

## VIDEOS IN EMERGENCY MEDICINE

## Trauma

# SALT triage training and virtual reality demonstration

Nicholas E. Kman MD<sup>1</sup>  | Alan Price MFA<sup>2</sup> | Vita Berezina-Blackburn MA, MFA<sup>3</sup> |  
Jeremy Patterson BFA<sup>3</sup> | Kellen Maicher MFA<sup>4</sup> | David P. Way MEd<sup>1</sup> |  
Jillian McGrath MD<sup>1</sup> | Ashish R. Panchal MD, PhD<sup>1</sup> | Alex Oliszewski MFA<sup>3</sup> |  
Scott Swearingen MFA<sup>3</sup> | Douglas Danforth PhD<sup>5</sup>

<sup>1</sup>Department of Emergency Medicine, The Ohio State University College of Medicine, Columbus, Ohio, USA

<sup>2</sup>Center for Immersive Media, University of the Arts, Philadelphia, Pennsylvania, USA

<sup>3</sup>Advanced Computing Center for the Arts and Design, The Ohio State University, Columbus, Ohio, USA

<sup>4</sup>James Instructional Design Section (JIDS), The Ohio State University Wexner Medical Center, Columbus, Ohio, USA

<sup>5</sup>Department of Obstetrics & Gynecology, The Ohio State University College of Medicine, Columbus, Ohio, USA

**Correspondence**

Nicholas E. Kman, Department of Emergency Medicine, The Ohio State University College of Medicine, 785A Prior Hall, 376 W 10th Ave., Columbus, OH 43210, USA.  
Email: [Nicholas.kman@osumc.edu](mailto:Nicholas.kman@osumc.edu)

This work has been presented at the following meetings/conferences:

Poster Presentation. International Meeting on Simulation in Healthcare (IMSH) Annual Meeting. January 2022. Los Angeles, CA.

Poster Presentation. National Association of Emergency Medical Services Physicians (NAEMSP) Annual Meeting. January 2022. San Diego, CA.

Podium Presentation. The Ohio State University Department of Emergency Medicine Annual Spring Research Day. April 2022. Columbus, OH.

**Funding information**

Agency for Healthcare Research and Quality, Grant/Award Number: R18HS025915

## 1 | BACKGROUND

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, and special populations).<sup>1</sup> SALT is endorsed by<sup>1-3</sup> the American College of Emergency Physicians (ACEP), American College of Surgeons Committee on Trauma, American Trauma Society, National Association of EMS



# SALT Triage Training and Virtual Reality Demonstration

**VIDEO 1** SALT triage training.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2024 The Author(s). *Journal of the American College of Emergency Physicians Open* published by Wiley Periodicals LLC on behalf of American College of Emergency Physicians.

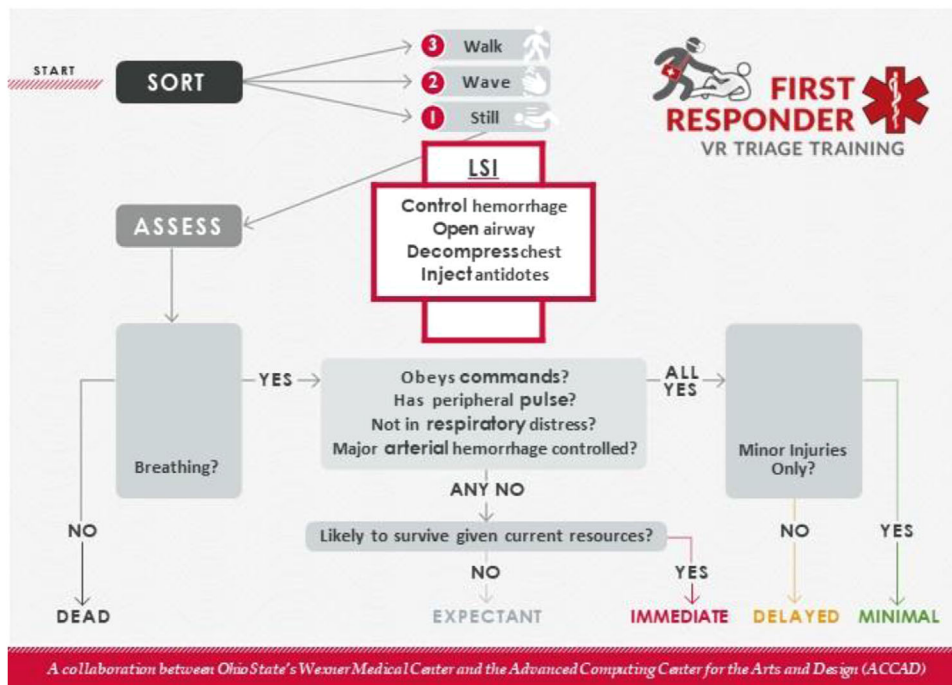
Physicians (NAEMSP), and National Disaster Life Support Education Consortium.

**3 | KEY POINTS**

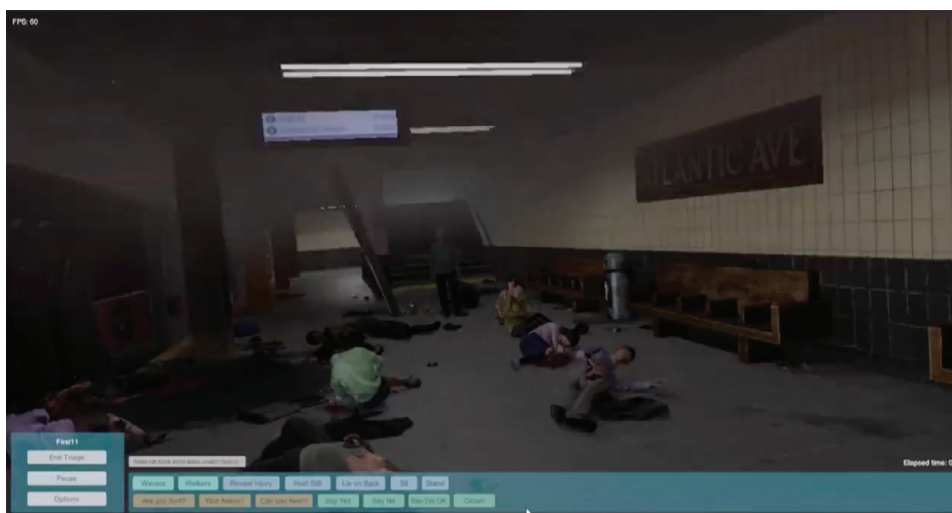
Hemorrhage is the leading preventable cause of death in trauma (30%–40% of fatalities).<sup>4</sup> Death from hemorrhage can occur in as little as 3–5 minutes. SALT allows for early hemorrhage control. In other triage algorithms, bleeding control does not occur until *after* respirations are counted and perfusion (cap refill) is checked.

**2 | PROCESS**

The process is explained using Video 1, and its algorithm is presented in Figure 1.



**FIGURE 1** SALT (sort-assess-lifesaving interventions-treatment and/or transport) triage algorithm.



**VIDEO 2** VR SALT demonstration.

In SALT, the individual assessment begins with limited rapid lifesaving interventions, such as:<sup>5</sup>

1. to control major hemorrhage with tourniquets or direct pressure provided by other patients or other devices;
2. to open the airway through positioning or basic airway adjuncts (no advanced airway devices should be used);
3. if the patient is a child, consider giving two rescue breaths;
4. chest needle decompression;
5. CBRN antidotes or autoinjector antidotes:
  - SALT includes an expectant category for patients who are still breathing but unlikely to survive given current resources.
  - SALT allows for a quick global sorting of the patients so responders can more accurately identify patients who are not responding or have an obvious life threat.

#### 4 | VR DEMONSTRATION

VR SALT demonstration is presented using Video 2.<sup>6</sup>

#### ACKNOWLEDGMENTS

This work was supported through a grant from the United States Agency for Healthcare Research and Quality Grant Number R18HS025915.

#### CONFLICT OF INTEREST STATEMENT

The authors report no conflicts of interest.

#### ORCID

Nicholas E. Kman MD  <https://orcid.org/0000-0002-4769-4658>

#### REFERENCES

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;2(Suppl 1):S25-S34. doi:10.1097/DMP.0b013e318182194e
2. <https://www.mayoclinic.org/medical-professionals/trauma/news/mass-casualty-triage-guidelines-revised/mac-20512735>
3. Goolsby C, Schuler K, Krohmer J, et al. Mass shootings in America: consensus recommendations for healthcare response. *J Am Coll Surg.* 2023;236:168-175. doi:10.1097/XCS.0000000000000312
4. Turner CD, Lockey DJ, Rehn M. Pre-hospital management of mass casualty civilian shootings: a systematic literature review. *Crit Care.* 2016;20(1):362. doi:10.1186/s13054-016-1543-7. Erratum in: *Crit Care.* 2017 Apr 13;21(1):94.
5. Pepper M, Archer F, Moloney J. Triage in complex, coordinated terrorist attacks. *Prehosp Disaster Med.* 2019;34(4):442-448. doi:10.1017/S1049023X1900459X
6. Kman NE, Price A, Berezina-Blackburn V, et al. First responder virtual reality simulator to train and assess emergency personnel for mass casualty response. *J Am Coll Emerg Physicians Open.* 2023;4(1):e12903. doi:10.1002/emp2.12903

**How to cite this article:** Kman NE, Price A, Berezina-Blackburn V, et al. SALT triage training and virtual reality demonstration. *JACEP Open.* 2024;5:e13203. <https://doi.org/10.1002/emp2.13203>