FROM CHAOS TO ORDER:
ELEMENTS OF SUCCESSFUL RESPONSE

Scene Response & Triage Considerations
ADVANCED EXPLOSIONS & BLAST INJURIES

The First Phase
- Incident command
- Securing the area
- Secondary device survey
- Bystanders as rescuers

Organizing Chaos
- Triage categorization
- Regular trauma protocols
- Radiation survey
- Survey for chemical contamination
- Agent-Host-Environment
- Communication
- Special populations (pregnant, children, elderly, and special needs)
Secondary Devices

- Secondary explosive devices are designed to explode after a primary explosion has attracted large numbers of responders to the scene to inflict additional injury, damage, and fear.
- Hidden in-out of view locations, or camouflaged
  - North Atlanta Abortion Clinic Bombing

Police Reacting the 2nd Explosion in Boston
Image Credit to Boston Globe/Getty Images

U.S. Fire Administration Guidelines

- Anticipate the presence of a secondary device at any suspicious incident.
- Search for a secondary device before moving into the incident area.
- Avoid touching or moving anything that may conceal an explosive device.
U.S. Fire Administration Guidelines

- Effectively manage the scene with boundaries, exclusion zones, triage areas, etc.
- Evacuate victims and non-essential personnel as quickly as possible.
- Preserve the scene as much as possible for evidence collection and crime investigation.

Personal Protective Equipment

Personal Protective Equipment
Bystanders as Rescuers

Tourniquets
- Better when applied in the prehospital phase and before shock
- Low morbidity
- Decreased mortality from external exsanguination of a single limb
  - Vietnam 9%
  - Currently 2%
  - Israel 0%

Pre-hospital Considerations
- Judicious use of IV fluids:
  - Overzealous fluid administration may worsen primary pulmonary injury and bleeding
    - Permissive hypotension
- Cautious mechanical ventilation:
  - Mechanical ventilation and positive pressure may increase the risk of alveolar rupture and air embolism
Prehospital Considerations

- Cautious air transport
- Air embolization:
  - Place patient in a prone left lateral position with the head down
  - Traps air pocket in right ventricular apex, preventing transfer to lungs

Prehospital Considerations

- Rescue of entrapped victims
  - Specialized rescue resources per Fire Dept’s
- Field management of crush injuries
  - Scene amputations
  - Sodium bicarbonate
- Immobilization (splints, collars and back boards)
  - Pediatric considerations

Mass Casualty Triage

- Dynamic process
- START (Simple Triage And Rapid Treatment)
  - RPM
    - Respirations > 30/min
    - Pulse Cap refill >2 sec
    - Mental status
- JumpSTART for Pediatrics
Triage Categorization

- **Red**
- **Yellow**
- **Black**
- **Green**

- Immediate
- Delayed
- Dead or expectant
- Minimal

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**START Triage**

**RESPIRATIONS**

- YES
  - Under 30/min
  - Immediate
  - Control Bleeding
  - Immediate
  - Failure to follow simple commands
  - Immediate
  - Deferred

- NO
  - Position Airway
  - Immediate
  - Non salvageable

**PERFUSION**

- Cap refill > 2 sec
- Immediate
- Can follow simple commands
  - Immediate
  - Deferred

- Cap refill < 2 sec
- Immediate
- Can follow simple commands
  - Immediate
  - Deferred

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**TRIAGE TAG**

- Immediate
- Delayed
- Dead or expectant
- Minimal

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**MORGUE**

- Immediate
- Delayed

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**MINOR**

- Immediate
- Delayed

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**DECEASED**

- Immediate
- Delayed
New Proposed National Triage Systems: SALT

- S: Sort
- A: Assess
- L: Life Saving Interventions
- T: Transport &/or Treatment

*Disaster Med Public Health Preparedness. 2008;2(3 Suppl 1):S25-S34*
Sort

- Walk
- Wave
- Can’t move or wave

Assess

- Walk
- Wave
- Can’t move or wave

- Third (green tag: minor)
- Second (yellow tag: delayed)
- First (red: immediate vs. black tag: deceased)

Life-saving Interventions

- Open airway
- Two rescue breaths for child
- Control hemorrhage: direct pressure, tourniquets
- Needle chest decompression
- Auto-injector antidotes
Triage

- Expectant or Gray/Black category
  - Resource based
  - Dynamic

Model Uniform Core Criteria (MUCC)

- Concept of effective interoperability among multiple EMS & rescue agencies on-scene
- FICEMS recommends single system of mass casualty triage across jurisdictions
- Categories (24 criteria)
  - Gen. considerations
  - Global sorting
  - Lifesaving interventions
  - Individual assessment of a given triage category
Transport

- Transport to the nearest facility of red patients
- Green patients should be directed to other hospitals that are further away and that are not necessarily level 1 trauma centers

Overtriage and Critical Mortality

[Graph showing Overtriage and Critical Mortality]

References: [Citations and sources are not visible on the image.]

Massachusetts Emergency Medical Service Regions and American College of Surgeons Verified Trauma Centers

[Map showing Massachusetts Emergency Medical Service Regions and American College of Surgeons Verified Trauma Centers]
264 people were treated at 27 local hospitals

Blast Lung Injury
- Should not rely on TM rupture to predict lung injury:
  - TM perforations are found in only 60% of patients with clinically significant injuries: leads to under-triage (miss 40%)
  - Clinically significant injuries present in < 30% of patients with TM perforations: leads to over-triage (70% w/o lg. injury)

Management of Crush Syndrome
- IVF:
  - Start in the field
- Urinary alkalinization
- Relief of entrapped extremity
- Field amputation
Scene Management of Quaternary injuries

- Inhalational injuries-Intubation
- Carbon monoxide-Oxygen
- Hydrogen cyanide-Oxygen and antidote therapy
- Chemical or radiological contamination-Decontamination
- Mental health-Psychological first aid

Questions or Comments?