Predictive Value and Appropriate Ranges of Out-of-Hospital Physiologic Field Triage Criteria for Identifying Seriously Injured Older Adults

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Background

- Transporting seriously injured older adults to non-trauma centers (under-triage) is a major problem in trauma systems.
- Revision of the physiologic trauma triage criteria has been suggested as a means to reduce under-triage in older adults.

Objectives

To evaluate the ability of out-of-hospital physiologic measures to predict serious injury among older adults (≥55 years), the relative value of different physiologic measures, and potential changes to the physiologic triage criteria compared to current triage practices.

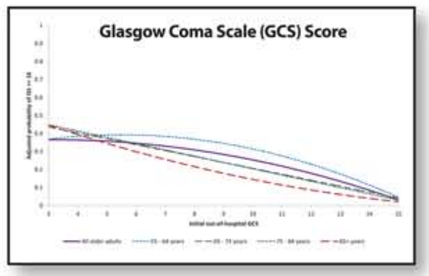
Methods

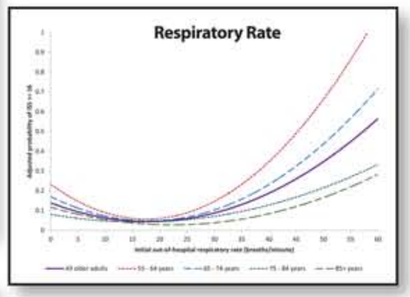
- ***Study Design:*** multi-site retrospective cohort study
- ***Setting and Patients:*** injured adults ≥55 years transported by 94 EMS agencies to 122 hospitals in 7 regions of the Western U.S. from 2006-2008 (Portland, OR; King County, WA; Sacramento, CA; San Francisco, CA; Santa Clara, CA; Denver County, CO; and Salt Lake City, UT).
- ***Outcome:*** Injury Severity Score (ISS) ≥16 ("serious injury")
- ***Out-of-Hospital Variables:***
  - Glasgow Coma Scale (GCS) score, systolic blood pressure (SBP), respiratory rate, heart rate and shock index.
  - Age, sex, assisted ventilation (BVM, intubation, supraglottic airway, cric), IV placement, site.
- ***Data Analysis:***
  - Probabilistic linkage to match EMS records to trauma registries, state discharge databases and emergency department databases.
  - Fractional polynomials to explore non-linear associations.
  - Classification and regression tree analysis.

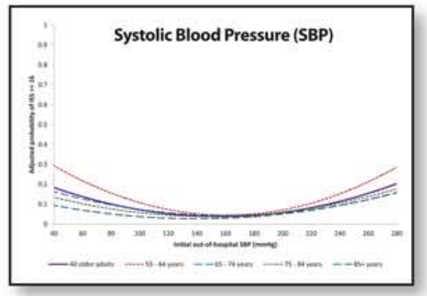
Results

- 44,890 injured older adults evaluated and transported by EMS.
- 2,328 (5.2%) had ISS ≥16
- Non-linear associations existed between all physiologic measures and ISS ≥16 (unadjusted and adjusted p ≤0.001for all), except for heart rate (adjusted p=0.48).
- Revised physiologic triage criteria: GCS score ≤14; respiratory rate <10 or >24 breaths per minute or assisted ventilation; and SBP <110 or >200 mmHg.
- Compared to current triage practices, revised criteria would:
  - Increase triage sensitivity 79.8% to 87.2% (difference 7.4%, 95% CI 6.4–8.5%).
  - Reduce specificity from 75.5% to 60.7% difference 14.8%, 95% CI 14.4–15.2%).
  - 62% increase in patients without serious injuries transported to trauma centers.

Figures 1-4:
Adjusted probability of serious injury by initial out-of-hospital physiology among injured older adults transported by EMS (n = 44,890)







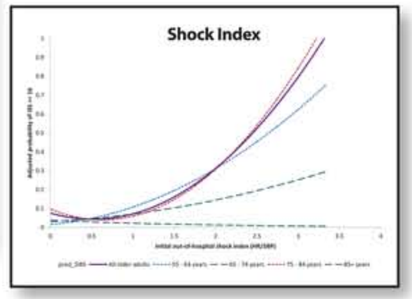
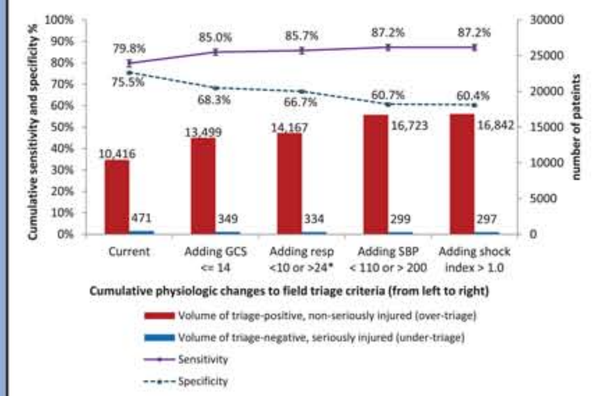


Figure 5: Elder Physiology



Conclusion

Existing out-of-hospital physiologic triage criteria could be revised to better identify seriously injured older adults at the expense of over-triage to major trauma centers.

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