


Disaster Planning for your Laboratory



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Objectives

- ❑ Discuss various types of disasters that could effect your laboratory
- ❑ Discuss communicable diseases seen as a result of natural disaster
- ❑ Discuss how these disasters may impact your laboratory
- ❑ Discuss how to design a disaster plan for your laboratory

Types of Disasters

- Biological and/or chemical
- Man-made
- Natural

Natural Disasters

- ❑ Hurricanes, tornados, earthquakes, flooding, and droughts can contribute to the transmission of some diseases
- ❑ Transmission cannot occur unless the causative agent is in the environment

Man-made Disasters

□ Electrical outages

■ Brown/black outs

□ Example: Power outages in Los Angeles in 2000

- Had to alter test runs based on power grid outages
- Don't always have warning that you'll be without electricity

□ Water outages

■ City

□ Example: Water main broke. Hospital was without water for a day.

■ Hospital

□ Example: Water pipe broke on 8th floor. Laboratory on 2nd floor.

- Equipment was effected
- Pneumatic tube system was effected

Most Common Communicable Diseases in Disasters

- Diarrhea
- Acute respiratory infection
- Measles
- Malaria (endemic areas)

www.who.int

Control of Communicable Diseases

- Clean water
- Adequate sanitation
- Vector control
- Shelter
- Immunizations

Diseases Related to Overcrowding

- Measles
- Influenza
- Meningitis
- Diarrheal illnesses



<http://www.radaronline.com/web-only/hurricane-katrina/pages/78W05KEHHIRES.php>

Hurricanes

□ During event:

- Injuries caused by flying glass or other debris

□ After event:

- Injuries include puncture wounds resulting from exposed nails, metal, or glass, or bone fractures

- Illness due to fungal overgrowth

- Illness due to contaminated water supply or spoiled food

- Tidal surge and/or flooding can contaminate the public water supply

- Drinking contaminated water or spoiled food may cause illness

Flooding

- ❑ An outbreak of waterborne *giardiasis* associated with heavy water runoff due to warm weather and volcanic ashfall (Am J Public Health, 73(8); 1983)
- ❑ Severe community-acquired pneumonia and sepsis caused by *Burkholderia pseudomallei* associated with flooding in Puerto Rico (Bol Asoc Med P R., 95(6); 2003)
- ❑ El Nino and associated outbreaks of severe *malaria* in highland population in Irian Jaya, Indonesia: a review and epidemiologic perspective (SR Asian J Trop Med Public Health, 30(4); 1999)



Floods & The Might M's

Excess moisture leads to

☐ Mosquitoes

- Capable of serving as a vector for whatever disease is endemic to that area

☐ Mold

- Wood, wallboard, wallpaper, upholstery, and dust can provide nutrients for growth
- Illnesses
 - ☐ Infectious
 - ☐ Allergic

Waterborne-Diseases

- Cholera, typhoid fever, shigellosis, and hepatitis A and E
 - Related to unsafe drinking water and inadequate sanitation
- Leptospirosis
 - Related to inhalation or exposure to water containing organism
- *Vibrio* spp., *Aeromonas* spp., or *Mycobacterium marinum*
 - Related to puncture wounds

Food-borne Diseases

- ❑ Cholera, Hepatitis, Typhoid fever, Vibriosis
 - Related to ingestion of contaminated food products



vector-borne Diseases

- Malaria, Dengue, Scrub typhus, West Nile Virus
 - Related to infection transmitted by various types of vectors



Diseases Following Earthquake

- ❑ **Coccidioidomycosis** following Northridge, CA earthquake in 1994 (MMWR, March 1994)
- ❑ **Diarrheal Diseases** in Kocaeli, Turkey (CID; 31: 2001)
- ❑ **Parasitic infections** in post-disaster situations years after earthquake (Pres Int.; 46; 2004)

Tornados

- ❑ Tornado disaster in rural Georgia: Triage response, injury patterns, lessons learned (Am Surg., vol 22, 2000)
- ❑ The characteristics of infections in crush syndrome (Eur Soc of Clin Microbiol and Inf Dis.; 8; 2002)

Tornado Disasters

□ Injuries

- Related to flying debris
- Soil-contaminated wounds
- Being thrown

□ Organisms Isolated from Victims

- *Serratia marcescens*
- *Acinetobacter* spp.
- *Pseudomonas aeruginosa*
- *Enterobacteriaceae*
- *Staphylococcus aureus*
- Gram-positive cocci
- Fungi

Drought

- Drought-induced amplification of Saint Louis encephalitis virus, Florida (Emerg Inf Dis., 8, 2002)
 - During extended spring droughts vector mosquitoes and nestling, juvenile, and adult wild birds congregate in selected refuges, facilitating epizootic amplification of SEV
 - When drought ends and habitat availability increases, the SLEV-infected birds and mosquitoes disperse, initiating an SLEV transmission cycle

Impact on Laboratory

- ❑ Disruption of utilities, receiving supplies, getting specimens from off-site locations
- ❑ Employee issues
- ❑ Could involve shutting down laboratory and bringing it back up
- ❑ Damage to equipment
 - Computers, Biological Safety Cabinets, Instruments, etc.

Where to begin ...

□ Institutional safety manual

- Make sure that employees have read and understand policies
- Know internal emergency phone numbers
- Participate in disaster drills
- Know your delegation tree

□ Determine your most likely disaster and plan accordingly

■ Set-up disaster teams


- Team A works during the disaster
- Team B relieves Team A

- In the case of living in New Orleans, as soon "the winds die down"

Guidelines



X4-R
Vol. 23 No. 29

Planning for Challenges to Clinical
Laboratory Operations During a Disaster;
A Report




**CLINICAL AND
LABORATORY
STANDARDS
INSTITUTE**™
(Formerly NCCLS)
Providing NCCLS standards and guidelines,
ISO/TC 212 standards, and ISO/TC 76 standards

This document provides guidance on steps to be taken by the clinical laboratory to be prepared in the event of an emergency.
An NCCLS report for national application.



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CLSI X4-R Report 2003



Guidelines

for the

Public Health Laboratory

Continuity of Operations Plan

(COOP)

PHL_COOP_Guidelines 2007

12-Step Disaster Plan

□ Communication

- Satellite phones
- Cell Phone towers went down. Could text message.

□ Security

- Safety of personnel, equipment, narcotics
- Safety of biological organisms

□ Generators

- Placed above flood high-water levels
- Adequate capacity to run medical equipment and air conditioning for extended periods of time

Hospitals and Health Networks. Howard Larkin. May 2006.

12-Step Disaster Plan (2)

☐ Fuel and Other Supplies

- 7 – 10 day supply of diesel fuel, fresh water, and essential medical supplies

☐ Back Up Records

- Off-site back-up for patient, employee, and student records (often another State)

☐ Employee Living Quarters

- Bed control
- Kennel space

OCHSNER'S ARK

Employees' pets find shelter as hurricane blows through

Thursday, September 18, 2008

By Michelle Hunter

East Jefferson bureau (NOLA.com)

In addition to the few thousand humans -- about 2,200 to be exact -- who sheltered at Ochsner Medical Center during Hurricane Gustav, 159 dogs, cats, birds, bunnies and hamsters also took refuge at the Old Jefferson hospital.

Officials at the hospital, located at 1516 Jefferson Highway, Old Jefferson, allowed essential staff members to hunker down with their pets during the storm, which made landfall Sept. 1.

"Rather than have them worry about their pets, we just have them bring them on over," said Nicole Ockmond, point person for Ochsner's Pet Center during Gustav.

The elevator lobbies on three floors of the hospital's parking garage were transformed into a temporary kennel as cages and carriers of all sizes were packed into the hallways. Staffers were required to pre-register their pets and provide cages, food and water. Employees were also responsible making the time to allow pets to "take care of business."

The Pet Center directory was posted on the garage elevator doors: floor 3 -- "little dawgs and kitties," floor 4 -- "birds and others," and floor 5 -- "big dawgs."

12-Step Disaster Plan (3)

☐ Cash and Supplies for Employees

- ATMs didn't work

☐ Disaster Team

- Select employees who are committed to doing the job

☐ Evacuation

- Evaluate patient and research animal needs

12-Step Disaster Plan (4)

□ Community Planning

- Begin communications with other hospitals, schools, government offices

□ Prepare for Overflow

- Major surges from evacuees

□ Leadership

Hospitals and Health Networks. Howard Larkin. May 2006.

Disaster Plans Assessments:

☐ Communication

- Delegation tree (laboratory and hospital)
- Phone lines (what's available & what are the numbers)
 - ☐ Land lines
 - ☐ Cell phones – texting
 - ☐ Satellite phones
 - ☐ Have list of employees cell, home, and evacuation destination phone numbers.
- Computers
 - ☐ Alternate servers
 - ☐ Power down any non-essential computers
 - ☐ Back-up all files
- E-mail
 - ☐ Have list of all employees e-mail addresses (work and private) and/or e-mail address of relative/friend that can reach them

Disaster Plans Assessments:

□ Essential phone numbers

- Laboratory personnel/ Lab Administration
- Employee hotline
- In-house paging numbers
- Satellite phone numbers
- Maintenance/Facilities
- Hospital Administration
- Security
- Housekeeping
- Vendor contact information

Disaster Plans Assessments:

❑ Adequate supplies

- For essential personnel – distribute list of items needed
 - ❑ Food & water
 - ❑ Clothes, bedding, air mattresses, medications, money, etc.
 - ❑ See personal supply slide (later slide)
- Stockpiles (routinely check expiration dates)
 - ❑ Ready to eat food items (can opener, disposable plates, forks, etc.)
 - ❑ Water
 - ❑ Flashlights, extra batteries
 - ❑ Tools (pliers, wrenches, hammer, etc.)
 - ❑ Hardhats (earthquake prone areas)
 - ❑ Paper products (toilet paper, paper towels)

Disaster Plans Assessments:

■ Reagents

- What is your inventory?
- Can you stock pile of reagents?
- Do you have a plan if vendor cannot get supplies to you?
 - Can you borrow from another lab?
 - Can you switch testing method?
 - Can you discontinue offering that test?

Disaster Plans Assessments:

Hospital (laboratory) equipment

■ What equipment is essential?

- Blood culture, Identification/AST instruments – essential

- Molecular testing for STD's – not essential

 - Power down until disaster is over

- Certain BSC's, incubators, refrigerators, freezers - essential

■ What equipment is currently on emergency power?

- Note what needs to be on emergency power and get that taken care of

■ Is equipment secure?

- Is equipment strapped down? Gas cylinders chained to wall?

■ What factors can effect the performance of equipment?

- Extreme heat – plan to have fans available

- Water – make sure you have enough reagent-grade water

- Expect equipment failures – know how to troubleshoot!

Checklist Examples:

Equipment	Vendor	Emergency Power	Special Needs
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Blood Culture Instrument	Company, web-site	Yes	Adult aerobic and anaerobic bottles
	Contact Person:		Pediatric bottles
	Name:		
	Phone:		
	Fax:		

ID/AST	Company, web-site	Yes	Reagent grade water
	Contact Person:		reagents
	Name:		ID/AST panels
	Phone:		
	Fax:		

Disaster Plans Assessments:

- ❑ Evacuation of animal facility
 - Have plan of how and where to evacuate any animals outside of the disaster area
- ❑ Storage of stock cultures
 - For critical stock cultures, have another set of organisms at another location outside of the disaster area
- ❑ Protection of stock cultures
 - Have stock cultures in locked area.
 - Have locks on freezers
 - Autoclave all biohazard material before storm

Disaster Plans Assessments:

□ Essential Testing

■ Triage your test menu

- What tests do you need to perform to support the clinicians and their patients in-house?
- What tests do you need to perform to support those seeking care from the Emergency Department?
- What staffing would be needed to perform these test?

Other Considerations

- ❑ Do you have an alternate laboratory that can handle your testing should you lab be inoperable?
- ❑ Do you have a plan to get specimens to alternate testing site?
- ❑ Can your laboratory be set-up in another location?
- ❑ Do you have a plan in which equipment is checked post-disaster to make sure it is safe to use?
 - Recertification of BSCs, electrical checks on instruments and equipment
- ❑ Do you have a plan to monitor temperatures in refrigerators/freezers that contain temperature sensitive reagents, media?
 - Do you have a plan of how to QC reagents, media, specimen collection devices, etc. that have been effected by out-of-range temperatures?
 - ❑ Know what the manufacturer's storage requirements

Gather & Disseminate Information

□ Employees

- Cell Phone number
- Home phone number
- Phone number at destination if person evacuated
- E-mail addresses (work and personal)
- Social Security Number
- Relative contact information
- Child care needs
- Dependent care needs
- Pet needs

□ Emergency phone tree

- Laboratory services

□ Disaster hotlines

- Employee hotline number
- Patient hotline number
- Physician hotline number
- In-house paging numbers
- Satellite phone numbers

□ Hospital services numbers

- Maintenance/Facilities
- Hospital administration
- Laboratory administration
- Security
- Housekeeping

□ Vendors

- Contact information (phone and fax number, e-mail)
- Test/analyzer with serial numbers
- Alternate or back-up test/analyzer
- Contact information for alternate or back-up vendor

First Aide Kit

- ❑ Adhesive bandages, assorted shapes and sizes
- ❑ Sterile dressing/gauze
- ❑ Gel hand sanitizer
- ❑ Antiseptic wipes
- ❑ Latex/non-latex gloves
- ❑ Adhesive tape
- ❑ Cold pack
- ❑ Scissors
- ❑ Tweezers
- ❑ OTC medications
 - Pain reliever
 - Laxative or anti-diarrhea medicines
 - Antacid
 - Allergy medicine
 - Anti-bacterial ointment

Personnel Supplies

☐ Food

- Ready-to-eat canned meats, fruits, vegetables
- Canned juice
- Staples (salt, pepper, sugar, Tabasco, etc.)
- High energy foods
- Comfort foods

☐ Water

- 1 gallon of water per person/day (at least 3 days worth)

☐ Blankets, pillows, sheets

☐ Air mattress

☐ Flashlight, batteries, extra bulbs

☐ Medications

- 7 day supply of prescription drugs and OTC medications

☐ Reading material, playing cards

☐ Plastic bags

☐ Portable radio

☐ Pocket change

☐ Toiletries

- Toilet paper, towelettes
- Feminine supplies
- Deodorant
- Soap/shampoo
- Plastic bucket with tight lid
- Gel hand sanitizer

☐ Extra clothes

☐ Cell phone (electric and battery chargers)

☐ Infants/children

- Formula
- Diapers
- Bottles
- Powdered milk

☐ Special items

- Extra glasses/contact lenses and supplies
- Denture needs
- Games, DVDs, cards, books, down-time material

Planning

Equipment

- ❑ Know what equipment is on emergency power
- ❑ Know what instruments require reagent grade water
 - Store extra during disaster seasons (hurricane, winter, etc.)
 - Have way to obtain more if needed (pharmacy, another laboratory, special arrangement with vendor, etc.)
- ❑ Back-up testing or instrumentation
 - Candles, jars, matches for candle jars if needed
 - Perform disk diffusion instead of automated AST if needed
 - Switch to kit tests if instruments not working
- ❑ Monitor critical temperatures on freezers, refrigerators, blood
- ❑ culture instruments, AST instruments, etc.
- ❑ Properly shut-down any non-necessary equipment

Planning (2)

Supplies

- ❑ Know storage conditions for reagents, specimen collection devices, media
 - Do you have a means to record temperatures in the event of no power or in excessive heat?

Computers

- ❑ All files should be backed-up to a secure location
- ❑ For LIS, have back-up procedure ready when computers are not available

Planning (3)

Building (maybe handles by another department)

- Know where cut-off valves are located
- Have blueprint of laboratory lay-out with electrical outlets detailed
- Know where emergency supplies are kept
 - Ensure that supplies are within expiration date

Safety Information & Drills

Make sure that everyone has read and understands your institution's safety manual. All employees should:

- Know internal emergency phone numbers
- Know nearest exit
- Know where disaster supplies are kept
- Participate in disaster drills

Earthquake Preparations

- ❑ Place large heavy objects to lower shelves or on the floor
- ❑ Secure shelves, filing cabinets, equipment, gas cylinders, computers, microscopes, make sure chemicals are in secure cabinet (or contained)
- ❑ Keep copies of design drawings of the facility to be used in assessing the safety of a building after an earthquake
- ❑ Conduct earthquake drills
 - Have hardhats available
 - Take cover under strong piece of furniture

Flooding Preparations

- ❑ Determine what needs to be moved up, out or away
- ❑ Leave drawers and cabinet doors open to prevent them from swelling and sticking shut
- ❑ Wrap equipment in plastic
- ❑ Have pumps and/or "WetVac's" available

Bring a Laboratory Back-up

- ❑ CAP question GEN.42005 Intermittent Testing
 - When a test is put back into production, the following requirements must be met:
 - ❑ PT or alternative assessment performed within 30 days prior to restarting patient testing
 - ❑ Method performance specifications verified, as applicable, within 30 days prior to restarting testing
 - ❑ Competence assessed for analysts within 12 months prior to restarting patient testing

Bring a Laboratory Back-up

Equipment Checks

- Water damage or structural damage
 - Have all electrical equipment checked
 - Have biological safety cabinet re-certified

Regent/Supplies Checks

- How long were your refrigerated items out of temperature range?
- What was your room temperature during/after event?

If temperatures were not maintained, quality control must be performed to ensure test/reagent/media, etc. is performing as expected

Conclusions

- ❑ Know what organisms are typically found in your environment
- ❑ Consider travel history of person who has been in a disaster affected area when identifying organisms
- ❑ Make sure that your laboratory plan fits in with your hospital plan
- ❑ Make sure that all employees understand what is expected of them during these events

Final Thought

"It's no use saying, 'we're doing our best.'

You have got to succeed in doing what is necessary."

– Sir Winston Churchill

Disaster Information Websites

- www.fema.gov/areyouready
- www.ready.gov/america/getakit
- www.redcross.org
- www.bt.cdc.gov/disasters