Mass Casualty Incident Triage…
…and then some

Eric S. Weinstein MD MScDM
31 January 2019
https://www.nytimes.com/2017/05/22/world/europe/manchester-concert-explosion.html
accessed 22 May 2017 picture Press Association, via Associated Press
OBJECTIVES

1. Theory:
   a. Model Uniform Core Criteria “MUCC”
   b. Review of (most) mass casualty triage systems


## TABLE 1

### Comparison of Existing Mass Triage Systems

<table>
<thead>
<tr>
<th>System</th>
<th>Coding</th>
<th>Status Assigned Based on</th>
<th>Permitted Therapies Before Assigning to Dead Category</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Triage and Rapid Treatment (START)(^5)</td>
<td>Immediate: red&lt;br&gt; Delayed: yellow&lt;br&gt; Walking wounded: green&lt;br&gt; Deceased: black</td>
<td>Immediate: respiratory rate &gt;30, slow capillary refill, or cannot follow commands&lt;br&gt; Walking wounded: able to walk&lt;br&gt; Deceased: not breathing after 1 attempt to open airway</td>
<td>1 attempt to open the airway through positioning</td>
<td>1. Modified version replaces capillary refill with no palpable radial pulse</td>
</tr>
<tr>
<td>Jump START(^6)</td>
<td>Immediate: red&lt;br&gt; Delayed: yellow&lt;br&gt; Minor: green&lt;br&gt; Deceased: black</td>
<td>Immediate: respiratory rate &lt;15, &gt;45, or irregular; or no palpable peripheral pulse; or inappropriate posturing or unresponsive (P or U on AVPU scale)&lt;br&gt; Delayed: unable to walk, regular respiratory rate 15–45; and palpable peripheral pulse; and A or V on AVPU scale&lt;br&gt; Minor: able to walk&lt;br&gt; Dead: not breathing after 1 attempt to open airway and 5 rescue breaths</td>
<td>Open the airway using basic positioning: if there is still on breathing and there is a palpable radial, give 5 rescue breaths&lt;br&gt; Reassess after Immediate and Delayed children have been taken care of</td>
<td>1. Developed for pediatric patients 1–8 y old&lt;br&gt; 2. Developed to parallel structure of START triage system&lt;br&gt; 3. If a child is carried to ambulatory area he or she should be first child assessed in that area&lt;br&gt; 4. Has modification for nonambulatory children</td>
</tr>
</tbody>
</table>
## European Master in Disaster Medicine

### Homebush
- **Immediate:** red
- **Urgent:** yellow/gold
- **Not urgent:** green
- **Dying:** white
- **Dead:** black
- Also assigned radio voice categories:
  - **Immediate:** A (alpha)
  - **Urgent:** B (bravo)
  - **Not urgent:** C (charlie)
  - **Dying:** D (delta)
  - **Dead:** E (echo)

### Triage Sieve
- **Priority 1 (Immediate):** red
- **Priority 2 (Urgent):** yellow
- **Priority 3 (Delayed):** green
- **Priority 4 (Expectant):** blue
- **Dead:** white or black

### Pediatric Triage Tape (PTT)
- **Immediate:** red
- **Urgent:** yellow
- **Delayed:** green
- **Dead:**

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### Instructions
1. **Based on START** and SAVE triage
2. **Category for dying** created so they can receive comfort care
3. **Uses geographic** triage with flags rather than individual tags

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### Open airway
1. **Heart rate of >120** bpm is substituted for capillary refill in cold conditions or poor light
2. **Does not use mental** status

---

### Does not breathe after airway is opened by jaw thrust
1. Requires a tape that uses height of patient to show providers age-appropriate parameters that should be used to triage a child (provides for 4 sizes of children: 50–80 cm, 80–100 cm, 100–140 cm, and >140 cm)
2. **Adaptation of Triage Sieve**

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*Research Group on Emergency and Disaster Medicine*  
*Onderzoeksgroep Urgentie en Rampengeneeskunde*
<table>
<thead>
<tr>
<th>System</th>
<th>Coding</th>
<th>Status Assigned Based on</th>
<th>Permitted Therapies Before Assigning to Dead Category</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>CareFlite³¹</td>
<td>Immediate: red</td>
<td>Delayed: walks</td>
<td>Open airway</td>
<td>1. No respiratory considerations</td>
</tr>
<tr>
<td></td>
<td>Urgent: yellow</td>
<td>Unsalvageable: not breathing with an open airway</td>
<td></td>
<td>2. Can be used for pediatric patients</td>
</tr>
<tr>
<td></td>
<td>Delayed: green</td>
<td>Immediate: doesn't follow commands or no palpable radial pulse</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unsalvageable: black</td>
<td>Urgent: does not walk but obeys commands and has a radial pulse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sacco Triage Method (STM)</td>
<td>Group 1: high rate of deterioration</td>
<td>Assigns an RPM score based on respiratory rate, pulse rate, and motor response</td>
<td>No vital signs score 0 – before scoring open airway, decompress pneumothorax, stop exsanguination</td>
<td>1. Actually provides a score for each patient; grouping of patients changes with availability of resources</td>
</tr>
<tr>
<td></td>
<td>Group 2: moderate</td>
<td></td>
<td></td>
<td>2. Transport order by score not group</td>
</tr>
<tr>
<td></td>
<td>Group 2: slow</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Military Triage

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate</td>
<td>Those who should be treated first, with a list of possible injuries.</td>
</tr>
<tr>
<td>Delayed</td>
<td>Those who can have a delay of 6-8 h before treatment.</td>
</tr>
<tr>
<td>Minor</td>
<td>Those who will not have significant mortality if no further care is provided.</td>
</tr>
<tr>
<td>Expectant</td>
<td>Those with signs of impending death or who require vast resources for treatment.</td>
</tr>
</tbody>
</table>

## CESIRA

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Unconscious, hemorrhaging, in a state of shock, insufficient respirations.</td>
</tr>
<tr>
<td>Yellow</td>
<td>None of the above with broken bones or other injuries.</td>
</tr>
<tr>
<td>Green</td>
<td>Able to walk.</td>
</tr>
</tbody>
</table>

## Triage Methods

1. Based on NATO triage.
2. Secondary triage includes system for patient evacuation.
3. Colors are often used to mark casualties when they have been triaged, but colors can vary from unit to unit and are not universal.

1. No dead category because only physicians can declare death in Italy.
2. Based on presenting problem.
3. Name is based on order in which conditions are evaluated.

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AVPU, alert, voice, pain, unresponsive; SAVE, Secondary Assessment of Victim Endpoint; RPM, respiratory rate, pulse rate, and motor response; NATO, North Atlantic Treaty Organization.
Figure (Bozeman).
Summary/adaptation of the START triage system. The Web version of this figure is available in color.

START Triage

Walking wounded are directed to go to treatment area. (All are triaged as Green.)

Those unable to walk are assessed by the "RPM" method:

- **Black**: None
- **Respirations**: >30 → **Red**
  - <30
    - **Pulse** (radial)
      - Absent → **Red**
      - Present
        - **Mental Status** (follows simple commands?)
          - No → **Red**
          - Yes → **Yellow**

Important:
Once any RED criteria are met, tag patient and MOVE ON!
Triage is sorting, not treatment. Only 2 interventions may be made during triage:
1) Open/clear airway.
2) Apply direct pressure to major bleeding sites.
Patients will be reassessed at treatment area(s).
Mass Casualty Triage: An Evaluation of the Science and Refinement of a National Guideline

E. Brooke Lerner, PhD; David C. Cone, MD; Eric S. Weinstein, MD; Richard B. Schwartz, MD; Phillip L. Coule, MD; Michael Cronin, PhD, MPH; Ian S. Wedmore, MD; Eileen M. Bulger, MD; Deborah Ann Mulligan, MD; Raymond E. Swienton, MD; Scott M. Sasser, MD; Umair A. Shah, MD, MPH; Leonard J. Weireter Jr, MD; Teri L. Sanddal, REMT-B; Julio Laiet, DO; David Markenson, MD; Lou Romig, MD; Gregg Lord, MS, NREMT-P; Jeffrey Salomone, MD; Robert O'Connor, MD, MPH; Richard C. Hunt, MD

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Basis (Science, Indirect Science, or Consensus)</th>
<th>Used by Other Systems</th>
<th>Relevant Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Triage systems and all their components must apply to all ages and populations of patients.</td>
<td>Indirect Science</td>
<td>Other Systems</td>
<td>Wang and Hung 2005; Wallis and Carley 2006¹,²</td>
</tr>
<tr>
<td>1.2 Triage systems must be applicable across the broad range of mass casualty incidents where there is a single location with multiple patients.</td>
<td>Consensus</td>
<td></td>
<td>Hodgetts 2001; Baker 2004; Cone and Koenig 2005³,⁵</td>
</tr>
<tr>
<td>1.3 Triage systems must be simple, easy to remember, and amenable to quick memory aids.</td>
<td>Indirect Science</td>
<td>Other Systems</td>
<td>Kilner and Hall 2005; Wang and Hung 2005²,⁶</td>
</tr>
<tr>
<td>1.4 Triage systems must be rapid to apply and practical for use in an austere environment.</td>
<td>Consensus</td>
<td>Other Systems</td>
<td>Lee, Chiu et al. 2002⁷</td>
</tr>
<tr>
<td>1.5 Triage systems are resource dependent and the system must allow for dynamic triage decisions based on changes in available resources and patient conditions.</td>
<td>Consensus</td>
<td>Other Systems</td>
<td>Benson, Koenig et al. 1996⁸</td>
</tr>
<tr>
<td>1.6 The triage system must require that the assigned triage category for each patient be visibly identifiable (e.g., triage tags, tarps, markers).</td>
<td>Consensus</td>
<td></td>
<td>Okumura, Suzuki et al. 1998; Hodgetts 2001; Kragh, Walters et al. 2008; Kahn, Schultz et al. 2009; Kragh, Littrel et al. 2009; Kragh, Walters et al. 2009⁵,⁹,¹³</td>
</tr>
<tr>
<td>1.7 Triage is dynamic and reflects patient condition and available resources at the time of assessment. Assessments must be repeated whenever possible and categories adjusted to reflect changes.</td>
<td>Consensus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criteria</td>
<td>Basis (Science, Indirect Science, or Consensus)</td>
<td>Used by Other Systems</td>
<td>Relevant Literature</td>
</tr>
<tr>
<td>----------</td>
<td>-----------------------------------------------</td>
<td>-----------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>2.1 Simple commands must be used to initially prioritize victims for individual assessment.</td>
<td>Indirect Science</td>
<td>Other Systems</td>
<td>Meredith, Rutledge et al. 1995; Garner, Lee et al. 2001; Holcomb, Niles et al. 2005</td>
</tr>
<tr>
<td>2.2 First priority for individual assessment is to identify those who are likely to need a Lifesaving Intervention. They can be identified as those: (1) unable to follow commands and not making purposeful movements, or (2) those with an obvious life threat (e.g., life threatening external hemorrhage).</td>
<td>Indirect Science</td>
<td></td>
<td>Meredith, Rutledge et al. 1995; Garner, Lee et al. 2001; Holcomb, Niles et al. 2005</td>
</tr>
<tr>
<td>2.3 Second priority for individual assessment will be those who are unable to follow the command to ambulate to an assigned place but are able to follow other commands (e.g., wave) or make purposeful movement.</td>
<td>Indirect Science</td>
<td></td>
<td>Meredith, Rutledge et al. 1995; Garner, Lee et al. 2001; Holcomb, Niles et al. 2005</td>
</tr>
<tr>
<td>2.4 Last priority for individual assessment will be those who follow commands by ambulating to an assigned place (or making purposeful movements) and have no obvious life threatening conditions (e.g., life threatening external hemorrhage).</td>
<td>Indirect Science</td>
<td></td>
<td>Meredith, Rutledge et al. 1995; Garner, Lee et al. 2001; Holcomb, Niles et al. 2005</td>
</tr>
<tr>
<td>2.5 All patients must be individually assessed regardless of their initial prioritization during global sorting. This includes the assessment of walking patients as soon as resources are available.</td>
<td>Indirect Science</td>
<td></td>
<td>Garner, Lee et al. 2001; de Ceballos, Turegano-Fuentes et al. 2005</td>
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https://www.nytimes.com/2017/05/22/world/europe/manchester-concert-explosion.html
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<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>Other Systems</td>
<td>Bellamy 1984; Baker 2004; Kragh, Walters et al. 2008; Kragh, Littrel et al. 2009; 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></td>
</tr>
</tbody>
</table>
### TABLE 4

**Individual Assessment of Triage Category**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Basis (Science, Indirect Science, or Consensus)</th>
<th>Used by Other Systems</th>
<th>Relevant Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Each victim must be assigned to one of five triage categories (Immediate, Delayed, Minimal, Expectant, Dead). Each category must be represented with an associated color: Immediate/red, Delayed/yellow, Minimal/green, Expectant/gray, Dead/black.</td>
<td>Consensus</td>
<td>Other Systems</td>
<td>Burkle, Newland et al. 1994; Bazarian, Eirich et al. 2003; Waisman, Aharonson-Daniel et al. 2003; Holcomb, Salinas et al. 2005; McManus, Yershov et al. 2005; Sztajnkrycer, Baez et al. 2006</td>
</tr>
<tr>
<td>4.2 Assessment must not require counting or timing vital signs and instead use yes or no criteria. Diagnostic equipment must not be used for initial assessment.</td>
<td>Indirect Science</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3 Capillary refill must not be used as a sole indicator of peripheral perfusion.

4.4 Patients who are not breathing after one attempt to open their airway (in children two rescue breaths may also be given) must be classified as dead and visually identified as such.

4.5 Patients are categorized as immediate if: they are unable to follow commands or make purposeful movements; OR do not have a peripheral pulse; OR are in obvious respiratory distress; OR have a life threatening external hemorrhage; provided their injuries are likely to be survivable given available resources.

<table>
<thead>
<tr>
<th>Science</th>
<th>Other Systems</th>
<th>Schriger and Baraff 1991; McManus, Yershov et al. 2005; 29,33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consensus</td>
<td>Other Systems</td>
<td>Hogan, Waeckerle et al. 1999; 34</td>
</tr>
<tr>
<td>Indirect Science</td>
<td>Other Systems</td>
<td>Koehler, Baer et al. 1986; Koehler, Malafa et al. 1987;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meredith, Rutledge et al. 1995; Quintana, Parker et al. 1997;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Garner, Lee et al. 2001; Holcomb, Niles et al. 2005;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Holcomb, Salinas et al. 2005; Holmes, Palchak et al. 2005;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>McManus, Yershov et al. 2005; Kragh, Walters et al. 2008;</td>
</tr>
<tr>
<td>Patients are categorized as expectant if: they are unable to follow commands or make purposeful movements; OR do not have a peripheral pulse; OR are in obvious respiratory distress; OR have a life threatening external hemorrhage; AND are unlikely to survive given the currently available resources. These patients should receive resuscitation or comfort care when there are sufficient resources available.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Indirect Science</td>
<td>Other Systems</td>
<td></td>
</tr>
<tr>
<td>Burkle, Oreaugh et al. 1994; Meredith, Rutledge et al. 1995; Fong and Schrader 1996; Garner, Lee et al. 2001; Hodgetts 2001; Frykberg 2002; Borden Institute 2004; Frykberg 2004; Christian, Hawthorne et al. 2006; Coule and Horner 2007,14,16,39-45</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Patients are categorized as Delayed if: they are able to follow commands or make purposeful movements; AND have peripheral pulses; AND are not in respiratory distress; AND do not have a life threatening external hemorrhage; AND have injuries that are not considered minor. |
|---|---|---|
| Indirect Science | Other Systems |

| Patients are categorized as Minimal if: they are able to follow commands or make purposeful movements; AND have peripheral pulses; AND are not in respiratory distress; AND do not have a life threatening external hemorrhage; AND their injuries are considered minor. |
|---|---|---|
| Indirect Science | Other Systems |
4.9 Patients categorized as immediate are the first priority for treatment and/or transport followed by patients categorized as delayed and minimal. Patients categorized as expectant should be provided with treatment and/or transport as resources allow. Efficient use of transport assets may include mixing categories of patients and using alternate forms of transport.
SALT Mass Casualty Triage Algorithm (Sort, Assess, Lifesaving Interventions, Treatment/Transport) — Adapted for a Very Large Radiation Emergency

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

Step 2: Assess: Individual Assessment

Lifesaving Interventions:
- Control major hemorrhage
- Open airway (if child consider 2 rescue breaths)
- Chest decompression

Breathing?
- No
  Dead
- Yes

Obys commands or makes purposeful movements?
- Has peripheral pulse?
- Not in respiratory distress?
- Major hemorrhage is controlled?

All Yes
- Minor injuries only?
  Yes
  Minimal
  No
  Delayed

Likely to survive given current resources?
- Yes
  Immediate
- No
  Expectant

Reassess: considering patient conditions, resources, scene safety

Step 3: Treatment and/or Transport
OBJECTIVES

2. Science:
   a. Exercise design and evaluation
   b. Outcome studies

3. Practical:
   a. MCI Planning Process
   b. Exercise design and evaluation

4. Special Considerations (another discussion)
   a. Chem, IGSA & Nuc/Rad
   b. SAVE TRIAGE
50 victims + 2 non-victims
Paramedics 1 week before, 90 min didactic

41/52 SALT verified
13.5% overtriage (50%)
3.8% undertriage (<5%)

Times 42/52, mean 15 sec/pt (5-57)

Safe low undertriage; Needs refinement, pt outcome
10-11 Manikin & 18-20 Victims
SALT verified
30 min didactic then 1 day later
2 groups, 2 locations, different population
First of 8-11 and then the last of the group
235 victim observations

Initial 81% correct      Last 83%
  8% over triage         6% over
  11% undertriage        10% under
Conclusion

Minimal Experience
63% had prior drill experience
29% had prior MCI experience
21% heard of SALT

Accuracy Higher than START
22 Paramedic Students

At least 1 week prior SALT (45 min didactic & 45 min practical)
At least 1 week after 25 virtual patients

3 month wash-out

At least 1 week prior SMART
Comparison of the SALT and Smart triage systems using a virtual reality simulator with paramedic students.

Cone DC, Serra J, Kurland L.

<table>
<thead>
<tr>
<th></th>
<th>SALT</th>
<th>SMART</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>383/547 pt 70% (48-88)</td>
<td>506/544 pt 90% (72-100)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>6.8% over</td>
<td>1.8% over</td>
</tr>
<tr>
<td>Underestimation</td>
<td>23.2% under</td>
<td>5.1% under</td>
</tr>
</tbody>
</table>

Virtual Reality

SMART more accurate than SALT
Simple Triage Algorithm and Rapid Treatment and Sort, Assess, Lifesaving, Interventions, Treatment, and Transportation mass casualty triage methods for sensitivity, specificity, and predictive values.

Bhalla MC¹, Frey J², Rider C³, Nord M⁴, Hegerhorst M⁵.
<table>
<thead>
<tr>
<th>Triage category</th>
<th>Clinical features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor/green tag</td>
<td>Discharged from the ED or hospital without intervention other than minor ED procedure (splint/sling, observation, suture)</td>
</tr>
<tr>
<td>Delayed/yellow tag</td>
<td>Patients get an intervention (group together: surgery, blood product transfusion, chest tube, angio procedure) sometime after the first 12 h after arrival to the ED</td>
</tr>
<tr>
<td>Immediate/red tag</td>
<td>Patients get an intervention (group together: surgery, blood product transfusion, chest tube, angio procedure) sometime within the first 12 h after arrival to the ED</td>
</tr>
<tr>
<td>Dead/expectant/black tag</td>
<td>Patients die within 48 h after arrival to the ED or have a Cerebral Performance Category Scale of 4 or 5 upon discharge</td>
</tr>
<tr>
<td></td>
<td>START</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Minor/green</td>
<td>66%</td>
</tr>
<tr>
<td>Delayed/yellow</td>
<td>22%</td>
</tr>
<tr>
<td>Immediate/red</td>
<td>9%</td>
</tr>
<tr>
<td>Dead or expectant/black</td>
<td>3%</td>
</tr>
</tbody>
</table>
5. Conclusion

Neither SALT nor START algorithm was appropriately sensitive for determining a victim's level of triage, especially in the critically injured who would require immediate intervention. Both START and SALT triage algorithms did have high specificity for predicting death.
Qualitative Analysis of Surveyed Emergency Responders and the Identified Factors That Affect First Stage of Primary Triage Decision-Making of Mass Casualty Incidents.

Klein KR¹, Burkle FM Jr², Swinton R³, King RV⁴, Lehman T⁵, North CS⁶.

<table>
<thead>
<tr>
<th>Emergency Managers</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advance Practice Nurse</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>EMT-Basic</td>
<td>84</td>
<td>21</td>
</tr>
<tr>
<td>EMT-Paramedic</td>
<td>129</td>
<td>32</td>
</tr>
<tr>
<td>Non-medical</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Nurse</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Physician Assistant</td>
<td>115</td>
<td>29</td>
</tr>
<tr>
<td>Physician</td>
<td>60</td>
<td>15</td>
</tr>
</tbody>
</table>
RESULTS

402/495 Completed

92% practiced a structured triage
8% gestalt (gut feeling)
CRITICAL APPRAISAL of LITERATURE

Study population: reasonable for MCI
The education: timing, content
The scenario: replicates an MCI
Then the data points: compared to valid
Computer Sim, Blended, Live
Consensus v. Delphi
National Implementation Of the Model Uniform Core Criteria for Mass Casualty Incident Triage

A Report of the FICEMS
FICEMS
State & Local EMS
Improve MCI Triage Capabilities
Based on MUCC
IV. While there exist multiple systems for mass casualty triage, there is one national guideline: the MUCC for Mass Casualty Incident Triage which can be used to measure the essential elements within various MCI triage systems.
MCI Exercise Design

Education, Training, Maintenance
Exact Aspect of MCI
Triage, Transport, Destination
Triage, Treatment
over-, under-
and at what point
Clinical Outcome
Comparisons
https://www.google.com/search?q=picture+scene+gone+with+the+wind+atlanta&tbs=isch&tbm=isch&source=univ&sa=X&ved=2ahUKEwi94c7j1PzfAhWIGt8KHa9mAsYQ7Al6BAgCEAO&biw=1440&bih=862#imgrc=cxdEDrSkVaPXHM:
Accessed 20 Jan 2019
Immediate Response

- Mutual aid arrived at approximately 8:15 PM
- Limited radio and cell phone capability at the scene
- 2 different staging areas established without coordination
  - Football field (1/4 mile from blast site)
  - Community Center (1 mile)
Primary Triage in a Mass-casualty Event Possesses a Risk of Increasing Informational Confusion: A Simulation Study Using Shannon's Entropy.

Ajimi Y¹, Sasaki M², Uchida Y¹, Kaneko I¹, Nakahara S¹, Sakamoto T¹.

Conclusion: Informational confusion in a primary triage area measured using Shannon’s entropy revealed that random triage using a low-visibility tag might increase the degree of confusion. Methods for reducing entropy, such as enhancement of triage colors, may contribute to minimizing informational confusion.
126

Comparative Analysis of Simple Triage and Rapid Treatment and Five-Level Nursing Emergency Severity Index Triage During a Large-Scale Disaster Drill

Reed K, Sarin RR, Cattamanchi S, Rifino JJ, Ciottone G/Beth Israel Deaconess Medical Center, Boston, MA
Prospective: START v. ESI

80 Victims: active shooter then IED

Initial Triage Officer
EMS Transport using START

EM Nurse @ Mock Field Hospital using 5-level ESI
80 Victims: 23 black/expectant on scene

Field: 18 Red (immediate)
   14 Yellow (delayed)
   26 green (minor)

ESI: 11 Level 1 (critical)
   20 Level 2 (severe)
   10 Level 3 (moderate)
   12 Level 4 (minor)
   3 Level 5 (minor)
56: both START by EMS and ESI
84% (47) equivocal by START EMS
14.2% (8) lower severity by START EMS
1.8% (1) higher severity by START EMS
Conclusion

Equivocal prioritization
START in the field & ESI nursing triage at hospital

Some under-triage using START not stat significant
Comparison of START triage categories to emergency department triage levels to determine need for urgent care and to predict hospitalization.

Hong R¹, Sexton R¹, Sweet B¹, Carroll G¹, Tambussi C¹, Baumann BM¹.
233 participants

<table>
<thead>
<tr>
<th>START</th>
<th>ESI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>0</td>
</tr>
<tr>
<td>Red</td>
<td>12%</td>
</tr>
<tr>
<td>Yellow</td>
<td>26%</td>
</tr>
<tr>
<td>Green</td>
<td>53%</td>
</tr>
<tr>
<td>White</td>
<td>9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1 = 1%</th>
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</thead>
<tbody>
<tr>
<td>2 = 34%</td>
</tr>
<tr>
<td>3 = 51%</td>
</tr>
<tr>
<td>4 = 14%</td>
</tr>
<tr>
<td>5 = 1%</td>
</tr>
</tbody>
</table>

**ABN Vitals**

<table>
<thead>
<tr>
<th>ESI (1,2,3) 43/49 = 88%</th>
</tr>
</thead>
<tbody>
<tr>
<td>START (Red, yellow) 25/59 = 51%</td>
</tr>
</tbody>
</table>
INTERVENTIONS

ESI (1,2,3) 20/21 = 95%
START (Red, Yellow) 7/21 = 33%

ADMITTED

ESI (1,2,3) 94/96 = 98%
START (Red, Yellow) 46/96 = 48%
Comparison of START triage categories to emergency department triage levels to determine need for urgent care and to predict hospitalization.

Hong R¹, Sexton R¹, Sweet B¹, Carroll G¹, Tambussi C¹, Baumann BM¹.

CONCLUSION: ESI better identified patients with abnormal vital signs, those who needed emergent interventions, and those admitted than START.
Impact of a Two-step Emergency Department Triage Model with START, then CTAS, on Patient Flow During a Simulated Mass-casualty Incident.

Lee JS, Franc JM.
Impact of a Two-step Emergency Department Triage Model with START, then CTAS, on Patient Flow During a Simulated Mass-casualty Incident.
Lee JS, Franc JM.

Conclusion
This pilot study of simulating a disaster in the ED found no significant differences in patient flow and triage accuracy when comparing the two-step triage method START, then CTAS, with START alone.
FINAL THOUGHTS

Resource Consumption
Resuscitate, Stabilize, Disposition

First responder v. First Receiver
Keep as close to daily
LSI, dynamic, Transportation decisions

Planning with stakeholders
Critical Literature
The management of the health impact of a disaster is one of the most difficult tasks to be performed by health workers. It requires specific knowledge and scientific evidence.
WADEM Congress 2019 is now Accredited!

7-10 May 2019
Brisbane, Australia
🔗 http://wadem2019.org/
WADEM is excited to announce its keynote speakers for the Congress in Brisbane in May. The speakers’ full profiles are available on the Congress website at the following URL – http://wadem2019.org/keynote.php.

- **Gregory Ciottone, MD, FACEP** – Harvard Medical School, Beth Israel Deaconess Medical Center, Team Rubicon Global
- **Mark Keim, MD, MBA** – DisasterDoc International, Emory University – Rollins School of Public Health
- **Joanne Liu, MDCM, FRCP** – International President; Médecins Sans Frontières (MSF) / Doctors Without Borders
- **Robert Muggah, DPhil** – Igarapé Institute
SALT Mass Casualty Triage Online Training

Mass casualty triage is a critical skill. Although many systems exist to guide providers in making triage decisions, there is little scientific evidence available to demonstrate that any of the available systems have been validated. Furthermore, in the United States there is little consistency from one jurisdiction to the next in the application of mass casualty triage methodology. There are no nationally standardized categories or color designations. SALT Triage is the product of a CDC Sponsored working group to propose a standardized triage method. The guideline, entitled SALT (sort, assess, life-saving interventions, treatment and/or transport) triage, was developed based on the best available science and consensus opinion. It incorporates aspects from all of the existing triage systems to create a single overarching guide for unifying the mass casualty triage process across the United States. SALT is compliant with the Model Uniform Core Criteria for Mass Casualty Triage currently contemplated as the proposed national standard for all mass casualty triage systems.

On July 8, 2013 all of the members of Federal Interagency Committee on EMS (members: DOT, DOD, HHS, DHS, and FCC) concurred with the following statement: “The FICEMS recommends that state and local Emergency Medical Services (EMS) systems improve their mass casualty incident triage capabilities through adoption of triage protocols and systems that are based on the Model Uniform Core Criteria. Federal resources may be used to support development of capabilities which improve EMS system preparedness for mass casualty triage.”

The full text of their implementation plan is available at (this also includes a list of the members of FICEMS):


This online training program consist of a 22 minute video, links to articles on SALT Mass Casualty Triage and a downloadable powerpoint set for teaching SALT Triage to others. The program has a short 5 question quiz that upon successful completion will result in a certificate of completion.

This free version contains the contact hour information on the certificate sufficient to claim credit for many professional organizations / licenses.

Click on the link below to create an on-line account or log-in.

If you are a first time user of this system you will need to create your account using the "First Time Here" link on the right side of the page and verify your email address. If you have not received the email within a few minutes be sure to check your spam folder for the email.
Enjoyable Learning Experience

“Teach me and I forget, teach me and I may remember, involve me and I learn”

Benjamin Franklin
eswein402@gmail.com