

posed of factual knowledge questions about triage ( $n = 15$ ) and triage decision-making questions ( $n = 10$ ). Seventy nurses working in hospitals in Sistan-va-Balouchestan state participated. The questionnaire reliability was 0.60 using the test-re-test method. Content validity was considered based on Canadian Triage and Acuity Scale.

**Results:** The response rate was 68% (70/102). Nurses proved to be unfamiliar with triage. Only 28% of their responses were correct. Only three emergency departments have specified special nurses to perform triage. Inter-rater agreement between nurses for all was  $r = 0.56$  and for each nurse was  $r = 0.12$ .

**Conclusions:** Emergency departments were not committed to a valid, reliable triage scale. Specialized education about hospital triage with a new approach is recommended. Further research on emergency department triage scales, standards, and guidelines is recommended.

**Keywords:** assessment; competency; education; emergency department; Iran; knowledge; nurse; training; triage

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#### (K110) Effects of Triage on Waiting Time for Health Services and Patient Satisfaction in an Iranian Emergency Department

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Establishing a triage process can improve the patient flow, and thus, patient satisfaction in the emergency department. This study was carried out to determine effect of triage on waiting time and patient satisfaction.

A sample ( $n = 600$ ) was utilized for this quasi-experimental design, and 300 subjects were selected for each group (intervention and control groups) through random allocation.

Data were collected using a time measuring form and a patient satisfaction scale.

The mean waiting time before and after triage was 10.7  $\pm$  3.77, 8.5  $\pm$  3.77 minutes, respectively ( $p = 0.000$ ). Mean patient satisfaction score in the two groups (before and after) was 29.6  $\pm$  5.07 and 37.7  $\pm$  5.86 ( $p = 0.000$ ).

A reduction in waiting time and increased patient satisfaction with the triage process indicate a reorganization of emergency department layout and staffing can improve the patient flow and quality of care.

**Keywords:** emergency department; emergency health; satisfaction; triage; waiting time

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#### (K111) A Review of On-Scene Disaster Triage Schemes and Proposal for a Standardized Triage System

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**Introduction:** Mass-casualty triage is a critical skill. The are any systems exist to guide providers in making triage decisions, however, there is little scientific literature to validate current systems. There are no internationally agreed

upon categories or color. The lack of standardization in triage can lead to confusion.

**Methods:** An expert panel reviewed existing triage systems. Each member was assigned a triage system and asked to conduct an exhaustive literature review and Internet search and to develop a report to the panel. Each system had two or more members assigned to conduct a review.

**Results:** The committee identified nine existing mass casualty triage systems, including two pediatric-specific systems. The systems were noted to be similar in naming and color representations, but differed on the inclusion of an expectant category. Studies that compared the various mass casualty triage systems and found that the ability to obey commands and systolic blood pressure were the best predictors were identified.

**Conclusions:** The committee concluded that no one system could be embraced as a validated system. The committee decided to use the best available scientific information and consensus opinion to develop a system that could serve as a proposed national guideline. The group discussed each component until consensus was reached. The guideline incorporates pieces of most existing triage systems; it was given the name SALT Triage (sort, assess, lifesaving interventions, and treatment and/or transport). This guideline is intended for use on-scene in all-hazards events for both adults and children.

**Keywords:** disaster; emergency medical services; mass casualty; SALT; standardization; triage

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#### (K112) Use of SALT Triage during a Simulated Mass-Casualty Incident

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**Objectives:** To determine the accuracy of SALT Triage during a simulated mass casualty incident and the average time to make triage designations.

**Methods:** Thirty trainees (11 medical doctors (MDs), six registered nurses (RNs), eight emergency medical technicians (EMTs), one RN/EMTs, four other) were taught to use SALT (sort, assess, life-saving interventions, treatment and/or transport) Triage during a 30 minute lecture. The following day, all trainees participated in 1 of 4 simulated mass-casualty incidents. For each incident, trainees were told to assess and prioritize all victims. Each scenario was comprised of 29 victims, including 11 moulaged mannequins and 18 moulaged actors. Each victim had a card that stated the victim's respiratory effort, pulse quality, and ability to follow commands. Initial and final assigned triage categories were recorded and compared to the intended category. Ten of the victims were equipped with stop-watches to measure the triage time interval. Timing began when the trainee approached the victim and ended when they verbalized their triage designation. The times were averaged and standard deviations calculated.

**Results:** Of the 30 participants, 20 reported having prior drill experience, and 11 had prior mass-casualty incident

experience. There were 112 victim observations. Four were excluded due to not being triaged. The initial and final triage was correct for 80% of the observations; 13% over- and 7% under-triaged. The mean triage interval was 30 seconds (+21; range: 4–94).

**Conclusions:** Assessments using SALT Triage were accurate and made quickly during a simulated incident. The accuracy rate was higher than those published for other triage systems and of similar speed.

**Keywords:** drills; emergency medical services; mass-casualty incident; SALT Triage; training; triage

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### (K113) Determination of Field Providers' Opinions of SALT Triage

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**Objective:** The objective of this study was to determine providers' opinions of SALT Triage after receiving training and using it during a simulated mass-casualty incident.

**Methods:** A survey was conducted of trainees in a disaster course. Trainees were given a 30 minute lecture on SALT (sort, assess, life-saving interventions, treatment and/or transport) Triage and then used it during a drill. After the drill, trainees were asked to complete the survey. Results were analyzed using descriptive statistics.

**Results:** Thirty trainees (11 medical doctors (MDs), six registered nurses (RNs), eight emergency medical technicians (EMTs), one RN/EMTs, four other) participated in the course. Of these participants, 67% had prior drill experience (mean: 10 drills) and 37% had prior mass-casualty incident experience (mean: four experiences). Prior to the drill: 7% reported that they felt very confident using SALT Triage, 33% were confident, 30% were somewhat confident, and 30% were not confident. After the drill: none reported not feeling confident using SALT Triage, 27% were at the same level of confidence, 73% felt more confident, and none felt less confident. Before the drill: 52% of respondents felt SALT Triage was easier to use than their current disaster triage protocol, 44% felt it was similar, and 4% felt it was more difficult. After the drill: 67% did not change how easy they felt SALT Triage was to use, 26% thought it was easier to use, and 3% thought it was similar.

**Conclusions:** Providers felt confident using SALT triage after a 30-minute training session and found it was similar or easier to use than their current triage protocol. Using SALT Triage during a drill improved confidence.

**Keywords:** drills; confidence; emergency medical services; mass-casualty incident; opinions; SALT Triage; triage; training

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### (K114) Use of the Visensia (Biosign) System Improves Emergency Department Trauma Triage: A Cluster Analysis with Outcomes

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**Introduction:** Triage criteria rely on physiologic, anatomic, and mechanistic indicators of injury to minimize over-triage and under-triage, which remain persistently high (35%–65%). The Visensia Index Score (VIS) is a proprietary algorithm in a bedside monitor (OBS Medical, IN) that integrates five vital signs: (1) heart rate; (2) respiratory rate; (3) blood pressure; (4) pulse oximetry; and (5) temperature. It calculates a score ranging from 1 (no abnormality) to 5 (severe abnormalities). The aim of this study was to explore the utility of VIS in identifying trauma patients likely to have a poor prognosis on arrival to the emergency departments. **Methods:** After Institutional Review Board approval, the trauma registry was used to review 117 patients admitted to a Level-1 Trauma Center over a six month period. The first set of vital signs was obtained upon arrival to the emergency department. An initial VIS and a mean VIS (based on multiple VS) was calculated. The analysis included a multivariate mathematical technique and *k*-means cluster analysis. Clusters of populations with different Visensia scores were compared and differences in their outcomes were analyzed.

**Results:** Two major clusters were identified: VIS Scores >3 increased the risk of mortality as compared to those with scores <3; odds ratio 3.3 [1.04–10.3; *p* <0.001]. There was no association with length of intensive care unit stay, hospital days; or Injury Severity Scale (ISS) scores.

**Conclusions:** Cluster analysis, a novel multidimensional approach, shows association of a higher VIS (>3) as a useful point-of-care parameter to identify trauma patients likely to have a poorer prognosis, much more than retrospectively computed ISS and Trauma and Injury Severity Scores (TRISS).

**Keywords:** cluster analysis; emergency department; emergency medical services; prognosis; Visensia Index Score; vital signs

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### (K115) Application of Patient Age-Dependent Sacco Triage Method to Victims with Blunt Injuries

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**Objective:** The Sacco Triage Method (STM) is a mathematical model of resource-constrained triage. The objective of this presentation is to apply STM-Age, an age-augmented version of STM, to blunt trauma victims and compare it to Simple Triage and Rapid Treatment (START) and START-like protocols.

**Methods:** The objective of STM is to maximize the number of expected survivors given constraints on the timing