n a Miami hotel auditorium two years ago, medical laboratory scientists, managers, supervisors, and directors sat through a daylong program, while laboratory experts presented their hands-on adventures with various disaster scenarios. As each speaker would complete his presentation, audience members would whisper among themselves: “We never thought of that,” “We don’t have that on our list,” or “How could we manage if that happened to us?” Disasters ranging from a SARS outbreak, to a power and water outage in a large city, to setting up a lab in the Houston Astrodome were all part of a day’s lessons to many who listened and realized how utterly unprepared they truly were for most disasters that might befall them.

The time is over for personal and/or professional wallowing in the comfortable reverie that “It won’t happen to me” or “It won’t happen here.” As we write, Hurricane Dolly has hustled across Texas and Mexico, dumping from eight up to 20 inches of torrential rain, threatening levees, flooding streets, causing structural damage, and trashing scores of power poles. Victims of the recent Midwestern floods who had known about potential levee problems for years probably have better ideas today about what it would have taken for them to be thoroughly prepared before the flood.

Yet, who among the 725+ people in Winfield, MO, would ever have suspected the sturdy levee that they had built could be compromised by an animal weighing no more than five pounds? A humble muskrat burrowing for food or building a den dug the hole that destroyed the levee that flooded Missouri farmland. They likely said, “We never thought of muskrats,” or “We don’t have muskrats on our list!” One Winfield resident, however, reportedly peered through binoculars at water pouring out of the 30-foot-wide gap in the levee and asked, “With all the guns in this county, couldn’t we kill a muskrat?”

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A litany of American disasters

Even muskrats and ruptured levees are tame compared to other natural and man-made disasters folks around the world have suffered in the past 10 to 15 years. We in the United States of America have met up with explicitly planned domestic and foreign terrorist attacks, as well as natural disasters in the form of hurricanes and tornadoes, and fires and floods that have swept across our country with seeming regularity. In the last 15 years, there have been disasters of every kind around our nation that still live fresh in our collective American memory:

- The 1993 World Trade Center (WTC) bombing when a bomb was detonated below Tower One. Terrorists intended to knock it into Tower Two in order to bring down both and kill thousands of people. Instead, six people lost their lives and 1,042 were injured.
- The 1994 Northridge, CA, earthquake had a magnitude of 6.7, but the ground acceleration was the highest ever instrumentally recorded in an urban area in North America; 72 people died and over 12,000 were injured. The earthquake — one of the costliest natural disasters in U.S. history — caused an estimated $12.5 billion in damages.
- The 1995 Oklahoma City bombing was a domestic terrorist attack at the Alfred P. Murrah Federal Building that claimed 168 lives and left 800 people injured.
- In 2001, the 9/11 coordinated suicide attacks by al-Qaeda pilot operatives upon the United States brought four commercial passenger jet airliners into the WTC, the Pentagon, and a Shanksville, PA, field. Excluding the 19 hijackers, 2,973 people from over 90 countries died as an immediate result with another 24 presumed dead. The death of at least a civilian from lung disease was ruled by a medical examiner to be a result of exposure to dust from the WTC’s collapse. Deaths among numerous rescue and recovery workers exposed to airborne contaminants, it is suggested, are also attributable to the 9/11 disaster.
- In 2008, while the Midwest was flooding, wildfires in California continued raging long after a massive lighting storm ignited them June 21. About 2,010 separate blazes burned statewide, ravaging nearly 1,400 square miles.

Global tragedies affect us all

And then there are the monstrous global catastrophes of historical proportions that cannot be forgotten, such as:

- The 2004 Great Sumatra-Andaman undersea earthquake on Dec. 26, with a magnitude between 9.1 and 9.3 with its epicenter off Sumatra’s west coast, triggered devastating tsunamis that inundated coastal communities around the Indian Ocean with 100-foot-high waves. This second largest earthquake ever recorded on a seismograph caused the entire planet to vibrate and triggered other earthquakes as far away as Alaska. In this, one of the deadliest natural disasters in history, more than 225,000 people in 11 countries were killed.
- The May 2008 Myranmar cyclone killed more than 84,537 people throughout large swaths of the Irrawaddy delta and the Yangon region and caused damage in the range of $4 billion. At least 53,836 people are still missing and presumed dead.
- The May 2008 Sichuan earthquake’s official figures state that 69,197 are confirmed dead, and 374,176 injured, with 18,340 listed as missing. The earthquake left about 4.8 million people homeless, though the number could be as high as 11 million.
- Could something like these disasters happen here? Forty years ago, in March 1964, the area of Prince William Sound in southeastern Alaska was struck by a magnitude 9.2 earthquake, the largest ever recorded in North America. Many of the southeast Alaskan coastal communities along Prince William Sound and Kodiak Island were completely wiped out. Tsunami waves killed 119 people and caused approximately $300 to $400 million in damages to Alaska alone.

What can we do?

After reviewing the presentations from the 2008 Executive War College’s disaster-preparedness session, we contacted several of the speakers for a fresh view of what kind of plan a laboratory could have in light of the array of comments we heard among their audience members. Here is each one’s three “top tips” for planning for natural and man-made disasters. [We will hear from Speakers Susan Poutanen, MD, Sylvia Waller, Donald P. Sharar, and John Kane in a subsequent related disaster-preparedness article.]

Thomas Williams, MD, medical director of Pathology at Methodist Hospital in Omaha, NE, and longtime amateur radio or “ham” operator: “You can act. If you are not actively involved or truly planning, get started. CLSI X4-R, “Planning for Challenges to Laboratory Operations During a Disaster, A Report” is intended as a “jump start” document. [At the time of this writing, CLSI is working to begin revision of the X4-R Report, intending to reissue it in the future as a consensus document.] Preparedness planning is basically interdisciplinary process planning. Recruit a good team, know the plans you do or do not have, and build better ones. This is usually a process of progressive gap-filling and detail development. Then integrate. Laboratory plans need to mesh with hospital and, potentially, even community plans. Involvement with and knowledge of your hospital’s and community’s plans and people will help you develop realistic plans and expand your response team beyond laboratory walls.”

Williams’ Tip 1: Continuity of operations from a damaged facility probably presents the greatest natural-disaster-related challenge to laboratory operators, as experiences reported from, but not limited to, Hurricane Katrina, attest. The difficulties and solutions these heroes describe constitute good content knowledge for preparedness planners.

Williams’ Tip 2: Emergency power in most hospitals is built “to code” (National Fire Protection Association) to support short-term operations and facility evacuation. Generator power may be woefully insufficient to sustain “usual” overall patient care and laboratory operations beyond these limited goals. Knowing what areas, sources, and devices — including ventilation and air conditioning — are, or are not, supplied under true power-line loss conditions is essential to contingency planning.

Williams’ Tip 3: A good community mass-fatality plan can be integrated with individual hospital plans, to relieve...
each hospital and/or pathology department from the burden of extended storage and management of unusual numbers of deceased persons, and associated family assistance and other challenges — a tremendous benefit in mass-casualty incidents (such as pandemic influenza). This is an example of an unusual extension of a community mass-fatality plan but one illustrative of the rewards of interdisciplinary planning.

William Neeley, MD, FCAP, DABCC, medical director of the Detroit Medical Center University Laboratories: “I have carefully thought about our disaster when we lost electrical power for an extended time. In addition, I have thought about disasters at other sites. I have come up with a list of the three biggest ‘show stoppers’ from my point of view.”

Neeley’s Tip 1: During our major disaster — the loss of both electrical power and water — we had line surges that destroyed a $3,600 power supply on one of our instruments. We did not have enough emergency power to handle all of our instruments. Now, we have installed a large UPS or uninterrupted power supply for all major instruments that allows us to sensibly turn them off before all power is lost. The UPS system prevents significant damage to our instruments that could occur when power is cycled on and off, which produces power surges.

Neeley’s Tip 2: Air conditioning, while highly desirable is extremely expensive, for both the laboratory and computer room. Without air conditioning, however, neither the major lab instruments nor the lab information system computers can function properly. We had to find some sort of temperature control. We did have emergency power and UPS systems for our computers, but these days, most buildings have sealed windows that cannot be opened, and the area in which they were housed did not have enough generated power for air conditioning. Today, the back-up power from our generators is adequate for the computer room and its air conditioners.

Neeley’s Tip 3: Most of our major laboratory instruments require large quantities of deionized water to function. The loss of our water source threatened to shut down most of our major instruments. A huge problem was the loss of a water source for our immunochemistry analyzers and special chemistry analyzers. Fortunately, our main chemistry instruments did not require water. I suggest you either have a back-up water supply or use instruments that do not require large amounts of deionized water.

Francis R. Rodwig, Jr., MD, MPH, chairman of the Department of Pathology and Laboratory Medicine and associate medical director for Hospital-Based Specialties at Ochsner Health System in New Orleans: “We used both of our bloodmobiles to transport non-critical patients to other facilities, beginning the day following the Hurricane Katrina storm.”

Rodwig’s Tip 1: Review your disaster plan at least annually — more if you are in an area with some risk. Extend your contingencies: If our equipment fails, we make arrangements with a nearby hospital. Of course, after Hurricane Katrina, we did not have other hospitals or even roads or airports for some time. Your plan should include communication plans and supplies, and some preparedness training.

Rodwig’s Tip 2: Review your equipment — what would work under adverse conditions? Use this information as a part of your next decisions on what to purchase.

Rodwig’s Tip 3: Value your relationship with your vendors. Our vendors were lifesavers in getting us back to full strength after our disaster.

Gary Assarian, DO, director of Outreach Laboratory Services at Henry Ford Hospital in Detroit, and Medical Director of Joint Venture Hospital Laboratories in Southfield, MI, offers the following suggestions for disaster planning: “Do not assume anything. Test the plan. You have the discipline it takes to do all this.”

Assarian’s Tip 1: No matter what plan you have, you cannot make it so detailed that it will address all contingencies. Disaster preparedness specific for one issue or another is misguided. Establish levels of communication and how that communication will be maintained. Your usual means of communication may not be available; therefore, adapt and adopt different means of communication.

Assarian’s Tip 2: In disaster-recovery plan, foremost is a chain-of-command and a list of the responsibilities for each person. In our plan, we had the hospital administrator act as the fulcrum for all issues; every issue came to him, and he swiftly and diligently delegated every issue to others. This

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works smoothly because a small number of people know what is going on in a variety of places, and they set the priorities. Those priorities can change when the need may be to find out where to get extra fuel, or when the air conditioning fails and testing has to be sent to another facility.

**Assarian’s Tip 3:** Lab leadership’s job is to declare that a disaster plan has been initiated and communicate that to all clients and the hospital leadership. The lab leaders should detail how the plan is to be implemented. Establish regular lines of communication, both internally and externally. Establish direct contact with key people. Be sure IT is on board. Do a “fan” calling to see if you have everyone’s phone number and contact information, perhaps even e-mail addresses. Remember what a lab is supposed to do: deliver timely results. Two things determine that — the volume and getting the work done. Go to a limited-menu mode so limited staff can focus on keeping just a few instruments going. Do not overburden one part of the system. Reduce requests; use STAT-only mode. The plan must explain how the work could be done elsewhere; that includes transportation and reporting results.

**Footnote**

One of the most valuable lessons learned from 9/11 was that of preparation. British-born Cyril Richard Rescorla, a retired U.S. Army officer who had also served as a soldier in Rhodesia and as an officer in VietNam, was employed by Morgan Stanley as a security officer prior to the first WTC bombing in 1993. From that point forward, Rescorla did not endear himself to the investment group’s executives and managers when he insisted that employees regularly practice evacuation drills.

On the morning of 9/11, he implemented the evacuation of 2,700 well-practiced Morgan Stanley employees from Tower Two immediately upon learning of the attack on Tower One. Against the advice of WTC building officials, he led these and also another 1,000 employees in Tower Five to safety. Out of all of the firm’s many employees, six lost their lives; these included Rescorla himself and three of his security officers. His remains were never recovered, but his disaster preparation made him a hero. A biography and a documentary, along with other honors, have been bestowed upon Rescorla posthumously, and signatures are being collected on a petition to award him a posthumous Presidential Medal of Freedom. The living tribute that marks Rescorla’s focus on disaster preparation, however, is the survivors whom he had trained.

As the world grows more complicated, and as we rely more on technology to assist us in performing all sorts of tasks at home, at work, and at play, we need only scan the headlines to find that somewhere at this very moment, a community of people is suffering from an electrical brown-out or black-out; storms have flooded roads and/or subways; or an earthquake, a tsunami, a cyclone, a tornado, a hurricane, or a wildfire has struck with ferocity; or evildoers have perpetrated a deadly plot on unsuspecting victims; or an epidemic/a pandemic has devastated the world at large. In these and other situations, the our best bet is to try to make an “all-hazards” checklist, determine a plan for each reasonable disaster situation, assemble the materiel needed to carry out the plans, and practice our plan until we are skilled at its implementation.