1 ***Common Threads in EMS Tragedies***

2 ***Objectives***

- Examine and identify commonalities of current trends and challenges facing the industry
- Discuss risk assessments, decision making and strategy and tactics
- Discuss situational awareness related to escalating incidents
- Discuss the current environment and identify links to reduce EMS provider injuries and LODDs

3 ***Influence Of Tragedy***

There is no greater influence of change in the fire service than a line of duty death of a firefighter.

Yet, there is no greater tragedy than that of a fallen firefighter whose death prompted the passage of a safety policy which may have prevented his death.....

Deputy Chief Ted Jarboe

1996

4

5

6 ***Related Studies***

- Occupational Fatalities in EMS: A Hidden Crisis
  - Maguire, B.J., Hunting, K.L., Smith, G.S., Levick, N.R.; *Annals of Emergency Medicine.* 2002; 40(6): 625-632
- The Epidemiology of Occupational Injuries and Illnesses Among EMS Personnel
  - Maguire, B.J., Hunting, K.L., Guidotti, T.L., Smith, G.S.; *Prehospital Emergency Care.* 2005; 9: 405–411
- The Hazards of Providing Care in Emergency Vehicles: An Opportunity for Reform
  - Slattery, D.E., Silver, A.; *Prehospital Emergency Care.* 2009; 13(3):388-397

7 ***EMS Personnel***

- • 900,000 providers
  - 180,000 full time
  - 154,000 paramedics
- Includes paramedics, emergency medical technicians and other responders
- 31 million responses and 22 million patients treated per year in the U.S.

8 ***The Issues***

- Where do you think injury and LODD statistics come from?
  - There are no unique occupational or industrial codes used for EMS, EMT or paramedic deaths
  - EMS treats 22 million patients annually, yet little is known about their occupational injuries

9 ***Illnesses & Injuries***

- What do you think are the major categories of injuries to EMS providers?
- Most common:
  - Exposure to blood-borne pathogens

- Injuries from lifting and moving patients
- Wounds inflicted by violent patients
- Injuries caused by traffic accidents involving ambulances

10 ***Illnesses & Injuries***

- 10% of all EMTs and paramedics are missing work because of a job-related injury or illness
  - Busy systems (>40 calls per week) had injury and illness rates of almost 19%
  - Urban areas (population >25,000) are 3 times as likely to get on-the-job injuries or illnesses

11 ***Illnesses & Injuries – In Perspective***

- Providers with back problems
  - Increased incident of work-related injury, with 12.5% of those folks suffering injuries at work
- Workers in the general public statistics
  - Rate of workers missing days on the job for work-related injuries or illness is only 1.3%

12 ***EMS LODDs***

- Estimated 12.7 fatalities per 100,000 EMS workers
  - Death rates for police is 14.2
  - Death rates for firefighters is 16.5
- EMS worker LODD rate is more than twice the national average for all workers (5.0)

13 ***EMS LODDs***

- What do you think are the major categories of LODDs to EMS providers?
- Of 114 LODDs
  - Ground transportation crashes: 67
  - Air ambulance crashes: 19
  - Cardiovascular & CVAs: 13
  - Homicides: 10 (most of them shootings)
  - Other: 5 (e.g. needlesticks, electrocution and drowning)

14 ***Ground Ambulance Crashes***

- Of all EMS fatalities, 74% are transportation related
- Between 1988 and 1997, there were reports of more than 350 fatalities and nearly 23,000 injuries to people involved in ground ambulance accidents

15 ***Ground Ambulance Crashes***

- In total, 60% of ambulance crashes and 58% of crash fatalities occur during runs using lights and sirens
  - 22.2 injuries per 100,000 runs with lights and sirens
  - 1.46 injuries per 100,000 runs with normal driving
-

16 ***Ground Ambulance Crashes***

- Oncoming motorist failure to yield is primary cause of ambulance crashes with lights and siren activated
- Unrestrained versus restrained ambulance occupants
  - Risks of death and severe injury is 4 to 6 times greater for unrestrained

17 ***Ground Ambulance Crashes***

- Between 1988 and 1997 – Ambulance occupants killed
  - o 72% were occupants of the rear compartment
  - o Only 40% of the total ambulance occupants were contained within the rear compartment during these crashes
- Rear compartment is particularly hazardous
  - o Non-crashworthy structure
  - o Interior surfaces – includes projectiles, dangerous strike zones
  - o Providers typically do not wear seat belts in the rear compartment
-

18 ***Fatigue***

- 21 hours of wakefulness can produce impairment equivalent to 0.08% blood alcohol concentration

Arnedt JT, Wilde GJ, Munt PW, MacLean AW. How do prolonged wakefulness and alcohol compare in the decrements they produce on a simulated driving task? *Accid Anal Prev.* 2001; 33(3): 337-44

19 ***Assaults***

- EMS providers high rates
  - o Assault fatality rate is 7 times higher than other health care workers
  - o Non-fatal assault rate 22 times higher than national average
- Some EMS interventions may increase risk

20 ***Assaults***

- September 9, 2012: Fort Wayne, Indiana - Three Rivers Ambulance Authority
- At least 17 bullet holes found on vehicle while transporting a stabbing victim

21 ***Common Threads – Case Studies***

22 ***Case Study #1 – Emergency Situation***

- Incident Overview
  - o Call Type: Seizure
- Audio

23 ***Incident Key Components***

- Initial request was for police to meet at the hospital
- Changed location to on scene due to patient becoming violent
  - o Demonstrated situational awareness
  - o Crew resource management
- Communications section immediately checked on unit's welfare

24 ***Case Study #2 – Life Threatening Situation***

- Incident Overview
  - Call Type: Automatic Fire Alarm
- Audio

25 ***Incident Key Components***

- Responded to an alarm
  - Typical and routine response situation
  - Alarm pulled by residents because of an assault situation
- Engine requested police
  - Location reported as front of the building
- Subsequent transmissions ask for police to "step it up" due to reports of individual with a knife
  - Assailant reported to be in parking garage
  - Engine not going to basement until secured by police
- Portable radios not working in garage

26 ***Case Study #3 – Emergency Situation***

- Incident Overview
  - Injured Person/Fall
- Audio

27 ***Incident Key Components***

- Requested police for agitated patient
  - Second request to have police respond on an emergency basis
  - Situational awareness identified escalating incident
    - Crew transmitted an emergency situation versus a "Signal 3"
- Communication section immediately checked on unit's welfare
  - Unit denied they were in danger

28 ***Case Study #4 – Life Threatening Situation***

- Incident Overview
  - Injured person (trauma)
- Audio

29 ***Incident Key Components***

- Situation Upon Arrival
  - Entered residence – conscious male with a gun
  - Crew immediately retreats
    - Calls for police assistance and additional fire/rescue help
  - Several shots fired
  - A fatal self-inflicted gunshot wound occurs

30 ***Incident Key Components***

- Situation awareness is key
  - No specific threatening situation reported
- Crew's immediate retreat was best and only option – unknown victim intent
  - Provide details to Communication Section for PD response (location, weapon, number

of individuals involved)
- Retreat options – by foot vs. moving vehicles in line of sight

31 ***Commonalities***
- High risk/low frequency events
  - Emergency situations
  - "Signal 3" – life threatening situations
- Occur anytime, any place, any call type and any unit type
  - Routine EMS calls
  - Routine fire related calls
  - Escalating incidents

32 ***Commonalities***
- Various terminology used for requests
  - Law enforcement notification
  - Emergency need for law enforcement without fire/rescue threat
  - Fire/rescue personnel in immediate danger

33 ***Commonalities***
- Communication Section actions
  - Communication personnel requested immediate police assistance
    - All requests call typed as "Signal 3" event
  - Checked if unit was in immediate danger/involved

34 ***Case Studies***
- Let discuss the lessons learned…

35 ***Lessons Learned***
- Have a communication device
  - Portable radio
    - Secondary communication device
    - Scan mode (e.g. Oscar channel)
  - 911 call – tape of other conversations
- Maintain your situational awareness
- Review procedures and terminology related to:
  - Emergency assist transmissions
  - "Signal 3" transmissions

36 ***Communications Lessons Learned***
- High risk/low frequency events
- Review policies and procedures related to
  - Emergency traffic
  - "Signal 3" transmission
  - "All clear" acknowledgement from Communications and unit
- Call taker awareness for 911 calls from personnel

37 ***Welfare Checks***
- CAD timer alerts dispatcher – typically 20 minutes on-scene time for any unit
  - "Checking your welfare" to on-scene units
  - 2 welfare checks from ECC prompts an ECC "Signal 3"

- If no response from on-scene unit – Communications will:
  - Attempts call-back to 911 caller
  - Dispatches closest unit "emergency"
  - Notifies area chief officer
  - Unit locator (if equipped)
  - Send PD to search possible routes of travel

38 ***Safety and Survival Techniques***

- Crew integrity
- Situational awareness
  - Scene Approach
    - Apparatus placement considerations
    - Consideration and control of warning devices prior to scene arrival
    - Body position in front of doors/windows
  - Animal Approach
    - Request Animal Control if needed
    - Protective measures

39 ***Safety and Survival Techniques***

- Situational Awareness
  - Patient Approach
    - Uncooperative patients that make personnel feel threatened may be considered refusing service until control – document circumstances
    - Always watch patient's hands and items within reach
    - Perform appropriate assessments – check for possible hidden weapons under clothing during assessment
    - Request PD to render weapons safe
      - Injuries can occur
      - Evidence preservation

40 ***Safety and Survival Techniques***

- Crew resource management
- Techniques
  - Separation – have a couple exit plans
  - Isolation of the individual
  - Shielding – distance, barriers, assistance

41 ***Safety and Survival Techniques***

- Primary and secondary communication devices available
- EMS unit stops and personnel bail out
- EMS unit proceeds to a close facility for assistance
  - Fire/rescue station
  - PD station
- Train, train, train on the high risk/low frequency events

42 ***Roadway Safety***

- National Traffic Incident Management Coalition
  - 4 minutes of travel delay time result for every minute a highway lane is blocked due to an incident

- Traffic crashes and "struck-by" incidents are leading causes of on-duty injuries and deaths for law enforcement, firefighters, emergency medical, and towing and recovery personnel

43 ***Roadway Safety***

- National Highway Traffic Safety Administration
  - 36% of all crashes on the Capital Beltway in Virginia and Maryland are secondary crashes
- Federal Highway Administration
  - Likelihood of a secondary crash increases by 2.8% for each minute the primary incident continues to be a hazard
  - Secondary crashes account for 18% of freeway fatalities and 20% of all collisions

44 ***Apparatus Positioning***

- Position EMS transport units "downstream" from other parked apparatus
  - EMS units may need to be backed at an angle into a protected loading area to prevent working in or near passing traffic – Use backers!
- Crash scenes in residential areas consider parking EMS units in driveways for safe loading
  - If driveways are inaccessible, park ambulances to best protect patient loading areas

45 ***Initial Action Items***

- Set initial taper in direction of traffic travel
  - Remove taper in opposite direction of traffic travel

46 ***Apparatus Lights***

- Nighttime operations, reduce the amount of white light on apparatus
  - Reduces the blinding effect to approaching vehicle traffic
- Other emergency lighting should be reduced to yellow lights and emergency flashers where possible

47 ***Considerations***

- How can we avoid secondary accidents?
  - For every minute on the scene, the chance of a secondary crash increases 7%
- What can we do to make the scene *SAFER*?
- Update ECC periodically and as incident changes (escalation, termination, etc.)

48 ***Strategies***

Ambulance Safety and Design

- *Improve design and safety standards*
- *Strategic positioning of supplies and equipment - within the reach of seated providers*
- *Increase use of seat belts*
- *Improve vehicle maintenance*

49 ***Strategies***

Driving

- *Change culture and behaviors*
  - *Policy revisions – use of lights and siren*
  - *Safe driving incentives*
  - *Accountability*
  - *Use of technology*

- *Training*
- *Fatigue*
  - o *Review shift/duty crew schedules*
  - o *Rotation of crew positions*
- *Crew resource management*
-

50 ***Strategies***

Situational Awareness

- *More than "Size-Up"*
  - o *Inner/Outer circles*
  - o *Continual assessments*
- *Comprehension and forecasting*
- *Two components*
  - o *Risk recognition*
  - o *Communication of risk*
- *Crew resource management (CRM)*

51 ***Strategies***

Risk Assessment & Decision Making

- *Hazard recognition*
- *Must be a continuous process for the entire duration of the incident*
- *Take feasible measures to limit or avoid risks*
  - o *Execute the basics*
- *If conditions change, and risk increases, change strategy and tactics*

52 ***Strategies***

Roadway Safety

- *Wear brighter, more reflective colors*
  - o *Compliance with wearing ANSI traffic vest*
- *Optimize vehicle placement to provide safe work zone*
- *Respond with only the necessary resources*
- *Quickly initiate a traffic management plan*
- *Reducing incident clearance times*

53 ***Strategies***

Patient Care Delivery

- *Consider technology usage*
  - o *Automatic ventilators*
  - o *Mechanical compression devices*
  - o *Lifting assist devices*
  - o *Patient transfer devices*
- *Have enough resources*
- *Wearing of seatbelts*
-

54 ***Strategies***

Personal Approach and Accountability

- *Take steps to reduce personal risk taking*

- *Healthy habits*
  - o *No smoking*
  - o *Exercise*
  - o *Healthy diet*
  - o *Sleep*
  - o *De-stress*
- *Compliance with PPE and BSI*

55 ***Strategies***

Communications

- *Portable radio limitations*
- *Calling a mayday*
  - o *EA/EB use and/or ease of use*
- *Calling emergency signal*
- *Communications section*
- *Standardize terminology*
-

56 ***Strategies***

Data Driven Decision Making

- *Improved databases with uniform data*
- *Research*
- *Development, implementation and evaluation of risk reduction interventions*
- *Mechanism to share best practices*
- *Be wary of untested solutions*
  - o *Use of ballistic vests*

57

58 ***Miracle on the Hudson***

"For 42 years I had made small, regular deposits of education, training, and experience, and the experience balance was sufficient that on January 15th, I could make a sudden, large withdrawal."

Captain Chelsey "Sully" Sullenberger
United Flight 1549

59 ***Questions/Comments***

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