

### Diagnostic Accuracy of The Kampala Trauma Score using Estimated Abbreviated Injury Scale Scores and Physician Opinion

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**Study/Objective:** To determine the diagnostic accuracy of the Kampala Trauma Score in predicting Emergency Department outcomes in a limited diagnostics setting.

**Background:** The Kampala Trauma Score (KTS) has been proposed as a triage tool for use in low- and middle-income countries (LMICs). This study aimed to examine the diagnostic accuracy of KTS in predicting emergency department (ED) outcomes, using timely injury estimation with Abbreviated Injury Scale (AIS) score, and physician opinion (PO).

**Methods:** This was a diagnostic accuracy study of KTS among injured patients presenting to Komfo Anokye Teaching Hospital, Ghana. The South African Triage Scale (SATS), KTS and Revised Trauma Score (RTS) variables, PO quantifying serious injuries, and ED disposition were collected. Agreement between estimated AIS score and PO were analyzed with normal, linear weighted, and maximum kappa. Additionally, receiver operating characteristic (ROC) analysis of KTS-AIS and KTS-PO was performed.

**Results:** A total of 1,053 patients were sampled. There was moderate agreement between AIS criteria and PO by normal ( $\kappa = 0.41$ ), weighted ( $\kappa_{\text{lin}} = 0.47$ ), and maximum ( $\kappa_{\text{max}} = 0.53$ ) kappa. ED mortality ROC area for KTS-AIS was 0.93 (95% CI: 0.87-0.98), KTS-PO 0.89 (95%CI 0.78-1.00), SATS 0.88 (95%CI 0.79-0.97), and RTS 0.84 (95%CI 0.72-0.96). Hospital admission ROC area for KTS-AIS was 0.73 (95%CI 0.70-0.76), KTS-PO 0.79 (95%CI 0.76-0.82), SATS 0.71 (95%CI 0.68-0.74), and RTS 0.56 (95%CI 0.54-0.58).

**Conclusion:** KTS predicted mortality and need for admission from the ED very well when early estimation of the number of serious injuries was used, regardless of method (ie, AIS criteria or physician opinion). This study provides evidence for KTS to be used as a practical and valid triage tool to predict prognosis, ED outcomes, and inform referral decision making from first- or second-level hospitals in LMICs.

*Prehosp Disaster Med* 2017;32(Suppl. 1):s234

doi:10.1017/S1049023X17005994

### Comparison of Six Disaster Triage Methods using the Wenchuan Earthquake Victim Database

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**Study/Objective:** A variety of disaster triage methods have been used in mass-casualty events. But most of them were only based on expert opinion. The study objective was to determine the accuracy of several disaster triage methods when predicting clinically important outcomes in the trauma victims of the Wenchuan Earthquake.

**Background:** To date, researchers have built a lot of triage methods, such as Simple Triage and Rapid Treatment (START), Triage Sieve, CareFlight, Revised Trauma Score (RTS), Sacco Score, Unadjusted Sacco Score, and so on. However, most triage methods have been based on expert opinion with limited evidence.

**Methods:** Trauma victims from the Wenchuan Earthquake Victim Database were assigned triage levels, using each of six disaster triage methods: Simple Triage and Rapid Treatment (START), SIEVE, CareFlight, Revised Trauma Score (RTS), Sacco Score, and Unadjusted Sacco Score. Methods for approximating triage systems were vetted by subject matter experts. Triage assignments were compared against mortality at discharge with area under the receiver operator curve. Secondary outcomes included death in the emergency department and ICU (intensive care unit) admission.

**Results:** In this study, 26,519 records were included. The Sacco Score predicted mortality most accurately, with area under the receiver operator curve of 0.825 (95% confidence interval 0.780 to 0.893). RTS and CareFlight was as accurate as START.

**Conclusion:** Among six disaster triage methods compared against actual outcomes in trauma registry patients, the Sacco Score predicted mortality at discharge most accurately. This analysis highlighted comparative strengths and weakness of START, SIEVE, CareFlight, RTS, Sacco Score, and Unadjusted Sacco Score, suggesting areas in which each might be improved.

*Prehosp Disaster Med* 2017;32(Suppl. 1):s234

doi:10.1017/S1049023X17006008

### Mass-Casualty Events: How do we Ensure an Efficient and Effective Response?

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**Study/Objective:** This case study evaluates the challenges experienced by first responders to a mass casualty incident where triage processes were flawed. The analysis highlights the importance of sound triage practice, and the significance of continuing professional development in a mass casualty event.

**Background:** In May 2005, six Canadians lost their lives and 21 people were injured, following a bus accident outside Edmonton, Alberta. Passengers were oilfield workers travelling to Edmonton from Fort McMurray, Alberta. Four passengers were confirmed dead on scene and subsequently, two others died in hospital. Consequently, analysis of the multi casualty incident revealed that although scene command and control was efficient and effective, accurate triage was inadequate.

**Methods:** A first-person case study analysis of a 2005, Greyhound bus accident, which occurred near Edmonton, Alberta, Canada, was analyzed.

**Results:** Achieving success and organization of a catastrophic event or natural disaster requires the recognition of the importance of scene control and command, accurate triage and the assurance of destination resource capacity. Multi casualty events are rare, and due to sparse exposure, first responders have limited experience to manage these events effectively. Mass casualty exercises are generally used, although no standardized method exists to evaluate their function and effectiveness. Accurate and timely information are essential in successful multi-casualty events; however, inexperience and limitations often lead to ineffective and inaccurate triage, treatment and transportation of patients.

**Conclusion:** To ensure efficient and effective mass casualty response, future research should focus on adequate professional development programs for first responders. In addition, tools and instruments to aid in successful multi-casualty events would be an asset in achieving success.

*Prehosp Disaster Med* 2017;32(Suppl. 1):s234–s235

doi:10.1017/S1049023X1700601X

### Comparison of the Predictive Value of Four Burn Scores for Death Risk in Burns Patients in Emergency Departments

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**Study/Objective:** To evaluate the predictive value of Modified Burn Score (MBS), Abbreviated Burn Severity Index (ABSI), Belgian Outcome in Burn Injury (BOBI), and Injury Severity Score (ISS) for death risk in adult patients with severe thermal burns.

**Background:** Severe burn patients have high mortality. Accurate prediction of the risk of death in patients with severe burn, contributed to objectively assess the disease, to help clinicians with better clinical decision-making and rational allocation of medical resources. At present, there is a variety of scores on the risk of mortality in burn patients. However there are still, few studies on the prediction of the risk of death in adults with severe thermal burns.

**Methods:** Retrospectively analyzed data of patients in West China Hospital from 2012 to 2014. The patient's name, gender, age, burn area, and whether complicated with inhalation injury were recorded; and the ISS, MBS, ABSI and BOBI score were calculated. Through drawing Receiver Operating Characteristic curve (ROC curve), the area under the curve of the four scores Area Under Curve (AUC), and the sensitivity and specificity for death prediction were obtained. Based on the sensitivity and specificity for death risk prediction, the Youden index was calculated, the best cutoff value was found, and the best score of death risk prediction for adult patients with severe thermal burn was selected.

**Results:** There were 85 adult patients with severe thermal burn that were included, with 49 males and 36 females. The AUC of ABSI, MBS, BOBI and ISS were 0.925, 0.825, 0.813, 0.715.

**Conclusion:** ABSI has the best value for the death risk in severe thermal burns adult patients.

*Prehosp Disaster Med* 2017;32(Suppl. 1):s235

doi:10.1017/S1049023X17006021

### New Triage System: Using Digitized Information Entered via a Digital Pen

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**Study/Objective:** We examined the capability of this new triage system, using digitized information entered via a digital pen, as an information tool in times of disaster.

**Background:** Triage is important in deciding the priority of treatment for many patients injured by disaster. Because the patient's information entered on triage tags and the chronologic list made in each section are done by hand, the process is complicated and accuracy and rapidity cannot be guaranteed. We have created a new triage tag using the Anoto Live Digital Pen (Anoto K.K., Tokyo, Japan).

**Methods:** The new triage tag uses a check box form as much as possible to reduce readout errors. Furthermore, we developed the system to collect digitized triage information and format the collected data as a chronologic list. We divided the triage data into three categories: check box, numerical characters, and letter characters. We demonstrated this new system during disaster training with simulated patients and assessed whether each category was exactly recognized as digital data.

**Results:** We were able to collect data from 22 simulated patients. The simulated patient information entered on the handwritten triage tag was quickly digitized, and a chronologic list could be made. Assessment of the accuracy of the digitized data for each category was as follows: check box, 100.0% (correct number/total number = 127/127); numerical characters, 71.8% (102/142); and letter characters 51.1% (47/92). The errors in the letter characters were almost exclusively confined to content written in Chinese characters.

**Conclusion:** This new triage system using digitized information entered via digital pen has some problems with the recognition of letter and numerical characters. However, this system, almost exactly, digitized the data and may be a useful device during times of disaster in the future.

*Prehosp Disaster Med* 2017;32(Suppl. 1):s235

doi:10.1017/S1049023X17006033

### Computer Versus Manual Triage in a Live Disaster Simulation

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**Study/Objective:** To compare the use of computerized versus paper-based "Simple Triage and Rapid Treatment" triage in disaster simulations.

**Background:** Efficient and accurate triage during mass casualty incidents is a critical step of disaster response. Traditionally, triage