The Top 10 Lessons Learned From Mass Casualty Incidents

Presented by:
Stephen J. Vetrano, DO, FACEP, EMT-B

Introductions

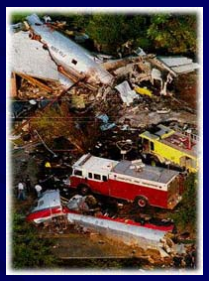
About Me

- Jersey Born, Jersey Raised, Jersey Educated
- Board Certified Emergency Physician
- NJ State Certified EMT
- EMS Medical Director

Objectives

- "Those who do not remember the past are condemned to repeat it."

George Santayana
1863-1952



What do these places have in common?

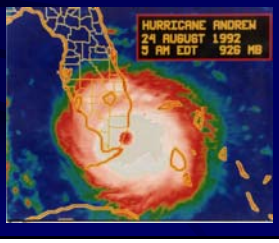
- Kansas City, Missouri
- Sioux City, Iowa
- Cove Neck, New York
- Secaucus, New Jersey
- Texas City, Texas
- Shanksville, Pennsylvania

Who heard of them before the "big one?"

10 - Mass Casualty Incidents are different from Disasters

Hurricane Andrew – August 24, 1992

Miami / Dade County, Florida



Hurricane Andrew

- Category 4 hurricane into major metropolitan center
- Dade County Only:
  - 15 direct fatalities – 43 indirect fatalities
  - 25,524 homes destroyed
  - 250,000 people homeless
- Overall $26 billion in damage

Disasters vs. MCI's

- A mass casualty incident overwhelms your system's resources - a disaster destroys your system's resources and infrastructure

Did we learn our lesson?

Did we learn our lesson?

Not from Andrew…

Hurricane Katrina

- August 29, 2005
- Gulf Coast of Louisiana, Mississippi, and Alabama

Hurricane Katrina

- Category 3 Hurricane into widespread area
  - Some differences with Andrew
- Costliest Disaster in US history
  - 1836 deaths due to storm and flooding
  - $82.1 Billion in damage (US Dollars)
  - FEMA took the brunt of the blame!?
    - Yet don't expect help for 72 hours!

9 – Most fatalities occur in the first twenty minutes

Hyatt Regency Skywalk – July 17, 1981

Kansas City, Missouri

Skywalk Collapse

- Three-tiered suspended walkway collapsed during a tea dance onto 1,500 people
- 111 immediate fatalities, 4 later
- 188 additional injuries
- Major rescue and field-medical response

Take Home Message

- What you see is probably what you will have – very helpful in accurate incident size-up
- Deaths from crushing, hypoxia, or massive blast injuries
- Similar findings at many major incidents
- Blast and explosive events still predominate

9A-Corollary

- Passover Massacre-Park Hotel, Netayana, Israel. March 27, 2003
- Suicide Bomber during Seder Dinner
- 28 immediate fatalities, 140 injured
  - 20 red tags
  - 2 additional deaths later

Passover Massacre-Israeli Response

- First responding units on scene <5 min
- First patient departed scene-approx 10 minutes
- All red tags off scene-approx 20 minutes
- All patients off scene: 33 minutes

Take Home Message

- WYSWYG/Scene Size up
- Don't waste time
- Forward Flow Medicine/Altered Standard of Care
  - Do we really practice it?
  - ATLS
  - Minimally acceptable care
  - Greatest good for greatest number: resource driven

8 – Need accurate, complete, and recurrent triage

World Trade Center Bombing – February 26, 1993
New York City, New York

World Trade Center 1993

- Explosion in parking deck beneath World Trade Center complex
- 6 fatalities, 1042+ patients
- Extensive use of START triage system
- Multiple triage areas, including on upper floors
- Continuous retriage

Triage Times

- 50 patients on an average transit bus
- 30 seconds per patient to triage
  - 25 minutes with one person
  - 12 ½ minutes with two people
  - 6 ¼ minutes with four people
- Now consider those numbers with hundreds of patients…

Take Home Message

- Inaccurate size-up happens frequently and results in inadequate resources
- Must have accurate count and communicate with everyone in the system
- Must use START triage and tags
  - Patient tracking system
- Must use multiple triage personnel
- Consider MASS™ triage

Triage Tag - Side 1

- Property/Evidence Tear-off Strip
- Adhesive Strip
- Triage Algorithm
- Nerve Agent Symptoms
- NAAK (Mark-1) Use
- Contamination/Decon
- Vital Signs and Treatment

Triage Tag - Side 2

- Tracking Number
- Injuries/Patient Information
- Related Patients Area
- Peel-off Tracking Numbers
- Demographics
- Triage Categories

7 – The closest hospital is always overwhelmed

Alfred R. Murrah Federal Building Bombing – April 19, 1995
Oklahoma City, Oklahoma

Murrah Building Bombing

- Truck filled with 4,000 pounds of ammonium nitrate fertilizer with fuel oil explodes in front of building
- 410 injuries – 139 transported by ambulance
  - 45 red, 25 yellow, 69 green
- 167 immediate fatalities, one later

Take Home Message

- Walking wounded will self-evacuate to the closest hospital before you can transport them
  - See also WTC
  - Expect 50% of the casualties to come in the first hour
  - 75% in the 2nd hour
- Ambulances will transport to the hospitals they are comfortable with unless a system is in place to distribute patients-75% of total transports
- Remember to consider hospital specialties!

Surge capacity

- Surge: the ability of a hospital to expand and absorb additional casualties
- Most related it to bed availability
  - Must also consider staffing
- When is optimum care affected?
  - Somewhere around 5 critical casualties

What about specialty centers?

- Shouldn't we take these patients to:
  - Trauma centers
  - Burn Centers
  - Pediatric Centers
- Regardless of Bed status/capacity?

Take this example, close to home for me…

NJ Turnpike MVC 10/29/04

- Commuter van hit by truck, then hit guard rail
- Total of 13 patients brought to CHS-Fuld
  - 1 by air, 12 by ground
  - 11 admitted, 3 to ICU

NJ TPK MVC

- Multiple trauma surgeons in house that morning
- Disaster code called (Code Triage)
- Job well Done!

Take Home Message

- Ambulances will transport to the hospitals they are comfortable with unless a system is in place to distribute patients
- Why did 12 Ground units go to one hospital?
  - Green Tagged patient
- Why did an air unit go to the same hospital?

Take home message

- Surge capacity again
- Diminishing care as casualties mount
  - There is no magic in a trauma center
- Need triage at the hospital: only the sickest get in

6 – Poor staging complicates the incident

Avianca Flight 52 Crash – January 25, 1990
Cove Neck, New York

Avianca Flight 52

- Boeing 707 crashed on north shore of Long Island after running out of fuel
- 73 fatalities
- 81 red, 4 yellow, no green patients
- Extensive network of volunteer emergency responders
- One main road to access incident was clogged with personal vehicles

Take Home Message

- Must consider staging of emergency vehicles and other response units very early in the incident
- Remember to consider both access and egress to the incident site
- Consider designating an escape route
- Remember to sustain the 911 system!

5 – Preplan likely hazards

United Flight 232 Crash – July 19, 1988
Sioux City, Iowa

United Flight 232

- DC-10 suffered massive hydraulic failure in all three systems
- 111 fatalities
- 47 red, 125 yellow, 13 green patients
- All public safety agencies in the area had practiced this incident at drills
- Advance warning of incoming aircraft allowed personnel and apparatus to prepare

Take Home Message

- You can predict the places in your response area where you are most likely to have a major event
  - Most likely to occur – transportation
  - Most damaging – weather incidents
- Target hazards in your community
  - High rise
  - Mass gatherings
  - High-visibility targets

What to preplan

- Apparatus and personnel necessary
  - Mutual aid units
- Command post locations
- Primary and secondary staging
- Access points, landing zones
- Casualty collection points
- Receiving hospitals
- Hazards
- Communications problems

Preplan

- Plans should be an all hazards approach
  - Make the plan fit the hazard, not a specific plan for each hazard
  - Exception: known threat

4 – Plan for convergent responders

World Trade Center Attack – September 11, 2001
New York City, New York

World Trade Center Attack

- Two passenger aircraft intentionally crashed into the World Trade Center
- 2,800 deaths, unknown number injuries
  - 1,103 patients seen at 5 local hospitals
- Hundreds of ambulances and thousands of responders were never requested to respond

Take Home Message

- Do not respond to an incident unless you are requested or assigned
  - Different from being in proximity
- Do not freelance on the incident scene
  - Remember the one additional fatality in Oklahoma City

3 – Go home at the end of the shift

New Jersey Transit 1107 vs. New Jersey Transit 1254
February 9, 1996
Secaucus, New Jersey

New Jersey Transit Crash

- Two transit trains crashed in a field outside Jersey City, New Jersey
- 3 fatalities, 162 injuries
- One ambulance enroute to the incident crashed head-on into a school bus

Take Home Message

- Driving is the number one way to die in the line of duty as an EMT / Paramedic
  - From 1994 to 1997, 67 out of 114 (59%)
  - Even more likely than air ambulance crashes (16.6%)

Why I practice safety everyday

Other Safety Concerns

- EMS responders as targets
  - Secondary Devices-Atlanta 1996 Olympic bombing
- Personal protective equipment
- Incident accountability – no freelancing!
- Patient movement teams

Don't Let This be You

2 – Poor Incident Command

United Flight 93 Crash – September 11, 2001
Shanksville, Pennsylvania

United Flight 93 Crash

- Boeing 757 with 40 passengers and crew crashed in a field in rural Pennsylvania
- All persons on the aircraft were killed
- Shanksville FD has 34 firefighters, 9 EMT's and one paramedic
  - Less than 200 calls per year
- Over 600 persons responded to the incident
  - Plus media, onlookers, etc.
- Desperately needed Incident Command System

Take Home Message

- Use ICS on every incident
  - Practice like you play
  - See also NJ TPK
- Must have interagency cooperation
  - Unified Command
- Use command vests, clipboards, and planning boards
- Keep written records

And the number 1 lesson learned from MCI's is…

1 – Communications failure is the most common problem

SS Grandcamp Explosion – April 16, 1947

Texas City, Texas

SS Grandcamp Explosion

- Freighter with 2,300 tons of ammonium nitrate fertilizer caught fire and exploded
  - 1,150 times more than Oklahoma City
- 400 people died in first blast, including entire fire department
- Monsanto chemical caught fire
- Tidal wave from explosion
- SS High Flyer also exploded
- 561 total fatalities, 3,000+ injuries

We have not remembered the past

- In 1947, the were intractable communications problems at this incident
  - Police could not talk with fire
  - Local fire could not talk with mutual aid
  - Civilian could not talk with military units
- Today, the same problems exist every day on a regular basis

Take Home Message

- Communications = Coordination
- Lack of communications discipline = frequency overload
- Technological limitations – cell phones, batteries, radios
- Disaster = Communications failure

Why doesn't this happen?

EGO EATS BRAINS!

- John Sinclair

Last Thoughts

- Federal resources are 24 to 72 hours away
- Plan to be self-sufficient
- Plan for the plans to fail
- Thanks to:
  - Matthew R. Streger, JD, MPA, NREMT-P
    - Original program author

Thanks for coming!

Stephen J. Vetrano, DO, FACEP, EMT-B
Emergency/EMS Physician