


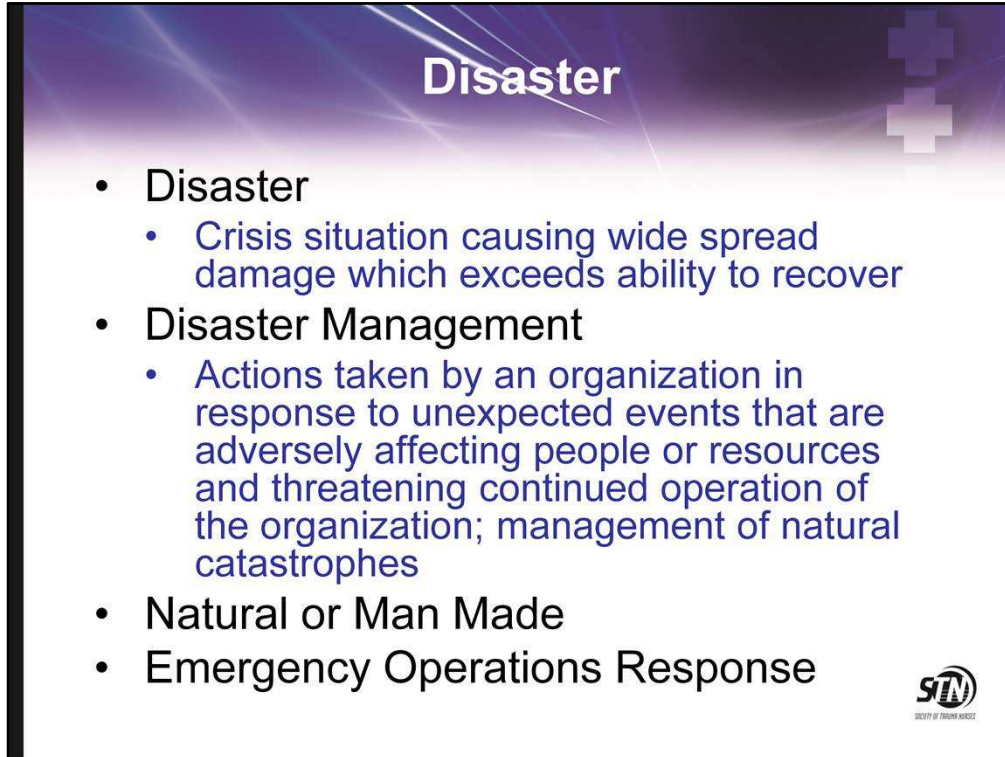
Objectives

At the conclusion of this presentation the participant will be able to:

- Facilitate discussion regarding disaster or medical emergency response operations
- Review the epidemiology of disasters
- Define the role of Public Health in a disaster
- Review the phases of disaster response
- Define the role of hospitals in disaster response



SOCIETY OF TOXICOPHARMACISTS

Review objectives of presentation.



Disaster

- Disaster
 - Crisis situation causing wide spread damage which exceeds ability to recover
- Disaster Management
 - Actions taken by an organization in response to unexpected events that are adversely affecting people or resources and threatening continued operation of the organization; management of natural catastrophes
- Natural or Man Made
- Emergency Operations Response

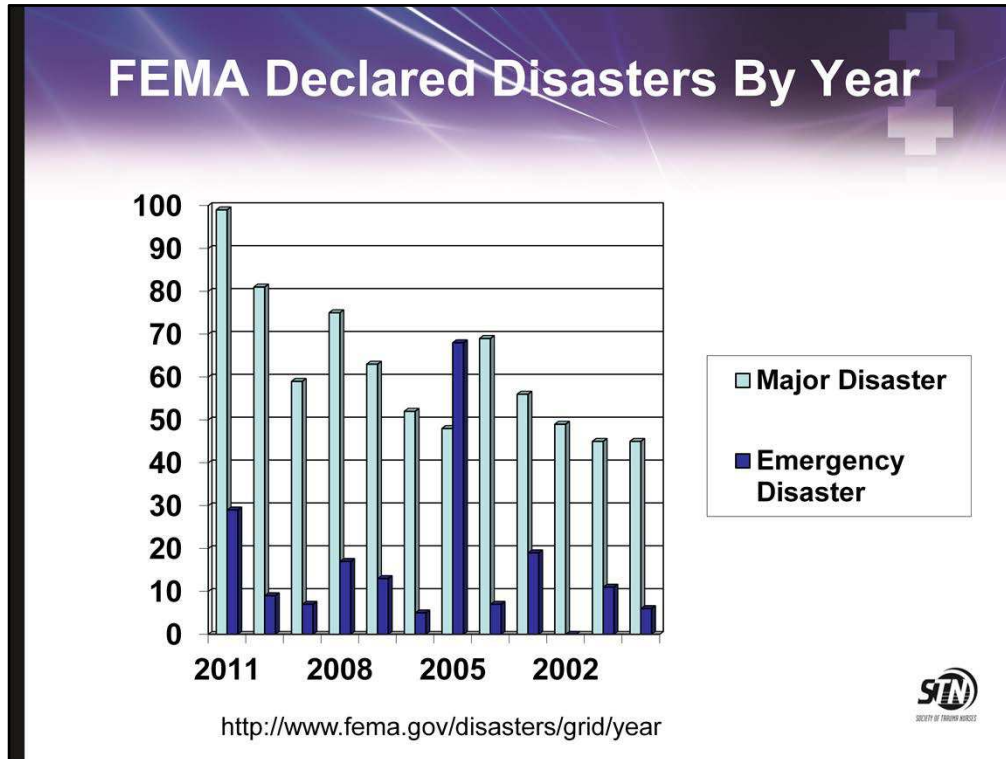


STN
SOCIETY OF TRAVEL NURSES

Review the definition of disaster.

Review with audience participation examples of natural events verses man-made events.

Define the new terminology for disaster is “emergency operations response”.

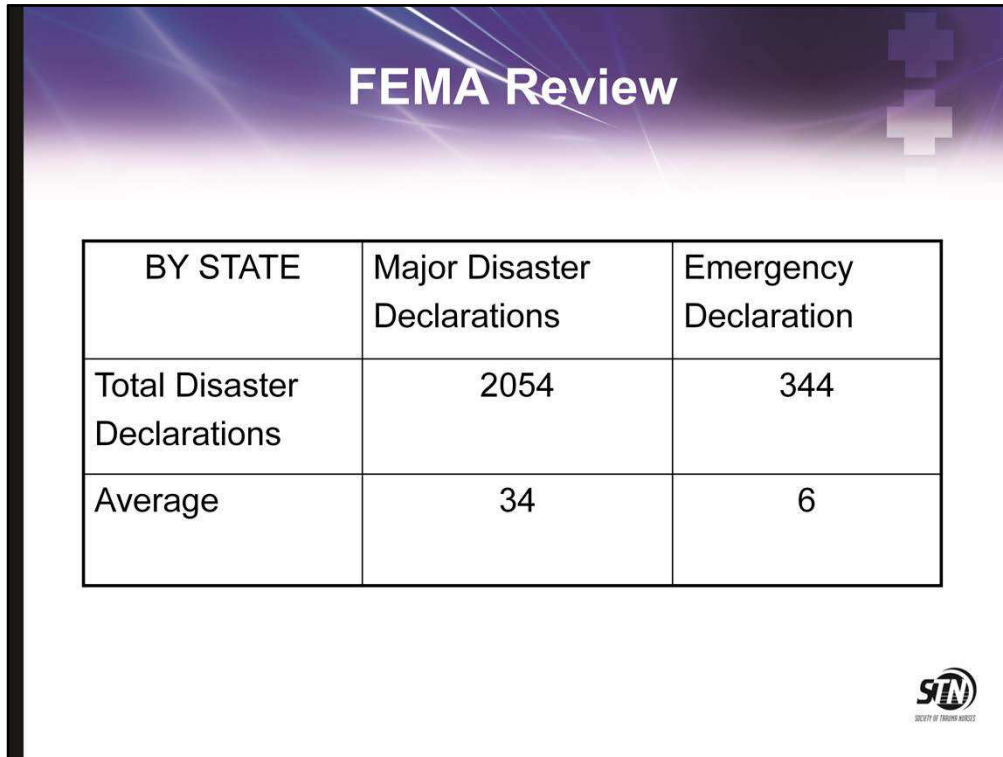


Slides defines the historical overview of emergency response / disaster events from 2002 to 2011 in the United States.

Major disaster response is defined by the State Governor and he/she requests a declaration from the President as a major disaster.


Emergency disaster is defined as an event that was managed by the local response.

Information obtained from FEMA.org <http://www.fema.gov/disasters/grid/year>



FEMA Review

BY STATE	Major Disaster Declarations	Emergency Declaration
Total Disaster Declarations	2054	344
Average	34	6




Total overview of the disaster declarations and emergency declarations compared to the average per state.

FEMA State Major Disaster Declarations

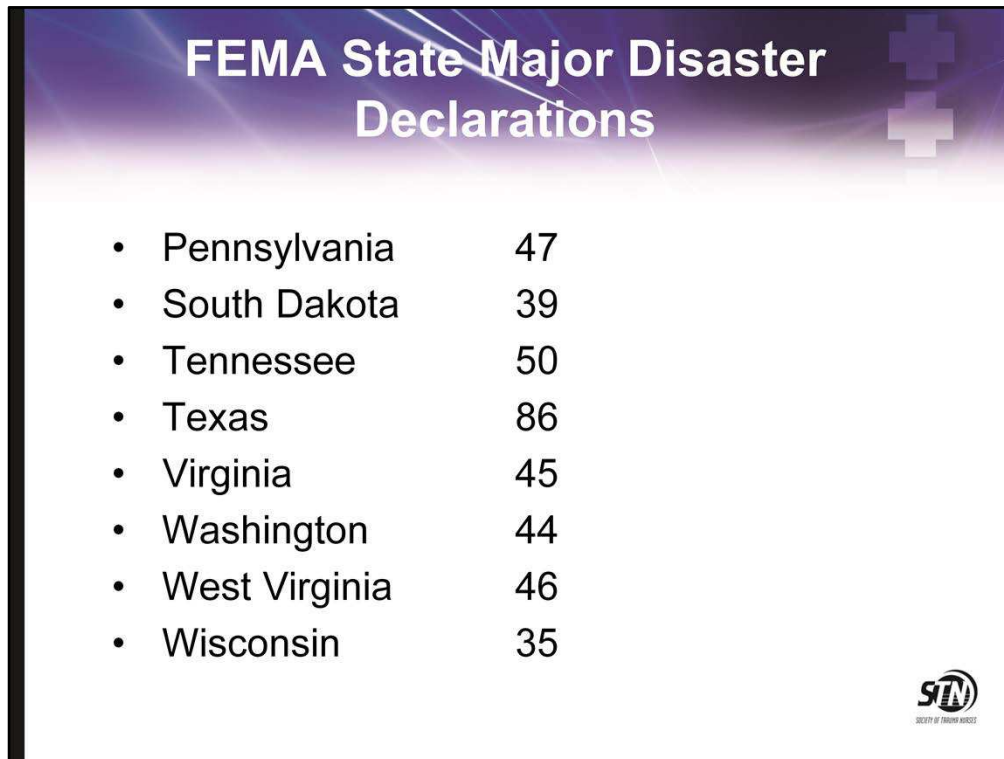
State		State	
Alabama	56	Louisiana	58
Alaska	37	Maine	59
Arkansas	53	Minnesota	48
California	78	Mississippi	50
Florida	63	Missouri	53
Georgia	36	Nebraska	47
Illinois	51	New York	65
Indiana	39	N. Carolina	40
Iowa	48	N. Dakota	42
Kansas	47	Ohio	45
Kentucky	55	Oklahoma	70

<http://www.fema.gov/disasters/grid/state>



This data reflects the states that exceed the average number of major disaster declaration of 34 per state. More on next slide.

Information is available at <http://www.fema.gov/disasters/grid/state>



Continuation of data reflecting those states that exceed the average number (34) of major disaster declarations.

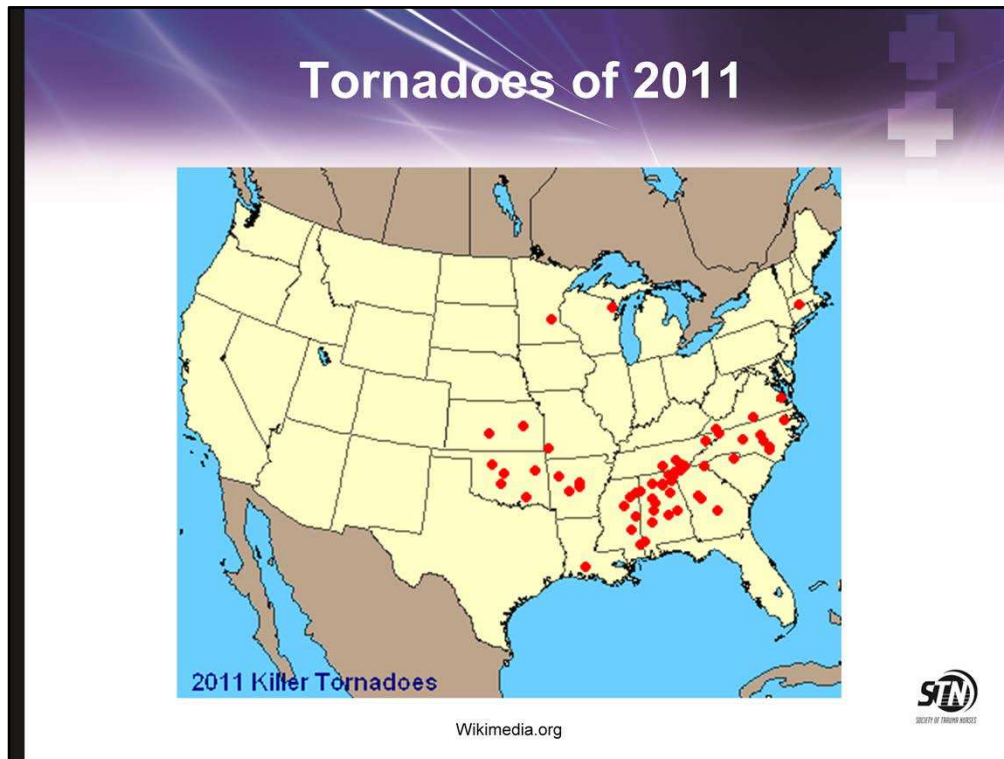


Disasters in 2011

- Total Weather Losses: \$35 Billion
- 700 US Disaster Deaths
- US - 10 Weather Catastrophes
- 5 Tornado Outbreaks
- Two Different Major River Floods
- Drought In Southwest
- Blizzards in Midwest / Northeast
- Hurricane Irene
- East Coast Earthquake
- Oppressive and Unrelenting Heat


SOCIETY OF TOXIC NURSES

List of disaster events for 2011 in the United States.



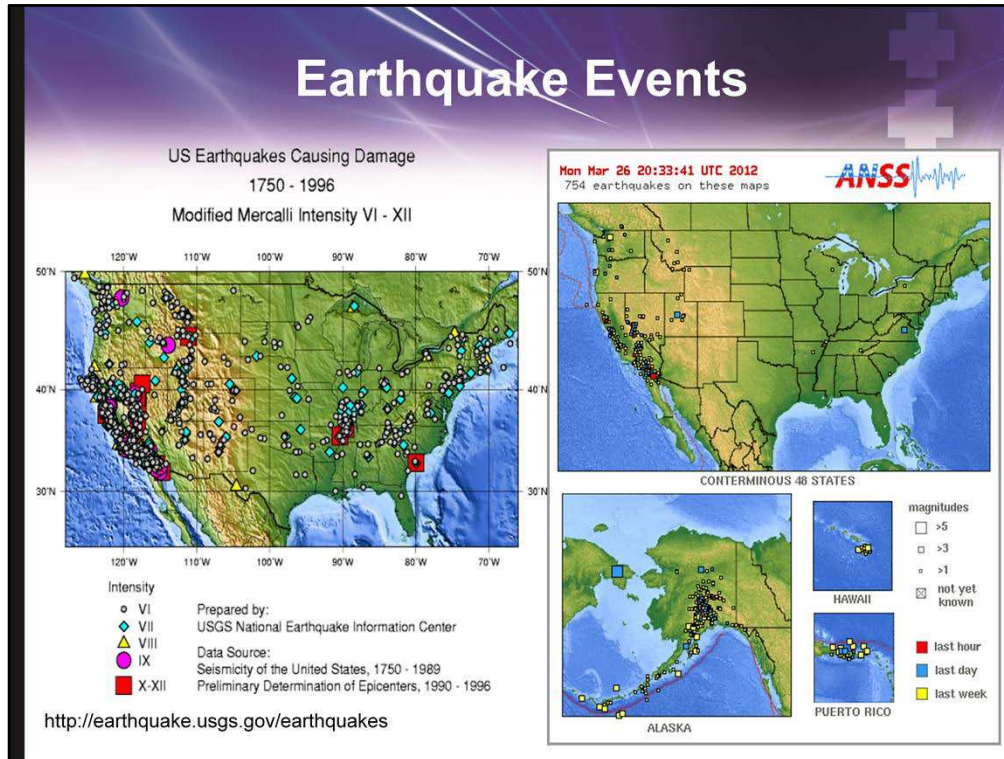
Map reflects the tornadoes of 2011 that produced fatalities. The point is to define tornadoes as a natural hazard in regions of the United States.



Picture is of a tornado event passing over the roof of a hospital on April 3rd with 11 tornadoes on the ground in Dallas County. (2012 Parkland Hospital)

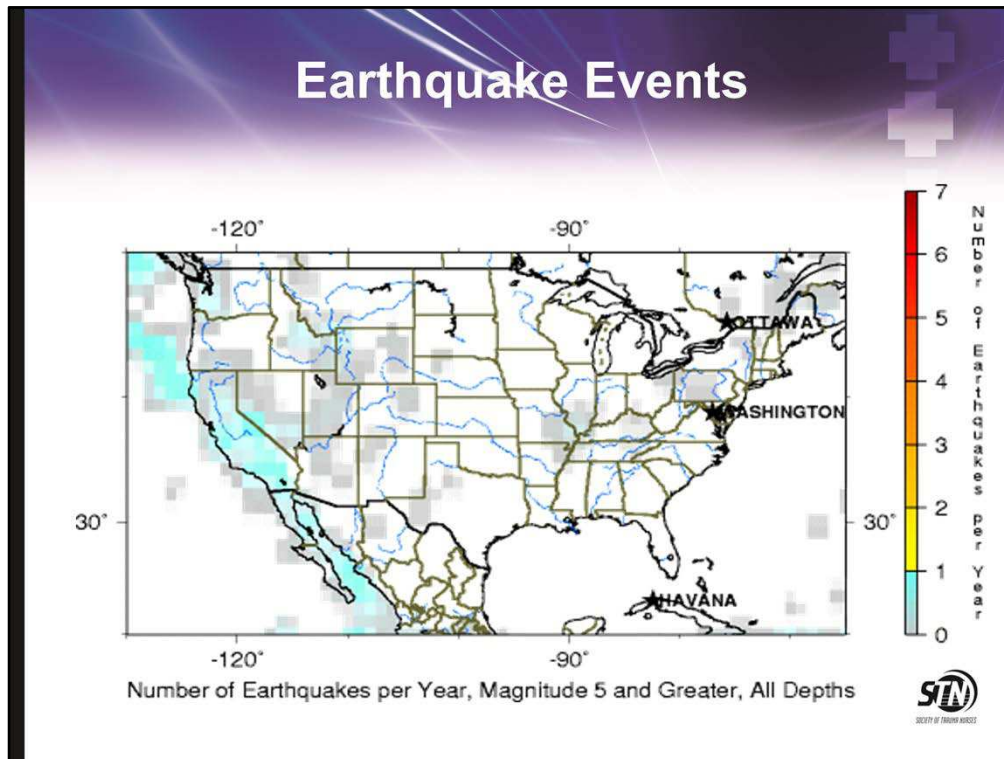


Joplin, Missouri, is a community of approximately 50,000 citizens. On Sunday, May 22, 2011, at 5:41 an EF5 tornado with a wind of 250 miles per hour hit the community and took its first “direct hit” on Mercy-St. John Hospital. The tornado hit one side of the building, and blew out windows and walls. Power was lost, water, gas and sewer pipes were disrupted. Liquid oxygen tanks were damaged and spewing. The hospital was emergently evacuated.

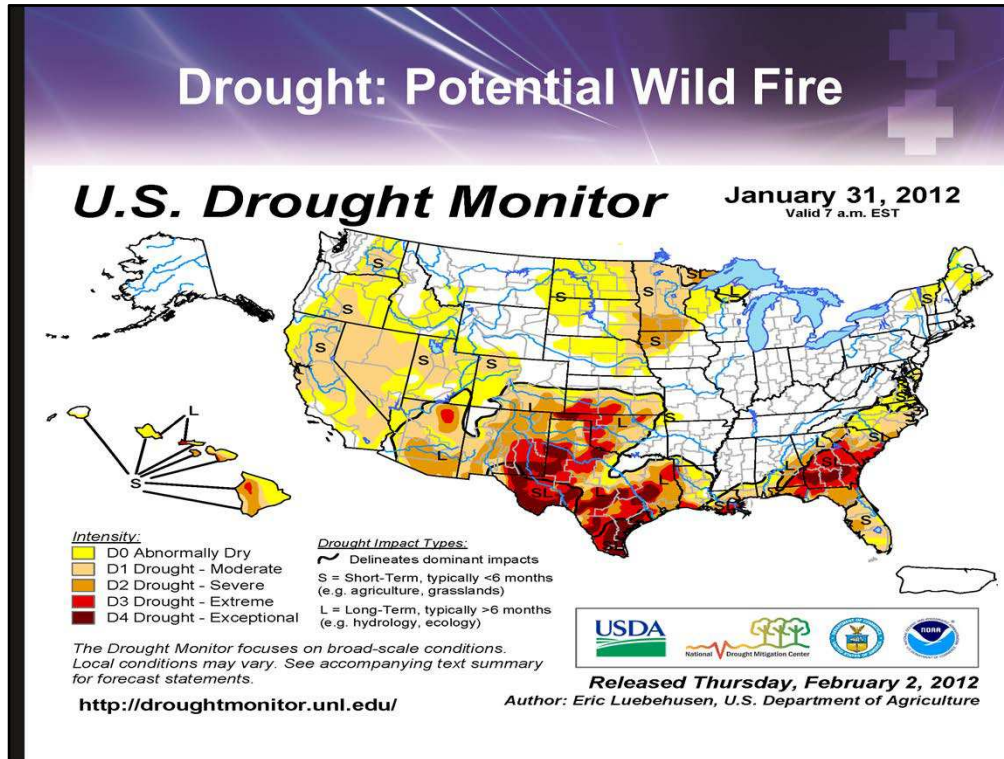


Map defines the US earthquakes causing damage from 1750 to 1996. Maps on the right defines earthquakes to 2012. The point is to define earthquakes as a natural hazard in specific regions of the United States.

Information found on <http://earthquake.usgs.gov/earthquakes/?source=sitenav>

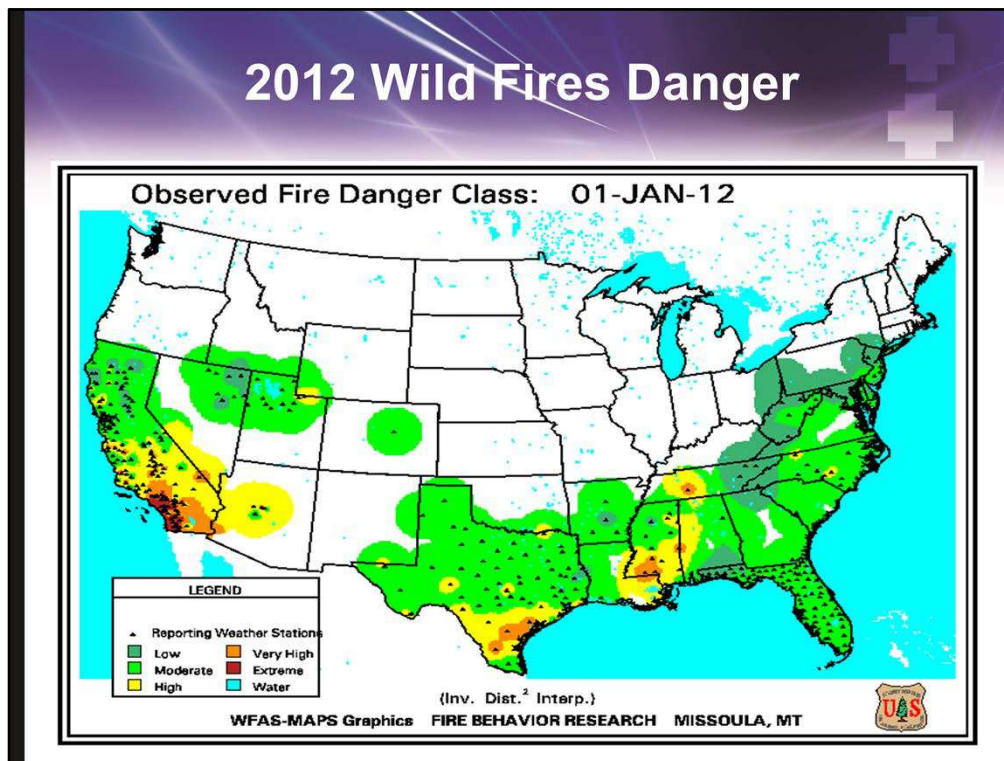


Additional data reflecting earthquakes as a hazard by defining the number of quakes with a magnitude of 5 or greater per year.



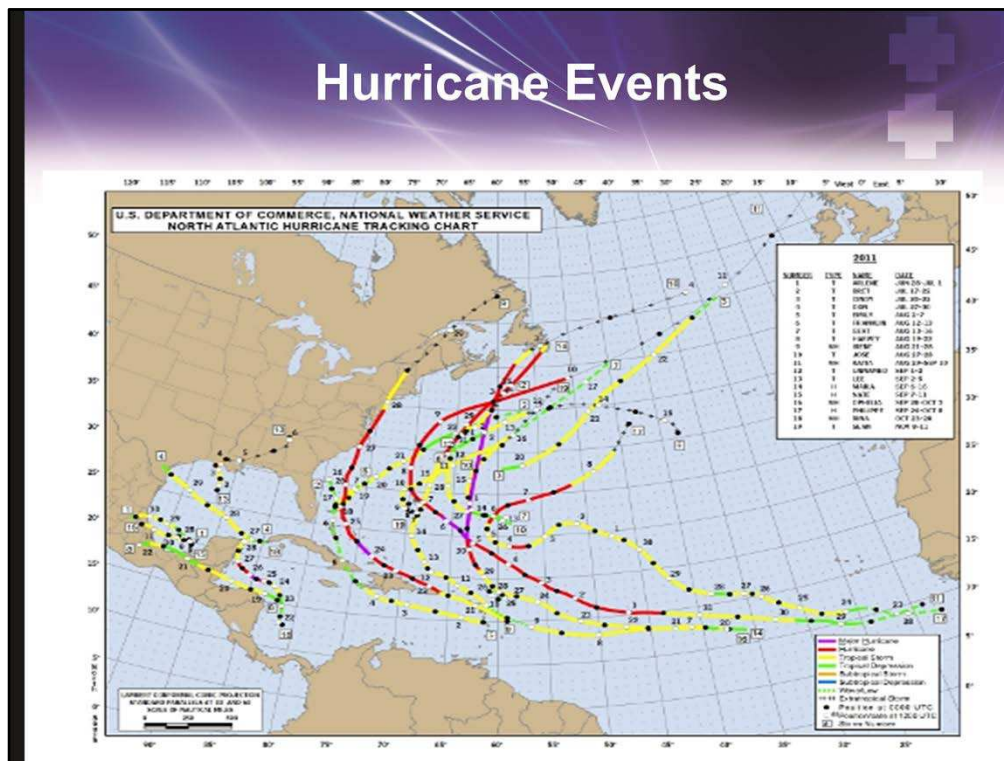
Drought conditions worsened across parts of the Southeast, with Exceptional Drought (D4) developing across southern Georgia and Moderate (D1) to Severe (D2) Drought covering most of Florida. Drought conditions improved for Texas by several categories, where January brought above-normal precipitation to much of the state. The footprint of Moderate Drought (D2) expanded across the Western Great Lakes, and covered Minnesota by the end of the month. Drought conditions also worsened by one to two categories across much of the West which had been drier than average for several months.

Point to make is a drought is a natural hazard in regions of the United States.

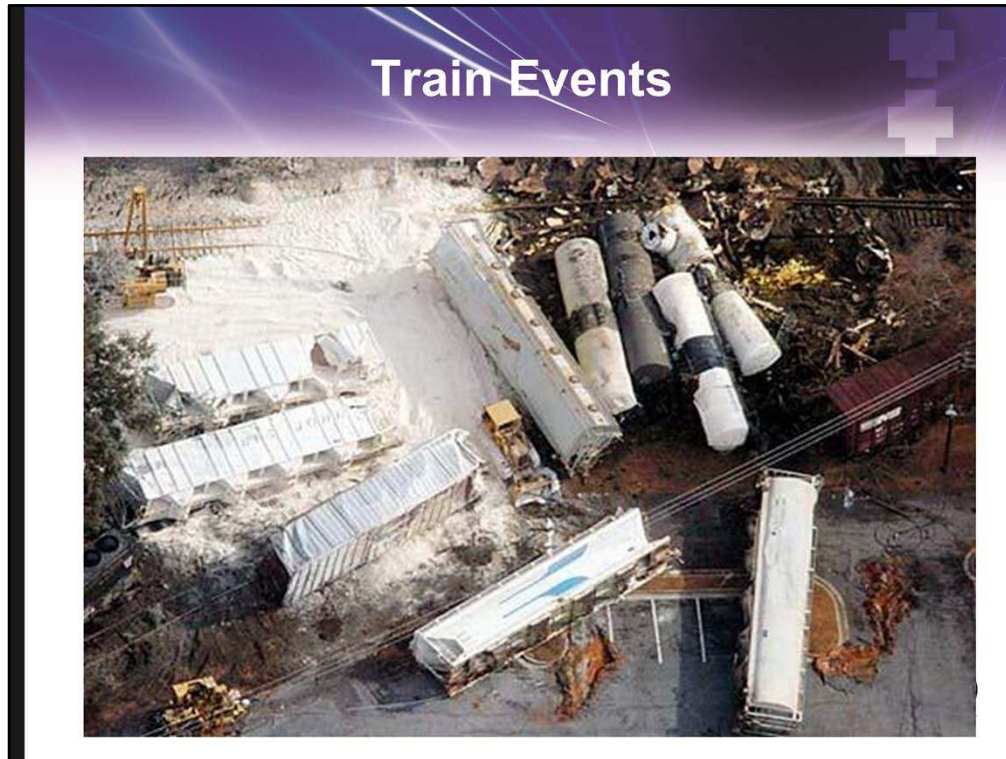


Map defines the potential wild fire danger in the United States. Information is from the Fire Behavior Research Center in Missoula, MT.

Wild fires are natural hazards or can be man-made.



Review of Hurricanes in 2011. Again, the point is to define hurricanes as a natural hazard in specific regions of the United States.



Data on train events provided on next slide

Train Events	
2002	7 Events -1 Evacuation, 10 Killed, 259 Injured
2003	3 Events -1 Evacuation with Fire, 2 Killed, 48 Injuries
2004	4 Events -1 Evacuation, 6 Killed, 74 Injured
2005	8 Events -1 Evacuation, 23 Killed, 433 Injured
2006	7 Events - 5 killed
2007	7 Events - 2 Evacuations
2008	9 Events -27 Killed, 297 Injuries
2009	6 Events -2 Evacuations - 17 Killed
2010	2 Events
2011	5 Events -5 Evacuations

http://en.wikipedia.org/wiki/Lists_of_rail_accidents



A few of the more significant events

January 6, 2005, Graniteville, S. Carolina: Forty-two car freight train collides head-on with a stopped local, sixteen cars derail. One tank with 90 tons of chlorine gas ruptures causing evacuation. 9 killed and 250 injured. (Photo on previous slide)

January 26, 2005, Glendale, California: suicide driver left car on tracks, then left vehicle. Metro double-decker commuter train hits vehicle, derails, hits northbound metro train and a parked train. Eleven are killed and 100 are injured.

September 17, 2005, Chicago, Illinois: Metro train derails. Two are killed and eighty-three are injured.

October 10, 2007, Painesville, Ohio: Train carrying ethanol and butane derails, causing evacuation and fire lasting for several days.

November 30, 2007, Chicago, Illinois: Train strikes a freight train causing multiple casualties.

March 25, 2008, Canton, Massachusetts: Runaway box car crashes into the Junction Station causing 150 casualties.

September 12, 2008, Chatsworth, California: Double-decker commuter train collides head on with a freight train. Twenty-five are killed and 135 are injured.

June 19, 2009, Rockford, Illinois: Train derailment with fourteen cars derailed and exploded. One killed and causing multiple burn casualties.

June 22, 2009, Washington, DC: Trains collide. Nine are killed.

July 9, 2009, Canton, Michigan: Train hits passenger vehicle trespassing crossing. Five killed.

May 13, 2010, Mebane, North Carolina: Train collides with truck. Eleven are killed.



1. American Airlines, September 11, 2001, Flight 77, crashes into the Pentagon, 66 fatalities on the plane.
2. American Airlines, Flight 587, crashes into the Queens apartment building, 260 fatalities on the plane.
3. US American Airlines, September 11, 2001, Flight 11, crashes into the World Trade Center, 92 fatalities on plane.
4. Airway, January 15, 2009, Flight 1404, ditches into the Hudson River, New York, due to multiple bird hitting engine.

Commercial Aircraft Events

- 2000 to 2011 – 209 Commercial Aircraft Crashes
- 2000 to 2011 – 13 Commercial Aircraft Crashes in the United States (753 Fatalities, 97 Reported Injuries)
- 2001 – Planes Used For Terrorism



Point is to define aircraft crash events as a potential man-made hazard in the United States. Plans must address multiple or mass casualty response to include burns, trauma, casualty's family needs as well as media)

In addition to events on previous slide....

1. Alaskan Airways, January 31, 2000, Flight 26, crashes into the Pacific Ocean, 88 fatalities.
2. Southwest Airlines, March 5, 2000, Flight 1455, runs off the runway in Burbank, California, 43 injuries out of 142 passengers.
3. Airjet Charter Flights, March 29, 2001, crashes on approach to Aspen, Colorado, 18 fatalities.
4. United Airlines, September 11, 2001, Flight 175, crashes into the World Trade Center, 65 fatalities on the plane.
5. United Airlines, September 11, 2001, Flight 93, crashes into field in Pennsylvania, 44 fatalities on the plane.
6. American Airlines, December 22, 2001, Flight 63, Richard Reid, Shoe Bomber. No fatalities.
7. Air Midwest, January 8, 2003, crashes on takeoff at Charlotte, NC, 21 fatalities.
8. American Eagle, May 9, 2004, flight 5401, runway event, 13 injuries.
9. Southwest Airlines, December 10, 2005, Flight 1248, slides off runway, no injuries on plane – one fatality on ground.
10. Conair Air, August 27, 2006, Flight 191, crash on take-off at Lexington, Kentucky, 49 fatalities.
11. Colgan Air, February 12, 2009, Flight 3407, crashes into houses in Clarence

New York, 50 fatalities.

12. Northwest Airlines, December 25, Flight 253, man with explosive device causes fire on plane – 3 injuries.



2000 – 2001	19 Deaths
2001 – 2002	4 Deaths
2002 – 2003	14 Deaths
2003 – 2004	29 Deaths
2004 – 2005	20 Deaths
2005 – 2006	5 Deaths
2006 – 2007	38 Deaths
2007 – 2008	3 Deaths
2008 – 2009	10 Deaths
2009 – 2010	5 Deaths
2010-2011	6 Deaths
2011-2012	7 Deaths
January 1-December 21, 2012	35 Deaths

There have been 201 deaths in school shootings since 2000.

First School Shooting- University of Texas in Austin, August 1, 1966 16 Killed
(Man-made hazard)

Columbine High School – Littleton Colorado, April 20, 1999 – 13 Killed

Virginia Tech Shooting – Blacksburg, Virginia, April 27, 2007 – 32 Killed

Sandy Hook Elementary School- Newtown, Connecticut- 20 students, 6 teachers
Killed

Since 1966, there have been over 117 documented schools shootings in the US.

Universities – 36 shootings

High Schools – 58 shootings

Middle Schools – 19 shootings

Elementary Schools – 14 shootings


Day Care Center – 1 shooting

Amish School – 1 shooting


Point - : Man-made hazard

Shooting Events in Hospitals

- Event at Psychiatric Hospital, Pennsylvania
- Event at Creighton University Medical Center, Illinois
- Event at Physician's Regional Medical Center, Florida
- Event at John Hopkins Hospital, Maryland
- Active Shooter Procedure – Code Silver



Johns Hopkins Hospital: Gunman Shoots Doctor, Then Kills Self and Mother



Slide to point out that hospitals can be the site of single or multiple shootings and emergency operations plans must address the active shooter.

What is your active shooter procedure?

Newspaper clipping of event in Pittsburgh Psych Hospital
2 Dead and 7 Wounded

Creighton University Medical Center – One man shot by a shooter.

Physician's Regional Medical Center – Shooter killed wife then turned gun on himself


John Hopkins – Shooter wounds doctor, kills mother then turns gun on himself

ENA Study

97.1 % - Physical Violence was perpetrated by patients and their relatives.
80.6% of physical violence occurred in the patients' room, 23.2% in the corridors, hallways stairs and elevators, and 14.7% at the nurses' station.
38.2% of physical violence against emergency nurses occurred while they were triaging patients, 33.8% while restraining or subduing patients, and 30.9% while they were performing invasive procedures.

15% of male nurses reported having been victims of physical violence compared with 10.3% of female nurses.

13.4% of violent acts occurred in large urban areas compared with 8.3% in rural areas.



1900 – 1959	15
1960 – 1969	12
1970 – 1979	15
1980 – 1989	11
1990 – 1999	8
2000 – 2010	23

Table reflects the terrorist events for the defined years. Information available through FEMA and online review.

Memorable Events

1983, November 7, U. D. Senate Bomb. The Armed Resistant Unit, a militant group bombs the US Capital in response to the US Invasion of Grenada.

1984, Rajneeshee bioterrorism attack: First bioterrorism in the US – the Rajneeshee cult spread salmonella in salad bars at 10 restaurants in the Dallas, Oregon, to influence elections.

1985 December 11: first fatality of the Unabomber's neo-luddite campaign.

1993, February 26; First World Trade Center bombing killed six and injured 1000.

Attached carried out by Al Qaeda.

1994 December 10; Second Unabomber fatality.

1995 April 19; Oklahoma City bombing; Alfred P. Murrah Federal Building – 168 fatalities.

1995 April 24; third Unabomber fatality.

1996 July 27; Centennial Olympic Park bombing by Eric Robert Rudolph occurred in Atlanta, Georgia, during the Atlanta Olympics. One person was killed and 111 were injured.

1997 February 24; Palestinian Ali Hassan Abu Kamal opens fire on tourist at observation deck atop the Empire State Building killing a Danish national and wounding visitors.

2009 November 5; Fort Hood shooting: Major Nidal Malik Hasan, a US psychiatrist, opens fire and kills 13 people at the Fort Hood Army Base.

2010 February 18; Austin suicide attack: Joseph Stack deliberately flew a small Piper Dakota aircraft into the government building in Austin, Texas, killing himself and an Internal Revenue Service employee.

Acts of Terrorism

- 1972: Attack at Olympics in Munich Germany
- 1979: 80 Iranian students invaded the US Embassy in Tehran and took 52 US Hostages
- 1983: Hezbollah suicide bomber crashed truck of explosives into US Embassy in Beirut; 63 killed
- 1983: Hezbollah suicide bomber bombed US and French military barracks in Beirut; 299 Killed
- 1983: Shiite suicide bomber crashed into the US Embassy in Kuwait; 5 killed
- 1984: Truck bomb explodes outside Aukar, Lebanon Annex of the US Embassy in Beirut; 24 killed
- 1984 and 1985 hijackers
- 1988: 757 Pan Am Flight 103 explodes; 270 killed



Brief overview of the acts of terrorism toward the US in and out of the United States.

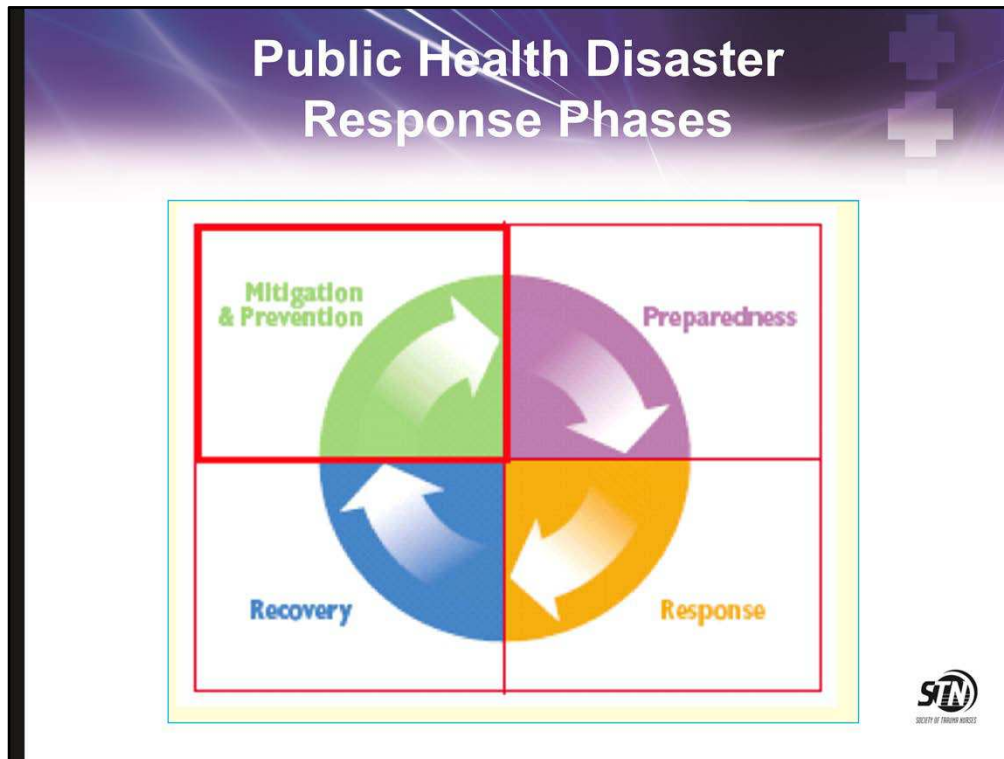
Acts of Terrorism

- 1993: 2 US helicopters shot down in Somalia; 18 killed
- 1993: First World Trade Center bombing
- 1995: Truck bombing of US National Guard Training Center in Saudi Arabia; 7 killed
- 1996: Truck bombing of Khobar Towers in Saudi Arabia; 19 killed
- 1998: Car bomb US Embassy Kenya, US Embassy Tanzania; 224 killed
- 2000: Suicide bombing of the U.S.S Cole in Yemen; 17 killed



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Continued list of terrorist acts toward the US.

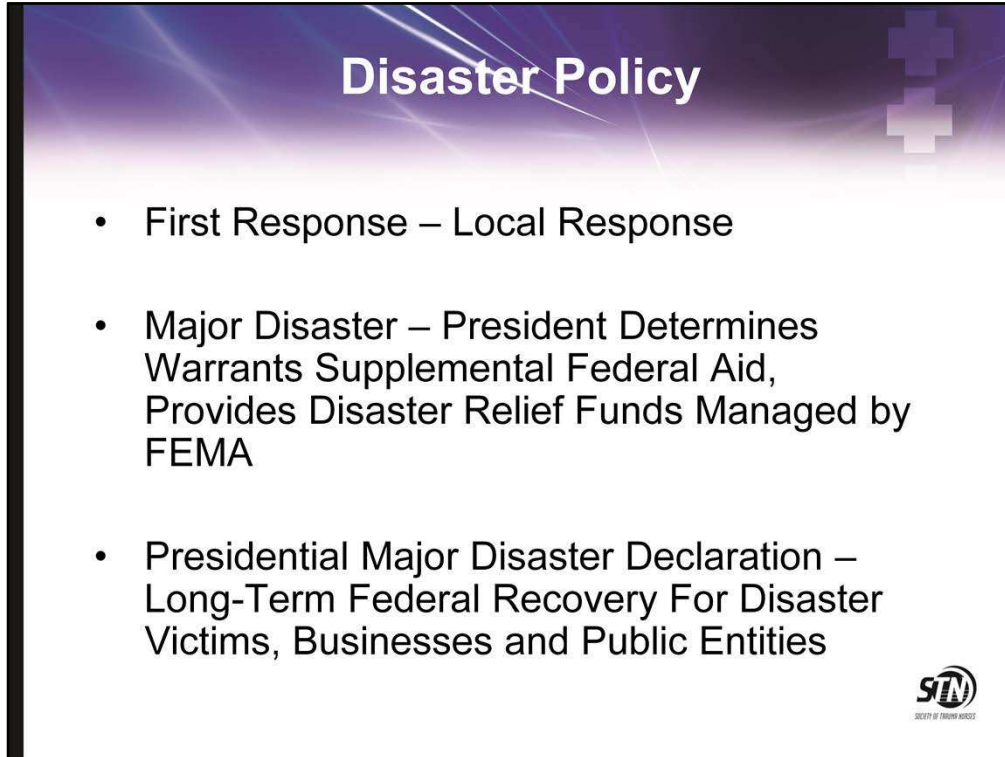


Mitigation: Process of defining risks and potential vulnerabilities and then working to reduce the vulnerability and to strengthen society's ability to endure and respond.

Preparedness: Process of developing a formal program of response. Preparedness includes training, staff development, classification of public health resources, development of standard operating procedures, developing emergency operations response procedures, developing communication procedures, and developing stockpiles and placement of key supplies and resources. This also includes participation in tabletop and functional exercises to test the response procedures. This is also the phase where community memoranda of understanding and external contracts are established.


Response: Phase in which each agency activates its emergency operations response plan to the specific threat, which can integrate local, regional, state and federal response. **Picture is of an emergency department preparing for a hazardous materials event.**

Recovery: Phase that identifies resources that can assist in restoring daily function as well as other resources that can address physically and emotional needs of the population. This is multidisciplinary and may include law enforcement, public schools, public works, EMS providers who are not 911 providers, and the business community.

A presentation slide titled "Disaster Policy" with a purple and white background. The title is in a large, bold, white font. Below the title, there is a bulleted list of three items. In the bottom right corner, there is a logo for "STN" with the text "SOCIETY OF TOWNSHIP NURSES" underneath it.

Disaster Policy

- First Response – Local Response
- Major Disaster – President Determines Warrants Supplemental Federal Aid, Provides Disaster Relief Funds Managed by FEMA
- Presidential Major Disaster Declaration – Long-Term Federal Recovery For Disaster Victims, Businesses and Public Entities



This process reflects the sequence of events to declare and event a major disaster. The event occurs which initiates a cascade of responses from the local to the regional responders. This process will escalate from the local, regional response to the district to the Governor of the State. The Governor requests major disaster assistance – FEMA Assistance. The President will define or declare if major disaster assistance is granted and if long-tern recovery assistance is granted.



Disaster Policy: Major Disaster Process

- Local Government Responds
- State Responds
- Damage Assessment
- Major Disaster Declaration is Requested By Governor
- FEMA Evaluates Request
- President Approves

http://www.fema.gov/media/fact_sheets/declaration_process.shtm



Local Government Responds with supplementation through mutual aid agreements, neighboring communities and volunteer agencies. Regional partnerships through the trauma system and other agreements assist in mutual aid agreements.

Comprehensive information about Disaster policy and response can be found :
<http://www.fema.gov/>

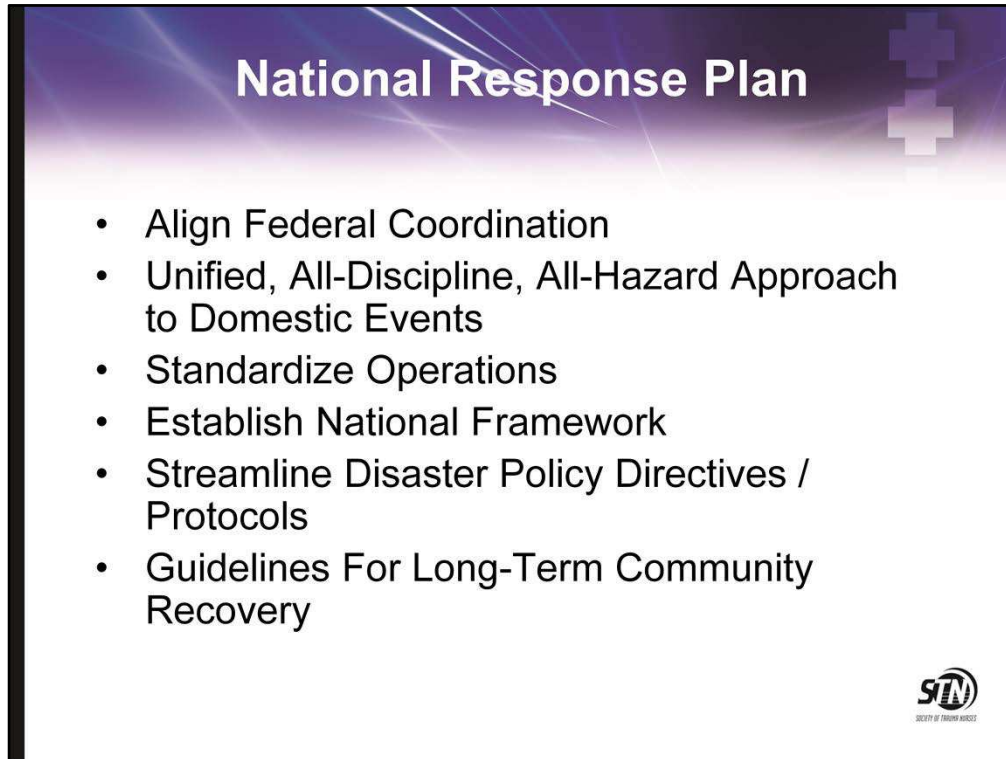
The State responds with state resources, such as the National Guard and state agencies.

The damage assessment by local, state and federal organizations determines losses and potential recovery needs.

The Major Disaster Declaration is requested by the Governor, based on assessments of damage and recovery needs and an agreement to commit state funds and resources to the long-term recovery.

FEMA completes an evaluation of the request and recommends actions to the White House based on the disaster, local community impact and the state's ability to recover.


The President approves the request of FEMA informs the governor that the request has been denied. This decision process could take hours to weeks depending on the nature of the event.



The President, declared Homeland Security Presidential Directive 5, following the September 11 terrorist attacks. He requested the development of a new National Response Plan to align Federal coordination structures, capabilities, and resources into a unified, disciplined, all-hazards approach to manage a domestic event. The goal was to standardize operations for all levels of disaster response from local federal, public to private entities. The NRP established a national framework, standardizes coordination, communication, incident management, and information sharing as well as disaster protocols. The NRP provides for guidance to initiate long-term community recovery.

The National Response Plan will supersede and integrated the following:


- Initial National Response Plan
- Federal Response Plan
- US Governmental Interagency Domestic Terrorism Concept of Operations Plan
- Federal Radiological Emergency Response Plan

A presentation slide titled "National Response Framework" with a purple and white background. The title is in large white font at the top. Below it is a bulleted list of items. The first three items are in black font, and the next four are in blue font. The last two items are in black font. At the bottom left is a URL, and at the bottom right is the STN logo.

National Response Framework

- Emergency Support Function #8
- Public Health and Medical Services
- Supplemental Assistance to State, Local and Tribal Government
 - Assess Public Health/Medical Needs
 - Public Health Surveillance
 - Medical Care and Personnel
 - Medical Equipment and Supplies
- Coordinator and Primary Agency is the Department of Health and Human Services
- NDMS

<http://www.fema.gov/national-response-framework>



Emergency Support Function #8 is to assist in Public Health and Medical Services. The support may be provided in response to multiple public health and medical events: Natural and man-made disasters creating public health and medical emergencies
Terrorist threats using chemical, biological, nuclear/radiological material or large explosive devices

Infectious disease outbreaks and pandemics

Animal health emergencies

Other event that creates an actual or potential public health or medical emergency where Federal assistance is needed.

ESF #8 of the NRP may be categorized according to the functional areas:

1. Assessment of public health / medical needs
2. Health surveillance
3. Medical care personnel
4. Health/Medical equipment and supplies
5. Patient evacuation
6. Patient care
7. Safety and security for human drugs, biologics, medical devices, veterinary drugs
8. Food safety and security
9. Blood and blood products
10. Agriculture safety and security
11. Worker health and safety
12. All-hazard consulting
13. Behavioral consulting
14. Public health and medical information
15. Vector control
16. Potable water, waster water and solid waster disposal
17. Victim identification / mortuary services
18. Veterinary services

National Disaster Medical System (NDMS) is another source of public health and medical

personnel under ESF #8. The NDMS is a nation wide partnership designed to deliver quality medical care to the victims and responders to domestic disasters.

Disaster Medical Assistance Team
Disaster Mortuary Operational Team
Veterinary Medical Assistance Team
National Medical Response Team

Disaster Role: Health Care System's Role

- First Responders: EMS, Police, Fire, Hospitals
- First Receivers: Hospitals
- Hospitals: Preparedness In Direct Odds With Productivity
- Regional Integration
- Collaborative Partnerships



The September 11th attacks created a change in how hospitals and health care systems were viewed in regards to disaster response. The health care system is now viewed as a component of our national response system. EMS, law enforcement and fire have long been recognized as first responders for a number of years. Recent paradigm shifts now include hospitals and health care systems as first responders and first receivers. Hospitals are now viewed as a component of national security. Hospitals are recognized as safe havens in communities. The public expects hospitals to be prepared to care for their needs during and event. However in most hospitals daily operating requirements stretch hospital resources. Funding to enhance disaster response is a low priority in today's health care facilities. Community integration and collaborative partnerships are now necessary but competition for the health care dollar creates a negative impact on integrations.

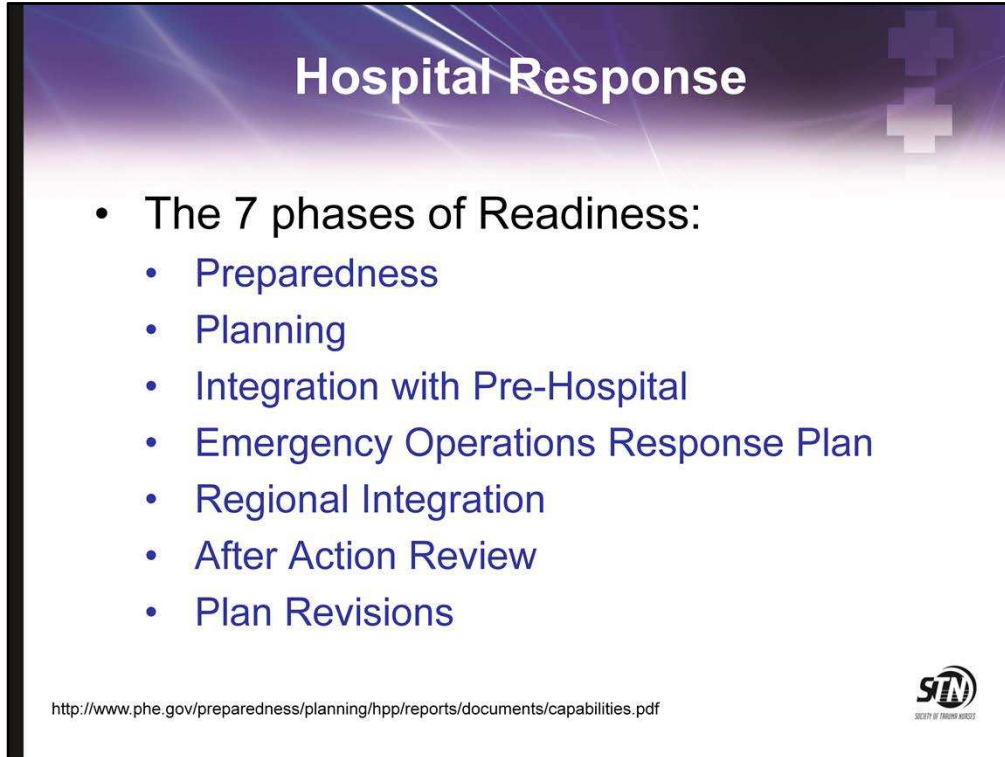
This is in direct contrast to what the public expects. Hospitals are expected to handle whatever they receive and do it right the first time.

Hospitals provide complex services: healthcare services, laundry services, hotel services, food services, building services, and warehouse services

Hospitals depend on public services for water, sewer, power, medical gases, communications, fuel, and waster collection. Back-up provisions for must be well planned and tested to prevent interruption of services and in major catastrophic events, event the back-up supply sources may be impacted.

Hospitals have within their infrastructure and environment hazardous materials:


toxic agents, poisonous liquids, gases, and combustible agents. Items such as heavy medical equipment, storage shelves or supplies can cause harm during events such as earthquake, tornado or situations of violence. These items create their own potential threat to the hospital. These and the previously mentioned issues must be taken into consideration during the preparedness and planning phases.



Hospital Response

- The 7 phases of Readiness:
 - Preparedness
 - Planning
 - Integration with Pre-Hospital
 - Emergency Operations Response Plan
 - Regional Integration
 - After Action Review
 - Plan Revisions

<http://www.phe.gov/preparedness/planning/hpp/reports/documents/capabilities.pdf>



Hospital response can be reviewed in very defined phases.

Preparedness

Planning Integration with Pre-Hospital Agencies

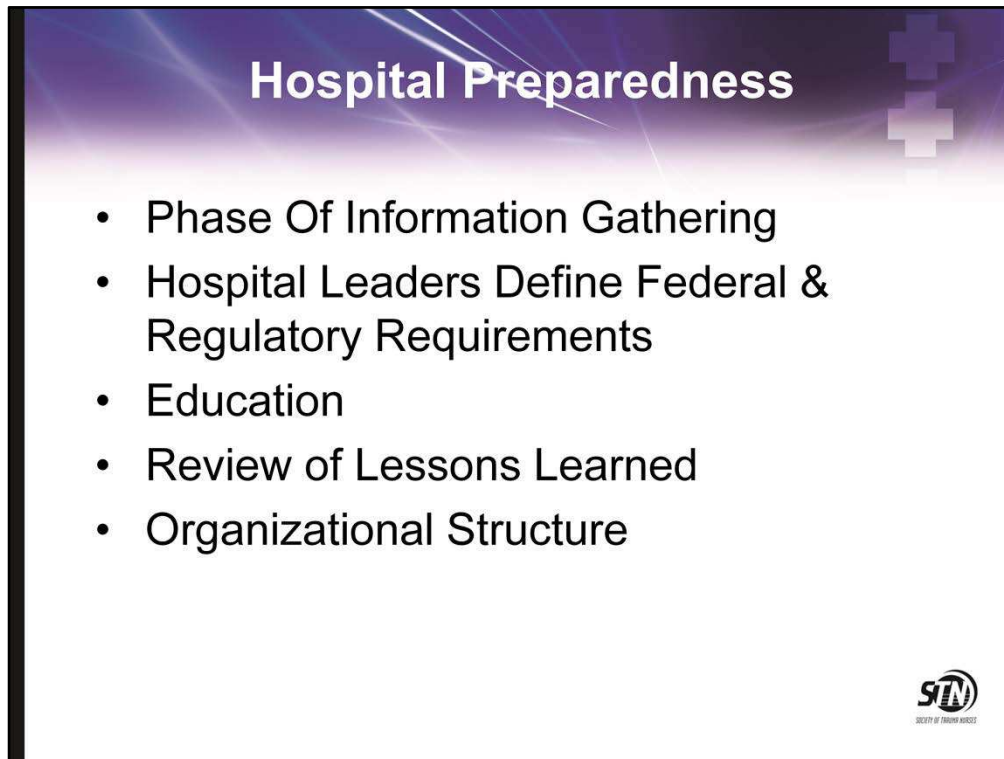
Emergency Operations Response Plan

Regional Integration

After Action Review

Plan Revisions

These phases will be covered individually.



The preparedness phase of the hospital response begins with data collection. Data to be reviewed begins with Federal and hospital regulations. These regulatory guidelines will define the minimal requirements for the hospital but does not necessarily define all components of successful responses. It is important that hospitals leaders commitment to needed educational needs such as Incident Command System training as well as training for triage, medical decontamination and special considerations for casualty management. Previous disaster exercises and after action reports must be reviewed to define status of corrective action plans and on-going weakness. Lessons learned for other events need to be reviewed. Regional and system response capabilities must be reviewed. The hospital must create an organizational structure that establishes emergency response as a priority and not bury the efforts under layers of bureaucracy of the hospital.

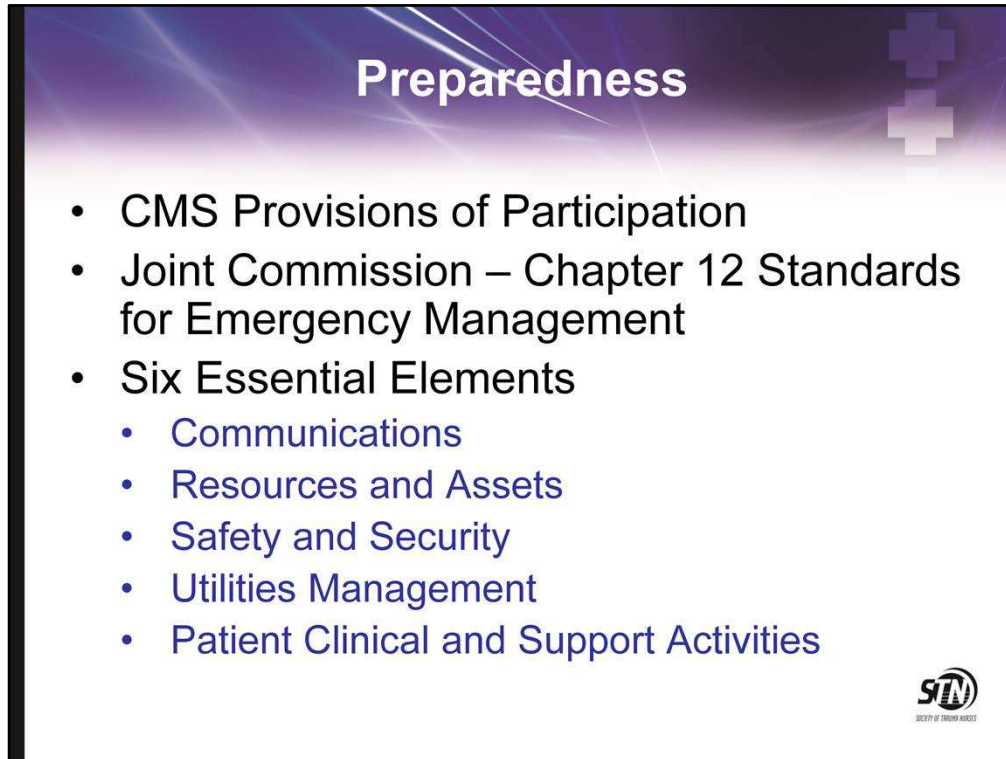
<http://www.fema.gov/national-incident-management-system>

<h2 style="text-align: center;">National Incident Management For Hospitals</h2>	
Adopt NIMS	Organization Wide
Command Management	ICS, MACS, PIS
Preparedness Planning	NIMS Tracking, Funding, Plan, MOU
Preparedness Training	800, 700, 100, 200, 300
Preparedness Exercise	All Hazard, AAR, CAP
Resource Management	Inventory, Acquisition
Community and Information Management	
Standard Terminology	

Hospitals receiving Federal preparedness and response grants, contracts or cooperative agreement funds must implement all seventeen NIMS elements. The seventeen are listed.

1. The hospital must adopt the NIMS infrastructure. Create a specific committee to address emergency operations response that had defined medical leaders and administrative leaders.
2. Command structure that follows the Incident Command System
3. Participate in Multi-agency Coordination System
4. Integrate Public Information System
5. Maintain a NIMS tracking process.
6. Track preparedness funds to demonstrate alignment with preparedness, planning, response and recovery efforts.
7. Revise and update emergency operations response plan to follow ICS and all NIMS elements.
8. Maintain documented and signed mutual agreements and mutual sharing agreements.
9. Define the hospital leaders that must complete the ICS 800, 700, 100, 200, 300 and 400 and track completion.
10. Integrate ICS training into all exercises and after action reviews.
11. Maintain an all-hazard response plan that integrates ICS and NIMS elements.
12. Complete an after action report with corrective action plans that is tracked for implementation.
13. Maintain an inventory assessment.

14. Ensure the resource acquisition aligns with the ICS standards.
15. Ensure communication plan and system aligns with ICS standards.
16. Ensure information management and tracking are processed through the ICS standards.
17. Plan defines standard and consistent terminology.





The hospital leaders and the committee responsible for the emergency operations response planning must be very knowledgeable of the regulatory requirements specific to emergency operations response. All members of the committee must fully understand their role and the regulations specific to the committee and their departments.

Joint Commission's Emergency Management standards identify six critical areas;

- Communications
- Resource and assets
- Safety and security
- Staff responsibilities
- Utilities management
- Patient clinical and support activities

Planning

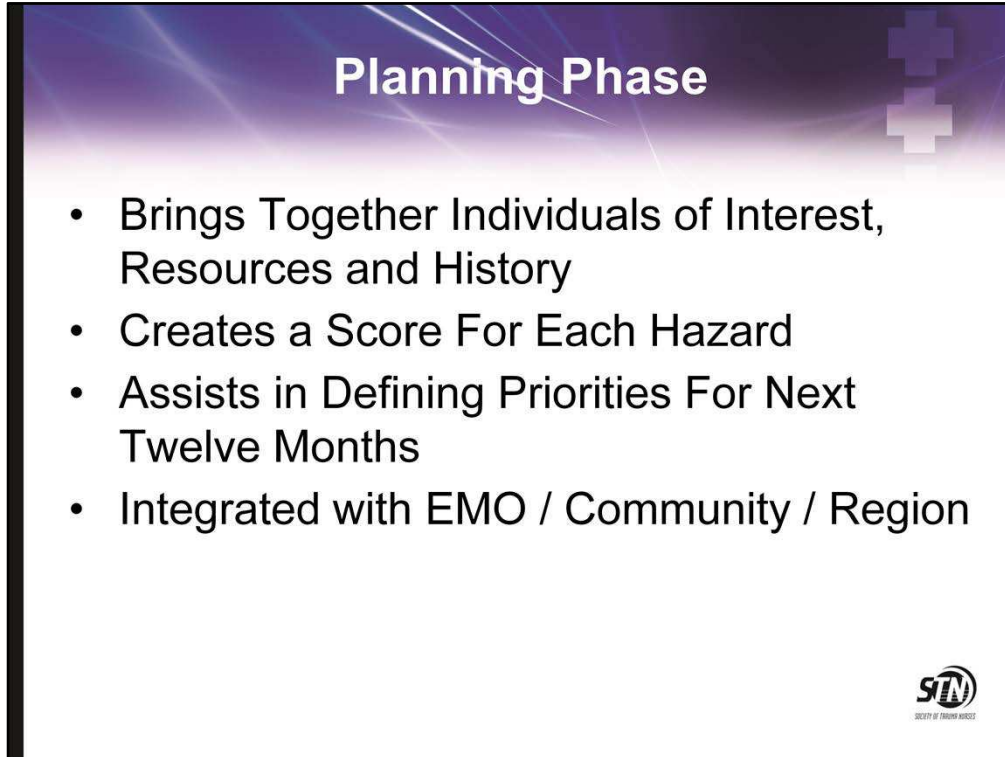
- Planning Phase Is A Critical Element
- Follows Review Of What As Happened
- Hazard Vulnerability Assessment
- Review Response Plans
- Define Resources Needed
- Community Integration
- Prioritize Exercise Events
- Special Populations
- Specific Risks: Chemical, Biological, Blast
- Planning For Staff Needs



The planning phase follows the preparedness phase. Planning begins with the a review of the planning committee members, their role in response, commitment to participation and resources they bring. The planning committee must include acute care physicians, nurses and administrative leaders. Areas that play a key role in response must have a committed participant. Other criteria may drive participation as well. Example: trauma center criteria requires the trauma medical director and the trauma program manager must participate in hospital response as well as regional response planning. The committee will assign a task force to work with other community / regional leaders to complete a HVA. The previous years response plan, exercise after action reports and corrective action plans are reviewed by the committee. The outcome of these events will define the priorities for planning for the next twelve months. Special populations must be reviewed and have appropriate provisions in the response plan. These populations include but are not limited to pregnant individuals, pediatric, psychiatric, dialysis and geriatric patients. Patients who are homebound on ventilators and special needs must also be taken into consideration. Specific risk patterns such a chemical, biological, blast and burns treatments must be included in the response plan.


Planning for staff will include 1) staffing model changes for the disaster response, 2) length of shift for the response, 3) how to provide meals and breaks for the response, 4) provisions for rest, potential for sleep arrangements depending on type of event, 5) provisions for child care / dependent care/ pet care and 6) health care / mental health provisions. Measures to notify staff of the event and of their need to

respond need to monitored for time delays and communication breakdowns. Measures to accurately track time must be in place. Plans must ensure the safety and welfare for staff.



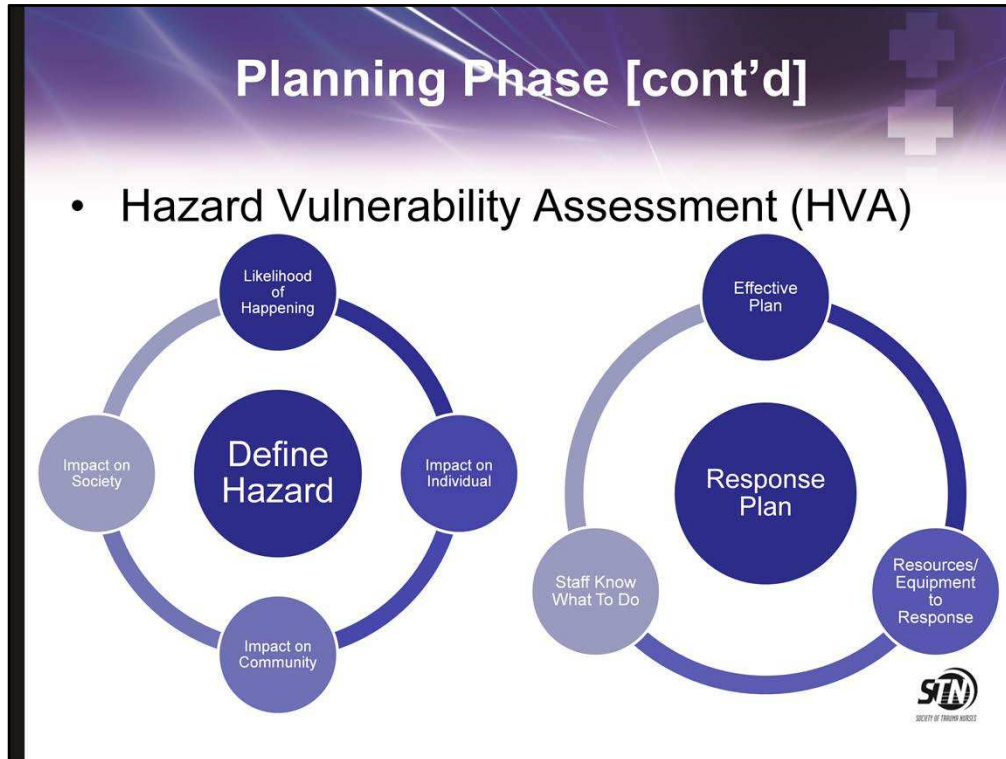
Planning Phase

- Brings Together Individuals of Interest, Resources and History
- Creates a Score For Each Hazard
- Assists in Defining Priorities For Next Twelve Months
- Integrated with EMO / Community / Region

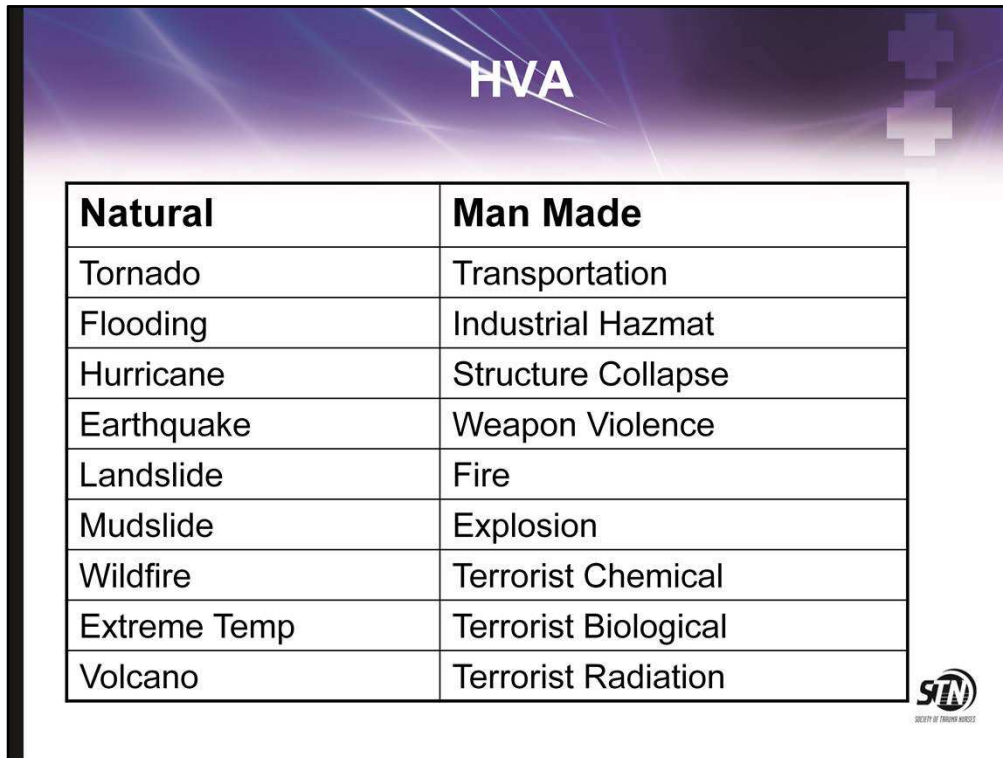


STN
SOCIETY OF TOWNSHIPS NORTHERN

The planning phase brings together hospital individuals that are interested, represent departments needed for response, have resources that are needed and provides history of what has happened as well response actions taken. These individuals need to reach out to the community representatives from Fire, EMS, Public Health and Emergency Management Office (EMO) to collectively complete a Hazard Vulnerability Assessment. Geographic regions and climate conditions impact the HVA.




The HVA tool utilized will assist with defining a specific score for each hazard. These scores and then used to prioritize planning efforts and exercises. Planning efforts should be integrated with the local and regional planning efforts. The region needs to understand what the hospital plans are and the hospital needs to understand the region's plan and expectation of the hospital.



HVA

Natural	Man Made
Tornado	Transportation
Flooding	Industrial Hazmat
Hurricane	Structure Collapse
Earthquake	Weapon Violence
Landslide	Fire
Mudslide	Explosion
Wildfire	Terrorist Chemical
Extreme Temp	Terrorist Biological
Volcano	Terrorist Radiation


SOCIETY OF TOWNSHIP NURSES

Hazard Vulnerability Assessment (HVA)

To include audience participation, you may ask for other examples of Natural or Man Made hazards that might be included as a hazard in their community that is not listed. Another category to consider is technology when completing an HVA.

Planning

- ICS / Command Center
- Medical Decontamination Training
- EMS Traffic Routes / Triage
- Medical Care
 - Unidirectional Flow
 - Minimal Standards
 - Staffing Patterns
 - Evacuation of ED / Trauma Areas
 - Surge
- Staff Notification / Staff Traffic Routes
- Communication – Redundancy
- Security



The emergency operations response plan must be reviewed annually and have an annual evaluation. This is a Joint Commission requirement. These activities are typically completed in the first quarter of the calendar year and sets the stage for the committee activities for the next three quarters. The plan must define the Incident Command System structure and implementation. In addition, the location for the command center must be defined and prepared. This will include being aligned with back up emergency power, communication systems, access to media outlets, fax machines, printers, and appropriate equipment. HICS forms, job action sheets, tracking boards and identification vests must be readily available. Job action sheets and HICS forms for the various departments but be developed and standardized to ensure alignment. Security to secure and protect the command center must be addressed. The Incident Commander must be aligned and integrated with the community and regional response. Individuals assigned to the Incident Commander job function must have appropriate training, leadership and communication skills.

Procedures for medical decontamination must be in place and ready to be operationalized. Training, equipment, storage and team notification for medical decontamination must be defined and provided. The facility must define its operational capacity to decontaminate the ambulatory, ambulatory with assistance and non-ambulatory patients.

Medical care guidelines must be defined. The location for triage during a mass casualty must be defined and be tested through various exercises. Security needs must be addressed. Individuals targeted to staff the triage area should have appropriate training. Tools for triage and the triage system to be utilized are defined in the planning phase. In addition, integration with EMS agencies will assist in identifying how to utilize the EMS field triage tag, and how EMS will identify the mass casualty triage area and the expectations of EMS. EMS traffic routes to the hospital will need to be protected and secured. Individuals targeted as the triage officer must have a strong clinical knowledge and understanding of expected outcomes. Triage staff should have appropriate safety gear and PPE protection. If decontamination needs are not ruled out the triage team may need to be suited in decontamination equipment. Staff receiving the patients must build in successive triage to decrease over triage.

Plans for where and how to relocate the patients in the emergency department and if the facility is a trauma center, relocation of the trauma patients needs to be defined. Patients for admission should have their admission expedited. Patients who are in the work-up queue should be relocated. Stable patients may be relocated. This maximizes capacity for the arriving casualties. Minimal standards of care should be defined through the planning process with provisions of how to implement. Patients who meet criteria for a head CT, will have a head CT performed, but the patient can not be moved back to their original resuscitation room. This patient may be held in the radiology recovery room until films are read and disposition priorities are defined. Planning for surge capacity (space) and capabilities (specific medical resources) is a priority. Areas to establish alternate intensive care

beds, alternate areas for managing the delayed and immediate casualties again will maximize surge capacity and capabilities.

Medical care from triage through resuscitation/evaluation to inpatient bed assignment must be defined. This includes defining areas for surge and alternate treatment areas. Measures to ensure unidirectional flow of the casualties and minimal standards of care are defined during the planning phase. Staffing pattern will be altered during a mass casualty response. Small stretcher teams are recommended for resuscitation areas. ICUs and inpatient units must review their response staffing options. Treatment areas that will need security must be defined and addressed in the plan. Staff education to ensure they understand these processes also need to be planned.



Procedures and mechanisms to notify staff must be addressed. Traffic routes for staff to return to the hospital need to be defined. These routes need to be communicated to other agencies and secured. Staff need to be educated regarding how they will be notified of an event, the traffic route and where to report.

Communication is one of the most common failures in a disaster response. There must be planned tiers of redundancy for communication. It is recommended that there be at least three backup systems for communication and the forth system be the HICS form 213 and a ham radio operator.

Security is another common failure point in effective mass casualty response. Each element of planning should take into consideration the security risk and needs. These issues need to be identified and addressed in the planning phase. They need to be incorporated into the emergency response plan and tested through the defined exercises.

Planning

- Just-In-Time Inventory
- Medication Distribution
- Infrastructure Contingency
- Business Continuity
- Casualty Tracking



Most hospitals have implemented systems such as pyxis systems or “just-in-time” inventory to maximize resource, utilization and decrease cost. Planning must review resources available and make provisions to ensure needed medical supplies, equipment, and medications are available for surge and mass casualty. The response must be timely and coordinated. This must be addressed in the planning phase to ensure needed agreements and operational issues can be defined prior to an event.

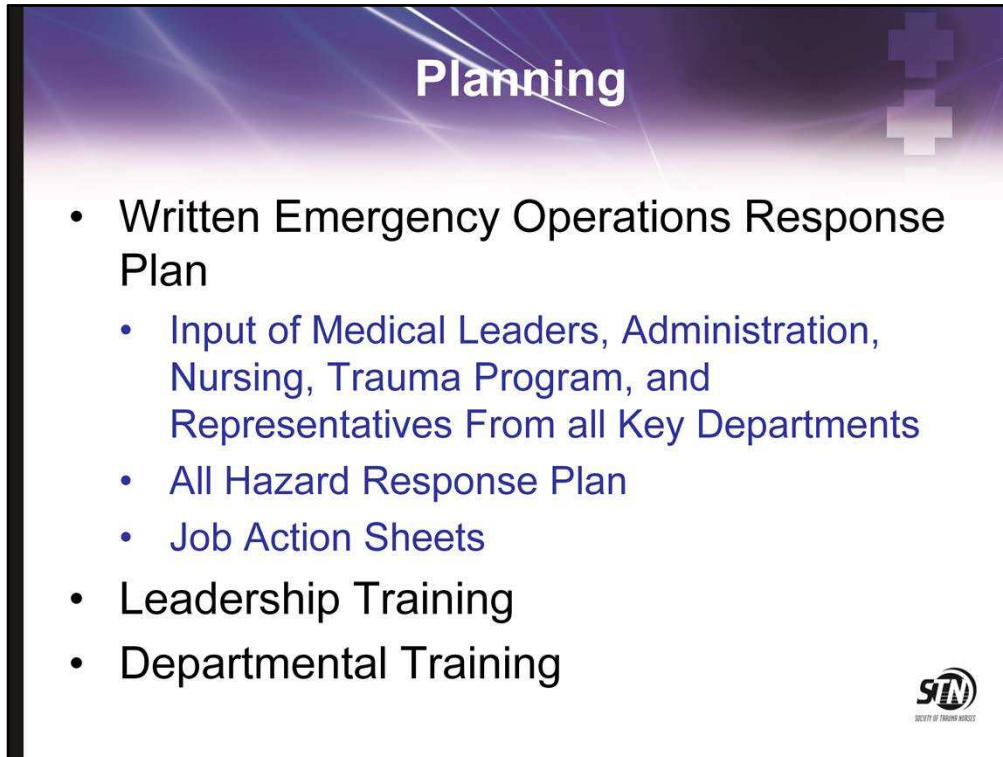
Planning efforts must review measures to ensure the building infrastructure can be maintained during the identified hazards. In addition, back up systems for fuel, water, power, HVAC, medical gases, oxygen, and waste management need to be reviewed to ensure sustainability. Contracts and agreements may need to be renewed annually as defined by the hospital contract management system or the vendor. In addition, the hospital may need to expand services and capabilities during a response, planning efforts need to address how the hospital engineering and facility departments will meet the demands.

Many hospitals have moved from the paper medical record and scheduling systems to electronic systems. Planning phases must review how these critical issues will be managed during and emergency response. In addition, patient registration processes will be altered to expedite casualty care. Plans need to identify how the patients will be identified and tracked. Business continuity planning may also identify areas of the hospital that are not critical to mass casualty response and define procedures to re-locate those resources.

Picture is of registration clerks in a disaster drill, learning the paper tracking method as adjunct to electronic registration when rapid influx of victims or electrical or IT issues does not allow for electronic registration.


Casualty tracking is critical in emergency operations response mass casualty events. Individuals arriving from the disaster event are called casualties. Individuals that were in the

hospital prior to the event are referred to as patients. This helps keep them separate in tracking systems. Casualty tracking can be completed through electronic systems or on paper using the HICS form 254. The critical issue is that there is a plan for tracking that is written, individuals are trained how to do this and this is tested in exercises.



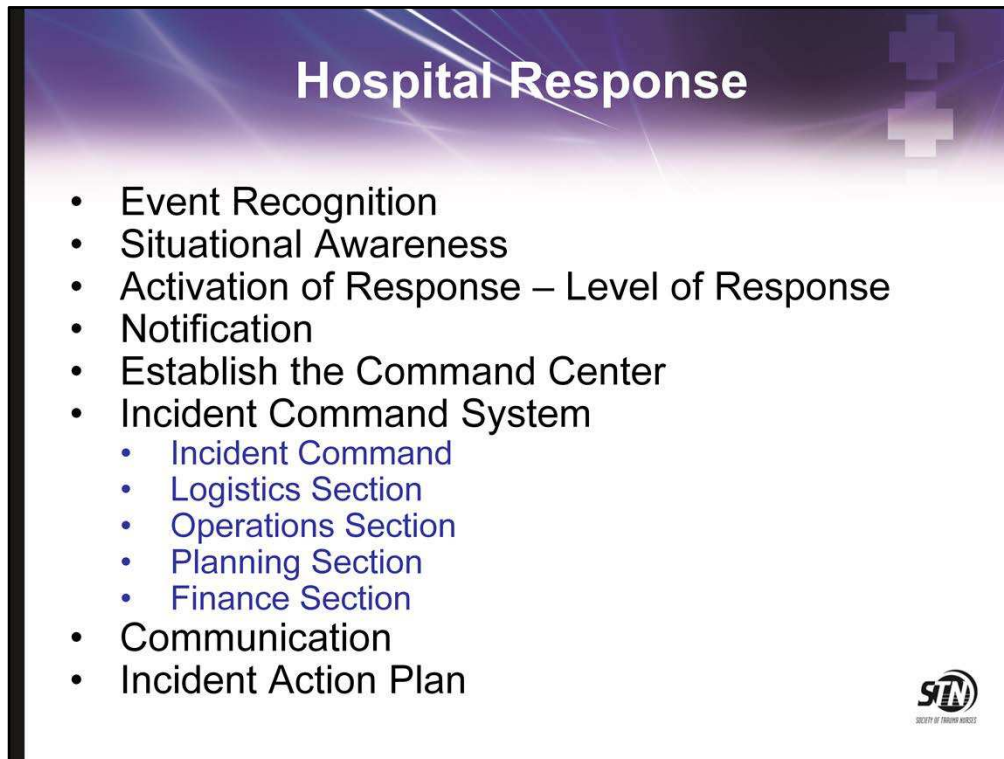
Planning

- Written Emergency Operations Response Plan
 - Input of Medical Leaders, Administration, Nursing, Trauma Program, and Representatives From all Key Departments
 - All Hazard Response Plan
 - Job Action Sheets
- Leadership Training
- Departmental Training



The final product of the planning phase is the written emergency operations response plan. This plan should be an all-hazard response plan. The HVA will define response procedures that need revisions, staff educational needs and if resources for mitigation are needed. These issues need to be addressed and incorporated into the writing of the emergency operations response plan. This process is done with the input of all key stakeholders and departments. The plan should be reviewed and approved by the committee and moved through the leadership organization of the facility. The next step is to address resources needed to carry out the plan.

Job action sheets need to align with job functions throughout the plan. Education for all leaders is necessary to ensure everyone is aware of the response plan and their role in the plan. The last phase of planning is to align the various departments with the plan. Most facilities have moved from having each department develop a response plan to having each department develop job action sheets that align with the emergency operations response plan. This ensures that all departments align with one all-hazard response plan. Department directors are responsible to educate all departmental employees on their role and use of the job action sheets and HICS forms.



Hospitals must be integrated with EMS and local Emergency Management Offices and be included in event notification systems to ensure they are aware of all developing issues within the community. Hospitals need to identify who within the system is to be notified and how information is to be processed. Once hospitals are made aware of an event, hospital staff can evaluate the event, potential impact and current status in the ED, trauma, Ors, ICUs and general units as well as staffing issues. This is called the situational awareness. This process will validate an event and define the level of response needed to manage the event. This process should be done in a timely through manner.

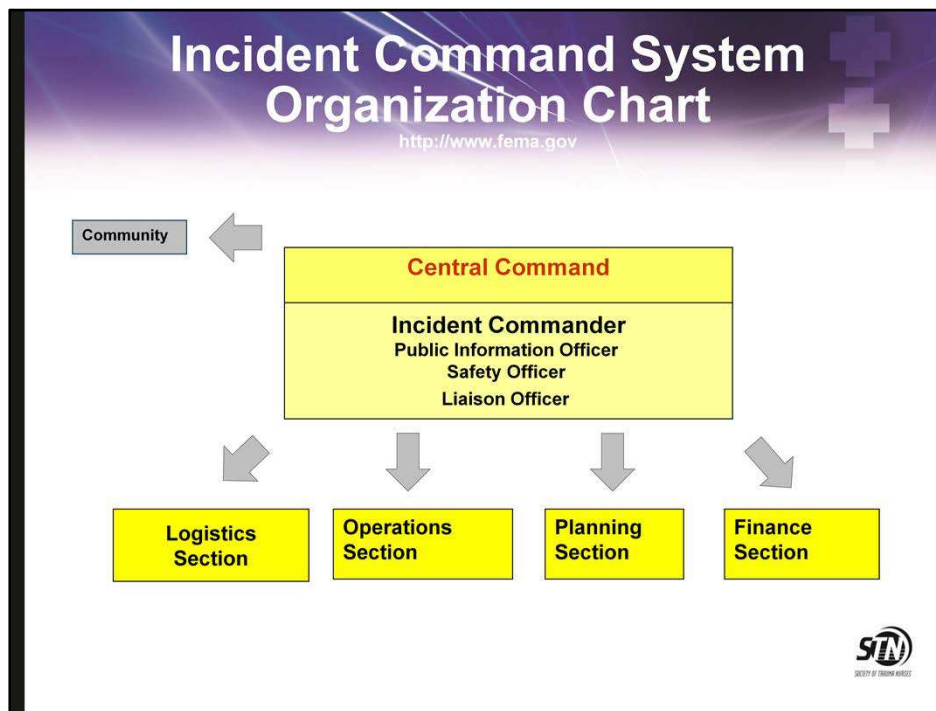
The emergency operations response plan defines who has the authority to activate the levels of response. The level of response will define the number of individuals and resources committed to managing the event. Response levels should be integrated and standardized within the community for clarity and communication. Once the response procedures are activated, notification of staff and community partners must rapidly be initiated. Notification of the individuals selected and trained to respond to the command center must be a priority to ensure operational readiness. Procedures must outline who and how the command center will be established. The Incident Command System should align with the NIMS ICS training to foster integration and communication with other community responders.

The Incident Commander has the authority to define the scope of response, duration of response and to manage the event. The Incident Command will define the incident objectives and operational time-period. The Incident Commander has the authority to change business priorities and operations to manage the event. The Incident Commander is supported by the command staff: Liaison Officer, Public Information Officer, Safety Officer. Some hospitals have added the role of the Disaster Medical Director to oversee all patient care activities in the planning phase as well as the response phase. This individual would serve as an advisor to the Incident Commander and be included in the general staff. The Incident Commander role is one that is assigned in all events, regardless of how minor. The Incident Commander may be mobile in small events. Incident Command is supported by the Logistics Section, Operations Section, Planning Section and Finance Section. Each

section has a defined job function and is led by a section chief. Individuals assigned to these roles must have completed the ICS 700, 100 and 200 at minimum to be successful in their role.

Communication systems must be implemented simultaneously with the Incident Command System. The Incident Commander must develop an initial message for all staff regarding the event and the Public Information Officer will execute the message. A communication plan must be defined and implemented. The Liaison Officer will establish communication with the local EMS and other agency responders. The Safety Officer is responsible to complete a safety analysis (HICS form 261) and communicate findings to the Incident Commander.

The incident objectives, safety analysis, communication plan and the plan to care for staff if they are ill or become injured are combined into the Incident Action Plan (IAP). The IAP is communicated to the Section Chief and monitored by the Planning Section Chief.



Organizational review of the Incident Command System. The concept of the Incident Command System focuses on command and control. The maximum number of direct reports should never exceed seven. The target is between five to seven.

Incident Command – Authority to manage the event

Logistics Section is responsible to get the supplies and resources to manage the event.

Logistics is often referred to as the “**Getters**”, **they get the space, staff and stuff needed to respond to an event**. Supply Branch Director is responsible for all supplies and equipment to respond to the event. The Service Branch Director is responsible for staff. This includes oversight of the Labor Pool, staff wellness, and staff needs such as child care, pet care, transportation, food and sleep. Logistics is responsible for all communication equipment resource needs.

Operations Section is responsible for the taking care of business. They are the “**Doers**”. The Section Chief will assign a Infrastructure Branch Director, Business Continuity Branch Director, Staging Branch Director, Hazmat Branch Director and a Medical Branch Director. The Medical Branch Director is responsible for all casualty care and patient care during the event. The Security Branch Director is responsible for all security needs of the facility during the event.

The Planning Section is responsible for data collection, processes and situational review. They are responsible for developing the strategy and action plans with the Incident Command that the other sections follow. The Planning Section Chief will maintain resource status and looks ahead to define what will be needed. Most hospital disaster drill do not last long enough to fully utilize the Planning Section and therefore is not fully appreciated or understood.

The Finance Section is responsible for the documentation and tracking all expenditures and

mutual sharing agreements. They analyze potential risks, staff compensation, and claims for injury.

Organizational structure titles:

Incident Commander – Leader

Command Staff – Officers

Sections – Section Chiefs

Branch – Branch Director: May have Deputy(ies)



Divisions or groups – Supervisors

Unit – Unit Leader

Additional information is available at the website listed. <http://www.fema.gov>


Hospital Response

- Initial Response Procedures
 - Security / Lockdown
 - Reorganization to ICS – Job Action Sheets
 - Unit Priorities
 - Emergency Department
 - Trauma
 - OR
 - ICU
 - General Units
 - Alternate Care Sites
 - Elective Procedures




The response procedures must be initiated at the same time the Incident Command System is being implemented. Critical timely functions include establishing the security perimeters, hospital access and hospital lockdown. These are managed by the Security Branch Director in the Operations Section. While this is being done, all units must realign to follow the Incident Command System chain of command. Job action sheets will be implemented and communication systems established in each department and each unit. Each unit will implement procedures listed on their job action sheet. The Emergency Department must immediately begin to evaluate all patients for their plan of care and movement out of the ED. Areas targeted for holding and staging in the planning process must assist in the movement of these patients to create capacity for the casualties. All visitors and family members must be relocated to clear the ED. Staffing assignments must be reassessed. Small stretcher teams are an effective way to decrease chaos, define responsibility and manage control. If the facility is a trauma center, the operational status of trauma must be defined as most events are trauma related. The trauma staff will be instrumental in helping expedite care. All units need to define patients that can be moved to a less acute unit or discharged home. The triage team must be established. Alternate care sites must be considered and evaluation of all elective procedures. Considerations for medical decontamination must be evaluated. Decontamination must be implemented early to protect the facility and can easily be stood down if not needed. **Picture is of security guard outside ED ambulance bays directing EMS traffic.**

Hospital Response



- Medical Decontamination
- Security / Access
- Triage
- Echelon of Triage
- Disaster Standards of Care
- Patient Tracking
 - Special Populations
 - Unresponsive Casualties
 - Morgue
- Casualties' Families
- Media



Hospitals must have defined medical decontamination teams that are comprised of individuals that have the appropriate training, competencies and skills to protect the hospital and hospital staff while managing the event. Equipment and where to store these items are critical to the success of an emergency response. Supplies must be readily available for staff to “don” and implement decontamination (**See picture**). Medical decontamination areas require security and defined access routes for patients and staff.

In addition, areas of the hospital may need security measures during a mass casualty event. The Incident Command Center, EMS routes, staff routes, Triage, ED, OR, ICU and casualty family centers require security measures.

Mass Casualty triage requires training in disaster principles. The mass casualty triage goals are to screen for the salvageable critical casualties and keep them moving forward in the treatment echelon of care. The triage team must focus on the “greatest good for the greatest population”. All areas receiving the mass casualties will evaluate the patient and provide a sequenced echelon triage to meet the care needs of the casualty. This is done to reduce under-triage and over-triage of casualties. Over-triage will deplete resources. Under-triage puts the salvageable critical casualty at risk. As the patient moves through the system, altered standards of care or disaster standards of care are defined.

Example of disaster standards of care:

Treatment by clinical exam without diagnostic adjuncts.

CT Head GCS>13

Chest Film / Pelvic Film for Penetrating or Blast Injuries

FAST Procedure

H / H, Blood Typing, ABG

Suturing / Splinting – Moved to Inpatient Setting or Out of Resuscitation

OR – Damage Control Only

ICU Admission – Avoid Long-Term Chronic Illnesses with Poor Prognosis

Special Populations

Pediatric

Geriatric

Morbidly Obese

Patients With Language Barriers

History of Behavioral Health Issues

Provisions to address the casualties' family must be in place.

The Public Information Officer is responsible for coordination of all media request. Staff must know how to refer all media request to the Public Information Officer. Individuals commonly targeted for interviews should attend a media training class to develop their interview skills.

Exercise & Training

- HVA Utilized to Define Exercises
- Table Top, Specific Exercises – Communication, Medical Decontamination
- Full Function Exercises
- Exercise Controllers
- Regional Exercises
- After Action Reviews
- Emergency Operations Response Plan Revisions



Each facility should define their annual exercises and emergency response training bases on their annual HVA. This is a regulatory requirement. Exercises can be a table top that brings disciplines together to walk through how they would respond to an event or it can be a specific exercises targeting a specific response such as communication systems or medical decontamination response. Defined scenarios should be realistic. Full functional exercises that included an influx of casualties that overwhelm the resources must be tested annually. A full functional exercises test a hospital's response to a full scale exercise that includes casualty influx and injects that test the system's response must be completed once a year. This exercise may test the hospital's ability to sustain itself for a period of time without community assistance or it may test integration with the regional response system. Exercises that provide opportunities to evaluate each area of operation have defined controllers that have a specific task to evaluate. These controllers do not participate in the event, but observe the responses and information onto an evaluation log. This information is then reviewed through the after action review of the response. This process will define areas that need response plan revisions, additional education or resources. These issues then become performance improvement items for the emergency operations response committee. Once the actions are completed they are integrated into the revisions of the plan.

Special Considerations



- Blast Injuries
- Chemical Exposure
- Radiation Exposure
- Biological Exposure



Hospital need to consider blast or explosion events, chemical, radiation and biological event when completing their HVA. The emergency operations response plan needs to be an all-hazard response plan. This means the response procedures and Incident Command System structure will remain the same but the safety officer/technical expertise and mitigation procedures will change based on the type of event.

Blast Injuries

- Blast – High Speed Chemical Decomposition of Explosive Materials
 - Shrapnel Fragments
 - Incendiary Material
 - Surrounding Materials
- Conventional Materials
 - Ammonium Nitrate
 - Fuel Oils
 - Gun Powder
 - Plastics / Others
- Characteristics Dependent on Composition and Components



“Blast” is a high –speed chemical decomposition of explosive material. It is often arranged to produce shrapnel fragments and incendiary materials to increase injury impact on humans. The blast typically blows out windows or building structures which become dispersed by the explosive force and cause additional injury. Most detonations are caused by conventional explosive materials such as ammonium nitrate and fuel/oil mixtures. The size of the blast and characteristics are defined by the explosive composition and mixtures in the composition.

A presentation slide titled "Blast Effect" with a purple gradient background and a white cross icon in the top right corner. The slide contains a bulleted list of factors and effects of a blast. The STN logo is in the bottom right corner.

Blast Effect

- Caused by High Pressure Shock Waves – Radiates Outward From Explosion
 - Size and Type of Explosive
 - Distance From Explosive
 - Transmittal Medium
- Reverberations of Blast
- Negative Waves
- Followed by Shrapnel, Fragments, Heat, Smoke and Fire
- Concern for Toxic Fumes / Dust
- Potential Structural Collapse



The primary blast effect is caused by the pressure wave hitting the human body. The distance the individual is from the explosion, size and type of explosive device will define the force that strikes the human body. In addition, the medium or environment the human body is in will impact the wave. Examples: Open air, under water. A blast wave in water is more effective and powerful than in open air.

Reverberations off of structures and over-pressurization of and enclosed space can cause more impact to the human body than the initial blast. The initial flow of gases from the explosion will then flow backward into a vacuum. This can cause rapid displacement of objects. The human body is subject to acceleration and deceleration injuries as well as penetration of foreign bodies. The fire and smoke from a blast can cause injury as well as the toxic fumes from the event. Dust from the explosion has the potential to cause further injury and pulmonary implications.

Potential Injuries:

Blunt Injuries

Penetrating Injuries

Burn Injuries

Ears: Tympanic membrane rupture / hemorrhage with possible ossicular disruption or fracture

Lung: Pulmonary lung contusions, PTX/HTX, and mediastinal air - These may lead to acute ventilatory insufficiency.

Bowel: Bowel wall contusions and potential acute rupture



Circulation: Air embolism in blood vessels due to a tear in the lungs – may lead to catastrophic organ collapse

Chemical Exposure			
Agent	Effect	Onset	Treatment
Nerve Agents: Vapor Liquid Both	Miosis (pinpoint pupils) Rhinorrhea SOB, LOC, Seizures Excessive Sweating GI Distress	Vapor – seconds to minutes Liquid- minutes to hours	Atropine Pralidoxime (2-PAMCl) Benzodiazepines ABC Support
Cyanide (Smells like bitter almonds)	Cherry Red Skin Nausea, LOC Dizziness Metabolic Acidosis Transient Rapid Breathing, LOC, Apnea, Cardiac Arrest	Seconds to minutes	Cyanide Kit Amyl Nitrate Sodium Nitrate Sodium Thiosulfate ABC Support
Blister Agents: Mustard Lewisite (Smell of mustard, onion or garlic)	Redness of skin. Blisters, Irritation of Eyes, Cough, SOB, Airway Injury Pulmonary Edema Mustard: Bone Marrow Suppression	Mustard: Hours Lewisite: Minutes	Lewisite: British Anti-Lewisite

Events that involve the dispersal of chemical agents pose a challenge to the trauma / emergency health care worker. Systems must be in place to detect these chemicals and system to decontaminate the casualty must be ready to deploy in a moments notice. Too often hospitals assume the emergency medical system will provide all decontamination and have inadequate planning.

Priorities Are:

1. Protect Staff and hospital as a resource to the community
2. Provide immediate care of the casualty by providing decontamination in a timely manner and access to emergent care.
3. Hospital must be able to address contaminated individuals of all ages, ambulatory as well as non-ambulatory casualties.

Chemical Exposure			
Agent	Effect	Onset	Specific Treatment
Pulmonary Agents - Phosgene Chlorine (Smells like fresh cut grass or hay)	SOB, Coughing, Chest Tightness, Laryngeal Spasm, Delayed Non-Cardiac Pulmonary Edema Urticaria or wheel skin Irritation	Symptoms Immediate Delayed Pulmonary Edema	No Antidote ABC Support
Riot Control Agents - Pepper Spray Tear Gas	Pain, Tearing, Redness of Eyes, Burning of Nose / Throat, Sneezing, Rhinorrhea SOB, Bronchospasm, Respiratory Distress Skin Erythema, Possible Conjunctivitis	Seconds 	Irrigate Eyes Copiously With Water / NS Wash Skin With Sodium Bicarbonate, Alkaline Soap, or Large Amounts of Cool Water Bronchodilators 

Appropriate decontamination equipment must be readily available. Consultation with the local Poison Center can assist in defining specific treatment options.

Hospital emergency operations response plans must have resources and guidelines specific to the chemical exposure and mass decontamination. Medical decontamination training to ensure staff competency will decrease the risk of hospital exposure and exposure to hospital staff. Training must include security, reception of the exposed, use of screening devices, and triage coordination into the hospital. This will require pre-planning and coordination with local EMS and law enforcement agencies. Hospital security providers should be trained in decontamination and how to don the suits for appropriate security and control at the hospital.

Issues to consider include but are not limited to:

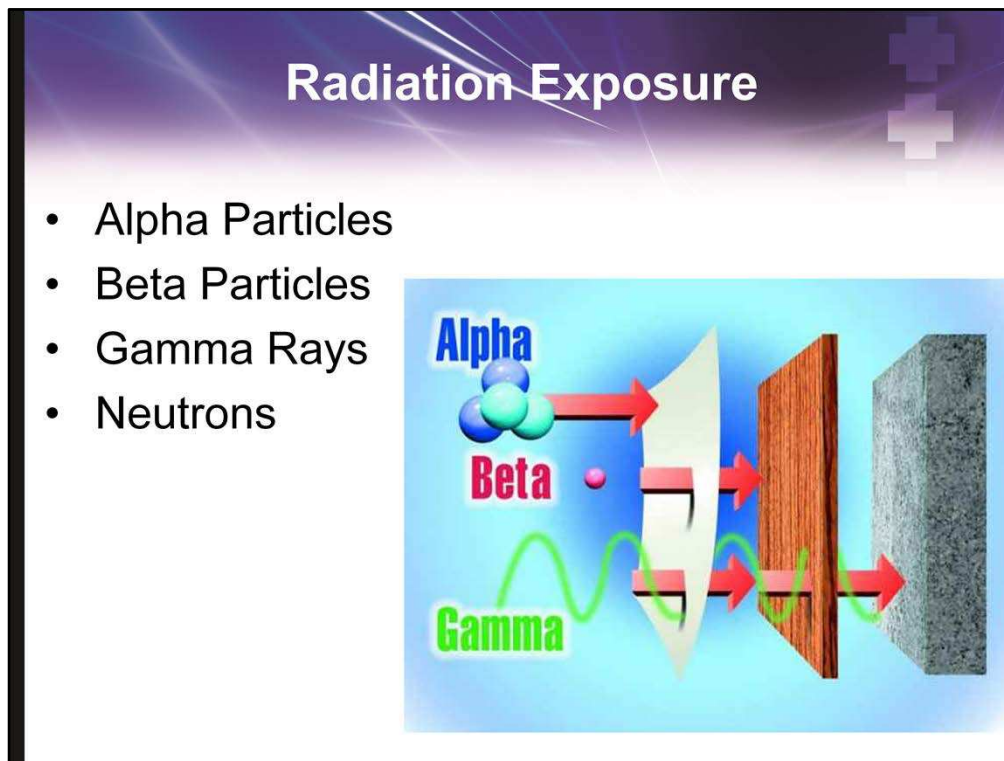
1. Hospital perimeter control
2. Decontamination area security
3. Decontamination safety measures and briefing of event
4. Decontamination flow
5. Primary triage
6. Decon team set up, coordination and support
7. Patient clothes / valuables
8. Communication
9. Patient privacy
10. Secondary triage
11. Staff relief
12. Documentation
13. Debriefing

Radiation Exposure

- Potential Terrorist Events
 - Nuclear Explosion
 - Meltdown of Nuclear Reactor
 - Dispersal of Material Through Conventional Explosives: Radiation Dispersal Device (RDD or Dirty Bomb)
 - Placing Radioactive Material In Public Areas



Hospitals must have procedures in place to screen for radiation exposure and decontamination. This is a regulatory requirement. Staff must know their role and be able to quickly implement procedures.



- Alpha Particles
- Beta Particles
- Gamma Rays
- Neutrons

Hospital emergency response plans must include plans for radiation exposure. The hospital radiation safety officer typically leads the development of response procedures and exercised regarding radiation exposure.

Alpha Particles are large positively charged particles containing 2 protons and 2 neutrons. They only travel centimeters from source and are highly destructive if inhaled, injected or absorbed into open wounds.


Beta particles are small negatively charged electrons that are released from the nucleus of a radioactive substance. They only travel several meters in air and may cause burns to skin, eye cataracts. They can be ingested or absorbed in open wounds and the impact is dose dependent.

Gamma Rays are an energetic form of electromagnetic radiation that can pass through body tissues and deposit energy into tissues. They can travel kilometers in air at speed of light and are an internal and external irradiation hazard. They may cause acute or delayed injury and can be carcinogenic depending on dose.

Neutrons are uncharged particles that pass through body tissues and deposit their energy in tissues. They are the result of nuclear fusion only and can travel many meters in the air. They are an internal hazard through collision with molecules in tissue and are captured by atoms in tissue and subsequently released as gamma radiation.

Radiation Exposure

- **External Contamination**
 - Radiation Debris Is On The Body and Clothing
 - Contamination Is Removed By Medical Decontamination
 - Prevent Internal Contamination By Inhaling, Swallowing or Through Open Wounds
- **Internal Contamination Caused By Inhalation, Ingestion or Absorbed By Open Wounds**
 - Potential Thyroid Gland Injury
- **Unit Measures**
 - 100 Rad = 1 Gray (Gy)
 - 100 Rem = 1 Sievert (Sv)
 - Amount of Radiation Human Absorbs Measured in RAD
 - Biological Effects of the RAD Exposure is Measured in REM



Patients exposed to radiation are not a risk to medical personnel who utilize normal personal protective equipment. Once decontamination has occurred, the patient is not a risk to the health care workers. Care for the injured patient exposed to radiation will follow the ABCs of resuscitation. Care should not be delayed once clothing has been removed. Toxicologist and Radiation Safety officers should be consulted for patients who have suspected internal contamination. Individuals on the medical decontamination team need specific guidelines regarding decontamination of the individual exposed to radiation.

Radiation Exposure: Prodromal Symptoms			
Symptoms	Time of Onset	Approximate Whole-Body Radiation Dose	Physiological Illness
Nausea, Vomiting	First 48 Hours	1 Gray 100 Rad	Decrease In White Blood Cells and Platelets
Nausea, Vomiting	First 24 Hours	2 Gray 200 Rad	Hematopoietic Syndrome Marked Decrease in White Blood Cells and Platelets
Nausea, Vomiting, Diarrhea	First 12 Hours, 8 Hours for Diarrhea	4 Gray 400 Rad	Gastrointestinal Damage 50% Mortality in Absence of Treatment
Nausea, Vomiting, Diarrhea	Within 5 Minutes	10-30 Gray 1,000 – 3,000 Rad	Severe Gastrointestinal Damage Very Poor Prognosis
CNS Impact, Mental Status Changes	Within Minutes	>30 Gray >3,000 Rad	Neurovascular Syndrome Severe CNS Damage, Cardiovascular Collapse Lethal

Acute Radiation Syndrome (ARS) is defined by the clinical syndrome that develop after the exposure to the radiation. ARS affects human body functions different, depending on the total dose of radiation received. The dose, duration of exposure and potential internal contamination through open wounds are factors in predicting ARS Outcomes.

Acute Radiation Syndrome progresses through four phases.

Prodromal Phase – often used to predict outcomes and survival

Latent Phase - Last longer with less exposure and shorter with higher exposure, Symptoms include fatigue, hair loss, weight loss


Manifest Illness Phase – Clinical symptoms of major organ systems.

Recovery or Death Phase - Defined by level of exposure.

Exposed to greater than > 10 Gy (1,000 RAD) generally die within 72 hours without medical treatment


Exposed to 4 Gy to 10 Gy (4,000 to 10,000 RAD) are likely to die without medical treatment

Exposed to less than 4 Gy (4,000 RAD) typically recover if given effective hematopoietic stimulation and appropriate protection from secondary infection



Biological Exposure

- Biological Terrorism
- Epidemic / Pandemic
- Potential Biological Exposure
 - Disease Unusual Or Does Occur Naturally
 - Multiple Diseases
 - Large Numbers of Military and Civilian
 - Massive Point-Source
 - Aerosol Route
 - High Morbidity / Mortality
 - Disease Limited To Localized Geographic Area
 - Low Exposure in Air Filtered Locations
 - Dead Animals
 - Absence of Natural Vector



Biological exposure is the use of microorganisms or toxins derived from living organisms that produce death or disease in humans, animals and/or plants.

Biological terrorism is a growing threat.

Routes of Exposure:

Inhalation – Exposure of most concern due to potential aerosol of the disease agent that would be inhaled deep into the lung

Oral – Direct contamination after an aerosol attack by ingestion.



Dermal – Mucus membrane and open lesions allow passage of disease agents. The intact skin is an effective barrier in most cases.

Listed are the indications of a potential biological exposure:

1. Disease agent that is normally not present in a geographic location is present or in combination with other disease agents in the same population.
2. There are multiple disease agents in the same patients.
3. Large number of civilian and military casualties in a focal area.
4. Data defines a massive data point-source outbreak with an agent that is non-contagious.
5. Aerosol route of infection is evident.
6. High morbidity and mortality related to those at risk.
7. Illness is limited to fairly localized geographic areas.
8. Low exposure rates in individuals with filtered air supply or those with closed ventilation systems.
9. Death of livestock or animals in conjunction to human exposure.
10. Natural vectors in the area of outbreak is absent.

Biological Agents

- Anthrax
- Tularemia
- Plague
- Smallpox
- Botulinum Toxin
- Viral Hemorrhagic Fevers



Listed are the disease agents that are believed to have the greatest potential for bioterrorism.

The most effective and most important prophylaxis against a biological agent is personal protection equipment.

Full face respirator – prevent respiratory exposure, mucus membranes, and conjunctivae – may be impractical

Decontamination – wash with soap and water

Prophylaxis – Precise Efficacy of available medical countermeasures has not been evaluated in actual events. Lab studies do support the use of vaccines and drugs at large exposure levels for some biological agents.

Hospital emergency response plans must have surveillance systems in place to detect developing trends. These systems should be integrated with regional public health systems. Hospitals should define lab capabilities for testing for agents and lab report turn-around times. Infections Disease staff are integrated into the command center and advise the Incident Commander in the role of the “safety-officer” during a suspected biological event. Systems to address decontamination and

Ethical Consideration

- Autonomy
- Nonmaleficence
- Beneficence
- Justice



Four common bioethical principles in health care:

Autonomy – decisions are informed and voluntary and when possible made by the patient.

Nonmaleficence – No harm by omission or commission

Beneficence – Treatment provides direct impact

Justice – Implies fairness and equal care

Image is of the Scales of Justice

Mass Casualty Considerations

Autonomy – Many patients will not have the ability to make informed decisions

Nonmaleficence – Mass casualty triage defines patients that will receive limited or comfort care

Beneficence – Not every patient will have equal care based on resources available

Justice – Mass casualty goals – greatest good for the greatest population

Preplanning and preparation that defines disaster standards of care or altered standards of care in advance will assist in creating “fair” care during an emergency response.

Regional Integration

- Regional Hazard Vulnerability Assessment
- Regional Coordination
- Regional Communication
- Patient Tracking
- Mutual Sharing
- Exercise Development
- After Action Review



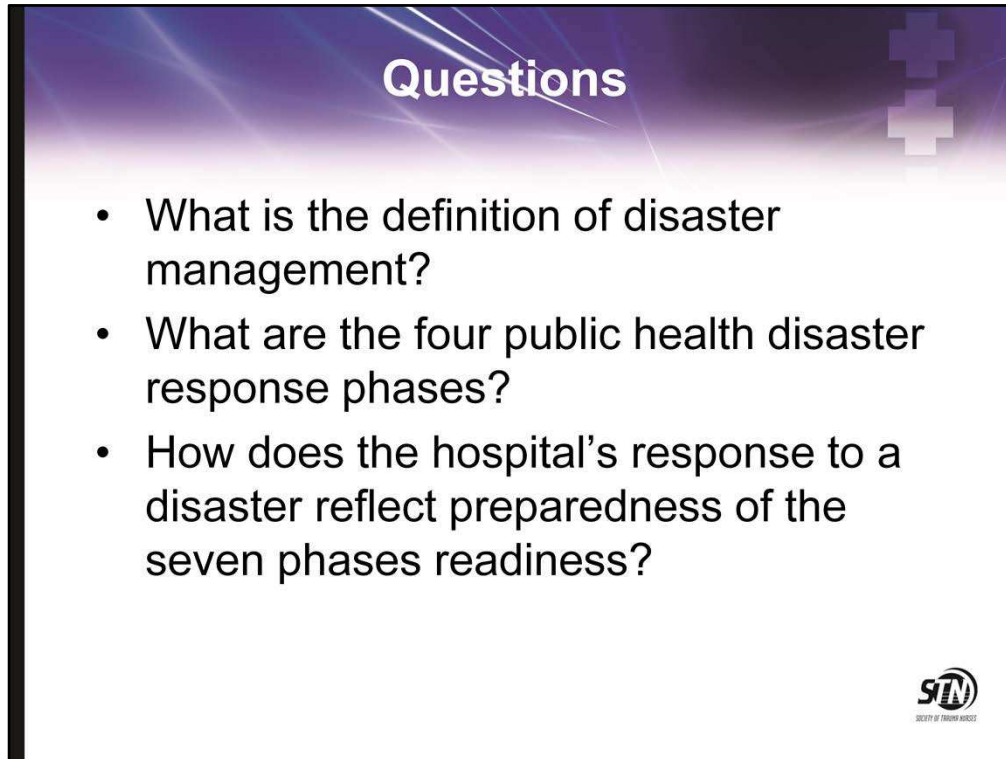
Hospital facilities must participate in and be integrated into the surrounding regional system that is responsible for preparedness and system response. This will ensure they are aware of infrastructure that exist in the region to support an emergency response as well as the strengths and weaknesses of the system.



See notes next slide



Some regions have developed sophisticated Regional Medical Operations Centers (RMOC) that work in collaboration with the local, county, district and state emergency management offices. The purpose of the RMOC is to coordinate all casualty medical care while the emergency management infrastructure manages the event. The RMOC fosters communication and agency collaboration from all disciplines with the intent of focusing on health care needs. Picture is an example of training being done in the Dallas / Ft. Worth area by the Executive Director of the South Texas Regional Advisory Council, Eric Epley.



1. **Disaster Management** – Actions taken by an organization in response to unexpected events that are adversely affecting people or resources and threatening continued operation of the organization; management of natural catastrophes
2. PH Phases: Mitigation, Preparedness, Response and Recovery
3. Hospital response can be reviewed in very defined phases.
 - Preparedness
 - Planning Integration with Pre-Hospital Agencies
 - Emergency Operations Response Plan
 - Regional Integration
 - After Action Review
 - Plan Revisions

Summary

- Define the Hazards That Impact Your Community and Complete an HVA
- Define Members of Your Emergency Operations Response Committee
- Define Response Priorities
- Develop Emergency Operations Response Plan – Educate
- Define Special Response Needs
- Define Realistic Exercises To Test Response Plan
- Complete After Action Reports
- Define Performance Improvement Needs
- Revise Plan

