

# The Story of Mercy and Joplin – Hospital Recovery-Sustainability

*19<sup>th</sup> Annual Chicago Infection Control Conference*



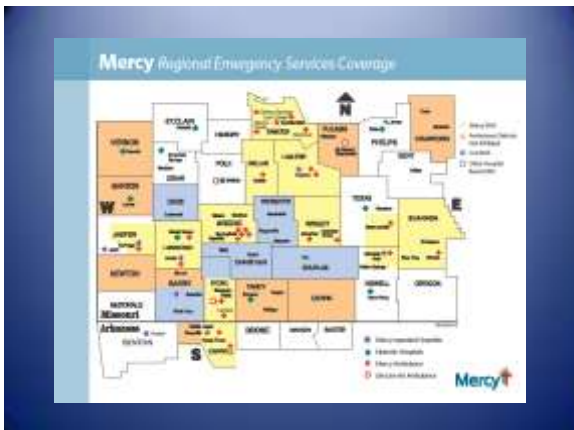
## Conflict of Interests

No conflicts of interests or disclosure to report



## Objectives

- Recognize hospitals are at risk for failure from a devastating disaster
- Introduce strategies – lessons learned to assist hospitals during the disaster response phase
- Identify the challenges for EMS providers working in a large scale event

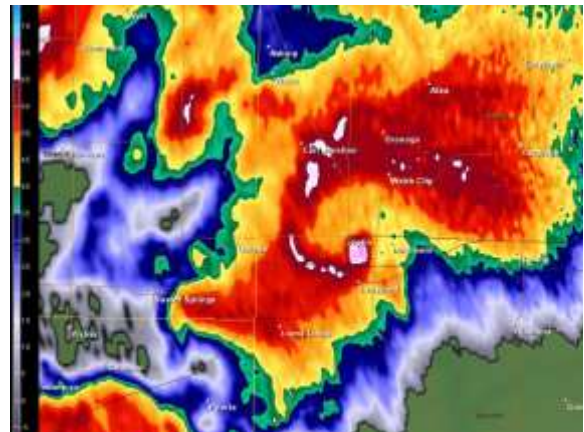



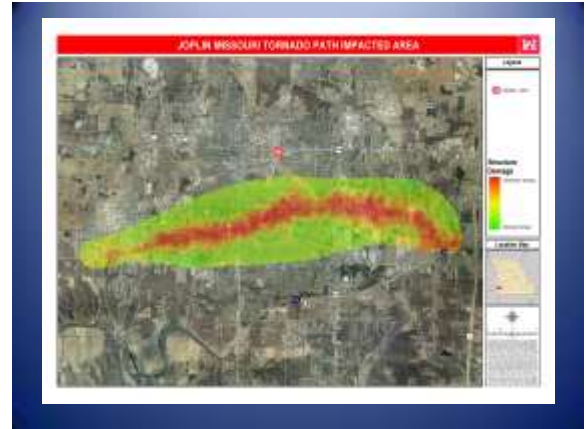


## Meteorological Conditions

### Severe Weather Outbreak Likely

- Instability and wind shear were sufficient for severe weather
- 1:30 PM CDT - Tornado Watch issued for Joplin and vicinity
- 3:00 PM CDT - Moderate (MDT) risk of severe storms
- 3:00 PM CDT - 10% probability of strong tornadoes (EF2 or greater) within 25 miles of Joplin
- 5:34 PM CDT - Approximate tornado touchdown in Joplin - warning time of 24 minutes





EF Number	Wind Speed (mph)	% US Tornadoes
0	65-85	62.2
1	86-110	26.5
2	111-135	8.0
3	136-165	2.6
4	166-200	0.58
5	200+	0.04

### Impact Statistics

- **TIME:** Sunday, May 22, 2011 @ 5:41 PM
- **HOSPITAL PATIENTS:** 183 inpatients including 25 ED patients
- **CO-WORKERS:** 117
- **STORM RATING:** EF5 tornado with 200 mph winds, 6 miles long, 1 mile wide band of complete destruction
- **AFTERMATCH:** 162 Fatalities and approximately 1500 injuries

### Impact Statistics

- **STRUCTURES DAMAGED:**
  1. 7500 residential structures – 4000 destroyed
  2. 3500 more structures damaged in the periphery many businesses
  3. 8 schools destroyed
  4. 2 Fire Stations destroyed
  5. 3 Nursing homes destroyed







### Impact Statistics

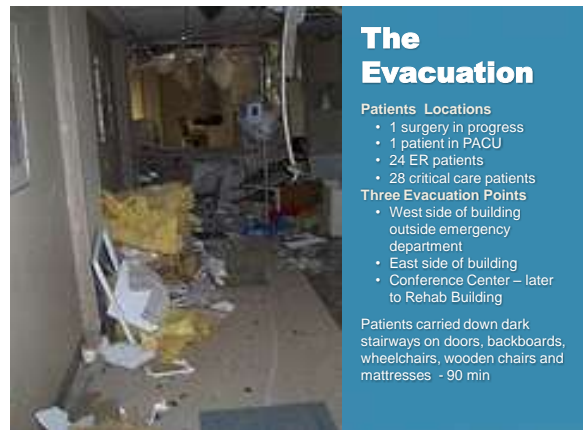
- 18,000 vehicles destroyed or damaged
- **POPULATION AFFECTED:** 17,000 / 9200 displaced
- Joplin population 50,175 (2010 census)
- Normal weekday business population 240,000
- 4,500 – 5,000 jobs effected or displaced



### Hospital Destruction

- Direct hit to St. John's
- Windows and walls blown out
- Portions of roof pulled off
- Building infrastructure severely damaged
- Massive debris
- 86 physicians' offices
  - Destroyed or severely damaged





## The Evacuation

### Patients Locations

- 1 surgery in progress
- 1 patient in PACU
- 24 ER patients
- 28 critical care patients

### Three Evacuation Points

- West side of building outside emergency department
- East side of building
- Conference Center – later to Rehab Building

Patients carried down dark stairways on doors, backboards, wheelchairs, wooden chairs and mattresses - 90 min





### Triage

- Ambulatory and wheel chairs to Rehab Building
- Critical to Freeman Health System emergency dept.
- Emergency tornado injuries treated at street outside St. John's



### Emergency Care

- Memorial Hall emergency - operational for 1 week with EMS Strike Team
- McAuley High School – overflow operation for 48 hours
- Brady Rehabilitation Center
- Medications, medical supplies and personnel deployed





### Triage Tags - Tracking



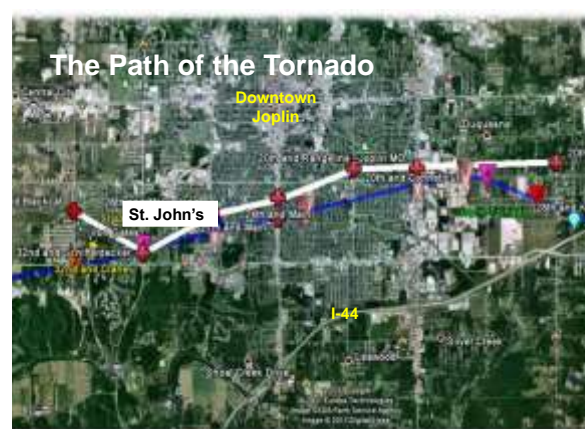
- Criticism over lack of use of triage tags and tracking
- Scanners and tags not available – trailer and supplies destroyed
- Triage and tracking is not real time

### Disaster Supply Trailer



### Local EMS Normal Operations

- Newton Co. EMS
- Metro Emergency Transport System (METS) EMS
- Share Medical Director, unified protocols/procedures, use same type equipment and ambulances
- Normal ambulances staffed 11.





## EMS Operations Available - Post Impact

- 7 EMS Co-workers, numerous hospital co-workers, PD and FD personnel lost homes
- Family plan is critical
- Staffed 21 ambulances
- Transported 250 patients in the first hour

## Initial Local Challenges

- Triage and Tracking
- Limited radio communications
- Intermittent/unreliable cell service
- Severity underestimated initially
- Access difficult for mutual aid ambulances
- "Injured drawn to emergency lights like moths to a flame".
- EMS Medical Sector overwhelmed – consider scribe
- Multi-State Response







### I-44 Closed 40 Tractor Trailers Overturned



### Regional EMS Response

- Over 100 different ambulances from 7 states were in the area for the first two weeks
- 13 Helicopters in the area after weather pattern cleared



### Forward Staging Area - North

- Mutual Aid Ambulances and Medical personnel staged in Springfield
- Fair Grounds
- EMS Strike Teams deployed to Joplin from staging – delayed response due to weather pattern and access to the area



## Alternative Modes of Transportation



## Missouri Hospital Association Response Roles

- Activation of the Hospital Mutual Aid Agreement
- Patient Tracking (all patients located within 1 week)
- Communication
- Coordination with MO1-DMAT
- Emergency Preparedness Coalitions
- Standardized Plain Language Emergency Codes – Implementation Guide

## Ongoing Challenges

- Situational Awareness
- Communications
- Presence in the ICC
- Ongoing weather conditions
- Crowd control - traffic
- Pharmacy Recovery
- IT - Server Recovery
- Safety and Security
- Escorts for Senior Leadership
- Safety of Volunteer Responders
- Dignitary Visits



## Situational Awareness

- Magnitude of the event
- Landmarks not recognizable
- Mapping important
- GPS devices and smart phones
- Spray paint street names on curbs

## Communications

- Alerting systems helpful for notification
- EMSsystem, WEBEOC beneficial tools
- EMS Mutual Aid Frequency
- Better use of Federal designated frequencies i.e. MTAC, VTAC etc.
- Ham Radio Operators not utilized effectively
- Communications trailers, equipment beneficial





## Communications

- Texting – Social Media
- Communications between ICC's
- PBX – 2500 calls handled via Springfield Command Center
- IT needs for Incident Command Centers



## Ham Station



## Incident Command Centers

- EMS is an important function of the Operation Division of ICS
- The IC must have good working knowledge of assets in the staging areas both air and ground.
- Medical Sector Command Concept

### Additional Command Sites

- Joplin City Command Center
- St. John's Mercy Springfield
- Freeman Health Systems





Traffic impacting Responder access

## Taking care of volunteers and community



## Debris Clean-up

- Tornado generated approximately 1.1 cubic yards of commercial waste.



## Public Health Response

- By 5-23-2011 Joplin and Jasper Co. Health Dept. developed a tetanus vaccine administration plan for residents and workers in the debris area
- The plan included stationary and roving vaccine distribution locations moving throughout tornado affected neighborhoods.



## Public Health Response

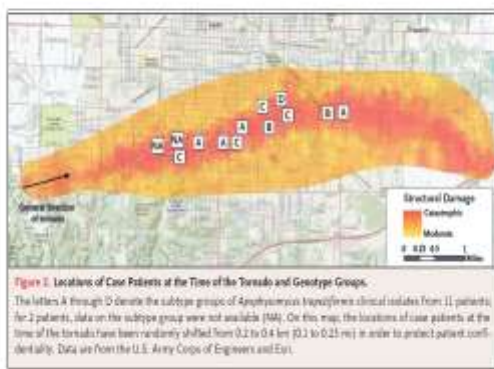
- On 5-24-2011 tetanus vaccinations began and in following weeks over 17,000 tetanus vaccinations were administered by many medical partners in community.
- 14 area health departments along with other local medical partners aided the local tetanus administration effort including over 125 staff.

## Necrotizing Cutaneous Mucormycosis

- Aggressive Fungal infection caused by environmentally acquired molds
- Soft-tissue infection seen in victims injured during the tornado, primarily lacerations closed locally.
- Total of 13 case patients were identified, 5 of whom (38%) died.

*The New England Journal of Medicine - December 2012*

HEALING CUTANEOUS MUCORMYCOSIS AFTER A TORNADO



## Necrotizing Cutaneous Mucormycosis

- A cluster of cases of cutaneous mucormycosis among Joplin tornado survivors
- Cases are associated with substantial morbidity and mortality.
- Increased awareness of fungi as a cause of necrotizing soft-tissue infections after a natural disaster is warranted.
- *The New England Journal of Medicine - December 2012*

## Animal Control

- Within 24 hours, the Humane Society of Missouri was on scene working with Joplin Animal Control to develop a plan for animal rescue operations.
- Within 2 days these operations began.
- ASPCA arrived the day after the storm to handle the emergency pet sheltering operation, working with the Joplin Humane Society.

## Animal Control

- 1,308 pets displaced by tornado picked up and taken to emergency pet shelter by local animal control staff and partner agencies
- 529 pets returned to owners from emergency pet shelter operated by ASPCA and Joplin Humane Society

## Animal Control

- ASPCA able to place remaining tornado displaced animals at end of emergency sheltering operation in new homes through their "Adopt-a-thon" and other placement activities.

## Lessons Learned

- Practice/Drill – drill until you fail include HAM operators
- EMS providers should be familiar with hospital disaster plan
- Add slippers/shoes to weather plan
- Store supplies in strategic locations
- Make emergency supplies portable
- Put together go bags (paper, pen, gloves, flashlights, water, batteries, cell phone chargers) on each floor.



## More Lessons Learned

- Address Security needs early – plan for lockdown with immediate security reinforcement or crowd diversion procedure
- Take time to establish operational periods of one to two hours and stop to review progress.
- Monitor for unauthorized individuals, such as vendors or media trying to make access to the facility



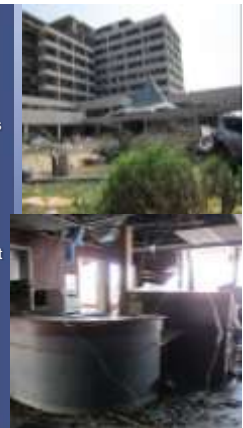
## Lessons Learned – cont.

- Mercy Emergency Management Committee – Health Care Coalitions
- Building design – location of ICU's, stairwell design
- No command center left after the tornado – have back-up off site
- Hold elective surgeries during warnings
- No morgue facility available – mass fatality plan important



## Lessons Learned – cont.

- Ensure that staff have multiple, proper ID's
- Cross credentialing
- Have a process to manage credentialed volunteers
- Take of staff needs quickly (job security, money, clothes, EAP)
- Control staffing day 1 through end of event







### Steps in Mercy's Rebuilding Process

**May 2011**  
One-week, 60-bed tent hospital at St. John's campus.

**August 2011**  
Tent hospital expanded to include additional services.

**Spring 2012**  
Tent hospital expanded to 120 beds and additional services.

**2014**  
New 377 bed hospital at I-44 and Main Street.



**Stage One Hospital Rebuild**

- 60-bed tent-based hospital the St. John's campus
- Full imaging capabilities
- Operating Room
- Intensive Care
- Emergency Room
- Joint Commission Survey





### Temp. Hard Walled Facility

- Moved from tent week of October 3<sup>rd</sup>.
- Heating and weather protection
- ED, OR's, imaging, ICU all connected by interior corridors
- Heated floors
- 



### Component Hospital

- Operational April 15, 2012
- 150 bed with expanded ED and ICU
- Pediatrics, OB departments
- Process completed in 8 ½ months – fastest construction of a component hospital on record.
- Trauma re-designation.
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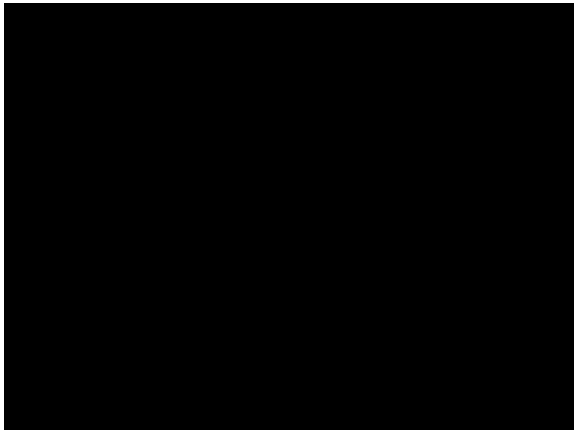
### Component Courtyard











Master Patrolman Jeff Taylor  
Riverside PD, Missouri

A portrait of a man in a police uniform, identified as Master Patrolman Jeff Taylor. He is smiling and wearing a dark uniform with a patch on his left shoulder. The background is a plain, light-colored wall.

**Questions?**

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A logo for "RISING" featuring a stylized cross and the word "RISING" in a bold, sans-serif font. The logo is positioned in the bottom right corner of the slide.