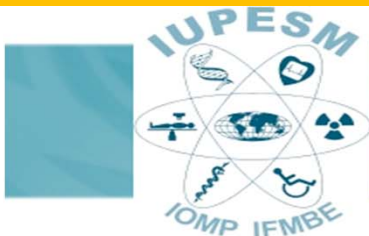


Emergency Preparedness Plan – Tutorial for Technology Managers

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International Union for Physical and Engineering Sciences in Medicine

Health Technology Task Group (HTTG)



THE NEW ENGLAND JOURNAL of MEDICINE

REVIEW ARTICLE

GLOBAL HEALTH

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,¹ and about 300 million people now live amidst violent insecurity around the world.² 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.

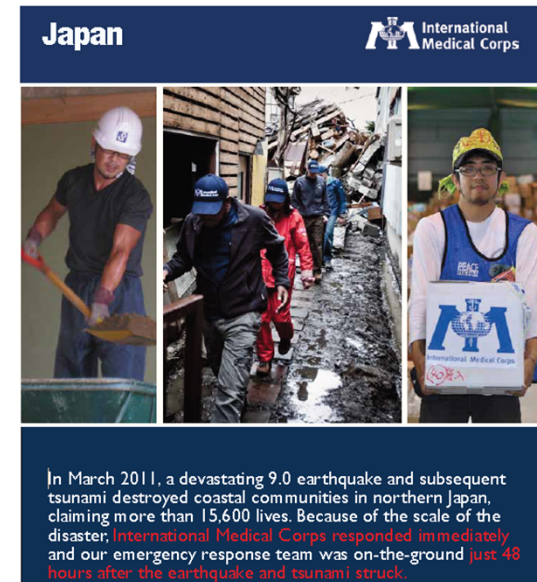
Disasters are known to mankind since beginning of recorded history



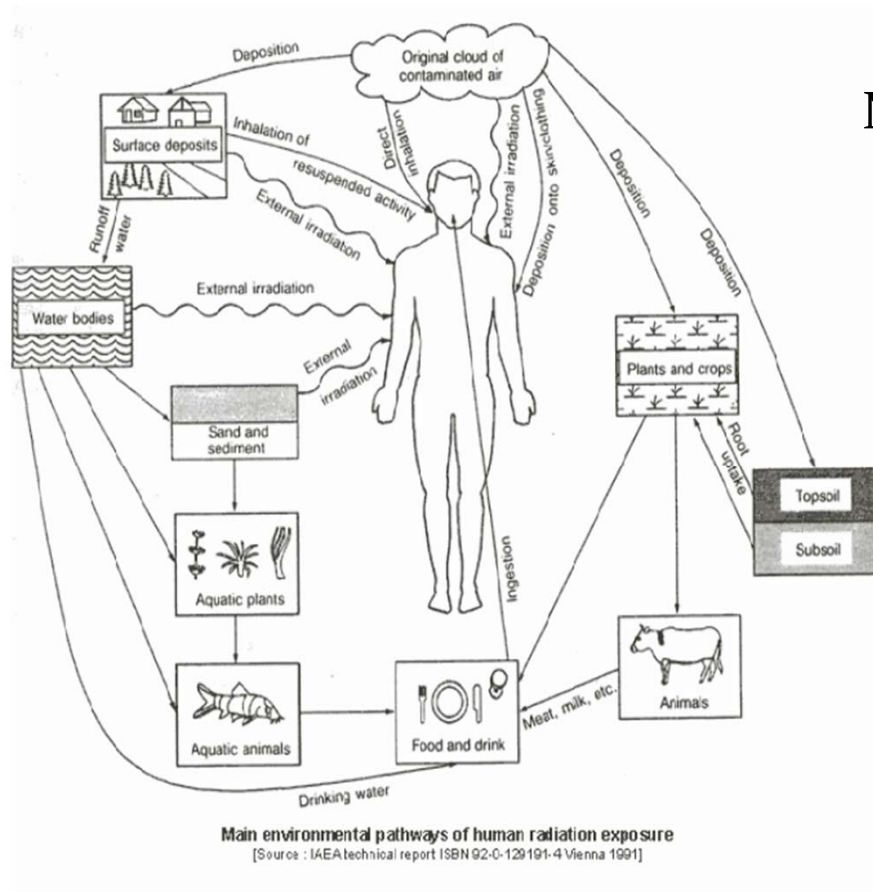
The difference in outcomes was mostly related to preparation & practice

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



Paths of radiation exposure^h

Natural

Meteorological- cyclone, hurricane, tornadoes, snowstorm, etc

Topological – landslide, avalanche, mudflow, flood

Seismic – earthquake, volcanic, tsunami

Biological – disease epidemic, insects, food

Man-made

Warfare

Civil - riot, strike

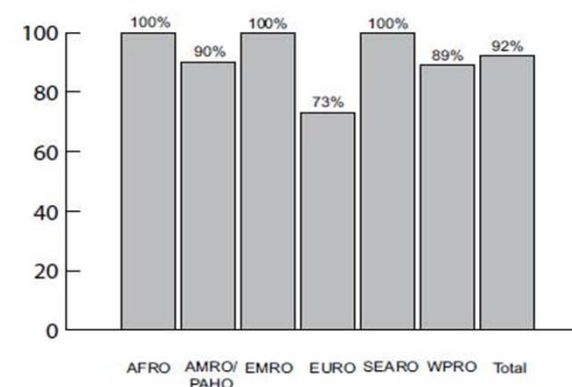
Terrorist, criminal - explosion

Accident – structural, transportation, plant

External/Internal (loss of utilities)

Countries Reporting Emergency/Disaster Experience in the Past 5 years by WHO region

Countries reporting emergency/disaster experience in past five years, by WHO region



The NEW ENGLAND JOURNAL of MEDICINE

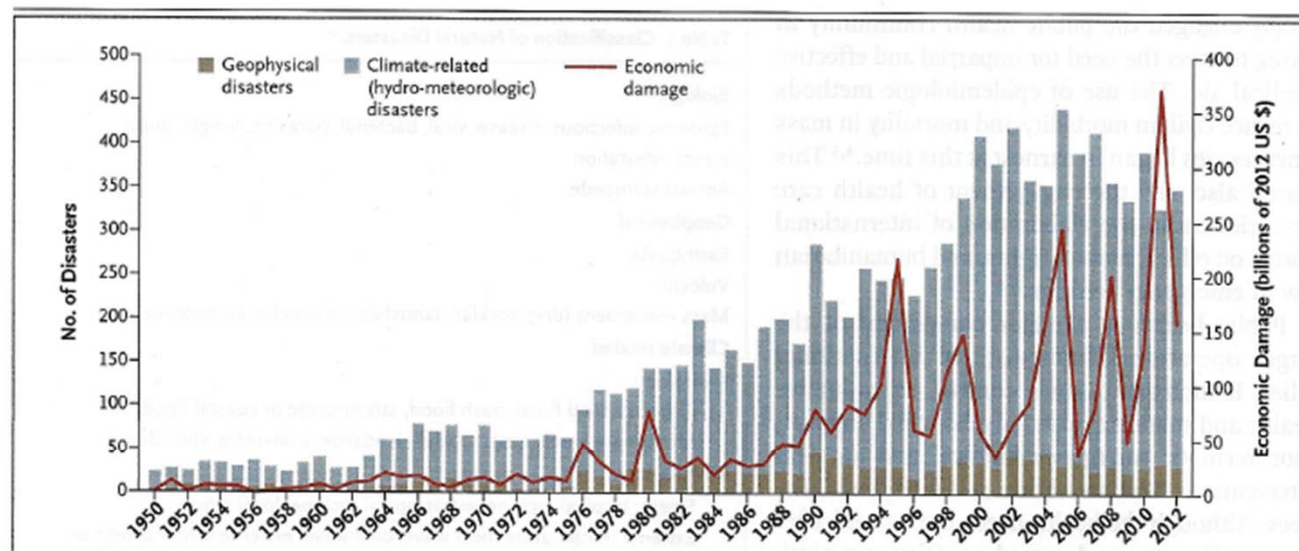


Figure 1. Numbers and Types of Natural Disasters, 1950–2012.

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.

Natural Disasters, Armed Conflict, and Public Health

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N Engl J Med 2013;369:1836-42.

DOI: 10.1056/NEJMr1109877

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Emergency Preparedness Plan (EPP)– The Clinical Engineers' Role

1. The role of health facility
2. Emergency Preparedness Plan (EPP)
Likely disasters to be encountered
3. Before Disaster Strikes
4. During Disaster
5. After the Disaster
6. Resources

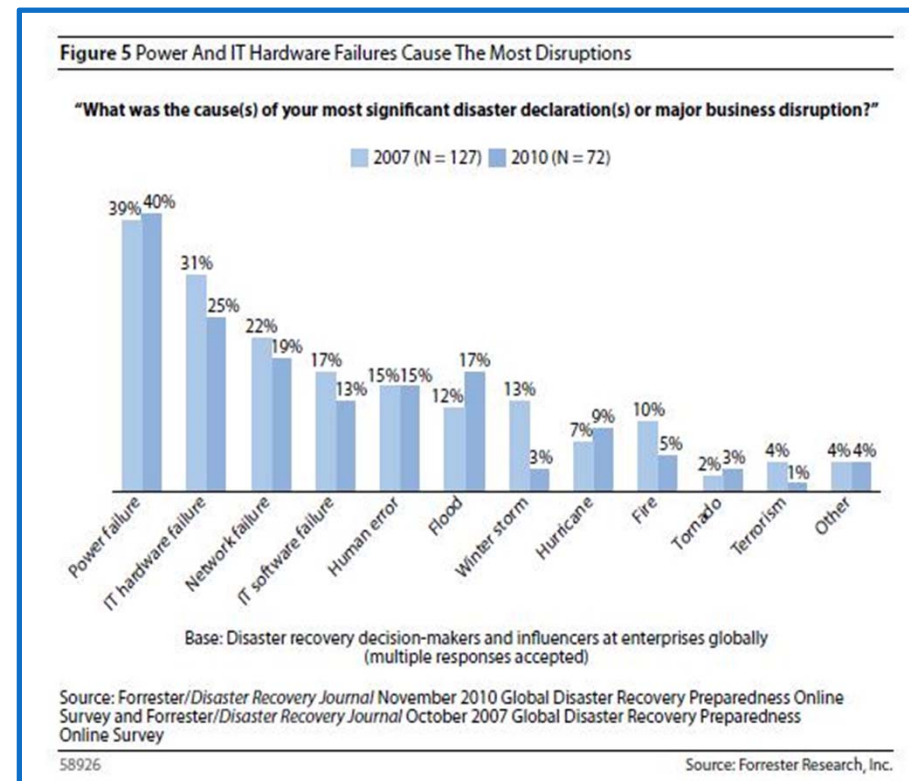
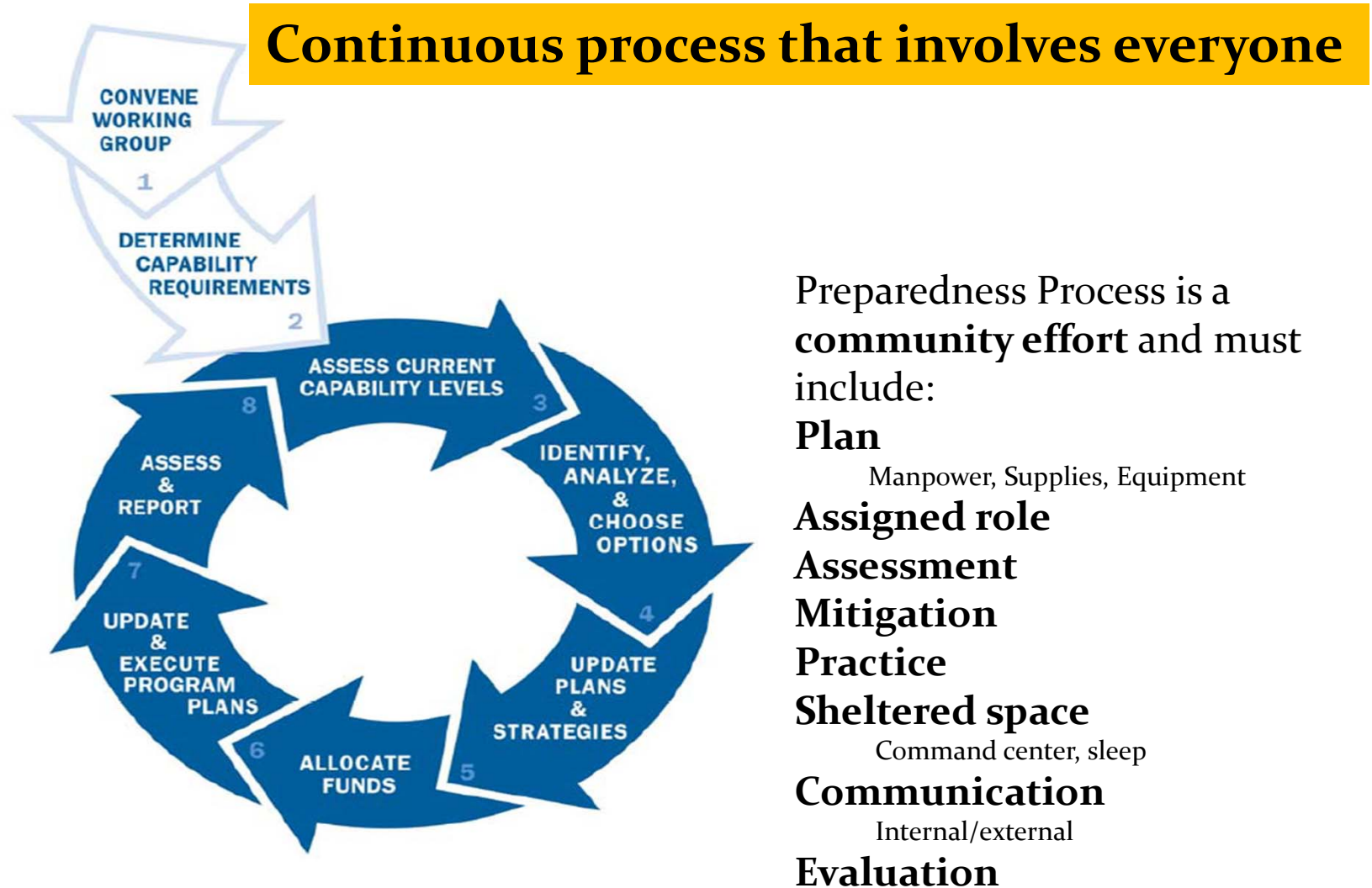


Figure B-2: Capabilities-Based Preparedness Process





HEALTHCARE PREPAREDNESS CAPABILITIES

NATIONAL GUIDANCE FOR HEALTHCARE SYSTEM PREPAREDNESS

JANUARY 2012



ASPR
NATIONAL SECRETARY FOR
PREPAREDNESS AND RESPONSE

Office of the Assistant Secretary for Preparedness and Response
Hospital Preparedness Program

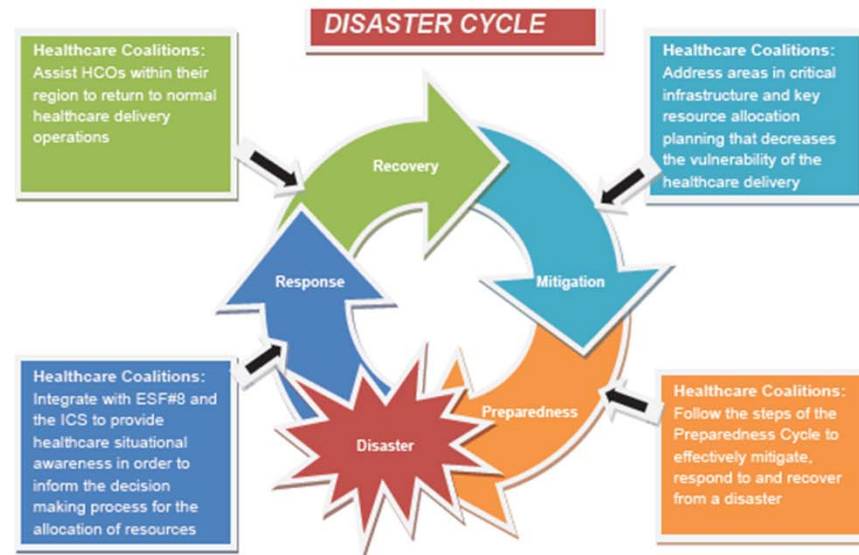
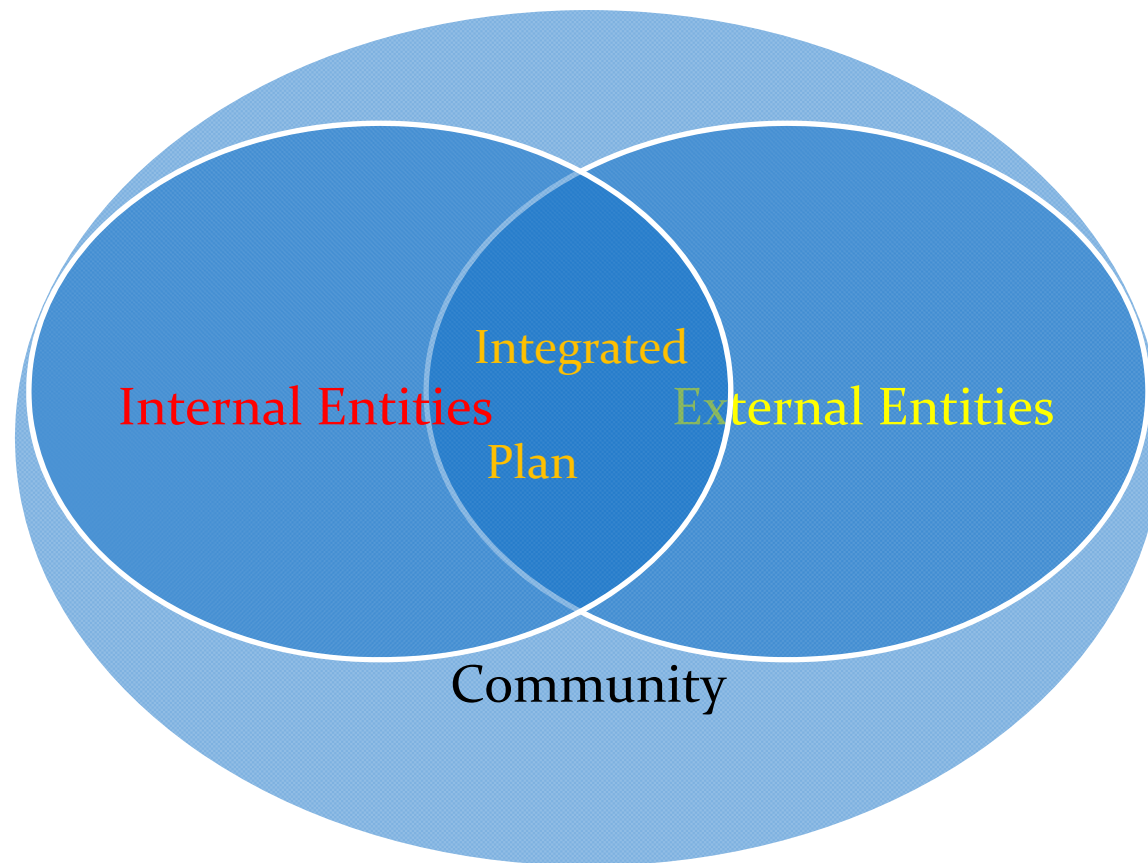


Figure 1: The Healthcare Coalition during Disaster

The Role of Health Facility



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 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.

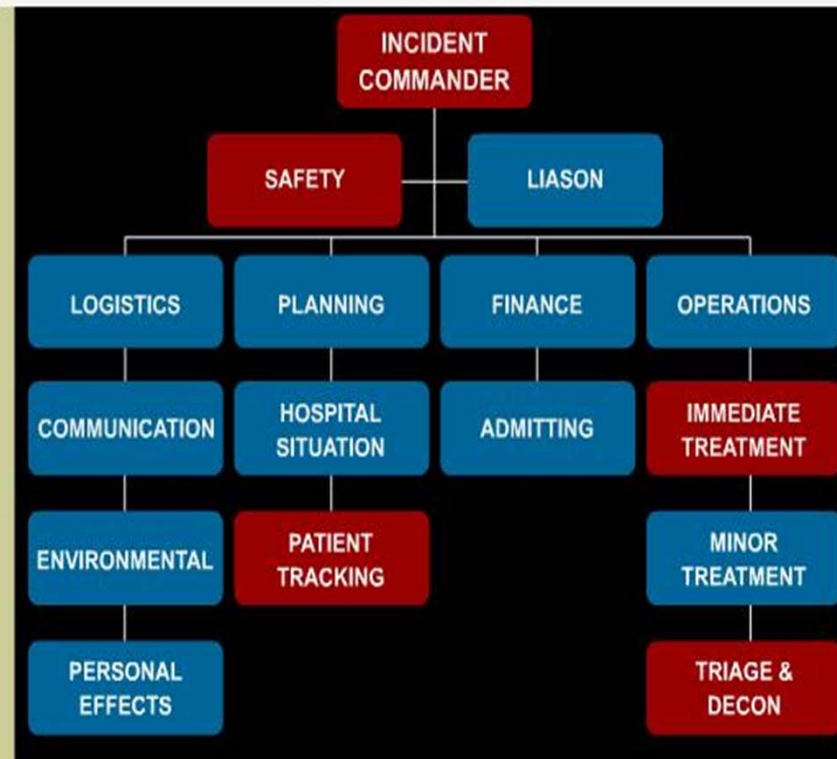
HICS is based on the same characteristics as the ICS including:

- 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



RESOURCES

- ▶ EARTHQUAKES
- ▶ FLOODS
- ▶ GUIDES
- ▶ HEALTH AND SAFETY
- ▶ HURRICANES
- ▶ REPORTS
- ▶ TORNADOES
- ▶ WINTER WEATHER
- ▶ EXTERNAL RESOURCES
- ▶ KEEP UP TO DATE ON OUR RESOURCES



- 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



EPP Does make a difference


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?

THE NEW YORK TIMES, SUNDAY, OCTOBER 20, 2013

**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

Is there a Limit for Preparation?

"All the News
That's Fit to Print"

The New York Times

National Edition

Greater Houston: A mix of sun and clouds. Highs in the 60s. Partly to mostly cloudy tonight. A few spotty showers. Lows upper 40s to near 60. Weather map is on Page B12.

VOL. CLXIII . . . No. 56,320

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THURSDAY, NOVEMBER 14, 2013

Printed in Houston

\$2.50



SERGEY PONOMAREV FOR THE NEW YORK TIMES

PARALYSIS Food and water remained scarce in Tacloban, the Philippines, even as aid piled up at the airport. Page A14.

At a Hospital, Survivors Face Quiet Despair

By KEITH BRADSHER

TACLOBAN, the Philippines — Richard Pulga, a 27-year-old farmer with thick black hair and a gentle manner, has been lying on a hard steel bed in a dark hallway of the main hospital here since Saturday with a shattered lower right leg, abdominal pain and his right eye filling with blood.

One of the first victims of Typhoon Haiyan to be brought to the Eastern Visayas Regional Medical Center, Mr. Pulga was given just an intravenous drip — a bag of saline solution to prevent dehydration. No painkillers, no antibiotics, not even antiseptic to dress the purple, bulging wound on his calf.

He needs an X-ray to assess the damage to his leg. Miraculously, the hospital's X-ray machine made it intact through the typhoon and accompanying storm surge, which partly flooded the hospital's main floor.

But the hospital lacks even the electricity to turn the machine on to check if it works. The only source of power is a gasoline generator the size of a small clothes dryer, which powers the lights in the emergency room and a simple operating room.

Food is in short supply — Mr. Pulga receives just two small bowls of rice porridge a day. "The government should do more for me and fellow victims. It's not enough, we're almost starving

Continued on Page A15



Determining Vulnerability

		Increasing Probability →				
Event; Power failure, loss of central oxygen supply		Improbable	Remote	Occasional	Probable	Frequent
Increasing Severity ↑	Catastrophic					
	High					
	Medium					
	Low					
	Negligible					

Low	Risk is acceptable. Risk has little effect on goals, no additional control measures required.
Moderate	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...
High	Risk to goals is unacceptable, risk must be reduced before Medical IT network can be used, either by reducing likelihood or by reducing severity.

HAZARD VULNERABILITY ANALYSIS CHART

[illegible]

Equipment Vulnerability, Redundancy & Backup Analysis

Type of System/ Equipment	Probability		Impact		Resource
		Human		Property	
Technological					
Supplies					
Human					

National Preparedness Guidelines

September 2007



Homeland
Security



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



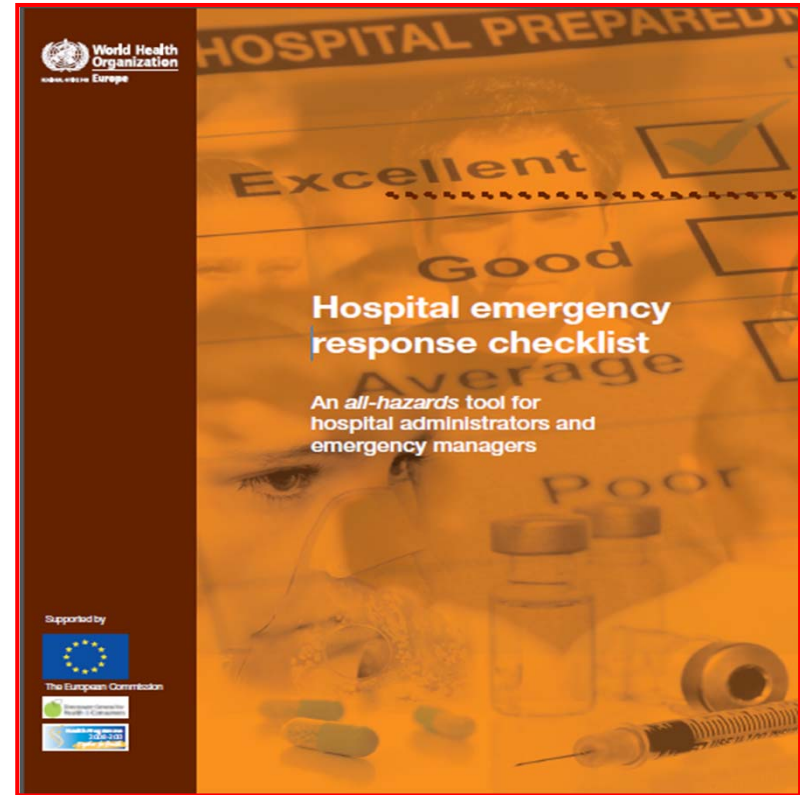
3. After the Disaster (continued)

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



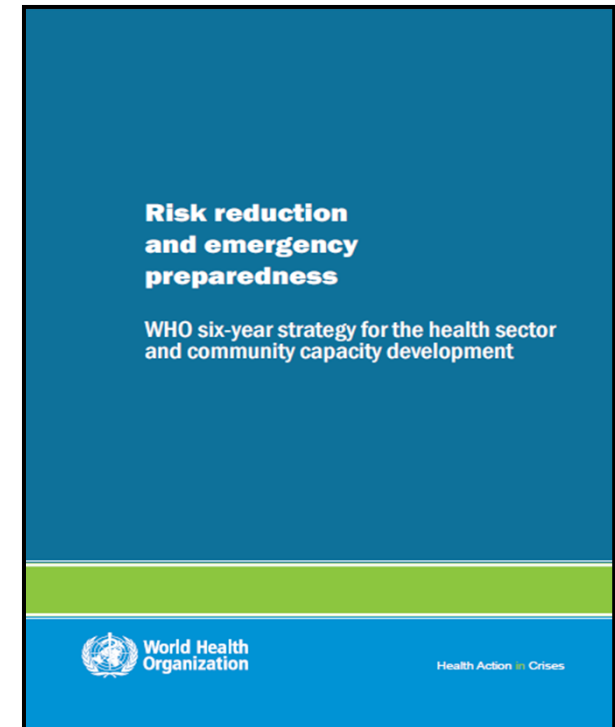
4. Resources

- World Wide Disaster Aid and Information via internet, <http://www.disasterrelief.org>
- *Emergency Preparedness and Response*. World Health Organization.
<http://iaemeuropa.terapad.com/resources/8959/assets/documents/UN%20DMTP%20-%20Disaster%20Preparedness.pdf>
- Federal Emergency Management Agency, <http://www.fema.gov>



4. Resources

- National Institute for Occupational Safety and Health,
<http://www.cdc.gov/niosh/emhazd.html>
- Disaster Readiness; Addressing Healthcare Technology Needs,
ECRI Health Devices Audio Conference, 2002.
- Center for Disease Control and Prevention,
<http://www.cdc.gov/mmwr/preview/mmwrhtml/mmstolal.htm>

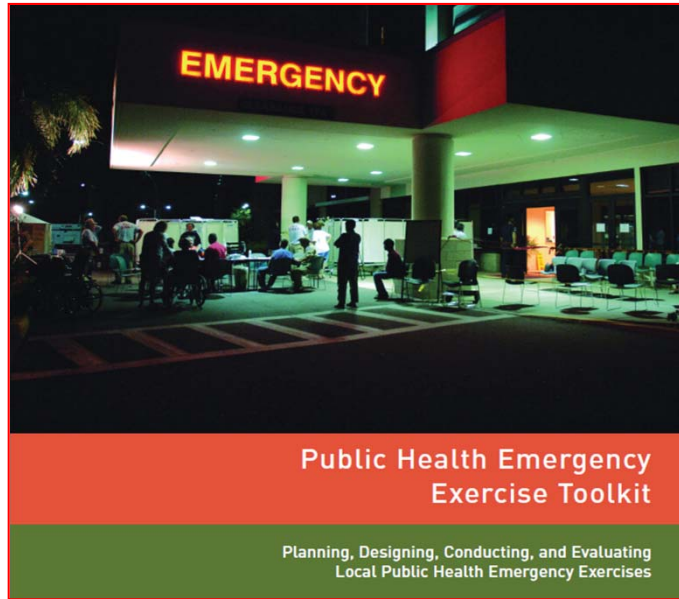


4. Resources

- Medical Technology Preparedness Council of the Advance Medical Technology Association (AdvaMed) (formerly Health Industry Manufacturers Association), <http://www.advamed.org/pubhcdocs/med-tec-preparedness.html>
- Monthly Newsletter: Health Care Security and Disaster Alert, hcmarketplace.com
- e-mail Newsletter: Emergency Management Alert, jkumar@hcpro.com
- Bioterrorism and Emergency Preparedness, ECRI Health Devices Sourcebook, 2003.

4. Resources

- Emergency Management Institute, <http://www.info.gov>
- Hospital Emergency Management, Course on-line, www.eCampus.wuv.edu
- Federal Consumer Information Center, <http://www.info.gov>
- Healthcare at the CrossRoads, Joint Commission, http://www.jointcommission.org/assets/1/18/emergency_preparedness.pdf
- News Site <http://www.cnn.com/specials/2002/prepared.cities/stories/city.comparison.htm>,
- Network Recovery www.sungardthenetbeneathyou.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.**