Digital Technology and Disaster Response - EHRs, Satellites, and RHIOs: Lessons from Tulane University Hospital During Katrina

Third National Emergency Management Summit
Washington, DC: March 5, 2009

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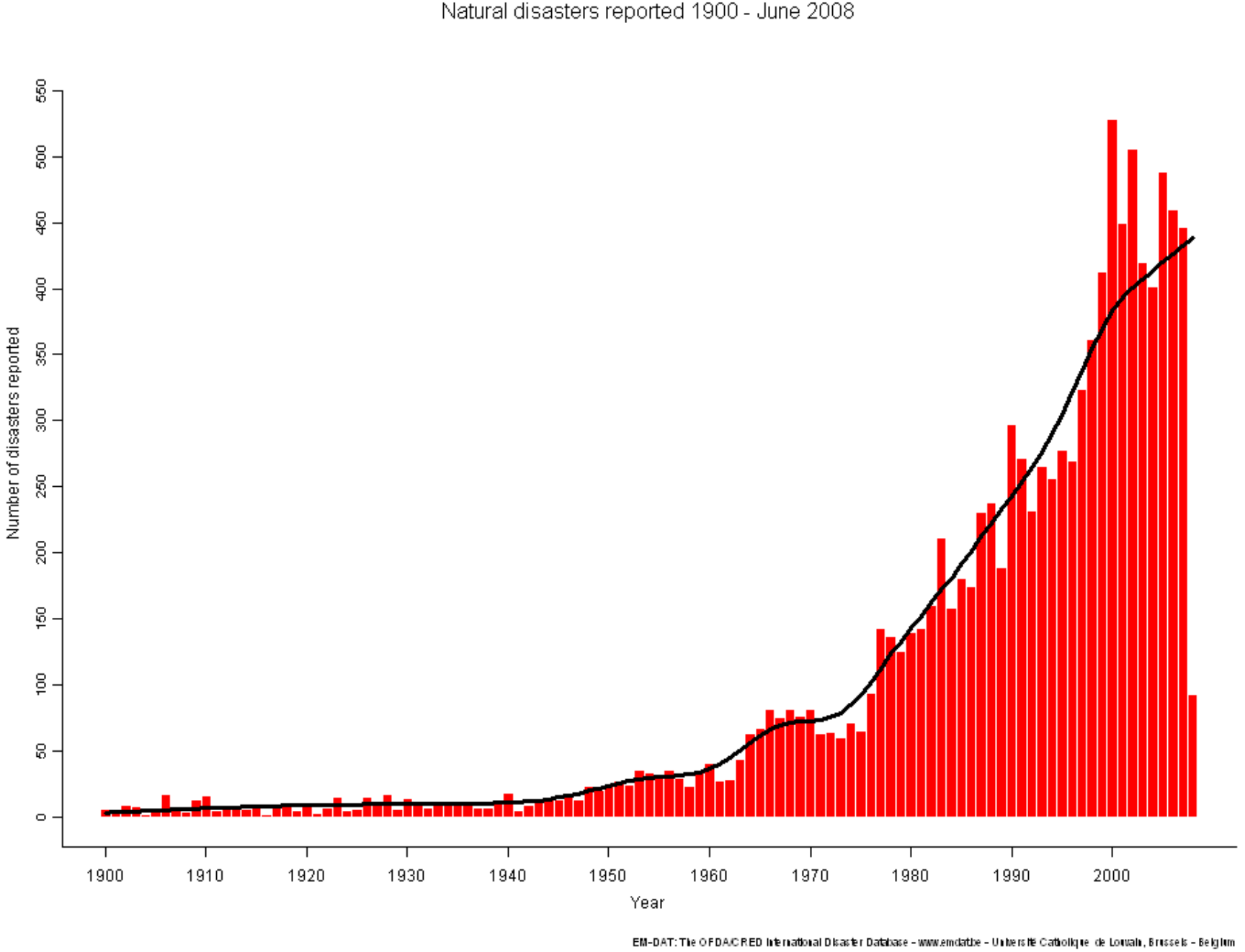
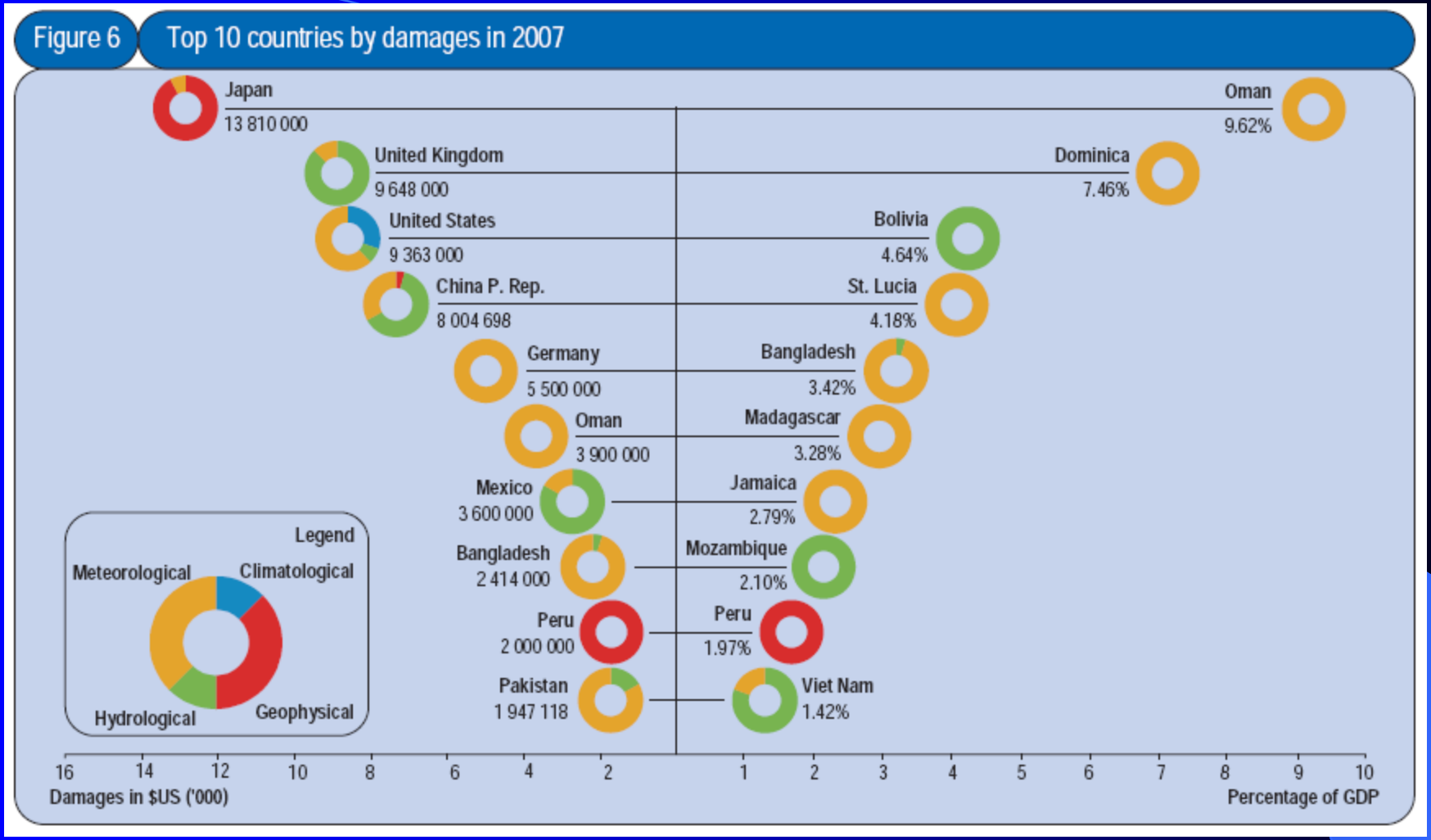
Welcome to Florida
We are here

Seminar Objectives

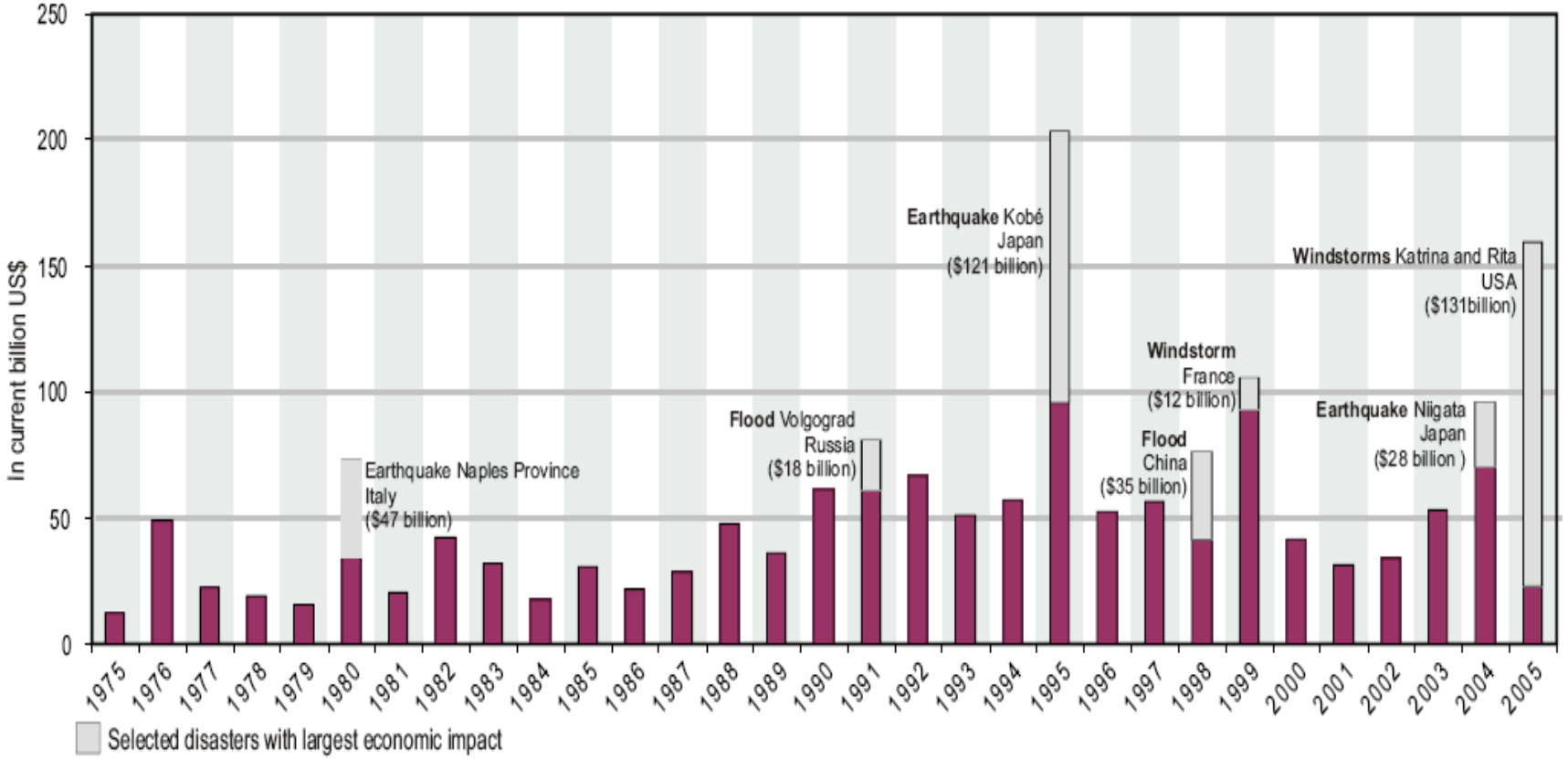
- To assess the current Emergency Disaster Response environment.
- To explore how information technology and wireless technology could have improved Disaster Response at Tulane University Hospital.
- To discuss Regional Health Information Organizations (RHIO's) as a mechanism to enhance disaster response.
- To develop a checklist of information technology initiatives that can promote process improvement in Disaster Response.


Natural disasters reported 1900 - June 2008
Number of disasters reported
0
50
100
150
200
250
300
350
400
450
500
550
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
Year
EM-DAT: The OFDA/CRED International Disaster Database - www.emdat.be - Université Catholique de Louvain, Brussels - Belgium



J. Scheuren, O. le Polain de Waroux, R. Below, D. Guha-Sapir, S. Ponserre **Annual Disaster Statistical Review The Numbers and Trends 2007.** Center for Research on the Epidemiology of Disasters (CRED), Department of Public Health, Université Catholique de Louvain, Brussels, Belgium. **Retrieved from:** http://www.cred.be/ February 04, 2009

Annual reported economic damages from natural disasters: 1975-2005



2005 Disasters in Numbers. cred@epid.ucl.ac.be. www.cred.be.

Table 2 Top 10 most important disaster by victims

Event	Country	Victims
Flood, June-July	China P. Rep.	105004535
Flood, July	India	18701103
Flood, July-August	Bangladesh	13772490
Flood, July	India	11100096
Cyclone Sidr, November	Bangladesh	8982775
Typhoon Sepat, August	China P. Rep., Philippines, Taiwan*	8381854
Flood, September	India	7200080
Flood, August	China P. Rep.	2430026
Flood, May	China P. Rep.	2300093
Drought, January	Zimbabwe	2100000
	Total	179973052

* China P Rep (8 000 039), Philippines (380 003), Taiwan (1812)

J. Scheuren, O. le Polain de Waroux, R. Below, D. Guha-Sapir, S. Ponserre **Annual Disaster Statistical Review The Numbers and Trends 2007.** Center for Research on the Epidemiology of Disasters (CRED), Department of Public Health, Université Catholique de Louvain, Brussels, Belgium. **Retrieved from:** http://www.cred.be/ February 04, 2009

Factors Contributing to Disaster Severity

- Human vulnerability due to poverty & social inequality
- Environmental degradation
- Rapid population growth especially among the poor
- Urban Growth

Sources: CDC & EK Noji, The Public Health Consequences of Disaster

Influence of Urban Growth

Urban population: 1920: 100 million

1980: 1 billion

2004: 2 billion

Source: CDC & EK Noji, The Public Health Consequences of Disaster

Category	2008	2025	2030	Change: 2008-2030	%	Share of World Population Growth
URBAN POPULATION						
United States	252,000,000	305,000,000	318,000,000	66,000,000	26.2%	4.2%
Other More Developed Nations	663,000,000	690,000,000	698,000,000	35,000,000	5.3%	2.2%
MORE DEVELOPED NATIONS	915,000,000	995,000,000	1,016,000,000	101,000,000	11.0%	6.4%
China	560,000,000	822,000,000	880,000,000	320,000,000	57.1%	20.4%
India	342,000,000	611,000,000	687,000,000	345,000,000	100.9%	22.0%
Other Less Developed Nations	1,541,000,000	2,156,000,000	2,382,000,000	841,000,000	54.6%	53.5%
LESS DEVELOPED NATIONS	2,443,000,000	3,589,000,000	3,949,000,000	1,506,000,000	61.6%	95.9%
Total Urban Population	3,358,000,000	4,584,000,000	4,965,000,000	1,607,000,000	47.9%	102.3%
RURAL POPULATION	3,389,000,000	3,427,000,000	3,353,000,000	(36,000,000)	-1.1%	-2.3%
WORLD POPULATION	6,747,000,000	8,011,000,000	8,318,000,000	1,571,000,000	23.3%	100.0%
Urban Share	49.8%	57.2%	59.7%	102.3%		

2008 population interpolated from 2005 & 2010 population.
Source: Calculated from United Natons 2007 Population Revision Database

http://www.demographia.com/db-worldua2015.pdf accessed February 4, 2008

Worlds Largest Cities

Rank	Metropolitan Area	Nation	Population
1	Tokyo-Yokohama	Japan	33,190,000
2	New York	United States	21,362,000
3	Seoul-Inchon	South Korea	19,920,000
4	Mexico City	Mexico	19,620,000
5	Sao Paulo	Brazil	17,720,000
6	Mumbai (Bombay)	India	17,580,000
7	Osaka-Kobe-Kyoto	Japan	16,930,000
8	Los Angeles	United States	16,374,000
9	Manila	Phillipines	14,140,000
10	Cairo	Egypt	14,000,000
11	Calcutta	India	13,940,000
12	Delhi	India	13,720,000
13	Shanghai	China	13,580,000
14	Buenos Aires	Argentina	13,390,000
15	Jakarta	Indonesia	13,330,000
16	Beijing	China	13,160,000
17	Moscow	Russia	13,100,000
18	London	United Kingdom	12,130,000
19	Karachi	Pakistan	11,020,000
20	Rio de Janeiro	Brazil	10,810,000

http://www.demographia.com/db-world-metro2000.htm accessed February 4, 2008

Mass Casualty Incidents

- Mass Casualty Incidents (MCI) represent one of the greatest challenges to a community's emergency response system due to their magnitude and intensity
- International disasters have claimed 3 million lives and have adversely affected 800 million over the past 20 years (1).
- These are in response to such events as:
  - Tsunami-Indonesia
  - Hurricane Katrina- New Orleans
  - May 2008, Cyclone Nargis hit Myanmar resulting in a death toll of 78,000
  - May 2008, earthquake in China, resulting in 39,577 deaths and 236,359 injured (2).

(1) Chan, TC, Killeen, J, Griswold, W & Lenert, L. (2004). Information technology and emergency medical care during disasters. Academic Emergency Medicine 11(11), 1229-1237.

(2) Harrison, Jeffrey P., Harrison, Richard A. and Smith, Megan. Smith "Role of Information Technology in Disaster Medical Response" The Health Care Manager. 27(4). 1-7, 2008.

Emergency Management

- Emergency management is the application of science, technology, planning and management to deal with extreme events that can injure or kill large numbers of people or create extensive property damage (1).
- The challenge in emergency medical response is to insure that adequate personnel, supplies, equipment and protocols are in place to deal with potential threats.
- Emergency medical response requires a plan that is scalable to the threat and coordinates the use of local, regional, and national resources.

(1) Drabek, T.E., & G.J. Hoetmer, eds. 1991. *Emergency Management: Principals and Practice for Local Government.* Washington, D.C.: International City/County Management Association.

Components of Medical Disaster Response

- While no two disasters are identical, the medical, physical, psychological and public health impacts are similar.
- Disaster medical response consists of mass casualty response, incident control, decontamination, comprehensive medical treatment, and public health initiatives (1).
- A key factor is the development of a unified command and control structure linked by a robust informatics network that allows for a clear assessment of the event and the efficient utilization of health care resources.

(1) McLean, M. & Rivera-Rivera, E. (2004).Advanced disaster medical response manual for providers. *Academic Emergency Medicine* 11(9), 998-1001.

Problems in Disaster Response

- Limited Resources
- Inadequate Communication
- Inadequate Data
- Misinformation
- Damaged Infrastructure
- Great Personal Risk

Disaster Informatics

- In the U.S., disaster medical response requires the coordinated efforts of local, state and federal resources.
- International disasters require the involvement of organizations such as the United Nations and the International Committee of the Red Cross along with the host nation in the planning process.
- The application of new communication systems can assist in planning within the chaotic environment of disaster response. Such disaster informatics will enhance mass casualty triage, improve the safety of first responders, facilitate command and control as well as improve overall resource utilization.

Source: Harrison, Jeffrey P. "The Growing Importance of Disaster Medical Response" International Journal of Public Policy. 1(4). 399-406, 2006.

Patient Tracking and Medical Care

- Primary means of information and documentation utilizes paper tags to identify patients from the field to the hospitals
- These tags have many limitations
  - Limited space to record medical data
  - Non- weather resistant
  - Can be easily marred or destroyed

Casualty, Patient and Population Tracking

- Scanning patient wristbands at the disaster site and uploading this data via a wireless LAN, disaster planners can identify the number and location of casualties in order to determine transport to trauma centers and other medical facilities.
- Bar coding will enhance patient tracking, improve patient care and coordinate the efforts of first responders, trauma centers and hospital. More importantly, electronic data then becomes the information necessary for disaster planning, casualty estimation, family notification, etc.
- Collection of DNA provides information and documentation on casualties, patients and humanitarian population
- Opportunities for identification include:
  - Digital Photographs
  - DNA Hair Samples
  - DNA Skin Samples
  - DNA Tooth

Source: Harrison, Jeffrey P. "The Growing Importance of Disaster Medical Response" International Journal of Public Policy. 1(4). 399-406, 2006.

Hurricane Katrina: August 29, 2005

Critical problems involved public sanitation, water safety, infection control, environmental health and access to care (1).

(1) Greenough, P. & Kirsch, T (2005) Public Health Response – Assessing Needs. The New England Journal of Medicine, 353(15); 1544-1547.

The future of disaster medical response

- Effective use of multiple data sources
- New informatics technologies including remote sensors, wireless LANs, GPS technology, patient tracking systems and online medical resource databases will improve disaster medical response
- Informatics technologies will improve patient care, enhance provider safety and provide better command and control in a Disaster situation

Source: Harrison, Jeffrey P. “The Growing Importance of Disaster Medical Response” International Journal of Public Policy. 1(4). 399-406, 2006.

Tulane University Hospital and Clinic

Tulane University Hospital & Clinic

- Ownership – JV Tulane University/HCA
- Academic Medical Center
- Faculty – 400
- Tulane is the #1 employer in New Orleans
- Part of New Orleans Medical Complex with Charity System and VA system
- 3 Campuses
  - TUHC Downtown – 235 beds
  - Tulane Lakeside – 119 beds
  - DePaul Tulane Behavioral Health Center – 110 beds

Source: Presentation by Stephen Baldwin, Associate Vice-President of Tulane University Hospital and Clinic Titled "BMT Programs and Disaster Management: Case Study from Hurricane Katrina"

Statistics at Landfall

- 178 patients (120 Tulane + 58 from Superdome)
  - 35 discharged before storm
  - 11 patients on ventilators
  - 11 pediatric and neonates
  - Two biventricular assist device (***BiVAD***) patients
  - 3 - 450+ lb. patients
  - 3 Bone marrow transplant (BMT) patients
- 60 Superdome evacuees (Arrived with 58 Superdome patients)
- 450 staff and families (At hospital and local hotels)
- 500 Medical School personnel and families
- 25-member University Police force
- 79 dogs, cats and birds

Source: Presentation by Stephen Baldwin, Associate Vice-President of Tulane University Hospital and Clinic Titled "BMT Programs and Disaster Management: Case Study from Hurricane Katrina"


ılane
UNIVERSITY
HOSPITAL & CLINIC

12 hours Post-Landfall

- Water begins rising in the power plant
  - 1 inch every 5-10 minutes
- Office of Emergency Preparedness recommend that we relocate 1st floor departments to higher ground……..AGAIN!
- Received word that levees are breached
- Decision to evacuate
  - How to accomplish
  - Create helipad on garage roof

Source: Presentation by Stephen Baldwin, Associate Vice-President of Tulane University Hospital and Clinic Titled "BMT Programs and Disaster Management: Case Study from Hurricane Katrina"


Tulane University Health Science Center

18 hours Post-Landfall

- Flood waters continue to rise
- Medical Staff triages patients for evacuation
- Helicopters arrive and evacuation begins
- Families separated
- Utilities begin to fail
  - Electricity, elevators, air conditioning, water, telephones
  - Complete loss of emergency power just before dark
  - Liquid Nitrogen levels high to sustain BMT products for 3 weeks

Source: Presentation by Stephen Baldwin, Associate Vice-President of Tulane University Hospital and Clinic Titled "BMT Programs and Disaster Management: Case Study from Hurricane Katrina"

72 hours Post-Landfall

- Evacuation continues
  - Delayed due to rain and fog
- Forty additional Charity Hospital patients arrive and are evacuated
- CNN arrives…..files story….and leaves
- Completion of patient/family evacuation

Source: Presentation by Stephen Baldwin, Associate Vice-President of Tulane University Hospital and Clinic Titled "BMT Programs and Disaster Management: Case Study from Hurricane Katrina"

72 hours Post-Landfall

- FEMA arrives
- US Marines arrive
- Governor's story – "Tulane is evacuated!"
  - ……not quite
- Building locked down
- 400+ staff slept in garage
- 4AM Warehouse Explosion

Source: Presentation by Stephen Baldwin, Associate Vice-President of Tulane University Hospital and Clinic Titled "BMT Programs and Disaster Management: Case Study from Hurricane Katrina"

The unsung heroes of Tulane!!

96 hours Post-Landfall

- Final staff evacuation
- Transportation of employees
  - Helicopters to the Airport
  - Buses to Lafayette
  - Decontamination
  - Shelter
  - Final destination

Source: Presentation by Stephen Baldwin, Associate Vice-President of Tulane University Hospital and Clinic Titled "BMT Programs and Disaster Management: Case Study from Hurricane Katrina"


Marriott

Cleanup and Rebuild

- Remediation - $20-23 million
- Equipment and Supplies - $25-30 million
- Construction - $30-35 million
- Timeline
  - Hospital shutdown – September 1, 2005
  - Remediation begins – September 17, 2005
  - Hospital reopens February 14, 2006
  - Cancer Center and BMT unit open September 2006
  - Complete Reopen – March 1, 2007

Source: Presentation by Stephen Baldwin, Associate Vice-President of Tulane University Hospital and Clinic Titled "BMT Programs and Disaster Management: Case Study from Hurricane Katrina"

Lessons Learned

- Communications – be sure they are effective
- Refine and practice emergency preparedness plans
- Don’t rely on anyone to “rescue you”
- Plan for a total loss of emergency power
- Redefine emergency supply inventory
- Reduce essential personnel to minimum
- Building & Equipment Salvage

Source: Presentation by Stephen Baldwin, Associate Vice-President of Tulane University Hospital and Clinic Titled “BMT Programs and Disaster Management: Case Study from Hurricane Katrina”

Hasty Networks in Hurricane Katrina

- On the morning of August 29, 2005 Hurricane Katrina came ashore in the Gulf Coast of MS and Louisiana causing a 20 foot storm surge and severe wind damage.
- The NPS-led team deployed on 3 September 2005 to Bay St. Louis and Waveland, MS, which was ground zero for Hurricane Katrina. NPS, OASD Information Integration office and several vendors (Cisco, Microsoft, Redline, and Mercury Data Systems) to create the first and only official communication network.
- The network solution provided a publicly accessible set of broadband wireless hotspot clouds in an area that suffered virtually 100% disruption of all communications capabilities.
- NPGS Monterey, California (CA) assisted the Hancock County Operations Center (EOC) by providing them with SATCOM-enabled wireless Internet connectivity to the county hospital, local government offices, police stations, emergency services locations, and the general public.

HASTILY FORMED NETWORKS AFTER ACTION REPORT AND LESSONS LEARNED FROM THE NAVAL POSTGRADUATE SCHOOL'S RESPONSE TO HURRICANE KATRINA 1 - 30 September 2005 Authors Brian Steckler (NPS Faculty) Bryan L. Bradford, Maj, USAF (NPS Student) Steve Urrea, Capt, USMC (NPS Student)

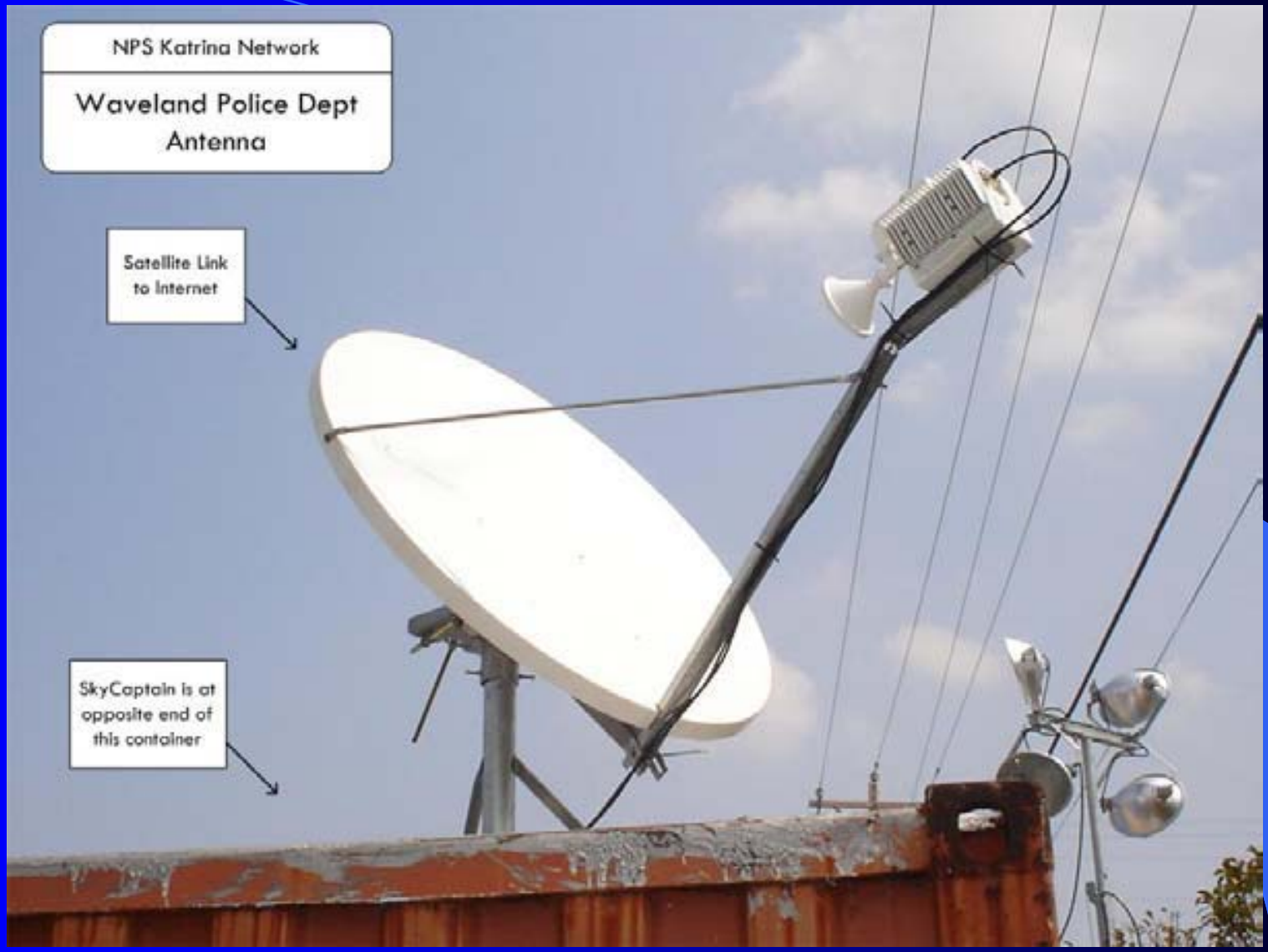
Global Star GSP 7100

(Source: GlobalStar website)

Voltaic Solar Backpack

(Source: Voltaic Website)

The Voltaic solar daypack shown worked well in the area. While it is not designed to charge laptops, it does charge cell phones, satellite phones, PDAs, GPSs, cameras etc. With almost 2,000 cubic inches of storage, it is still a bit small. A 4,000 cubic inch bag would handle more communication equipment.



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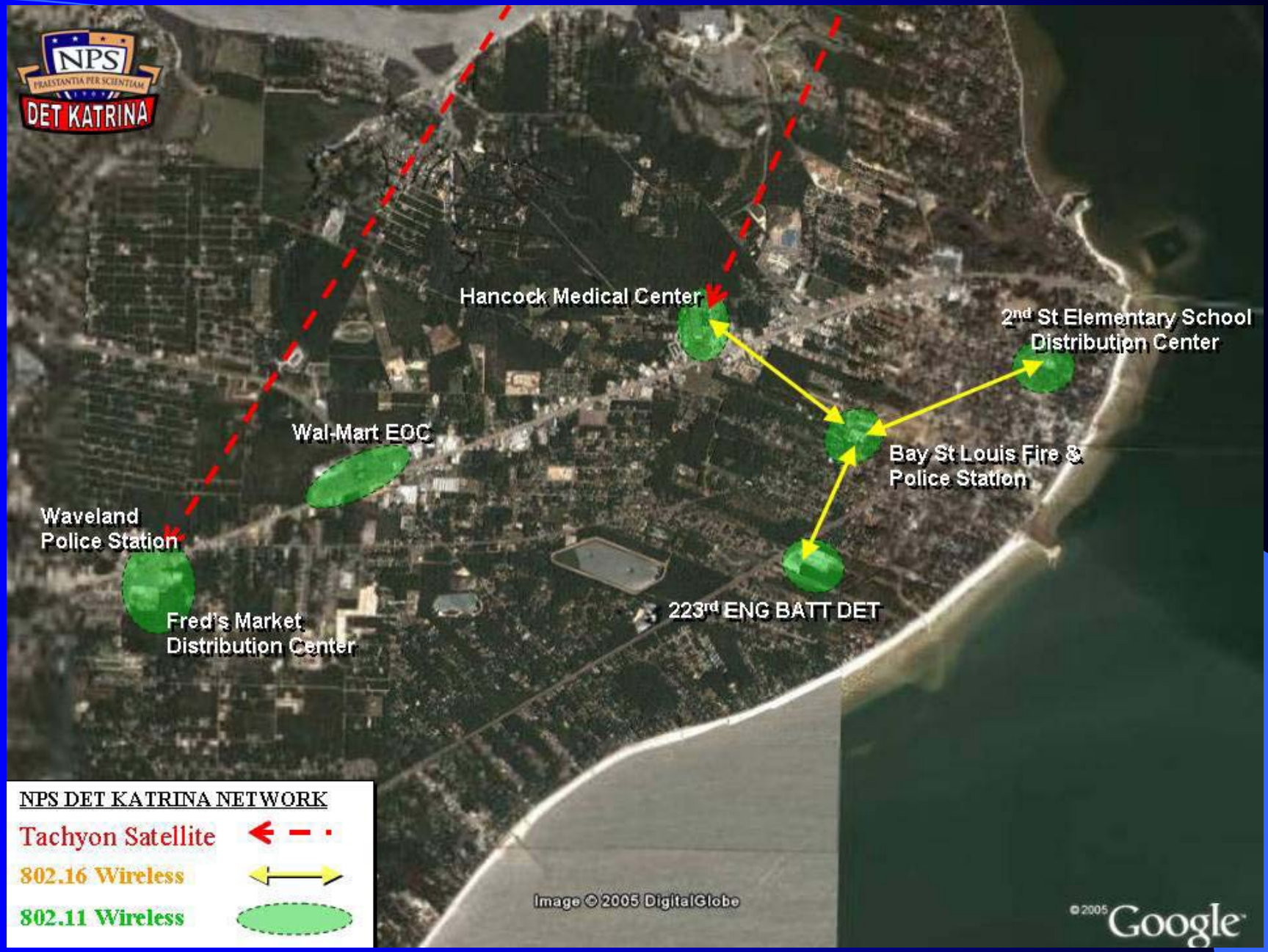

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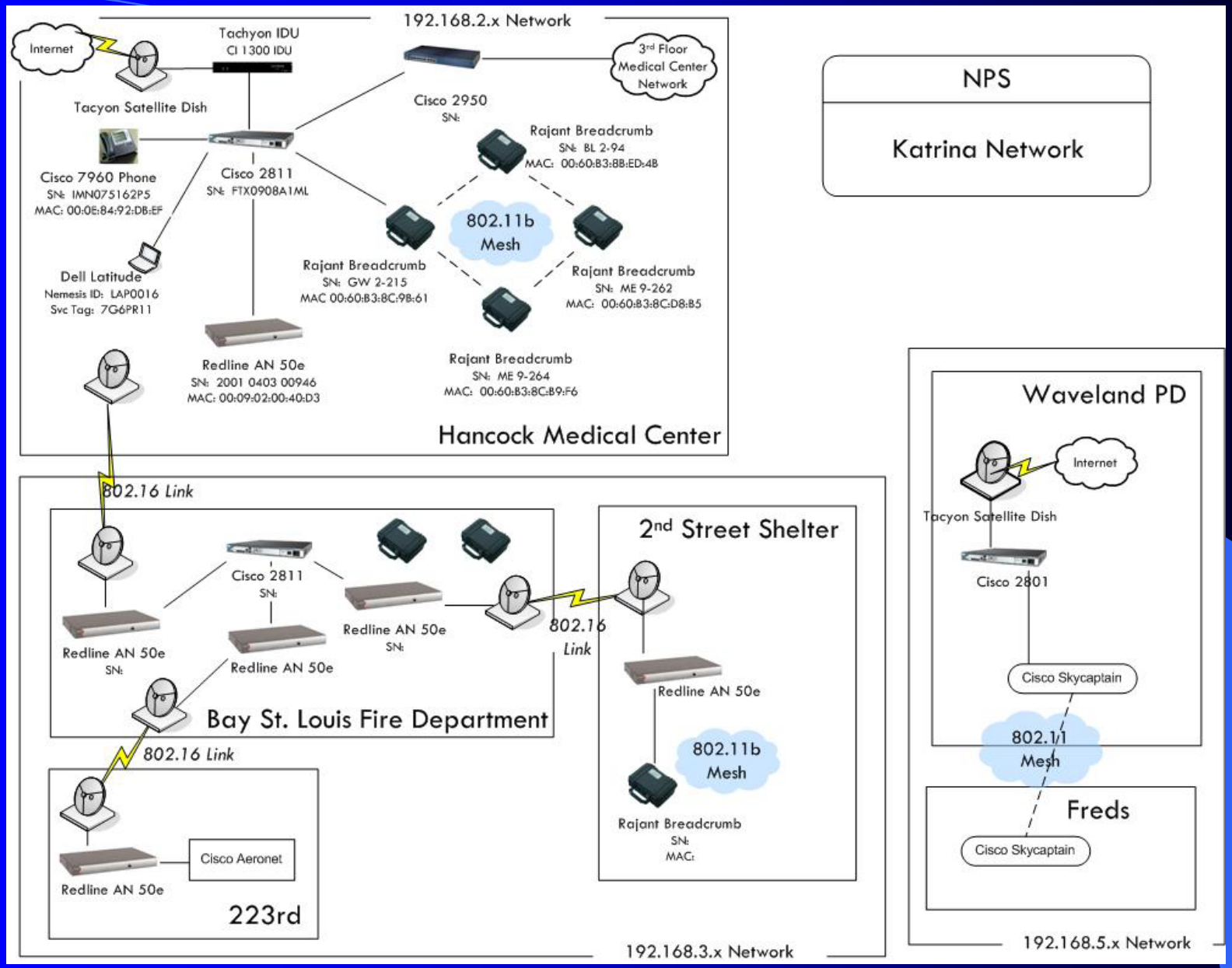

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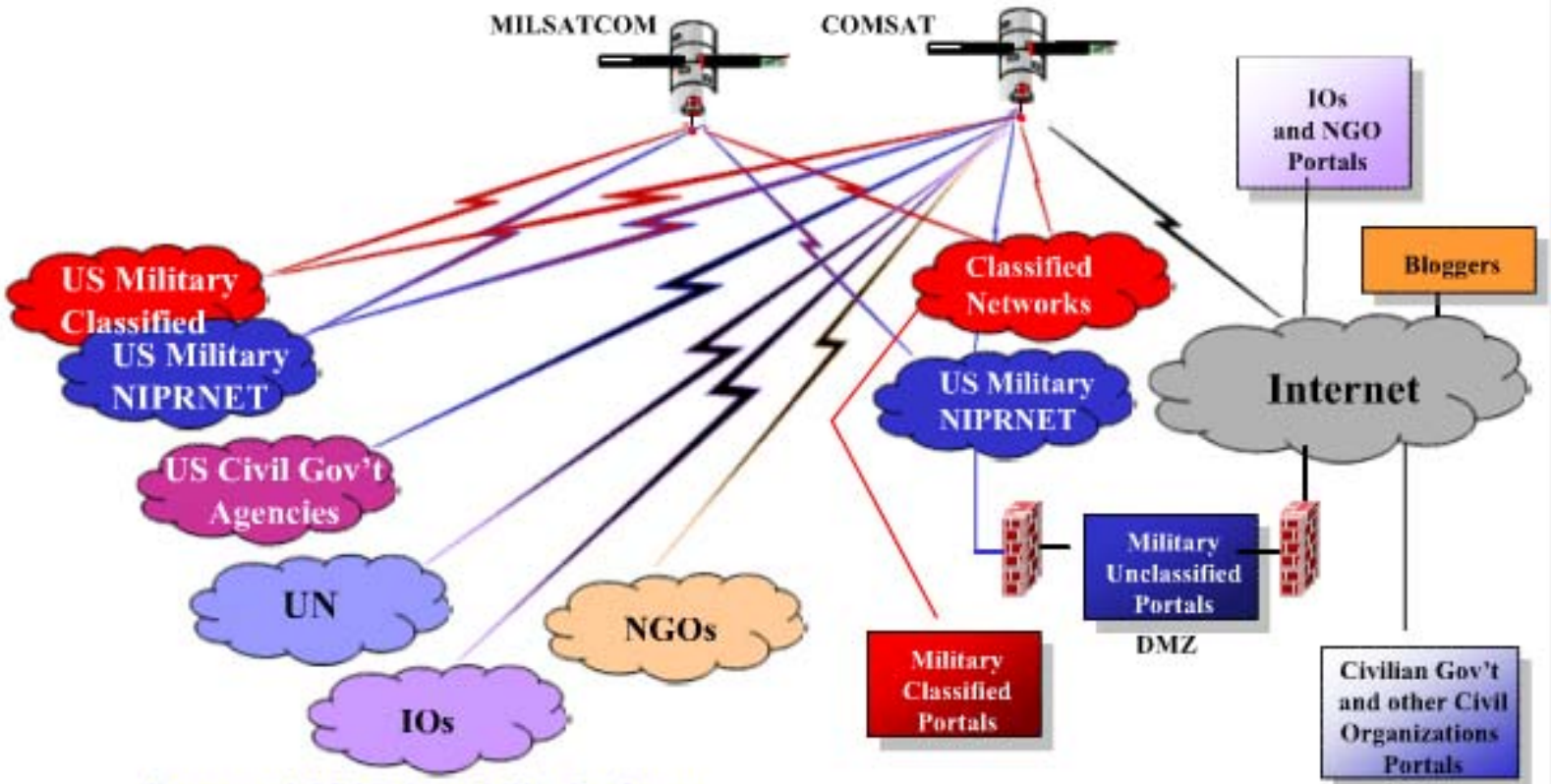
"HFN KATRINA" PRESENTATION:

Civil-Military ICT Baseline

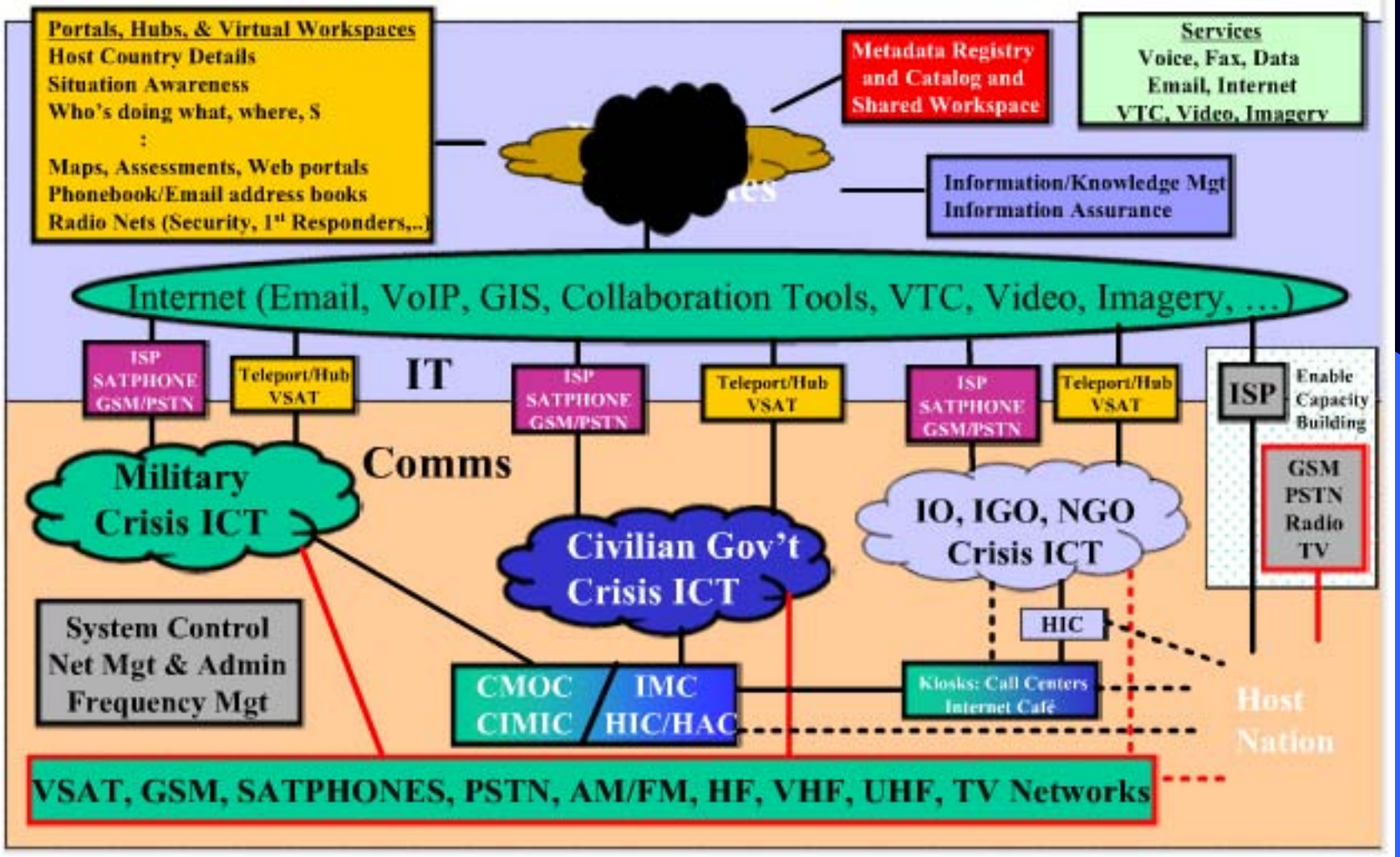
Internet is the "default" civil-military collaborative information network and commercial SATCOM the primary remote access communications means



Source: Naval Post Graduate School, Hastily Formed Networks http://faculty.nps.edu/dl/HFN/index.htm retrieved Jan 29, 2009

"HFN KATRINA" PRESENTATION:

Common ICT Response Architecture



Source: Naval Post Graduate School, Hastily Formed Networks http://faculty.nps.edu/dl/HFN/index.htm retrieved Jan 29, 2009

Estimates on Network Costs

- Hardware Cost for Similarly Configured System: $50,000 to $75,000
- Very Small Aperture Terminal (VSAT) with Large Dish $4,000 per month provides T1 line speed. Tachyon
- Broad Band Local Area Network (BGAN) small teams, 15 minute set up, cost $2 to $7 per megabyte transmitted. INMARSAT BGAN Satellite Services
- Personnel for Setup and Operation

The Nine Element HFN Puzzle

Surrounded by the Civil-Military Boundary and Enabled by Improvisation

HFNs Defined: Introduction

Disaster responders must communicate. They must pool their knowledge and interpretations of the situation, understand what resources are available, assess options, plan responses, then decide, commit, act, and coordinate.

This interactive learning module will help you better understand the tools, configurations and human skills necessary to set up an effective and efficient, on-location, communications network in response to emergency sitiuations.

Use your mouse to select a topic on the HFN puzzle to begin.

Printable (HTML) version of puzzle.

NAVAL POSTGRADUATE SCHOOL

Source: Naval Post Graduate School, Hastily Formed Networks http://faculty.nps.edu/dl/HFN/index.htm retrieved January 29, 2009

Power Sources

- **Solar**
- **Wind**
- **Crank** (bicycle or hand cranking systems provide a small capacity)
- **Hydrogen Fuel Cell (HFC)** (requires delivery via heavy gas bottles)
- **Modified automobile alternator/generator technologies** (using the natural power generation capabilities of automobiles on station to generate power—but again requires fossil fuel delivery or availability).
- Given that each of these power sources have different dependencies (sunlight, wind, physical labor, hydrogen/petroleum fuel, etc.) it is highly advisable to have multiple power generation options available. Typically, there is never sufficient power generation capacity to meet demand

Impact on Humanitarian Assistance

- New information systems, sensors, and extended connectivity enhanced the effectiveness of Humanitarian operations.
- Increased connectivity and the flow of information provided an “untethered” ability to collaborate, regardless of location.
- Data communications were the primary means of gaining situational understanding and ensuring coordination at all levels.
- Even limited information systems and connectivity provided value, allowed leveraging systems to maximize performance
- Information systems increase the need for reliable stable power sources and greater connectivity (bandwidth).

HASTILY FORMED NETWORK CASE STUDY, **USNS Comfort (TAH-20) Humanitarian Outreach Mission to The Caribbean and Central / South America (Summer 2007), Brian Steckler, Scott McKenzie,**A Cebrowski Institute Hastily Formed Network Study

Applications and Communications

- Assuming Responders have computers, Internet access, or cellular service, there will be several critical user applications available such as basic email, web access, file transfer capabilities via File Transfer Protocol (FTP,) and simple messaging systems (SMS) for text-based chat. Other critical user applications include collaboration and online communication tools.
- **Video-teleconferencing**
- **Voice over IP**
- **Websites specializing in Humanitarian Assistance and Disaster Response**
- **GIS mapping tools**

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SATCOM & Internet

- Satellite communications (SATCOM) provides options for Internet when the normal infrastructure copper or fiber optics from the telecommunications companies is destroyed or damaged. SATCOM can be rapidly deployed (less than an hour usually) and while it is a costly way to get Internet access versus normal wired internet access technologies, it is often the only option in disaster regions.
- Internet access speeds will range from 128 kbps to 20-30 mbps
- Very Small Aperture Terminal (VSAT) systems range from the size of a large laptop to 1-3 meter dishes. They can be set up on the ground, building rooftops, tops of RVs, but require clear line of sight to the satellite service provider's transponders on specific satellites.

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Wireless Local Area Network (WLAN)

- WiFi creates “wireless clouds” at Internet access speeds of 1-10 mbps or more in large areas (up to several square miles) with a number of strategically positioned meshed wireless access points (WAPs). This same technology is used in airports, coffee shops, etc, for public wireless access to the Internet.
- WiFi enables:
- Mobile operations for laptops, PDA, hand held VoIP phones, remote sensors for situational awareness, etc.
- Multiple WAPs can be integrated in an area, thereby increasing the footprint of the wireless cloud by using technology known as “wireless mesh.”
- Once you have established a wireless mesh, all Internet applications can be used

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Command and Control

- Handheld PDAs currently being tested within DOD record medical care provided at the disaster site and transfer this data via wireless technology to the disaster response center
- Many of the logistical problems faced in disasters are not caused by shortages of medical resources, but rather from failures to coordinate their distribution.
- Such data could be recorded on real time electronic status boards providing up to date information on patients, personnel and available resources.

Source: Harrison, Jeffrey P. "The Growing Importance of Disaster Medical Response" International Journal of Public Policy. 1(4). 399-406, 2006.

Challenges in Disaster Response

- The challenge is to identify those programs with the greatest potential benefit and prioritize future expenditures in a manner that will best meet the emerging threat.
- Rural communities lack the staff, equipment and training to respond to NBC threats, it is essential that specialized teams be developed and funded to provide disaster response.
- Such teams could be maintained as national assets and be made available to other nations as a deployable disaster response unit. By equipping these deployable units with the best technology and disaster informatics available, a high standard of international disaster medical response could be maintained in a fiscally responsible manner.

Source: Harrison, Jeffrey P. "The Growing Importance of Disaster Medical Response" International Journal of Public Policy. 1(4). 399-406, 2006.

Disaster Medical IT for Planning

- HAvBED system – national real-time hospital bed tracking system to determine the number of available beds in different locations
- Emergency Preparedness Resource Inventory (EPRI) Web-based tool
  - Assess regional supply of critical resources, prepare for incident response, estimate gaps
  - Includes inventory checklist to record where equipment and medicines are located, amount available and how to locate them
- Bioterroism and Epidemic Outbreak Response Model
  - Predicts staff needed to respond to major disease outbreak or attack

Clancy, C. (2007). Emergency Departments in Crisis: Implications for Disaster Preparedness. *American Journal of Medical Quality*. Vol. 22, No. 2; p. 123-126.

Tracking Tools

- GIS (Geographical Information System)
  - Real-time tracking materials and people
  - Coordinate patient care as they are moved from location to location
  - Help first-responders find fastest route
- RFID (Radio frequency identification technology)
  - Track equipment and patients
  - Battery-operated wireless tags
  - Alternative to bar coding

Harrison, J. (2006). The growing importance of disaster medical response. *Int. J. Public Policy,* Vol. 1 No. 4; p. 399-406.
Murphy, D. (2006). Is RFID right for your organization? *Materials Management in Health Care.* Jun 2006. Vol. 15, Iss. 6; p. 28-33.

IT Systems and Software for Disaster Management

- Incident management system – direct, control and coordinate response and recovery operations
  - 86% of hospitals report using an incident management system
  - FEMA developed National Incident Management System after 9/11
- Web-based health information management solution
  - EMSystem software – aids emergency preparedness by optimizing real-time communications, inventory resource allocation, volunteer registry management, patient tracking
- System back-up
  - Evault, Inc.
  - Double-Take for Windows servers

Braun, B., et al. (2006). Integrating Hospitals into Community Emergency Preparedness Planning. *Annals of Internal Medicine.* National Incident Management System. (2008). Retrieved April 5, 2008 from http://www.fema.gov/emergency/nims/

Regional Health Information Organization (RHIO)

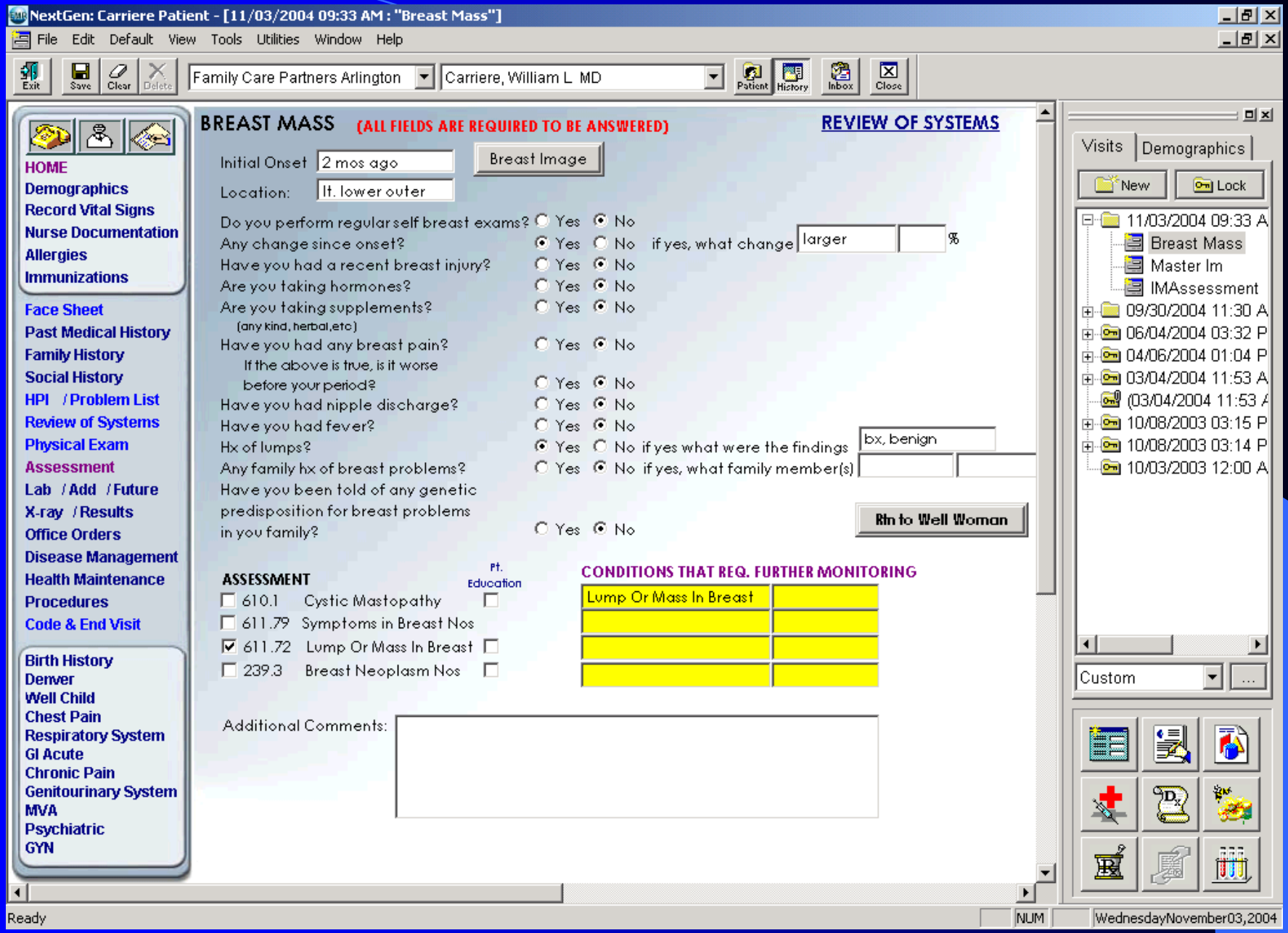
- **Definition –** A Regional Health Information Organization (RHIO) is a multi-stakeholder organization that enables the exchange and use of health information, in a secure manner, for the purpose of promoting the improvement of health quality, safety and efficiency. (1)
- Experts maintain that RHIOs will help eliminate some administrative costs associated with paper-based patient records, provide quick access to automated test results and offer a consolidated view of a patient's history. (1)
- RHIO's can provide the legal and technological framework to share patient data within local communities and across wide geographic areas.

(1) Source: HIMSS RHIO Definition, 2005

RHIO: Key Concepts for Success

- Decentralized architecture built using Internet as communication link.
- Joint governance composed of public and private stakeholders.
- Patient-centric focus with safeguards to protect the privacy of health information.
- Leverage existing technology, expansion of EHRs and federal initiatives as critical enablers.

Source: Sutherland, J (2005). Regional Health Information Organization (RHIO): Opportunities and Risks, White paper CTO PatientKeeper, Inc


NextGen: Carriere Patient - [11/03/2004 09:33 AM : "Breast Mass"]
File Edit Default View Tools Utilities Window Help
Exit Save Clear Delete
Family Care Partners Arlington
Carriere, William L MD
Patient History Inbox Close
HOME
Demographics
Record Vital Signs
Nurse Documentation
Allergies
Immunizations
Face Sheet
Past Medical History
Family History
Social History
HPI / Problem List
Review of Systems
Physical Exam
Assessment
Lab / Add / Future
X-ray / Results
Office Orders
Disease Management
Health Maintenance
Procedures
Code & End Visit
Birth History
Denver
Well Child
Chest Pain
Respiratory System
GI Acute
Chronic Pain
Genitourinary System
MVA
Psychiatric
GYN
BREAST MASS
(ALL FIELDS ARE REQUIRED TO BE ANSWERED)
REVIEW OF SYSTEMS
Initial Onset 2 mos ago
Breast Image
Location: lt. lower outer
Do you perform regular self breast exams? Yes No
Any change since onset? Yes No if yes, what change larger %
Have you had a recent breast injury? Yes No
Are you taking hormones? Yes No
Are you taking supplements? Yes No
(any kind, herbal,etc)
Have you had any breast pain? Yes No
If the above is true, is it worse before your period? Yes No
Have you had nipple discharge? Yes No
Have you had fever? Yes No
Hx of lumps? Yes No if yes what were the findings bx, benign
Any family hx of breast problems? Yes No if yes, what family member(s)
Have you been told of any genetic predisposition for breast problems in you family? Yes No
Rtn to Well Woman
ASSESSMENT
Pt. Education
610.1 Cystic Mastopathy
611.79 Symptoms in Breast Nos
611.72 Lump Or Mass In Breast
239.3 Breast Neoplasm Nos
CONDITIONS THAT REQ. FURTHER MONITORING
Lump Or Mass In Breast
Additional Comments:
Visits
Demographics
New
Lock
11/03/2004 09:33 A
Breast Mass
Master Im
IMAssessment
09/30/2004 11:30 A
06/04/2004 03:32 P
04/06/2004 01:04 P
03/04/2004 11:53 A
(03/04/2004 11:53 A
10/08/2003 03:15 P
10/08/2003 03:14 P
10/03/2003 12:00 A
Custom
Ready
NUM
WednesdayNovember03,2004

Management Implications

- Increased threat leads to investment in Disaster IT and provides opportunities for collaboration across wide geographic areas.
- Continued access to capital is necessary to improve Disaster Response systems.
- Analysis of historic data allows for focused investments in IT to improve efficiency and quality of Disaster Response.
- Disaster Planners are challenged to expand the use of IT in order to improve disaster preparedness, mitigation and prevention.
- Rural communities have minimal resources and require the support of mobile disaster response teams.

Source: Harrison, Jeffrey P. "The Growing Importance of Disaster Medical Response" International Journal of Public Policy. 1(4). 399-406, 2006.

Policy Implications

- As was documented during the Tsunami of December 26, 2004, the ability of communities to respond to cataclysmic events is limited by the availability of local resources. The only realistic approach is to develop a coordinated plan to meet local needs through the timely integration of local, state, federal and in some cases multinational resources.
- Recent events clearly support the development of specialized disaster response teams within the international community. These disaster response teams should be funded sufficiently to operate with state of the art technology and be trained for rapid deployment.
- Additional research in the development of new technology and improved medical treatments combined with strategic stockpiles of antibiotics and vaccines are appropriate.
- Due to the international nature of the threat and the significant expenditures required, a partnership of governmental, educational and research foundations may be appropriate.

Source: Harrison, Jeffrey P. "The Growing Importance of Disaster Medical Response" International Journal of Public Policy. 1(4). 399-406, 2006.

Influenza Pandemic

- **“In the past few months, the media buzz around ‘bird flu’ has died down, but the H5N1 strain of avian influenza has not. It remains a serious danger that we must all face together.”**

  Secretary Mike Leavitt, HHS
  May 15, 2007

Pandemic Influenza in the United States

http://www.hhs.gov/pandemicflu/plan/

Characteristics	Moderate (1958/68 like)	Severe (1918 Like)
Illness	90 Mil. (30%)	90 Mil. (30%0
Outpatient Care	45 Mil. (50%)	45 Mil. (50%)
Hospitalization	865,000	9,900,000
ICU care	128,750	1,485,000
Mechanical Ventilator	64,875	742,500
Deaths	209,000	1,903,000

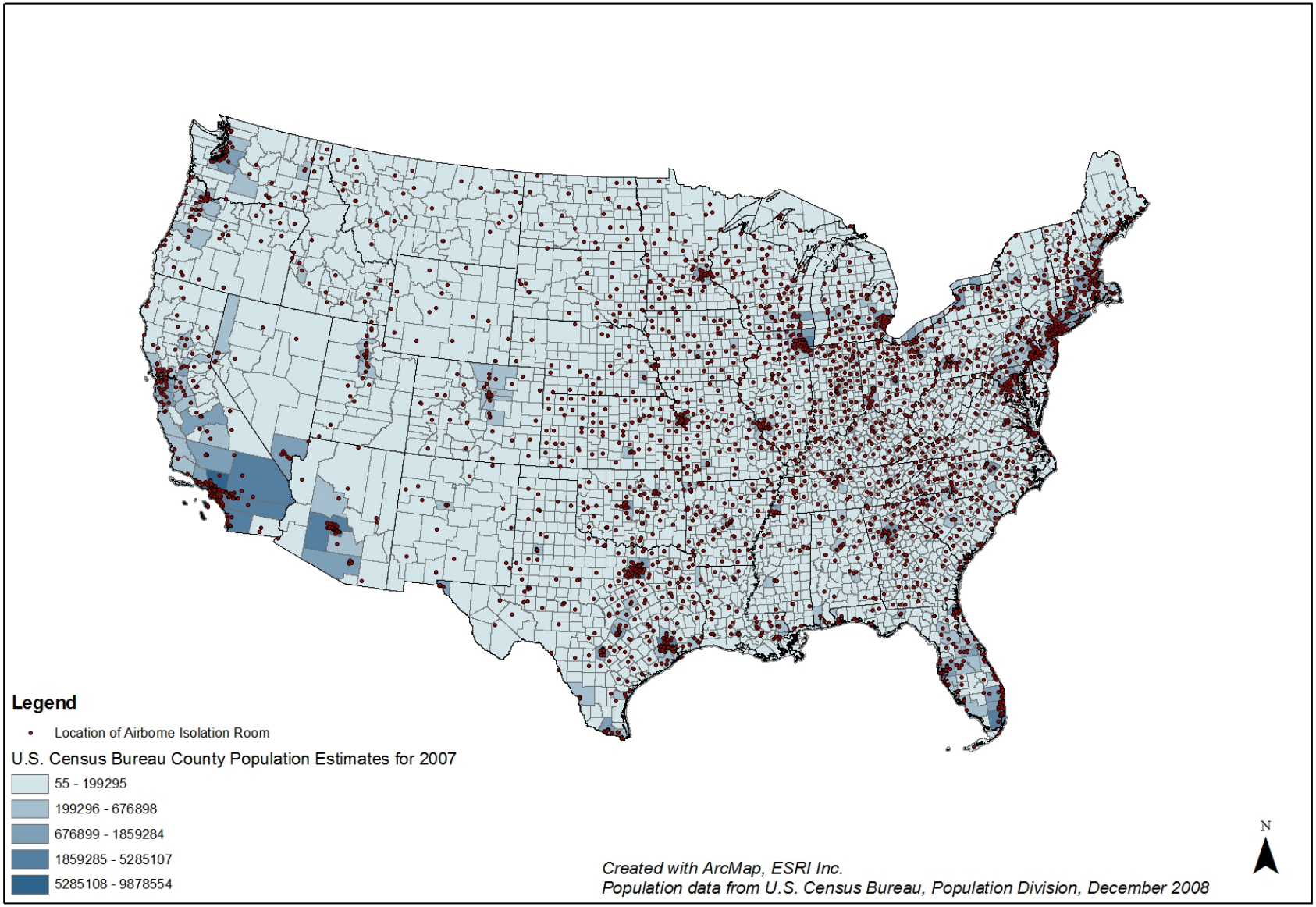
Airborne Infectious Isolation Room Capability by Hospital Size (N=4858)

Bed Size	Hospitals with Airborne Infectious Isolation Rooms	Hospitals without Airborne Infectious Isolation Rooms	Percent of Hospitals With Isolation Rooms
0-24 Beds	194	218	47%
25-49 Beds	639	402	61%
50-99 Beds	608	396	60%
100-199 Beds	768	291	72%
200-299 Beds	478	104	82%
300-399 Beds	280	55	83%
400-499 Beds	160	19	89%
500+ Beds	214	32	87%
Total	3341	1517	69%

Global Positioning Systems

- GPS technology and patient tracking can assist in planning for coordinated patient movement throughout the disaster area. While still under development, miniature CBN threat sensors can document those areas affected by contamination and facilitate the safe movement of patients along the continuum of care.
- Potential drawbacks that are being investigated:
  - Level of location resolution
  - Level of location accuracy
  - Ability to work within structures
  - Signal response delays
  - Acoustic ranging
  - Signal strengths

Figure 1: Airborne Isolation Rooms by Population



A Comprehensive Strategy for Disaster Response

- Embrace information technology in Disaster Response?
- Cost versus Benefit
- Local, State, National and International Focus?
- Advance or retreat?

Disaster Response IT Dashboard

YES NO

- Shared Vision of IT in Disaster Response----------
- Acquire Disaster Hardware and Software (commercial off shelf)--
- Application Architecture with Internet for wide area coverage--
- Integration of Disaster Response IT systems ---------
- Contract with Vendors for Disaster Services (People, Uplink)--
- Use of Wireless Technology ----------
- Mobile Users and Electronic Linkage to Disaster data-
- Integration of Global Positioning System (GPS)-----
- Disaster Data Warehouse with Real Time Access---
- Use of Pre-positioned/ remote Bio Medical Sensors--- ---------
- Use of IT Systems in Disaster Exercise ----------
- Capital investment in Disaster IT ----------
- Deployable Disaster Response IT Teams----------
- Ensure System Redundancy for Infrastructure, Staff, Network--
- Ongoing Research & Investment in Disaster IT---

Questions

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