Public Resilience in CBRN Events: Lessons Learned from Seven Cases

by

Michelle L. Spencer
Michael T. Kindt
Megan P. Stans

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USAF Counterproliferation Center

Air University

Maxwell Air Force Base, Ala. 36112-6427

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Michelle L. Spencer, co-author
Lt Col Michael T. Kindt, co-author
Megan P. Stans, researcher

ABOUT THE AUTHORS

Michelle L. Spencer is the Northrop Grumman Technical Services Program Manager for the USAF Counterproliferation Center. Previously, she worked on the Department of Defense's International Counterproliferation (ICP) Program acting as a liaison between the Defense Threat Reduction Agency and the Office of the Secretary of Defense. Prior to that time Ms. Spencer was on the Policy Staff of the U.S. House of Representatives Armed Services Committee. She is an alumna of the prestigious Robert Bosch Foundation Fellowship Program. She has a Master of Science in Defense & Strategic Studies from Missouri State University and Bachelor of Arts degrees in German and Political Science from the University of Missouri. Ms. Spencer has lectured and written on a broad range of foreign policy and national security issues. Her previous works include a chapter on border security in a series titled *Countering Terrorism in the Twenty-First Century*.

Lt Col Michael T. Kindt, Ph.D. is the Chief of the Mental Health Branch at the Air Force Medical Operations Agency, overseeing mental policy and processes for the AF Medical Service. Prior to this assignment he was Director of Counterterrorism Studies at the USAF Counterproliferation Center. Lt Col Kindt has a M.A. and Ph.D. in clinical psychology from Bowling Green State University and is licensed to practice clinical psychology in the state of Alabama. His previous assignments include directing provision of mental health services at Moody AFB, Ga., and RAF Molesworth, UK. He also has extensive experience in education and training, having worked as an instructor, flight commander and squadron commander of the 382d Medical Training Squadron at Sheppard AFB. Lt Col Kindt has published a monograph entitled "Building Population Resilience to Terror Attacks: Unlearned Lessons from Military and Civilian Experience," (CPC, 2006), and co-edited "The World's Most Threatening Terrorist Networks and Criminal Gangs" (Palgrave-McMillan, 2009)

Megan P. Stans is a researcher for Northrop Grumman Technical Services and has a Bachelor of Science degree in Psychology from St. Mary's College of California. In May 2007 she graduated from Auburn University with a Master of Arts degree in Sociology. She has worked with the USAF Counterproliferation Center and the USAF Culture and Language Center.

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EXECUTIVE SUMMARY

In the United States the term "resilience" does not conjure thoughts of a community's ability to endure a crisis. Even with the advent of "homeland security," resilience usually refers to communications or other critical infrastructure, not human assets. The concept of public resilience is different in Israel and the United Kingdom, where resilience is existential and practical.

This study focuses on resilience to a weapon of mass destruction (WMD) event or crisis, which is defined as "the ability to respond effectively and recover from any stressor in responding to a Chemical, Biological, Radiological and Nuclear (CBRN) weapons event." Simply stated it is the ability of an individual, a community and a nation to return to some semblance of normalcy after a catastrophic national event such as the Sept. 11, 2001, attacks or a regional event such as Hurricane Katrina. One of the major questions in the post-9/11 age is whether Americans could handle a major terrorist attack with an unknown source, duration, or perpetrator.

The USAF Counterproliferation Center undertook a year-long project sponsored by the Advanced Systems and Concepts Office of the Defense Threat Reduction Agency (DTRA) to explore issues related to building public resilience to an incident involving WMD. The project entailed four elements. First, in order to fully examine the manner in which CBRN weapons may test human resilience, a thorough literature review was conducted which resulted in the second phase of the study: seven case studies that provide insight through historical examples of cataclysmic events. Next, a one-day workshop was held with defense, homeland security, crisis management, legal and health experts. The event focused on methods for improving public resilience during the preparedness, response and recovery phases of a major WMD event. The workshop observations were combined with the case studies and literature review to form this report. Finally, recommendations for improving public resilience through government and public action provided the final phase of the project.

While varying measures of resilience exist at the individual level, this study determined "the combination of a positive individual perspective, strong social connectedness, and effective problem-solving skills, all of which form an individual's ability to cope with traumatic events such as a CBRN attack" were vital to human resilience. Taking that perspective to the next level, we focused on resilience at the community level to determine the requirements and how the federal government could support, but not necessarily

provide all elements needed for a community to weather a crisis.

Seven case studies were chosen for their impact on and lessons learned regarding public resilience. Some occurred in the United States, some in other countries, while still others were global in scope. These case studies represent a range of threats that exist today and provide the major challenges facing the government in encouraging and supporting a resilient population. They include the 2001 anthrax attacks, the 1995 Tokyo subway attacks, the worldwide SARS outbreak in 2003, Hurricane Katrina in 2005, the 2001foot-and-mouth epidemic that occurred in Great Britain, the catastrophic 1918-1920 Influenza pandemic that swept the globe, and the 1982 case of Tylenol poisoning.

Commonalities found within the case studies were reviewed and led to five recommendations for government action.

- **Lack of planning and proper execution hampers government action and leads to unpredictable citizen response.**

Many lessons on human and public resilience can be learned from the events leading up to and following Hurricane Katrina, which killed more than 1,500 people and destroyed approximately 300,000 homes. Even though National Weather Service (NWS) advised local authorities to evacuate, no mandatory evacuation order was given for New Orleans until 19 hours before the storm hit the city. The delay caused irrevocable damage and highlighted the lack of planning and execution of the few existing plans. Specifically, citizens doubted the veracity of official statements when directions were finally given. Local and state governments made no provisions for those who had no means to leave the area. The city of New Orleans was aware approximately 100,000 people would be unable to evacuate in the event of a major hurricane. The final straw was that officials did not have contingency plans for a flooded New Orleans, even though they knew it was likely to happen. The lack of planning and the lack of attention to plans that did exist caused the greatest challenge: maintaining order in New Orleans. One of the greatest failures of Katrina was the almost immediate loss of command and control by local law enforcement due to lack of planning for continuity of operations during and after the storm.

Another example occurred in the aftermath of Sept. 11, 2001, when the government warned Americans of additional terrorist attacks. Citizens bought gas masks and antibiotics to protect themselves. The U.S. Government was unprepared for a geographically dispersed biological attack with no known perpetrator. Federal, state and local agencies scrambled to answer the public's questions. The public responded to official directives which caused confusion given the statements were often contradictory or wrong. In the absence of clear official guidance the public reacted with common sense measures and vigilance, which strained first responder capabilities in many urban areas.

While each of the cases had at least one example of the failure of leadership, one case did stand out as an example of how a government (or company) should act to manage the crisis and maintain the trust of its people. When citizens of Chicago died of cyanide poisoning in 1982, the makers of Tylenol, Johnson and Johnson (J&J), sprung into action. Within J&J, no rule book existed for managing a company-wide crisis; however, the leadership pushed a singular concept – to find out what happened with the product and to tell the truth to the public. The Tylenol crisis was the most covered story since the Vietnam War with more than 80,000 newspaper articles, and hundreds of hours of national and local television and radio coverage. In the years following the events, studies by Johnson and Johnson estimated 90 percent of the American population was aware of the murders within one week. However, due to Johnson and Johnson's quick response and willingness to take responsibility for the product tampering incident and solution (tamper-resistant packaging), J&J's market share surpassed its 1982 levels within three years.

- **Trust in government is essential.**

As Hurricane Katrina descended on the city of New Orleans, citizens turned to their leaders for instructions. When local leadership failed to give succinct and clear information, the population headed for higher ground. As the storm subsided, 60,000 people arrived at the doors of the Superdome, a "shelter of last resort," with hastily stockpiled supplies for 15,000 people for three days. Another 20,000 convened at the Convention Center, a location never planned as a shelter and therefore, had no supplies, governance or the ability to acquire either. Of all the cases examined, Hurricane Katrina demonstrates the most challenging scenario to personal and community resilience. Warnings were not provided early enough to be maximally effective, the needs and capabilities of many residents were not adequately prepared for, leaving many unable to follow evacuation guidelines. Long-term issues of trust between the people and the government exacerbated communication and compliance problems.

The situation during "Spanish" influenza pandemic of 1918–1920 was complicated by the fact America was at war. Most of the deaths occurred in a 16-week period, from mid-September to mid-December of 1918, paralyzing social, political and economic life across the globe. Even though the disease swept quickly across the globe killing an estimated 50 million worldwide, patriotism and public morale were given priority over disease prevention. Public support for the war enabled war-bond fundraising, increased industrial productivity and buoyed relief efforts, all essential to winning the war. As the epidemic took hold in the United States, the first reaction of many national authorities was denial. As the disease spread, official reaction ran the spectrum of denial, obfuscation, confusion and contradiction, severely testing public trust. The government could not meet the needs

or expectations of the public even though the expectations were far below what they are today. The media played an important role partially through lack of coverage and misinformation provided by ignorant government leaders and advertising charlatans who preyed on public fear.

- **Lack of information causes stress and confusion in people.**

Studies have repeatedly shown the worst thing a government can lack is transparency. Unfortunately, if no plan for communication with the public exists prior to a crisis; few officials will know who is responsible for sharing information. During the foot-and-mouth outbreak in the UK, Scottish officials worked in conjunction with a national farmers association trusted by the local population. Other areas of Britain lacked coordination, leaving farmers to question low-level bureaucrats demanding destruction of their livelihood.

Given the novelty of sarin, few Tokyo first responders or healthcare personnel had experience with the chemical agent used in the subway in 1995. Conflicting reports were given as to how citizens should react. These factors combined dramatically increased the number of persons seeking medical care. As many as 3,796 individuals were injured to some degree, but over 5,500 sought medical attention. According to some medical experts many of those who sought medical care were "worried well," individuals who had minimal exposure, had minor symptoms or were near the incident and were unsure whether they had suffered any contamination. Local hospitals were flooded following the morning rush hour attack on the Tokyo subway. All who sought care were not necessarily medically required to do so; however, the lack of healthcare personnel with direct knowledge or experience with chemical weapons left a void of information quickly filled with questions by the media.

- **Government often lacks a plan to inform the people – how will it share information, who will share it, when will it do so?**

During the events surrounding the 2001 anthrax attacks, U.S. Government officials realized they did not have a coordinated plan for sharing necessary information with the public during a bioterrorism attack, nor the ability to manage public perceptions when treatments and results changed with the circumstances. The need for a trustworthy, reliable source of information for both government and citizens was revealed.

A similar situation occurred in Japan in 1995 when a little known cult placed sarin on the Tokyo subway, killing 13 and wounding many. No group took immediate responsibility, and minor attacks followed with the most severe in March. The intensity of the media coverage during the events limited the ability of the government to use the news outlets to communicate with the public. Given the lack of direction from the government, sensationalism quickly overcame "need to know" reporting. A new word, "sarinoia"

was born and heard repeatedly in media reports as Aum Shinrikyo, the group held responsible, and the situation surrounding the events were replayed and dissected daily. The Japanese government noted its lack of direct communication with the public (without damaging its legal case against Aum) as a hindrance in the official investigations following the 1995 attacks.

Another event highlighting the need for a plan for communicating with the public is the 2001 foot-and-mouth outbreak in Great Britain. Although the disease does not directly affect humans, the natural outbreak may mirror in many ways an agricultural biological attack. The UK Government reacted with the slaughter of millions of cattle. Rural communities were confused and anxious about the spread of the disease, while none desired the loss of livelihood. Government agents came in and quickly determined which animals were in danger of infection, and thus, required to be destroyed. The lack of communication left the public with feelings of fear and outrage. Much of the turmoil would have been avoided had the government explained policy and objectives and how these would also benefit the public in a real and tangible way.

- **People (and organizations) often will help others even when it places them in harm's way.**

The 1918 pandemic killed an estimated 675,000 Americans, five times more than died in combat during WWI. With millions of people incapacitated, the social fabric frayed, governments ceased to effectively govern and many activities in the public realm halted. In September 1918, 12,000 people died in the United States, which alone is a significant number; however, in October the number climbed to an astounding 195,000, crippling American society. Businesses, schools and public activities closed or ceased. As government resources failed, philanthropic organizations prevailed. Led by women of prominence, these organizations took up the mantle of leadership, effectively managing and operating civic functions and preventing total collapse of society. They organized nurses, provided hospice and even made arrangements to collect and care for the dead. These groups do not exist in the same form today, making their role questionable in tomorrow's pandemic.

However, human resiliency is often the highest during times of crisis. It is then citizens choose to help their fellow man. The story following Hurricane Katrina has two groups of heroes: the National Guard/Coast Guard and private entities such as the Red Cross and small local groups who picked up the mantle of responsibility for their fellow citizens where the government failed. Together the Coast Guard and Louisiana National Guard rescued over 55,000 people. In addition, non-profit and non-government organizations came to the rescue of thousands of New Orleans residents, feeding, housing and caring for hundreds of thousands of people, victims and rescuers alike. These organizations are rarely in-

cluded in planning for crises, but their role is essential in the success of any government action.

- **Novelty of CBRN attack and lack of surveillance hampers official reaction.**

The lack of direct experience with weapons of mass destruction is a blessing and a curse. In Tokyo during the 1995 subway attacks, medical personnel had little to no knowledge of the effects of chemical weapons. One doctor, who had previous experience with an earlier Aum Shinrikyo incident, called in his advice to the hospital receiving the largest number of casualties. At the onset of influenza in 1918, doctors had never seen such virulent cases and thus misdiagnosed the disease as the plague, meningitis and dengue fever. During the 2001 anthrax attacks in the United States, doctors relied on textbooks and empirical data from the 1979 Soviet release, neither of which matched the circumstances of the October events. Medical experts gave improper advice due to the dearth of knowledge. Interagency tensions arose when the U.S. Postal Service learned it had passed bad advice to its employees that had been provided by the Centers for Disease Control and Prevention (CPC).

During the UK FMD outbreak, the lack of disease detection for several weeks prior to the first recognized case limited government efforts to contain the outbreak. Nor did government planning and preparation anticipate the extent of the outbreak. Communication with the public lacked credibility due to widespread distrust of government motives, especially within the farming community. Disease eradication policies may have been more widely accepted had the government included English and Welsh farmers on the decision-making process and involved organizations the farmers trusted like the National Farmers Union as in Scotland. The 2001 FMD outbreak may have been accidental or natural occurrence, but it offers insight into issues that could arise following a large scale chemical or biological attack, including the ability to manage perception, reduce confusion on the part of the citizenry and government officials, and create established relationships between government and trusted non-government organizations that can act as liaison with the public.

By February 2003, a viral respiratory illness that had first emerged in China in late 2002 was given the name Severe Acute Respiratory Syndrome (SARS) by the World Health Organization (WHO). Concern heightened among health officials due to the high transmission rate among humans. According to the WHO by late spring, there were more than 7,000 cases of SARS worldwide and over 500 deaths. This case study focused on the actions of the Canadian government to combat the epidemic in British Columbia and Ontario. The difference in how these cases were handled within these provinces help to explain why Toronto came to be seen as the focal point of SARS, while cases in British Columbia were largely unnoticed by the rest of world.

British Columbian health officials were aware of the outbreak of SARS in China by early February. They monitored the situation, and communicated information to healthcare providers. The same was not true in Ontario, where no systematic surveillance or communication system existed. The absence of a coherent pandemic plan limited Ontario's ability to manage the SARS outbreak. Preparation by the healthcare community in British Columbia minimized the impact of the outbreak not only on the victims, but also on the community at large. The lack of effective communication severely hampered Toronto's ability to control infection. This inability not only cost lives and millions of dollars in healthcare-related expenditures, but caused Toronto to lose over $1 billion in tourist dollars.

- **Lack of interagency cooperation and info sharing significantly raises risks.**

As federal and state resources descended on New Orleans following Hurricane Katrina, one of the greatest challenges was no one commanded all agencies and organizations involved. Coordination was managed on a case-by-case basis, which was greatly hampered by the lack of interoperable communications. National Guard troops could not communicate with active duty military, and neither could reach out to local resources, except with cell phones. The result was a haphazard response by all agencies, desperate to rescue the victims of the storm.

Similarly, during the 2001 anthrax attacks various agencies relied on others for information, which did not always arrive in a timely manner or was incorrect upon arrival. Even though organizations know the challenges they face during a major event as they did following the anthrax attacks and Hurricane Katrina, the U.S. Government has been unable to solve the interagency issue. The mantle of leadership, responsibility for distinct aspects of response and coordination varies depending on the nature of the attack. Rarely have coordination efforts gone far beyond the written word. During normal execution of duties as well as crises exercises, inconsistencies are glossed over as too difficult to solve. Katrina is a prime example of a case where most first responders and secondary support agencies have been involved in planning, staging and exercising national command structure, all of which was thrown out the window during the event.

Recommendations

The most critical finding uncovered from this study is contrary to common perception, there is no significant evidence to suggest individuals or communities are prone to panic in a CBRN event. In the incidents examined, and in the opinions of most workshop participants, people have typically responded to such events by trying to care for themselves and loved ones and applying the advice of authorities as they understood it. This positive, responsive behavior can at times

still create challenges in response and recovery, such as when people were quick to report anything looking like suspicious white powder after the fall 2001 anthrax attacks. Or, when people immediately sought medical help when they had been, or believe they had been exposed to a chemical as in Tokyo following the 1995 sarin attacks. Despite these challenges, there is no evidence of large-scale irrational or counterproductive behavior in any of the cases reviewed for this report. This strongly suggests, rather than being looked at as a threat or problem to be managed in a crisis, the public should be seen as a potential partner in meeting the challenges of a community or of the nation following CBRN event.

This report recommends the U.S. Government undertake or implement five distinct actions:

1.) Lead with Authority, Responsibility and Honesty.

Lack of a coherent communication plan and clear lines of authority were painfully apparent during both the anthrax attacks and the response to Hurricane Katrina. In addition to overlapping authorities at the national level, Hurricane Katrina proved the U.S. Government could not effectively coordinate federal, state and local efforts as quickly as the crisis required.

The reason for the inclusion of the Tylenol poisoning case was the astounding ability of Johnson and Johnson to regain public trust and thereby increase market share following the tragic events of 1982. Important lessons can be learned from J&J's experience, including the fact J&J took responsibility for the crisis and responded to the public with honesty and clarity. No excuses were made, even though it was first thought the problem had to have occurred during manufacturing. Even after the company discovered it was not to blame, it did not slow its actions to prevent a repeat occurrence. Instead J&J acted swiftly, costing millions, but the loss was easily overcome within a few years. The last lesson of the Tylenol case was to use a "reservoir of good will" wisely. Americans trusted a product and were reassured by the rapid response of a well-known entity.

2.) Improve Communication Among and Within Government Entities.

Many government agencies and organizations rely on others for accurate and timely information, especially in a situation involving public health. During the anthrax attacks in 2001, agencies were challenged to manage information released to the public. Postal workers pressured localities such as Washington, D.C. to make a decision about the closing of the Brentwood Postal Facility, as well as to determine who should receive treatment. The public health statements from CDC and HHS were sometimes confusing or vague, raising concerns over fairness and increasing confusion regarding treatment options.

Given the likely magnitude of a CBRN event, public trust in government

statements and actions is essential. Mistrust leads to counterproductive activities such as refusing to be vaccinated or hoarding medicine against a vague threat. Not all citizens will conform, but clarity and uniformity will go a long way in easing confusion and chaos.

3.) Prepare and Inform the Public.

The average response time for the federal government to a disaster is 72 hours. Those first three days may be vital to community or individual survival and recovery. Thus, it is incumbent on citizens and local communities to take action prior to an attack and be able to respond quickly when an attack does occur.

The involvement of America's youth was seen by many workshop participants as crucial to increasing knowledge and improving overall resilience. While the U.S. Government has some initiatives aimed at children, they need to be expanded to utilize school, sporting and civic activities.

To make the most of their own resources, citizens need to know what is happening and what they can to do to help themselves and their families. One suggestion for encouraging individual preparedness is to expand current public awareness efforts.

The ability of the government to manage the expectations of its public is vital to recovery from any type of crisis. When people expect the government to take care of them, they are less likely to take steps to care for themselves. During the workshop, participants discussed methods for changing – not decreasing expectations. Therein lies the role of the media.

4.) Improve Medical/Public Health Infrastructure and Resources.

Medical resources are perhaps the most crucial resource following a CBRN event. Given the dearth of knowledge surrounding WMD, overcoming ignorance is likely to be a major challenge in managing an event. Following a WMD event, the public will need clear and decisive directions on what to do and who needs to seek medical care. There are likely to be many behavioral casualties or those who are uncertain of their status. The need for medical and support personnel could be overwhelming. This need is not discretionary. It is a strategic necessity that should receive priority as it has value in responding to almost any crisis situation.

5.) Use Existing Local Resources.

Advance preparation can alert citizens to a variety of possible CBRN and other crisis events and, thus, cut down on the number of unexpected surprises encountered. Further, during a crisis event, clear, consistent information from a reliable source is enormously helpful to those coping with a crisis or disaster.

Following landfall of Hurricane Katrina, local non-profit organizations housed and cared for as many evacuees as the Red Cross, although many did not receive re-imbursement or government support after the crisis had ended. The gov-

ernment needs to engage these non-traditional sources of community support. They have connectivity to the population and can communicate to them prior to and even during an event. For this reason, these private organizations should also be involved in local planning. Their adaptability and responsiveness demonstrate the strength of local expertise, relationships, and capability to reach and serve vulnerable populations and communities. Local community organizations may be best positioned and capable of bridging the gap between federal and state governments and their citizens.

Conclusion

Webster's Medical Dictionary defines panic as "a sudden strong feeling of fear that prevents reasonable thought or action." We found no empirical evidence to suggest citizens are likely to panic during a crisis even when WMD may be involved. The public needs information to be empowered to act on its own, knowing the government cares, but that self-reliance is key to being personally resilient and acting to support and encourage a resilient community and nation. Resiliency flows down from the government in terms of infrastructure, knowledge and capabilities; but it also grows outward from individuals and families who are prepared to maintain and sustain themselves within communities.

In order to foster a resilient society, the government needs to change its role from primary care provider to a more broad-based supporter of local and community resilience efforts. Focusing on personal preparedness at an early age, beginning at school, would go a long way in preparing citizens to cope successfully with future crises and disasters.

Honesty and clarity in government communication creates public trust. Public trust is a requirement for a reasonable, orderly response to a traumatic incident such as a CBRN event. Government leadership will increase understanding of the situation and feelings of manageability of crisis, all of which are requirements for personal resilience.

In looking back at major catastrophic incidents around the world, experts have noted the closer a person was to the crisis, the more realistic and reasonable the individual's behavior. Preparation for disasters, education, training and exercises, both physical and mental, can promote confidence in the public that they can cope with what comes. Advance preparation can also educate citizens to a variety of possible CBRN or other crises and, thus, lessen the number of unexpected surprises encountered. During a crisis, clear, consistent information from a reliable source is enormously helpful to those coping with a crisis or disaster. A prepared, informed and involved public is a resilient one.

INTRODUCTION

Public resilience is not a common concept in the United States. The term "resilience" is generally used in reference to communications or other infrastructure, but rarely in human terms. This is not the case in Israel and the United Kingdom, where resilience is widely accepted as a necessary part of everyday life. Resilience is generally defined as "the ability to respond effectively and recover from any stressor," in this case, following a weapons of mass destruction (WMD) attack or accident. In the simplest terms it is the ability of individuals, a community and a nation to return to some semblance of normalcy after a catastrophic event. What would the U.S. Government need to do? What support would need to be provided for citizens to enable them to go about their daily lives, even though their lives may be irrevocably altered? These are the questions addressed in this study.

The USAF Counterproliferation Center undertook a year-long project sponsored by the Advanced Systems and Concepts Office of the Defense Threat Reduction Agency to explore the issues related to building public resilience to Chemical, Biological, Radiological, and Nuclear (CBRN) weapons events. The project entailed four primary elements. First, in order to fully examine the manner in which CBRN weapons may test human public resilience, a thorough literature review was conducted, from which case studies were chosen that cover a number of key areas. The case studies and literature review were followed by an identification of top experts on psychological resilience, panic mitigation, disaster preparedness, consequence management, and crisis management as it pertains to preparing the public for and guiding the public through a WMD event.

Experts knowledgeable about the Homeland Security Advisory System, the Citizen Corps, and efforts of the U.S. military to prepare its members for threatening events were also identified. These experts were invited to participate in a one-day workshop to exchange ideas and to make recommendations on this subject. The workshop observations were recorded and combined with the case studies to form this summary report drawing on information revealed in the literature search, case studies and workshop. Finally, this report advances a set of recommendations for improving public resilience by measures to be adopted prior to and during a crisis situation.

Project Overview

The project focuses on the concept of resilience and factors that can increase or inhibit the development of this vital capacity. The overview also examines issues related to CBRN weapons and their impact on individuals and communities

that may present unique challenges to their resilience. To thoroughly examine the subject, past incidents that might provide insights into the effects of catastrophic attacks were reviewed. These cases were examined from the perspective of community response to CBRN related incidents. Actions taken by government agencies and the media during these incidents were considered terms of their impact, both positive and negative, on effected populations. Such an examination necessarily crossed into a wide range of fields of study and areas of expertise, including emergency management, risk perception and risk communication. While these are all extremely important to the interaction between government and the public in a time of crisis, detailed analyses of these areas is beyond the scope of this paper. The focus of this study will enhance understanding of public responses to CBRN related crises, and provide suggested improvements in government actions.

The incidents reviewed in this project can be broadly grouped in two categories. The first group includes events in which CBRN agents were used against a vulnerable civilian target. Fortunately, the number of events in this category are relatively few, and do not provide a wide range of cases for assessment. By necessity, a second category was reviewed. This group includes events that, although natural or accidental, simulated in some way the effects a CBRN event. Examining both types of events provided an opportunity to look at a wider range of possible responses to a CBRN attack. Finally we provide recommendations for building resilience.

The Concept of Resilience

Resilience is a psychological concept that gained widespread usage in the 1980s as researchers focused on the varying outcomes of children raised under adverse conditions. Researchers observed, as many of us have seen in our own experiences, that some children raised in homes where they were exposed to abuse, addictions, extreme poverty or in institutional settings, developed their own emotional and behavior problems. Other children exposed to similar stressors appeared to thrive, and become capable, competent individuals despite the adversity they faced.

A number of definitions of the term resilience were developed that captured this idea of coping well despite stress or adversity. One of the first and most referenced definitions of the term was advanced by Sir Michael Rutter who defined it as facing "…stress at a time and in a way that allows self-confidence and social competence to increase through mastery and appropriate responsibility."[1] A more recent definition put forth by the American Psychological Association, describes resilience as "the process of adapting well in the face of adversity,

[1] Rutter, Michael, "Family and School Influences on Cognitive Development," *Journal of Child Psychology and Psychiatry*, vol. 26, 683-704, (1985).

trauma, tragedy, or even significant sources of stress."[2]

Both definitions make clear resilience is manifested in response to a stressful event. Such stressors can include chronic problems such as living with an injury, disability, or an extended dislocation from a home, or prolonged exposure to substandard living conditions. Other stressors can be described as more acute, such as a sudden injury, the death of loved one, traumatic exposure to the dead and dying, or a brief dislocation from a home. Any type of CBRN incident could create a wide range of both acute and chronic stressors that would challenge an individual's capability to respond in a resilient manner.

These definitions also highlight that resilience is comprised of several components. It involves facing a stress or a threat in a way that builds confidence in the individual's ability to master future threats. It also involves taking some personal responsibility for the successful response to that threat. That is, individual or group resilience is unlikely to grow from having someone else manage a crisis or threat.

Thus, one key to the development of resilience is having had the experience of being faced with responsibility in a threat or crisis and successfully managing it. Resilience does not guarantee an event will not have an impact on an individual or the person will never experience distress or difficulty coping. Rather, resilience is the characteristic that allows one to adapt to stressors while continuing to function with minimal disruption.

Further, resilience is not an all-or-nothing characteristic. Everyone has a degree of resilience, and some may be more resilient to one type of stress than to another.[3] For example, some people may manage the stress induced by time pressure at work much better than they handle relationship stresses at home.

More relevant to the preparation for a terrorist attack, individuals and communities on America's gulf coast may have developed a significant amount of resilience to the effects of hurricanes and occasional displacements based on past experience of successfully preparing for, surviving and recovering from them. While this experience with hurricanes may instill confidence and resilience in coping with future storms, it may not translate well to the desired response to a chemical or biological terrorist attack.

The degree to which resilience translates from one kind of event to another may depend on the extent an individual is familiar with a threat or feels a sense of control in the response to it.[4]

While different individuals may manifest resilience in different situations, there are a number of characteristics common to resilient individuals. The characteristics can be grouped into three gen-

[2] "The Road to Resilience," *American Psychological Association*, On-line, Internet, http://apahelpcenter.org/featuredtopics/feature.php?id=6&ch=2.

[3] "Promoting Resilience," New York State Office of Mental Health; *OMH Quarterly*, (March 2003), On-line, http://omh.state.ny.us/omhweb/omhq/q0303/Resilience.htm.

[4] Ibid.

eral categories: (1) individual characteristics, (2) social ties and (3) coping strategies.

One individual characteristic common to resilient people is *optimism*, the ability to see hope for the future even in difficult circumstances. Without a sense of optimism things can get better, an individual is unlikely to begin to think about or work toward improving their situation. Such an individual would see themselves as a victim for whom things will not improve.

Another beneficial individual feature is *self-efficacy*, or a confident sense the individual can utilize available personal and external resources to cope with the imposed adversity or stressor. Even if one is optimistic, if they do not believe there is anything they can do to change their situation they will be unable to begin to help themselves.

Self-efficacy is related to *mastery*, which is the ability to take control of the situation one is placed in, break a large problem down into smaller, more manageable pieces and begin with those small steps to work to resolve the problem.

Hope that a bad situation can improve (optimism), the belief that one can work to improve it (self-efficacy), and the knowledge and experience of getting results when one takes initial steps toward recovery (mastery) combine to improve resiliency. Individuals are on their way to coping effectively with a traumatic event when they can achieve at least some level of optimism, self-efficacy and mastery.

Finally, resilient people demonstrate a sense of *coherence*, which is the belief that events that happen in one's life make sense. Coherence allows individuals to place even traumatic events into a bigger picture of life.[5]

Resilience to a WMD Event

While the definitions are informative, they do not directly illustrate how these individual characteristics relate to better coping during a terrorist attack.[6] In prepa-

[5] "Fostering Resilience in Response to Terrorism: A Fact Sheet for Psychologists Working with Adults," American Psychological Association. Online, http://www.apa.org/psychologists/pdfs/adults.pdf.

[6] A multitude of studies were undertaken following the attacks of Sept. 11, 2001. Several of these studies focused on whether New York area residents suffered from the symptoms of post-traumatic stress disorder and used that determination as a measure of personal resilience. The studies focused primarily on the individual and his immediate response to the event. Other post-9/11 surveys defined resilience more broadly and found while as many as 90 percent of respondents stated they suffered from stress, they did engage a multitude of coping mechanisms that allowed them to weather the storm. For an example of personal resilience, see George A. Bonanno, Galea A. Sandro, A. Bucciarelli, and D. Vlahov, "Psychological Resilience after Disaster - New York City in the Aftermath of the September 11th Terrorist Attack," Psychological Science, 17(3): 181-186, (2006). For an example of the resilience coping mechanisms see the RAND study, published as M.A. Schuster, B. D. Stein, L. H. Jaycox, R. L. Collins, G. N. Marshall, M. N. Elliott, A. J. Zhou, D. E. Kanouse, J. L. Morrison, S. H. Berry, "A National Survey of Stress Reactions After the September 11, 2001, Terrorist Attacks," *New England Journal of Medicine*, Vol. 345, No. 20, (Nov. 15, 2001), 1507-1512, and Kenneth A. Rasinski, Jennifer Berktold, Tom W. Smith and Bethany L. Albertson, "America Recovers: A Follow-Up to a

ration or response to a nuclear, radiological, chemical or biological attack, a resilient person would demonstrate optimism by believing he, the community, and the nation would be able to cope with the crisis and recover to see better days.

Self-efficacy would enable the individual to believe that by accessing and making use of available information and resources they can work to protect themselves and begin to recover.

Mastery would allow them to build on those initial successes, or past similar experiences and personal resources to take further steps to develop and implement a plan to recover.

Finally, a sense of coherence would allow the person to see the attack as part of a larger war on terror (rather than an unforeseen bolt from the blue) and part of a larger life that, although negatively affected by the attack, can still go on.

These resilient personality features allow an individual to respond well and be maximally personally effective in the event of a crisis. An individual without one or more of these characteristics is more likely to be overwhelmed by the stress of crisis, to respond ineffectively or even counterproductively, and be much more reliant on the support of others, creating unnecessary drain on emergency responders and their healthcare and other support systems.

In addition to these individual characteristics of resilience, the social ties that bind people together also contribute to resilience. People who are able to ask for and receive support from social groups such as family, friends, church or community are more resilient to stress than those who either cannot seek support or have none available. While it seems obvious receiving support would help an individual cope well with stress, there is evidence that providing support for others in times of crisis is helpful as well. Supporting others is one way of seeing the efficacy of your action and beginning to take at least a small step toward control over what may appear to be an overwhelming situation. This may explain why one in three Americans directly supported recovery after Sept. 11, 2001, by giving time, money or blood.[7]

The final set of factors contributing to resilience is related to coping strategies. Even with the individual characteristics identified above, a person must still utilize coping strategies to respond effectively to an attack. These strategies include stepping back to see the big picture before rushing to solve a problem, break-

National Study of Public Response to the September 11th Terrorist Attacks," National Organization of Research, University of Chicago, (Aug. 7, 2002).

[7] Ibid. See also the National Tragedy Study, which showed that most Americans felt a surge in pride in being American, gained trust in national institutions, and increased their faith in fellow citizens. Forty-nine percent of those surveyed made charitable contributions; 24 percent gave blood and 84 percent said "special prayers" for those affected by the attacks. "Public Bounces Back After Sept. 11 Attacks, National Study Shows," National Science Foundation Press Release, NSF PR 01-85, October 24, 2001 and Kenneth A. Rasinski, et al, National Organization of Research, University of Chicago, (Aug. 7, 2002).

ing large and potentially overwhelming problems into more doable tasks so progress can be made, and taking breaks from the crisis to rest or refocus energy.[8] Failure to cope effectively by trying to do too much or not recognizing personal limits can lead to poor decision-making which can make a crisis situation worse.

High resilience to stress, then, is the combination of a positive individual perspective, strong social connectedness and effective problem solving skills, all of which allow an individual to cope more positively even with traumatic events such as a CBRN attack. Although some individuals are by nature or experience more resilient than others, resilience is a trait that can be improved.[9]

Building Resilience

The American Psychological Association (APA) has produced a series of brochures on enhancing resilience and posted them on the APA website for public access. The APA identifies several factors toward building resilience that can not only be utilized by individuals but could also be enhanced by federal, state and local policy. The APA recommends that individuals build connections with others, including social and civic groups, to help develop avenues for social support in the event of a crisis. Creation or support of local organizations with abilities to bring individuals together to create support networks is one method of helping the population build resilience.

Another technique for increasing resilience is taking decisive action. This is a way of reducing the anxiety of indecision. By taking action, one can focus on the action at hand, rather than feeling stuck in uncertainty. Government agencies could facilitate this aspect of resilience by providing clear guidance of actions that should be taken in preparation for the general possibility of future disasters and terror attacks. Additionally, immediate direct guidance should be provided for coping with specific threats as the perceived risk increases or immediately following an attack.

Keeping things in perspective is another method of enhancing resilience. As individuals improve their ability to look at the big picture, they can better direct their actions and moderate emotional reactions. Larger efforts to communicate clearly about the risk of terror attacks, particularly in comparison to the other threats inherent in modern life, can help reduce anxiety associated with terror attacks.

For example, despite the emphasis placed on securing our nation from terrorism, the relative risk to Americans is rather low in comparison to those in the United States who have been killed by lightning over the last 40 years.[10] Providing accurate comparative data to allow the population to place the threat of terror

[8] Ibid.

[9] Ibid.

[10] Mueller, John; "Simplicity and the Spook," reprinted from *International Studies Perspectives*, Vol. 6, No. 2, (May 2005), AWC Terrorism Elective Reader.

attacks in the proper perspective would be one method of enhancing resilience. However, some CBRN attacks might inflict casualties well beyond our previous national experience.

A final technique for increasing resilience is to avoid seeing crises as too large to be managed, and by beginning to break down a crisis into more manageable pieces. Authorities could greatly enhance resilience in this area by providing pre-attack information, encouraging small steps that individuals, families and communities could take to improve their security. Such preparation may have a direct impact on an individual's sense of self-efficacy. Through pre-attack preparation, one would learn there are things they can do to improve their situation and be more likely to respond appropriately if an attack occurs. Thus, it appears clear with the proper motivation and allocation of resources, the nation could embark on a program to mobilize the population to be much more confident in its ability to respond to a significant threat. During an event, this power of resilience can be fostered by providing the public with accurate, timely information that gives guidance to those affected by the crisis.

Behavior in Crisis

This understanding of resilience and how it can be enhanced is particularly important in light of current knowledge regarding human behavior in the face of threat or disaster. Recent work by Anthony Mawson highlights the marked disparity between how people are presumed to behave during disasters and their actual behavior.[11] He finds that in contrast to the prevailing belief that in the face of disaster there will be mass panic and/or violence as people recklessly flee to safety, there is little evidence to support this belief. Mawson's research suggests that rather than panicking and fleeing, people are much more likely to engage in activities that are supportive of others or involve seeking familiar people or places.

He cites four mistaken assumptions that contribute to the belief that panic is likely in a disaster situation. The first mistaken assumption is the drive for self preservation will result in fleeing the scene or fighting others. The second mistaken assumption is most individuals will choose to move away, leaving the scene of the attack toward a safe location. The third mistaken assumption is physical dangers will create more panic than other types of stress. The fourth mistaken assumption is panic is only prevented by strict social discipline and leadership.[12]

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[11] Mawson's article builds on a larger body of work on panic behavior and response to disasters that dates back to the 1960s. A full review of this literature is beyond the scope of this paper. For further information on the topic see Quarantelli, E. L. (1960); "Images of Withdrawal Behavior in Disasters: Some Basic Misconceptions," *Social Problems*, 8, 63-79 and Quarantelli, E. L. & Dynes, R. (1977); "Response to Social Crisis and Disaster," *Annual Review of Sociology*, 3, 23-49.

[12] Anthony Mawson, "Understanding Mass Panic and Other Collective Responses to Threat and Disaster," *Psychiatry*, 68, (Summer 2005).

These mistaken assumptions can lead those in positions of responsibility and authority to attempt to avert such panic by not releasing information about a potential disaster or attack. Unfortunately, this behavior could potentially make panic more likely when a disaster occurs.[13]

Mawson outlines four corollaries to these mistaken assumptions that reflect research on actual human behavior in times of crisis or disaster. First, more than the drive to flee to safety, people are motivated by a desire to be with familiar people (family, friends, etc.) and in familiar places, even if this means moving toward the danger. Second, people tend to move not toward an objectively safe place, but toward people and places they perceive to be safe. Third, separation from these familiar people or places during a disaster may be more disturbing than the actual physical threat. Fourth, the key to avoiding panic may not be firm social control or discipline, but the presence of familiar people.[14]

These assumptions and their corollaries are keys to understanding and planning to strengthen the public response to CBRN attacks. If adopted, these concepts could encourage significantly different management of information and guidance provided to the public than a program based on the four mistaken assumptions cited previously.

Mawson's findings regarding public behavior in disasters are supported by other research that focuses on the likely public response to terrorist attacks. In a 2006 study, Sheppard, et al., found that following five significant terror attacks while there was evidence that when the public changed their behavior in some ways to adapt to a perceived threat, such as decreasing travel, or using more caution when opening the mail, there was little evidence of public panic.[15]

The findings by Mawson and Sheppard mesh well with the basic concepts of resilience reviewed earlier. One of the key factors in resilience was the ability to reach out to provide support to, and receive support from, others in times of stress. This ability to affiliate with others during crisis or stress then appears to not only help individuals cope with a crisis, but, on a large scale, enables groups to avoid panic behavior.

This drive for the familiar has both advantages and disadvantages for emergency planners. On the positive side, based on Mawson's research, mass panic is a much less likely outcome of disaster than is often feared. On the negative side, however, the tendency to seek out familiar people and places may lead many to ignore early warnings to evacuate or seek shelter leaving them at greater risk when danger occurs.[16]

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[13] Ann E. Norwood, "Commentary on 'Understanding Mass Panic and Other Collective Responses to Threat and Disaster:' Debunking the Myth of Panic," *Psychiatry*, 68, (Summer 2005).

[14] Mawson, *Psychiatry*, (Summer 2005).

[15] Ben Sheppard, G. James Rubin, Jamie K. Wardman, and Simon Wessely, "Terrorism and Dispelling the Myth of a Panic Prone Public," *Journal of Public Health Policy*; (2006), 27, 3.

[16] Ibid.

This potential appears to have been clearly demonstrated by the behavior of tens of thousands of citizens of New Orleans who opted to remain in their homes and with their families despite warnings to seek higher ground during Hurricane Katrina. The desire for affiliation may also have contributed to emergency workers leaving their posts to tend to their families rather than performing their jobs. This unwillingness or inability to heed warnings and seek shelter resulted in an overwhelmed emergency response system.

The challenge for those seeking to build population resilience to a CBRN attack will be to build on this desire to be with familiar others and support each other while enabling people to follow evacuation warnings and other directions. Having provided a basic understanding of resilience and public behavior in disaster, it will be helpful to examine some past incidents which help to shed light on these principles in practice.

Resilience Incidents

Fortunately there have been few true CBRN attacks in recent years for analysis, and some CBRN attacks that have occurred may not shed light on U.S. public resilience due to the cultural or demographic nature of the target populations. This project examined a combination of true CBRN attacks and natural events that, in significant ways, represent or may shed light on the human response to future CBRN attack scenarios.

The following CBRN attacks were reviewed. Those in bold were selected for inclusion in the study. The other events were excluded for a number of reasons. Several were excluded because they represented attacks on solely military targets and were not intended to have a direct effect on the civilian population.

The 1984 Rajneeshee biological attack in Oregon was not identified as an attack until well after it was perpetrated, and so victims and the community did not respond to the CBRN terrorism implications of this incident. The 2007 chlorine vehicle borne improvised explosive device (VBIED) attacks in Iraq occurred in a context of near continuous violence and did not appear to create significant population response beyond that caused by conventional IED attacks. The 2007 UK Foot and Mouth Disease outbreak (although it may have been intentional) appears to have had only minor impact, perhaps highlighting the resilience gained by the British public and the agricultural community through managing the previous 2001 outbreak.

Finally, the U.S. nuclear attacks on Japan at the end of WWII and Iraqi use of chemical agents on Kurdish civilians were not included for formal analysis. Although the Hiroshima and Nagasaki attacks represent the largest scale CBRN attacks on a civilian population, they occurred within a context of total war and resulted not in a return to normal functioning of the Japanese government, but military occupation.

Likewise, the attacks by Saddam Hussein against the Kurds reflect intras-

tate violence by the government against a minority population rather than an attack by an outside nation or terrorist group.

Thus, although there have been a number of intentional uses of CBRN agents, only those listed below in bold appear to have significant implications for likely CBRN attacks on the United States.

- WWI chemical attacks focused on fielded troops
- WWII atomic attacks on Japan
- Iran-Iraq War chemical attacks
- The Dalles, Oregon 1984 – Rajneeshee cult poisoned locals with salmonella
- WWII Japanese chemical and biological attacks on China
- Matsumoto, Japan, 1994 – Aum Shinrikyo attack on a residential area
- **Tokyo, Japan 1995 – Aum Shinrikyo released sarin in subway**
- **United States, 2001 – Anthrax attacks**
- Iraq 2007 – multiple VBIEDS attacks mixing high explosives with chlorine
- United Kingdom – 2007 Hoof and Mouth Disease Incident

To illustrate important resilience lessons, this review focuses on two true CBRN attacks, the 1995 Aum Shinrikyo sarin attacks in the Tokyo subway and the 2001 anthrax letter attacks in the United States.

Further, given the limited list of true CBRN attacks that yield useful resilience lessons, a number of accidental or natural events with CBRN-like characteristics were also considered for review. Each of these events in some way mimics some of the effects following a CBRN attack. The events listed in bold were chosen for inclusion in this study.

- **Pandemic Influenza 1918-1920**
- Bhopal, India 1984 – methyl isocyanate accident
- Goiania, Brazil 1987 – accidental dispersion of Cesium-137
- South Florida 1992 – Hurricane Andrew
- **United Kingdom 2001 – Foot-and-Mouth outbreak**
- **Toronto, Canada 2003 – SARS outbreak**
- United States, 2004 Flu vaccine shortage
- **New Orleans, LA 2005 – Hurricane Katrina**

In addition to those listed above, the 1982 Tylenol poisonings case was added for the lessons learned from the ability of Johnson and Johnson to maintain public trust in its product after the pain-reliever was used in a random serial murder case in the Chicago area.

In total, seven case studies, some by terrorists, and others, naturally occurring disasters or accidents, were chosen for their impact on and lessons learned regarding public resilience. They include the 2001 anthrax letter attacks, 1918 influenza pandemic, 1995 Tokyo subway

attack, 2003 SARS outbreak, 2001 foot-and-mouth outbreak, 1982 Tylenol poisonings, and 2005 Hurricane Katrina.

In choosing these case studies, the authors are attempting to represent the range of threats that exist today and assist in determining how to improve public resiliency through government action.

PUBLIC RESILIENCE CASE STUDIES

1. ANTHRAX ATTACKS

"Your guesses are as good as mine."

–CDC Director Jeffrey Koplan, regarding the source of the 2001 anthrax attacks

Salient Points

- An attack was not immediately obvious.
- The public responded to official directives which caused confusion given the statements were often contradictory or wrong.
- In the absence of clear official guidance the public reacted with common-sense measures.
- While panic did not ensue, heightened alertness strained first responder capabilities.
- Lack of medical knowledge threatened the ability of laboratories and clinics to respond effectively.
- The U.S. Government did not have a coordinated plan for sharing necessary information with the public during a bioterrorism attack.

In September 2001, the United States suffered from the first major attack on its homeland since Pearl Harbor 60 years before. Following the terrorist attacks on Sept. 11, 2001, fears of follow-on attacks, including bioterrorism, loomed on the horizon. While the nation anxiously awaited additional attacks, one man fell violently ill and died in Florida. Other cases followed in New York and later, Washington, D.C. In August 2008 U.S. federal prosecutors indicted Bruce Ivins, a scientist at U.S. Government laboratory at Fort Detrick, Maryland. In February 2010, the Federal Bureau of Investigation (FBI) formally closed their investigation. This case study will look at the events surrounding those attacks and how the U.S. Government and public reacted. Many hard lessons were learned by a government unaware of its inability to manage numerous attacks that did not fit the scenarios of the past. This incident magnifies an example of a CBRN attack against the American citizenry – already reeling from events of September 11th –and provides a number of insights into issues regarding public resilience.

On Oct. 4, 2001, public health officials confirmed the first case of intentional infection by *Bacillus anthracis* in the United States. During the following seven weeks the Centers for Disease Control and Prevention (CDC) reported 10 confirmed cases of inhalational anthrax and 12 confirmed or suspected cases

of cutaneous anthrax.[17] The outbreaks were concentrated in six locations within the United States: Palm Beach County, Fla.; New York City; Newark, N.J.; Capitol Hill in Washington, D.C.; the wider Washington, D.C. area, and Connecticut.[18] By the end of November 2001, five people had died. The FBI stated four letters were found containing anthrax, while the Environmental Protection Agency (EPA) confirmed over 60 sites had been contaminated with anthrax spores.

The Attack Timeline

On Oct. 3, 2001, Florida state health officials contacted the CDC about a possible case of inhalation anthrax. CDC officials responded immediately knowing that only weeks before Florida officials had completed a CDC course in identifying biological agents. Two cases of inhalation anthrax were confirmed in Palm Beach County. The two individuals worked for American Media, Inc. (AMI). Contamination was widespread at the media office and six local postal facilities, resulting from two letters containing *Bacillus anthracis.* The first fatality, Robert Stevens, an employee of AMI in Boca Raton, Fla., confirmed he had opened a letter containing white powder that had spilled out on his computer. He had disposed of the letter and had not given it any thought until healthcare officials questioned him. The letter was never recovered, but was likely the source of infection of a second AMI employee who was a mail handler for AMI.

An employee of NBC news anchor Tom Brokaw contracted cutaneous anthrax after opening a letter addressed to Brokaw around Sept. 20. The letter was postmarked Sept. 18 from Trenton, N.J., and contained a brown granular material. On Oct. 14, a police officer and two laboratory technicians who handled the letter were exposed to spores. All individuals recovered.

A letter containing white powder addressed to Senate Majority Leader Tom Daschle tested positive for anthrax after being opened by a member of his staff on Oct. 15. About 40 staffers were in his office at the time; 28 were found to have been exposed. The House of Representatives recessed on Oct. 17, while the Senate evacuated the office buildings and operated out of the Capitol building. According to the EPA the Capitol Hill site initially consisted of 26 buildings with suspected anthrax contamination. All 26 buildings were sampled; anthrax was detected in seven buildings, all of which were decontaminated at a cost of $27 million.

Also on Oct. 15, a 7-month-old son of an ABC employee tested positive for cutaneous anthrax. It was suspected, but not established, the child was exposed in a visit to ABC offices in New York City on September 28. The child was hospita-

[17] While there were numerous other cases, some tested positive for anthrax, but never became ill and others began antibiotics early enough to have likely prevented illness.

[18] According to the General Accounting Office, the Washington, D.C. area includes the investigations in Maryland and Virginia. *Bioterrorism: Public Health Response to Anthrax Incidents of 2001*, (October 2003), GAO-04-152.

lized, but fully recovered. On Oct. 18, a female staff member at CBS developed cutaneous anthrax. Four days later a 30-year-old employee of the *New York Post* also contracted cutaneous anthrax; the source of both were unknown but presumed to be letters. Two additional *New York Post* employees developed cutaneous anthrax. A letter was recovered later in the *New York Post* mail room.

On Oct. 18, two postal workers in New Jersey were reported to have cutaneous anthrax. These exposures presumably represent contact with letters mailed from this location. On Oct. 23, a female postal worker from Trenton was reported to have inhalation anthrax. All survived.

In Washington, D.C., on Oct. 21, a postal worker from Washington's Brentwood postal facility went to the emergency room and was sent home diagnosed with the flu; on Oct. 22, he was brought back by ambulance. Both he and another Brentwood employee, hospitalized the same morning, died on the Oct. 22. The next day, two additional workers were confirmed to have inhalation anthrax (one 35-year-old male who handled mail and one 41-year-old female postal union official); while nine others showed possible symptoms. In addition, one employee of the State Department, a mail handler, developed anthrax. All survived.

On Oct. 28, 2001, a 61-year-old Vietnamese hospital worker, Kathy Nguyen, was taken to New York City's Lenox Hill Hospital's emergency room. She complained of shortness of breath, flu-like symptoms and coughing up blood-tinged mucus. X-rays revealed symptoms of inhalation anthrax. Antibiotics were administered, but Nguyen died on Oct. 31. FBI investigators tried to determine how Nguyen had been infected. It was assumed she contracted it from a letter, yet no evidence of such a letter or spores in her mail were found. Only the clothes she wore to the hospital were found to be contaminated. Another possible source, the subway system in New York City, was tested extensively to no avail. The source of her exposure was never identified.

Finally, in a small Connecticut town, Ottilie Lundgren, a retired 94-year-old woman, died of inhalation anthrax on Nov. 21. The investigation eventually indicated she was exposed through cross-contamination of mail. One of the anthrax letters mailed to Congress passed through a postal sorting machine 20 seconds before a letter addressed to a location less than four miles from Lundgren's residence. This letter was presumably the letter mailed Oct. 9 to Sem. Leahy, which was misdirected and was discovered later in state department mail. The local post office handling Lundgren's mail was found contaminated by anthrax. No contamination was ever found at her house or in her belongings.

Public Reaction

Public response to the anthrax attacks as a separate incident from those that occurred on Sept. 11, 2001, is difficult to gauge. After Sept. 11, 2001, U.S.

government officials repeatedly warned the public of impending attacks. Only one week after the attacks, federal officials warned there were more terror cells ready to attack and some of the 19 hijackers had shown an interest in crop dusting. The specter of bioterrorism elevated to a realistic threat to public health. Federal authorities cautioned public health facilities to be vigilant for "unusual disease patterns associated with [the Sept. 11, 2001, terrorist attacks]."[19] Health and Human Services (HHS) Secretary Tommy G. Thompson warned Americans to "be on the lookout for mysterious health symptoms." Three weeks before any sign of anthrax was reported, the public responded to government warnings by purchasing the only FDA approved drug for anthrax, Ciprofloxacin, and sought vaccines for smallpox and anthrax. Many pharmacies ran out of their normal supply of antibiotics. Doctor's offices and clinics were inundated with requests for anthrax vaccine and antibiotics. The only U.S. producer of an anthrax vaccine received more than 1,000 requests from the public in the two weeks following Sept. 11, 2001.[20]

In addition to vaccines and antibiotics for biological threats, chemical agents were a growing public health concern. Gas masks were snapped up from army surplus stores and internet websites. On Sept. 30, 2001, eBay had 54 pages of gas masks for sale, many of which were useless against a chemical attack.

Studies following these attacks found that 57 percent of Americans modified their behavior in some way, including 12 percent who reported avoiding public events. But the most common behavior change was exercising caution when opening the mail, a very reasonable precaution reported by one-third of those surveyed.[21] Such behavior highlights the responses that can be triggered by vague public statements regarding threats, particularly those not accompanied by specific recommendations for public action. In such circumstances, citizens want to do something to protect themselves and will begin to change their behavior in ways that make sense to them in the absence of other guidance. This highlights the need to provide behavioral guidance to the public to better direct its efforts and help foster a sense of efficacy during times of crisis.

While having intentionally raised public awareness, after events began to unfold, the government then tried to assure the public the situation was under control. Initially it was unclear if the first case was an attack. In their haste, offi-

[19] Rick Weiss and Ellen Nakashima, "Biological Attack Concerns Spur Warnings: Restoration of Broken Public Health System is Best Preparation, Experts Say," *The Washington Post*, (Sept. 22, 2001), p. A04.

[20] Rick Weiss, "Demand Grows for Anthrax Vaccine; Fear of Bioterrorism Attack Spurs Requests for Controversial Shot," *The Washington Post*, (Sept. 29, 2001), p. A16.

[21] Ben Sheppard, James G. Rubin, Jamie K. Wardman, and Simon Wessely, "Terrorism and Dispelling the Myth of a Panic Prone Public," *Journal of Public Health Policy*, 27:3, (2006), p. 231.

cials gave reassuring statements without facts to support their assertions. The most serious example occurred on Oct. 5, 2001, when HHS Secretary Thompson said the death of the first victim was not terrorism, but an "isolated case" – one that was most likely caused by natural events. By Oct. 21, 2001, events had evolved to the point that President Bush called the attacks an "act of terror," stating that while no link to Sept. 11, 2001, had been established, clearly the incidents were intentional and, therefore, terrorism.

Americans were asked to be on alert and many responded exuberantly. Aside from hoaxes, thousands of reports were called in by vigilant citizens who came across white powder in their daily lives. While it is an overstatement to call this panic, the level of attentiveness was so high that white powder was suspect wherever it was found – from doughnut shops, to pharmacies, to makeup counters, to print shops. Common sense did not always prevail over anxiety. As cases continued to arise in Florida, New York, Washington, and New Jersey, responding to guidance to be on alert and perhaps fearful of becoming victims, new and generally false reports began to overwhelm first responders across the country. The FBI received 2,500 false reports of anthrax contamination. By Oct. 11, 2001, Florida officials had received more than 1,000 often frantic calls. In Miami, police ran out of disposable protective suits after responding to 19 calls in one day.[22] In the Washington, D.C. area, Prince Georges County hazardous materials teams responded to as many as 50 calls a day, working round the clock for almost two weeks. First responder agencies scrambled to create protocols for threats. As one health official later commented, "a single anthrax-laden letter pushed the Washington area emergency response system to the limit." False alarms were raised in all fifty states and were not limited to major metropolitan areas. They occurred from Darien, Conn., to Honolulu, Hawaii, and Covington, Ky., to San Francisco, Calif.

During the crisis the American public faced unprecedented uncertainty. While individuals appeared to have maintained personal and occupational responsibilities, a shift in leisure activities followed the attacks. Tourism declined precipitously in the fall of 2001. Retail, movie theaters and restaurants all saw a decline in sales. However, many retailers turned to internet sale to boost holiday figures. Online shopping rose 27 percent in 2001, a figure attributed greatly to the Sept. 11, 2001, and anthrax attacks.[23]

Public Perception and Media Coverage

As events unfolded during the fall of 2001, the media played a vital role in

[22] David Kocieniewski, "A Nation Challenged: The Jitters: Nervousness Spreads, Though Illness Doesn't," *The New York Times*, (Oct. 11, 2001).

[23] Leslie Walker, "Online Shopping Shows Signs of Renewed Growth," *The Washington Post*, (Nov. 15, 2001), p. E01.

informing the public. However, this service cuts both ways. While Americans gained vital details on conducting themselves in the face of daily threats, anxiety spiked after each new case was announced. There were many false reports, some of which were due to incorrect information, while others were based on false positives in testing for the bacteria. The level of coverage in print media was intense. Between Oct. 4, 2001, the initial government confirmation of an anthrax case, and Nov. 15, 2001, the *Washington Post* had 852 stories mentioning anthrax. By the end of 2001, the number had risen to over 1,200. The public had a strong desire for information, a fact reflected in the level of media coverage. Vigilance was high, but clarity was not. This led individuals to take actions that made sense to them.

In many cases access to some information prompted the desire for more. At the height of the crisis the U.S. Government as well as local entities struggled to respond. Most often, the public was directed to overburdened hotlines staffed by everyone from law enforcement to public health volunteers. On the internet websites of Federal Emergency Management Agency (FEMA), CDC, United States Postal Service (USPS), the Red Cross, and local entities such as Fairfax County, Va., tried to maintain accurate and up-to-date information. While the sources' effectiveness is unclear, it is certain better capabilities would have been required had the incidents continued beyond the eight weeks of crisis that unfolded across the East Coast.

As time wore on, the public was less concerned about a terrorist attack. However, the numbers varied geographically. By early November only 38 percent of Americans living in the middle of the United States felt they or their families could become victims of terrorism, compared with 50 percent of those living in "coastal urban areas."[24] Immediately after Sept. 11, 2001, the public highly appreciated the administration's counter-terrorism efforts. However, with the confusion shown by government leaders during the anthrax attacks, public opinion ratings fell by 13 percent in three weeks.[25]

During the anthrax incidents most of the American public got their information from the media, rather than directly from government sources. Interestingly, 46 percent of the public felt the general media got the facts correct, a rise of 11 percent over early September and the highest grade for accuracy since 1992.[26] Fifty-eight percent of Americans believed media coverage of the news on anthrax was accurate, and when it was not the public blamed "misleading information by the government" rather than sloppy reporting.[27] Follow-up research on public perception of the access to information conducted by Dr. Monica

[24] "Worries about Terrorism Subside in Mid-America," *Pew Research Center for the People and Press*, (Nov. 8, 2001,), p. 1.

[25] "Terror Coverage Boost News Media's Images," *Pew Research for the People and Press*, 28 November 2001, 1.

[26] Ibid.

[27] Ibid., p. 3.

Schoch-Spana at the Center for Biosecurity, at the University of Pittsburgh, drew several key lessons regarding sources of information.

1. People are capable of handling uncertain and unsettling news provided it is given candidly.
2. Information flow is an antidote to panic, not its cause.
3. "Government experts must have the answer somewhere" is a common assumption.
4. Meaningful, practical advice on how to protect one's self and family is a top priority.
5. In a crisis, media is an essential source of information, though fragmented and dizzying.[28]

Lack of Medical Experience

One of the greatest medical challenges of the anthrax attacks was the lack of first-hand experience with the virus in the United States. Scientists and doctors poured over textbooks and information from other countries. No one had seen a serious threat of exposure since a 1979 release of the bacteria in the Soviet Union. This dearth of information led experts to rely on the most common occurrences as a basis for their guidance. It proved to be an unavoidable pitfall that severely tested public confidence. One of the most blatant examples involved a case in New Jersey. Just hours before the first case of a postal worker developing cutaneous anthrax was announced to the public, a National Institutes of Health official stated "there have been no documented cases at all of an individual getting a letter personally from a contaminated facility and winding up getting the disease."[29]

The Florida case of Ernesto Blanco, the AMI employee presumably infected by a tainted letter, was equally perplexing as he did not present with the most common symptoms. During treatment his doctor used a textbook from 1901 with a case that mirrored Blanco's symptoms. After New York hospital worker Kathy Nguyen died of inhalation anthrax with no apparent linkage to the news media or postal service, federal authorities were baffled. CDC Director Jeffrey Koplan told reporters that in determining the source, "Your guesses are as good as mine."

Stunned experts learned of the virulence of the anthrax spores released in the letter to Sen. Daschle. Alan Zelicoff, a senior scientist at the Center for National Security and Arms Control at San-

[28] Monica Schoch-Spana; "The People Talk Back: Anthrax 2001 Public Communication Lessons," presentation to *The Public as an Asset not a Problem, A Summit on Leadership on Leadership during Bioterrorism*, (2003), Online, http://www.upmc-biosecurity.org/website/events/2003_public-as-asset/spana4/spana4_trans.html.

[29] Avram Goldstein and Michael Powell, "Anthrax in Five More D.C. Buildings; Officials Troubled by Infection of N.J. Woman Who Doesn't Work in a Mailroom," *The Washington Post*, (Oct. 30, 2001), p. A01.

dia National Laboratory stated, "We didn't think that anybody could come up with the appropriate coatings for anthrax spores to make them float through the air with the greatest of ease…[exposing 28 people with a single opened envelope] is no mean trick."[30]

A fundamental assumption made was that a high number of anthrax spores were required to infect a human with anthrax. While scientists knew that humans could be exposed to *Bacillus anthracis* without developing an infection, it was not thought that individuals could get inhalation anthrax without exposure to at least 8,000 to 10,000 spores. In an effort to calm public fears, Patrick Meehan, director of Emergency Environmental Services at CDC stated people receiving mail were "essentially at no risk of inhalation anthrax." However, two deaths by postal workers handling sealed envelopes, as well as two final victims whose contamination cannot be conclusively determined, changed the way experts thought about anthrax contamination. The CDC had to alter its underlying assumptions and its recommended actions released to the public.

To Cipro or Not to Cipro

One of the most contentious issues during the crisis was the decisions about what drugs should be recommended to protect the public. Officially the Food and Drug Administration (FDA) had approved only one drug for treatment of post-exposure anthrax. However, experts outside the government clarified throughout the crisis that Ciproflaxon ("Cipro") was one of many antibiotics that could kill viruses such as anthrax. As the crisis wore on, the FDA quickly approved additional generic antibiotics for treatment. However, by then the branded version had received so much attention, specifically after NBC News Anchor Tom Brokaw ended his evening broadcast with "In Cipro we trust," the public was wary of any other treatment. After thousands of Capitol Hill employees were given a 10-day supply of Cipro, many postal workers were given generic antibiotic leading to calls of elitism and unequal treatment. Given the lack of a public explanation of FDA approval and CDC recommendations, public anxiety grew over whether the government was able to provide protection for its citizens. The CDC later determined it failed to adequately inform both clinicians and the general public of the evolving threat and the equally evolving solutions to the problem. This failure challenged the government's credibility at a critical time.

CDC guidelines for who would receive prophylaxis changed several times as events unfolded. When CDC announced on Oct. 31, 2001, it would not recommend additional postal workers receive antibiotics as it seemed the "outbreak had peaked," Washington, D.C., officials stated they would take the information under advisement, but would make their own recommendations. The

[30] Michael Powell and Ceci Connolly, "Experts Warn Bioterrorism Could Expand," *The Washington Post*, (Nov. 1, 2001), p. A01.

District government tried to manage three closed postal facilities, while results on others remained unknown. Previously the CDC had recommended that workers in public and private facilities that received bundled mail from the Brentwood facility should hire private firms to conduct environmental testing. This included as many as 4,000 private businesses.[31]

The precise number of individuals who either requested or were required to take prophylaxis varies widely. Numbers include employees who worked in contaminated postal facilities, media outlets and Capitol Hill, as well as citizens who claimed to have been in proximity of those locations during known dates of contamination. Most estimates state between 20,000-40,000 Americans took Ciprofloxacin or other antibiotics for possible anthrax contamination; however, as many as 40 percent of those prescribed Cipro reportedly did not take the full required dosage due to side-effects of the medication.

Lack of Effective Communication Impeded Response

After the first anthrax infection was announced, government officials tried to assure the public anthrax was not contagious and the most common type, cutaneous, was easily treatable with antibiotics. The CDC scrambled to get accurate information to the nation's clinicians, as well as the general public. Many hospitals and clinics were overwhelmed with patients fearing that their common cold symptoms could actually be the initial phase of inhalation anthrax. The CDC had no method for contacting physicians, nor did individual physicians have any formal method for reporting suspicious cases to the federal authorities. Often times the CDC relied upon the news media to disperse information to medical workers as well as to the general public. One example cited was that outside of large metropolitan areas no organized method existed for contacting dermatologists, the physicians who instantly became the front line operators in identifying cutaneous anthrax.

The dearth of medical knowledge on anthrax had two major consequences. The first was the fact modern medicine had overtaken decades and centuries-old research on the risk of dying from inhalation anthrax. The death of only five individuals surprised many experts. The second consequence was physicians began to err on the side of caution. Hospitals across the country admitted and tested patients showing the slightest symptom related to anthrax. Hospital admissions coupled with the environmental samples collected by authorities due to hoaxes, fear, and legitimate concerns almost immediately overwhelmed laboratories, many of which were incapable of testing environmental samples. Testing requests besieged state and local labs. The state of New York reached out

[31] D'Vera Cohn and Avram Goldstein, "Anthrax Precautions May Be Relaxed; Many Who Handle Mail Could Stop Antibiotics," *The Washington Post*, (Nov. 1, 2001), p. B01.

to other states for help from colleagues in Massachusetts and Missouri, but technicians there also were swamped with samples from their own states. Only 81 city and state laboratories were certified to test biological agents such as anthrax at the time of the 2001 attacks.[32] The CDC and DoD completed most environmental testing.

Many agencies and organizations relied on others for accurate and timely information. One of the most serious consequences of this was seen in contamination of the Brentwood postal facility in Washington, D.C. Postal workers unions were upset that even after the letter to Sen. Daschle was found to be contaminated, the Senate buildings closed and congressional staffers placed on antibiotics, no connection was made to Brentwood until after a postal employee from that location died on Oct. 21. Postmaster General John Potter defended the United States Postal Service's actions, stating his agency had relied exclusively on the advice of the CDC. CDC relied on its knowledge about anthrax, which was a person could not get inhalation anthrax from a sealed envelope. While cutaneous anthrax infection was possible, it was easily treatable and not of great concern. Potter tried to reassure the American public by saying, "We deliver to 137 million addresses each day [and while] a handful of letters that have moved through the system have caused death and disease…what is in the mailbox is safe."[33] This issue highlights the challenge of presenting accurate risk information to the public without downplaying the concerns the public may have about novel threats such as CBRN agents.

Another example showing the importance of coordination occurred in Fairfax, Va., where one of the first cases of inhalation anthrax from the Brentwood postal facility was treated. The patient was admitted to the hospital without exhibiting the most common symptoms. Given his work location, tests were done simply as a precautionary measure. When he tested positive for anthrax, his doctors placed him on antibiotics and watched him carefully. He remained in good spirits, until one occasion when he watched a televised press conference held by local government officials regarding his condition, which they labeled as "gravely ill." This information stunned his doctors since they had no contact with the officials, nor, as later discovered, had anyone at the hospital. This incident shows the number of officials involved in an ongoing crisis can complicate communication, especially when the public demands details and solutions from government leaders.

After both federal law enforcement and public health officials were chastised for giving out incorrect information, HHS Secretary Thompson began his Oct. 30 press conference by saying the informa-

[32] Ceci Connolly and Steven Gray, "Thompson Seeks $1.2 Billion to Expand Stockpile of Drugs; HHS Chief's Request is Part of Broader Bioterrorism Plan," *The Washington Post*, (Oct. 18, 2001), p. A19.

[33] Ellen Nakashima, "Potter Defends USPS Response to Anthrax Fears; Postmaster General Says Agency Relied on Advice of CDC," *The Washington Post*, (Oct. 31, 2001), p. A17.

tion he was about to disclose was "what we know at this time. Information is developing that will likely alter these facts" given the ongoing nature of the investigation. CDC spokesman Tom Skinner admitted his agency faced a steep learning curve. He explained that CDC knowledge and understanding was evolving because the U.S. had no civilian experience with anthrax. He stated, "We're making decisions based on the best scientific information we have at the time."[34]

Interagency Cooperation

The greatest challenge for the U.S Government during the anthrax crisis was the requirement to conduct a coordinated, integrated, coherent government response implemented across local, state and federal levels; and most importantly, to communicate effectively to the public. Many obstacles existed to this effort. While the CDC had made preparations to conduct and lead the national response to a bioterrorism attack, many aspects of the planning were based on certain assumptions. Those assumptions included the source and targets of the attack. The assumption was "the delivery of a biological warfare agent would come from a known weapon system; that the target would be a military installation; that the soldiers at the site would be protected by adequate training, clothing and prophylaxis; and that a high number of false positive detections would not hinder the site's operations in any significant way."[35]

The CDC had considered the possibility of the use of the mail as a delivery system. Due to the increasing number of hoaxes experienced in the preceding four years, however, the agency was not fully prepared to address the interagency requirements of managing such a geographically diverse threat. In the earliest cases in Florida, cooperation among local, state and federal agencies was haphazard at best and often included giving misleading and incorrect information to the public. It was unclear who was in charge. Was it a public health issue or a criminal investigation? In Florida, federal officials were involved from Oct. 3, 2001, but the FBI did not formally take over the investigation until Oct. 12. After the letter was discovered in the U.S. Senate, information varied wildly as politicians felt compelled to "keep their constituents informed." Given the pace of the events, politicians and their staff regularly gave conflicting and incorrect information in live press conferences and interviews. This confounded the government's ability to deliver the most precise information about who should receive testing and treatment and where.

The level of coordination required at the federal level, as well as up and down

[34] Justin Blum, "Workers Question Response; CDC Says Policy Evolving," *The Washington Post*, (Oct. 23, 2001), p. A01.

[35] Keith Rhodes, "Diffuse Security Threats: Information on U.S. Domestic Anthrax Attacks," *Government Accounting Office Testimony* before the Select Committee on Intelligence, U.S. Senate and the Permanent Select Committee on Intelligence, House of Representatives, GAO-0-323T, (Dec. 10, 2002), p. 6.

the levels of government had not been expected. This included the need for CDC to accept vast amounts of incoming information, organize and analyze it; and respond appropriately to law enforcement, public health officials, and the general public. There was little capability for the FBI and CDC to share information with each other, and virtually no direct means for them to share information with their state and local counterparts. When the federal government raised the alert level or added specific information to an ongoing case, it often released the information to media outlets as it rarely had a direct and on-going connection to local law enforcement or public health officials. During the investigation many patients were repeatedly interviewed by various law enforcement and healthcare officials. Much of the information law enforcement and public health investigators need to obtain was the same, but the efforts were not coordinated in the early stages. Repeatedly questioning victims led to conflicting statements, while having law enforcement and public health professionals involved in a single session allowed officials to focus on relevant information for both criminal and public health issues.

Law enforcement officials repeatedly held information from public health officials due to their lack of security clearances. At the same time, due to medical privacy laws, public health officials were challenged with sharing all relevant information with law enforcement. While these issues were readily recognized at the federal level, it is not clear if they have been effectively addressed.

While the Department of Defense does not play a leading role in responding to a domestic bioterror incident, it does maintain significant assets, some of which are unique or scarce in the federal government tool box. First, DoD has the capability to respond very quickly, far outpacing most other departments of the U.S. Government. One HHS official acknowledged this by stating the HHS could not manage a large-scale biological attack, rather the government would rely on the capabilities of DoD, Veterans Affairs and the Federal Emergency Management Agency.[36]

During the anthrax attacks, DoD supported civilian public health and law enforcement entities with "unique weapons of mass destruction response capabilities to perform environmental assessments, transportation of contaminated articles, laboratory confirmation testing, and cleanup of locations suspected of anthrax contamination."[37] DoD laboratories conducted one quarter of all possible contamination testing. In addition, the 4th Marine Expeditionary Brigade's Chemical Biological Incident Response Force was seconded to the FBI's Hazardous Materials Response Unit to

[36] Ceci Connolly, "Public Health System is on War Footing; Officials Call Mobilization and Realignment of Resources Unprecedented," *The Washington Post*, (Oct. 27, 2001), p. A14.

[37] Paul McHale, in DoD response to "Bioterrorism: Public Health Response to Anthrax Incidents of 2001," (October 2003), GAO-04-152, p. 41.

assist in the examination of congressional mail. The Defense Department's capabilities exist to support overseas missions, but should not be discounted in domestic response planning as the military will always have scarce assets and capabilities unlikely to be maintained at the readiness level of U.S. Forces. Finally all U.S. military personal are required to receive anthrax vaccines, making them America's largest protected community.

Lessons Learned for Public Resilience

Although public health preparedness has improved since the 2001 anthrax attacks, more work is necessary to ensure public safety in the event of another attack. Examples from the anthrax attacks abound, from human resource issues to the lack of communication protocols affecting response time and the ability to effectively communicate among agencies and to the public. Many agencies and organizations relied on others for accurate and timely information. This issue highlights the challenge of presenting accurate risk information to the public without downplaying the concerns the public may have about novel threats such as CBRN agents. These government weaknesses must be addressed to enhance the public's ability to respond in an effective manner. To make the most of their own resources, citizens need to know what is happening and what they can to do to help themselves and their families. People need information to be accurate and consistent so they can make effective decisions. They also need to feel the government has an effective plan to help resolve the crisis, while understanding the crisis is evolving and thus, the solutions are too.

Despite the stress on the medical and laboratory facilities, first responders and investigators, the vast majority of Americans went on with their lives as "normally" as possible, demonstrating that even in the face of a deadly, widely dispersed attack, citizens responded in a largely resilient manner, following the guidance provided and continuing to carry out their responsibilities. While anecdotes exist, few employers noted lengthy absences. Most individuals reported to work daily, even when they worked on Capitol Hill or in a post office.

Employees raised concerns through unions resulting in the alteration of human resource policies across the federal government. Employees at the Agency for International Development requested the government ban public parking at the Ronald Reagan Building, where numerous United States and international agencies reside. Statements from the postal workers union showed its frustration at a presumed lack of rapid protection from contamination. Postal unions filed lawsuits in Florida and New York charging USPS had "been dragging its feet in efforts to protect its employees."

Unions for other government workers also expressed anxiety in regards to the unknowns. A spokeswoman for the State Department workers stated while guidelines were being shared, employees feared health officials were unsure of the advice they gave.

Another key issue was the impact of differential treatment among groups of potential victims. While the CDC had determined both generic antibiotics and Ciproflaxin were effective in treating anthrax, many senators and staffers were provided Ciproflaxin while postal workers were given the less expensive antibiotic. This prompted concerns about social class and racial biases in the treatments provided as the postal workers were clearly less affluent and more represented by minority groups. Such differences in treatment or access to care are unlikely to be seen as coincidences in a time of crisis, so treatments and other interventions must be planned to be fair as possible. Similar characteristics will be discussed in the Hurricane Katrina case study.

As one local health official stated, "the closer people have been to anthrax, the more realistic and reasonable they are."[38] This statement embodies the concept that a population will be more resilient the more prepared it is to deal with a threat. The examination of the anthrax attacks reveals despite widespread potential threat, conflicting information from official sources, inadequate flow of information to the public, incidents of different types of care being provided to different classes of victims, and the lack of closure to the threat, the public response was surprisingly unproblematic. Individuals, families, communities and businesses continued to function.

Improvements to these problem areas would allow the public to grow from this past experience and with clear and direct guidance on how to respond, may place more faith in the government system and respond even more positively in the future.

[38] Marc Fisher, "Irrational Fear Is Untreatable," *The Washington Post*, (Nov. 1, 2001), p. B1. This concept is reinforced in Fred P. Stone, *The "Worried Well" Response to CBRN Events: Analysis and Solutions*, (Maxwell AFB, AL: USAF Counterproliferation Center Future Warfare Series No. 40, June 2007), p. 5.

2. SARIN ATTACKS ON THE TOKYO SUBWAY

"Flee in the direction you see the fewest bodies."

–Advice from a Japanese government official regarding follow-on subway attacks.

Salient Points

- First lethal case of CBRN attack on civilian population by non-state actor.
- No immediate perpetrator was confirmed.
- Lack of effective communication between government and public contributed to the confusion regarding whether to seek medical care.
- The intensity of the media coverage limited the ability of the government to use the news outlets to communicate effectively with the public.
- Dependence of U.S. population on emergency rooms for basic medical care will severely hamper the healthcare community's ability to manage large scale CBRN attack.
- Fear of the unknown can be as terrorizing as an actual attack.

In the spring of 1995 Japan experienced the world's first major terrorist attack using chemical weapons.[39] On March 20, 1995, Aum Shinrikyo, a little known religious cult in Japan, killed 13 people in a a sarin attack on the Tokyo subway system. The incident was the first lethal case of a non-state actor using a CBRN agent against a civilian population.[40] What follows is a brief discussion of the incident from March 1995, the atmosphere around the cult, and finally, observations related to the resilience of a government and its public. Societal differences must be considered in a few aspects of the case, however, for the most part the lessons Japan has learned from the Aum Shinrikyo attacks are relevant for the U.S. Government today.

The Incident

At 8 a.m. on March 20, 1995, during the busiest time of the Monday morning rush hour, sarin was released on the Tokyo subway. The nerve agent was car-

[39] The March 20, 1995, attack was not the first incidence of a terrorist group using WMD against a civilian population. The perpetrator of the attack, the religious cult, Aum Shinrikyo, had previously used sarin in an attack on a Tokyo neighborhood in June 1994 where seven people were killed.

[40] There was a preceding biological attack in the United States, but no deaths resulted. In 1984, followers of the Indian guru Bhagwan Shree Rajneesh spiked salad bars with salmonella at 10 restaurants in a small Oregon town and sickened about 750 people. The cult members had hoped to incapacitate so many voters their own candidates in the county elections would win. The scheme failed, but the episode spread fear and drained the town's economy. See Gillian Flaccus, "Oregon Town Never Recovered From Scare." *Associated Press*, (Oct. 19, 2001), http://www.rickross.com/reference/rajneesh/rajneesh8.html.

ried into the metro in plastic bags wrapped in newspaper by five teams working in coordination. The teams place their deadly packages on separate subway lines that converged at Kasumigaseki station, where the police headquarters, the seat of the Japanese government, and the largest fish market in the city are located. The two-man teams had one driver and one person responsible for releasing the agent. At the appointed time the individuals boarded their respective trains, set packages on the floor and punctured the bundles with sharpened umbrella tips. Sarin slowly leached out onto the subway floor. The nerve agent sarin is most lethal when dispersed through the air, but the less efficient method was chosen at the last minute due to a lack of preparation time. It is believed the goal was to divert police attention from cult activities and prevent a scheduled police raid. The timing was chosen to maximize police casualties during the early morning shift change at police headquarters located above the subway station. All perpetrators escaped harm.

Sarin is extremely potent and even low concentrations can be fatal. The chosen delivery method and the lack of purity of the agent likely saved thousands of lives. Had the cult been able to take more time to prepare the sarin, it likely would have been far more potent. Many experts cite those reasons for the fact there were only 13 deaths and 50 serious injuries from such a lethal weapon that had the potential to do far greater harm.

The March 20, 1995, attacks were not Aum Shinrikyo's first or last foray into CBRN production or use. What is known in Japan as the "Matsumoto incident" was a sarin gas attack on a Tokyo suburb on June 27, 1994. Seven people died and over 200 hospitalized when sarin was aerosolized and sprayed in a residential area. No one claimed responsibility and the police investigation focused on one man until after the events of March 1995 pointed to Aum Shinrikyo. Several Aum Shinrikyo members confessed to both events following their arrests in the wake of the March 1995 Tokyo attacks. Experts believe the Matsumoto attack was a dress rehearsal for a massive attack planned by the cult.[41]

It was clear Aum Shinrikyo was a threat to the citizenry of Japan, a fact continually debated in the public forum throughout 1995. In addition to Tokyo and Matsumoto, there were numerous attempted attacks on the Tokyo subway and other public locations throughout 1995. Several copycat cases of toxins released in the Tokyo region made people ill without serious harm occurring; but several caused people to seek medical attention for watery eyes and

[41] Kyle B. Olsen, a member of the Central Intelligence's Nonproliferation Advisory Panel, visited Japan to investigate the Matsumoto incident and concluded that a group was clearly honing its capabilities. Only weeks before the attack on Tokyo, Olsen stated Aum Shinrikyo could have executed the attack on Matsumoto and been planning and preparing for a large-scale attack. Kyle B. Olsen, "Aum Shinrikyo: Once and Future Threat?" *Emerging Infectious Diseases*, Center for Disease Control, (July-August 1999), vol. 5, no. 4, http://www.cdc.gov/ncidod/EID/vol5no4/olson.htm.

burning throats. There were regular reports of people experiencing "foul smelling fumes" and being sickened in the subway and popular restaurants. However, at least two incidents attributed to Aum involved the use of large lethal doses of cyanide. Twice cyanide devices were found in bathrooms in subway stations before they could be dispersed. The cult members' revelations during the trial that followed the March 1995 attacks were even more frightening. After their arrest several members admitted to helping the cult produce hundreds of kilograms of mustard gas, VX, sarin, soman, tabun, and sodium cyanide.[42] When raiding the Aum Shinrikyo compound, police found enough cyanide to kill 20,000 people and chemicals to produce enough sarin to kill 4 million.

In addition to their attacks with chemical weapons, members of Aum Shinrikyo are also now known to have experimented heavily with biological weapons. They are known to have developed stocks of botulinum toxin and attempted to disperse this using aerosolized sprayers against seven different targets. These attacks failed either because they failed to develop sufficiently lethal toxin, or were unable to deliver large enough doses to cause death or serious illness. They also developed and attempted to disseminate anthrax as a biological weapon. Again these efforts failed, not through lack of effort, but due to technical challenges in both development and means of dissemination. Finally, the cult also acquired and experimented with other biological agents including Q fever and Ebola, but attempted no attacks with these agents. Ultimately, the group caused no known deaths or injuries as a result of these biological efforts, which may have pushed them to focus on chemical attacks.[43]

The Response

The first calls for help came into fire and police stations at 8:19 a.m. from Tokyo's suburbs. In less than an hour, calls poured in from all over the city including 15 subway stations. Responders, however, did not link the emergency calls into a single crisis until much later in the day.[44] The effects of the sarin attacks ranged from a foul-smelling odor to vapor-filled subway cars that caused passengers to cough, vomit, and convulse. At several stations subway operators were confronted with unconscious passengers on trains or on station platforms.[45] When

[42] Tim Ballard, Jason Pate, Gary Ackerman, and Sean Lawson, Chronology of Aum Shinrikyo's CBW Activities, James Martin Center for Nonproliferation Studies, Monterey Institute of International Studies, (March 15, 2001), p. 6, http://cns.miis.edu /pubs/reports/pdfs/aum_chrn.pdf.

[43] Seth Carus, *Bioterrorism and Biocrimes: The Illicit Use of Biological Agents Since 1900*; Amsterdam; the Netherlands: Fredonia Books, (2002).

[44] Ibid., p. 21.

[45] Amy Smithson, "Ataxia: The Chemical and Biological Terrorism Threat and the U.S. Response," *Chapter 3 – Rethinking the Lessons of Tokyo, Ataxia: The Chemical and Biological Terrorism Threat and the U.S. Response*, Washington, D.C.: Publication of the Henry L. Stimson Center, (October 2000), p. 19, available from http://www.

emergency responders arrived at the subway stops, victims stumbled out of the metro with impaired vision, some foamed at the mouth and others simply collapsed with no explanation.

The police arrived at a subway station within minutes of the first call and donned protective gear, as they had only weeks before been trained in chemical response.[46] However, while the police wore protective clothing, fire and rescue workers had not been trained, nor did they have protective gear. Their willingness to participate in rescue and treatment of the injured was not without risk, and to some extent created additional casualties. Approximately 10 percent of the 1,300 firemen who responded were injured during the incident.[47] While creating additional healthcare problems, it also demonstrates the willingness of people to place themselves at risk in a crisis situation. Although the police officers had received chemical agent training, mistakes were made in executing command and control of the incident. The command post was set up near one of the subway exhaust systems, making 31 policemen seek medical attention, including the chief of police.

In less than one hour, over 500 people sought care at St. Luke's Hospital, which is within walking distance from the Kasumigaseki station. As victims arrived at St. Luke's and other local hospitals, doctors tried to assess the symptoms and arrive at a diagnosis. At 9:30 a.m. a physician who had treated victims of the 1994 Matsumoto attack recognized the symptoms while watching the television coverage. The doctor called St. Luke's to suggest that sarin nerve agent may have been used in the attack. This was the first confirmation medical professionals had received of a chemical attack and specifically that sarin was the agent used. Japanese public health officials were unable to confirm that sarin was the agent for more than three hours. Given the uncertainty of diagnosis and the lack of medical experience in treating sarin exposure, it is not surprising over 100 staff members of St. Luke's as well as the majority of emergency personnel who transported the injured reported symptoms of exposure.[48]

While the Japanese subway system is equipped with easily accessible panic buttons available to all riders, only one individual ever signaled a driver to stop. Thus, while calls came into emergency systems, unknowing transportation officials continued to move trains through the system, distributing lethal chemicals along the way. One of the trains continued to transport the undetected nerve agent for more than 90 minutes after the perpetrator stepped off the train. By 9:45 a.m., the Japanese Ministry of Transport and Transportation halted all trains and placed all transportation systems in the country on the highest level of alert.

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stimson.org/cbw/pdf/atxchapter3.pdf .

[46] In government after-action reports it was admitted the training had been conducted because the police were aware of Aum Shinrikyo's chemical weapons production capability and the police prepared to raid the cult's compounds.

[47] Smithson, p. 98.

[48] Ibid.

Behavioral Casualties[49]

One of the most significant aspects of the Tokyo subway attacks was the number of individuals who sought treatment after having been near or on the subway around the time of the sarin exposure. Three factors affected the number of individuals claiming to suffer from effects of sarin in Tokyo on March 20, 1995. First was the fact many people exited the metro, perhaps having smelled a foul odor,[50] experiencing watery eyes, temporary blurred vision, or coughing; many had no idea that an attack had occurred. They went to work and only after hearing news reports, made their way to hospitals and clinics fearing for their well-being. Second, given the lack of nerve agent knowledge among healthcare professionals in Tokyo, little to no advice was given to metro riders who feared they might have been exposed, but were unsure of the symptoms or effects of sarin. Third, the mayhem experienced at subway entrances where victims arose from the underground choking, disoriented, and some violently ill, alarmed many individuals who were at worst tangentially affected. These combined factors dramatically increased the number of persons seeking medical care. As many as 3,796 individuals were injured to some degree, but over 5,500 sought medical attention. More than 1,000 required hospitalization.

According to some post-incident studies between 75 and 85 percent of patients who sought medical care were "worried well."[51] This highlights significant concerns about the public's tendency to seek medical attention in disasters. The size of this "worried well" or behavioral casualty effect in a disaster is frequently a matter of how one assesses whether or not one needs to receive emergent care, as well as why the patient presents for care. For example, while Smithson asserts 85 percent of 5,500 patients were psychogenic or "worried well," the Tokyo police record reports 3,795 were "poisoned" and only 1,705, or 31 percent, who arrived at medical facili-

[49] Scientists and public health officials vary in their opinions of the underlying causes for large number of people who sought medical care. Some experts place many patients in the category known as "worried well" or "behavioral casualties," the term we use in this study. However, other health experts such as Dr. Jerrold Post, professor of Psychiatry and Political Psychology at George Washington University, warn that dividing the public arbitrarily between those thought to have real versus imagined symptoms is a false dichotomy. This study focuses on the implications of the numerous patients who sought medical care immediately and for months following the attack, without determining whether people should have sought care or how those individuals should be classified. We use Fred P. Stone's research on the "worried well" as a basis for this section. Fred P. Stone, *The "Worried Well" Response to CBRN Events: Analysis and Solutions*, (Maxwell AFB: USAF Counterproliferation Center No. 40, June 2007). Surveys conducted years after the event showed that many victims were still suffering effects years after the attack. See "Survey: Subway sarin attack haunts more survivors" in Mainichi Online June 18, 2001. Available: http://www12.mainichi.co.jp /news/mdn/search-news/896300/aum-60-71.html

[50] While sarin itself is odorless, colorless and tasteless, the impurities of the sarin used on March 20, 1995, caused it to have a sulfur-like smell.

[51] Stone, (2007), pp. 6-7.

ties required no treatment.[52] This would reflect a significantly smaller "worried well" problem. Additionally, those who requested care without obvious evidence of exposure may reflect a very disparate group rather than a homogeneous cluster of overly anxious individuals. Fred Stone outlines several possible motivations for people to seek medical care in a CBRN event.[53] These include:

Group 1. People who were exposed and had minor symptoms requiring minimal or no medical care. Many of the "worried well" who flooded hospitals had in fact been exposed to the gas. They were either in or near the subway when the attacks occurred but were initially unaware of the attacks. Before realizing they had been exposed, they exhibited symptoms including vomiting, eye irritation, and nausea. They went to the hospital only after being urged to go by others. The reception they received was not always welcoming.

Group 2. People who may have been exposed but had no clear physical symptoms related to an organic aetiology.[54] This group thought they had been exposed and consequently went to local hospitals and clinics. Their motivation may have been preventative hoping to avoid future problems by being treated immediately. They may have also been anxious and misinterpreted anxiety as symptoms of exposure.

Group 3. People who could not possibly have been exposed but came to the hospital seeking care for imagined illnesses or prevention. People who have imagined illnesses based upon one symptom have a condition known as hypochondriasis.[55] It is estimated between four to nine percent of patients in a general medical practice have this disorder.[56]

Group 4. Those hoping to profit from the event either financially or emotionally. There was little potential for financial gain by feigning illness following the attacks. Although 4,000 people have filed workers compensation claims, few have actually received payments.[57] Those exploiting the attacks for emotional gain could have also been among the "worried well" although it is doubtful they constituted significant numbers. Factitious disorder is a condition in which people deliberately make themselves sick in order to play the sick role. The prevalence of this condition is unknown but probably very low.[58] Disasters,

[52] Sheppard, et al., (2006), p. 231.

[53] Stone, (June 2007).

[54] Tanja M. Korpi and Christopher Hemmer, *Avoiding Panic and Keeping the Ports Open in a Chemical and Biological Threat Environment*, (Maxwell AFB: USAF Counterproliferation Center No. 30, June 2005), p. 5.

[55] American Psychiatric Association, *Diagnostic and Statistical Manual Mental Disorder (4th ed.)*, (Washington, D.C.: American Psychiatric Association, 1994), p. 465.

[56] Ibid., p. 464.

[57] Robyn Pangi, Consequence Management in the 1995 Sarin Attacks on the Japanese Subway System," BCAIA Discussion Paper, 2002-4, ESDP Discussion Paper, ESDP-2002-01, John F. Kennedy School of Government, Harvard University, (February 2002), p. 48.

[58] American Psychiatric Association, p. 473.

however, represent the perfect opportunity to play the sick role.

Group 5. Those experiencing Post-Traumatic Stress Disorders (PTSD). Traumatic events can spur serious psychiatric disorders. PTSD is a mental disorder that includes flashbacks of the traumatic event, avoidance behaviors, and increased psychiatric arousal.[59] It can affect three to 58 percent of persons exposed to traumatic events.[60] Psychological consequences are the most likely adverse health outcome of a traumatic event.[61]

The Role of the Media and Educational Institutions

The role of the media in a cataclysmic event is a double-edged sword providing much needed information, but also can add an overwhelming amount of chaff with the wheat. At the scene of the subway incidents, the media begin live reports by 9 a.m., including via hovering helicopters. The noise of the helicopters increased the anxiety and confusion, as well as complicating communications on the ground. From the March 20 attack through the end of 1995, media coverage was very aggressive. The story dominated Japanese media, being reported daily in newspapers and television. The press was condemned repeatedly for its quality of coverage, reporting stories with few confirmed facts, often dramatizing the events and the group rather than presenting the facts. The intensity of the media coverage also appears to have contributed to increased need for medical attention as many who had left the subway with minor medical concerns were prompted by the media coverage to seek care. The lack of clear information on what had happened (a chemical attack), with what (sarin), how it should be treated (determine who needs care) and who is responsible (terrorists) impeded the public's ability to determine what actions they should have taken.

Aum Shinrikyo was very adept at public relations using any open avenue to further its reputation prior to March 1995. The Japanese media heavily bought into Aum's charms. One example is very telling. In October 1989, a national television station interviewed an. The attorney outlined many of Aum's illegal and immoral activities including charges related to weapons acquisition and kidnapping. The station allowed Aum members to view the tape before it aired. Asahara was furious with the program and Aum pressured the station not to air the tape. The station folded; never showing the tape to authorities nor admitting to the events until the Aum trials made the issue public. While the station manager resigned, there were no repercussions for withholding the information on Aum's capabilities from government authorities.

Academics and religious figures were also used by the cult for additional credibility. At least two well-known scholars visited the Aum compound prior to March 1995 and made positive state-

[59] Ibid., p. 495.

[60] Ibid., p. 426.

[61] Stone, (2007), pp. 14-17.

ments about the movement. This came under great scrutiny after the 1995 attacks, leading to the firing of one professor for "bring[ing] his university into disrepute."[62] More striking was the fact that Shoko Asahara had met with the Dali Lama and used photos and quotes from the meetings in Aum propaganda.

A Japanese Phenomenon?

In Japan and across the globe the question of why this happened and whether it could happen elsewhere is continually studied. For the Japanese one of the most important aspects of the aftermath of the Tokyo subway attacks were the revelations about the Aum Shinrikyo cult and whether it was a "Japanese" phenomenon. Japan considered itself a well-ordered society with little serious crime. Some commentators and experts speculated the legacy of the emperor system, the demands of the education system, the alienation of young people from the greater society, and lastly, a corporate ethos that valued collective actions over personal achievement held at least some responsibility for the success of Aum.[63]

One of the greatest challenges in the days following the March 20, 1995, attack was no individual or group took credit. Japanese citizenry feared the unknown. It was unclear where or when the next attack might come. Even after the media fingered Aum Shinrikyo for the attacks, arrests came slowly and many details of the case were not known until the trials of cult members. Experts across the globe were shocked as revelations about Aum's capability unfolded in the media. It was assumed an attack of this magnitude was beyond the capabilities of a minor religious cult like Aum Shinrikyo. Few Japanese citizens knew of Aum beyond its existence as a small strange sect that occasionally appeared in their neighborhood. Although the police had fielded numerous complaints regarding Aum ranging from kidnapping, torture, and missing members, as well as grievances from neighbors of its compounds regarding smells emanating from the area, no law enforcement action was ever taken. After considerable evidence was compiled linking the disappearance of an attorney critical of Aum, the police decided they had to act and preparations were made to raid the compound on March 22, 1995. However, these actions were well known to the cult as its members were among the police ranks.

The judicial system in Japan works differently than in the United States. While American law enforcement officials will arrest a suspect with only probable cause, the Japanese wait until their case can be made solidly in court. This difference leads to a 99 percent conviction rate. However, it also means law enforcement entities are unaccustomed to

[62] Ian Reader, *A Poisonous Cocktail: Aum Shinrikyo's Path to Violence*, (Nordic Institute of Asian Studies, Copenhagen: 1997), p. 109.

[63] See Robert Jay Lifton, *Destroying the World to Save It*, for a discussion of the "Japanese Phenomenon," (Macmillan: New York, 1999), pp. 232-270.

sharing information with the public until their investigation is complete. During the spring of 1995, information rarely flowed from government sources; instead police would leak information to the media. This challenged the public's ability to separate sensationalism from fact, since no facts came from official sources.

Following the attacks, the police, through media contacts, tried to assure the public the situation was under control. However, on March 30, Aum struck again, attempting to assassinate the chief of the National Police Agency, the official in charge of the Aum investigation. While the population was on edge, most continued about their daily lives, even with a bit more awareness of their surroundings and their fellow citizens. Extra security was hired for sporting events, shopping malls, and tourist destinations. Business for taxis surged as people avoided the metro whenever possible. Media coverage was a constant reminder of the threat posed by the cult. While members were being arrested on almost a daily basis, the leader, Shoko Asahara was not captured for 6 weeks. During that time Asahara and other Aum members continued to make statements, both declaring their innocence and prophesying more attacks. Asahara declared that April 15, 1995, would be a "Day of Doom" for Japan. Tokyo prepared for the worst. Sixty thousand extra police officers donned riot gear and took to the streets. Nothing happened. As one expert stated, after the subway attack, "the mere threat of another attack paralyzed Tokyo almost as effectively as nerve gas itself."[64] A new word, "sarinoia" was born and heard repeatedly in media reports. While fear and anxiety increased dramatically, life in Tokyo did continue. After the attack, subway trains were decontaminated overnight and the full metro system was up and running the following day.

One of the primary concerns following the subway attacks was the reality that terrorist groups could obtain weapons of mass destruction through both legal and illegal means. Aum Shinrikyo made many mistakes in the creation and formation of its weapon. Had the purity been higher and the delivery method more sophisticated, hundreds if not thousands could have died. Most startling, however, is the fact that regardless of its lethality, the Tokyo attack demonstrated the use of a chemical or biological agent does not have to inflict mass casualties to cause widespread disruption, panic and ultimately, terror.

By the end of 1995, over 350 cult members had been arrested. Most, however, were charged with crimes unrelated to the subway attacks. Shoko Asahara and his cult members were determined to be responsible for 27 confirmed deaths that occurred during the March 20, 1995, attacks, the June 1994 attack in Matsumoto, and other miscellaneous murders of cult members and those that spoke out against it. The Japanese citizenry was relieved when Asahara was arrested. However,

[64] David Kaplan and Andrew Marshall, *The Cult at the End of the World*, (London: Hutchinson, 1996), p. 271.

minor attacks continued to keep the population ill at ease. Much as the attacks of Sept. 11, 2001, were a wakeup call for Americans, the existence of the Aum Shinrikyo cult, its possession of mass quantities of weapons of mass destruction, and its attacks on the Tokyo subway, shattered the 50 years of peace and security in Japan. Japan changed from a virtually crime-free society to one that held its breath every time it boarded the metro. Aum Shinrikyo officially disbanded, then reorganized under another name. The name, Aleph, is not uncommon in Japan and all businesses that used it in their name came under suspicion of having links to the cult. Companies and educational entities were forced to change their name to protect their livelihood. Aleph is scrupulously watched by the Japanese government, but it operates legally causing concern fear for many who experienced the world's first major nerve agent attack on a civilian population by a terrorist group.

Implications for Resilience in the United States

Although there are cultural differences between the United States and Japan, this attack provides several lessons for enhancing resilience. As with the 2001 anthrax attacks, despite problems in emergency response, delays in identifying the attack agent, and unclear communication with the public, there was no evidence of panic or disruptive behavior in Tokyo, demonstrating that even in less than ideal circumstances the public can cope with attacks. The most significant concern noted in this incident is the potential problem of the "worried well." The extent of this problem depends on where the line is drawn between those who should be seeking care and those who can safely care for themselves. As one expert noted, there may be many reasons why individuals present for care, most of which in the absence of other guidance are very reasonable on a personal level. It falls to the public health community and emergency planners to provide accurate information to the population to allow those who are able to make better decisions about what types of symptoms require emergency care. This problem may be more severe in the United States, where millions of people depend on emergency rooms as their primary source of medical care, and even more dramatic in poorer areas within the United States. With many people seeking care for non-emergent conditions on a daily basis, increased flow to emergency rooms during a CBRN event may be unmanageable. Specific guidance regarding symptoms and at-home care options may better enable possible victims care for, or reassure themselves rather than reporting to an emergency room. Another potential solution to this problem is to establish front-line triage locations away from the medical facilities that can provide initial screenings and observations and ensure only those in need of urgent care are transferred to hospitals.[65]

[65] Stone, 2007, p. 29.

3. THE SARS EPIDEMIC IN CANADA

"Let me be clear: It's safe to live in Toronto and it's safe to visit."

–Mayor Mel Lastman

Salient Points

- The absence of a coherent pandemic plan limited Ontario's ability to manage the SARS outbreak.
- Preparation by the healthcare community in British Columbia minimized the impact of the outbreak not only on the victims but also on the community at large.
- Lack of effective communication severely hampered Toronto's ability to control infection.

In November 2002, Guangdong Province in China experienced a fast moving and highly contagious respiratory disease outbreak. By February 2003, this respiratory disease that had first emerged in China was given the name Severe Acute Respiratory Syndrome (SARS) by a World Health Organization (WHO) epidemiologist in Vietnam.[66] SARS "is a viral respiratory illness caused by a corona virus, called SARS-associated corona virus (SARS-CoV)."[67] It is similar to pneumonia with symptoms, such as a high fever, dry cough, and shortness of breath or breathing problems,[68] with a mortality rate of around 15 percent. In individuals over the age of 65, those with chronic illnesses or individuals who seek treatment late in the course of the illness the mortality rate is 50 percent or higher. Transmission can occur through contact with infected persons "droplets of respiratory secretions created while coughing or sneezing as well as in their stool and urine."[69] By May 2003, there were an estimated 7,183 cases of SARS worldwide and 514 reported deaths.[70]

The Start of an Epidemic

The initial outbreak of SARS started in rural areas of Guangdong province in

[66] Judith A. Johnson, "Severe Acute Respiratory Syndrome (SARS): Public Health Situation and U.S. Response," *Congressional Research Service Report for Congress* (RL31937), (May 23, 2003, available from http://opencrs.cdt.org/rpts/RL31937_20030523.Pdf, (Nov. 18, 2003).

[67] Centers for Disease Control and Prevention, *Basic Information about SARS*, http://www.cdc.gov/ncidod/sars/factsheet.htm, (Nov. 19, 2003).

[68] The University of Toronto Joint Centre for Bioethics, *Ethics and SARS: Learning Lessons from the Toronto Experience*, www.yorku.ca/igreene/sars.html, (Oct. 10, 2007.

[69] Judith Johnson, (2003).

[70] The World Health Organization, *Cumulative Number of Reported Probable Cases of Severe Acute Respiratory Syndrome (SARS)*, (May 9, 2003), http://www.who.int/csr/sars/country/2003_05_09/en/print.html, (Nov. 19, 2003).

November 2002, but was not officially recognized by the Chinese government until February 2003. On Feb. 1, 2003, an ambulance driver in Guangzhou transported a desperately ill patient from the Second Affiliated Hospital to the Third Affiliated Hospital. He was alerted the patient was ill with an extremely contagious respiratory illness. While in contact with the patient, he used all necessary precaution, including triple layer surgical mask and gloves. After transporting the patient, he cleaned and disinfected the ambulance. Three days later, the ambulance driver fell ill. He was hospitalized for observation, but no extraordinary precautions were taken. While in the hospital his wife cared for his daily needs without any protective equipment. His condition continued to decline and on February 21 he died. As he became ill, a similar respiratory disease infected other healthcare workers. This ambulance driver is thought to be the first of more than 1,700 healthcare workers to die of SARS. By June 2003, 32 countries reported cases of SARS with more than 8,000 people infected.[71]

The SARS outbreak in Canada offers a rare opportunity to examine the reaction of a country to a potential pandemic from two different perspectives. The SARS epidemic was located mainly in two provinces: British Columbia and Ontario. The differences in how these cases were handled within these provinces help to explain why Toronto came to be seen as the focal point of SARS, while cases in British Columbia were largely unnoticed by the rest of world.

British Columbia

On March 7, 2003, a man and his wife returned home to Vancouver from a trip to Asia. While in Hong Kong they stayed on the ninth floor of the Metropole hotel along with a woman from Toronto and a doctor from Guangdong province. During the third week of February, a number of people on the ninth floor of the Metropole would become ill with SARS through contact with the doctor from Guangdong. Soon after the Vancouver couple's return home, the man was taken to Vancouver General by ambulance following a visit to his physician. Prior to his arrival, the emergency room was alerted to his condition and his wife was isolated upon arrival at the hospital. While at Vancouver General, there was no transmission of SARS to any hospital employee or patient.

Vancouver General in Vancouver, British Columbia is the largest hospital in the province and is a major research and teaching institution. They practice vigorous infection control and have a strong culture of worker safety by taking a precautionary approach. This included the use of N95 respirators. At the time of the SARS outbreak, this was a novel approach in hospital management, but has gained credibility since 2003. When patients presented with an undiagnosed

[71] T. Abraham, *Twenty-First Century Plague: The Story of SARS*, Baltimore, Md.: The John's Hopkins University Press, (2005).

respiratory illness the healthcare staff at Vancouver General started with the highest level of protection and then scaled back as more information became available. Shortly before SARS was gaining strength in Asia, the emergency department of the hospital had undergone an infection control audit. This audit reinforced many of the practices that were standard procedure and made the department attuned to the precautionary approach of the hospital. This type of audit had been happening at Vancouver General for eight years prior to SARS. Vancouver General was only a small piece of a larger system. British Columbia had just released their pandemic plan in response to fears of Avian Influenza. Health officials also had a system of distributing health alerts to healthcare facilities throughout the province. In February 2003, health officials thoroughly monitored the situation in China. Alerts were sent to healthcare facilities in late February. Emergency room doctors at Vancouver General actively looked for unexplained fevers and respiratory infections in patients who had traveled to Asia during this time. When the patient who had been in China presented to the emergency room, the staff was aware of his travel history and was able to take precautions. "Two and a half hours after arriving at Vancouver General the patient was isolated, examined by specialists, treated by health workers wearing full respiratory protections and moved into a negative-pressure isolation room."[72] By April 2, 2003, the Workers Compensation Board, the labor department for British Columbia, performed systematic inspections of healthcare facilities.

Through all the precautions exercised by the medical staff in Vancouver, coupled with the coherent pandemic plan and clear communication between government officials and hospital staff only 46 people were infected, and no SARS deaths were reported in British Columbia. The results of this preparation highlighted how effective planning for communicable disease outbreaks can not only minimize the loss of life as a result of the disease, but also dramatically reduce the impact of the outbreak on the larger community.

Ontario

In contrast to the example of British Columbia, Ontario struggled through the outbreak with a number of fatalities, of which, several were in the healthcare community. In late February 2003, a 78-year-old resident of Ontario returned from a trip to Hong Kong. She had unknowingly been exposed to SARS by the doctor from Guangdong Province who was on the ninth floor of the Metropole hotel. Shortly after her return home she died of what at the time was reported as heart failure. On March 7, 2003, two days after her death, her son went to Scarborough-Grace Hospital emergency

[72] Commission to Investigate the Introduction and Spread of SARS in Ontario, *Volume Two: Spring of Fear*, (2003), p. 257, On-line, Internet, 18 November 2007, available from http://www.sarscommission.ca/index.html.

room complaining of a respiratory infection, only hours after the patient had been admitted to the hospital in Vancouver. The Ontario patient had been his mother's primary caregiver during her illness and had prolonged contact with her as well as his family during that time. He first went to his primary care physician who prescribed antibiotics and sent him home. When the medication failed to help he presented at the emergency room. He waited for more than 16 hours during which he is believed to have infected two other patients at the hospital. This is thought to be the start of the transmission chain in Toronto. From the time his mother landed in Ontario and his death there were a number of contacts with the community. Her physician, her son's physician and his medical practice, their large extended family, and the numerous people he encountered in the hospital were contacts he had days before he was quarantined. In the end, 44 died and 330 were infected with SARS.[73] More than half of those infected were healthcare workers, three of which succumbed to their infections.[74]

Unlike British Columbia, Ontario had no comprehensive pandemic plan. Further, no system of communication existed between government health officials and the healthcare community. If health alerts had been generated by the provincial government it is unlikely the alerts would have been effectively communicated. Another problem the province faced was a lack of education or misunderstanding regarding laws and regulations. For example, provincial law in British Columbia specifically states all respirators used by hospitals must first be tested and approved by government labs before use. Hospital workers therefore knew exactly what equipment should be used when confronted with suspect respiratory illnesses. In contrast, Ontario uses less specific wording regarding the use of regulators. The lack of specificity left both the healthcare facilities and workers confused regarding the appropriate equipment. When the Vancouver patient was intubated the dangers of this procedure were understood by the doctors and staff at Vancouver General. Even though this practice was extremely hazardous to the staff due to the risk of infection, no one at Vancouver General suffered ill effects. It was a different story at Scarborough Grace. Four workers were infected on March 17 after an intubation and later on March 24, an anesthetist, a medical resident and a nurse were infected by a patient they intubated in Toronto. One of the main reasons SARS spread quickly through the province was the lack of clear government control over hospital inspections to ensure compliance with safety standards.

While the provincial government in British Columbia was well-organized for a pandemic with a thoroughly practiced plan, a communication system, and inspections of healthcare facilities, Toronto had no coherent plan or system. The Ontario Ministry of Labour was officially in charge of public health, but throughout

[73] Ibid.

[74] Ibid.

the 1990s had lost much of its resources to cost cutting measures. This left the office unprepared for a public health crisis like SARS. In 1992, the Ministry had 19 physicians on staff, but by 1996 only three remained. Further, there were no lab or air sampling technicians and all of the occupational health and safety nurses had been laid off. Most importantly, inspectors had no real training for issues surrounding infectious disease and had never participated in an inspection of a healthcare institution specifically regarding an infectious disease before the SARS outbreak.

It is not surprising therefore that while provincial government inspectors in British Columbia made systematic inspections in early April, Ontario officials did not start the practice until June. It was in May the Ministry of Labour realized healthcare workers inadequately protected. One reason for the delay in inspections was fear for the safety of the inspectors. The Worker's Compensation Board in British Columbia had developed internal systems for protecting inspectors. In Ontario, the Ministry of Labour took a backseat to the Ministry of Health. "The Ministry of Labour was largely sidelined during the outbreak. It was not given a primary role at the Provincial Operations Centre, and it was not seen as having a central responsibility in protecting healthcare workers."[75]

Ontario lacked any comprehensive method for recognizing and dealing with a potential pandemic. There was also little communication from provincial health officials. Isolation was delayed by many days as Scarborough Grace stayed open to new patients. Patients with compromised immune systems who had been exposed to Mr. Kwan were transferred to other hospitals throughout the province. In addition to procedural problems, the health workers suffered great losses during this time.

Many of the nurses and doctors had never learned how to properly use N95 respirators or other protective equipment. Due to the lack of precaution and not properly isolating workers from potentially contagious patients a number of nurses and doctors became ill, and three died. This was both a physical and psychological drain to the medical community. Nurses complained to superiors, but much of what they said was disregarded or not acted upon. Those who became ill were eventually quarantined, but not until the disease was able to move through several hospitals. Those who remained on the job faced enormous pressure at home and at work. Fewer health workers meant longer hours for those still on the job, which took a physical and mental toll. In addition, those workers with family felt enormous pressure to either not return to work or quit for fear they might bring the infection home. Even in the workplace, those individuals who dealt with SARS patients were often shunned by co-workers. Some doctors even refused to treat people who were or may have been infected with SARS. Doctors from the United States were asked by

[75] Commission to Investigate the Introduction and Spread of SARS in Ontario, vol. 2, (2003).

Canadian colleagues to come and help relieve some of the burden.[76]

Public Response

SARS had a significant psychological and economic impact on the people of Toronto. For the limited spread and lethality of the disease there was considerable anxiety among the population. To a lesser extent it had an impact on people in other provinces and in the United States. One finding suggests the attempts to educate the public through the media were mixed. Positive results of the media campaign included more frequent hand washing, especially among Ontario residents, and being fairly knowledgeable about the disease. This knowledge included the contagious nature of the illness, generally how it spreads and that there is no vaccination. One negative aspect included people in areas unaffected by the outbreak taking unnecessary precautions. A survey conducted in April of 2003 demonstrated 35 percent of adults in the United States were concerned they or their family members may have been exposed to SARS.[77] This is close to the number concerned about terrorist attacks, which was around 42 percent of surveyed adults in the United States. The United States had a handful of isolated infections as a result of the individual returning from a country highly affected by the disease but no deaths were reported as a result of SARS. The level of fear was not proportionate to the actual danger of contracting the illness. Ideally, in future incidents fewer people in unaffected areas would demonstrate fear responses to such an outbreak. The authors of the study suggest this problem may be rectified by the clinicians and public health officials who provide the public with information. In the future, public health officials and clinicians would work closely to communicate more effectively. A final finding suggests that media coverage is both positive and negative because it informs individuals in the area of concern, but it also can create fear in people far removed from the incident.[78]

Healthcare Worker's Reaction

During a health crisis the healthcare workers are a vital resource. In Ontario during the SARS outbreak, the healthcare community was hit hard by the disease with health workers the main victims. Nearly 130 nurses, physicians, respiratory therapists and other health workers became sick. As previously discussed, this left a large burden, both physical and psychological, on those who remained at work. "Nurses lived daily with the fear that they

[76] L.K. Altman, "The Doctor's World: Behind the Mask, The Fear of SARS," *New York Times*, (June 24, 2003).

[77] R.J. Blendon, J.M. Benson, C.M. DesRoches, E. Raleigh, K. Taylor-Clark, "The Public's Response to Severe Acute Respiratory Syndrome in Toronto and the United States," *Clinical Infectious Diseases*, (2004), p. 38; pp. 925-931.

[78] Ibid.

would die or infect their families with a fatal disease."[79] One nurse was asked by her 9-year-old daughter if she was going to die. Almost two thirds of those workers surveyed felt their health and safety had been compromised during the outbreak. Some felt torn between continuing to work and quitting because of their families fear of infection. Some workers quit or refused to care for SARS patients; one radiologist locked himself in his office and would only review x-rays if they were slipped under the door. Physicians who worked with SARS patients were stigmatized by other doctors in the hospital. They would move to the other side of the room from a colleague who cared for SARS patients.[80] Dr. Perl, a doctor from the United States, told of her experience helping at Scarborough Grace during the epidemic. After her departure, her children's babysitter in the states quit. Later Dr. Perl was told by the teen's father that they were endangering his daughter by exposing her to SARS. While in Toronto, Dr. Perl did not tell anyone at her hotel why she was in Canada for fear of being ostracized.[81]

The Registered Nurses Association of Ontario surveyed healthcare workers after SARS to determine the psychological impact of the disease outbreak. A key finding in this report was that two-thirds of respondents had a change of attitude toward the nursing profession because of SARS. Those at SARS infected hospitals felt the effect more than those at non-SARS affected hospitals. Eighteen percent of respondents from North York General Hospital and 24 percent from Scarborough Grace Hospital reported feeling SARS symptoms during or after the SARS crisis.[82] In contrast, 7.6 percent of total respondents reported the same experience. Nurses reported their family lives were impacted by anxiety, isolation, stress, depression and loved ones fearing for the caregiver's health. Those nurses surveyed from North York and Scarborough Grace reported suffering from post traumatic stress at a rate of 57 percent and 47 percent respectively. This finding is not surprising when nurses recount being shunned by neighbors and separated from colleagues while at work. One nurse described her experience of her neighbors refusing to leave their house if she was in her backyard. At work, "nurses were directed to sit two seats apart in the cafeteria in an area separated from non-clinical staff, and security staff was present to monitor compliance with this directive."[83] Of those nurses surveyed, 15 percent declined to work because of the SARS crisis, five percent refused to work and 34 percent considered refusing to work. As discussed earlier, there was much confusion on how to properly wear protective equipment and exactly which gear was required. This fact is supported by the re-

[79] Commission to Investigate the Introduction and Spread of SARS in Ontario, *Volume One: Spring of Fear*, (2003), p. 1, http://www.sarscommission.ca/index.html, (Nov. 18, 2007).

[80] L.K. Altman, *New York Times.*

[81] Ibid.

[82] Registered Nurses Association of Ontario (Sept. 29, 2003). *SARS unmasked*, http://www.sarscommission.ca/hearings/01Mon.pdf/Mon_10_45_RNAO.pdf, p. 17.

[83] Ibid.

sults of the nurses' survey. Fifty-three percent of respondents felt confusion regarding which mask would provide adequate protection and only five percent were trained in the proper use and fit tested for respirators. Nurses reported problems trying to control infection because of the shortage of personnel. The lack of training with safety equipment and too few nurses created stress and frustration. The situation was exacerbated as personnel were put into quarantine or became sick.[84] Twenty-nine percent of respondents were quarantined either at home or on the job. Of those who were quarantined during the outbreak, 57 percent were quarantined for 10 days or more.

Another critical issue does not directly deal with the healthcare worker, but their patients. During the SARS outbreak, many facilities were closed and procedures unrelated to SARS were postponed for fear of spreading the infection to people with already compromised immune systems. Both necessary and elective surgeries were cancelled due to a fear of contamination. Treatments for many illnesses, such as cancer, were postponed or cancelled. Those who died because they could not receive treatment on time or have a surgery vital to survival are not calculated in the deaths related to SARS. Those critically ill patients admitted to the hospital oftentimes were not allowed visitors, causing undue stress on them and their families. Often nurses were the only people patients saw for weeks at a time. In addition, the nurses wore full protective equipment at these meetings which hampered communication, especially with the elderly. It also increased the patient's sense of isolation. They were not touched without gloved hands and would spend hours alone in between checks by hospital staff.[85]

The Travel Advisory

The World Health Organization issued a travel advisory for the Toronto area on April 23, 2003, advising travelers to avoid this area. This announcement angered Toronto which felt unduly punished for an illness thought, at the time, to be on the run. The SARS Commission estimates the travel advisory led to an estimated $950 million loss, and $570 million of that total was in tourism and travel dollars. In Canada, only 44 people succumbed to the disease and most deaths occurred in the elderly or chronically ill individuals. These facts did little to assuage the public's fear of SARS, especially when faced with headlines such as, "SARS death toll rises; health officials quarantined."[86] The article describes how some public health officials working to contain the disease had gone into quarantine. Overall economic impact of the SARS outbreak was estimated to be $1.5 billion, with two thirds of that impact in the Toronto area, and the remainder spread throughout the country. The study

[84] Ibid., 19.

[85] Ibid.

[86] C. Abraham, "SARS Death Toll Rises; Health Officials Quarantined," *The Globe and Mail*, (April 2, 2003).

noted no other single area experienced a significant enough economic impact to be measured in the study.[87]

Lessons Learned

It is clear the Vancouver area hospitals weathered SARS more effectively than Toronto. There are three main differences between the reactions of the healthcare facilities in both regions.

1. Disease surveillance. Province health officials in British Columbia were aware of the mysterious illness moving through China early in February and monitored the situation for new developments. In Ontario few people seemed to be aware of what happened in China and were not on alert for any suspect illnesses.

2. Communication. British Columbia was both aware of what was happening in Asia, and that information was also effectively communicated throughout the healthcare system. Physicians throughout the province were actively looking for individuals with suspect respiratory illnesses. This allowed Mr. C's physician to act quickly to get his patient isolated in a facility equipped to deal with infectious diseases. Likewise, Vancouver General had specialists available to assist in handling him safely. In addition, Vancouver General also had effective organizational communication. Information flowed both up and down the chain of command. The duties of the staff were well known and left little room for confusion. This was not the case at Scarborough Grace where many of the nurses were confused on which protective equipment was appropriate and in which circumstances it was warranted. Further, Ontario did not have the benefit of an established system of electronic bulletins to facilitate communication between government health officials and healthcare facilities.

3. Preparedness. Just prior to the outbreak of SARS, British Columbia had developed a pandemic plan that represented a clear plan of action in the case of an infectious disease outbreak. Coupled with this was the overall focus on worker safety and infection control at Vancouver General. Worker safety was well ingrained in the hospital staff and was practiced regularly. In Toronto, worker safety and infection control were not as rigorously practiced.

Implications for Resilience

The primary difference between the government's response in British Columbia and Ontario was preparedness. Just prior to the outbreak of SARS, British Columbia had developed a pandemic plan that had been transmitted, operationalized and practiced throughout the provincial healthcare system. The preparedness of the healthcare sector in British Columbia minimized the impact of the outbreak not only on the victims but

[87] Paul M. Darby, "The Economic Impact of SARS," The Conference Board of Canada, (2003), http://www.dfait-maeci.gc.ca/mexicocity/economic/may/sarsbrief May03.pdf.

also on the community at large. The differences in management and overall impact of disease outbreaks in Ontario and British Columbia highlight the critical role planning and preparedness within healthcare systems can have not only on preventing loss of life but also on the social and economic health of the greater community. Despite the poor management of the crisis in Toronto there was no evidence of panic, but many citizens in Toronto and other areas of Canada reacted reasonably and calmly in an attempt to prevent infection. Fortunately, there appears to have been little stigma attached to the city as a result of the outbreak as the Toronto tourism board reported by 2004 tourism has returned to pre-outbreak levels and visits continued to increase in 2005. This shows the willingness of tourists to accept announcements that locations impacted by such events are again safe, and over time resume their normal behavior.

4. HURRICANE KATRINA

"Considering the dire circumstances that we have in New Orleans, virtually a city that has been destroyed, things are going relatively well."

–Michael Brown, director, FEMA

Salient Points

- Loss of command and control by local law enforcement led to chaos and lawlessness.
- Delayed pre-landfall decision making by local and state government officials in Louisiana led to unnecessary loss of life and misery for thousands.
- Lack of communication between levels of government and between the government and its people contributed to mistrust, misunderstanding and unwillingness to follow direction, once it was finally given.
- The role of non-profit organizations was vital to the safety and well-being of the citizens of Louisiana and Mississippi.
- U.S. Government lack of decision-making on cleanup and repopulation challenged New Orleans residents' resiliency, likely mirroring events following a radiological attack.

Many lessons on human and public resilience can be learned from the events leading up to and following Hurricane Katrina. It seemed everything that could possibly go wrong did. American society had not seen that level of social fraying since the 1918 pandemic. Along the Gulf Coast of the United States for a few days in August 2005, anarchy reigned, people died unnecessarily and government officials spent much of their efforts blaming one another for all that had gone so horribly wrong.

Hurricane Katrina was one of the most devastating hurricanes in U.S. history. On Aug. 23, 2005, Katrina started in the Atlantic Ocean as a tropical depression and by August 29 had reached the Gulf Coast as a category five hurricane. Katrina killed more than 1,500 people and destroyed approximately 300,000 homes. The damage cost the U.S. Government between $125 and $150 billion, exceeding the total of Hurricane Andrew and the terror attacks on Sept. 11, 2001, combined. As a result of the storm, 95 percent of the daily oil output from the Gulf of Mexico ceased and almost two million people were without power.[88] Some of the most challenging long-term recovery issues seen in New Orleans may be representative of the challenges posed in the

[88] Committee on Homeland Security and Governmental Affairs, U.S. Senate, *Hurricane Katrina: A Nation Still Unprepared*, (Special Report 109-322), Washington, D.C., (2006), p. 133.

recovery from a radiological or nuclear attack.

Timeline

- **August 25:** Tropical Storm Katrina developed in the Atlantic and headed toward the coast of Florida.
- **August 26:** As Katrina entered the Gulf of Mexico it continued to strengthen, forecasted to make landfall in Mississippi and Louisiana in 72 hours as a category four storm.
- **August 27:** Katrina's winds extended almost 160 miles from its eye and had nearly doubled in size. By 8 p.m. the director of the National Hurricane Service spoke with the governors of Mississippi and Louisiana warning of the danger toward their states and suggesting evacuation orders.
- **August 28:** The National Weather Service issued a bulletin forecasting "devastating" damage from storm surges would most likely overtop levees. Tropical-force winds reached 230 miles from the eye. Finally mandatory evacuation is ordered in New Orleans, the second to last Louisiana parish to order evacuation.[89]
- **August 29:** When hurricane-force winds hit the coast, the eye of Katrina was more than an hour away, and the storm was a category four. Some areas of New Orleans experienced an 18-to-25-foot storm surge and flooding occurred in much of the city.[90]

State and Local Leadership

While the National Weather Service (NWS) can offer advice, only state and local officials have the power to order evacuation of a population. As the storm approached the Gulf Coast, officials in Alabama, Mississippi and Louisiana faced difficult decisions. Louisiana officials chose to stall, waiting to determine whether the severity of the storm would require total evacuation. Much of the able population departed voluntarily as early as August 27, while others prepared to weather the storm. Louisiana officials declared in repeated television interviews the storms were likely to overtop the levees and massive devastation could occur, but no mandatory evacuation order was given for New Orleans until 19 hours before the storm hit the city.

The delayed mandatory evacuation order had three serious consequences. First, the wavering of the government meant citizens doubted the veracity of statements when the mandatory evacuation order was finally given. Second, local and state governments made no provisions for those who had no means to leave the area. The city of New Orleans was aware approximately 100,000 people would be unable to evacuate in the event of a major hurricane making landfall on the coast of Louisiana.[91] During the

[89] Mandatory evacuation was never ordered in Jefferson parish, one of the most heavily populated parishes in the state.

[90] Committee on Homeland Security and Governmental Affairs, U.S. Senate, (2006).

[91] Ibid.

summer of 2005, this gap was noticed and draft memoranda of understanding (MOU) were created among bus, train and airline companies for assisting in evacuations, but the documents were never finalized. Some felt it was not feasible to plan for hurricane evacuation during hurricane season. In addition, the transportation MOUs were only feasible if there were places for the evacuees to go after arriving at a safe destination. The planning process never got that far.

There were, however, some non-governmental organizations that had plans that were executed – at least in part. The most accomplished was a program named Brother's Keeper. Church leaders and other community figures helped match people without transportation with those who would be willing to drive them to safety. This plan had the hope of some success, but was not fully developed. There were no predetermined meeting places and no contact information exchanged between the participating individuals. Like so many of the other plans for evacuation, the lack of follow-through kept it from being a viable solution.[92] The situation highlights the need for planners to be able to assess the needs of a community in a disaster.

Thus, as Hurricane Katrina descended on the city of New Orleans, the population turned to its leaders for help. When local leadership failed to give succinct directions, the population headed for higher ground. As the storm subsided 60,000 people arrived at the doors of the Superdome, a "shelter of last resort" that had hastily stockpiled supplies for 15,000 for three days. Another 20,000 convened at the Convention Center, a location that was never planned as a shelter and therefore, had no supplies, governance, or the ability to acquire either.

The final straw was that officials did not have contingency plans for a flooded New Orleans, even though they knew that it was virtually inevitable. There were no plans for evacuating "shelters of last resort" hastily designated in the city, nor were vital resources protected or sent to higher ground so they could be retrieved as the waters subsided. The lack of planning and the lack of attention to existing plans caused the greatest challenge: maintaining order in New Orleans.

Command, Control, and Coordination

One of the greatest failures of Katrina was the almost immediate loss of command and control by local law enforcement due to lack of planning for continuity of operations during and after the storm. Police headquarters was underwater, decimating the ability to direct and manage emergency response.[93] Transportation was limited by the rising water. Both dispatch and 911 resources ceased to function.[94] Communication was re-

[92] Ibid.

[93] Emergency Management Assistance Compact (EMAC) 2005 Hurricane Season Response After-Action Report, 1-11, http://www.tisp.org/files/pdf/news/emac_2005_hurricane_season_aar[1].pdf.

[94] Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katri-

stricted to the use of private cell phones that operated sporadically and had little capacity for battery recharge. The police department set up a command center in the parking lot of Harrah's Casino, but was unable to connect with as many as two-thirds of its officers.[95] Eventually it was determined as many as 320 had evacuated, abdicating duty.[96]

As the magnitude of the destruction unfolded emergency response organizations across the United States kicked into action readying for deployment primarily through Emergency Management Assistance Compact (EMAC), a "a congressionally ratified agreement that provides form and structure to interstate mutual aid, and through which states make available to each other in times of crisis their emergency response assets, such as National Guard troops."[97] The challenge was multifold. State officials led by Governor Kathleen Blanco repeatedly delayed requesting federal assistance, further stressing responders capabilities when they did arrive. The level of devastation was not anticipated (although many experts believed it should have been). The coordination of EMAC support (National Guard troops and first responders from other states) occurred at the state level, while active military and other resources including FEMA assets occurred at the federal level. As these resources descended on New Orleans, no one commanded all agencies and organizations involved. Coordination was managed on a case-by-case basis, which was greatly hampered by the lack of interoperable communications. National Guard troops could not communicate with active duty military and neither could reach out to local resources, except with cell phones.

No one seemed to have a clear understanding of their organization's or agency's role, nor those of others. Anecdotal evidence abounds that the national system of response hierarchy, known as National Incident Management System (NIMS) was misapplied, misunderstood or ignored all together. The result was a haphazard response by all agencies, desperate to rescue the storm victims.

As the storm surge faded relief agencies went into high gear. A first priority was to rescue and get as many citizens out of the area as quickly as possible. However, only one-third of the evacuees were in Red Cross centers, leaving the remaining two-thirds in local shelters or in "shelters of last resort" such as the Superdome and Convention Center. Transportation was challenging, but when the process was finally put into place,

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na, U.S. House of Representatives, "*A Failure of Initiative: The Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina*," (2006), p. 246.

[95] Committee on Homeland Security and Governmental Affairs, U.S. Senate, (2006).

[96] Interview by Select Comm. Staff with Maj. Ralph D. Mitchell, Jr., Region 1 Commander, La. State Police and LtC. Joseph Booth, Deputy Superintendent, La. State Police, in Baton Rouge, LA (Nov. 9, 2005). Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, U.S. House of Representatives, (2006).

[97] The White House, The Federal Response to Hurricane Katrina: Lessons Learned, (February 2006), p. 17.

FEMA shipped people out as quickly as possible. Most were not captured in a Red Cross database for survivors; resulting in the loss of contact with family members. The residents of New Orleans were sent to shelters across the 50 states, with little to no capability to reconnect to family or community.

Over one and a half million people evacuated from Louisiana, mostly in private vehicles. The rest relied upon government assistance inefficient for survivors or for the shelters to which they were sent. Numerous examples existed of localities across the United States preparing to receive weary souls, only to learn the people were re-routed last minute for seemingly no reason.[98] The lack of coordination among FEMA (the mover), the local haven (receiver), and the Red Cross, the only agency with extensive experience in resettlement, was extensive and cost many citizens, community and family connectivity they required to begin the road to recovery.

The success story of Katrina has to be the efforts of the National Guard and Coast Guard. More than 70,000 citizens stayed in New Orleans, many of whom were stranded on roof-tops without food and water. Together the Coast Guard and Louisiana National Guard rescued over 55,000 people.[99] The difficulties came in that there was no designated rescue location, thus boats and helicopters deposited people on dry land, resulting in massing of the population without food or water and without government evacuation plans.

Communication Failure

The destruction of communication infrastructure significantly impaired the government's ability to respond to the crisis left in the wake of the storm. Efforts by local, state and federal agencies to coordinate actions were complicated by this destruction. Local authorities undertook little to no advance planning for continuity of communications. After Katrina's landfall the only method for Mayor Ray Nagin to communicate with the city's emergency managers was to walk across the street. One hotel was able to maintain communications with its corporate offices and kept guests and workers in contact with families throughout the storm and evacuation periods.

The efficiency and planning of commercial operations able to maintain power and communications offers a useful model for future incidents.[100] Additionally, difficulty in communication and decision-making among local, state and federal government agencies, created an environment in which it was unclear who was in charge, fueling uncertainty in the affected communities.

[98] Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, U.S. House of Representatives, *A Failure of Initiative: The Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina*, (2006).
[99] Ibid, 116.

[100] Committee on Homeland Security and Governmental Affairs, U.S. Senate, 2006, 133.

Medical Calamities

The level of dysfunction in medical and nursing home facilities in New Orleans astonished and shamed many Americans. The House of Representatives Report on Katrina summed it up by saying, "Medical care and evacuations suffered from a lack of advance preparations, inadequate communications, and difficulties coordinating efforts."[101] That said, the level of individual heroics cannot be understated.

One of the greatest problems for medical facilities was the loss of communication with virtually the entire outside world. Hospitals had emergency plans, most of which assumed only temporary loss of power. With prolonged power outages, batteries ran out and institutions were incapable of requesting help from rescue agencies. Emergency 911 services were down or so clogged that relief was rarely a result.

Most hospitals did not have concrete guidance on evacuation, nor were they prepared for a full evacuation. Most plans called for shelter in place, or required a minimum of 36 to 72 hours to evacuate hospitalized patients.[102] With only 19 hours of notice, New Orleans evacuation became untenable, and occurred ad hoc and without coordination with law enforcement.

[101] Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, U.S. House of Representatives, (2006), p. 267.
[102] Ibid, p. 268.

Role of Private Entities

The size and scope of the disaster following Hurricane Katrina and her "sibling" Hurricane Rita are difficult to put into perspective. One after-action report summed it up by saying, "one million people had to be evacuated from an area the size of Great Britain."[103] The resources required to respond to that magnitude of a disaster had not been truly understood by the government and, therefore, failure to act with appropriate speed and efficacy was seen at the federal, state and local levels. While the response of the government has been highly criticized, the "bright spot" following Katrina was the role played by private volunteer entities commonly housed under the umbrella terms non-profit and non-government organizations.[104] Many of these entities were local churches and community organizations that had never before provided disaster relief, yet were capable of action due to local expertise, networks and relationship to the community.[105] According to one report, in the days after the storm nearly as many evacuees stayed in shelters operated by churches and other small non-profits as stayed in American Red Cross shelters.[106] Of course, the Red Cross itself is a private international humanitarian organization, not a U.S. Government entity.

[103] The Aspen Institute, *Weathering the Storm: The Role of Local Nonprofits in the Hurricane Katrina Relief Effort*, Washington, D.C., (2006).
[104] Ibid.
[105] Ibid., p. 9.
[106] Ibid., p. 2.

The Red Cross responded to its fullest capacity. The organization spent $2 billion on responding to Hurricane Katrina alone, a remarkable sum when one considers the annual revenue for the organization in 2004 was $3 billion.[107] In the aftermath of the storm, the Red Cross was criticized for the lack of support provided to "shelters of last resort" such as the Superdome and Convention Center. The mandate of the Red Cross, however, dictates it does not place workers in harm's way. Given the dire circumstances at the Superdome, the organization decided to bend the rules to provide some relief to those trapped in the Superdome, but workers were refused entry by law enforcement entities who declared the area unsafe.

One of the challenges of the role of private entities was there was a great deal of confusion and difficulty integrating these organizations into the "normal" process under which FEMA operates, specifically how to reimburse some of their costs for providing "mass care" in the immediate aftermath of the storm.[108] This led to difficulty in accurate accountability of evacuees including reuniting families and providing government assistance in relocation and distribution of funds. The situation shows the necessity of engaging non-government organizations to tap into their capabilities and resources at the local level.

Public Distrust

On Sunday, Aug. 28, 2005, the first mandatory evacuation in Louisiana's history was ordered. As noted earlier, for many, separation from family and loved ones may be more frightening than physical danger, prompting many to choose to stay rather than leave family, friends or even pets behind. However, mistrust played a prominent role in decision-making. In 1927, a flood of the Mississippi threatened to destroy affluent areas of New Orleans. To avert this, a decision was made to create a controlled breach in the levee that flooded the poor section of town.

Since then there has been the perception, mostly in the predominantly black neighborhoods, that poor areas of New Orleans have been sacrificed for the good of the city. In a qualitative study done after Katrina in shelters around the South, individuals demonstrated a marked lack of trust for those in charge of New Orleans, as well as for those people participating in the rescue.[109] Some felt the Lower Ninth Ward had been purposely flooded to save the tourist areas, while others believed rescue attempts began in

[107] Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, U.S. House of Representatives, (2006), p. 351

[108] General Accounting Office, *National Disaster Response: FEMA Should Take Action to Improve Capacity and Coordination between Government and Voluntary Sectors*, GAO-08-369, (February 2008).

[109] K.M. Cordasco, D.P. Eisenman, D.C. Glik, J.F. Golden, and S.M. Asch, "They Blew the Levee: Distrust of Authorities among Hurricane Katrina Evacuees," *Journal of Health Care for the Poor and Underserved*, 2007, vol. 18, pp. 277-282.

wealthier areas of the city. This lack of community engagement in the planning and execution of hurricane response efforts contributed to this mistrust and miscommunication.[110] To ease the problems created by mistrust, community leaders should have been included in the planning process. They would have been able to lend credibility to the city's efforts to evacuate the population. This would have only been effective had there been a plan for removing those people unable to evacuate to a safe location.[111]

While some communities may have high percentages of individuals and families who can cope with a crisis independently, if given accurate guidance, other communities (such as the Lower Ninth Ward) have great numbers of people who are unable to act on reasonable guidance. Barriers to following emergency guidance may include lack of access to communication channels, inability to understand guidance due to cultural or language barriers, inability to act on guidance due to medical or mental health conditions, or lack of necessary resources to follow directions. All of these issues must be taken into account when planning for a CBRN event and in providing guidance to a community following an attack to ensure the people can respond in the most effective manner.

Repopulation of New Orleans

After any major disaster, man-made or natural, rebuilding takes time and planning. The questions that still linger are how much of the city should be rebuilt and how it should be repopulated. The economic losses from the hurricane are great, but the city of New Orleans continues to suffer as tourist and business dollars are lost every year. It is not just the disaster that must be understood, but how a population can effectively rebuild and return to normal.

> Reconstruction is part of a sequence of four identifiable post-disaster periods: emergency, restoration, reconstruction and commemorative or betterment reconstruction. A retrospective study of San Francisco after the earthquake and fire of 1906 first examined these four periods. The emergency period is characterized by search and rescue, emergency shelter and feeding, the establishment of order, the clearing of major arteries, and the draining of floodwaters. Before this period ends, the restoration period is started, where the repairable essentials of urban life are restored. And well before this stage is over, replacement reconstruction begins to provide the infrastructure, housing and jobs for the destroyed city and pre-disaster population, followed often by a commemorative or betterment reconstruction.[112]

[110] Ibid.

[111] Ibid.

[112] R.W. Kates, C.E. Colten, S. Laska, and S.P. Leatherman, "Reconstruction of New Orleans after Hurricane Katrina: A Research Perspective," *Proceedings of the National Academy of Sciences*

The extent of the damage and the post-disaster failures extended the emergency period. The restoration was further complicated by the numbers of people forced out of the city. "The result is that much repairable, but population-dependent, infrastructure has not been restored or used."[113] Reconstruction can often create conflict between groups for resources and time.

While there are lessons regarding resilience to be learned from all stages of the Hurricane Katrina response and recovery, a unique feature of this disaster is that, unlike the others examined in the study, recovery has been slow and in some areas non-existent. For more than three years some areas of New Orleans have remained essentially abandoned as residents, governments and businesses debate how to move forward in areas such as the Lower Ninth Ward.

In some key ways this may reflect the same kind of problems seen if a radiological dispersion device were detonated. In such an event, a large area of a city may need to be abandoned, or reclaimed only through a very expensive clean-up effort. In such a case, some residents may insist the area be cleaned so they can return home, while others question whether such an investment is worthwhile, or whether funding such a project is even possible. Such delays in planning for recovery inevitably make it impossible for some people, or even entire communities, to return to a state of normal functioning in the interim.

The levee breaches that allowed much of New Orleans to flood created a toxic situation in the city. The water that flooded in was a mixture of oil and toxic chemicals from nearby manufacturers. This situation left many citizens wondering how contaminated the city may be after the water was pumped back into the lakes and the levees rebuilt. One question that must be addressed in the case of environmental contamination is what level of contamination is acceptable for human habitation? Prior to Katrina, New Orleans residents lived with a moderate level of environmental contamination. The soil throughout the area was contaminated with arsenic, lead and other chemicals. "Evaluating the risk to human health associated with contaminant levels in post-Katrina soil and sediments is complicated by the lack of clearly acceptable standards."[114]

Many of the environmental risks come from the demolition of damaged buildings as a result of mold growth or the release of chemical or biological material trapped in the buildings by flood waters. This creates a number of issues for city planning, and a number of questions must be answered. The legal issues must be fully addressed regarding homeowners attempting to return to their properties and

of the United States of America, (Sept. 26, 2006), vol. 103, no. 40, 14653-14660.

[113] Ibid.

[114] D.D. Reible, C.N. Haas, J.H. Pardue, and W.J. Walsh, Toxic and Contaminant Concerns Generated by Hurricane Katrina, *The Bridge*, Vol. 36, No. 1, (Spring 2006), http://www.nae.edu/Publications/Bridge/TheAftermathofKatrina/ToxicandContaminantConcernsGeneratedbyHurricaneKatrina.aspx. (Jan. 15, 2008).

the need to demolish a house undamaged structurally, but inhabitable.

Communication with the public is important to gain support and to explain the reasons behind government decisions. "In all decisions, communications need to be consistent, clear and sensitive to the needs of the local population…communicating the extent of the destruction of housing may be the most important first step."[115] This problem was recently faced by the New Orleans city government when the U.S. Department of Housing and Urban Development decided to demolish 4,500 units of public housing. This decision caused frustration and resentment within the community to boil over and protestors engaged in violent clashes with police.[116] This conflict demonstrates the problems that face reconstruction after a disaster. This demonstrates how groups and institutions fight for equitable division of resources and time after a disaster.

Lessons Learned

Of all the cases examined, Hurricane Katrina demonstrates the scenario that has been most challenging to personal and community resilience. Warnings were not provided early enough to be maximally effective, the needs and capabilities of many residents were not adequately prepared for, leaving many unable to follow evacuation guidelines. Long-term issues of trust between the people and the government exacerbated communication and compliance problems. The need for affiliation and the desire to be with loved ones was highlighted by an unwillingness to leave family and pets unable to be evacuated.

Federal, state and local authorities' actions were reactive, not proactive. Ramifications of decisions were not thought through. Some of those decisions cost lives, others resulted in mayhem, and many were detrimental to resilience of New Orleans' residents. The most glaring example is although city and state officials warned that Katrina would most likely breach the levees, little to no planning was undertaken to manage the consequences of the flooding. As the U.S. House of Representatives Report stated the lack of a full evacuation of New Orleans combined with the ruptured levees required "a post hurricane evacuation, for which federal, state and city officials had not prepared" and one that subsequently had to be made during the crisis and without full "situational awareness."[117]

The difficulties and inequities in rebuilding areas of the city left many citizens in a state of limbo, not knowing in what direction they should proceed to re-

[115] Centers for Disease Control and Prevention & U.S. Environmental Protection, *Environmental Health Needs and Habitability Assessment*, Agency, Joint Taskforce Centers for Disease Control and Prevention & U.S. Environmental Protection Agency, (Sept. 17,),p. 22 www.epa.gov/katrina/reports/envneeds_hab_assessment.html, (Jan. 11, 2007).

[116] J.M. Gonzales, and M. Kunzelman, "After Clashes With Police, Protestors Vow to Press on against Demolitions in New Orleans," *International Herald Tribune*, (Dec. 21, 2007).

[117] Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, U.S. House of Representatives, (2006), p. 104.

build their lives. Some of these most challenging long-term recovery issues seen in New Orleans may represent the challenges posed in the recovery from a future radiological or nuclear attack and should be critically reviewed for lessons that could be applied to a CBRN event on the U.S. homeland.

5. UK FOOT-AND-MOUTH EPIDEMIC

"The MAFF [UK Ministry of Agriculture, Fisheries and Food] killing machine is as relentless as Rommel."

–John Gouriet, UK political activist

Salient Points

- No UK pandemic pre-event plan or procedures existed to manage the outbreak or to inform the public.
- All UK veterinarians were not familiar with the disease, limiting diagnosis.
- The national government did not have an effective strategy for engaging communities.
- The level of public distrust ran high due to lack of understanding.

Another naturally occurring incident that may shed light on resilience to CBRN attacks is the 2001 foot-and-mouth outbreak in Great Britain. Although the disease does not directly affect humans, the natural outbreak may mirror in many ways an agricultural biological attack. Foot-and-mouth disease (FMD) has a long history in Britain with numerous outbreaks of the disease. "In Britain, throughout the early part of the 19th century, no attempt was made to eradicate FMD."[118] The most recent outbreak prior to 2001 happened in 1967 and cost the government around £27 million, primarily for farm compensation. By 1968, approximately 400,000 animals were slaughtered in order to bring the disease under control.[119] In contrast, over four million animals had to be slaughtered before it was eradicated in 2001.[120]

The Disease and the 2001 Outbreak

FMD is a virus that primarily infects bovidae, such as cattle, sheep, goats, swine and all wild ruminants. It is easily spread through four main methods: direct or indirect contact between animals in the form of droplets; animate vectors; inanimate vectors; and by airborne transmission. Animate vectors include humans and other animals not susceptible to the disease. Inanimate methods of transmission include spreading by vehicles and machinery. In temperate climates, FMD viruses can spread through the air up to 60 km overland and 300 km over water.

[118] The Cabinet Office (UK), *Foot and Mouth Disease: Lessons to be Learned Inquiry Report HC888*, (July 2002), p. 21.

[119] "1967: Foot-And-Mouth Slaughter Rate Soars," *BBC On This Day*, http://news.bbc.co.uk/onthisday/hi/dates/stories/november/21/newsid_3194000/3194490.stm, (March 2008).

[120] Department for Environment, Food and Rural Affairs (U.K.), Animal Health and Welfare: FMD Data Archive, http://footandmouth.csl.gov.uk/secure/fmdstatistics/slaughtmonth.cfm, (March 14, 2008).

The disease can survive in the body in marrow and lymph nodes at a neutral pH. Destruction of the virus can occur in the muscles after rigor mortis has set in as the pH level increases. Outside of the body the virus can survive in the fodder and environment for up to a month. Survival in this state is dependent on the pH of the soil and temperature. This disease is highly contagious, but causes a relatively low mortality rate among adult animals, but causes a much higher mortality rate in young animals. The incubation period can be from two to 14 days, followed by pronounced symptoms in cattle, such as anorexia, lip smacking, lameness and vesicles on feet which can rupture after 24 hours. In sheep the symptoms can often go unrecognized, since they may display less obvious lesions. FMD is also clinically indistinguishable from three other common diseases.[121] The similarity challenges diagnostic capabilities of veterinarians with little experience with foot-and-mouth. In 2001, some of the clinical specifications of FMD were important to how the disease spread and why the outbreak was so widespread.

On Feb. 19, 2001, a farmer in Brentwood, Essex, alerted a local veterinarian to a problem with a herd of sows. After testing it was confirmed the pigs were infected with FMD.[122] In addition, the disease was not limited to pigs, but also nearby sheep. The symptoms of FMD are often overlooked because often sheep display only mild symptoms of the disease. However, for three weeks prior to the pig diagnosis the disease had spread throughout the country by sheep sent to market.

The Public Response

The public's response to the foot-and-mouth outbreak varied depending on its position relative to the farming community. Much like the United States, Britain's economy over time has become centered on service jobs and has moved away from agriculture. The outbreak of FMD had a much more devastating impact on rural communities than urban areas. There were three aspects of the foot-and-mouth outbreak with an impact on urban and rural communities: time between outbreaks, quarantining of the countryside and mass slaughter. The first was the time that elapsed between major outbreaks of disease. The last major outbreak of FMD was in 1967, and it devastated British rural communities. By 2001, FMD was believed to be a disease of the past. This feeling seemed to be shared by farmers and government entities. One reason was the length of time between outbreaks. In terms of population resilience there was no sense of mastery of this problem. The public had little experience with this type of crisis. Many current farmers were children at the

[121] The diseases are Vesicular stomatitis, swine vesicular disease, and vesicular exanthema of swine. See OIE – World Organisation for Animal Health, *Foot and Mouth Disease Aetiology*, www.oie.int/eng/maladies/fiches/A_A010.HTM (March 14, 2008).

[122] The Cabinet Office (U.K.), *Foot and Mouth Disease: Lessons to be Learned Inquiry Report HC888*, (July 2002), p. 21.

time of the last major outbreak and had only vague memories of their parents handling of the situation. The issue of mastery was coupled with a limited perception of self-efficacy. Farmers could do little, but try to limit the spread of disease on their own farms. Contamination of a farm could come from a bird, wild animal or simply airborne viruses. Once the contamination occurred, the farmer's livelihood was at the mercy of government policies. This lack of experience, lack of planning, and lack of any clear control over the situation created feelings of frustration and despair in the farming community.

The second major impact on the UK was the ban on animal movement and quarantine over much of the countryside. Preventing animal movements creates two major problems for farmers. First, money is made when farmers acquire animals, fatten them up and send the herd to market for a profit. The slaughter of infected, or suspect animals, compounded with the lack of movement created a dire financial situation for most farmers. Second, movement is important to animal welfare. Farms are not equipped to maintain large numbers of animals over long periods of time. There is neither the space nor the feed to support long-term care. Farmers who did not have animals infected with foot-and-mouth disease were often worse off financially because they did not fall within the government's compensation scheme, yet they were unable to sell their livestock and earn a livelihood. Rural areas suffered generally from a loss of revenue generated by vacationers and tourists to the countryside. The entire country of Great Britain was declared a Controlled Area on Feb. 23, 2001, with the associated restrictions lasting approximately nine months.[123] The tourist sector of the UK economy was estimated to have lost almost $5 billion. Most of this loss was felt in rural areas as a direct result of reduced spending from domestic tourism. The British government spent almost $1.5 billion in compensation for lost livestock, and the rural community bore the rest of the cost.

The way animals are perceived and treated has changed over the decades. In the 2001 outbreak, animal welfare was an important aspect for many rural and urban communities. The large-scale slaughter and burning of animals left many communities traumatized.[124] The situation became particularly distressing when the animals were left where they were slaughtered for weeks on end. In addition to concern for animal welfare, communities were also worried about possible environmental contamination from the carcasses and the pits where the animals were eventually disposed. Because burial was a novel solution to disposal of so many animals, communities worried about water and air contamination. People also feared animals not in danger of infection, but who could spread the disease. Owners quarantined dogs and horses for fear they might transmit the

[123] Ibid., p. 63.

[124] Tara Womersley, "Villager's Tears as the Slaughter Begins," *The Daily Telegraph*, (June 20, 2001), http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2001/02/26/nfnm126.xml (Dec. 15, 2007).

disease. Rural communities were confused and anxious about the spread of the disease. One farmer with about 50 horses had limited their movement to his property in order to limit the potential of his animals spreading the disease. Another stated he felt anxiety every time he saw a bird fly over his property.[125] The lack of communication left the public with feelings of fear and outrage. Most did not understand the need for culling and pushed for vaccination. Much of this turmoil would have been avoided had the government explained its policy, objectives and public benefit in a real and tangible way.

The Government Response

The government's response to the FMD outbreak varied depending on the region. Scotland dealt with the outbreak more effectively than both England and Wales. Many farmers had little financial room for error at the time of the 2001 outbreak. Stopping the movement of all animals and destroying all infected or potentially infected animals created a great deal of stress, fear and resentment among the farming community toward the national government. Tony Blair and the Labour party were seen as being urban-centric and not sensitive to the issues faced by rural communities in England.[126]

At the beginning of the outbreak a number of agencies developed a plan for halting the disease. These agencies included the State Veterinary Service, Ministry of Agriculture, Forestry and Fisheries (MAFF) and the Food Standard Agency. Government epidemiologists came together to evaluate and model the potential spread of FMD. Through the findings of these epidemiologists, the three kilometer cull radius was determined to be a viable method for stopping the outbreak.[127] "Although culling contiguous premises was a blunt policy instrument, it had the benefit of speed in decision-making."[128] Government agencies began implementing the policy without adequately explaining it and thus, many farmers in England did not understand the logic behind it. In areas where the policy was rigorously applied the government met with opposition and frustration from farmers.

Communication was limited to formal announcements. The lack of communication left many farmers feeling victimized by careless implementation of policy. At times junior ministry officials faced threats of violence and harassment by angry and frustrated farmers. This created a great deal of stress working within the government at a time when

[125] Tara Womersley, "Flames Fan the Fears of Traumatized Community," *The Daily Telegraph*, (June 20, 2001), http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2001/02/27/nfnm527.xml, (Dec. 15, 2007).

[126] Ibid.

[127] Ibid.

[128] The Cabinet Office (U.K.), *Foot and Mouth Disease: Lessons to be Learned Inquiry Report HC888*, (July 2002), p. 96.

workers spent long hours at their jobs with no time off. In terms of population resilience the communication failure lowered the farmer's perception of self-efficacy. Farming has become a difficult profession as national and international economies have evolved. Many farmers have few financial resources to fall back upon during times of disease outbreaks. The stress of financial hardship and the perception of abuse by uncaring and unreasonable policy makers eliminated any sense of a farmer's ability to manage his own situation. Farmer's Unions stepped in and created a 24-hour suicide hotline to support farmers and avoid self-inflicted wounds by those in despair.

Implementation of the cull policy became problematic when the extent of the epidemic was realized. The State Veterinary Service did not have the resources necessary for mass slaughter. The lack of resources became noticeable when, in Cumbria, four cases meant 1,458 cattle and 17,270 sheep needed to be slaughtered with an additional 15 farms classified as dangerous contacts. Carcasses awaiting disposal overwhelmed the system and in some areas were left in the fields. At the height of the epidemic, over 600,000 animals were marked for slaughter and more than 200,000 carcasses had to be disposed of after they were killed.

In Scotland, many of the issues surrounding the FMD outbreak were avoided by the government's pragmatic approach. Scotland's response differed from England in both communication and implementation. The State Veterinary Service implemented national-level policies, yet because of the power vested in the Scottish national government; local government had some discretionary power. The National Farmers Union (NFU) of Scotland aided the communication between the government and local farmers.. The NFU helped to communicate the goals of the three km cull radius around infected farms. The farmers were aware of the rationale of this plan and the clear communication of policy objectives helped the program to gain at least some support from the farmers. The policy was supported by an organization within the community, the NFU, and the policy was explained in sensible terms.

The second way in which the Scottish response differed from England and Wales was the implementation of the national cull policy. The policy was implemented pragmatically and was limited to the edge of the outbreak area. Ninety-eight percent of animals slaughtered in Scotland were burned on the contaminated farms, limiting movement of the disease. In contrast, many of the carcasses in England were transported to other locations where the carcasses could be destroyed, raising public fears of further disease contamination.

Lessons Learned

The 2001 FMD outbreak in the United Kingdom highlights important public resilience issues and problems faced by both citizens and a government during the crisis. The lack of disease detection for several weeks prior to the first recognized

case limited government efforts to contain the outbreak. Government planning and preparation did not anticipate the extent of the outbreak. Communication with the public lacked credibility due to widespread distrust of government motives, especially within the farming community. Disease eradication policies may have been more widely accepted had the government included English and Welsh farmers on the decision-making process and involved organizations the farmers trusted, such as the National Farmers Union such as in Scotland. The 2001 FMD outbreak may have been accidental or natural occurrence, but it offers insight into issues that could follow a large-scale chemical or biological attack, including the ability to manage perception, reduce confusion on the part of the citizenry and government officials, and create established relationships between government and trusted non-government organizations that can act as liaison with the public.

6. 1918 INFLUENZA PANDEMIC

"*There is not the slightest danger of an epidemic… [because disease seldom attacks] a well-nourished people.*"

–Royal Copeland, health commissioner, New York City, 1918

Salient Points

- Official reaction ran the spectrum of denial, obfuscation, confusion and contradiction severely testing public trust.
- The government could not meet the needs or expectations of the public even though the expectations were far below what they are today.
- Use of media for public communication was problematic given wartime efforts.
- The role of home-centered healthcare and volunteer service programs was crucial in caring for patients at home.

The "Spanish" influenza pandemic of 1918–1920 caused an estimated 50 million deaths worldwide and sickened nearly one- third of the world's population. With millions of people incapacitated, the social fabric frayed, governments ceased to effectively govern, many activities in the public realm halted. On Oct. 18, 1918, the surgeon general of the United States predicted "if the epidemic continues its mathematical rate of acceleration, civilization could easily disappear from the face of the earth within a few weeks."[129] The pandemic was like no other, with a mortality rate surpassing even the Black Plague by modern estimates. In one study of the era, 97.5 percent of the people who died did so of either influenza or pneumonia resulting from the flu.[130] Most of the deaths occurred in a 16- week period, from mid-September to mid-December of 1918, paralyzing social, political and economic life across the globe. In the United States, businesses, schools and public activities closed or ceased. Public services failed. Machinery dug mass graves as cities ran out of coffins and grave diggers were among the dying. As quickly as it had come, the virus faded in late 1918, reoccurring in the spring of 1919 and sporadically until June 1920 when it disappeared.

The epidemic was startling, quick, and deadly. Experts were left with more questions than answers – questions scientists grapple with yet today. Why was this influenza strain so deadly? Why did it kill those in their prime as readily as the old and the young who are the normal

[129] John Barry, *The Great Influenza*, (London: Penguin Books, 2005), p. 365.

[130] Michel Garenne and Andrew Noymer, *Spanish Influenza of Demographic 1918: Consequences in The Long Run*, Pasteur Institute, (no date) [powerpoint presentation in French].

victims of influenza? What is its relationship to other influenza viruses? And finally, where and how did it originate? This case study will not attempt to answer all those questions, but rather will review the outbreak, the U.S. Government's reactions and the public's ability to persevere through one of the greatest crises Americans have ever faced.

The Beginning

Ninety years after the pandemic, scientists still search for answers about the lethal 1918-20 influenza strain that swept through virtually every country in the world. While there are many theories, no one has been able to definitively determine precisely where the virus began. One of the leading hypotheses is it began in January 1918 in Haskell County, Kansas, "an isolated and sparsely populated county in the southwest corner of the state."[131] From this remote area, draftees reported to Camp Funston at Fort Riley, Kansas. From Camp Funston, soldiers went to other camps across the United States, took trains to the East Coast to prepare for departure, and unknowingly carried the influenza virus to hundreds of thousands of soldiers and civilians worldwide along the way.

The flu killed an estimated 675,000 Americans, 10 times more than would die in the "war to end all wars." The virus of 1918-1920 was most deadly for people ages 20 to 40, a highly unusual statistic, as influenza usually kills the young and the old. The death rate for 15 to 34 year olds of influenza and pneumonia were 20 times higher in 1918 than in previous years.[132] Twenty-eight percent of the American population was stricken. In San Antonio over 90 percent of households reported at least one person sick. The effect of the influenza epidemic was so severe in 1918 the average life span in the U.S. was shortened by 11.8 years.[133] The life expectancy of an American male dropped as many as 17 years between 1915 and 1919 owning to both the war and the pandemic.[134]

Influenza was not unknown in the early 1900s. There had been significant epidemics during the 1850s and in 1889. Influenza was thought to be mildly worse than the common cold. Symptoms included body and headaches, stuffy nose, and a cough that usually lasted no more than three days. Thus, in 1918 when patients began presenting with much more dramatic symptoms and

[131] Several other theories exist regarding where the virus originated including France and China. John Barry details his findings in "The Site of the Origin of the 1918 Influenza Pandemic and its Public Health Implications," *Journal of Translational Medicine* (2004), pp. 2:3.

[132] Jeffery K. Taubenberger and David M. Morens, "1918 Influenza: The Mother of All Pandemics," *Emerging Infectious Diseases*, (January 2006), http://www.cdc.gov/ncidod/EID/vol12no01/05-0979.htm (Dec. 14, 2007).

[133] *The Deadly Virus: The Influenza Epidemic of 1918*, http://www.archives.gov/exhibits/influenza-epidemic, (Jan. 8, 2008).

[134] Garenne and Noymer.

many deaths, doctors misdiagnosed influenza as the plague, meningitis or other serious diseases. As one historian noted, "Many of them did not identify it as influenza because, it didn't fit the definition. Influenza does not kill people in great numbers; influenza does not particularly affect young adults; influenza is a pest, it's not a slaughterer of human beings."[135]

Some claimed German saboteurs arriving on U-boats had released poison gas in U.S. harbors. The United States was in the middle of the WWI, shipping hundreds of thousands of men and materiel to fight in Europe. In the spring of 1918, America's role in the war increased. In March 84,000 American soldiers set out for Europe; followed by another 118,000 in April.[136] But soldiers arrived in Europe sick or dead. By summer influenza was reported in Russia, North Africa, India, China, Japan, the Philippines and New Zealand.[137]

"Spanish Influenza"

Influenza hit Spain in May 1918, killing an estimated 8 million people. At the time, Spain was one of the few neutral countries in Europe and had no wartime censorship. Media reports of the illness were much more numerous than most countries, leading to the claim by other nations the outbreak originated in Spain. It was later determined to be untrue; however, the name "Spanish Influenza" remained in perpetuity.

The influenza pandemic roughly can be broken into three phases: Phase 1: March – June 1918, Phase 2: end of August 1918 – March 1919 and finally, Phase 3: March 1919 – June 1920. While scientists believe the same virus caused the three waves, they have samples only from the second wave, which caused the greatest amount of death and social chaos. Virologists continue to study the outbreak attempting to pinpoint its origin and prove or disprove the linkage among the three outbreaks.

The first wave caused a great number of illnesses, but not a noticeably higher rate of death, as was the case with the second wave. In 1918 influenza was not a reportable disease in any country and thus pinpointing its precise rate of illness and lethality is difficult. The only way to measure the severity is through mortality rates. Most cases of pneumonia in spring 1918 are now linked to the epidemic, but at the time were considered normal. While the origins are argued, the first major outbreak seems to have begun in early March 1918 in Camp Funston at Fort Riley, Kansas, followed closely by illness in New York City and other locales. In August 1918, a more virulent strain appeared simultaneously in Brest,

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[135] Alfred Crosby, *The American Experience: Influenza 1918*, Public Broadcasting Service, http://www.pbs.org/wgbh/amex/influenza/filmmore/reference/interview/index.html, (Dec. 19, 2007).

[136] "People & Events: The First Wave," *The American Experience: Influenza 1918*, Public Broadcasting Service, http://www.pbs.org/wgbh/amex/influenza/peopleevents/pandeAMEX86.html, (Jan. 4, 2008).

[137] Ibid.

France; in Freetown, Sierra Leone; and in Boston, Mass.

Patients suffered and died from varying symptoms complicating diagnosis as well as the lack of helpful information to prevent infection. The symptoms were so unusual that initially influenza was misdiagnosed as dengue, cholera or typhoid. Some patients died suddenly, seemingly perfectly healthy one minute and dead the next. Several anecdotes exist of people dropping dead on the streets with no warning. Other patients suffered from the onset of "normal" influenza followed by a rapidly development of a ferocious pneumonia that would fill their lungs with fluid, killing a patient by drowning. This variant was the most brutal as a patient's lungs were unable to function, oxygenation of blood failed causing victims to turn blue and even black. One army physician in Boston noted in many cases race could not be determined by skin coloration alone. Some patients coughed so violently they broke ribs. Other patients suffered from morbid bouts of bleeding from virtually every orifice of their bodies. The last group had less virulent forms of secondary bacterial pneumonia, suffering for longer periods of time. Scientists believe there is a possible link between the 1918 flu and mental health problems later in life including dementia and Alzheimer's disease.[138]

[138] Barry, pp. 378-381.

War as a Catalyst

By late September 1918, the United States had over 2 million soldiers in Europe and was planning on sending another 2 million as quickly as possible. Germany was under pressure; a pressure that could only be maintained with addition of young, able-bodied Americans to the fight. The U.S. Government needed soldiers, but it needed public funding and industrial support as well. As government leaders became aware of the possibility of epidemic spreading from military instillations to the general public, the threat had to be weighed against the war effort. In hindsight, the war ended in early November 1918, however, at the time, it was unclear when Germany would capitulate. The difficult decision was made to maintain troop movements, although some were curtailed or delayed. Historian Alfred Crosby explains:

> There were two enormously important things going on at once and they were at right angles to each other. One, of course, was the influenza epidemic which dictated that you should sort of shut everything down; and the war which demanded that everything should speed up – that certainly the factories should continue operating. You should continue to have bond drives. Soldiers should be drafted and sent to the camps jammed into barracks, put on boats with bunks six high, and sent off to France.

> One of the great tragedies of the situation is that there was no correct thing to do. You can't look back and say, 'If our officials had only done the correct thing.' There wasn't any correct thing to do.[139]

Thus, when the city of Philadelphia was planning its fourth Liberty Loan parade on Sept. 28, 1918, the possibility of raising millions of dollars to help the war effort outweighed the fears of a few health officials voicing concern over illness spreading through military camps, including the local Navy yard. Within seven days after the parade attended by over 200,000 people, Philadelphia's hospital beds were filled to capacity with victims of influenza. The flu killed almost 11,000 Philadelphia residents during October 1918.

Soldiers from all countries were hit hard by influenza. According to a report in the *New York Times* in June 1918, the German troops suffered from an epidemic "all along the German front."[140] The flu may have even delayed the Germany offensive in the battle of Château-Thierry in June 1918.[141] Of the U.S. soldiers who died in Europe, the influenza killed half. An estimated 43,000 servicemen mobilized for WWI died of influenza while 621,000 were sickened.[142] The mortality rate for army camps in the United States ran between five–10 percent.

Unraveling the Cause

Between 1890 and 1917, medicine had made many great strides. Scientists had learned to counter or control smallpox, cholera and yellow fever. Pasteur had linked germs to diseases boosting a feeling of innovation and invincibility. As one noted historian explained, "It was a time of great optimism in infectious disease control mainly because Pasteur had advanced knowledge to such a tremendous degree that we were following one success right after another success."[143] That optimism came to a screeching halt as the influenza pandemic took hold of the planet. National decision makers turned to science for answers; the medical community, however, was just as flummoxed. In 1917 it was strongly believed bacteria caused influenza. It was not until 1933 that it was determined to have been caused by a virus.

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[139] Alfred Crosby, *The American Experience: Influenza 1918.*

[140] "Spanish Influenza Is Raging in the German Army; Grip and Typhus Also Prevalent among Soldiers," *The New York Times*, (June 27, 1918).

[141] Rex W. Adams, "The 1918 Spanish Influenza, Berkeley's "Quinta Columna," *Chronicle of the University of California*, 1, (Spring, 1998), pp. 51-52.

[142] Alfred Crosby, *America's Forgotten Pandemic: The Influenza of 1918*, (Cambridge: Cambridge University Press, 2006 [reprint]), p. 205.

[143] Dr. Shirley Fannin, A Time for Great Optimism, *The American Experience: Influenza 1918*, Public Broadcasting Service, http://www.pbs.org/wgbh/amex/influenza/filmmore/reference/interview/drfannin1.html, (Dec. 19, 2007).

The lethality of the 1918 virus had never been experienced before or since, rising to over 2.5 percent, compared to less than 0.1 percent in other influenza pandemics. In some areas, mortality was as high as 35 percent of the population. Scientists do not know why. The virus moved about unexpectedly. In some areas, only a few were sickened, while in other areas whole communities were wiped out. Even when mortality was low, so many people were incapacitated that everyday life came to a halt. Commerce was limited to people standing in the streets yelling orders to clerks behind closed doors. Human contact was limited even within families. The state of public healthcare was in disarray with virtually no help or leadership from the federal government.

The Public Health Response

In the fast-paced, just-in-time world we live in today, it is hard to imagine the impact of the 1918 epidemic. But in the fall of 1918, it seemed there might be no end to the nightmare that worsened each day. In September 1918, 12,000 people died in the United States, which alone is a significant number; however, in October that number climbed to an astounding 195,000, crippling American society.

In 1918, the resources and capabilities of the federal government in the public health sector were marginal, limited by lack of personnel, resources and infrastructure. Much of the existing resources were used in support of the war effort. One-third of the American medical establishment – doctors, nurses and support personnel – served in the military stationed in Europe. In some towns and cities the shortages were more extreme. Private hospitals had closed due to personnel shortages, a dearth that would severely challenge many locales in caring for the sick.

As the epidemic reached the United States, the first reaction of many national authorities was denial. The health commissioner of New York City denied influenza had reached his city or that it was an epidemic. He argued no danger existed, but rather panic was unjust and panic itself was the cause of illness. As it became clear the epidemic was going to spread across the United States, public health officials issued statements, albeit sometimes contradictory. As one expert noted, one of the greatest challenges for decision-makers was "the consistent inability to predict when the epidemic was going to increase and decrease, the absence of really strong epidemiological evidence…left the public pretty well disarmed."[144]

The responses of the public health officials represented the prevalent medical concepts of the times. Given that a bacterium was believed to be the cause, good ventilation and fresh air were extolled as the best measures of prevention. In many areas public gatherings were

[144] Dr. Barbara Rosencrantz, *The American Experience: Influenza 1918*, Public Broadcasting Service, http://www.pbs.org/wgbh/amex/influenza/filmmore/reference/interview/drbarbara5.html, (Dec. 19, 2007).

limited in hopes of stemming the tidal wave of infection. However, the severity of the regulations was dependent upon local authorities. A 1918 article in the Journal of American Medicine stated the Committee of the American Public Health Association (APHA)[145] issued a report recommending limiting public gatherings. The APHA said:

> The committee held that any type of gathering of people, with the mixing of bodies and sharing of breath in crowded rooms, was dangerous. Nonessential meetings were to be prohibited. They determined that saloons, dance halls, and cinemas should be closed and public funerals should be prohibited since they were unnecessary assemblies. Churches were allowed to remain open, but the committee believed that only the minimum services should be conducted and the intimacy reduced. Street cars were thought to be a special menace to society with poor ventilation, crowding and uncleanliness. The committee encouraged the staggering of opening and closing hours in stores and factories to prevent overcrowding and for people to walk to work when possible.[146]

The report concluded the disease was extremely communicable and "spread solely by discharges from the nose and throats of infected persons."[147] In 1918, most laborers shared living quarters, cooking and eating utensils, in addition to common work space. Generations of families lived under one roof, making the infection prevention a daily challenge for all. The law prohibited coughing or sneezing without covering one's face and the use of common cups in factories. Public education campaigns were initiated, espousing hand-washing and general hygiene.

Recent research has suggested non-pharmaceutical interventions such as effective and timely implementation of school closures and bans on public gatherings had significant impacts on death rates. Markel et al. examined the utilization of these interventions in 43 American cities. They found cities that utilized

[145] The Committee on American Public Health still exists today as the American Public Health Association. According to its website, APHA "is the oldest, largest and most diverse organization of public health professionals in the world and has been working to improve public health since 1872. The Association aims to protect all Americans and their communities from preventable, serious health threats and strives to assure community-based health promotion and disease prevention activities and preventive health services are universally accessible in the United States. APHA represents a broad array of health professionals and others who care about their own health and the health of their communities." http://www.apha.org/, (Dec. 19, 2007).

[146] Molly Billings, "The 1918 Influenza Pandemic: The Public Health Response," (June 1997), http://virus.stanford.edu/uda/fluresponse.html, (Jan. 3, 2008).

[147] Ibid.

combinations of social contact restrictions and early implementation of these measures, such as New York City, experienced lower death rates than cities that delayed such actions or utilized such restrictions in isolation, such as Philadelphia.[148] Recognition of an outbreak and knowledge of how to respond are not the only factors that contribute to decisions to implement such measures and their ultimate effectiveness. Other social and political factors play a role as well.

Telling White Lies

The most important aspect of American life was the war, not illness. As one expert stated, "patriotism was more important than truth."[149] Another noted, "The pressure to maintain the war effort made so many other things lose their importance."[150] The value of public honesty was weighed against public morale. Morale won. At times, public health officials were at odds with political leadership. In Pittsburgh, the mayor told the public they should ignore public health official statements.

The media and public officials, however, were complicit in most cases, supporting the idea there was no epidemic and thus, no need to worry. People were forced to judge the juxtaposition among closing of businesses and limiting human contact and authorities telling them not to worry. A Chicago official stated, "Worry kills more people than the disease itself." Newspaper stories stating public officials had the outbreak under control ran side-by-side with advertisements for goods used in "preventing" the flu including snake oil, castor oil, laxatives, Vaporub, pine tar, cayenne pepper and camphor. Advertisements in newspapers declared, "Wear a mask and save your life! A mask is 99 percent proof against influenza." Many cities, including San Francisco, passed ordinances requiring gauze masks to be worn in public. Penalties for violation included up to $100 fine and 10 days in jail. Spitting, coughing and sneezing publicly were fineable offenses in many cities. "Open face sneezers" were equated with the Kaiser.

Cities across the eastern part of the country were losing control. Bodies piled up in the streets. Some corpses stayed in homes for days, as family members were too ill to remove them. Telephone networks were overwhelmed. In New York City authorities begged citizens to use the phone only in case of emergency because influenza had decimated the ranks of operators and jammed the lines with people seeking help. By Oct. 4, the U.S. Public Health Service advised state and local officials to enforce closure of all

[148] Howard Markel, et al, "Nonpharmaceutical Interventions Implemented by US Cities During the 1918 Influenza Pandemic," JAMA, (2007), pp. 298 (6), 644-654.

[149] John Barry, "Pandemic Influenza: Past, Present and Future," CDC Workshop, (Oct. 17,2006), p. 7.

[150] Richard Hatchett, Ibid., p. 9.

public gathering places.[151] This notice was only a recommendation as the federal government did not have the authority to enforce the measure, requiring local entities to issue their own ordinances – on their own terms and timelines.

Assistance from Private Sources

The importance of private relief organizations cannot be overstated. Philanthropic organizations, whose members were women of prominence, took up the mantle of leadership, effectively managing and operating civic functions and preventing total collapse of society. In Philadelphia, women's groups picked up where the local government collapsed, organizing nurses, supplies and even scheduling pick up of the dead. They took out full-page advertisements in local papers, pleading for volunteers with any medical background to join their ranks. The Red Cross played a vital role in organizing nurses and providing infrastructure nonexistent within the federal government. The Red Cross sought graduate nurses, undergraduates, nursing aides and retired medical personnel. By Oct. 8, the Red Cross operated full force across the country.

Another organization, the Society of Visiting Nurses, was busy around the clock going to homes caring for sick who could not make it to a hospital. Nurses across the country reported entering houses where all the occupants died or all the adults died and the children and those too ill to care for themselves starved. Without the corps of nurses the death toll would have been significantly higher. Hospitals, too, were overwhelmed. Not only was there staff and resource shortages, but generally every hospital bed was full. In larger cities, including Philadelphia, the sick lined the hallways and even stood out in the street waiting for treatment. Private homes opened in many cities for convalescing, freeing up hospitals for the urgent cases.

Where the Virus Hit and Why

Looking at mortality rates from the pandemic, scientists have spent decades trying to determine trends and linkages. Were some populations genetically predisposed to death from influenza? If this were true then perhaps the key is in our genetic code. Few countries escaped the illness.

- An estimated 7 million died in India, about 2.78 percent of India's population at the time. In the Indian Army, almost 22 percent of troops perished from the flu.
- In Britain, as many as 250,000 died.
- In France the number of dead was more than 400,000.
- In Canada, approximately 50,000 died.
- In Australia an estimated 12,000 people died.

[151] Crosby, *America's Forgotten Pandemic*, p. 74.

- In Fiji, 14 percent of the population died during only two weeks.
- In Western Samoa the number was 22 percent.[152]
- Entire villages in Alaska and southern Africa perished. In one Alaskan village 178 of 396 residents died in one week.[153]

In the U.S., about 28 percent of the population contracted influenza, and approximately 675,000 died. Italian-Americans had one of the highest rates of mortality, although scientists believe living conditions were likely the greatest factor. Twenty-four percent of American Indians living on reservations caught the flu, with a 9 percent mortality rate, almost four times higher than rates of big cities in the United States. Interestingly, African-Americans tended to fare better as a population than did whites. An anomaly, historian Alfred Crosby states, is African-Americans normally suffered a much higher rate of mortality from respiratory illnesses than whites, except during the 1918-1920 influenza.[154]

Scientists believe the most likely reasons for the variation among cultures were the cultural practices and living conditions, rather than genetic weakness.[155] Where families groups were crowded together under one roof, influenza flourished. However, statistics show no clear division among class lines. In many aboriginal cultures it is customary for families to gather with the dead, possibly leading to greater infection of the population.

Collective Conscience

The "Spanish flu" killed more Americans than all the wars of the 20th century combined yet no monuments exist to its dead. It is estimated no family in the United States went unscathed. In fact, it was rare to find a family that did not suffer at least one death, whether a cousin or an aunt, if not an immediate family member. In one study of 1,000 life insurance claims during the epidemic, the average age of the victim was 33, while the average age from previous years had been 55-60. The report estimated the death total in the United States to be at least 400,000 and stated each death represented an economic loss of 25 productive years resulting in a 10,000,000 year productivity loss to the American society as a whole.[156]

Given the brevity of events, why then does the Spanish Influenza not have a place in our collective conscience? There are many theories for this, the first

[152] http://en.wikipedia.org/wiki/Spanish_flu.

[153] Gina Kolata, "The 1918 Flu Killed Millions. Does It Hold Clues For Today?," *The New York Times*, (March 26, 2006), http://www.nytimes.com/2006/03/28/science/28flu.html?_r=1&oref=slogin&pagewanted=print.

[154] Crosby, *America's Forgotten Pandemic*, pp. 228-9.

[155] Ibid., p. 228.

[156] "Experts See Heavy Cost of Influenza," *The New York Times*, (Dec. 6, 1918).

of which is the speed at which events occurred. The epidemic took more lives worldwide in 25 weeks than AIDS has in 25 years. The events brought many communities to a breaking point, and then as suddenly as it began, it was over. There were three waves of the outbreak through 1918 and 1919; however, the fall of 1918 was the apex of the crisis. As the epidemic culminated, WWI came to an end. Delegations suffering from the flu delayed peace talks on more than one occasion.

Another reason for the lack of remembrance, as one expert suggests, is few "famous" people died – possibly given the age at which most of the victims succumbed. Those aged 25-40 had yet to make their mark on the world. Many dignitaries including the Kaiser, President Wilson, and Franklin D. Roosevelt suffered from influenza, but none died of it. Literary giants including John Dos Pasos, William Faulkner, Ernest Hemingway, Thomas Wolfe and F. Scott Fitzgerald were all affected by the flu, either by the loss of a loved one or suffering from the illness themselves, but the disease rates not even a mention in their novels of the times.[157]

The epidemic changed many scientific, social, political and economic aspects of the time; however, it did not withstand the test of time in collective conscious as it likely did in personal ones. It is unlikely anyone who lived through it failed to remember its horrors, but as communities and nations we did not allow it to linger.

Lessons Learned

There are many lessons to be learned from the events of 1918-1920, some of which have already been described. Below are five broad themes to categorize the primary lessons relevant to public resilience.

1. <u>Public trust in government statements and actions is essential</u>

Industrial productivity, fundraising through war bonds and relief efforts were vital aspects of the war. Maintaining public morale was a priority. News was carefully censored to ensure war efforts were not undermined. Newspaper reports of the war were carefully worded to encourage strong support of U.S. efforts. Additionally, local news was reviewed to keep a positive outlook for the reader. When reviewing newspapers from the fall of 1918, few stories focus on the influenza outbreak. Some papers barely mentioned the flu, with the exception of the obituaries that required more space with each passing day. Government officials regularly decried the concerns as overblown. On the West Coast, Los Angeles and San Francisco's health officials loudly proclaimed their doubts influenza would even reach their fair cities – only days before public places were ordered closed to stem the tide of infections.

War and ignorance played significant roles in government actions at the federal, state and local levels. Only a few

[157] Alfred Crosby, *America's Forgotten Pandemic*, pp. 315-317.

brave public health officials took preventative measures, while most stood by until illness brought their constituency to its knees. The lack of leadership, the censorship of the media and the dearth of understanding of the illness severely tested the public's ability to trust elected leaders.

In Philadelphia, public infrastructure strained to the breaking point, until private organizations came in, took control and restored order. In New York City, every statement from the city's health commissioner was incorrect, overstated or incomprehensible – even after his city was overcome with the epidemic.

The public requires trusted figures to give sound advice – what to do, where to go and how to get help. Without those elements chaos ensures. A 2006 Center for Disease Control and Prevention (CDC) Workshop summed it up by saying:

> False reassurance is the worst thing you can do. Don't withhold information, because people will think you know more. Tell the truth –don't manage the truth. If you don't know something, say why you don't know, and say what you need to do to know. Drown people with the truth, rather than withhold it...The key is trust. It is when people feel totally alienated and isolated that the society breaks down.[158]

[158] John Barry, CDC Workshop, (Oct. 17, 2006), p. 8.

2. <u>The role of the media is vital</u>

The media, as in all crises, played an important role, partially through its lack of coverage and its misinformation provided by ignorant government leaders and advertising charlatans who preyed on public fear. The role of the media in a modern day epidemic would be vital. Networks and media outlets would have to work with governments to provide truthful and vital information. The current trend toward sensationalism could greatly hamper a government's ability to lead its population through a crisis. Cooperation would be essential for extreme measures such as quarantine. Transparency in communications is key to successful implementation of policy. One expert concluded, "Today, we have the opportunity to frame how the public perceives what is happening."[159]

3. <u>The government should encourage reliance on self, family, community</u>

The war had brought people together, united in one cause. Influenza had the opposite effect – dividing families and communities into isolated and helpless camps. In some cases children or those too sick to care for themselves starved to death because no one was there to help them. People were so afraid of the contagion, once close-knit communities who had shared the good and the bad closed their doors to one another. However, there are numerous examples of bravery and fortitude at the individual level. In many areas, specifically big cities, pri-

[159] Richard Hatchett; Ibid., p. 10.

vate philanthropic groups literally saved society through organizing efforts. These local groups do not exist in the same form they did in 1918. Societal roles are different today – making philanthropic groups an addition to a resume, not the extent of it. The level of community effort in cities such as Philadelphia is hard to imagine in the modern age, including caring for the sick and managing sanitation, removal and burial of the dead. More thought needs to go into how the government can support communities and private entities in improving self-reliance.

Communities were more self-sufficient in 1918 than today and had local support networks nonexistent today. The family also played an important role. While many families suffered with several members ill, the fact they lived together or near one another meant those who were well could care for one another. Demographics have changed. Today, families are smaller and often live far away from familial support networks, forcing many to rely on whatever government services are available.

4. Leadership and clear lines of authority are necessary

The influenza virus cannot be seen, tasted or smelled. In the fall of 1918, seemingly healthy people dropped dead. At the height of the epidemic, many stores refused patrons entry, but rather asked them to yell their orders from the storefront, wait for their parcels to be prepared, and avoid any personal contact. It is difficult to imagine patrons doing that in today's society. It is also unclear to what extent the public would adhere to government edicts, especially those as extreme as quarantine. Would families agree to separation for the good of the public? With the current trends in individualism it is hard to imagine this would be the case. Any wavering or confliction in official statements would be taken as an opening for individual action.

Even in 1918 quarantine was not advised as it was considered "impractical." Public places were closed, but only fear kept people at home. Hospitals attempted to separate the ill by hanging bed sheets between beds. True quarantines were successful only in isolated areas with the ability to sustain their own community. Few areas of the world could manage that in the modern interconnected world.

In 1918 authority was more evenly dispersed among federal, state, and local officials. In addition, there was virtually no experience with a nationwide crisis. The federal government only had the authority to recommend actions to the local authorities. Many localities had different ordinances on managing the outbreak, which confused the public. In some areas public officials offered seemingly crazy remedies and outlandish recommendations. Today infrastructure and plans are in place to manage a pandemic. Whether the measures prescribed can be effectively put into action is a question no one can answer until required.

Conclusion

The 1918 pandemic is not measured in the great economic losses it caused. The war ended and life returned to "normal." Because of the limited duration the pandemic is "characterized as a hit-and-run disease that only produced brief slowdowns" in economic and human terms.[160] The economic impact would be much more severe today, given the just-in-time nature of the world economy.

Scientists do not discuss the next influenza pandemic in terms of whether, but rather when and how severe. The experience of the 1918 epidemic, as well as the strain itself, remain primary areas of scientific and anthropological study today. The unknowns in this case strike fear in experts' minds when considering what the future holds. In December 2006, one study estimated that an influenza virus as deadly as the one that caused the 1918 Spanish flu could kill as many as 81 million worldwide. The tidal wave of chaos leaves planners challenged to find solutions to incalculable problems in healthcare, manpower and economic stability. The United States has a national strategy for managing pandemic influenza. Today, influenza is a reportable disease monitored across the globe. While scientists search for clues from the past, decision makers try to plan and hope the next pandemic does not rival 1918.

[160] Ibid., p. 13.

7. TYLENOL TAMPERING CASE

"This was an outbreak of chemical terrorism."

–Cook County Medical Examiner Edmund Donoghue

Salient Points

- Quick response led to effective crisis management.
- Company (Johnson & Johnson/McNeil) took full responsibility.
- Public trust in product before and after the event was buffered by J&J actions.

A final case that can shed light on resilience in CBRN attacks is the Tylenol poisoning case. In this case, contamination of a trusted product created anxiety and changes in purchasing behavior for millions. The company's management of the crisis demonstrates communication principles key in restoring public confidence. In the fall of 1982, the mysterious deaths of Chicago residents stunned America. Seven people – two men, four women, and one 12-year-old girl died. Authorities quickly discovered the one thing they had in common: all had ingested Tylenol capsules shortly before their death. Extra Strength Tylenol capsules had been laced with potassium cyanide. This case study will focus on the actions of the maker of Tylenol, McNeil Consumer Products Company, and its parent company Johnson and Johnson (J&J) and their role in public resilience following the cyanide poisoning.[161]

Johnson and Johnson

On Sept. 30, 1982, Tylenol held 35 percent of the $1 billion analgesic market in the United States, representing almost 20 percent of its manufacturer's earnings and outselling Tylenol's next four competitors combined.[162] The Tylenol product line was a household name and considered a trustworthy product for pain relief. Neither the manufacturer of Tylenol McNeil Consumer Products Company, nor its parent company, Johnson and Johnson, had a crisis management plan in place; nor were they prepared to manage the outcome of Tylenol's use in a multiple murder case. However, the response to the events during the fall of 1982 is considered the "gold standard in crisis control" by many educators in crisis management.

Johnson and Johnson had a very simple corporate credo stating in order of im-

[161] For the purposes of this study, Johnson and Johnson will be referred to as "the company" with no distinction being made between the parent and its subsidiary.

[162] Steven Fink, *Crisis Management: Planning for the Inevitable*, (New York: AMACOM, 1986), pp. 203-218.

portance the company had a responsibility to consumers, followed by employees, the communities served, and finally stockholders. Trust was the mantra of the company, something it hoped to convey to the public throughout the crisis.

The Timeline

On Sept. 29, 1982, a 12-year-old girl died in a Chicago suburb after taking a single capsule of Extra-Strength Tylenol. Her death was followed by three other Chicago area residents. By Oct. 1, seven people had died of cyanide poisoning and Tylenol capsules were pulled from the shelves throughout Chicago.

On Oct. 2, law enforcement officials determined the poison capsules had come from lots at two different manufacturing locations. By Oct. 5, 31 million bottles of Tylenol capsules were recalled nationwide. All advertising for the entire product line was cancelled, and production of capsules halted costing Johnson and Johnson over $100 million.

Hospitals in Chicago and around the country were flooded with telephone calls. Many admitted numerous patients under the suspicion of cyanide poisoning from Tylenol, although no additional cases were discovered.[163] Some state health departments asked stores to remove all Tylenol products from the shelves as a precaution, although the Food and Drug Administration (FDA) required removal only of lots specifically linked to the deaths. The FBI requested J&J not end production of Tylenol until further information could be discerned, fearing the company would be seen as acquiescing to terrorist demands.[164]

Shortly following the murders, J&J received a handwritten extortion letter demanding $1 million to end the poisonings. Authorities traced the letter to a man named James W. Lewis, a tax accountant from New York City. Lewis was found guilty of extortion and sentenced to 20 years in prison. No link was ever found between him and the actual murders. The case has never been solved.

The Corporate Response

Product tampering was not part of the industrial lexicon in the early 1980s. When Johnson and Johnson initially learned that authorities investigated the role of Tylenol in the deaths of three people in Chicago, J&J management assumed there was a problem with the manufacturing. The CEO, James Burke, snapped into action within 90 minutes of hearing of the possibility of Tylenol's involvement in deaths. He began by:

1. Appointing a senior executive to take charge of Johnson and Johnson's crisis management with the primary task of discovering what happened.

[163] Rachael Bell, *The Tylenol Terrorist*, http://www.crimelibrary.com/terrorists_spies/terrorists/tylenol_murders/, (Nov. 8, 2007).

[164] Fink, p. 215.

2. Sending a crisis manager to "the scene."[165]
3. Sending a public relations manager with the crisis manager.
4. Opening direct communications between J&J management and crisis management team.[166]

Since no playbook existed for managing a company-wide crisis, managers and senior executives scrambled to contact relevant employees within the company. The vice president for public relations pushed a singular concept – to find out what happened and to get the truth to the public through the media. One critique of the J&J management team was they did not talk directly to the public through press conferences, but rather primarily used media outlets to disseminate information. However, numerous interviews were conducted with J&J management; the most notable being appearances by the CEO on the daily talk show "Donahue" and the news show "60 Minutes."

Johnson and Johnson had an aggressive market research strategy from the beginning. The first poll was taken during the second day of the crisis. Predictably, as the death toll rose, consumer confidence fell. However, the company believed that given its research results that Tylenol could regain market share. J&J set up a toll-free hotline that received over 30,000 calls in less than 60 days.

Following inspections, the company determined the cyanide was not introduced into the bottles at the factory, which left only one other possibility. Authorities determined the capsules had been taken from stores, filled with cyanide and returned to the shelves for sale. As soon as J&J officials realized product tampering had been the cause, the company began developing methods to protect their product. On Nov. 11, 1982, triple tamper-resistant packaging was released in a press conference broadcast across the country. On Oct. 12, J&J took out full-page ads in several major newspapers offering to exchange Tylenol capsules for tablets and soon offered significant coupons which could be obtained in newspapers or by calling the company.

The Tylenol crisis was the most covered story since the Vietnam War with more than 80,000 newspaper articles, hundreds of hours of national and local television and radio coverage. Studies by Johnson and Johnson estimate 90 percent of the American population was aware of the murders within one week.[167]

Tylenol's market share plummeted to 7 percent by mid-October 1982. However, the quick response by Johnson and Johnson restored consumer confidence in a product they had used before. The triple-tamper resistant packaging, the discount and the advertising campaign paid off. In only a few short years, Tylenol regained market share, and the analgesic market grew to over $2 billion by 1990.

[165] At this point, no one has considered product tampering, thus, it was assumed the problem was at the manufacturing site.

[166] Fink, p. 206.

[167] Fink, p. 216.

Lessons Learned

There are some limitations in comparing government and private-entity actions; however, several key lessons can be drawn from this case. While many layers protecting consumers against product tampering exist, concerns are high about biological terrorism. In the event of an attack, whether through a particular product or other means, the following are lessons exemplified by the events of 1982.

1. Trust in a product. It is difficult to imagine a more challenging threat to the existence of a product than to go from being a pain reliever to an instrument of murder. However, Tylenol had several strengths in its favor. It had a strong market share and a stellar reputation. It seems the public was able to forgive Johnson and Johnson given events were beyond its control. It is possible this might not have happened had the poisoning taken place inside the company. This kind of public trust is less likely to be as widespread today. However, it is clear J&J did an excellent job of standing behind its product.
2. Honesty. Johnson and Johnson's motto of honesty could be seen in their actions throughout the crisis. While honesty amidst a crisis is a challenge for governments and private entities alike, rest assured it will be much worse when the public discovers the lack of truthfulness, especially when public safety is concerned. Living in an era of Enron and public scandals, the public is likely to respond well to truthfulness – even if the product is at risk.
3. Responsibility. Johnson and Johnson quickly took responsibility for the crisis, recalling the product at great expense, even though the FDA required only specific products be removed. The J&J leadership made the choice to standby the product because they believed they could get Americans to buy the product again. They were right, but clearly this is related to actions throughout the crisis.
4. Use a "reservoir of good will" wisely. Americans trusted Tylenol, understood the harm had come outside of J&J's reach, and responded to the company's rapid response to secure the welfare of the public. As a crisis unfolds it would be wise to take stock of where good will lies and how that can be maximized without draining the "reservoir" of public trust.
5. Listen to the public. While polls are notoriously wrong, listening to the public is vital in maintaining and restoring public confidence. Johnson and Johnson had an aggressive market strategy based on consumer wants. Following that strategy, listening to their customers, and acting in good faith allowed J&J to restore Tylenol's market share.

DEFENSE THREAT REDUCTION AGENCY AND USAF COUNTERPROLIFERATION CENTER PUBLIC RESILIENCE WORKSHOP

While a review of previous CBRN incidents provides useful information regarding the potential public response to an attack or incident, such a study by its nature is purely retrospective. A single author can examine the findings of case studies and attempt to find insight into public behavior. The value of this effort provides only the limited perspective an individual can bring to such an endeavor. Public resilience as a concept is impacted by a vast range of individual, community and government characteristics as well as agencies at the local, state and federal levels. In order to provide a forum to represent the wide range of actors the USAF Counterproliferation Center held a one-day workshop to discuss these findings on Jan. 22, 2008.

The goal of this workshop was to bring together experts from a variety of military and civilian agencies with roles in the preparation for and response to CBRN events. Military organizations tasked with responding to a CBRN event include NORTHCOM whose "civil support mission includes domestic disaster relief operations during fires, hurricanes, floods, and earthquakes. Support also includes counter-drug operations and managing the consequences of a terrorist event employing a weapon of mass destruction."[168] Subordinate to NORTHCOM and with specific responsibility for these activities is Joint Task Force-Civil Support (JTF-CS). The mission of JTF-CS is to plan and deliver DoD support "to the designated Lead Agency for domestic chemical, biological, radiological, nuclear, or high-yield explosive consequence management operations."[169] Another organization with a primary supporting role in catastrophic events is the National Guard. The National Guard, functioning in a Title 32 role, provides each state with forces prepared to respond rapidly to disasters.

In addition to military organizations, a number of civilian components have key roles in both preparing for disasters and helping individuals and communities recover from a CBRN attack. The Department of Homeland Security is the lead agency, with several subordinate agencies playing crucial roles. FEMA is tasked "to reduce the loss of life and property and protect the nation from all hazards, including natural disasters, acts of terrorism, and other man-made disasters, by leading and supporting the nation in a risk-based, comprehensive emergen-

[168] USNORTHCOM website, http://www.northcom.mil/About/ index.html.

[169] Ibid.

cy management system of preparedness, protection, response, recovery and mitigation."[170] The Citizen Corps, subordinated to FEMA, was created to help build communities better prepared to respond to any type of disaster, and improve the safety during and following an event also provides essential support. Given this mission, the Citizen Corps is the only agency with a clear mission to build resilience in the U.S. population.

In addition, significant academic research has been conducted into building public resilience and thus, representatives from academia were invited to participate in this workshop.

The workshop began with introductions and a briefing on the concept of resilience relative to CBRN attacks. The goal of this briefing was to establish a common frame of reference for the diverse group of workshop participants. Prior to the workshop, a determination was made to break the concept of CBRN resilience into more manageable pieces for analysis. Smaller working groups enhanced the capability of the experts to delve more deeply into the issues. Resilience cannot be broken easily into distinct phases; therefore some substantive overlap existed between the chosen areas of *preparation*, *response*, and *recovery*. The first group focused on actions relevant to resilience accomplished prior to an attack or imminent threat of attack, known as the *preparation* phase. This group focused on issues of education, preparation and community coordination that taken before an incident would likely improve the public's resiliency during and after an attack. The second group focused on issues related to resilience in the response phase immediately following a CBRN incident. For the purposes of this workshop, *response* was defined as beginning at the point when an attack occurred or an imminent threat was discovered through the time the incident had subsided. The final group focused on actions to enhance reliance during *recovery* from a CBRN event. Individuals were assigned to these subgroups based on a combination of the level of responsibility their organization had in each phase and their personal experience. Also an effort was made to ensure no single organization dominated any group ensuring an interagency perspective to the discussion and resulting recommendations.

Each group was tasked to conduct a two-hour session in both morning and afternoon. In the first session, the focus was on barriers or obstacles that could interfere with the ability of the population to respond resiliently in the respective phase of an event. Following this discussion each group reported back to the plenary with its most significant findings. In the second session, the groups were asked to return to their list of barriers and to suggest ideas, actions and plans to overcome these barriers. Again, each group presented their findings to the overall group. The notes from these groups are presented in this section.

[170] FEMA website, http://www.fema.gov/about/index.shtm.

GROUP 1: PREPARATION

Lt Col Kindt opened the plenary session with a presentation that laid the foundation for further discussion, and as the facilitator for Group 1, his thoughts carried into the group discussion. Group 1 analyzed preparation as a factor in the resilience required to either withstand a CBRN event or to live under the threat of such an event.

Resilience Defined

Resilience is the ability to cope with a negative or traumatic event and return quickly to a healthy level of functioning. Inherent in resilience is the ability to comfortably live under the stress caused by the threat of an event that would necessitate resilience for survival. Clearly, preparation, the focus of Group 1's task, has a bearing on the latter. Lt Col Kindt further stated that individual resilience factors of optimism, self-efficacy, mastery and coherence are crucial for effective coping and should offer an outline for group discussion. Familiarity based on experience, particularly successful experience, goes a long way toward causing people to believe in themselves – to be convinced they can perform and persevere when required. Such a belief is the essence of optimistic self-efficacy – and resilience.

Weapons of Mass Destruction Events

CBRN events, however, introduce factors that significantly complicate, and to some extent, work against self-efficacy. Most people have never experienced a CBRN event, have little or no training for such an event, and may have only the vaguest notion of the different types of weapons and attacks that fall into this category. Add to the unknown factor that any such attack would be unexpected, indiscriminate, and quite possibly grotesque; the prospects for resilience decrease further. Also, a radiological or biological attack might not be recognized immediately and likely would be invisible could add significant uncertainty if one were not properly prepared.

Behavior in Crisis

Knowing how people are likely to behave in crisis has a huge bearing on determining methods for preparation. The most common assumption is people will panic and flee, and strong discipline will be required to hold the population together. In fact, experience has shown panic occurs only when physical danger is imminent or present, there are limited escape options, and there is a lack of social connectedness. In most situations people are much more likely to render assistance than to panic. Further, if people are motivated to flee for one reason or another,

flight is often not toward safety, but toward family and friends. The desire for social cohesion, therefore, becomes the key to understanding and predicting behavior.

Public behavior in a crisis, while perhaps more positive than one might intend also is not apt to be perfect, with several factors contributing to less than desirable reactions to threats or events. First, there are those who will deny any such event is likely to happen or has happened. In some ways coupled to denial is fatalism, the idea the individual has no control over events and future events are either unavoidable or preordained – and leads some individuals to conclude that further activity on their part would be fruitless.

Further contributing negative factors are the social amplification of risk – the either well-meaning, overblown warnings, or the demagogic warnings of those that have something to gain.

Also, once an event occurs, we can expect some behavioral casualties, another term for "worried well." These individuals would request health care for a variety of reasons, some legitimate, some not. Examples of such "worried well" behaviors might be exhibited by those minimally exposed, others with anxiety reactions mimicking exposure, still others following official instructions, or individuals seeking personal gain through the system.

Public Expectations

Lt Col Kindt presented a summary of research by Dr. Monica Schoch-Spana that shows during crises the public expects certain things from government. The public expects the government to:

- provide instructions and equipment;
- provide information as to who has been affected or infected by an attack;
- provide drugs and vaccines;
- provide health care to those who need it;
- prevent more attacks; and
- establish conditions and provide information so life can return to normal.

Focus for Discussions

In the three discussion groups concentrating on *preparation*, *response and recovery*, each was to seek to answer three questions:

- What is the public likely to do?
- What information does the public seek?
- What is the public likely to need?

Further, these questions were to be considered in the context of the aforementioned resilience factors:

- optimism
- self-efficacy

- mastery
- coherence

The Role of Government

The first group had a lively discussion on the topic of preparation, with the issue playing against, and in concert with, the concepts of community engagement and personal preparedness. Three central points emerged from the discussions. First, governments *do* have a role to play. There are some tasks only governments can accomplish.

Second, there may be unreasonable expectations about the capabilities of governments. Frequently, citizens look for someone or some organization to blame when a crisis occurs. Such feelings have led to expectations of perfect warning, instantaneous response, and the appearance of the President on scene to prove he cares about the situation. Further, we may have oversold the capability of the military to react in emergencies, particularly when significantly committed overseas.

Third (and conversely), while there are expectations, there is also distrust of the government. This is reinforced when the government has information individuals or communities do not, and a failure to communicate the information.

This mistrust leads to such counterproductive activities on the part of the citizenry as refusing to be vaccinated or hoarding medicine against a vague threat. This concept led, later in the day, to a discussion on the merits of the federal government preparation, which has been extensive, but of which the public may have too great an expectation. One participant said the world is an untidy place, and sometimes there are bad results from events that governments can neither prevent nor instantly recover from.

The counter argument was the citizens of this country, even while we diligently prepare, should be demanding *more* of government, not expecting less. Recovery from a CBRN event for citizens in a highly developed, complex and interrelated society found in the United States probably is significantly more difficult – requiring more government help, for example, with rebuilding infrastructure – than it might be in a less complex society in a remote region of Africa. But that is no reason to let governments off the hook. In fact, as an important engine of the world's economy, we have a certain responsibility not only to ourselves, but to the rest of the world, to fully recover.

It is important for citizens to realize what government can and cannot do, and prepare accordingly. This is where the concept of the Civil Preparedness Continuum is useful:

Individual planning
↓
Group action
↓
Community-level action

Individuals and local groups must take responsibility for themselves and supplement that which the government can provide. And since, as we have seen, there is a probable information gap between federal and local governments and between government and individuals in the community, frequently policy decisions at the federal and state government level are not consistent with individual and local planning. Therefore, some questions should be opened up to a public dialogue, involving individuals and communities in governmental decisions and allowing a better understanding of possible gaps in preparation for crises.

Why Individual Preparations Often Fail

The group agreed individual preparation for disaster events of all types, much less CBRN events, is spotty at best. There are a variety of reasons for this shortfall:

- Some lack time while others fail to make the time.
  - Sometimes those retired or inactive in the workforce for other reasons, but are established and retain a good bit of community involvement, have more time to plan than do the rest of society.
  - While it is possible to accomplish risk mitigation individually, rarely do people take the time to do so, as there is little incentive – particularly if there is a financial incentive to do otherwise.
- Other risks may be more compelling when compared to WMD risks.
  - Preparing for a natural disaster based on past experience may seem prudent, but trying to think about WMD attacks in addition may be just a bridge too far (and cause great anxiety).
- Individuals either may not be aware of the threat, or may not know what to do about it.
- Less affluent individuals probably have less access to information, money to prepare, or time to plan.
  - Many middle-class people, while more able, still fail to make a plan.
- When there are too many threats, people often become overwhelmed – and simply do nothing in response.
- Others may fail to prepare when there is a significant financial cost involved in crisis preparation; this is especially daunting to those facing the prospect of evacuating their homes when they live paycheck to paycheck.
- When this type of event has never happened before, it is hard for most people to plan for something either they think very unlikely and/or probably will never occur.
- People are likely to be slow to prepare for the type of events they have not previously experienced.

Even when citizens do prepare, they may not do it well, or may have incomplete equipment or supplies. People living in hurricane zones are, in general, only 50 percent adequately equipped. And on a national scale, preparedness is estimated at around 2.7 on a scale of 10. An interesting observation confirmed by the group was people are much better prepared at home than at the workplace. Frequently, workplaces intend to supply its shelter locally using the just-in-time concept – which can prove deadly when there is no more time to respond. Experts in the group indicated large businesses tend to prepare better than small ones, which is unfortunate, because the small businesses are in contact with more people.

When people *are* prepared, however, they themselves become first responders – a wonderful result.

Social Networks as a Solution

The group agreed social reinforcement is necessary to encourage personal preparedness. The good news is people tend to self-organize in groups that already exist, and these groups offer a constant in times of crisis. Working through churches, schools and work places has proven to be effective in the past, but there are few incentives to do so absent a clear and present danger. As an example, the military offers very clear incentives to conform, plan, fight and many other necessary activities. A more loosely formed community or social organization does not have those incentives – unless the desired activity takes on the vestiges of a moral crusade such as the move to wear seat belts or stop smoking. Therefore, at least part of the solution is to provide incentives of some sort with existing, effective groups to encourage emergency preparedness. Possible groups to provide incentives are businesses, insurance companies and governments.

The group had a brief discussion on the efficacy of communities. One member suggested some research (Putnam, *Bowling Alone*) has said social networks decline and distrust in government grows as we retreat to our electronic devices and computers. Others in the group said those findings are in dispute, and community groups are numerous and healthy.

One clear incentive for individuals and communities to coalesce around preparedness is that state and federal government assets, as well as the bulk of emergency responders, may need as much as 72 hours to respond to a disaster. Each state also has National Guard WMD Civil Support Teams positioned to arrive on scene within 12 hours of the incident. Local first responders like police, firemen and doctors would cope with the event earlier. Community response capabilities, developed over time, can be a bulwark against the shortfalls of government disaster responses.

Experience as a Basis for Preparation

In one sense, experience works against preparation for CBRN events given so little such experience exists. Most individuals either cannot picture what such a CBRN event would look like or even that one would occur at all. On the other hand, many Americans have had experience with natural disasters, including hurricanes, tornadoes, earthquakes, and floods, and can easily picture the consequences of those. Most people understand natural disasters are likely to occur somewhere. So it is easier to encourage individuals to prepare for a natural disaster than it is to spur special preparations for a CBRN event. Another challenge is once a natural disaster occurs, it is usually over, and then it is just a matter of the clean-up or rebuilding. With a CBRN event, areas are likely contaminated or unusable for a considerable amount of time. Asking people to be prepared to leave, and maybe never to return, is more than many are willing to consider.

Using an "all hazards" approach for preparedness is a double-edged sword. While one-size-fits-all planning may simplify preparation, most people understand some events require sheltering in place with stocks of supplies, while others require a capability to evacuate. A CBRN event could cause contamination to require supplies and preparation far beyond those required for a flood or hurricane. Finally, if all hazards take on equal threat value, then planners run the real danger the WMD hazards may seem unimportant and relevant specific measures may seem unnecessary.

One possible solution when addressing hazards is to focus community efforts on the hazard which is most likely occur in the local area and base preparations on that particular scenario. The result should be less overwhelming for the population. For instance, a town in western Nebraska is probably not going to be the target of nuclear terrorism, but it could face tornadoes. Conversely, the District of Columbia does not have to contend with tornadoes and hurricanes regularly, but it is very concerned about terrorism.

Creating a Preparation Campaign

The group conducted a discussion on how to create a campaign to encourage people to prepare for a CBRN event. Most agreed such a campaign would require participation across the civic preparedness continuum, and should include all levels of government. The campaign should be at the local level involving well-respected community leaders. Information may in fact flow from the government in many cases, but the reliance on web-based information or public service announcements may not be effective. A different messenger at the local level, a champion of the cause, in most cases would be more effective.

This campaign should focus on the most significant threat to that community and plan in detail for the event. As the planning gains community acceptance, plans should be expanded to include rea-

sonable local CBRN events. This might include an incident involving a local chemical or industrial plant that uses hazardous materials. One of the worst chemical incidents on record was the 1984 Union Carbide incident in Bhopal, India that killed as many as 2,000 people. While this type of incident is frightening it provides an excellent example of the type of varying responses required to a CBRN event. It also provides a plausible example of a localized CBRN event caused by a terrorist attack or accident.

Community plans should include venues for sharing information with the public. Several examples included sporting organizations and events, adult and teen certification programs, business involvement and even patriotic approaches such as, "I support our National Guard troops so they don't need to support me."

GROUP 2: RESPONSE

Group 2 consisted of a mix of mental health, government, and disaster response professionals. Lt Col Fred Stone started the session by having each member of the group introduce himself, and then he described the goals for the group. The morning session objective for Group 2 was to identify potential problems during the response phase. The afternoon session objective was to identify possible solutions to the problems, and possibly to identify metrics with which to measure progress. The following is a summary of the discussions from both the morning and afternoon sessions.

Communication

In response to a CBRN event, communication would be a primary concern. One problem that could arise is the loss of electronic equipment, specifically communication systems. Government officials at all levels would need to disseminate information to the public. Chaos related to the loss of communication equipment or general technical failure is likely to increase or result in miscommunication or the release of conflicting information. Another issue regarding communication is the credibility of the source. It would be necessary for the public to follow directions from the government, however; citizens may doubt the credibility of the information if the source is not believed to be an authority.

During the afternoon session, the group developed several possible solutions to the aforementioned communication problems during the response to a CBRN event. Getting information to the public in a timely fashion is important. If there is a loss of electronic equipment, one solution may be the use of military aircraft to relay communications. The development of one-touch communication abilities such as OnStar would allow instant communication or information dissemination to a large section of the public. Developing scripts for government officials to follow in the event of a WMD incident could enhance coherent communications early in a response.

The development of a group of people, both internal and external to the government, known to the media and public as “trusted agents,” may facilitate communication and give messages more weight. Fewer issues of miscommunication or misunderstanding may result. The allocation of bandwidths for emergency messages may also relieve communication problems. Communication among federal, state and local officials would be more effective if relevant local officials are identified prior to an event to allow for more efficient communication. Another aspect is the use of clear terminology when relaying information to the public. For example, in the event of a radiological attack when the public is told to take off contaminated clothes and shower, this suggestion needs to be accompanied with how fast the clothes

should be taken off and how the contaminated clothes should be handled. Explanation of new concepts related to CBRN exposure effects and solutions would also make communication more effective.

Federalism

The reality of the government's role during a disaster is misunderstood by the public. Politicians do not generally understand their roles in a CBRN crisis either and fear the legal ramifications of a federal abuse of power in a response to an incident. The limits of the federal government's power and role are not well defined in most people's minds. There is also a fear the federal government will highlight the inadequacies of local government officials. The group discussed some solutions to these problems. Instead of having major regional or national exercises in which the government entities are judged in black-and-white terms, training scenarios should be created that emphasize suggestions for improvement. This information would need to be released so evaluations can be accessed. Another suggestion is the creation of a Center of Excellence to provide a repository of information and facilitate inter-agency cooperation. Further, providing education, training and exercises for political leaders to prepare them for the event of a CBRN attack or situation may give them some valuable experience in handling such a disaster.

People and Expectations

During the response to a CBRN event people will come to the area from unaffected areas for a number of reasons. Inexperienced or untrained personnel coming to the scene may cause confusion and harm to themselves or others. Another issue is concrete versus abstract problems. If the danger posed by the event is not considered probable and more abstract the public may be less compliant in preparation for it. People confronted with a CBRN disaster may be motivated primarily by family security concerns. It may be hard to keep inexperienced responders at the scene of an event if they are motivated by social ties, and the danger is perceived as somewhat abstract. The public's expectations of a system-wide government crisis response may be unrealistic. These unrealistic expectations may also extend to the military. Unrealistic expectations, in addition to a lack of personal accountability, may make the response more difficult to accomplish. The speed of the response also may not meet the public's expectations.

Some solutions developed by the group for changing public expectations likely will include Community Emergency Response Training (CERT) to increase community awareness of an individual's responsibility during an emergency. This would create a baseline knowledge within the community and generate a feeling of common interest with the members of the local community. Some type of incentives may be required to get people to prepare, such as offering a discount on insurance if the policy holder takes certain steps to-

ward preparedness. The steps toward preparedness could take the form of classes or training exercises.

Liability issues must be addressed as well. The revision of Good Samaritan laws applicable across state lines is required, as well as provisions in legislation to provide subsequent aid for casualties who may not receive immediate treatment. Another solution could be more public participation in emergency training and greater transparency in crisis decision-making processes. This may increase the public's willingness to cooperate with the government during a crisis. The training could also include more positive reinforcement of the behaviors needed. In addition to training, a long term change in perspectives and public education is needed. This could include civil defense education in schools and inclusion of community organizations in the training.

A number of solutions were discussions that address the issue of mass care following a CBRN event. The first is the need for a large area for people to be medically observed, probably outside of medical facilities so hospitals are not overwhelmed by "worried well." Some alternate facilities must be found in order to observe those who may have been exposed. Another way to reduce "worried well" patients is to offer a website or call center to inform people who may be concerned, but may not need to visit the hospital. To reduce the possible stigma associated with being contaminated by CBRN agents, it would be smart to certify those not exposed to the event. Public education also should be undertaken to dispel myths about the dangers of associating with CBRN victims, once no longer contagious. It is also necessary to encourage doctors and officials to feel free to say "I don't know" when it is appropriate. Finally, the government must be more responsive to the public's needs. It should not be necessary to make the public come to government facilities, but instead government programs ought to reach out to them if necessary.

Resources

During the response phase the basic needs of the public such as food, shelter and safety must be addressed. A further problem is the lack of public transportation, a problem that can not only hinder evacuation out of a dangerous area, but also be a problem preventing supplies and first responders from returning to the disaster area after the event. Providing quick and effective medical support and adequate logistics also are important requirements. The group identified the present dearth of integrated public and private sector disaster planning and the ineffectiveness in resulting the sharing of resources. This lack of preparation limits or prevents the efficient use of resources during and following a crisis event.

One of the group's solutions was the expansion or identification of potential reserve resources for a surge capacity. On the personnel side these reserves could include retired professionals from military, firefighting, police and nursing sec-

tors. The group also saw the restoration of critical infrastructure such as transportation, communications, power and hospitals as a strategic necessity, not a discretionary one. Improved public health infrastructure was deemed as a primary immediate concern.

Summary

In summary, the top concerns identified by the *response* group included the understanding by the population of the concept of federalism and multiple levels of government response; the requirement to change the expectations of the general public regarding what government can and cannot do; the need to improve personal responsibility for advance preparation and self help on the part of the citizen, and the need to work with the media to address public perceptions of an event and the individual, organizational and government response to it.

In terms of solutions, the group came up with several inventive ideas to increase the resilience of the general public by helping people to respond reasonably well to better-understood risks. The primary issue is information – how and when to get the correct information to the public so individuals and communities can make informed decisions. Including people early in the planning and exercises during the preparation phase was noted as a priority. Following this inclusion, the creation of a Center of Excellence for CBRN crisis management was suggested to act as an information repository to be used by government officials, politicians, local leaders, as well as the general public. The Center could conduct training and provide written statements for political leaders to mitigate crisis effects and public expectations. The U.S. Government could use the Center to establish a fundamental level of knowledge in the population thereby creating a "knowledge baseline" that would steel a community against CBRN use or CBRN threats of use. This local involvement could include civil defense education in schools and community involvement by local organizations such as churches. The group discussed the need to change the culture of expectations as well as to provide education about likely CBRN effects and "best practices" in coping with CBRN events.

GROUP 3: RECOVERY

Group 3 consisted of mental health and disaster response professionals from government, business, NGOs and academia. Michelle Spencer facilitated the introduction of each group member, and then outlined the group's goals. During the morning session potential problems associated with *recovery* from a CBRN event were discussed. In the afternoon, the group discussed the possible ways forward. The following is a summary of the discussions from both the morning and afternoon sessions.

One of the challenges of determining issues specific to recovery is there are no clear lines to separate immediate response options from recovery actions or recovery from preparation for next event.

Recovery is the true test of resilience; response is weathering the storm. In the recovery phase we are looking for people to return to normal, pre-event functioning. Within those parameters the primary question is, "What does the public need?" In addition, several topics were highlighted for the group to consider including overall wellbeing, issues specific to a CBRN incident, employment and those surrounding the community, family and home.

Overall Wellbeing Issues to be Managed

- Anxiety over future attacks is likely to be prevalent including questions such as:
  - Is it really over?
  - Who is in charge of recovery?
  - How can we make it better/make it right?
- Impact on those not immediately affected:
  - Anxiety about additional attacks.
  - Discerning if, when and how to assist others.
    - Deciding how best to augment official responders is a significant issue.
    - Challenge: How to help without getting in the way of legal responders.
- Managing expectations for assistance:
  - Need to reinforce realistic expectations and change unrealistic ones.
  - Identifying levels of need – deciding who to help first, second and third.
  - Teaching the public how to access response aid without individuals taking unfair shares of resources.

CBRN Issues to be Addressed

- Identify first the source of the problem – a CBRN attack or a natural outbreak or accident.
- Deciding the type of attack and identifying the appropriate response to ei-

ther a chemical, biological, radiological or nuclear event.

- Provide education and communications to the public to avoid unnecessary stigmatization of people/products/locations.
- Providing access to medical care.
  - Need to maximize medical resources and care in potential mass casualty situations with appropriate measures (e.g., What about triage? quarantine? relocation? decontamination? mass vaccination?).
  - Separating behavioral casualties from physical casualties to relieve pressure on hospitals and clinics.
  - Providing equitability of care.
- Mental health issues:
  - Identifying and treating post-traumatic stress disorder.
  - Making available counseling services on a large scale.
  -

Community/Family/Home Issues to be Tackled

How long a family must wait to return home will likely depend on the attack type. Thus, the level of public anxiety and psychological stress may include:

- Burial/disposal of contaminated human remains.
- Decisions about whether bodies of family and friends will be recovered in radiation zones.
- Identifying when families can return home.
- Identifying if it is safe to return.
- The perception of whether the individual and group have been treated fairly.
- The degree to which long-term evacuation or abandonment of homes, communities and businesses might be required.
- The amount of trust and confidence victims have in the government authorities.

Employment Issues to be Resolved

- When will I be able to return to work?
- Will businesses/jobs return to the community?
- Will insurance payments offset my losses?
- Will government aid help in the economic recovery effort?

Communication

Following a disaster, recovery efforts require effective, continuous communication between the government and the public. Communication from a trusted person or organization may increase the credi-

bility of the message to some sectors of the population. Ideally, the public should receive a coherent message through the media from that trusted source with government credentials, even if he or she is not technically part of the government.

Citizens need to feel secure, and the government can provide some layer of security by quickly and uniformly explaining the situation including details on which local areas are believed to be safe, an explanation of why the event happened, whether another event could be expected in the future and anything the population can do to help ensure its own safety. Specific information on water, food and environmental safety may be needed also. Further details, especially in the case of a chemical, biological, radiological or nuclear (CBRN) event, would include how the public can access medical care or other government support services without overwhelming the public health sector. The government should foster the expectation that, as a situation develops, the information will change. This will keep the general public from feeling misled as facts and information change with situation progress. Messages to the public should be adaptable and flexible as needed. To build the public's trust, responsibility must be taken for any failures on the government's part.

Information also should be given to those not directly affected by the event. In crisis situation people outside of the disaster area will want to provide financial or other assistance. Following disasters the desire to help others is often cathartic for those geographically or otherwise disconnected from the actual event. Without vectoring this desire results in multitudes of resources being wasted on accepting items such as clothing, toys and foods that cannot be distributed, as has been the case after almost every major event in the United States in the last two decades. There should be a point of contact where people who have the desire to contribute can find information on what is needed and how to help.

Another suggestion was to utilize feedback mechanisms and direct contact between the government and public to avoid a breakdown in communication. To shrink the gap a website or other online forum could be established to allow the public to post information or questions and government officials could post responses and other information. This type of feedback is currently being attempted by the Transportation Security Administration. This type of forum is not a single-source solution as it would not reach some members of the population without computer access. In addition, the site would be challenging to maintain during crisis when events are occurring quickly and both government and the public struggle to keep up with events. However, providing the public with a trusted information source where federal, state and local updates could be seen might reduce confusion and anxiety.

To further help with public resilience to a CBRN event the government's message should include optimism. In the face of a terrible event the public would benefit from a message of hope the event is survivable and life will and can return to

normal. Many of the group members pointed out the U.K. and Israel focused on the ability of the population to withstand attacks and return to a normal level of functioning instead of preventing such attacks. The knowledge that events happen seems to help the population cope with a problem. This same message should be disseminated within the United States. Another aspect would be clarifying what the population can do in the event of another attack or incident. How can the public adjust its actions or activities to mitigate the effects of another incident?

Macro/Micro Economic Issues

Businesses are as vulnerable as the public to the effects of a CBRN event. Many local business owners may question whether it is viable to reopen a business after a CBRN incident in a given area. The economic questions for commercial entities: Will an area be rebuilt? Is it safe for humans? What about the environmental effects? What is the time frame for return to an affected area? The answers to these questions will determine whether a business reopens or decides to leave the area. Quick and standardized decision making by the government is key. If an area will not be re-inhabited or it will take a long period of time to re-establish the population, a business may need to find a different location. This information is vital to a swift recovery. This issue was recognized as a "chicken and the egg equation" for a community because businesses require customers to be in business, while the public requires basic businesses in the local area– grocery stores, gas stations, banks – to conduct daily lives. In addition to businesses an affected population needs basic elements of the community to return to a normal functioning life, like churches and community organizations.

Infrastructure and Basic Needs

To identify where recovery should start the infrastructure must be restored as quickly as possible to return a community to a baseline- level of functioning. An important aspect of community infrastructure is not one at the forefront of most planning; it is the recreational areas. After Hurricane Katrina most of the public recreation space such as parks and playgrounds were destroyed and have not been rebuilt. A community needs rest and recreation places for children and adults to restore themselves and re-engage in "normal" life. The stress relief provided by sports, outdoor activities and community activities is elemental to resilience.

In the event of a CBRN incident, healthcare availability may be limited due to the nature of the incident. The group discussed the lack of health care workers in New Orleans after Hurricane Katrina. A population may be reluctant to return after a disaster if basic services are not available. In the case of pandemic illness, healthcare workers may be the first segment of the population affected. Additionally, mental health treatment will like-

ly be required for survivors of a CBRN event. Without the restoration of these basic necessities, people evacuated from a community may not come back.

As was the case with the *preparation* and *response* groups, the *recovery* group determined the public holds many misconceptions about the capabilities of the federal government. Group members felt the public perceived the government had far greater capability to move resources and people than is currently possible. In addition to promoting public optimism, a "can do" attitude, the group suggested self reliance should also be fostered. Any culture of victimization will need to be changed to help individuals realize that, in the event of a CBRN incident, he or she may need to tend to his/her own safety and care for a period of time during the recovery process. Further, non-governmental organizations must be included in recovery planning allowing integration and phasing of existing resources instead of trying to use commercial assets only after the government's resources have been exhausted.

Liability

After a disaster or crisis, commercial and private entities often supplement U.S. Government efforts. The private sector often has surge capacity the government does not, and can effectively collect and distribute materiel through existing supply systems. The group discussed Wal-Mart as an example of a large retail entity with enormous potential for assistance given existing shipping and transportation network, location in small communities across the nation, and desire to help in times of need. During the recovery phase of a disaster Wal-Mart trucks and shipping system could be utilized to move supplies and resources to and from the affected region. After Hurricane Katrina, the unofficial use of established commercial networks augments many commercial establishments in New Orleans. The major hurdle for the private sector is the issue of later compensation and liability. Who will be legally accountable if persons are injured in the recovery effort? What if trucking capacity is needed for removal of human remains? Is Wal-Mart or another commercial entity required to assist? If they assist, can they later be compensated? Integrating commercial industries into the recovery effort would utilize more resources closer to an incident site much like the Wal-Mart example, however, the government must provide the necessary compensation and liability coverage, and require the participation of the insurance industry in the United States. It is likely this issue would have to be resolved through legislation.

Summary

The recovery group determined many of the public's needs are the same in *recovery* as in the previous two phases. The greatest challenge is it is impossible to determine in advance how long the recovery period will last or how many resources will be required to assist a popu-

lation in efforts to recover from a WMD attack. As during any phase of a CBRN event communication between layers of government and between government and the public is elemental in effectively addressing the crisis and speeding the recovery process. An informed public will more likely understand some mistakes by the government if the local institutions are involved in the planning and decision-making process. Local authorities that have trained and exercised using the National Response Plan as a guide are more likely to show a positive attitude and achieve progress at the individual and community level.

The key to recovery and even renewal of a community after a CBRN event is the interdependent role among the citizens, government and the business organization sectors. Each needs the other working at his own level in the community to survive a CBRN disaster event. Federal and state authorities need to determine how they can best support local officials, both in preparing communities through education and in restoring local areas after an event has occurred. If this mutually supportive relationship can be established and fostered, communities and individuals are more likely to be resilient. A single individual or community cannot recover alone with the just-in-time nature of business today. Planning is essential to recovery, and lessons learned in recovery need to be fed back into the planning process for the next crisis to come.

RECOMMENDATIONS AND CONCLUSION

This study has defined resilience as the combination of a positive individual perspective, strong social connectedness, and effective problem-solving skills, all of which form an individual's ability to cope with traumatic events such as a CBRN attack. Several characteristics have been identified as common in resilient people, specifically an individual needs optimism, self-efficacy, mastery and coherence to achieve resiliency. In addition to the individual characteristics of resilience, two other factors help a person to be more resilient: having social ties and the capability to implement effective coping strategies. The ability to ask for and receive support from social groups such as family, friends, church or community contributes to resiliency against stress.

In addition, supporting others is one way of seeing the efficacy of your action and beginning to take at least a small step toward control over what may appear to be an overwhelming situation. The final factor, coping strategies, form around the ability to breaking large and potentially overwhelming problems into more doable tasks so progress can be made, and taking breaks from the crisis to rest or refocus energy.

Given the findings of the case studies and the outcome of the workshop, certain conclusions can be drawn about public resilience, specifically the more prepared a population is to manage a crisis, the more stress resilient it will be. This finding has been proven in studies following disasters. A second assumption is regardless of how hard the government tries to convince people of the necessity of preparedness, there will be some who are unwilling or unable to do so. This fact should not deter the government from encouraging preparation, as the more citizens who are prepared, the better the response of the whole can be.

The most critical finding uncovered from the case studies and workshop is contrary to common perception, there is no significant evidence to suggest individuals or communities are prone to panic in a CBRN or CBRN-related event. In the incidents examined for this study, and in the opinions of most workshop participants, people have typically responded to such events by trying to care for themselves and loved ones and by following the advice of authorities as they understood it. This positive, responsive behavior can at times still create challenges in response and recovery, such as when people were quick to report anything looking like suspicious white powder during and after the 2001 anthrax attacks. Or, when people immediately seek medical help when they have been, or believe they may have been exposed to a chemical as was the case in Tokyo following the 1995 sarin attacks. Despite these challenges, there is no evidence of large-scale irrational or counter-

productive behavior in any of the cases reviewed for this report.[171] This strongly suggests that, rather than being looked at as a threat or problem to be managed in a crisis, the public should be seen as a potential partner in meeting the challenges of a community or of the nation following CBRN event.

The recommendations of this report will focus on two aspects of improving this potential partnership between the government and the people to improve resilience to a CBRN incident. The first way to improve this partnership is to encourage individuals and communities to better prepare to serve as a partner in times of crisis. This includes supporting efforts to increase personal, family and community preparedness for the most likely threats in their area. The second method to enhance this partnership is to build the capacity of relevant military and government organizations to see the public as a partner and better meet the need for information and appropriate services following an attack.

Perhaps the largest barrier to greater resilience in the response to a CBRN event is the gap between government response capabilities and the expectations the public has for government action during and following a crisis. Broadly speaking, the American public expects their government to provide instructions and any equipment that might be necessary during an event, provide information as to who has been affected by an attack, and to provide medications and healthcare to those in need. Also, citizens expect the government to prevent future attacks and establish conditions so life can return to normal.

This study highlighted several cases where the United States and other governments failed in one or more of those expectations. While the ability to meet every public expectation is too lofty a goal, changing perceptions of the government's role as well as that of each citizen and community is likely to result in better harmony between public expectations and government capability. The goal instead should be to create an informed public that understands its role in preparation for, response to, and recovery from a CBRN event or other serious crisis. This basic knowledge can create an understanding of issues likely to raise and encourage proper action at the local level.

A 1994 University of Michigan poll found only 21 percent of people polled agreed they could trust the federal government to do the right thing most of the time. Fourteen years later that number is not likely to increase given the unpopularity of the Iraq war, the Hurricane Katrina debacle and the economic decline. Ironically, however, most citizens believe the onus is on the government to prepare for and respond to a major disaster or crisis. In light of these assumptions and the agreed requirements for public resilience,

[171] One could argue that 70,000 citizens of New Orleans chose not to listen to their government and evacuate prior to landfall of Hurricane Katrina. However, the reasons included unclear government direction prior to the "mandatory" call, as well as the delay that left people without immediate resources at the mercy of government action.

this report recommends the U.S. Government take the following actions:

1. Lead with authority, responsibility and honesty.
2. Improve communication between and within government entities.
3. Prepare and inform the public.
4. Improve public health infrastructure and resources.
5. Capitalize on existing local resources.

Lead with Authority, Responsibility and Honesty

While it sounds like common sense the federal government needs to lead the nation during times of crisis, there has often been confusion as to which agency has the lead to do what during and after an event. Lack of a coherent communication plan and clear lines of authority were painfully apparent during both the anthrax attacks and the response to Hurricane Katrina. In addition to overlapping authorities at the national level, Hurricane Katrina proved the U.S. Government could not effectively coordinate federal, state and local efforts as quickly and efficiently as the crisis required.

If one key to resilience is a sense of efficacy during a crisis, it is critical the authorities know which agency and personnel will be communicating vital information to the public and the public knows to whom it should listen. Although the National Response Framework provides guidelines for public communication in the External Affairs Emergency Support Function, it does not ensure clear, honest and consistent communication with the public from one source.

Unclear communication between the government and the people during a CBRN event will likely amplify negative characteristics including distrust of the government, miscommunication and disruptive behavior. People often assume the government must know what to do in a crisis. If clear answers are not provided, or if the authorities are unable to honestly communicate the limits of their knowledge, people will have a much more difficult time responding to and recovering from a disaster. The public needs to feel the government has an effective to help resolve the crisis.

The reason for the inclusion of the Tylenol poisoning case was the astounding ability of Johnson and Johnson to regain public trust and thereby increase market share following the tragic events of 1982. Important lessons can be learned from J&J's experience, including the fact J&J took responsibility for the crisis and the company responded to the public with honesty and clarity. No excuses were made, even though it was first thought the problem had occurred during manufacturing. Even after the company discovered it was not to blame, it did not slow its actions to prevent a repeat occurrence. Instead J&J acted swiftly, costing the company millions, but in the end, that loss was easily overcome within a few years. The last lesson of the Tylenol case was to use a "reservoir of good will" wisely. Americans trusted a

product and were reassured by the rapid response of a well-known entity. As a crisis unfolds it would be wise to take stock of where good will lies and how that can be maximized without draining the "reservoir" of public trust.

The aftermath of Hurricane Katrina provides the starkest example of how the failure of the government to lead can cause misery and hardship for its citizens. While the onus of decision-making was at the local level for evacuation and planning, the federal government must assume the task of communicating effectively with the public, providing trusted agents to share information and to direct the people to take proper action.

Improve Communication Between and Within Government Entities (Between Agencies & Federal/State/Local)

Many government agencies and organizations rely on others for accurate and timely information, especially in a situation involving public health. During the anthrax attacks in 2001, agencies were challenged to manage information being released to the public. Localities such as Washington, D.C. were under pressure from postal workers to make a decision about the closing of the Brentwood Postal Facility, as well as to determine who should receive treatment. The public health statements from CDC and HHS were sometimes confusing or vague, raising concerns over fairness and increasing confusion regarding treatment options.

While communication with the public will remain one of the greatest challenges for the government, the President should encourage all government entities (legislative, executive, and judicial) to have one message, and if possible, one messenger. This will likely require substantial cooperation preceding a crisis. A CBRN event is so novel a concept for most people that anxiety is expected to peak, requiring clear instructions to the public in a timely fashion. In one study, five years after the September 11th attacks it was reported that over 65 percent of the respondents did not believe the U.S. Government had adequately explained what was expected of citizens following a WMD event.[172]

Given the likely magnitude of a CBRN event, public trust in government statements and actions is essential. Mistrust leads to counterproductive activities such as refusing to be vaccinated, or hoarding medicine against a vague threat. During Hurricane Katrina the government's failure to communicate clear authoritative instructions to its citizens led to mass confusion and caused many to make their own decisions about evacuation and shelter. As previously stated, no individual or government agency has claimed responsibility for directing

[172] James N. Breckenridge and Zimbardo, Philip, "The Political Psychology of Terrorism Five Years after September 11," Paper presented at the annual meeting of the International Society of Political Psychology, Classical Chinese Garden, Portland, Oregon USA, (July 4, 2007), http://www.allacademic.com/meta/p204617_index.html.

people to the Convention Center – a location that had no supplies, authorities or plan for evacuation.

Not all citizens will conform, but clarity and uniformity will go a long way in easing confusion and chaos. In order to encourage public willingness to listen and follow government instructions, the use of trusted agents is recommended. As with the anthrax case, the situation following an event is likely to be unpredictable, requiring different actions for varying situations. Without clarity and trust, this fluidity will increase confusion and misdirection.

Prepare and Inform the Public (Before, During, and After)

Creating the environment needed for self-efficacy and mastery of events during a crisis requires education before the event. General awareness must be raised regarding the risks and proper response to protect personal health and welfare because the government may not be able to respond as quickly as the public might expect. The average response time for the federal government to a disaster is 72 hours. Those first three days may be vital to community or individual survival and recovery. Thus, it is incumbent on citizens and local communities act prior to an attack to be able to respond quickly when an attack does occur. Interestingly, one recent study suggested people were aware they were unprepared. When asked whether they thought their fellow citizens were prepared for a major terrorist event, over 72 percent did not believe they were.[173]

Even though lacking, generally people tend to be better prepared at home than in the workplace. Frequently, workplaces intend to supply their shelters locally using the just-in-time concept, which can prove deadly for preparations. Large businesses tend to prepare better than do small ones, which is problematic, because the small businesses are in direct contact with more people in the local community.

To make the most of their own resources, citizens need to know what is happening and what they can to do to help themselves and their families. One suggestion for encouraging individual preparedness is to create a public awareness campaign. One of the most successful public service campaigns in U.S. history began in 1944 when Smokey Bear first said, "Only You Can Prevent Forest Fires." In a recent study by the Ad Council who created Smokey, 95 percent of the people surveyed could finish the sentence when given the first words. The campaign was developed to educate the public on forest fire prevention. At the time, lumber was considered a strategic resource for the war effort – a resource threatened by accidental fires that accounted for nine out of 10 forest fires, which were destroying millions of acres every year.[174] Today Smokey has his

[173] James N. Breckenridge and Philip Zimbardo, (July 4, 2007).

[174] The Ad Council, Forest Fire Prevention - Smokey Bear (1944-Present),

own website with information and resources for educators, parents and children.

The involvement of America's youth was seen by many workshop participants as crucial to increasing knowledge and improving overall resilience. Children will force the issue at home when their interest in a topic has been piqued. By providing steps easily understood and implemented, children can be one of the most significant forces for change in attitude surrounding personal and family responsibility to be prepared for a natural disaster or WMD event. The Department of Homeland Security and FEMA have recognized this fact, including "Ready Kids" as one of three primary focus groups for preparedness information.

In addition, the use of sporting organizations and events, adult and teen certification programs, business involvement, and even patriotic approaches such as "I support our National Guard troops so they don't need to support me," should be considered as viable approaches to improving citizen preparedness.

A campaign should focus on the most significant threat to that community and plan in detail for the event that all the community can imagine. Thus, each community is threatened by some natural disaster whether it is flood, fire, earthquake, tornado or hurricane. Increasing citizen preparedness for a natural disaster can easily transform into preparedness for a CBRN event, if the public knowledge base exists. Citizens need to distinguish between types of WMD events and have an understanding that each requires a different response. This information is provided by the U.S. Government on a preparedness website called Ready.gov. However, it is lost in a myriad of information that is likely, when taken as a whole, to overwhelm citizens.[175] The results of the preparedness campaign have been lack-luster, perhaps owing to the lack of a catastrophe that forms a relation in citizens' minds between their own well-being and preparedness for an event that could affect their lives directly.

At the local level communities are reaching out to citizens to encourage preparedness for natural disasters through localized versions of the federal program. The "Ready Houston" Campaign is an excellent example of a focused effort for hurricane preparedness, as are numerous community and faith-based initiatives to increase collaboration among people and organizations at the local level.

As previously mentioned, even with an effective preparedness campaign, not all citizens will be aware and prepared. While preparedness is a vital aspect of public resilience, it does not address all phases of a crisis. The concept of preparedness needs to be expanded to encourage longer-term views should citizens have to endure a lengthy crisis, whether CBRN-related or a natural disaster on the

http://www.adcouncil.org/default.aspx?id=129, (April 1, 2008).

[175] One source titled, "Are You Ready: An In-depth Guide to Citizen Preparedness," is helpful. However, it is 204 pages in length and not prominently displayed, http://www.fema.gov/areyouready/recovering_from_disaster.shtm

scale of Hurricane Katrina. The Government must be ready and able to quickly give instructions to the public. This information must be clear and concise and indicate the desired action. One of the criticisms of government announcements regarding Hurricane Katrina is that localities in Louisiana used different terms such as "precautionary" evacuation, "voluntary" evacuation, "recommended" evacuation, "highly recommended" evacuation, and "highly suggested" evacuation.[176] While there has been criticism of the national threat level system, it can be used as an example of a general tool to help the public understand the situation. The challenge is to tie actions to the threat, increasing the clarity of desired action.[177]

In the United Kingdom, preparedness is viewed amid a broader spectrum of resilience. But resilience is not simply what occurs following an event or crisis, but rather a constant state. By integrating elements of preparedness into daily life, resilience is normalized. Residents have access to several helpful websites to direct information that can be used daily or during an event. Information includes organizational contacts, both public and private (from Red Cross to government agencies), as well as pertinent information such as weather and traffic. There is a general national-level website, regional websites with information specific to threats and responses of the local area, and local resilience forums, led by local representatives.[178] The goal of the local forums is to provide community risk assessments and help formulate location-specific responses.

Technology is one important tool to accomplish this task. The spread of the SARS virus in China provides an illustrative example. As the outbreak worsened, public anxiety grew as did rumors of infections and quarantines. While official information was sparse, citizens took it upon themselves to share information by sending text messages on their mobile

[176] Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, U.S. House of Representatives, (2006), p. 108.

[177] Many of the recommendations in this paper are consistent with a large body of research on risk perception and risk communication. Although a full review of this field is not within the scope of this work, for an overview of these topics see Fischoff, Baruch, "Risk perception and communication." In R. Detels, R. Beaglehole, M.A. Lansang, and M. Gulliford (Eds.), *Oxford Textbook of Public Health, Fifth Edition* Chapter 8.9, (Oxford: Oxford University Press, 2009). Other researchers in this field that are relevant to resilience include Paul Slovic and Peter Sandman.

[178] London has six local forums. According to the London website, "The Local Resilience Forums are chaired by local authority chief executives. Membership includes representatives from the emergency services, local authorities, government agencies, health, utilities, voluntary organizations, businesses and the military. One key area of work undertaken by LRFs is the identification and assessment of local risks that could cause an emergency. A wide variety of risks are assessed including flooding, pandemic flu and utility failures. Once identified, the chance of a risk occurring and the possible consequences are assessed, and the risk is given a score. All of this information is collated to produce a Community Risk Register (CRR). The CRR is then used as a tool to effectively monitor and manage risks, and to inform work priorities for emergency planning teams in your area," http://www.londonfire.gov.uk/LocalResilienceForums. asp.

phones, quickly spreading the news of disease outbreaks. In response, telecommunication companies began to offer innovative tools to assist their clients in preventing contagion. One Hong Kong telecommunication carrier introduced an SMS tool that showed areas where infections had been confirmed to help citizens avoid those areas. The government quickly saw the capability as an asset and sent out an estimated 6 million SMS messages to quell a rumor Hong Kong would be quarantined. Use of push technologies such as SMS, smart phone applications, email and On-Star capabilities is vital to sharing time-sensitive information with the public. Technology will not provide the information silver bullet. However, those without access to electronic communications are likely to have links to people who do, thus, bringing the focus back to community involvement.

Yet another challenge during an ongoing crisis is what is not known. Political leaders hesitate to admit a lack of knowledge, but studies have shown people are capable of handling uncertain and unsettling news provided it is given candidly. Thus, it is best to share priorities and the risks of government actions. Admit mistakes and elucidate options, including associated risks. More information, not less, is likely to illicit the desired outcome. One expert explained, "Don't withhold information, because people will think you know more. Tell the truth – don't manage the truth. The key is trust."[179]

The ability of the government to manage the expectations of its public is vital to recovery from any type of crisis. When people expect the government to take care of them, they are less likely to take steps to care for themselves. During the workshop, participants discussed methods for changing – not decreasing expectations. Therein lies the role of the media.

In the 24/7 news cycle it is easy for the vital information to be lost when competing for the public attention with engaging stories of triumph and loss – or any ratings-winning story. The government must work with the media to highlight essential information during and following a crisis. The current trend toward sensationalism could greatly hamper a government's ability to lead its population through a crisis. The government has the opportunity to frame how the public perceives the situation, but it must work together with the media to do it. This includes discouraging sound-bites and armchair quarterbacks following an event.

The government needs to develop scripts in advance of a CBRN event for acknowledged experts to follow. These universally accepted spokesmen should be known to the media. The creation of a speaker's bureau or list will greatly reduce public anxiety when people known to the community provide clear, concise information and directions. There are precedents for this concept – former U.S. Surgeon General C. Everett Koop's messages related to healthcare, George H.W. Bush and Bill Clinton's joint appeal following Hurricane Katrina, as well as the

[179] John Barry, "Pandemic Influenza: Past, Present and Future," CDC Workshop, (Oct. 7, 2006), p. 8.

numerous celebrities who have spurred the public into action for various causes.

In order to get communities involved, businesses need to be engaged in preparedness efforts. The government could provide incentives through tax credits or create a certification process that provides preparedness compliance awards. An example of this process is the *Energy Star* program the government uses to promote the manufacturing and use of energy efficient consumer products. Through this program the government offered consumers, home and commercial builders, and appliance manufacturers tax credits for energy efficient products. Consumers win both through the tax credit and lower energy costs.

An alternative method for increasing public preparedness is to encourage states and localities to hold tax-free shopping for preparedness items. Preparedness kits could be offered to provide basic medical necessities, food and water purifiers, and clear instructions of what to do in case of a natural disaster or CBRN event. Much like weather radios, preparedness kits could be offered through a variety of businesses.

Improve Public Health Infrastructure and Resources

Medical resources are perhaps the most crucial resource following a CBRN event. Given the dearth of knowledge surrounding WMD, overcoming ignorance is likely to be a major challenge in managing an event. During the 1918 influenza pandemic, the war and ignorance of the medical facts were the two primary factors in determining government actions at the federal, state and local levels. Many leaders denied an epidemic. Only a few brave public health officials took preventative measures, while most stood by until illness brought their constituency to its knees. The lack of leadership, the censorship of the media, and the dearth of understanding severely tested the public's ability to trust its elected leaders. It left the population almost to its own devices in determining the most effective preventative measures. Following a WMD event, the public will need clear and decisive directions on what to do and who needs to seek medical care.

There are likely to be many behavioral casualties or those who are uncertain of their contamination or infection. That fact denotes the need for large areas for people who want or need to be observed to congregate. Sporting or convention venues should be considered, as well as the need for family visitation and transport of the sick to medical facilities. Given the possibility of a stigma being attached to those tested for contamination, a documentation process would be advantageous. Persons not exposed could receive a certificate of health, thereby reducing the stigma.

The need for medical and support personnel could be overwhelming, as it was in 1918. The United States needs to identify and create a database of reserves should the need arise. These could include retired military, firefighters, policemen, as well as medical personnel.

Also, non-clinical nurses should be accessible. Texas was an example of a state with a database listing 40,000 such nurses available when surge capacity is required. This need is not discretionary. It is a strategic necessity that should receive priority as it has value in responding to almost any crisis situation.

In order to plan for a crisis, some assumptions have to be made. However, in a CBRN incident, predicting outcomes with little empirical evidence will challenge the public's attention and patience. During the anthrax attacks, medical assumptions led to misdiagnoses and improper directions to the public. Public health authorities learned that much of the contagion assumptions made from available historical data did not hold up in the 2001 cases. Thus, when assumptions are made, they need to be made transparent to the public. Let the public know guidance will change depending on the situation, and they should not assume the initial guidance will still be correct and timely at the end of the crisis.

Capitalize on Existing Local Resources

Two specific social issues during the 1918 influenza epidemic are relevant today. First, unlike the early 1900s, families are now more dispersed and the lack of local familial and immediate social support may have an adverse affect on personal resilience. In the early 1900s, generations of families lived together under one roof (or at least nearby). Demographics have changed. Today families are smaller and often geographically dispersed which will challenge the ability of a person's social network to come to their aid, and could force many to rely on whatever government services are available. Secondly, in 1918, private philanthropic groups literally saved society through their organizing efforts. However, these local groups do not exist in the same form they did in 1918 and the neighborhood sense of community is likely to be less in many areas.

That is not necessarily true of churches and religious organizations, which often play a significant role in the local community, especially after a disaster. Following landfall of Hurricane Katrina, local non-profit organizations housed and cared for as many evacuees as the Red Cross, although many did not receive re-imbursement or government support after the crisis had ended. The government needs to engage these non-traditional sources of community support. They have connectivity to the population and can communicate to them prior to and even during an event. For this reason, these private organizations should also be involved in local planning. Their adaptability and responsiveness demonstrate the strength of their local expertise, relationships and capability to reach and serve vulnerable populations and communities.[180] Local community organizations may be best positioned and capable of bridging the gap between federal and state governments and their citizens.

[180] The Aspen Institute, 2006, 9.

Unfortunately the federal government does not always have the foresight to include local entities in planning. One example is the 2005 National Strategy for Pandemic Influenza, in which local and states have the lead in controlling the spread of contamination and disease, but had little to no role in creating the national response plan. This lack of coordination means the plan is based on assumptions regarding local and state capabilities that may not hold up during an event.

Conclusion

In the United Kingdom, demonstration of public resilience is part of British history. British citizens survived the London Blitz during the 1940s and repeated IRA bombings in the decades that followed. After the 2005 subway attacks, Londoners rode "the tube" again the next day. In Israel years of bombings, terrorism and war have forced Israeli citizens to prepare for and recover from the worst circumstances.[181] It is uncertain whether American citizens will ever be as resilient without similar crisis experiences. However, given our history of successful public campaigns and community service, it is clear we can improve upon American public preparedness and resilience.[182] In order to accomplish this goal, the government needs to change its role from primary care provider to a more broad-based supporter of local and community resilience efforts. Focusing on personal preparedness at an early age, beginning at school, would go a long way in preparing citizens to cope successfully with future crises and disasters.

Honesty and clarity in government communication creates public trust. Public trust is a requirement for reasonable, orderly response to a traumatic incident such as a CBRN event. Leadership by the government will increase understanding of the situation and feelings of manageability of crisis, all of which are requirements for personal resilience.

In looking back at major catastrophic incidents around the world, experts have noted the closer a person was to the crisis, the more realistic and reasonable the individual's behavior. Preparation for disasters, education, training and exercises, both physical and mental, can promote confidence in the public they can cope with what comes. Advance preparation can also educate citizens to a variety of possible CBRN or other crises and, thus, lessen the number of unexpected surprises encountered. During a crisis, clear, consis-

[181] Further information on the focus on resilience in the UK can be found at the official government site: http://www.ukresilience.gov.uk/. The USAF Counterproliferation Center has conducted a comparison of Israeli and American homeland security efforts which begins to address this resilience issue. See Larsen and Pravacek, Comparative US-Israeli Homeland Security, (2006), http://www.au.af.mil/au/awc/awcgate/cpc-pubs/larsen3.pdf

[182] One study indicated that when asked a majority of respondents stated (22% agreed and 17.5% strongly agreed) they were "personally resilient," while 28% agreed and 18% strongly agreed they "belonged to a resilient community." See James N. Breckenridge and Philip Zimbardo, (July 4, 2007).

tent information from a reliable source is enormously helpful to those coping with a crisis or disaster. A prepared, informed and involved public is a resilient one.