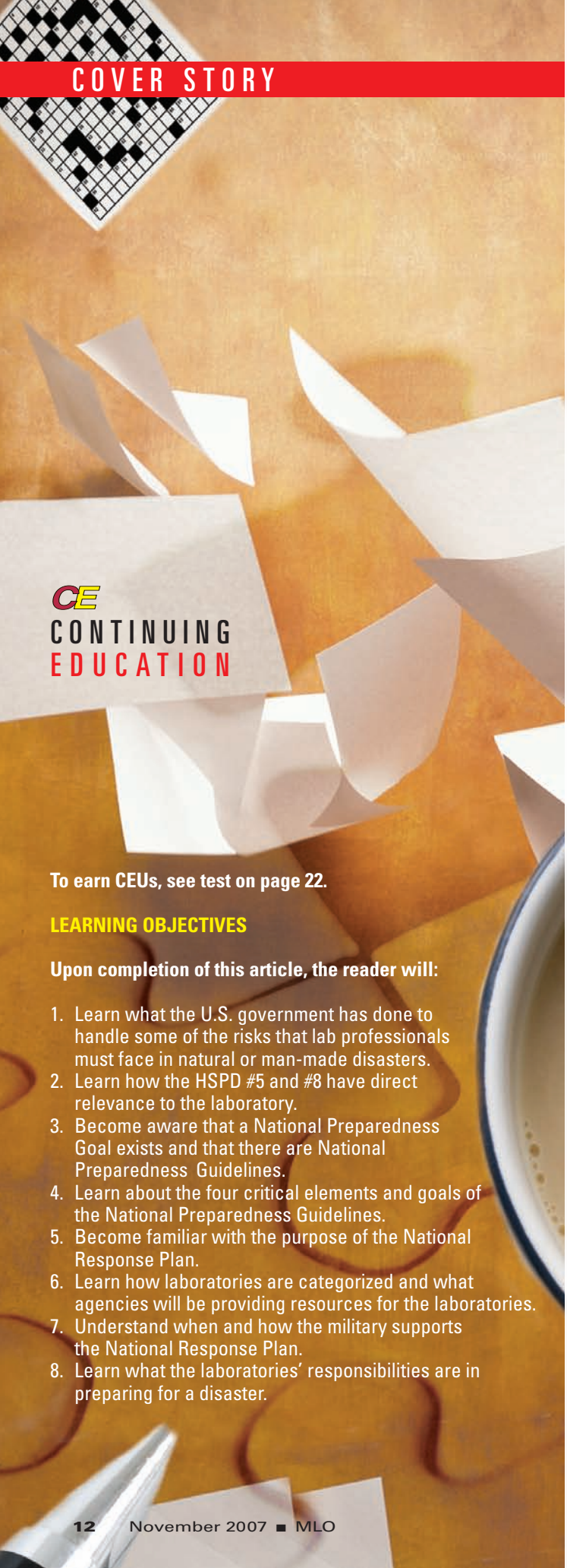


CE CONTINUING EDUCATION

To earn CEUs, see test on page 22.

LEARNING OBJECTIVES

Upon completion of this article, the reader will:

1. Learn what the U.S. government has done to handle some of the risks that lab professionals must face in natural or man-made disasters.
2. Learn how the HSPD #5 and #8 have direct relevance to the laboratory.
3. Become aware that a National Preparedness Goal exists and that there are National Preparedness Guidelines.
4. Learn about the four critical elements and goals of the National Preparedness Guidelines.
5. Become familiar with the purpose of the National Response Plan.
6. Learn how laboratories are categorized and what agencies will be providing resources for the laboratories.
7. Understand when and how the military supports the National Response Plan.
8. Learn what the laboratories' responsibilities are in preparing for a disaster.

Solving the puzzle of laboratory preparedness: The National Response Plan

By Richard Gonzales, LTC, MS, U.S. Army

"Throughout the evolution of our homeland security paradigm, one feature most essential to our success has endured: the notion that homeland security is a shared responsibility built upon a foundation of partnerships. Federal, state, local, and tribal governments, the private and non-profit sectors, communities, and individual citizens all share common goals and responsibilities — as well as accountability — for protecting and defending the Homeland."

—President George W. Bush
National Strategy for Homeland Security
October 2007

The current National Response Plan is more than an update of the old Cold War era Civil Defense plan.

No matter how or where news is disseminated — television, newspapers, websites — we are sure to find at any moment a multitude of disasters occurring around the world, from weather-related natural events such as snowstorms, floods, hurricanes, typhoons, or tsunamis to man-made events such as wildfires, oil spills, nuclear meltdowns, and wars and conflicts that severely affect the lives of people everywhere. As laboratory leaders, we must be concerned as to how these varied events might affect the daily operation of our labs. We need to understand how these types of events will impact our organizations, and we must develop plans to mitigate the risk involved in providing support prior to, during, and after any disaster.

What would you do if you found yourself in the middle of a crisis? How would you personally react? How would you ensure that your laboratory continued to function? Is your organization prepared?

If you had been living and working in New Orleans, could you have predicted what was to unfold when Hurricane Katrina hit the Gulf Coast in 2005? That storm did not even hit New Orleans with its full impact, and yet we witnessed a cataclysm unlike any in our collective memory. For many years, experts had predicted a large hurricane was destined to hit New Orleans. Could we have been better prepared?

Despite a previous bombing at the World Trade Center parking garage in 1993 that killed six, who would have imagined that the Twin Towers would be attacked on September 11, 2001, by terrorists using hijacked American commercial airliners? Could we have been better prepared?

Having lived in the metropolitan Washington, DC, area during the 2005 anthrax attacks, I found the simple task of retrieving mail caused untold stress. Who could imagine that someone would send deadly biological agents in the mail? Could we have been better prepared?

The Spanish influenza pandemic of 1918-1919 caused 20 to 40 million deaths worldwide and is considered to be the most devastating epidemic in recorded human history. Scientists and world health officials now warn us to expect another pandemic to occur with the H5N1 avian influenza virus. Can we be better prepared?

The intent of this article is to give laboratory professionals an understanding of what the U.S. government has done on a broad national scale to mitigate some of the risks we face from both natural and man-made disasters. Whether we want to admit it or not, these events impact each laboratory wherever the facility is located and every individual who works in it. Let us examine how each laboratory fits into the national plan for emergency preparedness via the National Preparedness Guidelines, where we can find some tools to help in the development of disaster plans.

National Preparedness Guidelines

In the aftermath of 9/11, the president issued a series of 20 Homeland Security Presidential Directives (HSPD). Two of these directives — HSPD #8, National Preparedness, and HSPD #5, Management of Domestic Incidents — have direct relevance to any laboratory. In HSPD #8, the president directed the Secretary of Homeland Security to develop a national disaster all-hazards preparedness goal.

As a result, the secretary released the National Preparedness Goal. Publication of the National Preparedness Guidelines finalized the development of the national goal and its related preparedness tools. The goal guides federal departments and agencies, state and local governments, the private sector, nongovernmental agencies, and the public, in determining how to most effectively and efficiently strengthen national preparedness for terrorist attacks, major disasters, and other emergencies.

The goal utilizes a capabilities-based planning approach for planning, under uncertainty, to provide capabilities suitable for a wide range of threats and hazards covering 15 national planning scenarios utilizing a universal task list to develop the target capabilities list.

There are four critical elements of the Guidelines:

1. National Preparedness Vision: provides the overarching vision;
2. National Planning Scenarios: 15 scenarios that highlight the scope, magnitude, and complexity of plausible catastrophic terrorist attacks, major disasters, and other emergencies;
3. Universal Tasks List: a menu of tasks from all sources in the prevention, protection, response, or recovery of an event that may be performed in major events mentioned in the National Planning Scenarios; and
4. Target Capabilities Lists: provides guidance on specific capabilities and levels of capability that all levels of government will be expected to develop and maintain. There are over 36 capability summaries, which include detailed descriptions, which can be tailored to a geographic region.

As an integral part of their communities, laboratories provide a major capability that would have to respond to a major surge of laboratory testing or, if in a clinical setting, an increase in laboratory support for massive casualties. We saw an example of this when Houston opened up its Astrodome to New Orleans' citizens during Katrina — Houston's laboratory professionals were called upon to immediately serve a large and quite unexpected population.

The goals of these critical-element guidelines are to:

1. organize and synchronize national efforts to strengthen national preparedness;
2. guide national investment in national preparedness;
3. incorporate lessons learned from past disasters into national preparedness priorities;
4. facilitate a capability-based and risk-based investment-planning process; and
5. establish readiness metrics to measure progress and to assess the nation's overall preparedness to respond to major events.

The guidelines reinforce the fact that preparedness is a shared responsibility. The response of any disaster begins at the local level with support from state and federal agencies, as needed. The guidelines are an umbrella document that cover all hazards, are risk based, and are a call to action in the development of a successful National Incident Management System (NIMS). The NIMS places responsibility on individual, local, state, federal, and government agencies for establishing a preparedness cycle in advance of an incident. The cycle of preparedness for prevention, protection response, and recovery mission can be summarized as:

- plan;
- organize;
- equip;
- train;
- exercise, evaluate, and improve.

This cycle is applicable to a laboratory as it prepares for any inspection cycle or as it is managed via a good laboratory practices, or GLP, environment. Every laboratory prepares for accreditation assessment and inspections through review of policy, processes, and procedures. This is also the case with disaster preparedness. The best disaster plan needs to be practiced and rehearsed prior to an actual event.

What is the National Response Plan?

The current National Response Plan (NRP) is more than an update of the old Cold War era Civil Defense plan. In HSPD #5, Management of Domestic Incidents, the president directed the development of a new NRP to align federal coordination structures, capabilities, and resources into a unified, all-discipline, and all-hazards approach to domestic-incident management. This approach is unique and far-reaching in that, for the first time, it *eliminates* critical seams and *ties together* a complete spectrum of incident-management activities to include the prevention of, preparedness for, response to, and recovery from terrorism,

Continues on page 14

major natural disasters, and other major emergencies.

The end result is vastly improved coordination among federal, state, local, and tribal organizations to help save lives and protect America's communities by increasing the speed, effectiveness, and efficiency of incident management. The NRP incorporates best practices from a wide variety of incident-management disciplines to include fire, rescue, emergency management, law enforcement, public works, and emergency medical services. Included in these activities is federal support to state, local, and tribal authorities; interaction with non-governmental, private-donor, and private-sector organizations; and the coordinated, direct exercise of federal authorities, when appropriate. The NRP can be partially or fully implemented in the context of a threat, anticipation of a significant event, or in response to an incident requiring a coordinated federal response. The NRP is built upon the premise that incidents are typically handled at the lowest jurisdictional level.

The NRP is applicable to all federal departments and agencies that have primary jurisdiction for or participate in operations requiring a coordinated federal response. Within the NRP, there are 15 emergency support functions (ESFs). The ESF group contains capabilities with resources that are most likely needed during actual or potential incidents where a coordinated response is required. The activation of the ESF group is a measured response to the particular event; in response to an incident, not all ESFs may be activated. Laboratories are categorized under ESF #8, Public Health and Medical Services, under the coordination of the U.S. Department of Health and Human Services (HHS).

HHS, in its primary agency role for ESF #8, coordinates the provision of federal health and medical assistance to fulfill the requirements identified by the affected state and local authorities having jurisdiction. Included in ESF #8 are overall public-health response; triage, treatment, and transportation of victims of the disaster; and evacuation of patients out of the disaster area, as needed, into a network of military services, Veterans Affairs, and pre-enrolled non-federal hospitals located in the major metropolitan areas of the United States. ESF #8 will use resources primarily available from:

1. within HHS
2. support agencies including the Departments of Defense (DOD), Department of Veteran Affairs (VA), and the American Red Cross;
3. the National Disaster Medical System (NDMS), a nationwide medical mutual aid network between the federal and non-federal sectors that includes medical response, patient evacuation, and definitive medical care. At the federal level, it is a partnership among HHS, DOD, VA, and the Department of Homeland Security (DHS), and is administered by DHS; and
4. specific non-federal sources such as major pharmaceutical suppliers, hospital-supply vendors, the National Foundation for Mortuary Care, certain international disaster-response organizations, and international health organizations.

Laboratories must be integrated into these plans since all aspects in identifying a potential threat, treating patients, and recovering from a disaster will depend on the ability of the laboratories to provide their critical services.

Military support to NRP

As a supporting agency to any of the other federal agencies, the DOD provides Defense Support of Civil Authorities, or DSCA, in response to requests for assistance during domestic incidents. DSCA refers to DOD support provided by federal military forces, DOD civilians and contract personnel, and DOD agencies and components, in response to requests for assistance. In most instances, DOD provides assistance to DSCA in response to requests from a lead or primary agency. DSCA normally is provided when local, state, and federal resources are overwhelmed, provided that it does not interfere with the department's military readiness or operations.

In ESF #8, the DOD may provide:

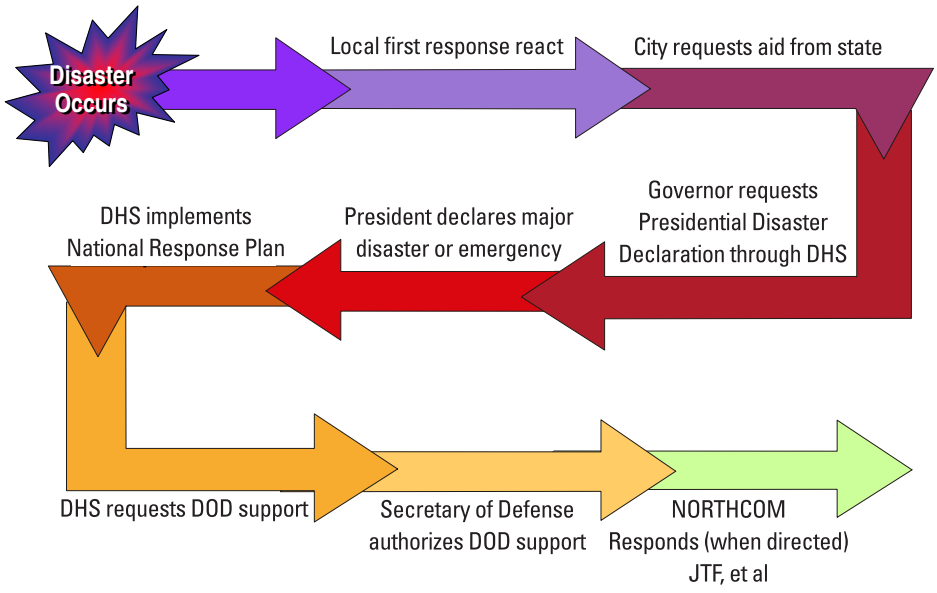
1. available blood products in coordination with HHS;
2. DOD confirmatory laboratory testing support in coordination with HHS;
3. available DOD medical supplies for distribution to mass-care centers and medical-care locations being operated for incident victims with reimbursement to DOD;
4. available emergency medical support to assist state and local governments within the disaster area and the surrounding vicinity. Such services may include triage, medical treatment, mental-health support, and the use of surviving DOD medical facilities within or near the incident area; and
5. assistance in managing human remains, including victim identification and mortuary affairs.

The DOD laboratories are fully integrated with civilian agencies in providing a continuous network of laboratory capability and in maintaining close working relationships with various government and civilian agencies like the Center for Disease Control and Prevention's Laboratory Response Network (LRN), the AABB (American Association of Blood Banks), and the College of American Pathologists (CAP). Many hospitals and laboratories are already integrated in the LRN as a sentinel, referral, or national lab to provide a quick response to a biological or chemical attack.

The availability of blood products is a critical infrastructure that the AABB has sought to address through the development of the Interorganizational Task Force on Domestic Disaster and Acts of Terrorism. This group determines: the need for blood, blood products, and supplies needed to manufacture, test, and store blood products; the ability of existing supply-chain resources to meet these needs; and any emergency measures needed to augment or replenish existing supplies. The military is an active participant in the National Blood Exchange (part of the AABB) and the LRN.

Additional deployable resources may be used in response to a request for support to the homeland defense. Field laboratories may be deployed to affected areas. These laboratories are fully self supporting and functional, and able to support clinical and environmental testing to augment the existing medical infrastructure. Blood detachments have the capability to collect and process emergency blood products on short notice where existing infrastructure is damaged or no longer exists. At local community hospitals, existing local resource-sharing agreements ensure that scarce laboratory resources, such as blood products, are properly utilized. Disaster planning may involve the resourceful use of local existing capabilities that have been incorporated into contingency plans.

Continues on page 16



allows a laboratory leader to critically review his contingency plans, where he will find potential shortfalls and unexpected outcomes to his laboratory's plan.

Laboratory responsibilities: DOTMLPF

- **D**octrine (processes, policies, techniques, and procedures);
- **O**rganization (organizational structure, IT support, critical staff);
- **T**raining (new equipment or new policy training requirements, personnel competency);
- **M**aterial (suppliers, logistics, equipment maintenance, reagents, water);
- **L**eadership (senior management support, informal leaders, union participation);
- **P**ersonnel (staffing impact); and
- **F**acilities (physical plant, life support, temporary housing, transportation).

Laboratory preparedness

Multiple layers of support exist for any event, as outlined above. Accreditation agencies (AABB, CAP, The Joint Commission) require laboratories to have emergency operations, plans, and procedures for internal and external disasters. What is not recorded, however, is how well these plans are interlinked at the local, state, and federal level. In trying to plan for a wide variety of contingencies, laboratory leaders must continually prepare for the unexpected and understand how their organizations integrate with the existing structure. These lab professionals must be able to adapt to the changing situation and exercise the appropriate control mechanisms to respond. Since laboratories are integral to the daily operations of hospitals and their communities, continuity of operations is critical not only for the lab but also for the community. In disaster planning, laboratory leaders should understand the resources available, know when and where to ask for additional assistance, see that second- and third-order effects of their plans are adaptable and resourceful, and plan for the unexpected. One method by which to examine and study problems or contingencies is a "DOTMLPF" domain analysis, used to analyze existing or future capabilities to determine met or unmet requirements. Use of this tool

Continues top of column three

Conclusions

Everyone has an active role in homeland defense. Meeting the challenges of a post-9/11, post-Katrina world requires everyone to make appropriate plans. Governments at all levels have an obligation to protect their citizens. The National Response Plan provides a framework to meet this obligation. As critical members of the community, laboratories also must be fully integrated into disaster planning from the federal level down to the local level to ensure their continued operation prior to, during, and after a crisis.

Additional resources are available at:

www.aabb.org/Content/Programs_and_Services/Disaster_Response/disastercontact.htm
www.bt.cdc.gov
www.bt.cdc.gov/lrn/
www.dhs.gov
www.dhs.gov/xprepresp
www.ready.gov/ □

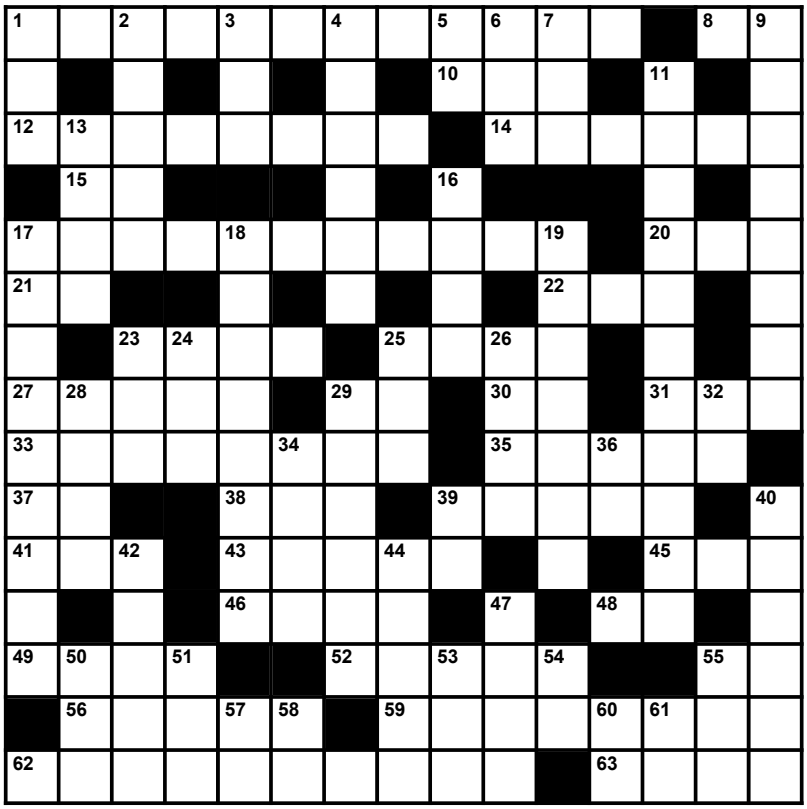
LTC Richard Gonzales, MS, MT(ASCP) SBB, is currently assigned to the U.S. Army Medical Center and School, Directorate of Combat and Doctrine Developments, at Fort Sam Houston, TX, as the Laboratory Science and Blood Bank Combat Developer in the Concepts and Requirements Division. As Laboratory Consultant, he is responsible for the Army-wide development of field medical-laboratory systems, logistics-integrated tactical blood-bank systems, and pathology systems to support worldwide Army and Joint Military Operations.

LTC Gonzales identifies current and future medical-laboratory operational requirements to support the Army's Future Force. He serves as the Directorate's Subject Matter Expert on medical-laboratory issues and is responsible for development of doctrine, training, organizational structure, and equipment/materiel requirements for deployable field medical systems. He provides laboratory and blood-bank consultation to combatant commands for use in deliberate planning and coordination of operational requirements in support of combat operations.

He has served in the Army for over 22 years in various assignments in the United States and overseas including Chief, Blood Services, Walter Reed Army Medical Center (AMC), Dwight David Eisenhower AMC, William Beaumont AMC; Director, Joint Blood Program Office, U.S. Central Command and U.S. Forces Korea. He has also served as an assistant professor of Military Science at Santa Clara University and various other adjunct positions.

Additional reading

1. National Response Plan, Department of Homeland Security, December 2004
2. The National Strategy for Homeland Security, Office of Homeland Security, October 2007
3. College of American Pathologists, Laboratory Accreditation Program, Laboratory General Checklist, April 2006
4. Standard for Blood Banks and Transfusion Services, 24th ed., American Association of Blood Banks, 2006
5. Quick Reference Guide for the National Response Plan, May 2006
6. *www.jointcommission.org*



Answers on page 59

Crossword by Myles Mellor

Across

1. State of being ready to handle a disaster
8. Above
10. Bones
12. Vibrio _____ (bioterror agent)
14. Frightening incidents
15. Montgomery locale
17. _____ Tularensis (bioterror agent)
20. Disconnect
21. Verification of this is vital for security in the use of 1 down
22. Born name
23. Lab training org. teaches how to handle bioterror incidents
25. Blood measure
27. Coughed up matter used in tests
29. Silicon symbol
30. Expression of surprise
31. Sheltered side
33. Arrange statistics
35. Test
37. Roman 51
38. A while earlier
39. Closes in, a culture, e.g.
41. Company abbreviation
43. Deadly gas used in Tokyo subway attacks
45. "Molecular photo copying" technology used to monitor Post Office mail for biohazard detection
46. Energy Efficiency and Renewable Energy Network, for short
48. Operation, abbr.
49. Electrical fishes
52. Fools
55. Madison locale
56. Piece
59. LRN lab classification
62. See 17 down
63. Seizures

Down

1. Handheld instrumentations that are very useful in emergency situations
2. Bioterror agent (virus found in Africa)
3. Swallowed
4. Expire
5. Nope
6. Hospital depts., abbr.
7. Pouch
9. Possible test result
11. Bioterror agent, B_____a Species
13. "Die ___" Bruce Willis film
16. This org. (formerly NCCLS) produced the "Report X4-R, Planning for Challenges to Clinical Laboratory Operations During a Disaster"
17. Individuals directly handling the consequences of a bioterror attack (goes with 62 across)
18. Type of bioterror test
19. Sept. 2001 bioterror agent in letters
23. Heart of
24. Laboratory Test Unit, briefly
25. Excel ____ chart
26. Observe
28. Patient symptom
29. Kept for future use and analysis
32. Right-angled extension
34. Chocolate __
36. Chicago's state
39. Tin symbol
40. Tracks
42. Culture components
44. Being worked with (2 words)
47. Microscope feature
50. Compass direction
51. Drink a bit
53. For each one
54. Street, abbr.
55. Bioterrorism ___ workshop (not dry, but...)
57. Together prefix
58. Inside, prefix
60. Conditional
61. Symbol for nickel

A New Orleans hospital weathers the storm

By Renee Diiulio

Aug. 29, 2007, marked two full years since Hurricane Katrina hit the Gulf Coast and completely destroyed several communities lining its shore. It then smashed into New Orleans and, in many ways, say people involved in its recovery, forever changed the city. Fondly known as "The Big Easy" — a magnet for tourists and conventioneers — New Orleans has been in a fight for its very life since the storm. The city, however, did witness the maintenance of some services during and continuing improvements since the storm.

According to the Louisiana Hospital Foundation (LHF) of Baton Rouge, 64 hospitals are located in the New Orleans area. When Hurricane Katrina hit, 61 of these institutions were forced to close. Approximately one year later on Aug. 7, 2006, the LHF reported 18 still had not reopened their doors. Only three hospitals managed to continue operations throughout the entire hurricane crisis: the Ochsner Clinic Foundation, New Orleans; West Jefferson Medical Center, Marrero; and East Jefferson General Hospital, Metairie.

Staying operational throughout the storm conditions was no easy feat. The hospitals experienced some damage and extreme conditions. Communications were down, electricity was out, and staff was unable to come into or out of the area. Workflow and volume changed, but the East Jefferson lab was able to adjust, with many of the staff living on the premises.

"We were isolated from the world," says Mike Lattier, microbiology supervisor at East Jefferson. "We never shut our doors, and the lab never stopped testing. We did not lose one patient as a result of the hurricane." He attributes a thorough emergency-preparedness plan and high staff morale for seeing the hospital successfully through the crisis.

Storm conditions

East Jefferson General Hospital is a community-based facility licensed for 450 beds. According to Lattier, pre-Katrina the microbiology lab handled about 7,000 tests a month. "There was a severe dip in the month of September following the hurricane — volume dropped by about half," recalls Lattier.

The hospital was not accepting many new admissions, surgery was not performed for about two weeks, and the outpatient workload had dropped to almost nothing. "Once people started moving back, though, it picked up pretty quickly. We are now back to the same volume as pre-Katrina," estimates Lattier.

In the aftermath of the storm, however, the hospital felt like an island. "Homes in the area were flooded by as much as three feet of water, and we were surrounded by it. The hospital is high enough up that we had some seepage under thresholds but no flooding," says Lattier.

There was some damage to the roof and windows, but the bigger problems were the lack of communications and power. "Communications were horrendous. We lost Internet and phone service.

Cell phones were not working because the cell-phone towers were down," says Lattier. Hospital generators kept needed systems running — but the elevators were inoperable, the lights were dark in hallways, and the air conditioning was greatly reduced. "The air-conditioning chillers were reduced to conserve power, and it was very hot, even in patient rooms," he continues.

In the lab, the temperature reached 90°F. Lattier became concerned that the microbiology instruments would stop functioning. The lab uses an older model automated identification system, and an automated microbial identification system to detect and identify infectious organisms. "We did set up some fans and were pleasantly surprised that both instruments never missed a beat," says Lattier. Chemistry kept its analyzers functioning in the same way.

Though the tests kept running, the lack of electricity impacted laboratory workflow in other ways. Refrigerators were consolidated, and whatever was not needed was turned off. The computer system was down, which affected lab ordering and results reporting. "We take the laboratory information system for granted; it was challenging to operate without it," says Lattier.

The hospital servers, normally stored on the first floor, had been relocated to higher floors in case the hospital did flood. After the storm passed, the servers were returned to the first floor and turned back on as power was restored.

In the meantime, orders and specimens were hand-carried to the lab; results were given by phone, when possible, or hand-delivered. "Chemistry and hematology were able to print out manual reports, which could be easily brought to the floors, but in micro, it is difficult to do manual reports. So, we used the phone when possible, or the doctor would come down to see results," says Lattier.

Team players

The new, more intense workflow was managed with smaller teams. Each laboratory department had team members, designated by the hospital emergency-preparedness plan, who were required to be on duty during a disaster. Lattier recalls that two people manned the microbiology lab for a little over a week after the storm.

The entire management team was also present, having been deemed "essential" personnel. "People questioned this rationale, but it allowed the techs to perform the testing while we helped out delivering specimens and results, even taking out garbage and serving in the cafeteria," says Lattier.

What the plan had not prepared for was having someone to relieve the disaster team. "We were here pretty much around the clock, but since the workload had dropped off significantly, it was doable," says Lattier. A bigger challenge was being on-site for that length of time.

"People took a while to get back; some had no homes. As they started trailing in, many stayed at the hospital," says Lattier who lived in his office for three weeks while waiting for power to be restored to his home. Those who did not lose their homes pitched in to help those who did. An individual in the East Jefferson Hospital's compliance and legal department was assigned the task of finding housing for hospital employees displaced by the hurricane.

"She did a great job of finding apartments or obtaining FEMA

[Federal Emergency Management Association] trailers for those who needed them," says Lattier. Some of the lab personnel are still living in trailers more than two years after the storm. During and after the hurricane, the hospital held counseling sessions, and chaplains remained on duty to service patients and staff. Despite the hardships, morale remains high, and the team pulls together to solve many other problems.

Plan 'A' still good

While the hospital fared better than other institutions in the area, lessons were learned, and adjustments have been made to the emergency-preparedness plan. What worked will be kept. Implementing security measures (e.g., requiring IDs to gain entry) and obtaining clean water posed no problem (e.g., the hospital drew water from its well).

To address communications issues, the hospital has now installed satellite phones. Future emergency-electricity needs will be met through a direct feed established with the hospital's energy company. The hospital servers will eventually be permanently moved to higher floors to avoid having to move them in case of flooding.

Future emergency staffing plans will provide for a Team A to be in place *during* the disaster, and a Team B to handle *recovery*. "Names will be selected on a rotational basis, although management will still be a part of every team," says Lattier.

While the hospital did not have to evacuate as a result of Hurricane Katrina, it would have if the premises had flooded. "After the storm, we had a mock drill and realized that it would be extremely difficult to evacuate all of our patients, even with prior arrangements with other hospitals and transportation companies. There is just not enough notice," says Lattier. The hospital does have a helipad, which was used to bring patients in during and after the storm, and which could be used to get patients out, if need be. Thus, the hospital has decided to keep the same evacuation plan that it had in place during Katrina.

As one of only three New Orleans hospitals to continue functioning during the 2005 crisis, East Jefferson General Hospital in Metairie is proud that its pre-Katrina emergency planning enabled the institution to serve its community, and that its post-Katrina emergency-planning review has put into place other necessary policies in the event of another catastrophe. □

Renee Diiulio is a freelance writer employed by bioMérieux in Durham, NC, which produces the older model automated identification system — a VITEK Legacy — and the automated microbial identification system —a BacT/Alert 3D.