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Resilience

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Editor's Notes

By James D. Hessman, Editor in Chief

What every person, organization, and agency needs, but not everyone is planning for – Resilience. This monthly printable issue of the DomPrep Journal takes a look at changes in resilience efforts over the past decade. On 11 September 2001, the world stood still while watching unprecedented events on U.S. soil unfold; in Craig Fugate's (Administrator for the Federal Emergency Management Agency) terms, Americans were facing the "Maximum of Maximums."

Robert McCreight points out that, while "Resilience" continues to grow in importance, the term itself and how it relates to each person or organization still need to be more precisely defined. The Remembrance Card that Joseph Cahill receives each year at this time reminds him about eight friends, eight colleagues, eight co-workers, who gave their own lives to save so many others ten years ago. The multiple attacks by those who are willing to perish for their beliefs may not be common in the United States but, as Joseph Trindal points out, multimodal martyrdom has been steadily increasing in recent years. These Mumbai-style attacks by suicide-seeking terrorists pose a growing threat worldwide.

A remarkably comprehensive report, by Kay Goss, discusses the many ways that the International Association of Emergency Managers, the National Fire Protection Association, and many other organizations, government agencies, academia, and everyday citizens are supporting the Whole-of-Community approach to making the nation safer day by day and year by year. An urgent message from Dr. Thomas K. Zink discusses several dangerous aspects of the U.S. government's current approach to protecting the American people from additional anthrax attacks. The benefits and risks must be weighed to determine the threat of mass fatalities. An encouraging progress report, by Raphael Barishansky and Audrey Mazurek, illustrates the increasingly important role played by public-health professionals in responding not only to pandemics but also to mass-casualty incidents of all types.

A helpful article on the basics of radiation by Jeffrey Williams defines the "ABGs" (alphas/betas/gammas), neutrons, and the various invisible but often fatal radiation dangers posed by each. Knowledge and preparation provide the best way to recognize and avoid unnecessary exposure risk. Omar Alkhalaf reports on how Ventura County's Plume-Mapping Working Group (PMWG) initiative may save their Los Angeles neighbors (and other jurisdictions). Tracking the plume's path following a chemical or nuclear explosion provides authorities with more accurate information on the safest way to reach evacuation routes.

Catherine Feinman takes readers on a tour of the U.S. Army's Chemical/Biological Center (ECBC) in Edgewood Maryland, home to some of the most lethal gases, toxins, and powdery "substances" of various types anywhere on earth. The article (and accompanying slide show) demonstrates efforts that ECBC is continually making to protect and equip today's warfighters. An "umbrella" report, so to speak, by Adam McLaughlin, tells how New York and Connecticut are drying out, and attempting to recover from, the recent floods in those states. Louisiana, a thousand miles or so to the southwest, is coping with the good news/bad news message about its recent levee improvements (and remaining inadequacies). An update on Colorado's new communications and "Interoperability Training Program" shows how that state is meeting its resilience goals.

About the Cover: The annual U.S. remembrance of the 11 September 2001 terrorist attacks – which has become a second Memorial Day for most Americans – is depicted here in this imaginative merging (by Susan Collins) of the twin towers of the World Trade Center, as viewed from the street, and New York City's own Memorial Lights. (iStock photos)


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Attaining Resilience: Getting from Here to There

By Robert McCreight, CIP-R

In emergency management and homeland security, the definition of "resilience" – both as a concept and as a watchword – is packed with significant ambiguity, profound promise, and a certain degree of controversy. Obviously, urging professionals and practitioners to develop, nurture, and sustain resiliency plans might well inspire a number of good ideas and lead to some helpful practical actions. However – although the ability to overcome calamity, prepare for unexpected devastation, and ensure the robust recovery of key infrastructures may be implied – there is still a divergence of opinions about the true meaning of resilience.

The term resilience has been invoked as a major theme in various speeches over the past 12-18 months by such national leaders as Craig Fugate, administrator of the Federal Emergency Management Agency (FEMA), and DHS (Department of Homeland Security) Secretary Janet Napolitano. However, at least a few other knowledgeable authorities have argued that resilience is simply a new perspective on recovery, the next level of sophistication in mitigation efforts, and/or even a fifth core element beyond the "traditional" four: mitigation, preparedness, response, and recovery.

Largely for that reason, and in order for state and local governments to achieve substantial gains in resilience over the next decade, it should be recognized that some challenging issues require additional clarification – including but not necessarily limited to such umbrella topics as definitions, incentives, metrics, technologies, and strategic impact. Following are some relevant points related to each of those abstract terms that should be taken into consideration.

First Priority: A Clear Definition of the Term

To begin with, resilience needs to be expressed in operational terms that go beyond mere dictionary definitions and such exhortations as being "robust," possessing the ability both to "absorb disasters" and "bounce back," and making it possible to "restore order" and reactivate "key systems." Even more specifically, there should be clearer "official" definitions of resilience, at all levels of government – when, for example, the event or incident involved is in the magnitude of a WMD (weapons of mass destruction) attack, a category 3 (or higher) hurricane, a major earthquake, or a similar natural or manmade disaster affecting a large geographic and/or densely populated area.

Resilient outcomes may differ substantially, of course, from "ordinary" outcomes that would occur naturally and without the heavily invested material measures needed to create and/or upgrade resilience capabilities. One

key concern is whether individual cities, states, or even the federal government can push ahead independently with their own resilience operations simply on the basis of what, at least apparently, are considered to be common principles – and without relying on a much more precisely defined definition.

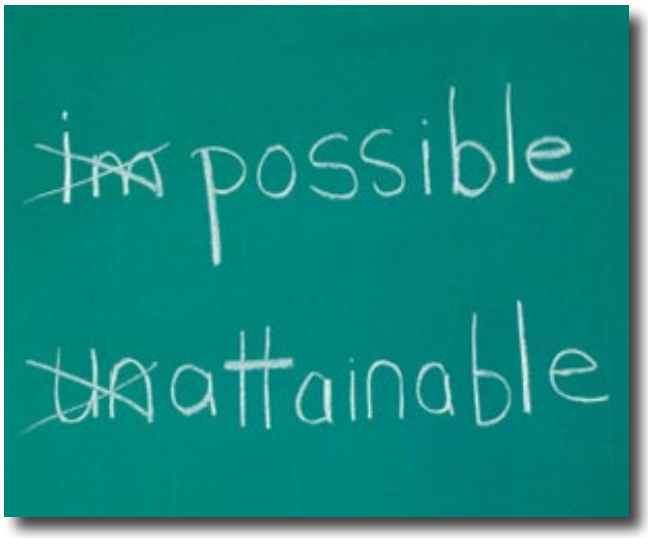
There is also a parallel need to reconcile some currently varying expectations about resilience, its operational dynamics, and the core principles (including political and fiscal considerations) related to the term – as understood by the public sector, the private sector, academia, and the general public. It also is far from clear whether resilience is an attainable and desirable goal, or more of a standard for streamlining emergency preparedness. Here it should be noted that, for most operational purposes, agreement on definitions is certainly desirable for any number of reasons, but may not be of truly crucial importance.

Creating Resilience Through Public and Private Sector Incentives

In creating or upgrading resilience capabilities, of course, it would be helpful to first determine how, and to what extent, a judicious combination of investments, tax breaks, leveraged projects attractive to venture capitalists, and other financial, budgetary, and fiscal options would be beneficial. Many private-sector companies and non-profits are understandably hesitant to move forward on resilience projects because of the uncertainties associated with ROI (return on investment). Developing the parameters needed to measure and test the ROI of dollars and other resources, including personnel, allocated to programs and projects designed to create/improve resilience will be a major political and fiscal challenge.

It is in that context that the following common-sense question should and must be asked: Can resilience be validated only *after* a major disaster? To answer that question it is particularly important to know the level of resources needed, the length of time required, and the specific sectors of the industrial commercial economy that should be targeted.

The restoration and reinforcement of aged bridges, tunnels, highways, wastewater systems, and utilities may certainly be a worthwhile way to start to help reinvigorate and renew numerous critical national infrastructures. However, even



such a colossal, and costly, effort may not automatically improve overall national resilience.

Acceptable Metrics for Measuring & Testing Resilience

Controversies over how resilience should be measured and tested are inevitable, but the eventual pursuit of acceptable metrics will be key to additional progress. Metrics are needed to identify the gap between the present state and some presently ill-defined and perhaps more idealized state reflecting both enhanced and modernized improvements embodying variously engineered tolerances and degrees of robustness that are also not yet defined.

Two relevant questions: (1) What metrics will define a safe and smart office building reasonably immune to most if not absolutely all external or internal disasters? (2) What type and/or scale of metrics will specify how a community, and/or its schools and businesses, can attain a level of resilience that measurably surpasses anything that reflects the current rather ambiguous situation?

The ability to build a social environment that not only taxes and/or rewards commercial and industrial structures but also reduces their insurance liability or magnifies their corporate balance sheet based on their resilience activities is an appealing concept. However, it may still be difficult for resilience to be precisely measured by the public and the press.

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Needed for Uniting Sectors

More advanced social technologies also will be needed to bring together various governmental, corporate, academic, community, and business sectors to develop the stakeholder strategies required to attain and sustain resilience. For that reason, town meetings, webinars, media reports, and other educational ventures will continue to be valuable.

Unfortunately, soliciting creative buy-ins to foster greater stakeholder involvement will not be easy. The strategies discussed above must possess enough political and economic viability to ensure that the gains achieved will not be eroded, redefined, downgraded, or misdirected by a probably well meaning but not always reliable legislature. As with many other social technologies, many if not all of the new resilience programs and policies will probably emanate from the grassroots level and take on increasing credibility as they filter through numerous echelons of business and social enterprises. But they still will be rather fragile and subject to external buffeting by outside detractors and outright foes. More important in this process, therefore, are the linking institutions and organizations that sustain a resolute focus on resilience and advance the cause without doubt, hesitation, or reservations.

Interdisciplinary Strategies to Promote Collaboration & Cooperation

To briefly summarize: The creation and improvement of resilience will require development of a pragmatic yet visionary strategy that is inherently interdisciplinary. It will draw strength and legitimacy from public health, engineering, telecommunications, education, manufacturing, banking, and other key sectors of society that are assigned the responsibility for defining both the pathways to and metrics used for attaining resilience.

Substantial effort and resources will be required to support this interdisciplinary effort, which must be orchestrated by a combination of leaders from the community at large, specifically including academia and other private-sector stakeholders as well as various public-sector agencies and organizations. This long-term effort will in all probability encounter strong opposition and at least a few periodic setbacks, but must remain focused on its commitment to achieving a measurable degree of resilience that may be distinctively different from but nonetheless obviously superior to the present-day system.

The overall task of attaining resilience requires a frank and long-term investment – of political, fiscal, and material resources. This massive effort must be both resource-rich and strategically pragmatic in terms of what may lie ahead. The end result will likely be a new and more vigorous type of resilience built on a foundation of revolutionary societal reform and modernization as it attempts to subdue and curtail the worst effects of the natural disasters that have plagued mankind for countless generations.

For additional information on this subject, see additional works by this author at Journal of Homeland Security and Emergency Management

Resilience as a Goal and Standard in Emergency Management by Robert McCreigh Ph.D., The George Washington University (www.bepress.com/jhsem/vol7/iss1/15/)

Resilience: The Fifth Element in Crisis and Emergency Management by Robert McCreight Ph.D., The George Washington University, 2010 HDSES (www.chds.us/?media/openmedia&id=2570)

Educational Challenges in Homeland Security and Emergency Management, Robert McCreight Ph.D., The George Washington University, 2009 (www.bepress.com/jhsem/vol6/iss1/34/)

Dr. Robert McCreight has over 35 years of experience in the U.S. State Department working in such major fields as global security, arms control, intelligence operations, biowarfare, nuclear weaponry, counter-terrorism, emergency humanitarian missions, and political-military affairs. He served concurrently for 27 years in the U.S. military – primarily in intelligence, psychological operations, civil affairs, and logistics. His teaching areas of expertise include counterterrorism analysis, homeland security, regional security, and treaty verification. He has written a number of articles for the Journal of Homeland Security and Emergency Management, the Strategic Studies Quarterly and the International Journal of Homeland Security on homeland security, emergency management, and national defense subjects and is an adjunct professor in the graduate programs of both the University of Nevada and The George Washington University.

Resurrection & Remembrance: The World Trade Center

By Joseph Cahill, EMS

Carlos Lillo (FDNY, Astoria Station, Queens), Ricardo Quinn (FDNY, Bedford-Stuyvesant Station, Brooklyn), Mario Santoro (Columbia Presbyterian Hospital, Manhattan), Keith Fairben (Columbia Presbyterian Hospital, Manhattan), Mark Schwartz (Hunter Ambulance), Richard A. Pearlman (Forest Hills Volunteer Ambulance Corps, Queens), David M. Sullins (Cabrini Medical Center, Manhattan), and Yamel Merino (MetroCare Ambulance, The Bronx). These eight people from New York are primarily known today for their heroism as responders who died at the World Trade Center on 11 September 2001 while assigned to EMS (emergency medical services) duties.

During the fall of the twin towers, many responder groups, and individual responders, were forced to scatter. In addition, responder vehicles and equipment were lost, unit cohesion collapsed, and the air thickened into an almost opaque fluid. As the world's visible edge moved closer and closer to the viewer on the street, even several blocks away from the towers, various "shapes" could be seen moving about. It was easy to become convinced that everyone known to be on the scene but not within view was lost. After that, everyone newly found had risen from the dead.

A now iconic photo shows five of these eight responders together. A quick bit of video shows them coming and going into and from the east doors of the North Tower – entering with a stair chair and exiting with patients.

A Message from a Friend: A Reminder for Posterity

Every September over the last 10 years a number of survivors including this author receive a "birthday" message, from a good friend. It was more than a faux birthday message, though. It was a reminder that each survivor lives today not on borrowed time but on time granted by fate. Like other Americans who lived through that day, every survivor of the World Trade Center tragedy was thrust back into a world completely changed from the one he or she had inhabited in the earlier part of his or her life. The warm and safe world they knew before had suddenly turned cold, unforgiving, and dangerous.

The gift of survival possesses the same randomness as the gift of birth. A career fire officer described the chaotic scene of the WTC attacks this way: "You ran. You ran as far and as fast as you could, in the direction you happened to be pointed. If [that direction] was north, you lived. If it wasn't … you didn't."

The 9/11 attacks were and will remain a seminal event for the U.S. emergency-response community in every state, city, and town in America. Since that date, responders throughout the nation have learned to move more defensively. Scene safety is no longer merely making sure that an emergency vehicle is safely parked and that the police responders also on the scene have the local traffic under control. It now means much more than that – being on constant alert for secondary devices, for example, and for routes of egress, should an immediate escape become a sudden necessity.

The landscape of what-if scenarios also has changed; so has the process of equipping and training emergency crews. There is now an increased emphasis on CBRNE (Chemical, Biological, Radioactive, Nuclear, and Explosive) hazards, along with a parallel buildup of essential materials and other physical resources – detection systems and PPE (Personal Protective Equipment) gear, primarily, particularly at the line-unit level.

Now, ten years after the 9/11 attacks, the take-home message is not that enhanced training and equipment should be made available through a particular *department* – of course it should – but that enhanced training and equipment should be made available *to the individual responder*. Moreover, the most important lesson that has been learned is that, when the world is crashing down from all directions, individual responders may have to take action on their own – without direction from command, without a briefing, and without re-supply from a departmental stockpile.

The best way to ensure that the eight responders named above, and the thousands of other innocent victims who perished that same day, did not die in vain is not to *join* them but to *live*, to *survive*, and to *continue the fight in their name*.

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. Much in demand as a speaker – he has addressed venues as diverse as the national EMS Today conferences and local volunteer EMS agencies – Cahill also served on the faculty of the Westchester County Community College's Paramedic Program and has been a frequent guest lecturer for the U.S. Secret Service, the FDNY EMS Academy, and Montfiore Hospital.

Beyond an Active-Shooter Scenario

Countering a Multimodal Martyrdom Operation

By Joseph Trindal, Law Enforcement

A local emergency dispatch center receives a frantic call reporting continuous shooting at a shopping mall. Almost immediately, dispatch center call lines light up with additional reports – with "many casualties" now included in the information provided. Dispatchers send responding officers the limited and fragmented information they received from desperate citizens. Officers are inclined to assume that they probably will be confronting an "active shooter" situation. Fortunately, the training and tactics needed for interdicting an active shooter are now widely embedded throughout the U.S. law-enforcement community. However, the response training and tactics used in an active-shooter situation are only minimally applicable to the multimodal martyrdom-style operations that have become so frequent in recent years. Recent noteworthy martyrdom-style operations include the multiple coordinated attacks carried out by terrorists in Mumbai, India, in November 2008, for example, and the attacks earlier this month in Kabul, Afghanistan – which included such high-value political targets as the NATO headquarters there and the U.S. embassy.

The training and tactics needed for interdicting an active shooter are now widely embedded throughout the U.S. law-enforcement community – however, the response training and tactics used in an active-shooter situation are only minimally applicable to the multimodal martyrdom-style operations that have become so frequent in recent years

September 2011 obviously marks a very special time of reflection on the 9/11 attacks that took place a decade ago in New York City, Washington, D.C., and Shanksville, Pennsylvania. It also provides an opportunity to build upon one of the most poignant lessons learned from those closely coordinated attacks – namely, the need to prepare for worst-case scenarios. To date, the United States is fortunate not to have endured a martyrdom attack similar to the 2004 massacre in Beslan, North Ossetia, where more than 380 people were killed in a school hostage crisis. However, as exemplified by 9/11, the United States cannot afford to fall short in developing the local-level capacity, in communities throughout the nation, to cope with martyrdom attacks, including extreme "multimodal" types of operations.

Recognizing the Multimodal Martyrdom Attack

Globally, such martyrdom attacks as suicide/homicide bombings are now a frequent occurrence. Moreover, as devastating as they already have been in Israel and several other countries, the next level is likely to be an attack in which numerous suicide/homicide bombings are preceded by small arms fire as well as IEDs (improvised explosive devices) randomly aimed at the target population. In this type of operation, the person-worn explosives are usually (but not always) reserved for the final phase of the martyrdom operation.

Defeating a well planned and carefully implemented martyrdom attack is extremely difficult to counter, of course, particularly when it involves not just one but several small teams of suicide/homicide terrorists, working closely together in well coordinated assaults against multiple targets. The terrorists' tactical objectives in these operations are essentially twofold: First, maximize the casualty count suffered by the target population; Second, protract the duration of the operation as long as possible in support of the first tactical objective.

The multimodal martyrdom attack usually appears at first as a single extreme criminal/terrorist incident. However, as more and more citizens report their observations, and additional ground intelligence is obtained, the situational picture becomes both more confusing and much more complex. When that happens, early recognition that a multimodal martyrdom attack is underway is particularly important for communities in position to scale up the best response as rapidly as possible.

Needed: A Coordinated Response Strategy & Rapid Situational Awareness

Very few U.S. communities have developed the essential capabilities needed to quickly recognize, and manage, multimodal

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martyrdom attack situations. Local law enforcement agencies at all levels, from the traditional "officer on the street" to the upper command echelons, must be prepared to escalate their operational tempo, from the routine to the extreme, in an efficient and well-coordinated manner. An effective whole-of-community law enforcement response will necessarily, therefore, require quick and continuing interagency collaboration.

To meet the whole-of-community law enforcement rapid response imperative, agencies must develop and perfect numerous efficiencies in real-time attack situational awareness that not only may involve many targets but also targets that are constantly moving from one point to another. One of the more difficult challenges facing India's response agencies during the 2008 Mumbai attacks was identifying where the next attacks were likely to take place. The Mumbai terrorists operated in small but closely interconnected two- or three-man teams, each of which was moving, frequently and unexpectedly, from one target location to another. One of the terrorist teams even left behind, deliberately – in a taxi the team had commandeered – a timed IED that later detonated several blocks away from the attack epicenter.

A truly effective operational response must include the quick and accurate command-level analysis of real-time situational intelligence in order to effectively direct the relatively scarce resources likely to be immediately available during a rapidly changing deadly attack. The counter-attack performance objective for law enforcement agencies should be to establish intelligence-driven command and control almost immediately – i.e., within 30 seconds or so – after the first report of an attack. As is the case with an active-shooter incident, elapsed time in a multimodal martyrdom attack is measured in much greater casualties, including a high percentage of fatalities. In most U.S. jurisdictions, therefore, the co-locating of initial overall incident command with the communications center can be made most effective by reducing the time lags between intelligence collection, command analysis, and field dissemination.

Commander Guidelines: "Everything Within Their Power"

In most cases communications center dispatchers and officers on the street are the principal focal points for collecting real-time ground-level intelligence. For both the street officers and the dispatchers, distraught and frightened citizens are usually the initial sources for raw information, and for that reason the dispatchers and officers must be trained to: (a) quickly gather all relevant information possible from those citizens; and (b) relay that information as quickly as possible to the incident command center. The dispatchers and street officers also need training, and situation-tailored drills, not only in managing the distressed information source – i.e., the individual citizen, in most cases – but also in quickly relaying that information to incident command.

The dispatchers and incident commanders also must do everything within their power to create real-time geospatial awareness of the situational dynamics. Map plotting, no matter how simplistic or rudimentary, is usually the best approach – but requires that someone in a position of authority within the command element be designated, well in advance, to charting (or predicting) the most likely next steps or progression of the assailants. Establishing a lean and adaptable capability for rapid situational awareness should be achieved, ideally within 15 minutes or less, after the initial citizen report, with speed, accuracy, and agility the key objectives. The establishment of "robustness," even within a fully developed incident command system, is a time luxury usually available only in the interdiction phase of an incident if the rapidly evolving situation stagnates because of slow and/or ineffective containment.

Another major complicating factor to keep in mind is that, in Mumbai-style attacks, terrorist controllers operating outside the "battle zone" may, to thwart the counter-attacks, be constantly briefing the martyrs/assailants with near real-time intelligence of the ongoing police activities. During the interdiction dynamic, therefore, public officials must maintain operational security, including radio silence if and when possible, to the fullest extent possible, particularly in the modern digital media age. It is also wise to assume that the assailants are capable of maintaining their own situational awareness from media sources, as well as from potential crowd-embedded observers on the ground.

Adapting Interdiction Tactics: The Columbine Paradigm

The predominant lesson for law enforcement derived from the 1999 Columbine High School tragedy in Colorado is the need to rapidly deploy all officers available to quickly interdict the threat and save lives. Speed remains a core objective in countering a martyrdom attack. However, unlike the typical situation when an active shooter often, but usually as a last resort, chooses suicide over engagement, the adversary in a martyrdom attack is willing from the start to accept a potentially fatal engagement with responding forces. In the extreme martyrdom attack model, the assailants are usually pre-disposed to accept their own deaths as part of the operational design.

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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 typical martyr also is prepared to end such confrontations by detonating an IED attached to his own body. However, the end-game objective, up to and including the assailant's own demise, remains homicide. Moreover, unlike the average suicide/homicide bomber, the martyrdom operational assailant is tactically and mentally prepared for a fatal confrontation with law enforcement. In short, martyrdom operations are planned, rehearsed events in which all of the assailants involved have been trained and indoctrinated to blunt and confound the law enforcement response.

For initial responding officers, the situation may appear to be an active-shooter incident, but they must be prepared to rapidly re-evaluate that assumption and revise their tactics accordingly. Interdicting a martyrdom attack is necessarily a "come as you are" operation. Street officers should be equipped and proficient with patrol rifles. They should carry an ample supply of magazines for reloads to sustain containment efforts.

Other officers should provide protection for the small teams moving toward their interdiction objectives. Even the first three or four responding officers can form themselves into contact and cover teams in order to effectively leapfrog forward under constant protective cover. However, the opportunity to train in team-coordinated maneuvers is seldom available for the special tactics officer. Small-unit tactical training similar to that used in combat theaters is even more infrequent in the law enforcement community, particularly at the street level.

Nonetheless, the interdiction of multimodal martyrdom attacks requires the tactical coordination of multiple small-unit law-enforcement teams. In an extreme situation such as a Mumbai-style attack, those teams usually will have to be assembled on short- or no notice from multiple precincts and neighboring jurisdictions. When that happens, team cohesion and tactical coordination are particularly important to avoid blue-on-blue force situations.

The Planning Script for Countering Martyrdom Attacks

Interdiction effectiveness in rapidly defeating multimodal martyrdom attacks is achieved through concerted planning and preparation. Therefore, planning and preparedness for such incidents should be both internal and interagency.

Internally, all state and local law enforcement agencies should examine their communications and dispatch capabilities to determine if existing capacity is enough to serve as both an intelligence collection point and a hasty command and control center, while continuing to manage the routine and cascading call volume from the rest of the call center's service community. In recent years, usually as a consequence of budget cuts, many agencies have moved supervisory law enforcement officers from the communications centers to the street and/or other operational divisions. Those same agencies should now determine how to meet an operationally acceptable, but at the same time realistic, time-performance objective to provide the competent law enforcement operational presence needed inside the communications center.

Agency-level planning also should include the identification of likely targets and routes of movement for small martyrdom-attack teams. In meeting the terrorist tactical objectives for such operations, the most likely targets may well include, but not necessarily limited to:

- Locations where people gather (e.g., the Nord Ost Theater Incident – Moscow 2002);
- Sites of iconic value (e.g., Nariman House, a prominent Jewish Center – Mumbai 2008);
- Critical infrastructure (e.g., the Cama Hospital, another Mumbai target; also Budyonnovsk Hospital – Russia 1995);
- Tourist targets (e.g., the Taj and Oberoi/Trident Hotels – Mumbai 2008; and the Inter-Con Hotel in Kabul, Pakistan, earlier this year);
- "Special" targets that might hold political or emotional compelling significance (e.g., the Beslan School, North Ossetia – 2004).

The planning should include reviews, between and among mutually supportive law enforcement agencies, of mutual-aid agreements as well as compatibility analyses of response tactics, training, and procedures (TTPs). Harmony between agency TTPs provides a vital foundation to operational cohesion in countering coordinated martyrdom attacks. The development of interagency training on numerous types of situations, not only those considered to be critical incidents, helps develop interagency operational cohesion.

Stairways, Room-Clearing Situations & Intergovernmental Collaboration

Such training programs should be designed, developed, and used to focus on countering and interdicting the multimodal

martyrdom attack methods. Training should prepare officers and first-line supervisors with much greater awareness of terrorist tactics, coupled with local environmental relevance as well as operational methods and the tactics likely to be needed for a successful interdiction. The context for such training should leverage existing tactical capabilities as the baseline, with various situational adaptations added to counter the most likely martyrdom threats. Here it is important to remember that the initial calls for assistance may seem to warrant an active-shooter or explosion-incident type of response.

Officer-level tactical training should include small-team assembly, covered movement, and interdiction tactics incorporating the primary tools that most officers have at their *immediate* disposal. Essential training should strengthen such core skill sets and/or incident scenarios as firearms proficiency, weapons transition, room-clearing situations, the use of stairways, IED awareness, shooting "on the move," and rapid citizen-debriefing techniques.

The testing and validation of whole-of-community preparedness for defeating multimodal martyrdom attacks also should include intra- and inter-agency drills and exercises that extend to all levels of response and command. Effective counter-martyrdom responses are based primarily on achieving swift and seamless intergovernmental collaboration with real-time situational awareness and adaptive interdiction capabilities on the ground. Preparedness exercise programs inclusive of this threat are invaluable to broadening existing community-wide resilience.

The attacks on U.S. soil one decade ago this month offer an abundance of watershed lessons for the U.S. emergency services community – not only to proactively anticipate the changing dynamics of the terrorist/criminal threat but also to defeat such threats, no matter what their origin, from domestic and foreign enemies alike.

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International Progress Report

Building Resilience: Emergency Management Standards, Technology, and Training

By Kay C. Goss, Emergency Management

This year marks the beginning of the second decade after the devastating 9/11 terrorist attacks against the United States; it also is the seventh year since Hurricane Katrina ravaged the U.S. Gulf Coast. There is therefore still a stronger than ever resolve, at all levels of government – and in the hearts and minds of the American people – to create and/or improve the resilience of the nation's critical infrastructure in the wake of both natural and manmade disasters.

However, building the preparedness needed, and strengthening the resilience required, will be a profoundly difficult and continuing challenge. As FEMA (Federal Emergency Management Agency) Administrator Craig Fugate has pointed out, everyone – all Americans – must be a member of "the Team." In other words, the "Whole of Community" approach so often cited involves not only the federal, state, tribal, and local governments but also the private sector, the nonprofit sector, and the general public – specifically including schools, churches, families, and individuals.

Resilience is not only an economic necessity, but also a mandatory prerequisite for the tasks involved in and building of emergency preparedness, hazard mitigation, and homeland security. There are, of course, many ways, and many tools, already available to ensure progress toward developing a truly robust ability to strengthen and stabilize the U.S. critical infrastructure, governmental institutions, communities, individuals, and families.

Common Sense, Logic, Experience – Plus Some Outside Help

Three of the more important of these tools for progress are: (a) standards; (b) technology; and (c) training. This is where common sense comes in. Logic and experience both dictate that agreement on accepted, and operationally effective, standards must come first. Fortunately, there are already in place numerous successful examples to follow such as: (a) the

NFPA (National Fire Protection Association) 1600 standards for Emergency Management and Business Continuity; and (b) the Emergency Management Accreditation Program (EMAP) sponsored by the National Emergency Management Association, the International Association for Emergency Managers, and the Council of State Governments – all of which worked closely in partnership with FEMA in developing, and updating, these voluntary standards for emergency management programs.

Most of the existing standards, now followed, are similar in certain respects, with such major topics and issues as: program management; advisory councils; hazard and risk assessments and analyses; preparedness and planning; mitigation and prevention; logistics; and response and operations. Also such closely related and complementary fields as finance and administration; resource management; risk and hazard identification/assessments; business impact analyses; public information, communications, and warnings; mutual aid and assistance contracts and agreements; training and education (both general and task-specific); and recovery operations.

The United States is not alone in this field, fortunately; many U.S. allies also are focusing more intensely on the need for resilience. The British Continuity Institute, to cite but one example, has built a model set of resilience standards – intended primarily for the private sector but with considerable "outgrowth" potential beyond that. In addition, DRII (Disaster Recovery Institute International) provides standards and courses for those planners interested in becoming a Certified Business Continuity Planner.

Building the preparedness needed, and strengthening the resilience required, will be a profoundly difficult and continuing challenge – and all Americans must be members of "the Team"; in other words, the "Whole of Community" approach often cited involves not only the federal, state, tribal, and local governments but also the private sector, the nonprofit sector, and the general public

This Way Out: New Evacuation Technology

In addition to these program standards, there are standards supporting technological advances and the resilience of buildings, many of them inspired by: (a) the study carried out by the National Institute of Science and Technology (NIST, an important branch of the U.S. Department of Commerce) of the World Trade Center Towers attacks; and (b) the International Code Council's upgraded requirements for the warning systems and evacuation assistance procedures used in high-rise buildings. One of the more significant advances in standards mandated after the 11 September 2001 terrorist attacks, in fact, was the requirement to develop, install, and use new technologies and systems (including prominent and highly visible signage) to help those trapped in high-rise buildings make their way to the nearest stairways and exits that would take them safely to the outside.

Inventors, public officials, and universities have rallied to meet these standards, and go far beyond them, to produce intelligent building evacuation technology, signage, and systems that: (a) show at a glance the locations of all doors, stairs, halls, and exits available during emergencies; (b) determine and "announce," both audibly and visually, which of these routes and exit points are safe to use; and (c) can be activated by cell phones. For example, DHS is supporting research in this area, as is Johns Hopkins University and Lightstep Technologies, LLC, of Belfast.

Many other technologies provide a firm foundation for greater and more effective interoperability among first responders, law enforcement, and emergency management personnel – largely by providing actionable information, in real time, simultaneously to all responders, managers, and others who have a "need to know." Charles Werner, Fire Chief of Charlottesville and Chair of SAFECOM at DHS, works on achieving interoperability, 24 X 7. Moreover, new EOC (Emergency Operations Center) technologies – e.g., ESI's WebEOC and NC4's E Team – also are in common use around the country.

Credentials, Accreditation, Education & the CEM Designation

The recent progress in defining and promulgating more precise and better defined standards has led to parallel improvements in credentialing, certifications, and accreditations as well. For example, building on NFPA 1600 and EMAP – as well as on NIMS (the federal government's National Incident Management System) and NRF (the National Response Framework), and other policies and programs – the Foundation for Higher

Education Accreditation now accredits degree programs in emergency management that are based on the verified ability of such programs to prepare students to design, develop, and maintain compliant emergency management programs at all levels of government, as well as throughout the private and nonprofit sectors.

Credentialing is usually defined and understood as a system (often required by law) by which identification cards are used to authenticate a person's identity and to provide essential information about the skills, qualifications, and other attributes and capabilities possessed by and/or associated with the person identified. Interoperability, in the credentialing context, provides the capability for an organization, company, or jurisdiction to access information from the identification card that is accurate, complete, and legitimate. For operational purposes, credentialing is used primarily for security and to make judicious decisions about granting access and privileges to those possessing the identification cards required.

FEMA is currently leading the way in credentialing by installing such a system for the agency's own permanent full-time personnel, as well as for the agency's Disaster Assistance Employee/Disaster Workforce Reservists. There also has been a highly successful local example – the First Responder Authentication Credentialing (FRAC) – of the credentials upgrading effort in Northern Virginia, and an equally successful state effort in Colorado. A number of other jurisdictions are working on developing similar high-tech identification systems for their own emergency-services and law-enforcement agencies and organizations.

In a closely related field, the International Association of Emergency Managers (IAEM) developed a "Certified Emergency Manager" (CEM®) program in the early 1990's that provides a necessarily rigorous (but highly effective) process for an important professional qualification. Included in that process are a lengthy and detailed application, essay, and examination. An estimated one thousand or more emergency managers currently have the honored CEM designation; of those, more than 200 have held it for 10 years or longer. Which does not mean it represents a lifelong diploma, as almost all other hard-earned degrees/designations do. As is true of all or almost all areas of both science and history, the state-of-the-art skills and

capabilities required in emergency management are constantly being upgraded, so re-certifications of the CEM designation are required every five years.

Rigorous and Repeated Training, and Other Course Remarks

Nonetheless, the upgrading of standards, technology, and training is still not enough. As in most other areas of modern life, the human aspect is still the most important ingredient – and the real key to final success. For that reason, human capital and performance must be closely monitored, revised and improved.

Repeated training and exercises, followed by close and helpful evaluations, provide the essential foundation needed to build the individual resilience not only of senior leaders and operating staff of official agencies and organizations, but also of the general public. Following this process enables each member of the Whole of Community Team to know, understand, accept, and exercise his/her own roles, responsibilities, and options in using the standards and technology already available as well as the "new and improved" versions just over the horizon.

Today, the availability of high-quality emergency training is also widespread – and more easily accessible than ever before. There are almost 200 Independent Study Courses offered online, for example, by FEMA's Emergency Management Institute in Emmitsburg, Maryland. The enormously popular delivery method for the Institute's Integrated Emergency Management Course is used around the country for more than 50 courses per year and has made it possible for community leadership teams in any U.S. community to participate with FEMA's support.

In addition: (a) The National Fire Academy also provides vital training for not only fire and rescue personnel but also for hazardous materials specialists; and (b) The Center for Domestic Preparedness in Anniston, Alabama, offers a full curriculum of specialized courses designed to build and upgrade the technological capabilities, from top to bottom of the leadership ladder, of emergency operators and managers, as well as homeland security specialists, throughout the entire country.

There are also close to 250 emergency-management degree and certificate programs in colleges, universities, and other higher-education institutions throughout the United States, and another one hundred or so schools also either considering or in the process of developing similar programs. An additional 100 programs focused primarily if not exclusively on homeland security also are available.

Meetings & Conferences; Training & Exercises

The 14th Annual FEMA Higher Education Conference convened earlier this year (9-11 June) in Emmitsburg, Maryland, brought together more than 400 officials from U.S. institutions (and seven other countries) offering, planning, or considering such programs. As previously mentioned, the Foundation for Higher Education Accreditation in Emergency Management and related areas has: (a) developed an initial set of standards for such programs; (b) already accredited three such programs; and (c) is now in the process of assessing several additional programs. Many other organizations and educational institutions have been or are considering such processes as well.

Carefully planned, thoroughly monitored, and effectively evaluated exercises provide some of the most practical opportunities available to assess and evaluate training, preparedness, and resilience programs – perhaps more effectively than is possible with "real life" events. (In the latter, there are almost always, by definition, more urgent operational priorities that take precedence.)

Frequent and well planned exercises are needed to give emergency managers and operational specialists the time needed to discuss – at length, and in a positive environment – the questions raised and the concerns voiced related to the decision-making process as they work their way through a scenario.

Significant progress has been made in the nation's emergency management efforts to reach a new and higher level of resilience. Nonetheless, much remains to be done. Partnerships and outreach programs offer additional opportunities for joint planning, training, and exercises of all types, as do effective new technologies, community mitigation measures, and effective response and recovery policies. All of these efforts, and others, enhance resilience, build the quality and capabilities of the emergency services professions and programs, promote the general preparedness of individual states, cities, and individual communities, and build a much stronger and safer nation.

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Anthrax Prevention – Risks vs. Benefits

By Thomas K. Zink, MD, Health Systems

Since the terrorist attacks against the United States on 11 September 2001, significant activity and demonstrable gains have been made in the effort to improve U.S. homeland security. First, the Bush White House Security Council outlined a layered approach to prevent, warn about, protect against, contain, and treat future terrorist attacks. Then the newly created U.S. Department of Homeland Security (DHS) developed its four pillars of biodefense for the 21st Century: (a) threat awareness; (b) prevention/protection; (c) surveillance and detection; and (d) response and recovery.

More recently, Rear Admiral Nicole Lurie, M.D., appointed by President Barack Obama to serve as Assistant Secretary of Preparedness and Response (ASPR) of the U.S. Department of Health & Human Services (DHHS), identified the four highest priorities for ASPR as: (a) individual and community resilience; (b) response capacity; (c) healthcare system capabilities; and (d) countermeasures development/delivery. The common thread within these high-level strategic goals is an emphasis on response. When the word "prevention" has been used, it has often referred to the intelligence and law-enforcement activities necessary to thwart terrorist plots.

This same response order of priorities, though, is sometimes a source of frustration for those who practice preventive medicine, in which pre-exposure immunization is a cornerstone of both community health and resilience. A major ongoing concern is that the current anthrax biodefense policy is based primarily on the use of antibiotics (with or without vaccination) following an attack – an approach that appears to ignore and/or downplay the threat posed by multi-drug resistant (MDR) anthrax. In the case of MDR, the planning related to antibiotics opens the door to the possibility of numerous casualties actually caused by failed antibiotics.

There exists abundant data in medical literature documenting the fact that anthrax can be and has been made resistant to antibiotics. One authoritative example: Abed Athamna et al. reported (in the August 2004 issue of the *Journal of Antimicrobials and Chemotherapy*) that anthrax could be made resistant to 18 different antibiotics designed to treat it. Included on that list are all of the antibiotics currently stored in the Strategic National Stockpile (SNS) for post-exposure response to an anthrax attack.

Similarly, retired Major General Philip K. Russell, M.D., sounded the alarm on MDR anthrax – in a 2007 Clinical Infectious Disease Supplement titled *Project BioShield: What It Is, Why It Is Needed, and Its Accomplishments So Far* – as "posing a threat to national security." Russell is the former commander of the U.S. Army Medical Research and Development Command, where he spearheaded the effort to increase the capability of the nation's armed forces to defend themselves against biological agents. Moreover, the current edition of ASPR's own *Aerosolized Anthrax Response Playbook* includes an exhaustive review of the threat posed by MDR anthrax.

Ignoring the Obvious: A Worst-Case Scenario

Nonetheless, the continuing emphasis on post-attack antibiotic utilization dominates current planning to such a degree that neither MDR anthrax nor, another credible possibility, the use of preventive immunization, is on the current operational agenda.

Here, a point in fact is the scenario selected, earlier this year, for the 7-8 July deliberations of the National Biodefense Science Board (NBSB) on the use of Anthrax Vaccine Adsorbed (AVA; Biothrax®) to protect children and special-needs populations. At the Board's 7 July public meeting, in fact, instead of proposing the worst set of circumstances of an attack with MDR anthrax, a much less onerous attack situation was postulated for consideration. More specifically: The scenario selected for the public-meeting deliberations was the potential "wide-area" release of antibiotic-sensitive anthrax.

Today there is no FDA-licensed indication for the use of AVA after exposure in any person of any age, and there also is no FDA-licensed indication for use of the vaccine in children and/or seniors (older than 65) either pre- or post-exposure. AVA is FDA-approved, in fact, only for the pre-exposure prevention of anthrax in persons in the 18-65 age group. Consequently, the NBSB was asked by Lurie to engage all "stakeholders" in the issues involved. Those stakeholders include, but are not limited to, the American Academy of Pediatrics, the American Medical Association, various federal partners from the Department of Homeland Security (DHS), the Centers for Disease Control and Prevention (CDC), the Department of Defense (DOD), and the National Vaccine Program Office – as well

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as knowledgeable representatives from academia, local and state public health agencies, advocates for children's rights, and the nation's biopharmaceutical industry.

The members of those groups, certainly, would be well qualified to ascertain the best approach available to close the existing gaps in knowledge involving the efficacy, immunogenicity, and safety of AVA administered to children and members of the various special populations groups that also need protection. Lurie also specifically requested the NBSB, in fact: (a) to directly address the challenges involved in administering the vaccine under an Investigational New Drug (IND) research protocol after an anthrax event; and (b) to compare those challenges with the ethical considerations involved in attempting to gather sufficient data in the absence of a confirmed anthrax release.

Zero Proof of Zero Benefits

Recognizing the type of anthrax likely to be encountered is critically important to properly address the questions posed by Lurie in her request to the NBSB (and to other stakeholders). Any contrarian undercurrent about administering AVA in children – in the absence of either a bonafide imminent threat or a confirmed release of anthrax – is understandable, of course. However, when the lack of a clear and present threat is coupled with an assurance that any anthrax encountered will be sensitive to antibiotics, there is very little, if any, motivation to expose children to what might plausibly seem to be an unnecessary immunization. In other words, no matter how low a risk is assigned to the use of AVA, the risk-to-benefit ratio of vaccination necessarily remains undefined – primarily and perhaps exclusively because the contrarian position is that immunization would be of zero benefit.

However, that calculation changes dramatically if more complete data on the potential anthrax weapon is presented and discussed – which is not what happened at the NBSB public meeting. In MDR anthrax, the contribution provided by antibiotics is, by definition, resisted. For one thing, there is no antibiotic safety net involved – and, without effective antibiotics, even the vaccination of exposed victims might fail because the disease progresses first to toxicity, then to death, much too quickly for the vaccine to be able to provide the protection needed.

If, on the other hand, the threat posed by MDR anthrax is acknowledged, the risk-to-benefit ratio for anthrax vaccination is no longer undefined. The risk numerator remains the rate of adverse events of AVA – but in the case of MDR anthrax the benefit calculated can no longer be responsibly defined as zero. Just the opposite, in fact. In MDR anthrax, the benefit denominator becomes the 93 percent efficacy of protection conferred by immunization. In MDR anthrax, therefore, the risk of vaccination pales in comparison to the probable benefit. In other words, the introduction of MDR anthrax into the equation illustrates the clear benefits of receiving pre-exposure vaccination – even if the only gain (but an extremely important one) is to provide an objective clinical trial that can be used to develop more accurate dosing, efficacy, and safety assessments

Interestingly, there are several important caveats to consider in calculating the risk-to-benefit ratio of the alternative to preventive vaccination – namely, potential problems related to the cornerstone antibiotics (ciprofloxacin and doxycycline) now planned for use in children. With both of those antibiotics, the safety and efficacy data related to inhalational anthrax is extremely limited. In the case of ciprofloxacin, the FDA reports that: (a) only dosing data are available; and (b) those data are based on only 10 cases. The case of (or for) doxycycline, a tetracycline derivative, is even more problematical, because it is not FDA-licensed for use in children under eight years of age.

Ethical Considerations & the Potter Box

Above and beyond these risk-to-benefit calculations, it also is important, as Lurie has requested, to assess the ethical dilemma inherent in the clinical trials carried out on subjects who are unable to make decisions on their own behalf. One practical instrument to assist in the consideration of ethics in the equation is the so-called "Potter Box," developed in 1965 by Dr. (ThD) Ralph B. Potter Jr., who was then professor emeritus of social ethics at the Harvard Divinity School.

The Potter Box is frequently used by scholars of communication and healthcare ethics as a moral reasoning tool because it incorporates not only a broad spectrum of facts and scientifically objective information but also several morally (and, therefore, politically) important values, principles, and loyalties that can and should be taken into consideration to guide users through the meta-communications required to arrive at a final decision on potentially controversial subjects.

Of particular importance to those using the Potter Box is the collection and consideration of all relevant facts on the question at hand. According to Potter, every known fact relevant to a mor-

ally acceptable judgment must be sought, and fully documented, without obfuscation or personal bias to cloud the picture. It is only after every single fact is considered can the politically and mentally difficult work of comparing values, applying ethical principles, and weighing ethical loyalties be adequately undertaken and carried out.

It is in this context that acknowledgment of the factual data related to the use of MDR anthrax should be considered imperative to successful completion of the ethical work assigned to the NBSB – and to all of the other stakeholders involved – relevant to the AVA clinical trials in children.

Currently, an estimated 500,000 doses of Strategic National Stockpile AVA are now wasted every month due to shelf-life expiration. This is despite the fact that the 2010 Final Recommendations of the CDC's Advisory Committee on Immunization Practices support the offering of preventive immunization to "persons involved in emergency response activities including, but not limited to, police departments, fire departments, hazardous material units, government responders, and the National Guard."

Today, ten years after the multi-wave, multi-site lethal "anthrax letters" were posted – very shortly after the 9/11 terrorist attacks on the World Trade Center and the Pentagon – there is an ample supply of anthrax vaccine, and indisputable evidence of the dangers related to the use of MDR anthrax. It seems reasonable to suggest, therefore, that there may well be no better time than the present to shift planning from a post-exposure response capability to preventive immunization – especially for those personnel who are needed to preserve civil order and maintain continuity of operations and government.

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The Next Pandemic: Understanding the Public Health Role

By Raphael M. Barishansky & Audrey Mazurek, Public Health

In coping with pandemics, public health authorities play one of the most important roles in the overall process of planning, preparedness, response, and recovery. Although the term "pandemic" refers to a wide range of infectious diseases – e.g., human immunodeficiency virus (HIV), plague, smallpox, and tuberculosis – the current focus of public health preparedness planning is on influenza (flu) pandemics. Examining some pandemics of the past – as well as more recent events such as the severe acute respiratory syndrome (SARS) and influenza A (H1N1) virus pandemics – will assist in shedding light on what has been and what still needs to be learned from them, as well as the specific roles and responsibilities of public health in understanding the last pandemic better and preparing more effectively for the next one.

Almost a century ago, in 1918, the "Spanish flu" killed tens of millions of people worldwide, including an estimated 675,000 in the United States. It was an unusually severe and deadly pandemic that spread around the world – the fatality rate for diagnosed cases was estimated to be about 10 to 20 percent of those who had been infected. Unfortunately, historical and epidemiological data are inadequate for identifying the specific geographic origin of the disease, but it is known that most of the victims were healthy young adults. Even at that time, the improvement of modern transportation systems had made it easier for soldiers, sailors, and civilian travelers to spread the disease, and that capability was considered to be a major factor in the worldwide occurrence of the disease.

More recently, in 1957, the "Asian flu" killed nearly two million people worldwide, including an estimated 70,000 in the United States. A World Health Organization (WHO) expert panel found that, in some countries, the disease spread more rapidly in the wake of public gatherings such as conferences and festivals, and in many cases broke out first in camps, army units, and schools. The WHO findings suggested that the avoidance of crowding – and the implementation of social-distancing, quarantine, and/or isolation measures – might play an important role in reducing the peak incidence of an epidemic. In early 1958, though, as the previous year's pandemic seemed to be dying down, another wave of illness, this time among the elderly, became a

prime example of the "second wave" that can develop during a pandemic – i.e., the disease infects one group of people, seems to decrease (at least temporarily), but then infects a growing number of victims in a different segment of the population.

Ten years later, in 1968, the "Hong Kong" flu killed about 700,000 people worldwide (about 34,000 in the United States). Fewer people died during that pandemic than in the two previous pandemics cited above – and for various reasons, including the following: (a) the earlier pandemics left some population groups with a certain degree of immunity against the flu virus; (b) in some countries, the 1968 pandemic did not gain full momentum until the start of the winter school holidays, thus limiting the spread of infection (through what was *de facto* social distancing); (c) there was greater access to improved medical care (which translated into earlier and more effective support available to the very ill); and (d) a broader range of antibiotics were available that proved to be more effective against secondary bacterial infections.

Current Events & A Long List of Lessons Learned

More recently, the world coped with the SARS (Severe Acute Respiratory Syndrome) epidemic in 2003 and the H1N1 flu outbreak in 2009-2010. Although SARS has been termed a "near pandemic," the lessons learned from it also are worth noting – within a matter of weeks in early 2003, SARS spread from Hong Kong and rapidly infected individuals in some 37 countries around the world. Each nation affected reacted differently, though, and collectively utilized a relatively broad range of public health strategies, including the following:

- The prompt isolation of infected individuals after they started to show initial signs and symptoms of infection;
- The quarantine of those who might have been exposed to already infected or potentially infected individuals;
- The heightened monitoring and active surveillance of asymptomatic contacts – usually through contact tracing;
- The implementation of improved community-control measures such as the closing of schools and the use of voluntary limitations on public gatherings;
- The rapid and more effective dissemination of educational information – through travel alerts and advisories, press releases, and interagency partner notifications; and
- The implementation of mandatory limits on public interactions and curfews, as well as the total cancellation of some public events.

There were no SARS-related deaths in the United States – but there were eight confirmed cases of persons who had contracted the virus overseas. However, the media and public attention on SARS in the United States led to several helpful lessons learned, such as the need to: (a) Develop more robust public health risk communications training and messaging (e.g., messaging should be standardized, current, and culturally sensitive); (b) Better understand the legal and political impact of various isolation, quarantine, and social-distancing measures – and how each would be implemented if needed; and (c) Coordinate across agencies and departments to ensure that public health was at the planning table alongside police, emergency medical services (EMS), fire, emergency management, hospitals, and other "stakeholders."

Many countries, including the United States, that had been affected in various ways by the SARS outbreak implemented additional public health measures – including, but not limited to: the expanded use of disease surveillance systems; the implementation of heightened infection controls in hospitals and EMS units; intensive contact tracing (coupled with medical surveillance); and the formation of multidisciplinary investigation and response teams.

Among the more prominent public health control strategies used during the H1N1 pandemic of 2009-2010 were additional and more widespread school closures and the increased use of antiviral drugs. The same pandemic also saw a push-out, to various state health departments, of antiviral medications from the Strategic National Stockpile (SNS) that had been created by the U.S. Centers for Disease Control and Prevention (CDC). In addition, several other nations with confirmed H1N1 infections – Australia and Hong Kong, for example – used isolation, home quarantines, antiviral medications, and enhanced infection-control practices to reduce the spread of disease.

Although SARS was certainly a different virus strain, the lessons learned from 2003 might have significantly helped the preparedness for and response to H1N1. However, there seemed to be at least a few cases of "reinventing the wheel" in 2009 – and, for that reason, many of the same lessons learned during SARS also emerged during and after H1N1. After H1N1, there was a better planned, and more effective, push to develop not only Pandemic Influenza Plans but also some complementary Isolation and Quarantine Plans.

It is worth noting that this type of joint/complementary planning had already been emerging, in certain communities

throughout the United States, but was not yet either widespread or mandatory. Most of the pre-2009 initiatives started earlier – usually to cope with the 2005-2007 SARS and H5N1 outbreaks (the latter, also referred to as the Bird Flu, never escalated into a pandemic).

How Prepared Is the United States Today?

Since 11 September 2001 and the anthrax attacks that followed in short order, the U.S. Congress has appropriated billions of dollars in federal funding to help CDC increase the public health sector's preparedness and response capabilities. CDC does this primarily through the downstream dispersal of those same federal funds to: (a) create, expand, or otherwise improve such programs as the Public Health Emergency Preparedness (PHEP) Cooperative Agreements; (b) write and promulgate guidance documents (related, for example to the National Response Framework, Target Capabilities List, Presidential Policy Directive 8, National Incident Management System, and the Homeland Security Exercise and Evaluation Program); and (c) provide and upgrade technological systems and equipment. In 2002, the CDC also released the "Local Public Health Preparedness and Response Capacity Inventory" – a survey instrument that attempted to develop a quick but reliable assessment of the current preparedness of states and local health departments. (Although 22 states and 800 local health departments used the tool in some manner, it did not include measurable indicators, directions for how to answer the questions, or provide standardized questions and analyses relevant to the information collected.)

Examining some pandemics of the past – as well as more recent events such as the severe SARS and influenza H1N1 virus pandemics – will assist in shedding light on what has been learned, and what still needs to be learned, from them, as well as the specific roles and responsibilities of public health in understanding the last pandemic better and preparing more effectively for the next one

In 2006, the CDC's SNS division started to develop more robust tools and resources to assist states and local health departments in increasing their capacity to receive, distribute, and dispense SNS assets in the event of an emergency/disaster. In 2007, the SNS Technical Assistance Review (TAR) Tool began collecting and reporting data, as viewed from the federal level, of state and local readiness to receive SNS materiel and to measure the plans of local Cities Readiness Initiative (CRI) Metro Statistical Areas in relation to their ability to ensure the prompt delivery of prophylaxis to their populations within 48 hours after the start of a significant public health emergency – another anthrax attack, for example.

In responding to the H1N1 outbreak, CDC administered $1.4 billion, between 2009 and 2010, in Public Health Emergency Response (PHER) grants awarded to participants in the PHEP cooperative-agreement program – 50 states, eight territories and freely associated states, and four major metropolitan areas (Chicago, Los Angeles County, New York City, and Washington, D.C.). The goal, of course, was to help ensure increased preparedness and response capacity, particularly during the pandemic. The PHER grants included guidelines for how the money should be spent (e.g., on vaccinations, dispensing, community mitigation, and epidemiological surveillance). The guidance for participants in the PHEP cooperative agreement program also became increasingly more robust each year, along with new or revised federal guidance for improving public health preparedness capabilities.

In addition to the preceding, some states have imposed additional requirements for their local health departments when providing them with funding. In 2004, the National Association of County and City Health Officials (NACCHO) developed the Project Public Health Ready (PPHR) program, which helps local health departments build and/or improve their preparedness capacities and capabilities by using locally developed public health preparedness standards. In March 2011, CDC released the *Public Health Preparedness Capabilities: National Standards for State and Local Planning*, which includes 15 capabilities – designed to serve as national standards, and aimed at ensuring that federal funds are directed to specific priority areas (which the awardees can use to demonstrate measurable and sustainable progress toward the capabilities desired).

In addition to the aforementioned efforts, there has also been significant progress in building public health preparedness

capabilities and capacities through the additional funding of programs, research, and development of tools and resources by and within national associations and organizations, community-based organizations, private-sector businesses, universities, regional coalitions, and other groups. In short, it is undeniable that, over the past 10 years, public health has become a major player in responding to emergencies/disasters alongside traditional first responders, and that the overall public health community is much better equipped to do so.

Several questions remain, however, including the following: (a) *How truly ready* is public health for the next pandemic or disaster? (b) Have enough and/or the right types of lessons been learned and implemented from past events – or will additional time, effort, and money have to be invested into reinventing the wheel when the next pandemic hits? (c) Is the dwindling funding still available being properly used, in innovative ways, to push efforts forward – or are boxes being merely checked off and the minimum being done to continue receiving the funds still available?

How Prepared Should the United States Be?

So the question that must now be answered is this: What is the current preparedness level of the United States and where should it be? The answer depends to a large extent on the specific jurisdiction(s) involved – and raises several additional questions, including the following: (a) How much is public health preparedness supported by the leadership and partners of the specific jurisdictions involved? (b) How much time and effort are being put into the search for better and/or more innovative ways to make money and other resources last longer? (c) How much more willing are the health departments of those jurisdictions to invest in future preparedness efforts (with or without money)?

Over the years, the following messages have been emphasized the most to public health preparedness planners and staff across the country, and at all levels of government: It is important to change the public health culture to include preparedness as a cross-cutting and overarching concept that affects all other public health services; and, among other things, it is important to continue: Writing and maintaining plans; Training staff (all staff, not only newcomers and those who work on preparedness daily); Exercising plans (with partners, not just internally); Determining where the gaps and lessons learned are; and, most important of all, actually implementing the improvements/corrective action plans developed so that the same deficiencies do not show up over and over again during each and every training exercise or "real-life" event.

Another important question: Have jurisdictions taken these messages seriously? If they have, and have actually taken the steps needed to implement the changes required, then they are (or at least should be) much better prepared for the next pandemic or major public health event than in the past. The bottom line is that nobody knows when the next pandemic or major public health emergency is coming, where it will originate, and what is likely to be its overall impact on the general population. What is known, though, is that there has been a tremendous push from all levels of government – as well as from the private sector and academia – to develop and improve public health preparedness measures, create a more robust public health preparedness infrastructure and workforce, and provide more useful and practical resources and tools than were ever before available. Fortunately – and perhaps, at least in part, because of the H1N1 and SARS outbreaks – there has been an increased awareness of pandemics in general by public health authorities, government officials, and the American people. For that reason alone, there will probably be no better time than the present to take advantage of this opportunity before the next pandemic erupts.

Even if another pandemic is years in the future, and federal as well as state funding for preparedness efforts continues to drop, it is important not only to remain vigilant but also to continue to "do more with less" – if only to ensure the rapid response to, and recovery from, whatever the next event may be.

When – not if – the next worldwide pandemic or major public health emergency strikes, the worst-case scenario for public health is to believe in the spurious and totally unacceptable reason that "We didn't think we were going to get hit with another major pandemic so soon," and to *not* have updated preparedness plans, to *not* have trained staff, and/or to *not* have established partners.

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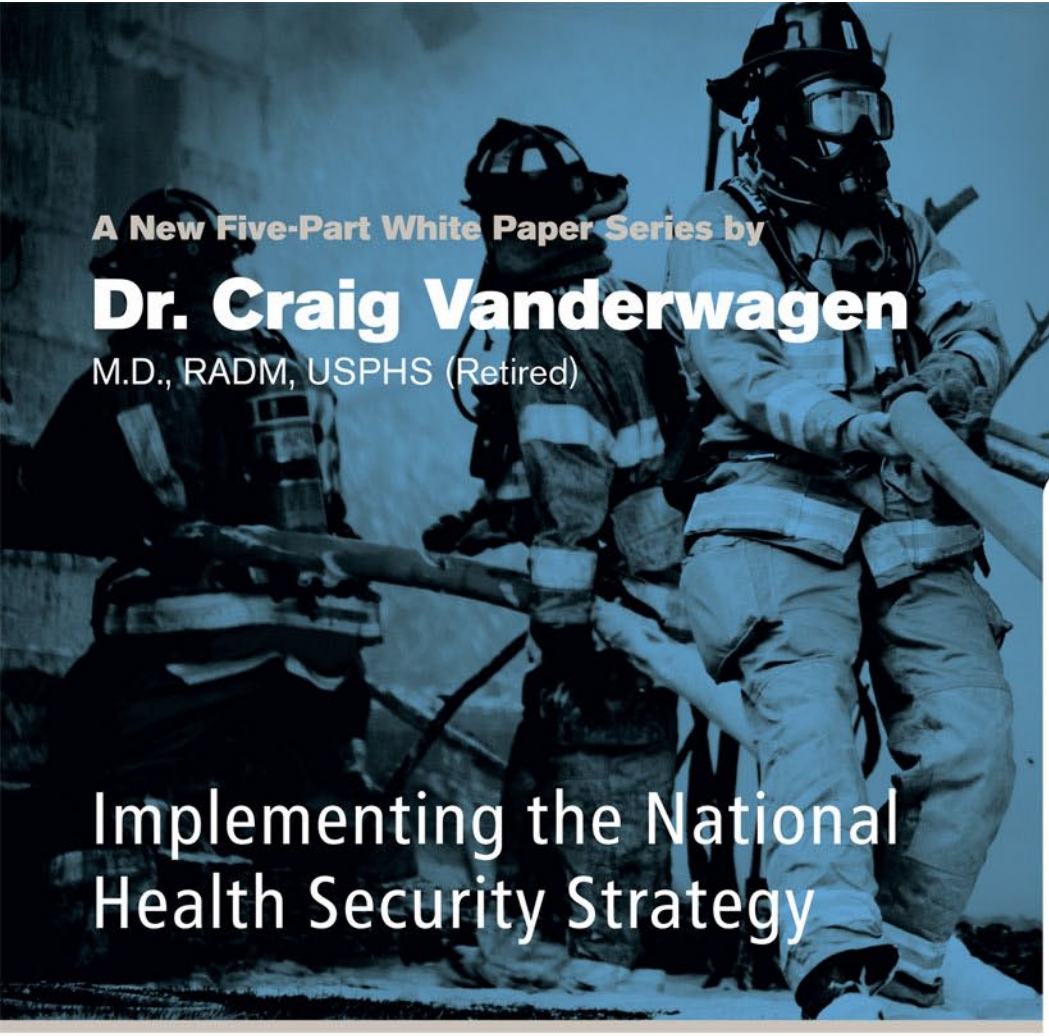

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Emergency Preparedness: The ABGs of Radiation

By Jeffrey Williams, Emergency Management

Although radiation hazards are not a new concern, the impact of such hazards on first responders and emergency managers has been brought to the forefront with events such as the terrorist attacks of 11 September 2001 and the earthquake/tsunami nuclear power plant disaster in Fukushima, Japan, earlier this year. These events shed light on the fact that radiation is poorly understood, not only by the public at large, but also (though to a lesser degree) by first responders and emergency managers. That lack of understanding applies both to the terminology involved and to various technical details related to the topic of radiation in general.

The first area in which clarification is needed is in use of the term "radiation." Many people use the term in a general way, without understanding important distinctions that should be considered. In general, radiation is energy released from a source, and can be listed in two major categories: (a) ionizing radiation, which is caused by the creation of an electrical charge, by stripping away an electron, on a normally neutral atom; and (b) non-ionizing radiation, which comes from energy that is not strong enough to ionize an atom. Non-ionizing energy – such as microwaves, radio frequency radiation, and thermal radiation – imparts energy to an atom, but at levels too low to create a charge on that atom.

In general, radiation is energy released from a source, and can be listed in two major categories: (a) ionizing radiation, which is caused by the creation of an electrical charge, by stripping away an electron, on a normally neutral atom; and (b) non-ionizing radiation, which comes from energy that is not strong enough to ionize an atom – non-ionizing energy imparts energy to an atom, but at levels too low to create a charge

In the emergency response field, the type of radiation that raises the greatest concern is ionizing radiation, which releases energy from an atom that is strong enough both to charge atoms and to convert neutral atoms into charged particles. Radioactive materials, the principal sources of ionizing radiation, include both naturally occurring materials in the soil and environment as well as manmade radioactive materials – which are used primarily in industrial and medical applications. Although mechanical devices such as X-ray machines are included in this category, they usually are not a major concern in emergency planning and/or first-response situations because the dangers they might pose can be avoided simply by turning off the device.

Most atoms are stable and do not release radiation; ionizing radiation, though, is released from unstable atoms – i.e., radioactive atoms are ones that release a surplus of energy in order to become stable. An isotope is the version of an element that is unstable and thus releases radiation. The act of releasing energy is known as radioactive decay, which changes an unstable atom into a stable atom. That act can be a one-step process or a multi-step process; in the latter case, an isotope may change sequentially into another unstable atom before becoming stable. The term "half-life" refers to the time that it takes half of a given amount of an isotope to fully decay into its next state, and varies for each isotope.

Alpha, Beta, Gamma – Contamination vs. Exposure

Possibly the most important skill in developing effective radiation protection is understanding the difference between contamination and exposure. Radioactive contamination occurs when particles of material – e.g., dirt, dust, debris – containing radioactive elements become deposited or attached to a person or object. In the field of nuclear weapons this phenomenon is called "fallout" – in the creation, use, and/or disposal of dirty bombs it is called "contamination." Exposure occurs when the fallout or contamination is close enough to a person for the energy from the radioactive decay to interact with that person's body – whether that exposure causes an obvious reaction or not. Neither contamination with nor exposure to radioactive material changes a person's stable atoms and/or makes the person radioactive.

The four primary types of ionizing radiation that are of the greatest concern in emergency management and first response are: (α) alpha; (β) beta; (γ) gamma; and (η) neutron. Each can be and is identified by its own unique aspects and by such identifiable physical characteristics as electrical charge, mass, energy, and prevalence – and, of particular importance, the respective health hazards each poses to human life.

Alpha, beta, and neutron radiation actually possess physical mass. They are tiny portions of the atomic material that are released, whereas gamma radiation is pure energy with no mass. Following are a few additional specifics about each of these types of ionizing radiation:

Alpha – The alpha particle, which is positively charged, is the "large" radiation particle emitted by an atom. Even so, it is only a very small fraction of the total mass of an atom. The combination of its large size and strong charge results in alpha radiation not being able to travel very far and, largely for that reason, being easily prevented from penetrating the human body. Alpha particles travel only a few inches and can be effectively stopped by a piece of paper, normal everyday clothing, or even the layer of dead skin that covers human flesh. An important warning, though: If alpha radiation does manage to get inside the human body, it can be very damaging.

Beta – The beta particle, which is negatively charged, is the smallest radiation particle – significantly smaller than an alpha particle. Its smaller size and smaller charge allow it to travel a greater distance than the alpha can – typically anywhere from a few feet to a few yards. Although it has a greater ability to penetrate, it can still be stopped by a thin piece of plastic. If a large number of beta particles were to come into contact with the skin, they could cause surface skin burns ("beta burns"). As with alpha radiation, any beta radiation can be harmful if it gets inside the body.

Neutron – The electrically neutral neutron, a rather odd creature in the radiation zoo, is rarely encountered. It is much larger than a beta particle, but still only one-fourth the size of the alpha particle. Its lack of electrical charge means that it interacts with very little, making it much more difficult to stop or even detect. Another unusual neutron characteristic is that it seldom exists by itself – outside a nuclear reactor, there are in fact very few sources of neutrons. Typically, neutron radiation is present with some other form of radiation– but some can be generated by the reaction of alpha radiation with certain other materials. Neutron radiation is harmful both inside and outside of the body.

Gamma – This is the most common and by far the deepest penetrating form of radiation; it is also known as X-ray radiation. There is a technical scientific difference between gamma radiation and X-rays, but for planning and response purposes the terms can be used interchangeably. Protection from gamma radiation involves the use of greater amounts of shielding – lead or steel sheets for mobile sources, for example, and concrete walls for stationary sources. Gamma radiation can cause significant physical harm both inside and outside of the body.

Obviously, the immediate availability of radiation detectors is critically important for both emergency responders and emergency managers. Because radiation cannot be detected by a human's physical senses, reliable detection devices are needed to determine its presence. However, most if not quite all such devices are specific to only one type of radiation, and no single device works for all types of radiation. The most useful detector for general use is one for gamma radiation, since many industrial sources have gamma emissions.

In short, a comprehensive understanding of the radiation basics can be a major challenge for first responders and emergency managers. However, knowing the difference between exposure and contamination, as well as the different exposure routes – and the different threats posed by different types of radiation – first responders and emergency managers can and should be able to plan more effectively, and with fewer uncertainties, for most radiological emergencies.

Jeffrey Williams has served over the last 20 years as an environmental engineer for an agency of the U.S. Department of Defense, during which time he has conducted numerous environmental assessments and multimedia environmental audits, supported a microelectronics fabrication operation, and became a leader in the move to sustainable "green" building design and operation. He also has served on two different emergency response teams, during which assignments he became an expert on radiological dispersal devices and various related topics. A well known speaker, he has delivered scores of technical presentations at various public and private forums on topics ranging from environmental regulations to radiological preparedness. Prior to joining the Defense Department he worked on the design and construction of hazardous-waste disposal sites for industrial facilities and led the team that developed the first high-integrity container (HIC) for low-level waste accepted at the Hanford, Washington, disposal site. He holds both a Bachelor of Science in Nuclear Engineering and a Master of Science in Environmental Engineering from the University of Maryland as well as a Master of Arts in Legal Studies from the University of Baltimore; he also has studied at the Massachusetts Institute of Technology's Center for Advanced Engineering Studies.

Improving Situational Awareness During a Nuclear/Chemical Attack

By Omar Alkhalaf, Health Systems

The threat of a chemical or nuclear attack is a clear and present danger that emergency planners, managers, and responders must prepare for each and every day. In particular, the threat of a chemical or nuclear weapon detonation in a major city within the borders of the United States is a very real one, particularly in light of the 11 September 2001 terrorist attacks. In the event of such an attack, maintaining a continuing communications capability would be of critical importance both in establishing situational awareness and in preparing neighboring cities and towns for mass evacuations or influxes.

When an attack is chemical or nuclear in nature, chemicals and/or radiation are released into the air in the form of a plume. This plume poses the most dangerous threat, to both life and property, because it travels with the current weather and can spread over a very large area. By mapping the dispersion, emergency managers can in most cases immediately determine the direction of its movement and provide the guidance needed by residents either to shelter in place or to evacuate to a safer location well away from the CBRN's projected path.

Ventura County, California, has developed plans to prepare for such an event and to be able to quickly provide the best – i.e., safest – evacuation routes. Given the fact that nearby Los Angeles is one of the nation's largest cities, and therefore a particularly inviting target for would-be terrorists, Ventura County must be prepared to facilitate either a mass evacuation or a sudden influx of similar magnitude. To be able to do so, the planners of the Ventura County Department of Public Health, working in close cooperation with other county agencies, established the Ventura County Plume-Mapping Working Group.

Life-or-Death Decisions – With Little or No Information Available!

All of the Working Group members fully understand the need to maintain immediate and continuous situational awareness for the county – and that the county itself must be fully prepared to provide the public at large with accurate evacuation information in the immediate aftermath of a nuclear/chemical event. The Working Group members also understand that, in many similar situations – not involving nuclear or chemical weapons, though – local response agencies and county officials do not always have immediate or full access to the critical information they need from the epicenter, and also receive very limited if any support from federal, state, and/or regional mapping agencies in the initial hours following an attack such as that postulated.

In preparation for such difficult circumstances, members of the Working Group identified and developed redundant local plume-mapping capabilities of their own that will help them obtain the information they would need about a radiological release immediately after an incident occurs. It is vitally important – not only for emergency managers at the scene of the attack but also for others in the surrounding areas – to have such information available in the immediate aftermath of the attack, or as soon thereafter as possible. Possession of such important data provides emergency managers with the situational awareness needed to make the intelligent life-or-death decisions required in such harrowing circumstances and to determine, as quickly as possible: (a) whether residents should in fact be told to evacuate; and (b) if so, in which direction and by which route or routes.

In short, the Ventura County Plume-Mapping Working Group now will be able, following a nuclear or chemical attack, to quickly identify the direction of the plume and, working from that all-important starting point, to anticipate and greatly influence the direction of the evacuations needed. Surrounding counties can and should use the same information, of course, both to prepare for the evacuees and to ensure that incoming supplies and other tangible resources are redirected to the appropriate locations. Whatever the magnitude of such an event, the information provided by the Working Group immediately after a major chemical or nuclear attack will be critical in the decision-making process.

To briefly summarize: By creating a redundant group, under their own control, to map the course of the plume in the aftermath of a nuclear or chemical attack, emergency managers will be able, without having to depend on outside resources, to gather the critical information they will need to make their literally life-saving decisions. The same information also will help emergency managers determine the direction toward which residents should evacuate, and thus ensure that surrounding communities in the same geographic area are quickly and fully prepared to receive the influx of very large numbers of evacuees.

Omar Alkhalaf is an outreach and operations analyst for Lessons Learned Information Sharing (LLIS.gov), the U.S. Department of Homeland Security/Federal Emergency Management Agency's national online network of lessons learned, best practices, and innovative ideas for the nation's homeland security and emergency management communities. He received a bachelor's degree in Global Affairs with dual concentrations in Global Diplomacy and Governance/Middle East & North Africa Region from George Mason University in Northern Virginia.


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ECBC – Protecting Those Who Protect Others

By Catherine Feinman, Viewpoint

In July of this year, DomPrep and special invited guests had the honor of being invited to tour the U.S. Army's Edgewood Chemical Biological Center (ECBC) at the Aberdeen Proving Ground in Maryland. Organized by DomPrep40 Advisor Major General Stephen Reeves, USA (Ret.), the day began with introductions of ECBC's leadership staff – Joseph Wienand, Joe Corriveau, Alvin Thornton, Jim Baker, Mary Wade, and a number of other ECBC participants. The staff shared their own insights, as well as a huge and helpful quantity of background information, about the facility, its changes over the past 80+ years, and the Army laboratory's long-standing support of the warfighter by providing critical defense capabilities.

ECBC has a long history dating back to the early 20th century. In October 1917, the area known as Gunpowder Neck became the U.S. Army's first chemical weapons arsenal. Over the years, the Center's mission has evolved from a major focus on chemical threats (early 1900s), to research and development (mid-1900s), to biological threats (late 1900s), to emerging threats (2000s). The established mission of ECBC, currently led by Technical Director Joseph Wienand, is to "Integrate life-cycle science, engineering, and operations solutions to counter CBRNE [chemical, biological, radiological, nuclear, and explosive] threats to U.S. forces and the nation."

Before leaving the briefing room, the visitors were instructed on the safety and security measures they would have to follow when traveling within and between facilities. Engineering controls, such as CBR filtration and air monitoring, reduce the risk of exposure to airborne toxins. Personal protective equipment is required in certain designated areas to avoid physical contact with potentially dangerous substances. Warning signs posted throughout ECBC facilities indicate which areas are "controlled access" and/or "restricted." In addition to 24-hour surveillance, all facilities are also tied into the 911 emergency response system.

The first stop on the tour was the Bioscience laboratory, which is full of expensive high-tech equipment for DNA testing and identification. With the help of known DNA sequences and overlapping, scientists are able to identify new sequences. This capability is particularly useful for: (a) combatting terrorists who, by following a simple procedure, can make a small change in an agent to get a big result; and/or (b) identifying different strains of pandemic outbreaks. One sequencing instrument used in this lab is even capable of processing 96 bacterial samples in a single run. Using libraries to minimize sequencing errors, this capability significantly reduces the time needed for the DNA-to-identification process.

Downstairs, the McNamara Life Sciences Research Facility – a Biosafety Level 3 (BSL-3) high-containment biological facility – is fully equipped with an alarm system, PPE (personal protective equipment), negative pressurization, and shower. At the time of the tour, the lab was completely shut down for its biannual decontamination. Because of the sensitivity and dangers associated with the agents found in this facility, the storage area requires two people to sign in, and to enter the facility by using two locks. In addition to the government-required monthly inventory inspections, ECBC also conducts annual internal inspections of 100 percent of the inventory.

In the most interior (and most secure) area of the building are the biodefense, animal, toxicology, and chemical research laboratories. The hallways are lined with small windows used for viewing, from the outside, work being carried out within the labs. One hallway is equipped with a large black box and laser safety curtains, which are used for studies on laser-induced fluorescence measurements of aerosolized agents. That unit was, in fact, designed to test and process the anthrax-contaminated postal letters that were discovered in late 2001, shortly after the 9/11 terrorist attacks.

The next stop on the tour was the McNamara Glove Box Facility, which is used for toxicology work and, at times, contains the most dangerous toxins on Earth. This is a new state-of-the-art facility that has the ability to actually generate aerosol atmospheres. The ergonomic design of the glove box provides three chambers – for exposure, observation, and working – which are easily, and individually, accessed by researchers. After this stop, attendees were ushered onto a bus and headed for the next building on the tour.

The Sample Receipt Facility is designed to receive, triage, and analyze unknown samples – all within a single building. After passing through two barred doors, visitors enter the explosive-sample receipt room, where potentially explosive samples (e.g., unearthed, discarded, or unknown military and other items in the form of liquids, solids, and surfaces) are handled. A just-

received item is placed inside a glove box for initial analysis (sometimes with the assistance of the Federal Bureau of Investigation and/or U.S. Department of Homeland Security) before any testing is done. The explosive is then separated, within the box, from the solid or liquid sample.

After separation is complete, jars containing the sample are taken to the Receipt Lab High Bay, where an overhead heel tank full of sodium hydroxide is connected to sinks (which are fitted with protective hoods), to help neutralize explosives. Another glove box is used for sampling. Upon leaving this area, researchers are required to enter a four-stage decontamination room protected by 24-hour surveillance, negative pressure rooms, and HEPA filters. All necessary precautions are taken for the safety of the researchers and all others within the facility.

The Sample Triage Lab and Chemical and Toxin Analysis Lab are where the chemicals can be extracted from the sample material. To protect personnel in the lab from dangerous fumes, chemical agents are kept under hoods fitted with chemical security sashes that prevent leakage. In the rare situations when samples do escape, snorkels located throughout the lab are able to filter the released toxins out of the air. Two bio-analysis suites receive the samples – which are inserted into a "pass-through" that can open from only one side at a time to prevent unnecessary exposure and contamination. After the sample leaves the Sample Receipt Facility, the client knows what the sample is not. The next step is to identify what the toxin is.

The Advanced Chemistry Laboratory (ACL) – across the courtyard, with three wings housing 20 labs – is where researchers identify what the sample is. Visitor badges and protective goggles are required before entering the facility. Testing in this building is performed on chemical warfare agents, liquid and solid bore samples, and synthesized active-threat compounds. The ACL's Decontamination Science Branch Room is equipped with high-tech labs, fitted with much larger hoods, to accommodate the needs of modern technology. This enables researchers to test almost anything that may be contaminated – thus serving as a clearing house for risk assessments.

At the ACL, risk mitigation is determined based on the route of entry: inhalation (vapor test micro-chambers determine how much vapor comes out after decontamination); and contact exposure (contact test – skin surrogate used to see how much was transferred). With dosing and imaging stations and environmental control chambers to control humidity and temperature, a suite of technologies can extract liquids, sample vapors, quantitate, and analyze – all in the same room. The ACL is staffed by a multidisciplinary team trained to carry out all of the following tasks: methodology development, performance testing, creative model, decontamination development, and technology development.

The ACL lab currently is incorporating a new approach using vapor emission rates and factors to determine the onset of toxicological symptoms based on various scenarios. Because the data must be reproducible and similar, this new approach provides a higher accuracy for hazard risk assessments. To determine, based on these risk assessments, what hazardous mitigation is specifically needed, the facility uses its Traditional Agents Lab and Emerging Threats Lab. In addition to studying and identifying existing threats, the next stop on the tour demonstrated ECBC's innovation and creation capabilities.

The Berger Engineering Complex: Advanced Design and Manufacturing (ADM) – ECBC Prototype Integration Facility (PIF) – is staffed by 140 specialists with varying backgrounds devoted to designing, building, testing, and reporting to turn a product around quickly, from idea to reality. The rapid product-development process at ADM-PIF balances risk, cost, and performance against schedule requirements. The result is very fast concept-to-product production (<180 days) using a "3-D data capture" process. In the domestic preparedness environment, there are numerous unknowns, so it requires a multidisciplinary staff to get things accomplished.

Everyone on the team at ADM-PIF has to be on board – traditional artists and animators are closely integrated and working with scientists and engineers. This multi-discipline team offers: (a) methodology development; (b) performance testing; (c) creative modeling; and (d) technology development. Beginning with a science or engineering idea, artists and animators create images that can be used to back up those ideas. Full-motion video can be used for training, talking points, technical overviews, and even microbiology renderings, with 100 percent technically accurate images. According to Mark Schlein, one of the guides, "Each one of our capabilities is valuable alone, but the real power and synergy comes when they are put together."

The Rapid Technologies Lab uses reverse-engineering 3D for additional manufacturing and imaging. Laser scanners

in the lab are capable of recreating objects through the use of laser images, which are then output to 3D printers using, rather than ink, photo polymer (or other materials such as ABS plastic, glass and nylon powder, titanium, stainless steel, and bronze). Thus, an idea is transformed from a sketch into a functional prototype. Many of these ideas result in the development of the defensive CBRN equipment needed by today's warfighters.

In 2006, ECBC developed and produced the Buffalo Mine Protected Clearance Vehicle (MPCV) to use as a training aid for combat units that may encounter improvised explosive devices (IEDs). One of these trucks, as well as ECBC's CBRN Unmanned Ground Reconnaissance (CUGR) advanced concept technology demonstrator (ACTD), were housed in the two-story high Test Bay Area at the time of the tour.

The Bay Area also houses the Joint NBC (nuclear, biological, and chemical) Reconnaissance System Increment II, which is designed for warfighters in the urgent-need phase. Cost sharing and collaborative efforts are used to purchase equipment for the system such as radios, PPE, HazMat boots, air compressors, various tools, decontamination showers, fire extinguishers, and other systems and devices. With the safety of soldiers in mind, all equipment is packed for ease of use, access, and inventory. Because CBRNE threats are expected to continue to grow and change, ECBC is devoted to keeping up with current and emerging threats to protect civilians as well as warfighters.

ECBC officials and managers are currently focusing special attention on three emerging threats: lethal weapons (G- and V-type nerve agents); nonlethal/incapacitating weapons (riot control agents); and xenobiotic-based weapons (foreign chemicals in a living system such as dioxins and aflatoxin; non-attribution potential such as cancer-causing agents; and biotransformation-bioactivation agents).

In short, the threat is here and the weapons technology required is fully mature. Through advances in science and technology research and development, ECBC is finding the answers needed to provide the defense capabilities required to meet the ever-emerging and frequently changing chemical threats of today, tomorrow, and the years to come.

Catherine Feinman is Associate Editor for the DomPrep Journal. She joined the DomPrep team in January 2010. With over 20 years of experience in publishing, she previously served as Journal Production Manager and Subscription Manager for Bellwether Publishing, Ltd.. She received a bachelor's degree from the University of Maryland, College Park, in International Business/French.

Connecticut, Louisiana, New York, and Colorado

By Adam McLaughlin, State Homeland News

Connecticut
Southington Uses Social Media To Sound the Alert

When Hurricane Irene touched down in Southington, Connecticut, on 28 August 2011, calls started to immediately flood the Emergency Operations Center at the Southington Police Department (SPD). Town Manager Garry Brumback, Southington Police Chief Jack Daly, and Southington Fire Chief Harold Clark quickly compiled the information related to downed wires, fallen trees, closed roads, and other hazards. Two minutes later, Southington Police Sergeant Lowell DePalma received the information online.

For the past several years, the Southington Police Department has used both Facebook and Twitter as a primary means of communication between SPD, the media, and the general public. Over the last weekend in August, the decision to keep an open line of communications through social-media outlets paid major dividends for both the department and the local citizenry.

Using Twitter and Facebook was "unique and extremely helpful, because the use of social media helps reduce any delay that could come with sending press releases to media outlets," DePalma said. "When you send the information to a newspaper, it takes time for them to receive it – and [it] won't be printed until the next day. Using this [the social media], the release of information is almost instant."

The department started using Facebook and Twitter in November 2009, and since then has used them not only for all press releases but also for the department's arrest logs as well as for the dissemination of other information important to local residents and business owners. There already have been 2,817 "likes" posted on Facebook; and there are now more than 450 followers on Twitter.

Although the system has been in place for a few years and previously had been used mostly to provide information about road closures and other public hazards during snowstorms and similar events, DePalma said, the late August warning was the first time the department was able to use it during an officially declared state of emergency.

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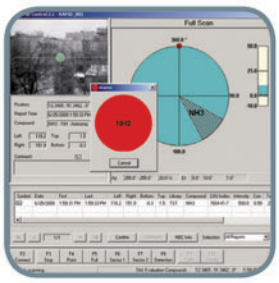

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More specifically: The department used the social media to post 28 separate releases between August 27 and August 31, giving updates on everything important ranging from the latest weather conditions to the number of power outages, various recovery and safety tips, and much more. The quick and comprehensive provision of information was well received by the local community – many residents posted replies just to say "thank you" for the efforts. "I hope to see … [similar] communications like this during future hazardous situations," said local resident Jason Goralnik. "SPD should be commended for [its] exemplary public-safety updates."

Other residents – e.g., Lorraine Hungerford and Patrick Tassos – offered similar praise, commenting that the updates were more efficient and effective than the reports provided by the local and national media. "The SPD updates were extremely helpful, especially because our area was affected very little," Hungerford said through Facebook. "The updates were great reminders that not everyone or every street was so lucky. They [the police department] really kept us in our place. Thank you."

Using Twitter and Facebook was "unique and extremely helpful, because the use of social media helps reduce any delay that could come with sending press releases to media outlets," DePalma said – "When you send the information to a newspaper, it takes time for them to receive it – and [it] won't be printed until the next day. Using the social media, the release of information is almost instant"

Louisiana

New Orleans Levees: A Near-Failing Grade In New Rating System

A new U.S. Army Corps of Engineers (USACE) rating system for the nation's levees is about to deliver a near-failing grade to New Orleans area dikes, Army officials have confirmed, despite the internationally acclaimed $10 billion effort to rebuild the system in the aftermath of Hurricane Katrina.

Preliminary rankings obtained by the New Orleans *Times-Picayune* in late August show that the Corps believes there is still a significant risk of flooding from major hurricanes or river floods that are greater than can be held in check by the strengths and design heights of the river and hurricane levees on both the east and west banks of the Mississippi River. The levees on both sides, according to the *Times-Picayune*, were rated Class II or "urgent" – meaning unsafe or potentially unsafe – on a scale of I to V, with V representing normal or "adequately safe."

The hurricane and river levees in Louisiana, particularly those close to New Orleans, are designed to protect from surges created by a so-called "100-year hurricane" – i.e., a storm with a 1 percent chance of occurring in any given year, or once in a century. The ratings show that "500-year events," which have "a 0.2 percent chance of occurring" in any given year (or once in five centuries), would spill over the current levees and cause significant flooding for a considerable distance inland of the river.

The new rating system, which was ordered by Congress in 2006 in the aftermath of Hurricane Katrina, is intended to help Congress – and the federal, state, and local officials involved – determine what levees must be improved, how, and how much. The new and much improved system mandated is expected to start to be implemented nationwide early next year – after a review by senior USACE officials that is now underway has been completed.

In determining the ratings, screeners take into consideration a complex variety of performance factors, including a specific levee's ability to withstand erosion, the stability of the slope of earthen levees, and the ability of embankments and foundations to withstand seepage. The screeners also look at: (a) how well gates and other closures in the system can withstand failure; (b) the chance of flood walls being pushed over, or undercut, by storm surges; (c) past performances (during previous floods); and (d) performance predictions for future events.

In the case of the levees close to New Orleans, the possibility of failures during flood events involving water levels below the authorized "100-year heights" was not considered likely. Larger events, however, could and probably would cause flooding, the investigators found. The reviewers estimated, in addition, that those events could kill as much as 3 percent of the area's popu-

lation, inundate more than 190,000 homes, office buildings, and other structures, and cause almost $50 billion in the collective damage that would result.

Those estimates were made by weighing the population and economic investment behind the levees against their effectiveness and other methods – including building codes, the level of public awareness, and evacuation plans – used by localities to protect themselves and the local population. The USACE rating system does not, however, take into account the Corps' plans to "armor" certain earthen segments of the system to further reduce the chances of erosion if the levees are overtopped, according to Eric Halpin, a USACE levee safety official.

"I am a little bit surprised … [the new scores are] that low, although I would not have expected them to be much higher," said Robert Turner, executive director of the Southeast Louisiana Flood Protection Authority-East – which oversees levee districts on the eastern side of the Mississippi. "The consequences would be enormous here because we are in an urban area."

Obviously, the urban nature of the New Orleans area, on both sides of the river, drives up the risk to both lives and property, compared to the risks in less populated areas, according to assessments of the individual levee segments. For instance, in listing the consequences of overtopping for a greater than 100-year flood for each of the levee segments, the reviewers found that there are 26 hospitals, 51 chemical facilities, 20 locations where hazardous materials are stored, and numerous oil and gas refineries – as well as major Port of New Orleans facilities – that would be adversely affected by future flooding in areas close to the Crescent City.

New York

Hurricane Damage Estimate Approaches $100 Million

The estimated cost of the damage caused by Tropical Storms Irene and Lee is "approaching $100 million," New York officials said after emerging from a cabinet meeting in mid-September with Governor Andrew Cuomo.

It is still too early to accurately estimate the final fiscal impact of the damage, they stressed, and that figure will be at least partially offset by federal aid. The current estimate also does not factor in the state's share of the damages suffered by individual citizens and by local towns, villages, and school districts.

The final total may not be known for several more weeks, in fact, but this year's state budget plan includes a $150 million appropriation for emergencies. According to Budget Director Robert Megna, the impact of the two storms is "within the parameters we set. We are still trying to figure out how much it is going to cost us," he continued after leaving the closed-door meeting. "Once we figure that out, we will put a plan together for how we finance it."

The Federal Emergency Management Agency (FEMA) reimburses up to 75 percent of the costs assessed by local governments – and separate funding streams, usually administered through the Federal Highway Administration, can cover 80-100 percent of the cost of repairs to most arterial roads. But this means that the state itself is obligated to pay for as much as one fourth of the total cost of the damages. The current $100 million estimate does not factor in the state's share of assistance to affected individuals – grants to homeowners in flood-ravaged areas can range as high as $30,000 – and/ or to local government jurisdictions such as towns and villages.

The latter obligations may turn out to be the real cost driver. Some hamlets, such as Prattsville in Greene County, were virtually obliterated by flood waters, so some other entity has to pay the remaining fourth of the bill to rebuild sidewalks, schools, and local roads. Another complicating factor is that, because the communities most seriously affected are in some of the state's poorest areas, several legislators have called on the state government to pick up all of the costs involved in the rebuilding of those communities. Cuomo has so far refused to commit himself either way to that proposal.

A major slice of the direct costs borne by the state involves the New York Department of Transportation (DOT). The department's commissioner, Joan McDonald, said that there were an estimated 300 or so instances of storm damage – including total washouts that closed Route 73 in Keene, for example, and Route 103 in Rotterdam (the latter route was still closed as of 19 September). "In many instances," though, she added, "it [the damage] was shoulder erosion or guardrails taken off." The cost of repairing either, of course, would be much less than the cost of replacing a washed-out

bridge. "We worked around the clock to start to bring them back," McDonald said. "We are convinced we will get the remaining pieces opened and … [doing so] will not negatively impact our capital program."

The New York DOT is using emergency contracting authority, McDonald also said. It was not immediately clear, though, how much money has been spent by the department so far, and what repairs will be classified as "temporary" – i.e., eligible for complete reimbursement – vs. "permanent," for which the federal government will shoulder up to 80 percent of the costs.

"We are looking to get the maximum federal amount. Permanent and temporary can be ambiguous," McDonald said. "We are working with them [federal officials], and they said to track our resources, track our spending, and we are going to seek the full amount from them.

[For additional information on the N.Y. storm damages and cost assessments, click on www.fhwa.dot.gov/specialfunding/er/guide.cfm"]

Colorado
Debuts Statewide Interoperable Communications Training Program

Ten years in the making, Colorado's vision of perfecting communications between public safety agencies will finally begin. On September 15 the Governor's Office of Information Technology (OIT) announced a new program offering free radio training to law enforcement personnel and other first responders that will allow various agencies statewide to communicate more effectively with one another.

The new "Colorado Interoperability Training Program" will focus primarily on teaching a set of standards that will give a diverse group of professionals not only a much improved understanding of radio equipment but also a shared language that can be used both during emergencies and for day-to-day communications.

A number of other states have implemented similar programs on a smaller scale, but Colorado's statewide effort is believed to be the most ambitious yet. As technology becomes increasingly ubiquitous, the need for education becomes critical, said Dara Hessee, chief of staff of the Governor's Office of Information Technology (OIT). "This [training program] is really the first of its kind in the United States," Hessee said.

With funding provided by the U.S. Department of Homeland Security's Interoperable Emergency Communications Grant Program, the OIT will work with the Statewide Interoperability Executive Council (SIEC) to meet the program's target of filling a number of gaps in the current knowledge base.

Officials said that the training program was prompted, in part, by incidences of communication breakdowns because some public safety workers did not sufficiently understand the capabilities of the mobile and/or portable equipment they had been issued, and/or did not have adequate knowledge about the communication systems used by neighboring jurisdictions.

Agencies will have the option for either online or classroom training and a menu of classes to choose from that, depending on the needs of the agency involved, could range in length from several hours to several months. Making the program easy to access, convenient, and "customizable" was particularly important, said statewide interoperability coordinator Clint Goldenstein. "We are trying to bring the training to them [the trainees]," he said.

In addition to Web-based and classroom training, the new program also provides a number of illustrated workbooks that outline not only the radio equipment used, but also the policies and procedures required by a specific agency.

The retraining of current employees is a large part of the program, but standardizing how new employees in the state are trained may prove to have an even more permanent impact. Not every first responder will be trained within the next year, Goldenstein said, but this is the first step, he suggested, in creating a new state standard for communications.

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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NOVEMBER 11-18, 2011

IAEM International Association of Emergency Managers

www.IAEM.com

The Stakes are High

FOR EMERGENCY MANAGERS

Clark County, NV, USA | Rio All-Suites Hotel

Join us in Clark County, NV for the 2011 IAEM-USA Annual Conference and EMEX

You don't want to miss this great opportunity to network and exchange ideas with more than 2,500 others in the emergency management and homeland security fields. Attendees will benefit from educational forums on current industry trends and tools, as well as professional training.

EMEX EMERGENCY MANAGEMENT & HOMELAND SECURITY EXPO

www.EMEX.org

While you're here, plan to visit EMEX 2011—the showcase for leading technolgies, products and services in emergency management.

FEATURED SESSIONS INCLUDE:

KEYNOTE SPEAKER

W. Craig Fugate
Administrator of the Federal Emergency Management Agency

Amanda Ripley
Author, The Unthinkable: Who Survives When Disaster Strikes—and Why

Jason Ryan Dorsey, The Gen Y Guy®
Crossing the Generational Divide: Leveraging the Power of Generations™ for Your Strategic Advantage

Gordon Graham
Ignoring Problems Lying In Wait: The Ultimate High Stakes Gamble

Who Should Attend?

- Emergency Managers
- Homeland Security Officials
- First Response Coordinators
- Contingency Planners
- Private Industry Risk Managers
- Operations Personnel
- Contract Services Providers
- Emergency/Disaster Management Students