Developing a National Guideline for Mass Casualty Triage

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Conflicts of Interest

- No financial conflicts related to this material
- Led the SALT and MUCC workgroups
Objectives

- Describe the current literature related mass casualty triage
- Explain the development of the Model Uniform Core Criteria and its relationship to SALT Triage
- Discuss what needs to done next to have a national standard for mass casualty triage

How do we prepare for an MCI?
"When I arrived at the scene of the explosion there were a couple of hundred people walking towards us looking shocked and dismayed over what had happened. The best analogy I can give is that it was like a scene from a zombie movie as these people moved towards us. We were standing at the only exit from the factory compound and people were coming from all over the facility -- narrowing into a single stream as they moved through the gate. While the majority were not injured, we could visually identify many with obvious injuries within the group of evacuees. Our first goal was to immediately separate the injured from the group so that we could triage them to transport units and receiving facilities. The most unexpected aspect of this event was that unlike many of the MCI drills I have witnessed, all of our patients were ambulatory with the challenge being not to miss any patients as they were self-evacuating. The final patient count was 44, with two ending up in intensive care…”

- Battalion Chief Pepie Du De Voire, Milwaukee Fire Department
  –EMS Operations Chief

Falk Plant, Milwaukee, WI, December 6, 2006

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Real Events

- **2004 Madrid bombings**
  - 10 bombs on 4 commuter trains at rush hour
  - 191 fatalities and ~2,000 people injured
  - Closest hospital -- 272 patients in 2.5 hours
It doesn’t look like this

The Mass Casualty Triage Project

- Started in 2006
- Part of CDC sponsored:
  - Terrorism Injuries: Information Dissemination and Exchange (TIIDE) project
- Effort to develop national guideline for mass casualty triage
Project Goal

- Review available evidence on mass casualty triage
- Develop a position paper on a national standard for mass causality triage

Workgroup

- ACEP
  - Eric S. Weinstein
- AMA
  - Phillip Coule
  - Ray Swienton
- ACS-COT
  - Jeffrey Hammond
  - Jeffrey Salomone
  - Eileen Bulger
  - Sharon Henry
  - Howard Taekman
- NAEMT
  - Greg Lord
  - David Markenson
- NAEMSP
  - David Cone
  - E. Brooke Lerner
  - Robert O'Connor
  - Richard Schwartz
  - Ian Wedmore
  - Jason Lui (fellow)
- NASEMSO
  - Wayne Misselbeck
  - Nick Nudell
  - Joseph Schmider
- Federal Partners
  - Jon Krohmer, DHS
  - Tasmeen Singh, EMSC
  - Gamunu Wijetunge, NHTSA
  - Bob Bailey, CDC
  - Rick Hunt, CDC
  - Scott Sasser, CDC
  - David Marcozzi, ASPR
- NAEMSA
  - Teri Sanddal
Compared Existing Systems

- For each triage system assembled:
  - Research evidence
  - Practical experience
- Compared features of each system
- Reviewed by consensus

Best Comparison Evidence Identified

- Garner 2001
- Comparison of START, Sieve, Care Flight
- Sensitivities 45 - 85%
- Specificity 86 - 96%
- Care Flight did the best
- Done in the ED non-MCI conditions
- Used a resource use criteria to determine accuracy
Triage System Comparison

- Comparison Grid
  - Coding
  - Parameters for categories
  - “Pre-dead” therapy
  - Who can use
  - Cost
  - Training time
  - Validation
  - Key Differences

- Found many common features

Consensus

- Did not find overwhelming evidence supporting any system
  - Most systems had identified weaknesses

- Developed new system using best of all systems
**SALT Triage**

- Sort – Assess – Life Saving Interventions – Treatment and/or Transport
- Simple
- Easy to remember
- Groups large numbers of patients together quickly
- Applies rapid lifesaving interventions early
- All hazards
- All populations

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**SALT Mass Casualty Triage**

1. **Step 1 – Sort: Global Sorting**
   - Walk
   - Assess 3rd
   - Wave / Purposeful Movement
   - Assess 2nd
   - Still / Obvious Life Threat
   - Assess 1st

2. **Step 2 – Assess: Individual Assessment**
   - LS1: Control major hemorrhage
   - Open airway (if child consider 2 rescue breaths)
   - Chest decompression
   - Auto injector antitoxin

   - Breathing
     - Yes
     - Obey command or makes purposeful movements?
     - Has Peripheral Pulse?
     - Not in respiratory distress?
     - Major hemorrhage is controlled?
     - Yes
     - All
     - Yes
     - Minimal
     - No
     - Minor
     - Any
     - Yes
     - Dead
   - No
     - Likely to survive given current resources
     - Yes
     - Expectant
     - No
     - Immediate
     - Delayed
- Concept endorsed by
  - American College of Emergency Physicians
  - American College of Surgeons Committee on Trauma
  - American Trauma Society
  - National Association of EMS Physicians
  - National Disaster Life Support Education Consortium
  - State and Territorial Injury Prevention Directors Association
What went wrong?

- Not enough organizations involved
- Representatives did not actually have the power to make decisions on behalf of their organizations
- We made a new thing
- It was a start

Model Uniform Core Criteria

- Yes that spells MUCC
- 1) Involve more stakeholders
- 2) Create a checklist rather than a system

- Like cardiac arrest treatment
  - ILCOR – consensus on science = MUCC
  - AHA – treatment guidelines = SALT
**Workgroup**

- Expanded to 30 members
  - Prior members
  - Representatives from more organizations
- Review science again and develop list of recommended criteria
  - identified key components a triage system should include to meet the national guideline
  - Allow flexibility and innovation in triage systems while still creating interoperability

**Sample Criteria**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Basis</th>
<th>Used by Other Systems</th>
<th>Relevant Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Lifesaving interventions are considered for each patient and provided as necessary, prior to assigning a triage category. Patients must be assigned a triage category according to their condition following any lifesaving interventions.</td>
<td>Indirect Science</td>
<td>Yes</td>
<td>Bellamy 1984; Baker 2004; Kragh, Walters et al. 2005; Kragh, Littrel et al. 2005; Kragh, Walters et al. 2009</td>
</tr>
<tr>
<td>3.2 Lifesaving interventions are performed only if: (1) the equipment is readily available, (2) the intervention is within the provider’s scope of practice, (3) they can be quickly performed (i.e., less than a minute), and (4) they do not require the provider to stay with the patient.</td>
<td>Consensus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.3 Lifesaving interventions include the following: control of life threatening external hemorrhage, opening the airway using basic maneuvers (for an apneic child consider 2 rescue breaths), chest decompression, and auto injector antidotes.</td>
<td>Science</td>
<td></td>
<td>Bellamy 1984; Bellamy, Pedersen et al. 1984; Brodko, Vanfgard et al. 2007; Lee, Porter et al. 2007; Osuga and Tafelz 2010; Kragh, Walters et al. 2005; Kragh, Littrel et al. 2005; Kragh, Walters et al. 2009</td>
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<td></td>
<td></td>
<td></td>
<td>Chest Decompression (Barton, Esperson et al. 1995; Eckstein and Suyehara 1968; Davis, Pettit et al. 2005)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Aneurysm (Bellamy 1984)</td>
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<td></td>
<td></td>
<td>Auto-injector antidotes: (Chiumino, Suzuki et al. 1999; Baker 2004)</td>
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3.3 Lifesaving interventions include the following: control of life threatening external hemorrhage, opening the airway using basic maneuvers (for an apneic child consider 2 rescue breaths), chest decompression, and auto injector antidotes.
Broader Endorsements

- Endorsed by
  - American Academy of Pediatrics
  - American College of Emergency Physicians
  - American College of Surgeons – Committee on Trauma
  - American Trauma Society
  - Children’s National Medical Center, Child Health Advocacy Institute, Emergency Medical Services for Children National Resource Center
  - International Association of Emergency Medical Services Chiefs
  - National Association of County and City Health Officials
  - National Association of Emergency Medical Technicians
  - National Association of EMS Physicians
  - National Association of State EMS Officials
  - National Disaster Life Support Education Consortium™
  - National EMS Management Association
  - Society for the Advancement of Violence and Injury Research

- Concurrence by
  - HRSA/MCHB Emergency Medical Services for Children Program

Feds?

- CDC felt strongly that NGO’s had to endorse before feds considered
- Forced feds to come up with an answer
Grass Roots

- SALT’s adoption
  - National Disaster Life Support Courses
  - Communities adoption ex. Milwaukee County, City of Kenosha
  - Included in more than 6 text books
  - Doomsday preppers episode
- The concern less interoperability

Where is it now?

- FICEMS still deliberating about MUCC
  - States continue adopting MUCC
  - Communities continue adopting SALT
SALT Research

- Cone 2009: 2 paramedics - 1 drill
  - 78.8% accurate
- Lerner 2010: 235 victim observations - 8 drills
  - Correct triage 83% (95% CI: 78%-88%)
    - 6% over-triaged
    - 10% under-triaged

SALT Research

- mean triage interval 28 seconds ±22
- 58 victim observations during a live drill
Four Month Retention

- Deluhery 2011
- 159 Milwaukee County Paramedics
- 20 minute training session
- Identical test immediately after training and 4 months later

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<th>Initial Test</th>
<th>Four Month Test</th>
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<tr>
<td>Overall questions correct</td>
<td>84% (10.9 ± 1.9)</td>
<td>85% (11.0 ± 1.9)</td>
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<tr>
<td>Correctly triaged patient scenarios</td>
<td>8.3 patients ± 1.7</td>
<td>8.3 patients ± 1.4</td>
</tr>
</tbody>
</table>

Comparisons

- Cone 2011:
  - Simulator comparison of SALT vs. SMART version of START
  - Found START faster and more accurate
- Primary issue
  - What is the right answer
  - When we know everything who should have been identified as immediate, delayed, etc.?
## Developing a Gold Standard

### Immediate
- Neurologic, vascular, or hemorrhage-controlling surgery to the head, neck, or torso performed within 4 hours of arrival at a hospital.
- Limb-conserving surgery performed within 4 hours of arrival at a hospital on a limb that was found to be pulseless distal to the injury prior to surgery.
- Escharotomy performed on a patient with burns within 2 hours of arrival at a hospital.
- Chest tube placed within 2 hours of arrival at a hospital.
- An advanced airway intervention (e.g., intubation, LMA, surgical airway) performed in the prehospital setting or within 4 hours of arrival at a hospital.
- IV vasopressors administered within 2 hours of arrival at a hospital.
- Arrived in the ED with uncontrolled hemorrhage.
- Chemical exposure that required additional treatment with antidotes in the ED or in the hospital within 4 hours of arrival that was provided to correct symptoms and not given solely for patient comfort and/or the relief of minor symptoms (e.g., rhinorrhea).
- Patient who required EMS initiation of CPR (i.e., had a cardiac arrest) during transport, in the ED, or within 4 hours of arrival at a hospital.

### Minimal
- Discharged from the ED with no X-rays or an extremity X-ray that was negative or showed an uncomplicated fracture (i.e., a closed extremity fracture without significant displacement or neurovascular compromise); no laboratory testing; received only simple wound repair (single layer suturing only); and received no medications intravenously (does not include fluids), or inhaled (does not include oxygen) from EMS or in the hospital.
- Chemical or radiologic exposure that did not require any treatment beyond external decontamination in the field or in the hospital.
Real Events

- 2004 Madrid bombings
  - 10 bombs on 4 commuter trains at rush hour
  - 191 fatalities and ~2,000 people injured
  - Closest hospital -- 272 patients in 2.5 hours

Retrospective Analysis

- Kahn 2009:
  - Evaluated triage during a 2003 train crash
  - Real world research is needed
    - Difficult to grant fund using current funding models
Funding

- No way to fund prospective real-world
- Funding for retrospective likely to slow
- Need to rapidly mobilize funds to study events
  - Foundation?

What’s Next for MUCC?

- Build the science
- Sustain the process so it improves
  - Give it a home
  - Set up a review schedule 5 or 10 years?
    - By-product is improved and increased science
    - Ex. Field Triage Guidelines
What’s Next?

- The rest of the event
  - MUCC address ONLY the first level of sorting
  - Probably a very short part of the response
  - For example, it does not address
    - Transport priority
    - Resource allocation
    - Population based triage
- Can not take over 7 years for each one!
  - Workgroup efforts ~1 year
  - Rest of the time was politics

Discussion?

Free SALT Training video hosted by NDLSF available at:
http://www.salttriage.org

Contact me: eblerner@mcw.edu