Emergency Preparedness Plan – Tutorial for Technology Managers

Yadin David, Ed.D., P.E., C.C.E., FAIMBE, FACCE
Biomedical Engineering Consultants, LLC
Asst. Professor, University of Texas School of Public Health
Texas Medical Center, Houston, Texas, USA
Member, IUPESM/HTTG
Member, IFMBE/CED

e-mail: David@BlomedEng.com
www.BlomedEng.com

Health Technology Task Group (HTTG)
Natural Disasters, Armed Conflict, and Public Health
Jennifer Leaning, M.D., and Debarati Guha-Sapir, Ph.D.

Natural disasters and armed conflict have marked human existence throughout history and have always caused peaks in mortality and morbidity. But in recent times, the scale and scope of these events have increased markedly. Since 1990, natural disasters have affected about 217 million people every year, and about 300 million people now live amidst violent insecurity around the world. The immediate and longer-term effects of these disruptions on large populations constitute humanitarian crises. In recent decades, public health interventions in the humanitarian response have made gains in the equity and quality of emergency assistance.

The difference in outcomes was mostly related to preparation & practice

Disasters are known to mankind since beginning of recorded history
Disaster

- Unforeseen and sudden event causes great damage, destruction, and human suffering.
- Disaster comes in variety of:
  - Types,
  - Intensities, and
  - Duration (flood, blackout)
Disaster Types

Natural
- Meteorological - cyclone, hurricane, tornadoes, snowstorm, etc
- Topological - landslide, avalanche, mudflow, flood
- Seismic - earthquake, volcanic, tsunami
- Biological - disease epidemic (i.e. Ebola), insects, food

Man-made
- Warfare
- Civil - riot, strike
- Terrorist, criminal - explosion
- Accident - structural, transportation, plant
  - External/Internal (loss of utilities)
Countries Reporting Emergency/Disaster Experience in the Past 5 years by WHO region

The NEW ENGLAND JOURNAL of MEDICINE

Figure 1. Numbers and Types of Natural Disasters, 1950–2012.
The effect of a disaster on the local economy usually consists of direct consequences (e.g., damage to infrastructure, crops, and housing) and indirect consequences (e.g., loss of revenues, unemployment, and market destabilization). The estimated economic damage is for the year in which the disasters occurred and is given in billions of 2012 U.S. dollars. Data are from the EM-DAT International Disaster Database, Center for Research on the Epidemiology of Disasters, University of Louvain (www.emdat.be/). Although this database tracks biologic events, such events are not shown here because they require very specific analytic approaches and are often not directly connected to geophysical and climate-related disasters.
Emergency Preparedness Plan (EPP) – The Clinical Engineers’ Role

1. The role of health facility
2. Emergency Preparedness Plan (EPP)
   For Likely disasters to be encountered
3. **Before** Disaster Strikes
4. **During** Disaster
5. **After** the Disaster
6. **Resources**
Preparedness Process is a community effort and must include:

- **Plan**
- Manpower, Supplies, Equipment
- **Assigned role**
- Assessment
- Mitigation
- Practice
- Sheltered space
- Command center, sleep
- **Communication**
  - Internal/external
- **Evaluation**
L’Aquila 6.3 Earthquake, Italy, 2009
The Role of Health Facility

Internal Entities

External Entities

Integrated Plan

Community

The Hospital role in disaster impacts the whole community.
1. Before Disaster Strikes

- Know your community/campus/inventory (Facility, equipment, telecommunications, etc.)
- List and prioritize resources and assets (systems, equipment, facilities)
- Design and prepare response plan accordingly, plan for shutdown, plan for alternatives
- Integrate with external agencies
- Plan how will you operate, accommodate
- Practice and exercise
Hospital Incident Command System

A Hospital Incident Command System (HICS) is an example of an ICS planned for hospital personnel.

HICS is based on the same characteristics as the ICS including:

- A clear organization
- Adaptable and scalable
- Quick and easy implementation

This structure is similar to the previous incident command system (ICS) structure, but has expanded. The reporting chains are clear. Additional functions have been added as needed. This structure is not static, but may evolve to include more control over inpatient activities and administration.

The roles for the initial chart are in red.

<<RETURN>>
Technology Disaster Planning

- Become part of the organization EPP
- Relate type/probability of disaster to your systems
- Assess your procedures
- Prioritize focus of systems support
- Get staff involved/trained/practice reporting
- Conduct drills
- Analyze results
Brazil has experienced 37 disastrous floods since 2000, (World Health Organization collaborating center on disasters). Seven occurred in 2009 and four in 2008. The rain-related disasters have affected nearly five million people over the last two decades.

More than 280 people died in Rio State in flooding and landslides last year, and at least 75 more in São Paulo State. That followed the more than 130 who died during heavy rains in Santa Catarina State in 2008.

But disaster experts say that the stark difference in the death tolls in Brazil and Australia, where at least 28 people have died in flooding in the northeast in the past two weeks, reveal a wide gap in the preparedness of the countries and their flood management policies.
Is there a Limit for Preparation?

NO LIGHTS. NO WATER. NO HEAT. IT'S TIMES LIKE THESE WHEN YOU FIND OUT WHAT REALLY POWERS A GREAT HOSPITAL.

NYU LANGONE MEDICAL CENTER IS PROUD TO BE RANKED #1 IN THE U.S. FOR QUALITY AND SAFETY.

New York had never seen anything like it. Hurricane Sandy wreaked havoc on the city. And NYU Langone was no exception. The lights went out, and there was no water or power. Yet, despite it all, our people rose to the moment, successfully evacuating and relocating every single patient.

In spite of these challenges, NYU Langone Medical Center has been named #1 for overall quality and patient safety, a ranking that continues to grow stronger.
Is there a Limit for Preparation?
# Determining Vulnerability

<table>
<thead>
<tr>
<th>Event; Power failure, loss of central oxygen supply</th>
<th>Increasing Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Improbable</td>
</tr>
<tr>
<td>Catastrophic</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Negligible</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Low</strong></th>
<th>Risk is acceptable. Risk has little effect on goals, no additional control measures required.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Moderate</strong></td>
<td>Risk acceptability needs further consideration. Risk has some effect to goals but can be accepted when balanced with benefit. RO must pre-define policies in Risk Management Plan for risks in this level. Policies can include special team reviews (IT, clinical) or review boards, rationales, top management signoff, showing risk has been reduced as low as practicable, etc...</td>
</tr>
<tr>
<td><strong>High</strong></td>
<td>Risk to goals is unacceptable, risk must be reduced before Medical IT network can be used, either by reducing likelihood or by reducing severity.</td>
</tr>
<tr>
<td>Type of Emergency</td>
<td>Probability</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Mass Casualty Incident</td>
<td>HIGH 5</td>
</tr>
<tr>
<td>Mass Casualty Incident (m)</td>
<td>HIGH 5</td>
</tr>
<tr>
<td>Mass Casualty Incident (h)</td>
<td>HIGH 4</td>
</tr>
<tr>
<td>Terrorism, Chemical</td>
<td>HIGH 5</td>
</tr>
<tr>
<td>Terrorism, Biological</td>
<td>HIGH 5</td>
</tr>
<tr>
<td>Terrorism, Nuclear</td>
<td>HIGH 5</td>
</tr>
<tr>
<td>Accidental, Chemical</td>
<td>HIGH 4</td>
</tr>
<tr>
<td>Accidental, Biological</td>
<td>HIGH 1</td>
</tr>
<tr>
<td>Accidental, Nuclear</td>
<td>HIGH 1</td>
</tr>
<tr>
<td>VIP Situation</td>
<td>HIGH 3</td>
</tr>
<tr>
<td>Infant Abduction</td>
<td>HIGH 2</td>
</tr>
<tr>
<td>Hostage Situation</td>
<td>HIGH 3</td>
</tr>
<tr>
<td>Civil Disturbance</td>
<td>HIGH 5</td>
</tr>
<tr>
<td>Labor Action</td>
<td>HIGH 3</td>
</tr>
<tr>
<td>Forensic Admission</td>
<td>HIGH 4</td>
</tr>
<tr>
<td>Bomb Threat</td>
<td>HIGH 5</td>
</tr>
<tr>
<td>Sewer Failure</td>
<td>HIGH 2</td>
</tr>
<tr>
<td>Steam Failure</td>
<td>HIGH 2</td>
</tr>
<tr>
<td>Fire Internal</td>
<td>HIGH 4</td>
</tr>
<tr>
<td>Hurricane</td>
<td>HIGH 3</td>
</tr>
<tr>
<td>Tornado</td>
<td>HIGH 2</td>
</tr>
<tr>
<td>Ice Storm</td>
<td>HIGH 4</td>
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<td></td>
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</tbody>
</table>
# Equipment Vulnerability, Redundancy & Backup Analysis

<table>
<thead>
<tr>
<th>Type of System/Equipment</th>
<th>Probability</th>
<th>Impact</th>
<th>Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Human</td>
<td>Property</td>
<td></td>
</tr>
<tr>
<td>Technological</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

_National Preparedness Guidelines_  
*September 2007*
1. Before Disaster Strikes (continued)

- Practice the whole operation response - do not assume *(trust but validate)*
- Practice response at every level of the operation
- Test alternatives to patient and family management and set priorities (evacuations, environmental controls, medical equipment and communications)
1. Before Disaster Strikes (continued)

- Know your vendors and their capabilities
- Inspect level of emergency stock/expiration date and replenish
- Designate service center location, establish (reporting/media) contact point
- Designate personal and back up teams
  - Group A, Group B, Group C (rotation)
2. During Disaster

- Operations are short in duration and focused
- Assess equipment and system’s conditions, determine impact
- Determine status of critical utilities for patient care equipment (batteries, central/local gases, fuel, vacuum/suction, refrigeration/heating, etc.)
- Assess staffing pool and needs (skills, volume, housing, hygiene, food, family, rest)
- Post current status and date/time stamp it
2. During Disaster (continued)

- Validate environmental conditions (accessibility, cooling, forecast, etc.)
- Assess and implement supplies chain operation
- Understand what services are needed and sustainable
- Consider decontamination protocols and supplies
3. After the Disaster

- Assess equipment and systems condition
- Implement commissioning protocols and priorities
- Perform environmental tests, hazardous material containment, hazardous waste removal
3. After the Disaster (continued)

- Record and document damage and action taken
- Replace equipment subjected to a qualification criteria
4. Resources

- World Wide Disaster Aid and Information via internet, http://www.disaterrelief.org
4. Resources

- National Institute for Occupational Safety and Health,
  [http://www.cdc.gov/niosh/emhazd.html](http://www.cdc.gov/niosh/emhazd.html)

- Disaster Readiness; Addressing Healthcare Technology Needs,

- Center for Disease Control and Prevention,
  [http://www.cdc.gov/mmwr/preview/mmwrhtml/mmstolal.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mmstolal.htm)

- PAHO Emergency Preparedness and Disaster Relief
4. Resources


- Monthly Newsletter: Health Care Security and Disaster Alert, [hcmarketplace.com](http://hcmarketplace.com)

- e-mail Newsletter: Emergency Management Alert, [jkumar@hcpro.com](mailto:jkumar@hcpro.com)

- Bioterrorism and Emergency Preparedness,
4. Resources

- Hospital Emergency Management, Course on-line, [www.eCampus.wuv.edu](http://www.eCampus.wuv.edu)
- Healthcare at the CrossRoads, Joint Commission, [http://www.jointcommission.org/assets/1/18/emergency_preparedness.pdf](http://www.jointcommission.org/assets/1/18/emergency_preparedness.pdf)
- Network Recovery [www.sungardthentnetbeneathyou.com](http://www.sungardthentnetbeneathyou.com)
This is a call for action
To join other initiatives and to
establish a Global Center for Training Health Technology Managers (GCTHTM) in Emergency Preparedness.