or longer. In instances of severe atropine intoxication, respiratory depression, coma, circulatory collapse, and death may occur.

The fatal dose of atropine is unknown. In the treatment of organophosphorus poisoning, doses as high as 1000 mg have been given. The few deaths in adults reported in the literature were generally seen using typical clinical doses of atropine often in the setting of bradycardia associated with an acute myocardial infarction, or with larger doses, due to overheating in a setting of vigorous physical activity in a hot environment.

Pralidoxime

It may be difficult to differentiate some of the side effects due to pralidoxime from those due to organophosphorus poisoning. Symptoms of pralidoxime overdose may include: dizziness, blurred vision, diplopia, headache, impaired accommodation, nausea, and slight tachycardia. Transient hypertension due to pralidoxime may last several hours.

Treatment: For atropine overdose, supportive treatment should be administered. If respiration is depressed, artificial respiration with oxygen is necessary. Ice bags, a hypothermia blanket, or other methods of cooling may be required to reduce atropine-induced fever, especially in children. Catheterization may be necessary if urinary retention occurs. Since atropine elimination takes place through the kidney, urinary output must be maintained and increased if possible; intravenous fluids may be indicated. Because of atropine-induced photophobia, the room should be darkened.

A short-acting barbiturate or diazepam may be needed to control marked excitement and convulsions. However, large doses for sedation should be avoided because central depressant action may coincide with the depression occurring late in severe atropine poisoning. Central stimulants are not recommended.

Physostigmine, given as an atropine antidote by slow intravenous injection of 1 to 4 mg (0.5 to 1.0 mg in children) rapidly abolishes delirium and coma caused by large doses of atropine. Since physostigmine has a short duration of action, the patient may again lapse into coma after 1 or 2 hours, and require repeated doses. Neostigmine, pilocarpine, and methacholine are of little benefit, since they do not penetrate the blood-brain barrier.

Pralidoxime-induced hypertension has been treated by administering phentolamine 5 mg intravenously, repeated if necessary due to phentolamine's short duration of action. In the absence of substantial clinical data regarding use of phentolamine to treat pralidoxime-induced hypertension, consider slow infusion to avoid precipitous corrections in blood pressure.

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the ability to transport obese and/or wheelchair-bound clients. In fact, a local EMS agency had to be called to help with one patient with high blood sugar – a bariatric client who had not left his home in years other than by medical transport (in an ambulance fitted with a specialized lift) and therefore required transport to the emergency room.

Many of the patients had already been in very tenuous health even before the storm, so the shelter staff had to deal with a situation that was already bad and rapidly becoming worse and worse. By Sunday morning (February 6), the MRC and ARC staff helped initiate transport of the remaining clients and were able to close the shelter by midday. Meanwhile, Dayton Power and Light reported that its own repair crews – working with some 1,500 mutual-assistance personnel from Ohio and four other states – were working to restore power to the final 24 customers who had lost electrical service during the ice storm.

The Long Laundry List of Lessons Learned

Among the numerous lessons learned, the following are among the most important:

(a) Public health nurses should be used in shelter operations only as a last resort. A better role for them would be to coordinate and support the medical aspects of a response or to lead MRC volunteers.

(b) The activation of local MRC nurses/volunteers to support standard shelter operations should not be automatic but, rather, an action given serious consideration after all relevant circumstances have been taken into consideration. In emergency situations, a properly designated unified command should manage resources in accordance with National Incident Command System (NICS) principles.

(c) MRC units should strive to support (not run) a "Federal Medical Station" shelter in whole or in part because of the unit size involved. (The state-level assets of the Greene County MRC Unit assigned to a 50-bed facility were more easily supported than would have been possible in a situation involving a 250-bed medical shelter.)

(d) During large-scale events, the ICS structure should be established as early as possible. During the ice storm, the "location" of the event was not only constantly changing but also had no fixed boundaries; the same will be true of many other public-health emergencies for the foreseeable future. Nonetheless, the ICS structure itself should be clear to all personnel involved. Local MRC units probably should not automatically be considered lead agencies in the planning and/or development process. Increased attention must be paid to logistics requirements, though – and should include specific instructions on: (1) how to requisition supplies; and (2) how to initiate and supervise shelter activities. The guidelines for both of these important tasks should be developed (or adapted from existing sources) by the properly designated lead agencies involved.

(e) Many special-needs residents are in a tenuous state of health. Inadequate sheltering may make matters worse by causing those with disabilities to slip more easily from a stable to an unstable health status, thereby adding to the already heavy burden imposed on the shelter staff and social support systems. More specifically, this additional burden includes, among other particulars, the need for shelter staff to access resources, extend required services within the shelter, and/or transport clients to outside services.

(f) Nurses provide particularly valuable services, covering a broad spectrum of both general and special care, during a public health emergency. Among the many difficult issues overcome during the ice storm were several changes of shelter location, client transport, direct-care issues, outdated medicines, the inadequate equipment available for bariatric clients, and delayed notifications to the decision makers and participating organizations involved that were authorized to resolve problems. There also were a number of problems related to the admission and discharge procedures used to help medically stable (but physically fragile) clients into and out of the shelter. In short, during a public-health emergency, having the right volunteer in the right place at the right time can dramatically affect the health outcomes of clients being cared for in a shelter.

Footnote: Following the massive February 2 ice storm event, one of the Greene County MRC volunteers was awarded the 2011 Office of the Civilian Volunteer Medical Reserve Corps (OCVMRC) MRC Responder Award for outstanding service, following the MRC activation, in support of the ARC shelter activities. The ice storm and accompanying winds that left 80,000 Dayton Power and Light customers in the Greater Dayton region without power also left the shelter staff in the same area without the supplies and specialized equipment needed to prepare both properly and effectively for the sudden inflow of special- needs clients.

Donald Brannen (pictured) is a graduate of the College of Medicine, University of Cincinnati and Xavier University's Hospital Administration Program. He also holds undergraduate degrees in liberal arts and medical laboratory science and is a community epidemiologist and Medical Reserve Corps unit leader with over 25 years of experience in medical and public health research. Amy Schmitt, RN, BSN, graduated from the Good Samaritan College of Nursing and Health Science in Cincinnati, holds a bachelor's degree in nursing from Indiana Wesleyan University, and is program coordinator of the Greene County, Ohio, Communicable Disease and TB Control Unit. Mark A. McDonnell holds bachelor of science and master of science degrees from Ohio State University; he is the health commissioner of Greene County and a member of the Adjunct Faculty at the Wright State University College of Medicine. He also is executive director of the Greene Community Health Foundation and a member of the NACCHO Public Health Preparedness Committee.

The Handling of Mass Fatalities During Medical Surges

By Anthony S. Mangeri, Emergency Management

Emergency managers focus much of their planning efforts on the needs of their communities in times of crisis. These efforts are designed both to ensure continuity of services and to secure the resources necessary for healing their communities from the devastation incurred both during and after the event. Although death is always a difficult subject to address, emergency managers must nonetheless plan for the particularly complicated impact on community resources caused by mass-fatality incidents.

In addition to the medical needs of those seeking health care, hospitals and other acute care providers have the added responsibility of addressing the hospital-based management of mass-fatality situations. However, to effectively address medical surge needs during a mass-casualty scenario, community, public health, and healthcare emergency planners must fully discuss, in advance, fatality management in general and, in particular, the decedent flow process. How the remains of the deceased are handled is not only a major crisis-management issue but also, particularly if mishandled, a substantial social and cultural concern.

The emergency-planning process for mass-fatality incidents must address not only the handling and processing of deceased victims, but also the special needs and personal feelings of the bereaved families. Public information that needs to be disseminated should include such topics as the handling of fatalities, the mandate of dignity for decedents, and protection of the overall health of the community. The lack of an efficient public-information process may very quickly lead to public distrust – along with a perception that government may be interfering with the legal and/or civil rights of the bereaved.

Mass-fatality incidents can often change the normal flow of decedent management and mortuary services – which in some communities, and/or in certain situations, may be rather limited. There also may be difficulty in securing death certificates, which are almost always required prior to releasing the remains of the deceased. To stem the spread of disease during a pandemic or other major public-health emergency, there also may be a need for social distancing, including the imposition of limits on social gatherings – specifically including funerals.

Relevant Questions, Legal Requirements, and Business Continuity

Developing the strategies needed to address catastrophic events and lessen the impact of medical surge on healthcare systems is perhaps the most essential aspect of that process. One of the first steps in planning for mass-fatality management is for healthcare facilities to identify their own roles in the process. It is particularly important to understand the planning currently in place to address emergency operations, both within hospital facilities and within the community at large.

There are a number of relevant questions, including the following, that should and must be asked to help healthcare professionals and emergency planners develop an effectively integrated mass-fatality management strategy:

1. Have the hospitals within the regional healthcare system formed the mass-fatality management teams likely to be needed?

2. Does the community emergency operations plan identify the mass-fatality management strategies likely to be employed?

3. How will and should hospitals and other healthcare facilities interact with local public health and medical examiner/coroner (ME) systems?

4. What are the relevant laws, rules, and regulations addressing decedent management within the jurisdiction?

Healthcare systems managers and planners must also be aware not only of the legal requirements mandated by state and local governments but also the standards published by such other entities as the U.S. Centers for Disease Control and Prevention, the Joint Commission on Accreditation of Hospital Organizations, the Occupational Safety and Health Administration, and the Health Resources and Services Administration.

In general, mass-fatality incidents fall into one of two categories: (a) an acute localized incident; or (b) a prolonged regional event such as a pandemic. Activation of a healthcare facility's mass-fatality management strategy may be necessary when there is a medical surge caused by either of these two categories.

In many ways, the management of mass fatalities is also a business-continuity issue for healthcare facilities. Under normal circumstances, most of the nation's healthcare systems can perform the mass-fatality management functions needed with little or no interruption of normal everyday operations. However, during a large-scale disease outbreak or mass-casualty incident, fatalities can and often do exceed a hospital's normal operational capabilities, thus putting excessive demand not only on the medical staff but also on the physical resources needed to adequately manage decedent flow.

The Typical Process – And Many Exceptions to the Norm

Healthcare systems tend to focus most of their attention, and resources, on the sick and injured – an understandable order of priorities that can often leave healthcare facilities with very limited personnel or resources assigned to morgue services. However, during large-scale mass-fatality events, in addition to providing medical care for the living, hospitals are also responsible for identifying, storing on-site, and properly – and very respectfully – disposing of decedent remains.

It is reasonable to assume that in such events a large number of fatalities will remain at the point of the incident and will not be transferred to a hospital. In fact, as many as 50 to 75 percent of the decedents from a mass-casualty event, depending on the scenario, will probably *not* be directly, or quickly, transported to hospitals or other healthcare facilities. The majority of these fatalities will be taken from the incident scene directly to the ME's office for forensic triage and investigation.

However, in a prolonged regional event such as a pandemic, hospitals are more likely to experience both a surge and subsequent in-hospital fatalities for a period ranging from a few weeks to several months. Moreover, because a large geographic jurisdiction will usually be affected by a pandemic, MEs will require additional time to process the incoming remains. MEs working with public health officials will also be required to create a case definition, which is a critical component to the management of decedent flow. After a case definition has been established, MEs will be able to advise healthcare facilities as to which cases require transfer to the ME and which can be released directly to mortuary services.

Additional Complications, Circumstances, and Considerations

Another complication to keep in mind is that, when most of the deaths caused by a specific incident occur outside a medical treatment facility, the ME's resources can become overloaded very quickly. When that happens, hospitals can expect to hold decedent remains for up to several days as MEs and public health officials work together to determine the case definition and investigatory requirements. It also is likely that, during a prolonged event: (a) the number of fatalities needing storage will quickly exceed existing regional capabilities; and (b) limited refrigerated storage may create a need for nontraditional methods of temporary storage.

Mass-fatality management involves a substantial number of technical, legal, and cultural issues in managing morgue services and decedent flow. Community emergency managers and healthcare systems must therefore work together, in advance, to address, at a minimum, several critical planning considerations: (a) integrating public information systems; (b) identifying potential locations for community-based portable and/or temporary morgues; (c) packaging and storing the personal effects of a large number of decedents; (d) processing and issuing death certificates; (e) notifying the next of kin; and (f) managing family relations by providing accurate and detailed information (as quickly as possible, often under very difficult circumstances) as well as referrals to community-based family service systems.

It is clear that planning for a mass-fatality incident involves a number of highly regulated and technical processes. A hospital's primary function is, and will always be, to care for the sick and injured. However, healthcare-based mass-fatality management should supplement community-based emergency planning for mass-fatality incidents. All emergency-operations efforts involving mass fatalities therefore should be based on the reasonable assumption that the disposition of remains must be carried out in an expeditious but always respectful manner. In addition, healthcare and other relevant policies and plans must be reviewed, updated if and when needed, or created anew to ensure that the needs of the bereaved, and of the community as a whole, are properly considered. Planning should not occur in a vacuum.

Anthony S. Mangeri, MPA, CPM CEM, is Assistant Professor for Emergency & Disaster Management of the American Public University System. He has more than 25 years' experience in emergency management and public safety services; his latest research and consulting work includes the development and creation of mass-fatality management strategies for healthcare organizations. Following the 11 September 2001 attacks, he served as Operations Chief at the New Jersey Emergency Operations Center, helping coordinate that state's response to the attacks on the World Trade Center. He also has served as a volunteer firefighter and emergency medical technician for almost 25 years, reaching the rank of Assistant Chief-Safety Officer.

Whole-Body Imaging: A Safe Alternative to the "Pat Down"

By Aaron Sean Poynton , Transportation

Over the heavily traveled holiday season late last year, there was media frenzy over the use of whole-body imagers (WBIs) and TSA's (Transportation Security Administration's) enhanced "pat downs" at U.S. airports. The 2010 "Don't touch my junk" moment in California, which sparked a national debate, was reminiscent of the 2007 "Don't tase me bro" incident in Florida. Critics and supporters on both sides lined up to express their views and the pundits had a heyday. In April 2011, the controversy sparked again when the video of a six-year-old girl receiving an "enhanced" pat down at the New Orleans airport went viral.

While much of the recent debate's focus is directed toward TSA's enhanced pat downs, it is important to emphasize that, in many cases, travelers have a choice between pat downs and WBI screening. In these cases, the pat down is used only after the traveler declines the screening. Since it is unlikely that the TSA will abandon its enhanced pat-down policy or shelf the WBI option, travelers need to be able to make well informed decisions should they be faced with the choice between WBIs and enhanced pat downs.

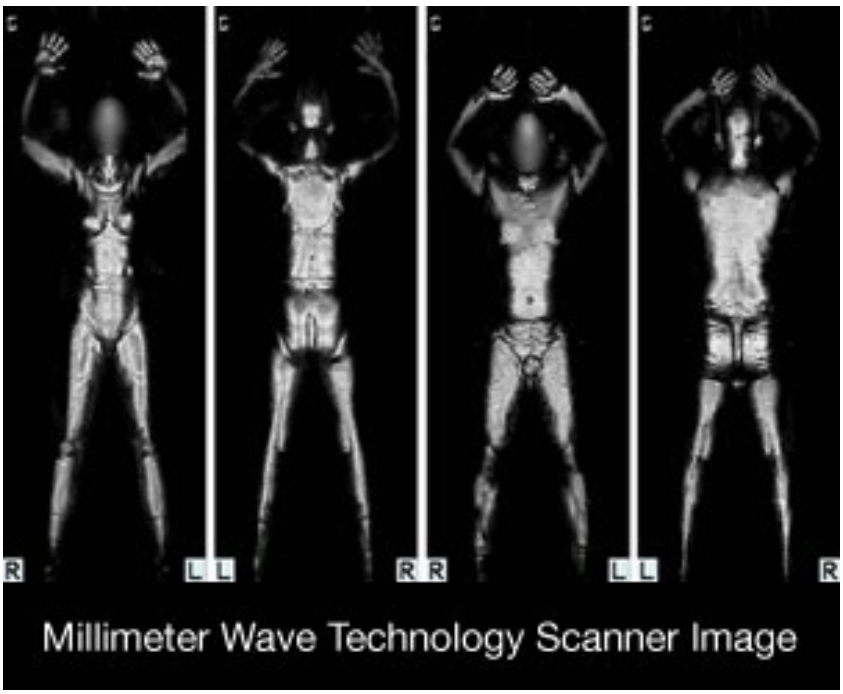
Unfortunately, it can sometimes be difficult to determine the difference between fact and fiction. Much of the information available can be misleading, particularly if one focuses solely on negative aspects of the technology used. The three principal issues that critics and supporters debate involve privacy, safety, and health concerns. Before travelers decide to opt out of WBI screening, or perhaps even opt out of flying altogether, it is important to learn the facts about the WBI technology currently being used at U.S. airports. In that context, here are five myths that can and should be debunked:

MYTH: ***Travelers are exposed to an unsafe level of radiation when scanned***

FACT: There are two types of technologies used by TSA in its WBI screening. Many of the systems use millimeter-wave technology, which emits no ionizing radiation. Using this technology is as safe as having a picture taken with a digital camera. On the other hand, backscatter X-ray technology emits low doses of radiation – so low, though, that the person being scanned receives only about the same amount of radiation as he or she would receive during two minutes of flight on a typical commercial aircraft. That is not surprising, because this system was created specifically to produce an acceptable image while minimizing radiation exposure.

MYTH: ***TSA operators personally sees the body images of those they are screening***

FACT: The images produced by WBIs are sent to a secure remote viewing station where a trained professional – who is looking specifically for items that could pose a threat to the traveling public – views the image. The viewer then sends a message by radio to the TSA agent on the floor, who has no access to the image. That message either clears the passenger for travel or directs the agent on the floor to perform additional screening – an option almost always based on an anomaly seen in the image. Here it also should be emphasized that the TSA operator who analyzes the image has no personal or visual contact with the passenger.



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MYTH: ***The TSA viewer at the remote station will see the traveler naked***

FACT: WBI systems do not possess the type of X-ray vision possessed by Superman. The images produced by most WBIs are grainy black-and-white, and relatively low-resolution, still pictures. However, a well trained operator is able to use an image to depict nonmetallic threats, such as plastic explosives, or a ceramic knife, that would probably be missed by a traditional metal detector. In the future, moreover – as the technology advances and the image quality improves – new privacy measures such as software modifications that blur faces and genitals will in all likelihood be incorporated into the system to add an extra layer of anonymity.

MYTH: ***Images of travelers are saved for future viewing and could fall into the wrong hands***

FACT: As soon as the system operator deems that a specific passenger is safe, the images are permanently deleted from the computer and cannot be retrieved for future viewing. In addition, cameras, cell phones, and other video or recording devices are prohibited in the TSA remote viewing stations, and any violation of TSA's policies in this area could result in both criminal charges and civil legal action.

Much of the information available can be misleading, particularly if one focuses solely on negative aspects of the technology used... but the three principal issues that critics and supporters debate involve privacy, safety, and health concerns

MYTH: ***Being screened by a WBI system is mandatory***

FACT: *Anyone* can opt out of being screened by a WBI system. However, if a traveler is requested to go through a WBI screening but is not willing to do so, he or she will be asked to undergo another type of screening, such as a pat down, to ensure the safety of other travelers. TSA also offers the use of private screening rooms for pat downs and/or other more invasive secure screening. In that context it is important to note that both screening methods, the WBI screenings and the pat downs, are currently secondary screening procedures at most U.S. airports and it is likely that a traveler will not be asked to go through either.

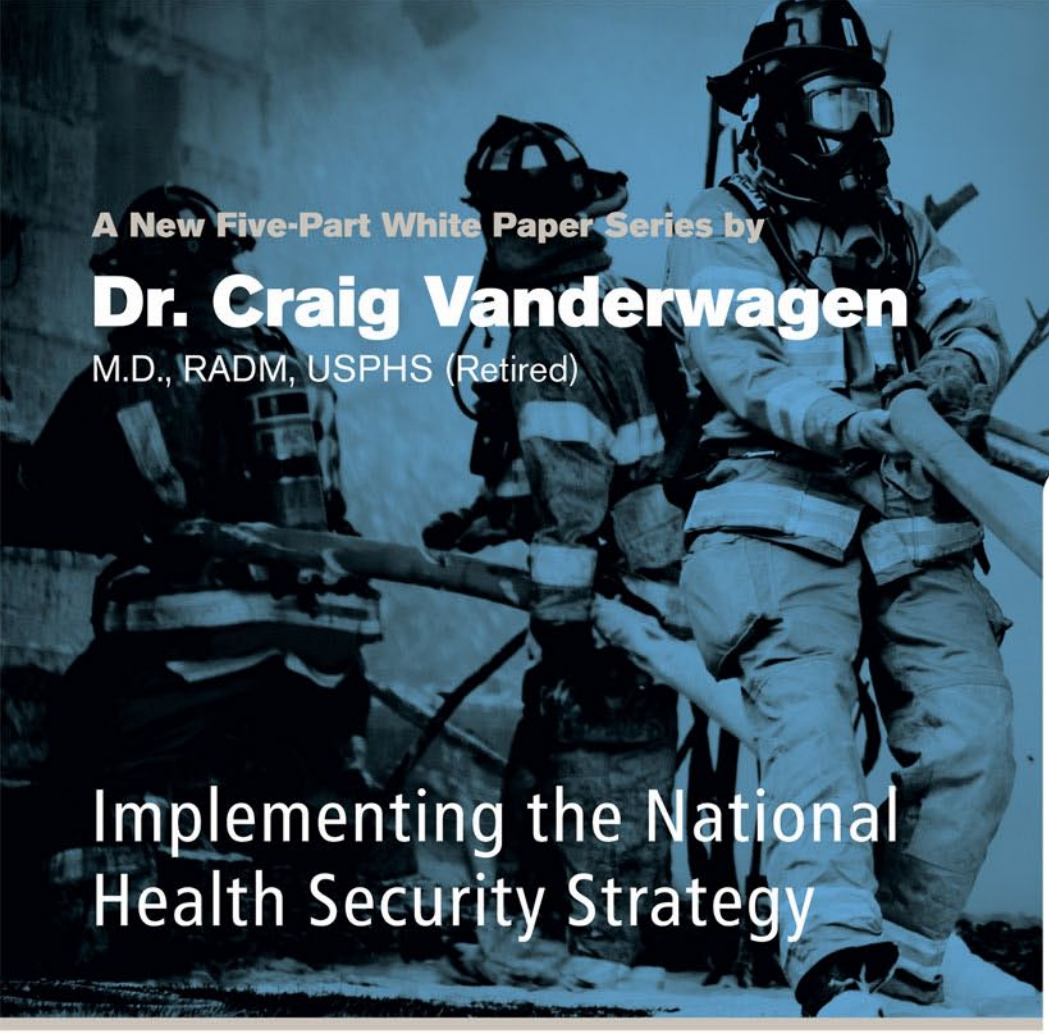
In short, with a little research and some reliable information, a traveler can make a better informed decision about his or her preferred screening option. Nonetheless, it is clear that threats to the world's airways are a clear and present danger, and likely to be so for the foreseeable future. Ensuring the safety and security of the skies must therefore be a high priority for many years to come. Such post-9/11 attempted terrorist attacks as those planned by the December 2001 shoe bomber, the December 2009 underwear bomber, and the October 2010 toner-cartridge bombers provide clear evidence of the diverse and frequently changing tactics employed by terrorist groups. Unfortunately, the airport security methods of the past cannot detect many of the threats currently facing the nation's airlines. Although no current security measure is totally infallible, it is abundantly clear that WBI technology provides a safe and convenient layer of security to protect the nation's aviation system from most modern threats.

For additional information on:
"Don't Touch My Junk," click on: http://en.wikipedia.org/wiki/Don%27t_touch_my_junk

"Don't Tase Me Bro," click on: http://en.wikipedia.org/wiki/University_of_Florida_Taser_incident

The "Under-Age" Pat Down at the New Orleans Airport, click on: http://news.travel.aol.com/2011/04/13/tsa-gives-pat-down-to-six-year-old-girl-in-new-orleans/

Aaron Sean Poynton is the senior government market specialist at a science and technology company that has no commercial interest in whole-body imaging. Previously, he served as director at a global technology company in the defense and homeland security markets. A former officer in the U.S. Army and an FAA-certified ground security coordinator, Dr. Poynton is a graduate of the Johns Hopkins University Army ROTC program and holds a bachelor's degree in economics from the University of Maryland UMBC, a master's from the George Washington University School of Business, and a doctorate in public administration from the University of Baltimore.



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Public Health Monitoring Systems: Two "Good Stories"

By JL Smither, Public Health

States have been using various technology and communications tools, such as the Internet, to detect, monitor, and track public health concerns. The effective use of these tools allows health officials to better plan their response and resource allocation to any major disease outbreak. Two of these systems – New Jersey's Hippocrates system and the Tarrant County, Texas, School Health Surveillance System (SHSS) – also provide those involved in public health efforts with a workable combination of both real-time and static data and recommendations.

In 2001, not long after the 9/11 terrorist attacks against the United States, five news media agencies and two U.S. Senators received anthrax-laden letters postmarked from Trenton, New Jersey. For years afterward, that state's Department of Health and Senior Services continued to receive calls from local citizens, the media, and various "concerned organizations" reporting encounters with what frequently are described as "white powder" substances.

The department originally tracked these reports by hand, but eventually moved to a more basic electronic record system, and then to the Health Operations Tracking system. Close to the same time, in 2003, the department was developing a new Healthcare Emergency Resource Management Information System to help track the availability of hospital beds that could be used during potential mass-casualty incidents.

Not long after the 9/11 terrorist attacks, five news media agencies and two U.S. Senators received anthrax-laden letters postmarked from Trenton, New Jersey; for years afterward, the state's Department of Health and Senior Services continued to receive calls from local citizens, the media, and "concerned organizations" reporting encounters with [various] "white powder" substances

Hippocrates: TOPOFF 3, Warren Grove, and H1N1

By 2005, the department had already combined these two electronic tracking systems through the use of a software interface. However, even though the software allowed for a common interface, both programs still ran separately and could not easily be cross-referenced. To make that integration possible, the department developed what is called the Hippocrates system – which was tested during TOPOFF 3, a full-scale international preparedness exercise that included a scenario based on a mock biological-warfare attack in New Jersey. Using feedback from that event, the department enhanced Hippocrates and launched the first full version of the system in December 2006.

The Hippocrates system (available at https://hippocrates.nj.gov) requires users to log in to access public health monitoring tools. The department has gradually released access to the system to specific groups such as the State Health Command Center, various regional medical coordination centers, and a number of county and city health departments as well as the state police, acute-care hospitals, long-term care facilities, and certain federal agencies and organizations. Among the new operational tools made available to these users are geographic information systems-based maps that can be overlaid with real-time data – e.g., the locations of points of dispensing, traffic conditions, and command centers. The system also allows users to communicate with one another through chat rooms and file sharing.

Hippocrates was first used during the 2007 Warren Grove wildfire to track the fire's movement, to monitor intensive care sites, and to help evacuate long-term care facilities as needed; an estimated 18,000 acres were consumed by the fire, and hundreds of residents had to be taken out of the area as well. Following that success, the system has continued to be used, most notably to track the spread of the 2009 H1N1 influenza pandemic. (For more information about what tools are available, please see *Lessons Learned Information Sharing (LLIS.gov)* Good Story, *The New Jersey Department of Health and Senior Services' Hippocrates System.*)

SHSS: School Nurses, NACCHO Guidance, and Outbreak Maps

In Tarrant County, Texas, influenza outbreaks are now detected and monitored through the SHSS, an online portal with a mission similar to that of the New Jersey Hippocrates system. The

SHSS was launched in 2007 by the Southwest Center for Advanced Public Health Practice, an Advanced Practice Center funded by the National Association of County and City Health Officials (NACCHO). The SHSS allows the Tarrant County Public Health (TCPH) department to collect health-related information from and push related information out to county schools.

Because school children are more likely not only to contract influenza-like illnesses but also to spread those illnesses to others outside the school, TCPH focuses its monitoring efforts on schools as the best way to both detect and control disease outbreaks. The SHSS, which is accessible to school nurses as well as to county health officials, allows the nurses to record daily updates of their school's health data, including absenteeism reports. The system also provides real-time outbreak maps, helpful information on flu-prevention activities and recommendations, and places to report outbreaks of the flu and other contagious diseases.

In part because the system was built on an open-source software platform, the SHSS is highly replicable in other jurisdictions. NACCHO also offers a guidance kit to help establish monitoring systems in other communities. (Click on: http://apc.naccho.org/Products/APC20102215/Pages/Overview.aspx.) The kit focuses on Tarrant County but also includes case studies of four other similar systems. (For additional information, click on *LLIS.gov* Good Story, *The Southwest Center for Advanced Public Health Practice's School Health Surveillance System*.)

To briefly summarize: The systems described above are effective primarily because they provide a combination of collaboration tools, static information and recommendations, and real-time data updates. In addition, they are adaptable to many audiences and scalable to a number of different situations, which makes them useful in many different types of responses. They can also be emulated by other jurisdictions at a relatively low cost. (For more information on these and other types of public health systems, please visit *LLIS.gov*.)

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Delaware, Missouri, Tennessee & Washington

By Adam McLaughlin, State Homeland News

Delaware
New Medical Registry for Emergencies, Disaster Response

Delaware has launched a statewide voluntary registry to collect general information on the medical conditions of state residents so that emergency medical technicians and emergency managers may better serve them in life-threatening situations. The new Emergency Preparedness Voluntary Registry gives residents a web-based interface that can be used to verify their addresses, list emergency contacts, and provide basic information about any of their medical conditions that could affect how emergency personnel respond. Registration also enrolls residents in the state's emergency notification system.

The registry, newly operational in late April, will not replace the state's emergency medical dispatch protocols, but will give first responders additional information about individual victims during an emergency situation, said Terrence Whitham, Delaware's 911 administrator. "If the person calls and we have physical contact with … [that person], a dispatcher is going to follow their [dispatch] protocols," he said. "What this is intended to do is – when we have third-party calls on somebody or [that person] may be unconscious – we do have some … basic information [already available]."

For each household with a registered resident, an icon appears on a dispatcher's map indicating that additional information is already on file. That information is shared with dispatchers at all of the state's nine public safety answering points, and with state and local emergency managers. The shared mapping data not only provides a level of redundancy but also increases the situational awareness of call-takers; the latter benefit could be particularly important if operations from one call center must be transferred to another – or if a call-taker in Kent County, for example, answers a call that perhaps should have been forwarded to the lower part of Newcastle County.

Emergency managers will be able to use the information in the registry to prepare for and carry out advance planning for disasters. Whitham noted that a number of nursing home

patients in New Orleans drowned in the aftermath of Hurricane Katrina because the facilities they were living in had not been evacuated. Delaware itself sits on a peninsula that in the past has experienced a number of severe storms. The new registry and accompanying layers of maps would help Delaware's emergency managers see immediately where special-needs residents are living, Whitham pointed out, and what equipment may be required to evacuate them. "We can actually plan how many specialized buses with wheelchair ramps we are going to need," he commented. "The emergency managers would have a database that they could [use] … to assist them in advance planning for transportation needs."

The new registry, which grew out of a two-year program to update the state's emergency services function planning, was a collaborative effort that included, among other participants, public health and social services officials, emergency medical service providers, and the state's Developmental Disabilities Council. Developing the registry cost an estimated $35,000 in the state's own E-911 Board budget and FEMA (Federal Emergency Management Agency) grant funds.

An icon appears on a dispatcher's map indicating that additional information is already on file; that information is shared with dispatchers at all of the state's nine public safety answering points, and with state and local emergency managers

Missouri
Kansas City Hosts International AgroTerrorism Symposium

Hundreds of people representing 25 nations gathered at the Hyatt Regency in downtown Kansas City last week for the fourth Federal Bureau of Investigation (FBI) International Symposium on AgroTerrorism. The conference focused on a number of topics dealing with the world's food supply and how to keep it safe "from farm to fork."

The FBI organized the first symposium in 2005, but the last time a group like this had met was three years ago. "A lot has occurred" since then, of course, said FBI Special Agent Craig Watz, but "nothing that has been intentional. We have not had an intentional contamination of food or within the agricultural industry. However," he continued, "the potential [for such contamination] exists and we want to encourage partnerships – public/private partnerships – between government, law enforcement, and the private industry."

No nation, and no individual, has unleashed a biological agent, such as one that causes foot-and-mouth disease, against the U.S. livestock industry in recent years. But there have been instances of other types of attacks on the nation's food system. For instance, in 1984, the Rajneeshee religious cult spiked the salad bars at several restaurants in Oregon with Salmonella typhimurium. That attack poisoned 751 people. "The reason they [the cult members] did that was to influence a local election … to sicken enough people" so that those who had been poisoned "were not able to vote," said Linda Lee, an intelligence analyst with the FBI.

Any attack targeting the nation's food supply creates fear, she also pointed out. To begin with, it diminishes confidence in the sector that has been attacked, Moreover, the economic impact of a biological attack on the livestock sector would be significant. If there is any one disease that alarms livestock producers and security experts alike, it is foot-and-mouth disease, specialists in agroterrorism agree. "There is no such thing as a small outbreak" of that disease, Lee continued. "If you have an outbreak, you have a big, big problem on your hands."

Terrence Wilson, animal scientist at the University of California-Chico, concurred, and told those attending the 27 April symposium that foot-and-mouth is "a billion-dollar disease, period." Wilson and Japanese military official Hiroya Goto discussed a food-and-mouth disease outbreak in Japan last year that cost that nation well over $3.1 billion. More than 290,000 cows and pigs had to be "culled from the herd," they said, as a result of the infection.

The Japanese military played a key role in the government's response, said Goto, a representative of the military medicine research unit of the Japanese Ground Self-Defense Force. He and Wilson agreed that the outbreak of foot-and-mouth disease would be a national emergency that requires immediate action, primarily because it can have a major

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impact on the national economy. Moreover, it not only could lead to massive trade embargoes, but would also have a profound psychological impact on the public. In addition, Goto pointed out, it would have to be looked at as a potential bioterrorist attack.

To illustrate the disruption such an outbreak could have on international trade in general, it was pointed out that Taiwan was once a big provider of pork to Japan. But in 1997, Taiwan experienced a foot-and-mouth outbreak, after which its pork exports to Japan plummeted from 266 metric tons of pork in 1996 – the last year before the outbreak – to none at all in 2005.

Wilson and other experts said they always advise dairy producers to learn the early signs of foot-and-mouth disease and report anything suspicious to a veterinarian as quickly as possible. The veterinarians themselves then must seek laboratory confirmation of their findings, because the symptoms of food-and-mouth disease are similar to those of several other diseases – the vesicular stomatitis virus, for example, and swine vesicular disease. The blisters that accompany both of these diseases are similar in appearance to one another.

Tennessee
Memphis Converts Transit Bus for Mass Medical Evacuations

As flood waters continue to threaten parts of Memphis, that major Tennessee city, and the surrounding region, have a new tool at their disposal for the mass transport of residents with special needs. Using a federal grant, the Memphis Fire Department has converted a bus, donated by the local transit authority, to transport special-needs patients to evacuation shelters.

The transit bus was converted through the use of an AmbuBus kit from First Line Technology. The kit can be used to outfit a standard transit bus or a 40-foot school bus with up to 18 stretchers, which are secured against the sides of the bus. The kit is composed of a frame of structural steel possessing a weight capacity of 40,000 pounds and configured with pre-drilled positioning holes. The kit contains, among other things, all of the bolts and hand tools required for assembly. An AmbuBus takes about two hours to reconfigure into either a temporary or permanent configuration. The Memphis bus was configured to accommodate 16 stretcher-bound patients and a dozen or so seated patients.

Jim Logan was a medical group supervisor in New Orleans on the first day of operations after the levees broke in 2005 – "We triaged … 368 patients that day and … a special-needs bus was something we sure could have used," he said; "An ambulance at best can carry two patients, and that's it"

The need for mass-casualty transport has been a continuing challenge during responses to several hurricanes and was one of the key lessons learned following Hurricane Katrina. Jim Logan, consequence management coordinator with the Memphis Fire Department, was a medical group supervisor in New Orleans on the first day of operations after the levees broke in 2005. "We triaged … 368 patients that day and that [a special-needs bus] was something we sure could have used," Logan said. "An ambulance at best can carry two patients, and that's it."

Logan said the converted bus could be a valuable resource for transporting patients if the waters now threatening Memphis and the surrounding area continue to rise. The city's fire department has approximately 33 ALS (advanced life support) ambulances in its inventory; in addition, a dozen or so private ambulance services that already operate in the city will be needed for daily operations. The converted bus could be extremely useful if the city's special-needs population has to be evacuated.

The Memphis Fire Department used approximately $30,000 of a grant awarded to the Memphis-Shelby County Metropolitan Medical Reserve System to purchase the AmbuBus kit. The Memphis Area Transit Authority donated, and continues to maintain, two reconditioned buses for the fire department – which plans to purchase another kit in the next grant year to convert another bus and to have three to five buses converted for medical transportation within the next three years.

Washington
University Receives Grant to Create Disaster-Scenario Database

There are few situations in life as frightening as being in the midst of a major earthquake – which often begins as a low vibration, an uneasy "feel," and a sound similar to that made by a very large truck rumbling by a house or office building. Those early-warning sounds very quickly escalate into a fierce, deadly freight train of a roar, combined with and characterized by the violent shaking of buildings, large and small, in the area and all of their contents – including humans, pets, and other living animals. At various times within the shaking phase of the quake the earth itself heaves both upward and back down as though the entire planet had been transformed into one large rolling wave of not very solid ground.

It is at such times that many people realize – perhaps for the first time – that they have no real control over their lives – and that "control," however it is defined, is simply a temporary illusion created by nature during the times the local area of Planet Earth chooses not to be on a rampage.

The recent devastation in Japan caused by a huge earthquake and follow-on tsunami highlights once again the importance of scientists being able to predict where and when earthquakes will occur. It is only coincidental, of course, but as part of an ongoing effort to minimize the loss of life and property caused by earthquakes, two Western Washington University scientists are now the recipients of a federal grant that will be used to put together a new earthquake survival "tool" that, when completed, will be the first of its kind in the country – and perhaps the entire world.

More specifically, Assistant Professor of Environmental Studies Scott Miles and Research Associate Rebekah Green of the university's Resilience Institute have received a $45,000 grant from the Washington Emergency Management Division to create and "populate" a digital database of 20 earthquake disaster scenarios and the potential impact of each.

The database is expected to be used by emergency planners and responders throughout the state to: (a) develop a pre-event training curriculum; (b) understand the individual vulnerabilities of each of the 20 areas expected to be analyzed; and (c) plan for post-event operations in the wake of an event.

"Data is not useful until it is packaged for specific decision needs," Miles commented. "Washington will soon have a one-stop location for practitioners and the public to understand physical earthquake hazards and their potential social and economic impacts throughout the entire state. This type of interactive, user-focused tool will be the first of its kind in the country."

The grant will be used not only to build the application database but also to fund the research efforts of a graduate student, Benjamin Kane of Davis, California.

The Resilience Institute's primary mission is to create and disseminate both practical knowledge and operational tools that promote the development of resilient human and ecological communities in the context of natural hazard risks. The Institute focuses particularly on research and service in the state of Washington. Its past and current projects include research on the impact on businesses of flooding within Lewis County itself.

Adam McLaughlin, CEM, MS, MPA, is the operations manager for Elizabethtown Gas, an AGL Resources Company that delivers service to approximately 273,000 residential, business, and industrial natural gas customers in New Jersey. He previously served, for over six years, as the manager of emergency readiness, Office of Emergency Management of the Port Authority of New York & New Jersey. His responsibilities in that post included the development and coordination of Port Authority interagency all-hazard plans, and the design and development of emergency preparedness exercises. Prior to assuming the Port Authority post, he served in the Army for 10 years as an infantry and military intelligence officer; he is a combat veteran of Afghanistan.

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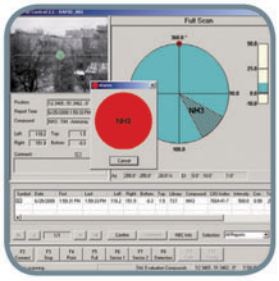

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