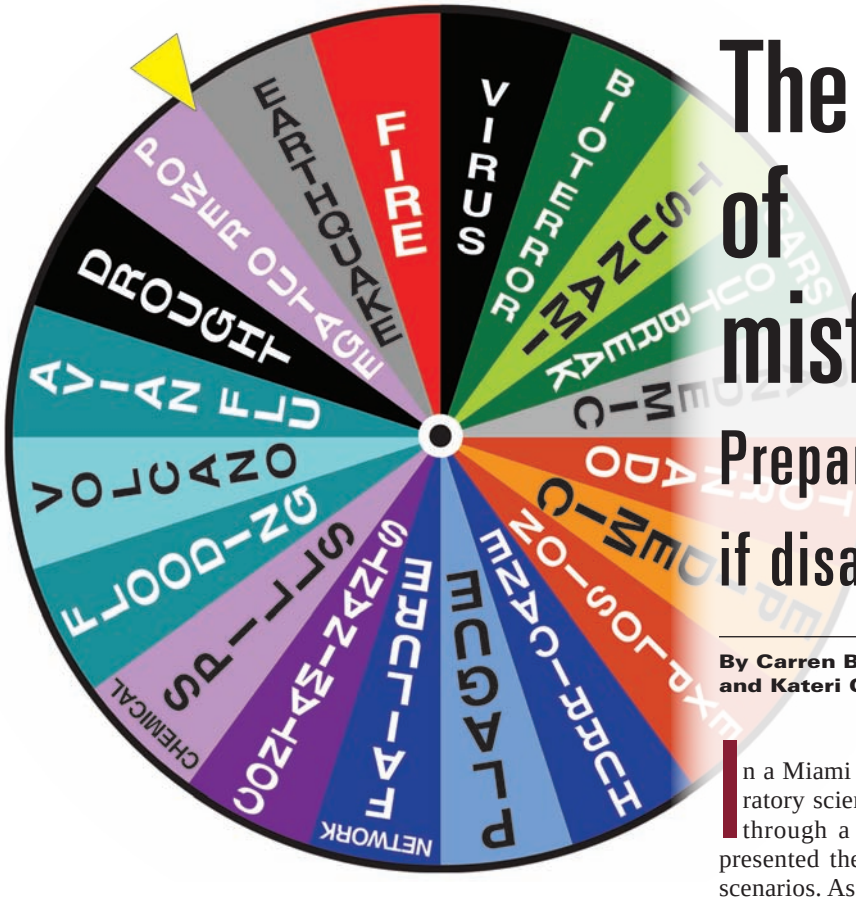

The wheel of misfortune

Prepare to win if disaster strikes

By Carren Bersch, *MLO* Editor, and Kateri Clemons, *MLO* Administrative Assistant

In 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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LEARNING OBJECTIVES

Upon completion of this article, the reader will be able to:

1. Identify recent global disasters.
2. Identify top three tips from four experts on disaster planning.
3. Define concepts of VRP and UL.
4. Identify 10 tips for selecting a vital record storage solution.

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 car 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, 2,974 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 2006 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 laboratorians, 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-fatalities 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-fatalities 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

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.

Vital record protection

By Van Carlisle

The basic foundation of any biological laboratory's reason for existence is to conduct tests, and collect and analyze data. What happens if the medium upon which the data is stored — whether digital or paper — is lost, compromised, or destroyed? A more meaningful query is, how best to prevent such an occurrence? Develop a clear disaster-recovery-and-continuity plan ahead of time. Obviously, a thorough and viable contingency plan encompasses a wide spectrum of activities and tasks, and there exists a large and growing industry segment devoted to producing these plans for organizations. This article will focus on the importance of vital records protection (VRP) for all biological laboratories from theft, loss, damage, or destruction of any kind, because VRPs are an essential component of disaster recovery and continuity.

Consider all of the potential events that could occur either within the laboratory itself or where the information is being stored: fire, flood, earthquake, tornado, hurricane, theft, terrorist attack, or biohazard. Once all possible threats that might affect a laboratory (or any business for that matter) have been identified, the next step in the plan development process is to properly classify which records and data sets are to be considered vital to your laboratory.

It is necessary to differentiate the documents that are *important* but easily reproduced from the records that are difficult to reproduce or *essential* for business survival following a disaster. With regard to VRP, every laboratory operation is unique; however, recorded data that typically fall under the category of "vital" may include contracts/agreements that prove ownership of property, such as equipment, vehicles, and products; operational records, such as current or unaudited accounting and tax records; current personnel and payroll records; shipping delivery records; current case history files; research data and produced reports and summaries.

Be sure to proactively invest in the proper equipment to house all-important data and documents to round out the VRP plan. *National Fire Protection Association*, Standard 232 "*Protection of Records*" recommends "when keeping vital records on site, store them in a fire-resistant file cabinet or vault that has been tested and rated by Underwriters Laboratories (UL)." It is imperative to seek products that have had their fire-resistance claims tested by Underwriters' Laboratories — absolutely avoid equipment with manufacturers' or non-independent ratings. UL, in particular, is the best; no other testing and standards organization matches its reputation.

Additionally, if the organization has any sort of medical operation, (such as a clinic or nurse's office) then the Health Insurance Portability and Accountability Act (HIPAA) is applicaple. HIPAA address the security and privacy of health data, and mandates protection and preservation of health and related information, including signature information contained on original consent forms (i.e., irreplaceable, original copies of paper documents) Failure to comply with HIPAA can result in civil penalties (mainly

fines) as well as criminal penalties.

Having a VRP setup that includes UL-rated fireproof and impact- and water-resistant record-storage units is one of the most crucial components that should be included in a disaster-recovery-and-continuity plan in order for it to be effective. Aside from protecting human life, a laboratory's second concern must be aimed at securing the documents and data that will help get the lab back up and running as quickly and as painlessly as possible, immediately following *any type* of disaster.

One organization that can attest to the importance of properly addressing VRP is Bio-Serv, a San Diego, CA-based company, that designs and manufactures an extensive line of environmental-enrichment treats and devices. The company specializes in custom-formulated research diets and exclusive medicated-dosing systems (MDSes) that make administering medications "as easy as giving a treat."

Rhonda Nichols, Bio-Serv's quality analyst, explains the company's approach to VRP. "All of our products, ultimately, will have their own unique manufacturing document. Each one is about 30 to 40 pages and gives step-by-step instructions on how to produce a specific product. If one of these documents gets destroyed, we would have to start from square one and redevelop a product. This is why we have five four-drawer UL-rated fireproof filing cabinets. It gives us and, more importantly, our customers peace of mind knowing that these documents are safe from nearly all threats." Bio-Serv's example of VRP is instructive. Developing a contingency plan will save any scientific organization valuable time and money when trying to rebuild, reproduce, and replace after a catastrophic event.

Another biological laboratory that is properly prepared is the Rocky Mountain Biological Laboratory, otherwise known as RMBL (pronounced "rumble"). Located in the West Elk Mountains, near Crested Butte, CO, RMBL is a biological field station in what used to be an old mining town. The laboratory provides scientists and students access to diverse natural habitats, infrastructure for high-quality research and education in the eco-rich area high above sea level.

RMBL Director Ian Billick comments on the measures necessary to protect the lab's irreplaceable documents.

"In addition to scientific data, we also store historical info, such as photos, journals, field records, and old town records in fireproof filing cabinets. Since it would be impossible to replace some of these items, the cost of protecting ourselves from disaster is more than justified. The first step in creating an archival system is to create a log of materials received. Once this is done and information is categorized, you can then identify a way to properly store it so it will not be lost or damaged over time."

Creating an archival system that incorporates a long-term data storage component is crucial to all biological laboratories. Even in the modern digital age, systems crash, information becomes corrupt, and fires still destroy buildings.

In 2006, The Howard Hughes Medical Institute (HHMI) and the Burroughs Wellcome Fund came together to produce, "*Making the Right Moves: A Practical Guide to Scientific Management*." The document is designed to educate all types of laboratories on the best practices for scientific record keeping. Chapter 8: *Data Management and Laboratory Notebooks*, explains how laboratories can protect their collected data from being lost or destroyed:

"Laboratory notebooks that are 'in progress' should be kept in the laboratory and reviewed periodically. Usually, notebooks are kept on a laboratory bench, but if you are concerned about the risk of damage or contamination, make it a rule that at the end of each day, all laboratory notebooks are placed in a fireproof cabinet or other designated space."

The take-away lesson is clear: Protect the laboratory's vital data at all costs. The benefit of having the protection in place before it is needed greatly outweighs the cost of acquiring proper preventive equipment. Be ready for the worst — and when disaster strikes, the laboratory and business will survive and recover in an expedient fashion.

Top 10 tips for selecting a vital record storage solution

1. ***Make sure the unit has a UL-Rating (Underwriters Laboratory).*** The independent testing center details how long the contents will be safe and at what temperature the contents will be affected.
2. ***Understand the difference between UL-Rated, UL-Tested and UL-Listed.*** Be cautious of a unit that claims it was "built to" UL specifications, as this does not mean that Underwriter's Laboratory tested and approved the unit. Also, a mark of UL-Tested *does* mean that it was tested, but it may not have passed. To be safe, only buy products that are UL-Listed or UL-Classified.
3. ***Determine how many hours of protection your unit will need.*** UL gives hourly and temperature ratings for its products. For example, a unit with one-hour Class 350 UL-rating means that the internal temperature of the unit did not go above 350°F when exposed to a fire burning at 1,700°F for one hour during testing. Judge how many hours of protection you will need based on your distance to the nearest fire department.
4. ***Purchase the unit based on the contents it will protect.*** For example, digital media such as CDs and other electronic devices should not be exposed to temps over 125°F or humidity levels over 85%. Special data safes or media vaults should be used when storing vital electronic information.
5. ***Look for impact testing when selecting a unit.*** A fireproof unit will not do you much good after it is dropped four stories and crushed under piles or ruble unless it is built to withstand such an impact.
6. ***Make sure the unit is water resistant.*** Most damage occurs to documents while the fire is being put out. Thousands of gallons of water are sprayed by fire hoses and suppression sprinklers, which often ruins its contents. No storage container can stand up to the claim of being "waterproof;" however, special designs can ensure that little to no water damage occurs from fire hoses or sprinkler systems.
7. ***Decide which locking mechanism will be best for you.*** There are several options available for locking the unit to protect against unauthorized entry or theft. From complex electronic locks with individual users able to open the container with a unique ID number to simple spin dial or key locks.
8. ***Consider warranty options.*** Choose a manufacturer that guarantees its product through its warranty. The best option to look for is a lifetime warranty, which will replace the unit after a fire free of charge.
9. ***Make sure that your floor can support the weight of the container.*** Some fireproof units can weigh in excess of 1,000 pounds; and, if necessary, consult an engineer to ensure the unit will be safe on an upper-level floor.
10. ***Do not let cost be a prohibitive factor.*** It is easy to consider preventive equipment as a non-essential cost; however, bear in mind how much time, money, and effort will be involved in replacing or reproducing what was stored in a less-expensive non-fireproof container before calculating potential return on investment on a more expensive unit. □

Since 1975, Van Carlisle has been the president and CEO of FireKing Security Group, an asset-protection company in New Albany, IN. For more info, visit www.fireking.com, or contact Carlisle at vanc@fireking.com.

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