

SALT Triage Training

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Columbus Medical Association & Affiliates

Columbus Medical Association Foundation | Physicians CareConnection | COTS | Physicians Leadership Academy

Disclosures

- Dr. Kman is supported by grant number R18HS025915 from the Agency for Healthcare Research and Quality (Virtual reality to train & assess emergency personnel responding to a mass casualty incident).
- The content is solely the responsibility of the authors and does not necessarily represent the official views of the Agency for Healthcare Research and Quality.

Background



Las Vegas (2017) and
Sandy Hook (2014)

Background

The Columbus Dispatch

LOCAL

If the next mass shooting is in Columbus, are paramedics here ready?



Bethany Bruner

The Columbus Dispatch

Published 6:10 a.m. ET June 9, 2022 | Updated 1:01 p.m. ET June 9, 2022

With an increasing number of mass shooting incidents across the U.S., including at least 12 between June 3-5, Columbus Division of Fire emergency medical personnel know it's just a matter of time until it happens here.



Background

ON THE COVER

The Ohio State University Armed Aggressor Incident: A Recollection of Events

Nicholas E. Kman, MD, FACEP

At 9:55 AM on Monday, November 28, we received the page that no one wants to get (Figure 1).

The first 2 things I did were to call down to the emergency department (ED) to alert the 3 emergency physicians working and then to check social media to verify the possibility of an actual emergency on campus.

When I saw the tweet giving instructions to “Run Hide Fight” (Figure 2), I immediately headed down to the ED from our administrative offices. I had worked 3 to 11 in the ED the night before. Begrudgingly, I was in early that Monday to catch up on e-mail.

When we arrived in the ED, nurses and residents were already congregating in the trauma bays near the emergency medical services (EMS) entrance. Our ED director had been quickly briefed by our chief medical officer. As in most mass casualty events, we had a paucity of information at the onset. We heard that we were getting as many as 12 patients from an “active shooter event.” We started to implement our Emergency Operations Plan like we had in many

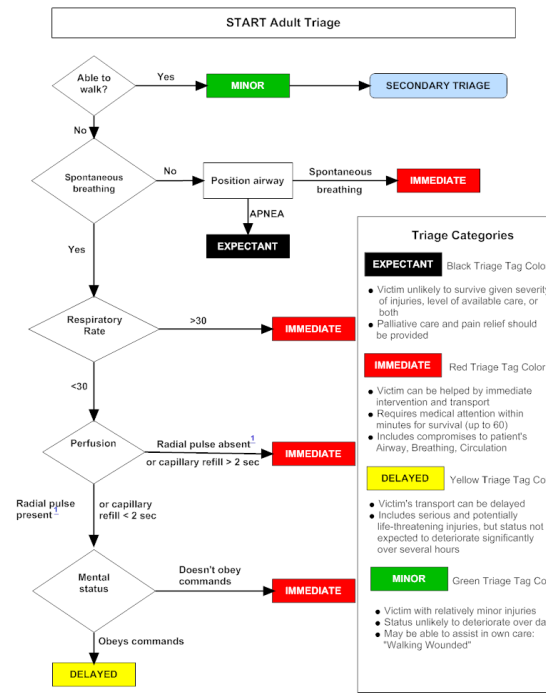


Transition to SALT Triage



START vs SMART

- START is a method of triage



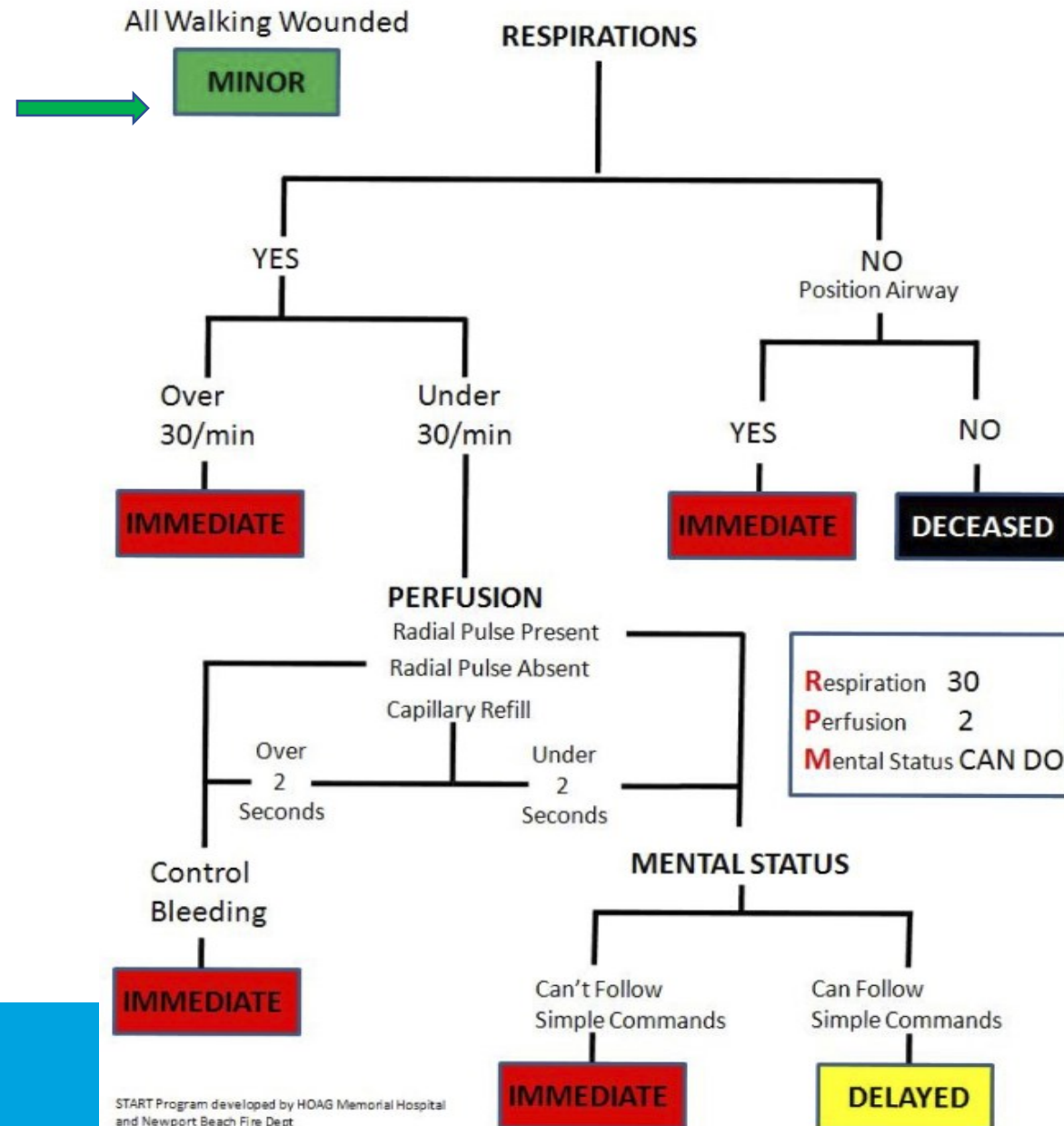
- SMART is a series of proprietary products



Are all walking wounded minor?

START TRIAGE

(Simple Triage and Rapid Treatment)

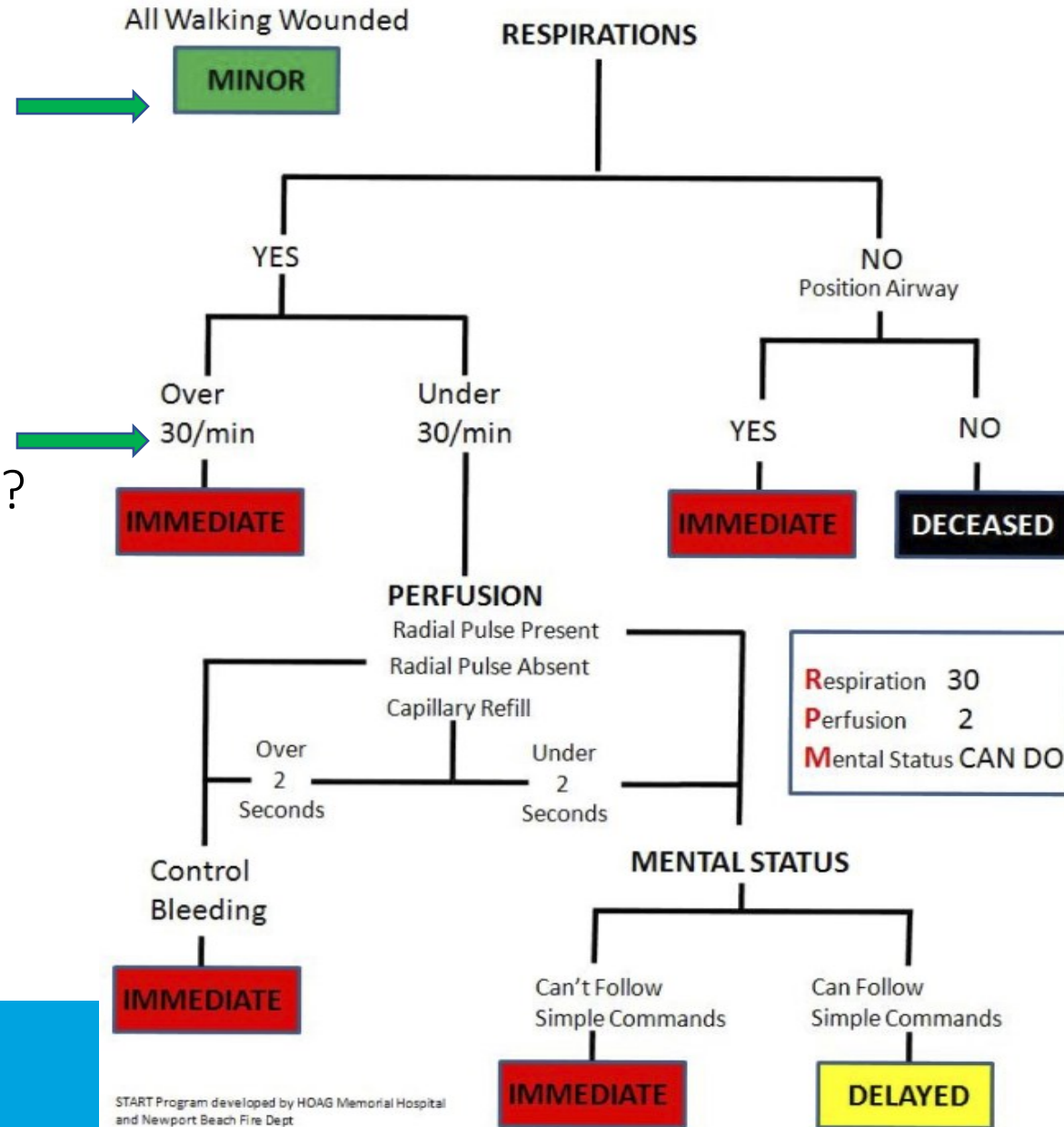


START TRIAGE

(Simple Triage and Rapid Treatment)

Are all walking wounded minor?

How good are we at counting respiration rate?

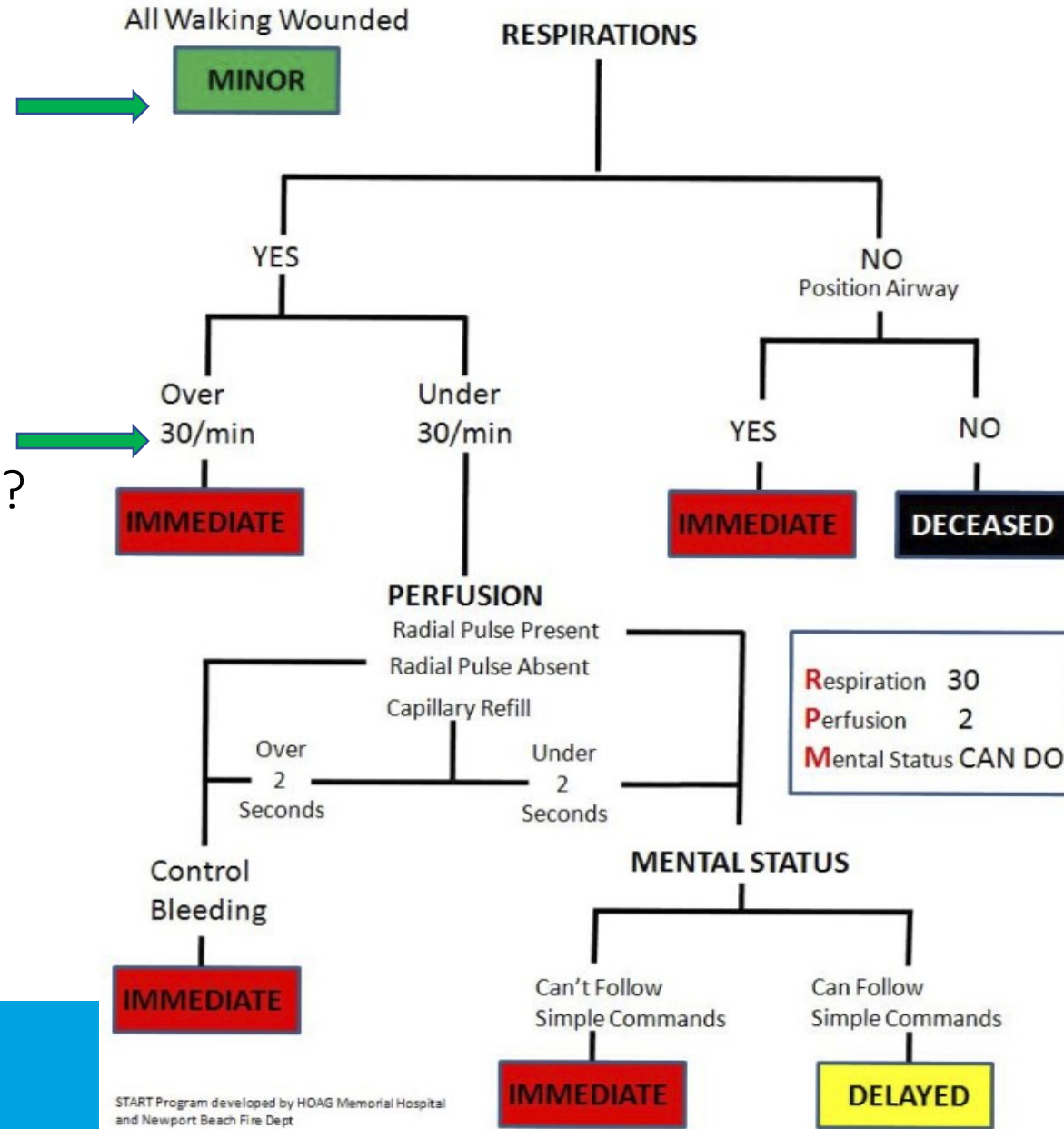


START TRIAGE

(Simple Triage and Rapid Treatment)

Are all walking wounded minor?

How good are we at counting respiration rate?



Lovett PB, Buchwald JM, Sturmann K, Bijur P. The vexatious vital: neither clinical measurements by nurses nor an electronic monitor provides accurate measurements of respiratory rate in triage. Ann. Emerg. Med. 2005; 45 (1): 68–76.

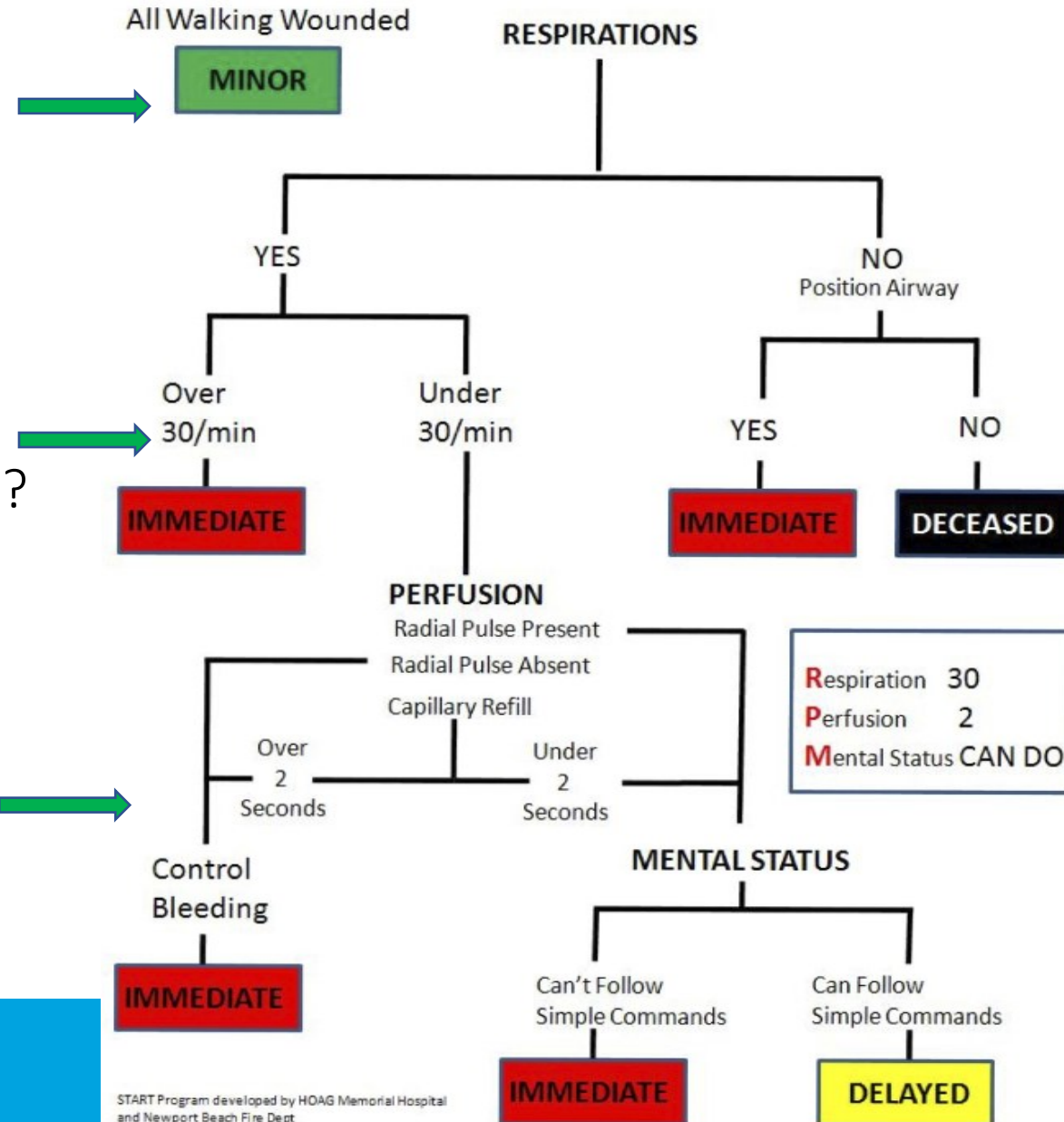
START TRIAGE

(Simple Triage and Rapid Treatment)

Are all walking wounded minor?

How good are we at counting respiration rate?

Is hemorrhage control prioritized?



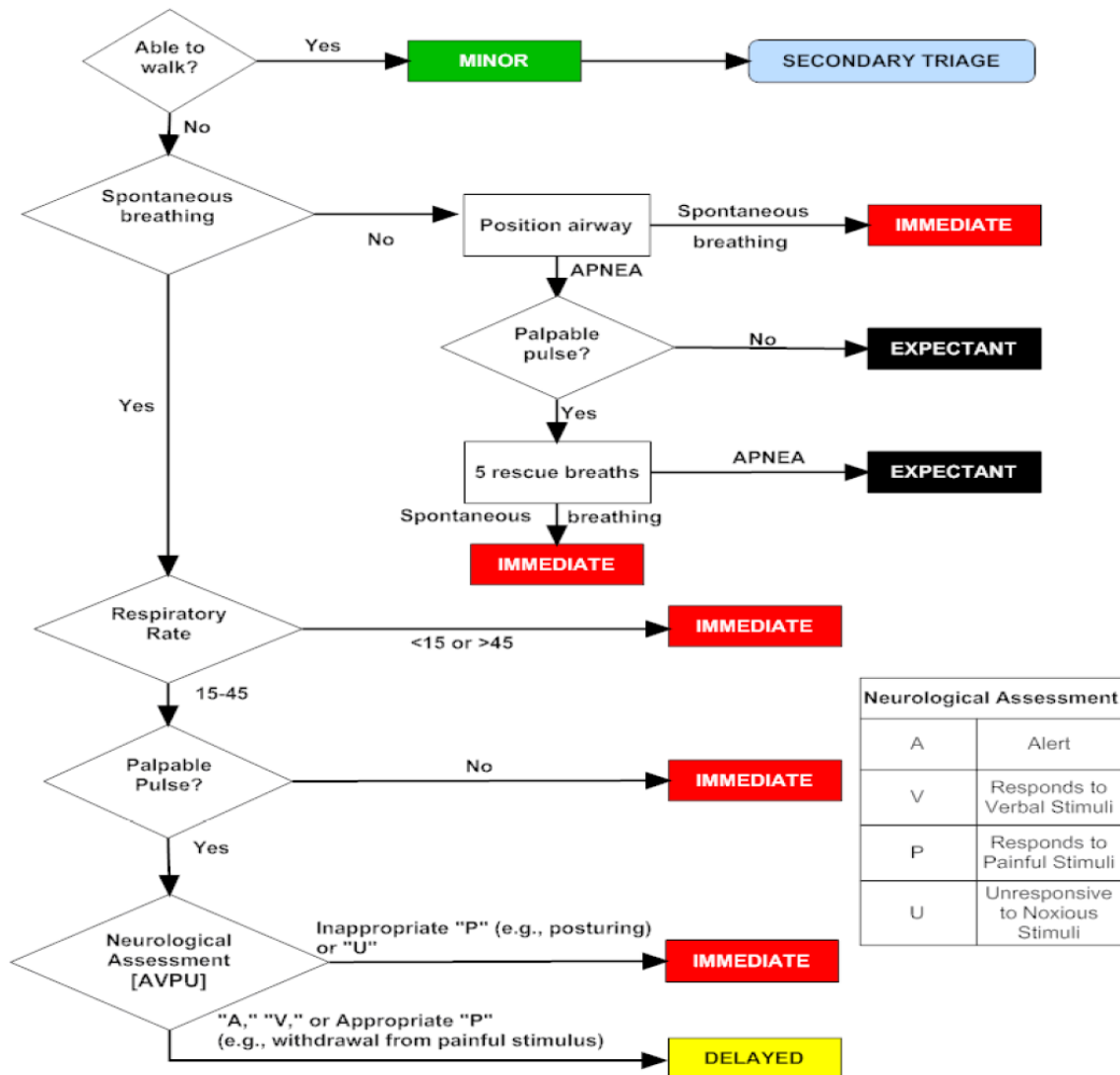
START Program developed by HOAG Memorial Hospital and Newport Beach Fire Dept

Bleeding Control (TCCC)

- How long does it take to bleed to death from a complete femoral artery and vein disruption?
- Answer:
 - Casualties with such an injury can bleed to death in *as little as 3 minutes*
 - *10% of animals in lab studies died within 3 minutes without hemorrhage control measures.*



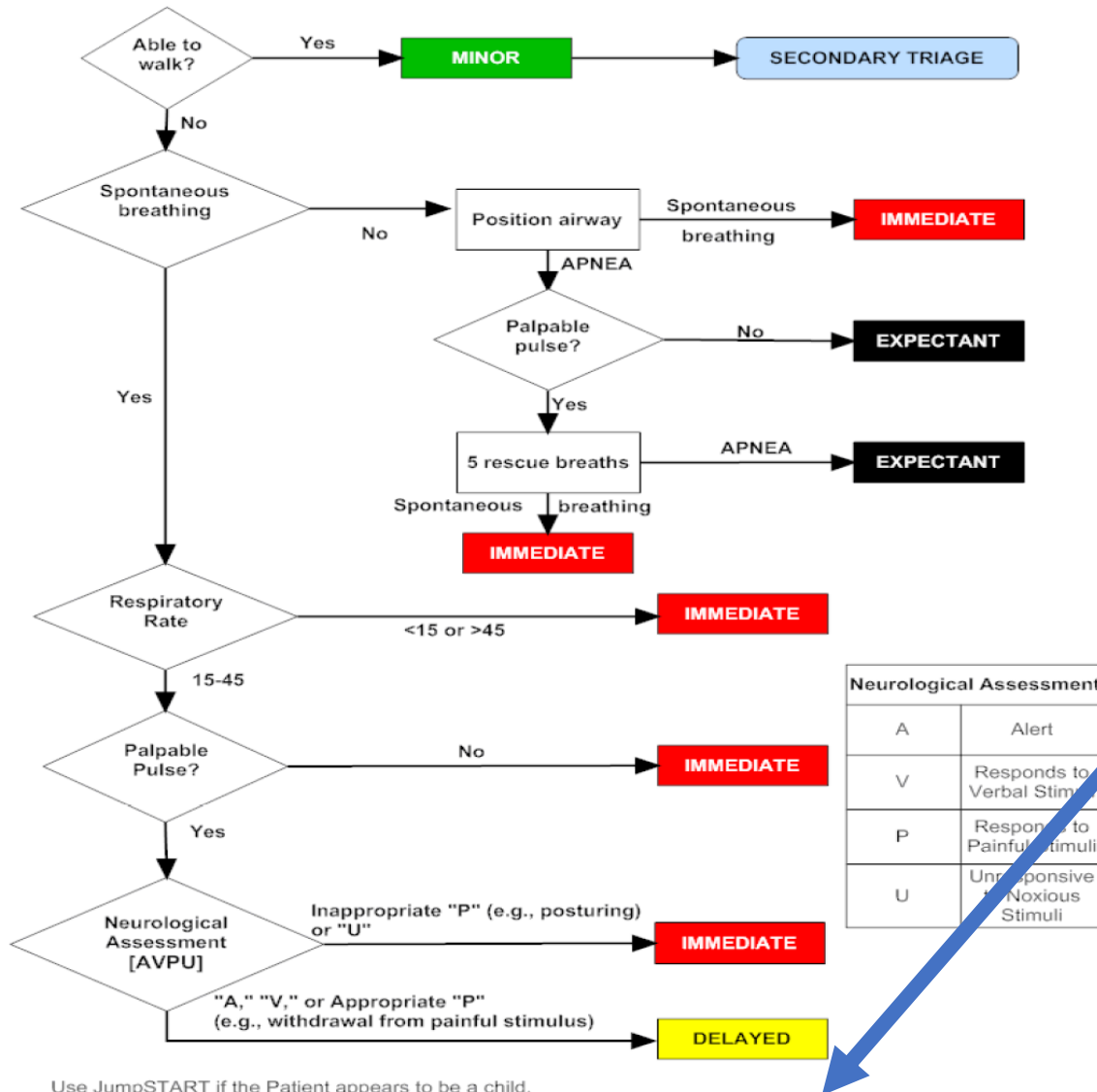
JumpSTART Pediatric Multiple Casualty Incident Triage



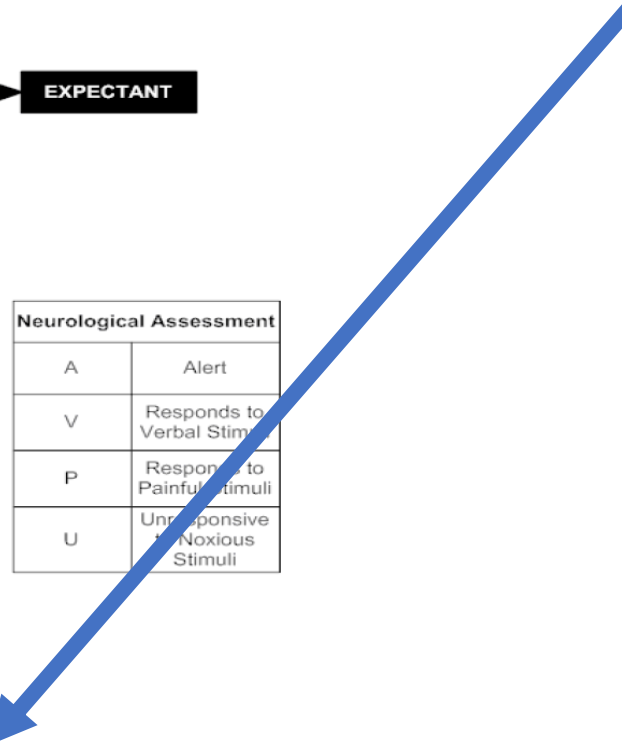
Use JumpSTART if the Patient appears to be a child.

Use an adult system, such as START, if the patient appears to be a young adult.

JumpSTART Pediatric Multiple Casualty Incident Triage



Now do this in addition to that but don't forget that respirations are now 15-45 and not 30.



Neurological Assessment	
A	Alert
V	Responds to Verbal Stimuli
P	Responds to Painful Stimuli
U	Unresponsive to Noxious Stimuli

Use JumpSTART if the Patient appears to be a child.

Use an adult system, such as START, if the patient appears to be a young adult.

MUCC and SALT Workgroups

- In 2006, National Association of EMS Physicians (NAEMSP), with funding from CDC, convened workgroup (eventually called SALT workgroup) of experts from national organizations, to examine science supporting existing mass casualty triage systems and make recommendation for adoption of single system as national standard.
- Workgroup concluded that no existing triage system had enough evidence for universal adoption and many had shortcomings.
- Workgroup instead developed SALT (Sort-Assess-Lifesaving Interventions-Triage/Treatment) Triage system- based on expert opinion and limited research available and incorporated the widely accepted best practices of existing triage systems.



SPECIAL FOCUS

Model Uniform Core Criteria for Mass Casualty Triage

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 Health Resources and Services Administration/Maternal and Child Health Bureau Emergency Medical Services for Children Program

ABSTRACT

There is a need for model uniform core criteria for mass casualty triage because disasters frequently cross jurisdictional lines and involve responders from multiple agencies who may be using different triage tools. These criteria (Tables 1-4) reflect the available science, but it is acknowledged that there are significant research gaps. When no science was available, decisions were formed by expert consensus derived from the available triage systems. The intent is to ensure that providers at a mass-casualty incident use triage methodologies that incorporate these core principles.

- No national guideline for mass casualty triage existed in US.
- Lack of national guideline has resulted in variability in triage processes, tags, and nomenclature which has the potential to inject confusion and miscommunication into the disaster incident, particularly when multiple jurisdictions are involved.



Development of Model Uniform Core Criteria (MUCC)

•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 Health Resources and Services Administration/Maternal and Child Health Bureau Emergency Medical Services for Children Program; American Trauma Center Association



Special FOCUS

SALT Mass Casualty Triage

Concept Endorsed by the 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, and State and Territorial Injury Prevention Directors Association

It is recognized that there is a need for a national standard for mass casualty triage, because disasters frequently cross jurisdictional lines involving responders from multiple agencies. After reviewing all of the existing triage systems, a consensus review panel found that there was insufficient evidence to support 1 system over the others. Using aspects of the existing systems and based on best evidence, SALT (Sort-Assess-Lifesaving Interventions-Treatment and/or Transport) was developed as a national all-hazards mass casualty initial triage standard for all patients (eg, adults, children, special populations). SALT was designed to allow agencies to easily incorporate it into their current MCI triage protocol through simple modification.

STEP 1: SORT

SALT begins with a global sorting of patients, prioritizing them for individual assessment. Patients who can walk should

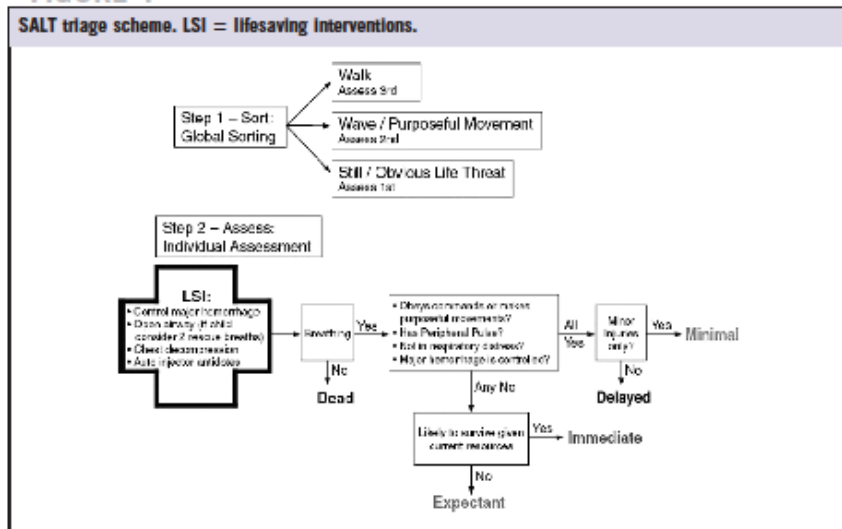
be asked to walk to a designated area and should be assigned last priority for individual assessment. Those who remain should be asked to wave (ie, follow a command) or be observed for purposeful movement. Those who do not move (ie, are still) and those with obvious life-threatening conditions should be assessed first because they are the most likely to need lifesaving interventions (Fig. 1).

STEP 2: ASSESS

The individual assessment should begin with limited rapid lifesaving interventions:

- Control major hemorrhage through the use of tourniquets or direct pressure provided by other patients or other devices
- Open the airway through positioning or basic airway adjuncts (no advanced airway devices should be used)

FIGURE 1



SALT Triage Endorsements

- 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
- Mayo Clinic
- Dayton MMRS



SALT Triage Endorsements

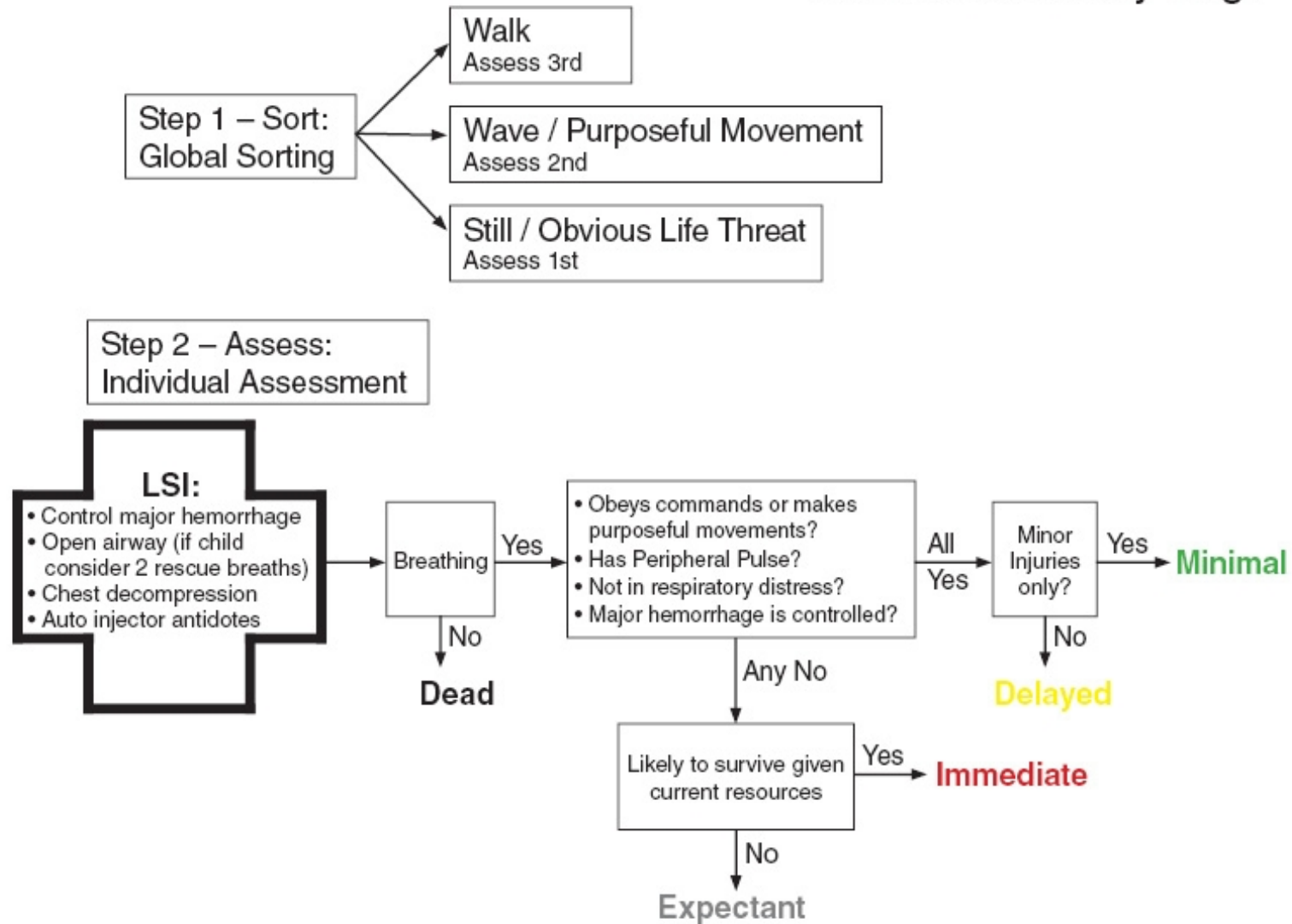
- Mayo Clinic Statement (5/8/2021):
- "SALT as straightforward and easy to grasp."
- "Alternatively, START had gaps," says Juntunen, "even categorizing a victim with a penetrating or life-threatening injury as minimally injured. In theory, you could have someone with their arm chopped off, but as long as they could respond to you and walk across a parking lot, they would be categorized as green," he says. "You could also have a gunshot wound to the chest and be green."



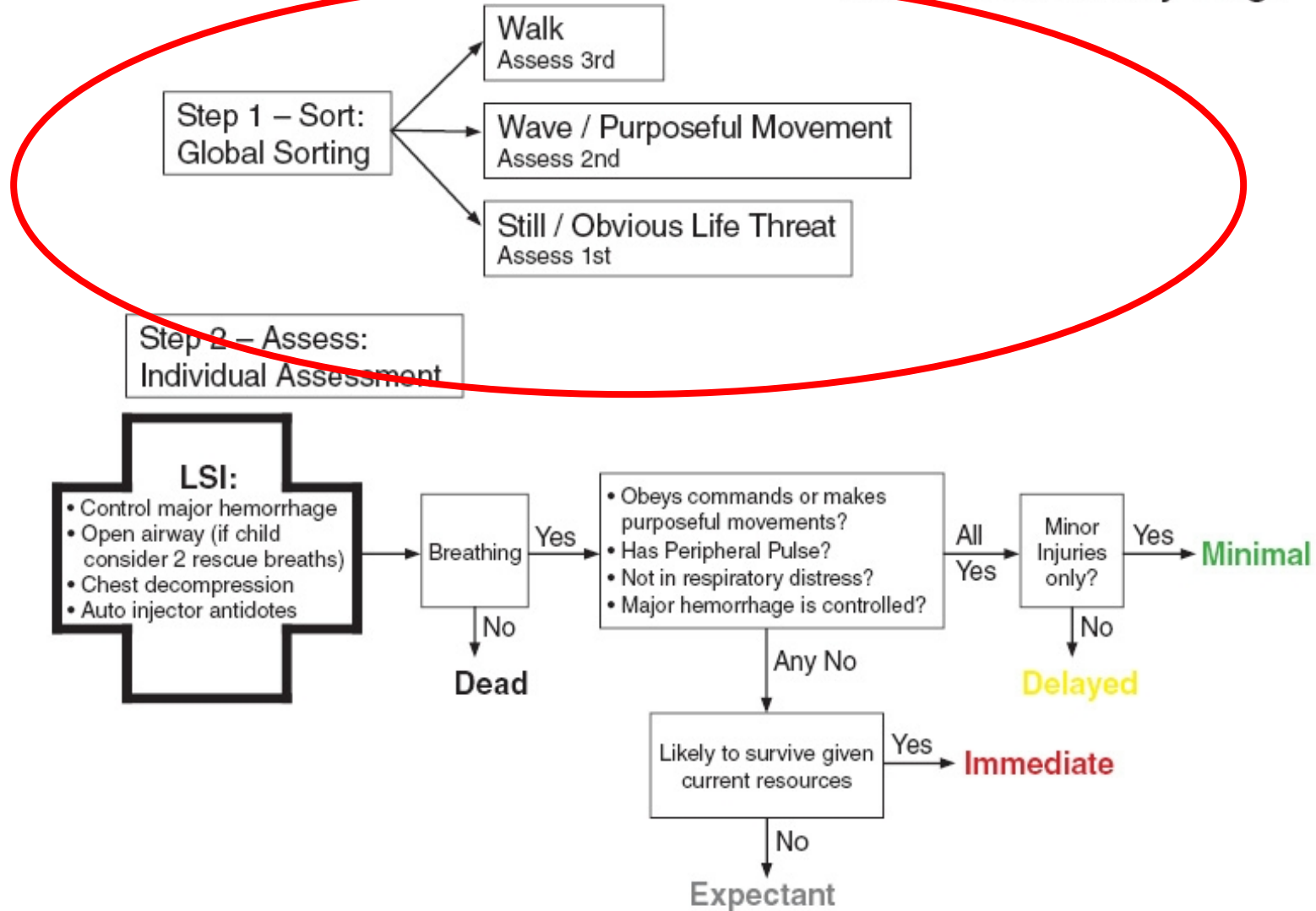
<https://www.mayoclinic.org/medical-professionals/trauma/news/mass-casualty-triage-guidelines-revised/mac-20512735>



SALT Mass Casualty Triage



SALT Mass Casualty Triage



Global Sorting: Action 1

- **Action:**

- “Everyone who can hear me please **WALK** to [designated area] and we will help you”
 - Use loud speaker if available

- **Goal:**

- Group ambulatory patients using voice commands

- **Result:**

- Those who follow this command - last priority for individual assessment

Global Sorting: Action 2

- **Action:**

- “If you need help, **WAVE** your arm or move your leg and we will be there to help you in a few minutes”

- **Goal:**

- Identify non-ambulatory patients who can follow commands or make purposeful movements

- **Result:**

- Those who follow this command - second priority for individual assessment

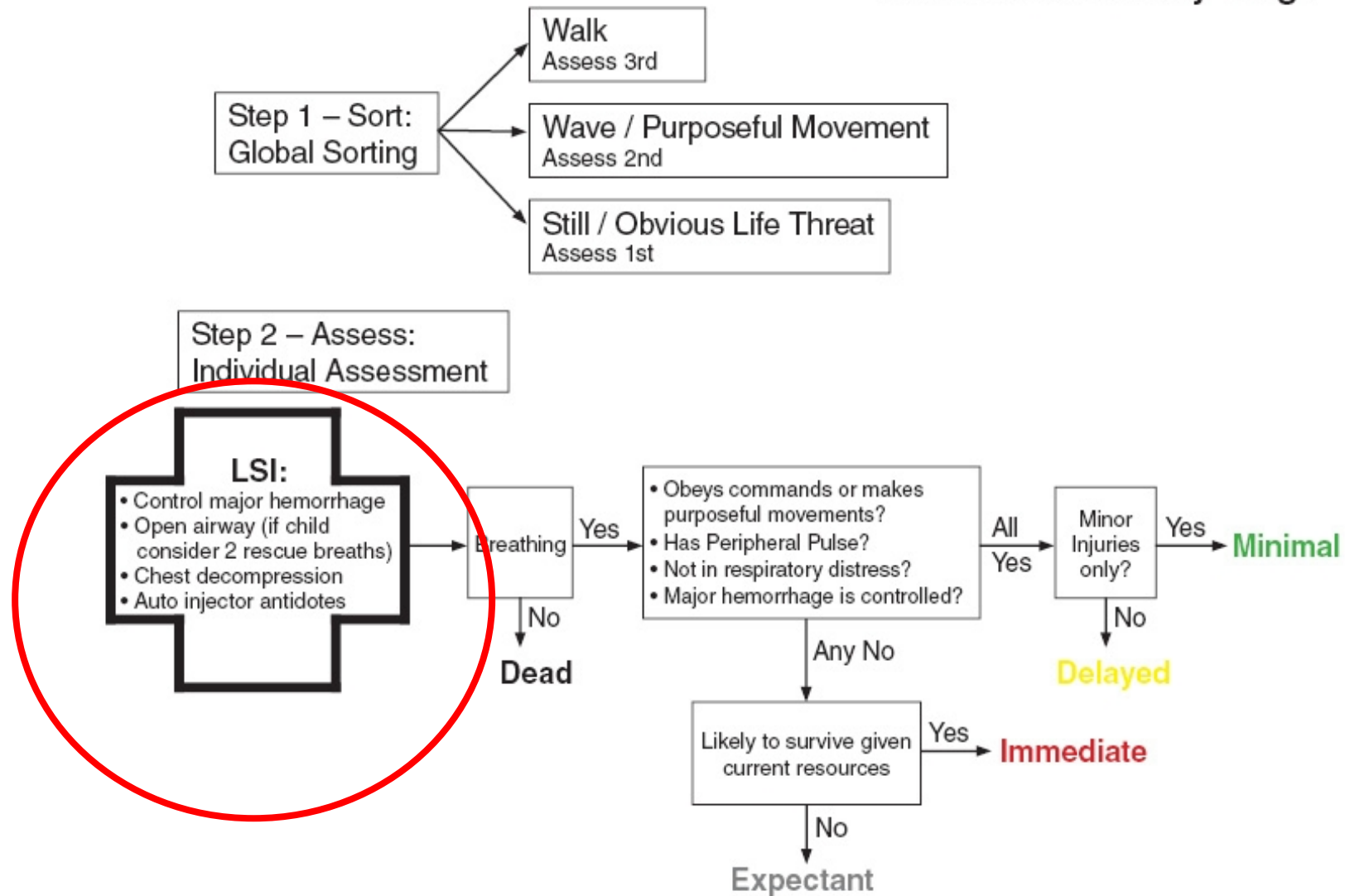
Global Sorting Result

■ Casualties now prioritized for individual assessment

- ☐ Priority 1: Still, *and those with obvious life threat*
- ☐ Priority 2: Waving/purposeful movements
- ☐ Priority 3: Walking



SALT Mass Casualty Triage

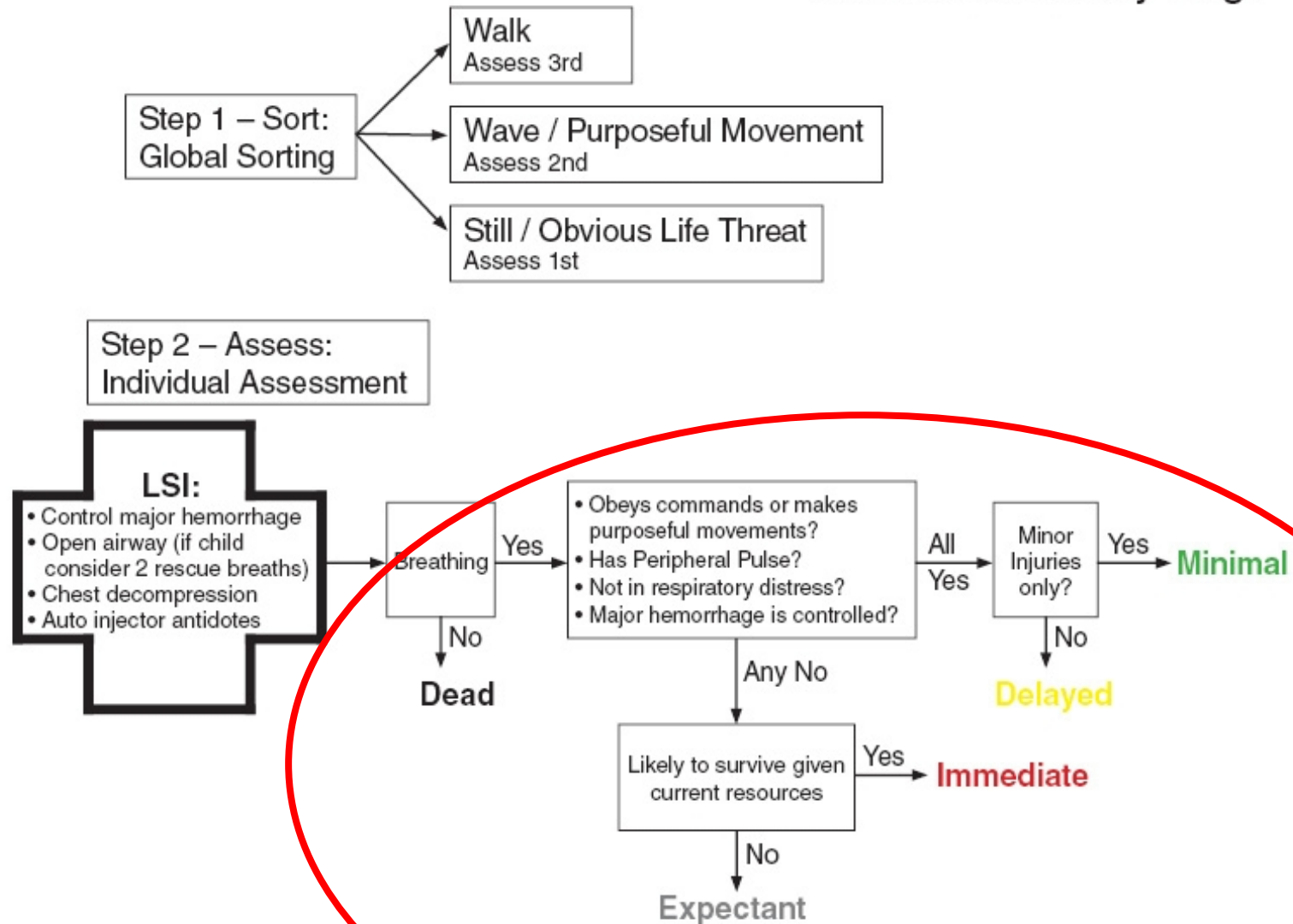


Step 2: Assessment-Life Saving Interventions (LSI)

- Control major hemorrhage with tourniquets
- Open the airway through positioning or basic airway adjuncts (no advanced airway devices should be used)
- If the patient is a child, consider giving 2 rescue breaths
- Chest decompression
- Autoinjector antidotes



SALT Mass Casualty Triage



Step 2: Assessment

- ◆ If the answers are **NO** and the patient **IS** likely to survive given current resources, tag them as **IMMEDIATE (red)**
- ◆ If the answers are **NO** and the patient is **NOT** likely to survive given current resources, tag them as **EXPECTANT (gray)**
- ◆ If the answers are **YES**, but injuries are not minor and require care, tag patient as **DELAYED (yellow)**
- ◆ If the answers to all of those questions is **YES** and the injuries are minor, tag patient as **MINIMAL (green)**

Dead

- Patient is not breathing after opening airway
 - ❑ In Children, consider giving two rescue breaths
 - ❑ If still not breathing must tag as dead
- Tag dead patients to prevent re-triage
- Do not move
 - ❑ Except to obtain access to live patients
 - ❑ Avoid destruction of evidence
- If breathing conduct the next assessment

Immediate



- Serious injuries
- Immediately life threatening problems
- High potential for survival
- Examples
 - Tension pneumothorax
 - Exposure to nerve agent
 - Severe shortness of breath or seizures

Immediate

■ **No** to **any** of the following

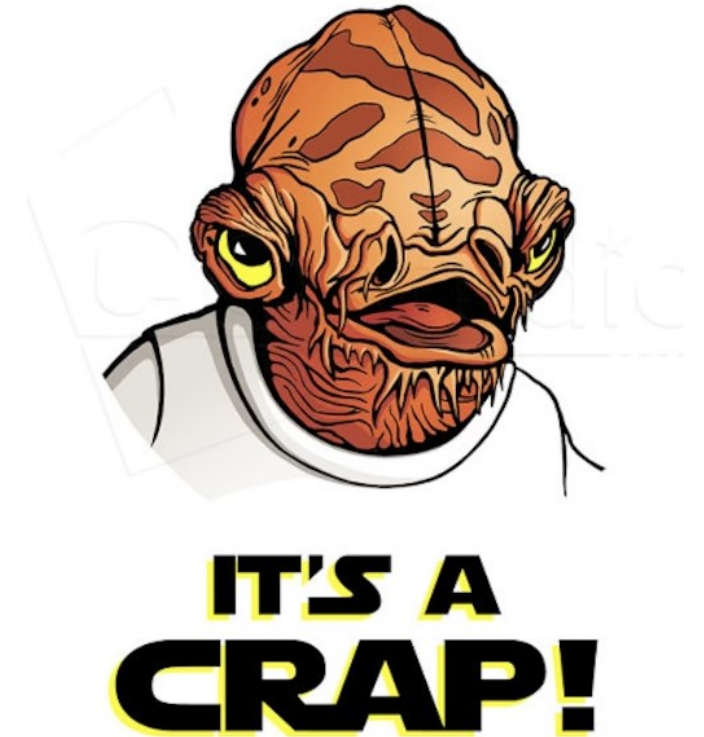
- ☐ Has a peripheral pulse?
- ☐ Not in respiratory distress?
- ☐ Hemorrhage is controlled?
- ☐ Follows commands or makes purposeful movements?

■ **Likely** to survive given available resources

Step 2: Assessment

◆ A mnemonic for the four Assessment Questions is **CRAP**:

- ◆ C – Follows **Commands**
- ◆ R – No **Respiratory Distress**
- ◆ A – No (uncontrolled) **Arterial bleeding**
- ◆ P – **Peripheral Pulse Present**



Expectant

■ No to any of the following

- ☐ Has a peripheral pulse?
- ☐ Not in respiratory distress?
- ☐ Hemorrhage is controlled?
- ☐ Follows commands or makes purposeful movements?

■ Unlikely to survive given available resources



Expectant

- DOES NOT MEAN DEAD!

- Important for preservation of resources

- Should receive comfort care or resuscitation when resources are available

- Serious injuries

- Very poor survivability even with maximal care in hospital or pre-hospital setting

- Examples

- 90% body surface area burn
 - Multiple trauma with exposed brain matter

Delayed

■ Serious injuries

- ❑ Require care but management can be delayed without increasing morbidity or mortality

■ Examples

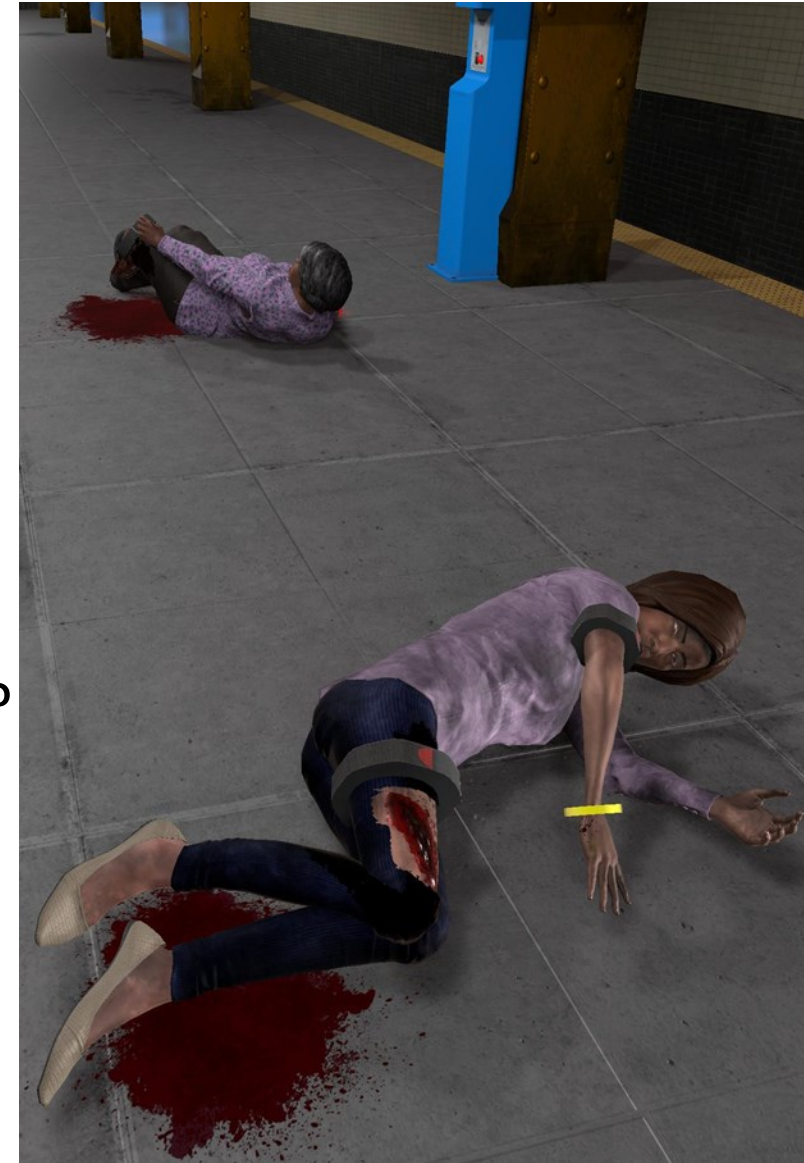
- ❑ Long bone fractures
- ❑ 40% BSA exposure to Mustard gas



Photo Source: Phillip L. Coule, MD (from SALT Triage <https://www.ndlsf.org/salt>)

Delayed

- Yes to **all** of the following
 - ☐ Has a peripheral pulse?
 - ☐ Not in respiratory distress?
 - ☐ Hemorrhage is controlled?
 - ☐ Follows commands or makes purposeful movements?
- Injuries are **not** Minor and require care



Minimal

■ Yes to **all** of the following

- ☐ Has a peripheral pulse?
- ☐ Not in respiratory distress?
- ☐ Hemorrhage is controlled?
- ☐ Follows commands or makes purposeful movements?

■ Injuries **are** Minor

Minimal

- Injuries require minor care or no care
- Examples
 - ☐ Abrasions
 - ☐ Minor lacerations
 - ☐ Nerve agent exposure with mild runny nose



Transport

- ◆ Transport priority is determined in the Treatment Area or by the Transport Group
- ◆ Do not overload any hospital, regardless of transport distance to other hospitals.
 - ◆ In an MCI, many trauma patients will need to be transported to non-Trauma Centers.
 - ◆ All hospitals will accept and stabilize trauma patients during MCIs.

Current Events and Literature

- What does the current literature say about Mass Casualty Response?
- Is triage category the most important outcome measure?
- Can we go beyond a PowerPoint lecture as training module for this?



<https://news.wosu.org/news/2022-11-30/ohio-state-doctors-using-virtual-reality-to-provide-disaster-response-training-to-first-responders>

Mass Shootings in America: Consensus Recommendations for Healthcare Response

Craig Goolsby, MD, MEd, FACEP¹, Keke Schuler, PhD², Jon Krohmer, MD³, David N Gerstner, EMT-P⁴, Nancy W Weber, DO, MBA, FACOEP, FACEP⁵, David E Slattery, MD, FACEP, FAEMS⁶, Deborah A Kuhls, MD, FACS, FCCM, FRCST (Hon)⁷, Thomas D Kirsch, MD, MPH, FACEP⁸

Mass Shootings in America: Consensus Recommendations for Healthcare Response

both the EM and EMS groups questioned the effectiveness of existing, widely-used triage protocols, such as SALT or START.¹⁶ These groups recommended modification or replacement of “standard” triage to include anatomic triage (e.g. considering location of gunshot wounds and prioritizing patient care based on potential lethality of injury to underlying structures).

Mass Shootings in America: Consensus Recommendations for Healthcare Response

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I'll come back to this!

Mass Shootings in America: Consensus Recommendations for Healthcare Response

Themes	Prehospital Recommendations
Prior Training, Exercises, Readiness	Communities need to conduct regular drills and exercises involving participants at all response levels, including senior leadership. Mass shooting exercises should mirror actual events and what to expect.

Community Preparation of Bystander, Civilian, Law Enforcement	Specific education about seeking treatment and not overloading hospitals is also important.
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Triage	Triage needs to occur at the site of mass shooting incidents (MSI). SALT triage with consideration of anatomical gunshot wound injuries.
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RESEARCH

Open Access


Pre-hospital management of mass casualty civilian shootings: a systematic literature review



Conor D. A. Turner^{1*}, David J. Lockety^{1,2,3} and Marius Rehn^{2,3,4}

- Hemorrhage is the leading preventable cause of death in trauma.
- The primary principle of the Hartford Consensus was that nobody should die from uncontrolled bleeding.
- Prehospital medical management at mass shootings is addressed in military settings by Tactical Casualty Combat Care (TCCC) guidelines prioritizing the control of catastrophic hemorrhage.

Triage in Complex, Coordinated Terrorist Attacks

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2. Monash University Community Emergency Health and Paramedics, Melbourne, Victoria, Australia

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Conflicts of interest: none

Keywords: Emergency Medical Services; tactical medicine; terrorism; triage

Abbreviations:

CCP: casualty collection point
CCS: casualty clearing station
CCTA: complex, coordinated terrorist attack
EMS: Emergency Medical Service

Abstract

Introduction: Terror attacks have increased in frequency, and tactics utilized have evolved. This creates significant challenges for first responders providing life-saving medical care in their immediate aftermath. The use of coordinated and multi-site attack modalities exacerbates these challenges. The use of triage is not well-validated in mass-casualty settings, and in the setting of intentional mass violence, new and innovative approaches are needed.


Methods: Literature sourced from gray and peer-reviewed sources was used to perform a comparative analysis on the application of triage during the 2011 Oslo/Utoya Island (Norway), 2015 Paris (France), and 2015 San Bernardino (California USA) terrorist attacks. A thematic narrative identifies strengths and weaknesses of current triage systems in the setting of complex, coordinated terrorist attacks (CCTAs).

Discussion: Triage systems were either not utilized, not available, or adapted and improvised to the tactical setting. The complexity of working with large numbers of patients, sensory deprived environments, high physiological stress, and dynamic threat profiles created significant barriers to the implementation of triage systems designed around flow charts, physiological variables, and the use of tags. Issues were identified around patient movement and “tactical triage.”

Conclusion: Current triage tools are inadequate for use in insecure environments, such as the response to CCTAs. Further research and validation are required for novel approaches that simplify tactical triage and support its effective application. Simple solutions exist in tactical triage, patient movement, and tag use, and should be considered as part of an overall triage system.

Pepper M, Archer F, Moloney J. Triage in complex, coordinated terrorist attacks. *Prehosp Disaster Med.* 2019;34(4):442–448.


Triage in Complex, Coordinated Terrorist Attacks

Matt Pepper, MPhil;¹  Frank Archer, MBBS;¹ John Moloney, MBBS²

In contrast to the lack of a universal triage system in Norway, responders at San Bernardino had trained many times on the use of START adult and JumpSTART pediatric algorithms. No responder utilized this system during the incident. Post-incident analysis reveals that responders universally relied on clinical judgement and did not use physiological numbers or number ranges for triage decisions.²⁵ The metrics of activity, pallor, gasping or rapid breathing, presence of large amounts of blood, and the anatomic location of gunshot wounds were utilized instead to aid decision making.

France utilizes a national standard for triage.²⁸ While this was applied at CCSs across Paris, improvised and simplified tactical triage systems were also reported to be used at various sites, including the Bataclan.²⁹

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Triage in Complex, Coordinated Terrorist Attacks

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to preventable causes of death, which therefore make the LSIs specified by the SALT triage system an appropriate balance between saving lives and providing care to the maximum number of victims, especially in high-threat incidents:⁵³

- Severe hemorrhage control (tourniquets, wound packing, and/or direct pressure);
- Basic airway management (nasopharyngeal adjuncts and prone/recovery position);
- Application of vented chest seals and needle decompression of tension pneumothorax; and
- Administration of Chemical, Biological, Radiological, or Nuclear (CBRN) antidotes.

The application of swift and effective hemorrhage control has been shown to have a significant effect on decreasing mortality if applied prior to the onset of shock.⁵⁸ The earlier these interventions can be applied will be not only be life-saving, but will also reduce the patients further resource requirements.

A tactical triage system should allow for LSIs to be applied during the process of rapid patient assessment, due to risk of sudden exsanguination or deterioration.

Is the best method to “Scoop and Run”?

Critical Care December 2001 Vol 5 No 6 Simon and Teperman

Review

The World Trade Center Attack Lessons for disaster management

Ronald Simon and Sheldon Teperman

“It is clear from this attack and other disasters that local hospitals will rapidly be swamped by anyone that can get there on their own. Communications will be unreliable and expected transport routes and methods may be unavailable. Without guidance, EMS crews will bring the injured to the closest hospital, further stressing existing resources. The triage of patients in urban and rural disasters is different and needs to be re-examined.”



Should we triage based on anatomical location?

- Shuman M, Wright RK. Evaluation of clinician accuracy in describing gunshot wound injuries. J Forensic Sci. 1999 Mar;44(2):339-42. PubMed PMID: 10097358.
- When greater than 2 wounds were present (14), the clinicians were wrong 93% of the time.
- This study demonstrates that clinicians responsible for treating gunshot-wounded persons do not adequately document or interpret these wounds.

Final Pearls

- SALT triage
 - Global sorting of patients using voice commands allows providers to start with the presumed sickest patients (not just the first person you come to!).
 - Life-saving interventions are considered **first** during individual assessment (Stop the Bleed).
 - Expectant category is included, but retriage is certainly necessary.
 - Assessment must not require counting or timing vital signs and instead use yes-or-no criteria.

USE OF SALT TRIAGE IN A SIMULATED MASS-CASUALTY INCIDENT

E. Brooke Lerner, PhD, Richard B. Schwartz, MD, Phillip L. Coule, MD,
Ronald G. Pirrallo, MD, MHSA



Summary Thoughts

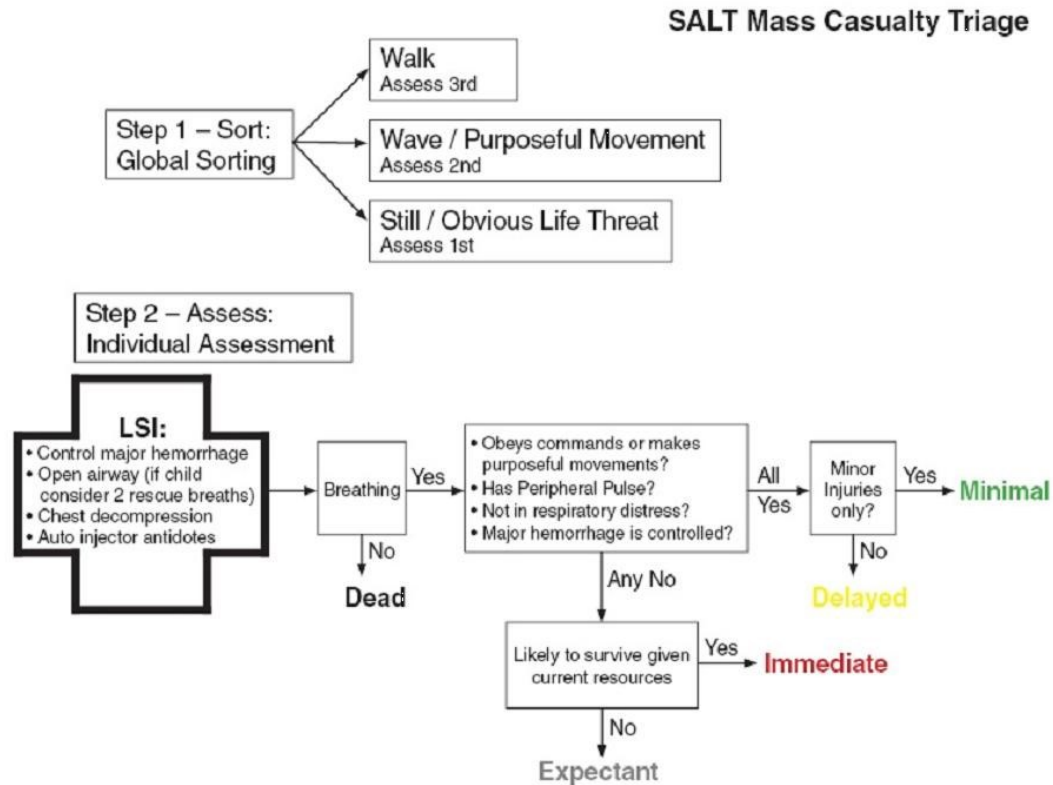
- The literature around this topic is shaky at best and more study needs to be done.
- Expert consensus favors SALT.
- SALT allows for early hemorrhage control.
- New training tools will allow for better accuracy from first responders.
- https://go.osu.edu/mcivr_video

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1. Lerner EB, Schwartz RB, Coule PL, et al. Mass casualty triage: an evaluation of the data and development of a proposed national guideline. Disaster Med Public Health Prep. 2008 Sep;2 Suppl 1:S25-34. doi: 10.1097/DMP.0b013e318182194e. PMID: 18769263.
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4. Turner CD, Lockey DJ, Rehn M. Pre-hospital management of mass casualty civilian shootings: a systematic literature review. Crit Care. 2016 Nov 8;20(1):362. doi: 10.1186/s13054-016-1543-7. Erratum in: Crit Care. 2017 Apr 13;21(1):94. PMID: 27825363; PMCID: PMC5101656.
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Questions?



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