Silver Trauma: Not just old adults

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@BraithwaiteMD

Disclosure

- Contract educator for Teleflex / Arrow

Objectives

- List two limitations of the NEXUS cervical spine injury criteria in the geriatric population
- List three differences in presentation and prevalence of cervical spine injury in the geriatric population
- Describe the potential utility of the shock index and Glasgow coma scale in geriatric patients
- Explain a geriatric-specific EMS neurologic assessment scale optimized to detect traumatic brain injury

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Definition: What is “geriatric”?

- CDC Field Triage Criteria 2011
  - older adults risk for injury/death increases after age 55 years
  - SBP <110 might represent shock after age 65 years
  - low impact mechanisms (e.g., ground-level falls) might result in severe injury

https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6101a1.htm

What are best practices for Geriatric Trauma?

National Model EMS Clinical Guidelines

September 2017 | VERSION 2.0

Are geriatric-specific patient care guidelines needed?

Absolutely

Not really

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Model Guidelines: Head & Spinal Trauma

2. Certain populations with musculoskeletal instability may be predisposed to cervical spine injury. However, evidence does not support or refute that these patients should be treated differently than those who do not have these conditions. These patients should be treated according to the Spinal Care guideline like other patients without these conditions
3. Age alone should not be a factor in decision-making for prehospital spine care, yet the patient's ability to reliably be assessed at the extremes of age should be considered. Communication barriers with infants/toddlers or elderly patients with dementia may prevent the provider from accurately assessing the patient
7. Patients with severe kyphosis or ankylosing spondylitis may not tolerate a cervical collar. These patients should be immobilized in a position of comfort using towel rolls or sand bags

3. **Geriatric Consideration:** Elderly patients with ankylosing spondylitis or severe kyphosis should be padded and immobilized in a position of comfort and may not tolerate a cervical collar

Important issues

- Elderly “hide things”
  - Mental status, cognitive capacity
  - Vital signs
  - Physical disabilities

Post-trauma complications

- Pneumonia (31% vs 17% in young)
  - Mortality 22% vs 10%
- Each additional rib fx adds
  - 1.16 OR pneumonia
  - 1.19 OR death

Falls

- Loss of independence, SNF need
- Highest injury-related deaths
- Most are ground-level falls
- Multifactorial: Fall syndrome

Fall syndrome

- Multifactorial health condition occurring when accumulated effect of degeneration in multiple systems causes and complicates injury and produces health challenges. There are a constellation of causes.

Frailty definition

- Frailty is defined as a state of heightened vulnerability to functional dependence or death in response to a stressor.
- Frail people who suffer injury or illness necessitating ED attendance have less reserve and so are less likely to recover to their premorbid level, or survive, than the non-frail.

Original Investigation | SURGICAL CARE OF THE AGING POPULATION

Superiority of Frailty Over Age in Predicting Outcomes Among Geriatric Trauma Patients
A Prospective Analysis

Bellal Joseph, MD; Viraj Pandit, MD; Bardiya Zangbar, MD; Narong Kulvatunyou, MD; Ammar Hashmi, MD; Donald J. Green, MD; Terence O'Keeffe, MB, ChB; Andrew Tang, MD; Gary Vercruysse, MD; Mindy J. Fain, MD; Randall S. Friese, MD; Peter Rhee, MD

Fall History

S = Symptoms
P = Previous
L = Location
A = Activity
T = Time of day

Medication risks

- Orthostasis
  - Diuretic
  - Laxative
- Antidepressants, antipsychotics, sedatives, benzodiazepines, opioids
- Antihypertensive
- Anticoagulant
- Ask about any recent medication change

Do you have geriatric-specific medication dosing in your protocols?

Yes

No

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Geriatric-specific dosing

	Pediatric (Broselow colors)									Adult		Geriatric
	5 kg	7 kg	9 kg	10 kg	12 kg	15 kg	20 kg	30 kg	40 kg	50-74 kg	≥75 kg	Any weight
Methylprednisolone	10 mg	14 mg	18 mg	20 mg	24 mg	30 mg	40 mg	62.5 mg	80 mg	125 mg	125 mg	125 mg
Midazolam IM				1 mg	1.2 mg	1.5 mg	2 mg	3 mg	4 mg	5 mg	10 mg	5 mg
Midazolam IN	1 mg	1.5 mg	2 mg	2 mg	2.5 mg	3 mg	4 mg	6 mg	8 mg	10 mg	20 mg	10 mg
Morphine IV / IM	0.5 mg	0.7 mg	1 mg	1 mg	1.25 mg	1.5 mg	2 mg	3 mg	4 mg	4 mg	6 mg	2 mg
Naloxone IV / IM / IN	0.5 mg	0.7 mg	1 mg	1 mg	1.2 mg	1.5 mg	2 mg	2 mg	2 mg	2 mg	2 mg	2 mg

Decisions

- Trauma center or not?
  - Does Level I or II change outcomes?
  - Not being far away may be better
- Negative effects of hospitalization
- Change in trauma center activation criteria?
  - ACS Optimal Resources Guide
    - Will include geritrauma chapter and include new guidance

Geriatric-Specific Triage Criteria Are More Sensitive Than Standard Adult Criteria in Identifying Need for Trauma Center Care in Injured Older Adults

Brian Ichwan, BS; Subrahmanyam Darbha, MS; Manish N. Shah, MD, MPH; Laura Thompson, MD, MPH; David C. Evans, MD; Creagh T. Boulger, MD; Jeffrey M. Caterino, MD, MPH*

List three differences in presentation and prevalence of cervical spine injury in the geriatric population

- Describe the epidemiology of cervical spine fractures in the geriatric vs. adult population
- State whether physical exam is reliable in the assessment for potential cervical spine injury in geriatric patients
- Describe the role of NEXUS in geriatric patients

Table 1. Differences between Ohio's 2009 geriatric trauma triage criteria and adult trauma triage criteria for EMS providers.[23]

Geriatric Triage Criteria (Age ≥70 Years)*	Corresponding Adult Triage Criteria
Physiologic	
Systolic blood pressure less than 100 mm Hg, or absent radial pulse with carotid pulse present	Systolic blood pressure less than 90 mm Hg, or absent radial pulse with carotid pulse present
GCS score ≤14 in trauma patient with a known or suspected traumatic brain injury	GCS score ≤13
Anatomic	
Fracture of 1 proximal long bone sustained from motor vehicle crash	Fractures of 2 or more proximal long bones
Injury sustained in 2 or more body regions	No corresponding adult criteria
Cause of injury	
Pedestrian struck by motor vehicle	No corresponding adult criteria
Fall from any height, including standing falls, with evidence of a traumatic brain injury*	No corresponding adult criteria

*Traumatic brain injury is defined as decrease in level of consciousness from baseline, unequal pupils, blurred vision, severe or persistent headache, nausea or vomiting, or change in neurologic status.[23]

Evaluation of Cervical Spine Fracture in the Elderly: Can We Trust Our Physical Examination?

TERRAL GOODE, M.D., ANDREW YOUNG, M.D., SEAN P. WILSON, M.D., JUDITH KATZEN, R.N., LUKE G. WOLFE, M.S., THERESE M. DUANE, M.D.

From Virginia Commonwealth University, Richmond, Virginia

List two limitations of the NEXUS cervical spine injury criteria in the geriatric population

- Utility in significant blunt trauma
- Utility in low risk trauma

NEXUS Criteria

NEXUS Criteria for C-Spine Imaging ☆

Clears patients from cervical spine fracture clinically, without imaging.

When to Use | Pearls/Pitfalls | Why Use

Focal neurologic deficit present	**No 0**	Yes +1
Midline spinal tenderness present	**No 0**	Yes +1
Altered level of consciousness present	**No 0**	Yes +1
Intoxication present	**No 0**	Yes +1
Distracting injury present	**No 0**	Yes +1

If none of the above criteria are present, the C-Spine can be cleared clinically by these criteria.

Imaging is not required.

The NEXUS criteria are insufficient to exclude cervical spine fractures in older blunt trauma patients

Gabriel Paykin[a,b,c], Gerard O'Reilly[a,b,c], Helen M. Ackland[a,b,d], Biswadev Mitra[a,b,c,*]

[a] Department of Epidemiology & Preventive Medicine, Monash University, Melbourne, Australia
[b] National Trauma Research Institute, The Alfred Hospital, Melbourne, Australia
[c] Emergency & Trauma Centre, The Alfred Hospital, Melbourne, Australia
[d] Intensive Care Department, The Alfred Hospital, Melbourne, Australia

Prospective Validation of Modified NEXUS Cervical Spine Injury Criteria in Low-risk Elderly Fall Patients

John Tran, MD*
Donald Jeanmonod, MD*
Darin Agresti, DO*
Khalief Hamden, MD†
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*St. Luke's University Hospital, Department of Emergency Medicine, Bethlehem, Pennsylvania
†Carilion Clinic, Roanoke, Virginia

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Model Guidelines

- Spinal Trauma

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- Head Trauma

3. **Geriatric Consideration:** Elderly patients with ankylosing spondylitis or severe kyphosis should be padded and immobilized in a position of comfort and may not tolerate a cervical collar

Describe the potential utility of the shock index and Glasgow coma scale in geriatric patients

- Review the derivation of the shock index and list its significance for predicting mortality
- List 2 reasons why GCS is unreliable for predicting severe head injury in geriatric trauma

Shock index predicts mortality in geriatric trauma patients: An analysis of the National Trauma Data Bank

Viraj Pandit, MD, Peter Rhee, MD, Ammar Hashmi, MD, Narong Kulvatunyou, MD, Andrew Tang, MD, Mazhar Khalil, MD, Terence O'Keeffe, MbChB, Donald Green, MD, Randall S. Friese, MD, *and* Bellal Joseph, MD

Shock Index = HR / SBP

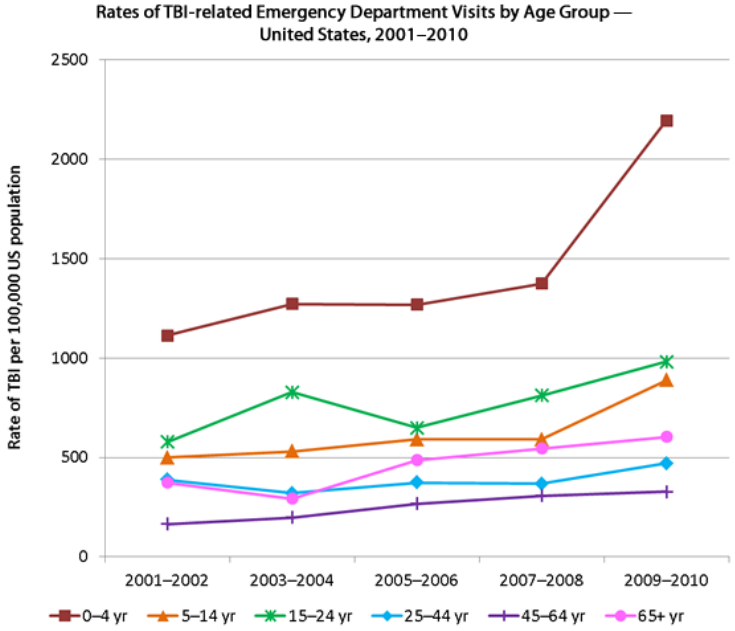
- Normal: 0.5-0.7
- Hemodynamically unstable: > 1
- SI > = 1 should go to trauma center
- Utility of shock index
  - Predicts need for blood transfusion
  - Predicts inhospital mortality
  - Risk stratification

Why doesn’t GCS work in the geriatric patient?

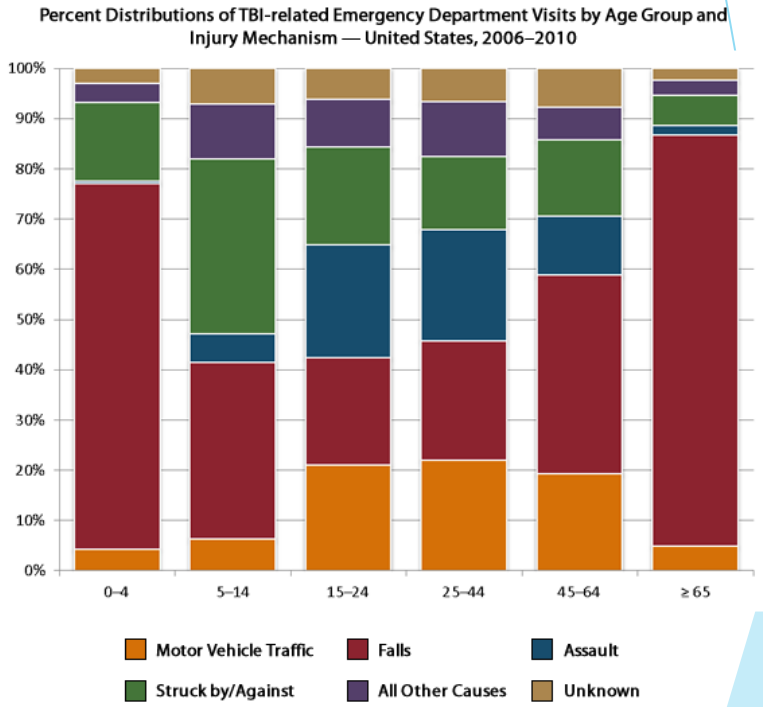
Explain a geriatric-specific EMS neurologic assessment scale optimized to detect traumatic brain injury

- Describe deficiencies in existing scales when applied to geriatric patients
- Describe the abbreviated EMS neuro tool for geriatric TBI

TBI epidemiology

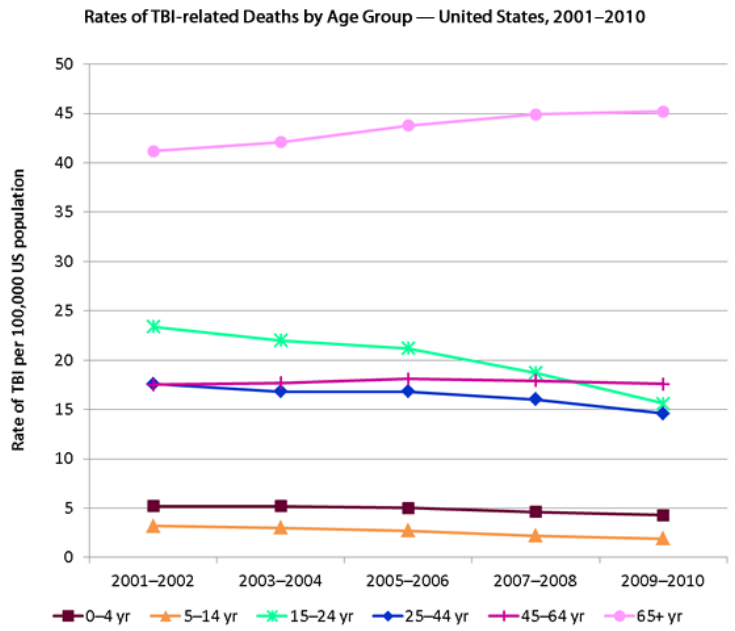


https://www.cdc.gov/traumaticbraininjury/data/rates_ed_byage.html

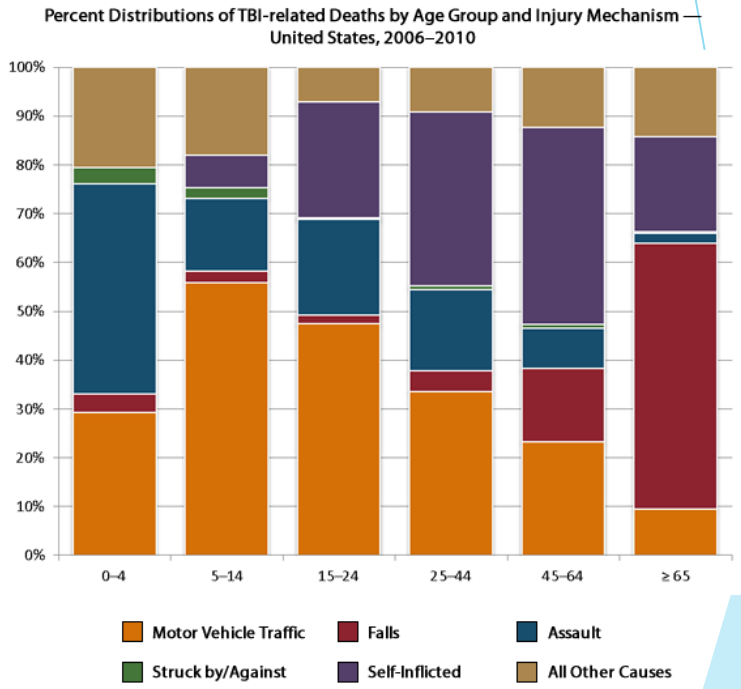


https://www.cdc.gov/traumaticbraininjury/data/dist_ed.html

TBI epidemiology



https://www.cdc.gov/traumaticbraininjury/data/rates_deaths_by age.html



https://www.cdc.gov/traumaticbraininjury/data/dist_death.html

...the following is the most useful criterion to ... ...ssing an elderly brain injured patient's need ... transported to a trauma center?

Pupils

Withdrawal from pain

Ability to follow commands

GCS

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EMS Neuro assessment in injury

- Which scale is best?
- “Trauma” vs. “Injury”

ch neuro assessment tool do you use in traur

S

SMS

AVPU

SVS

SMS

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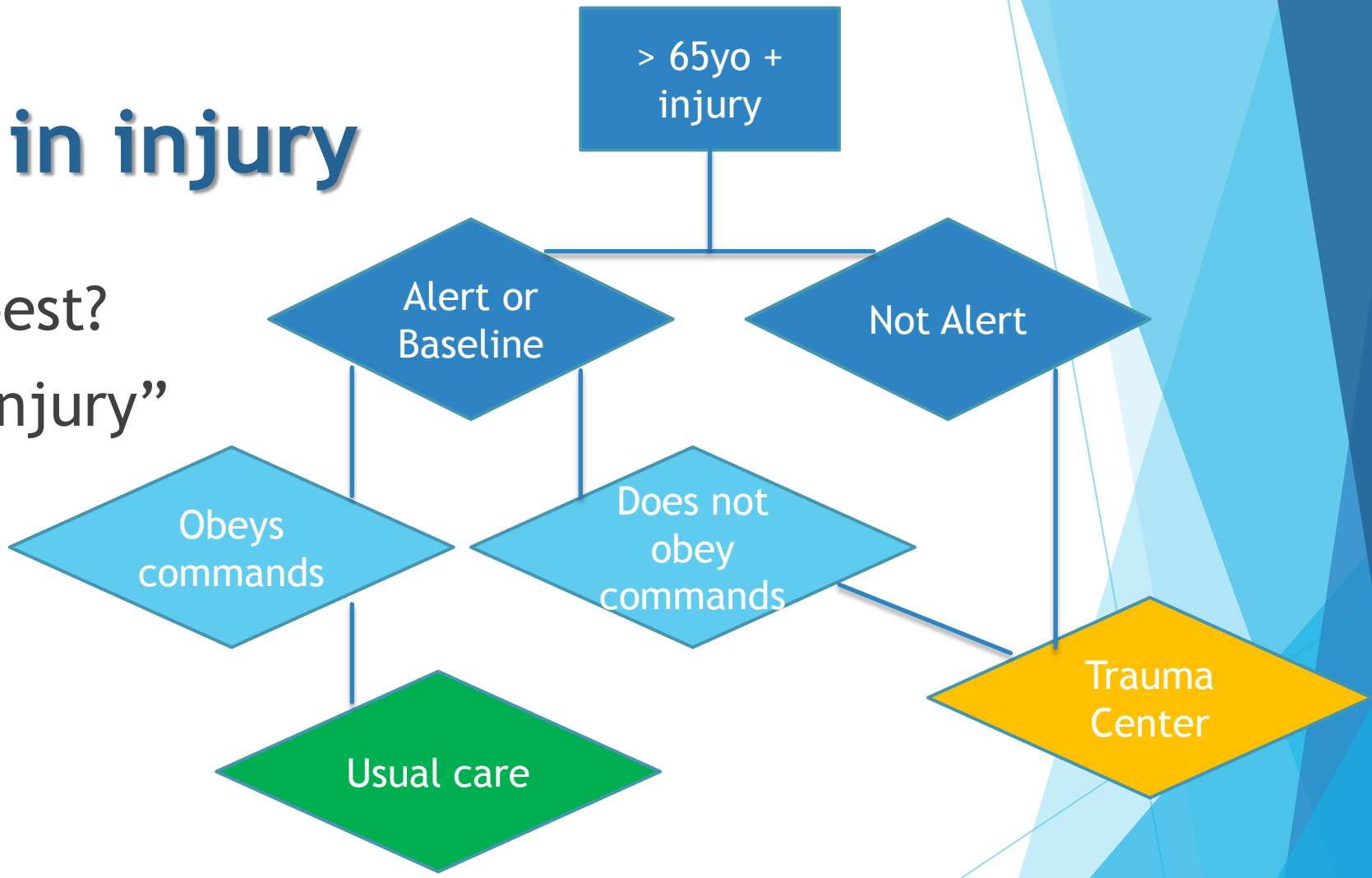

Wasserman, E. B., Shah, M. N., Jones, C. M., Cushman, J. T., Caterino, J. M., Bazarian, J. J., . . . Dozier, A. (2015). Identification of a neurologic scale that optimizes EMS detection of older adult traumatic brain injury patients who require transport to a trauma center. *Prehosp Emerg Care, 19*(2), 202-212. doi:10.3109/10903127.2014.959225

Which of the following is the most useful criterion to use when assessing an elderly brain injured patient's need to be transported to a trauma center?

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Pupils	**A**
Withdrawal from pain	**B**
Ability to follow commands	**C**
GCS	**D**

Anticoagulants in Head Injury

redicted intracranial hemorrhage with minor head trauma Brewer study?

Injury above the clavicles

History of LOC

MVC instead of fall as MOI

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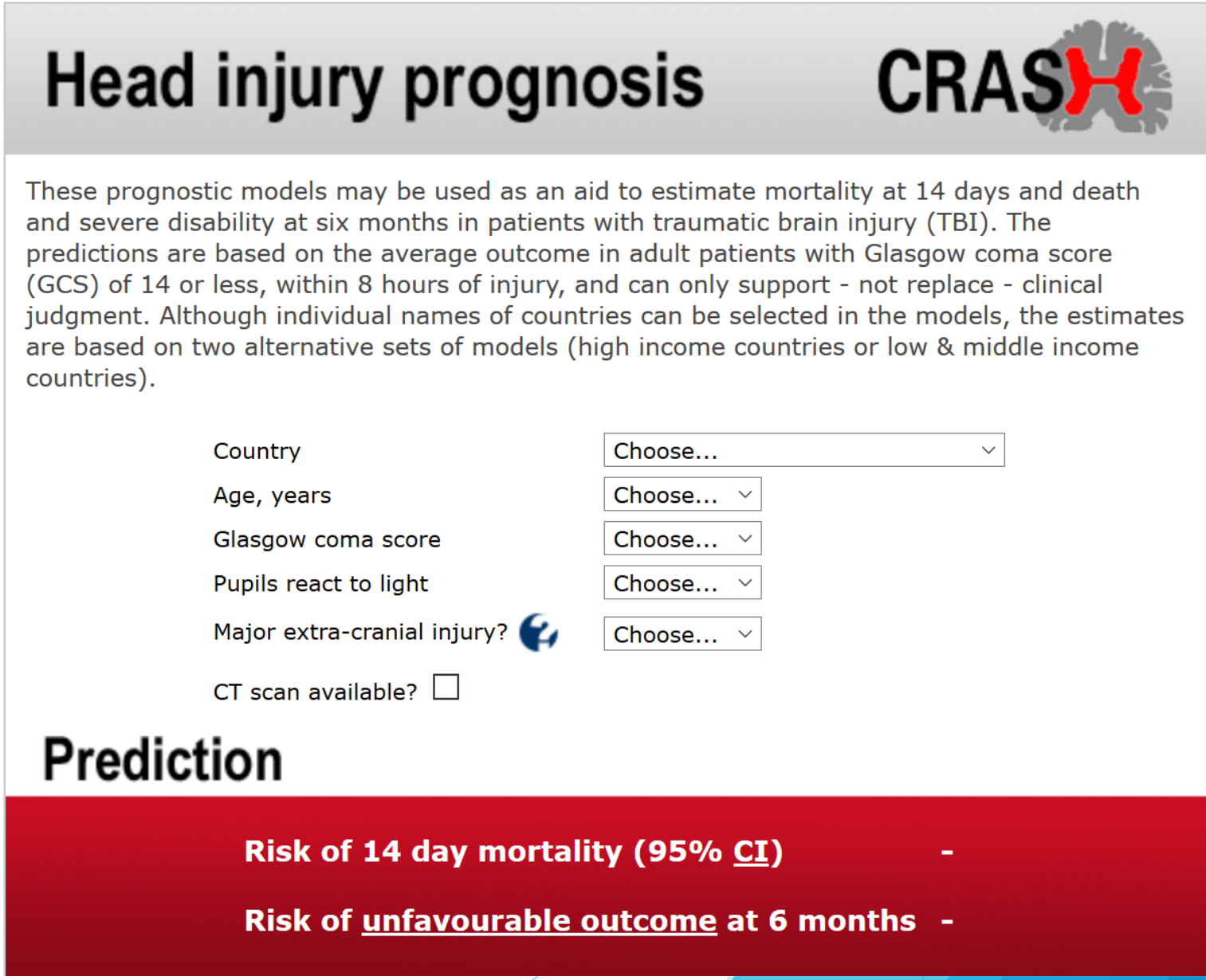
Anticoagulant use

- Risk of head injury
  - LOC
  - GCS
  - Modified trauma triage criteria

Out-of-Hospital Triage of Older Adults With Head Injury: A Retrospective Study of the Effect of Adding "Anticoagulation or Antiplatelet Medication Use" as a Criterion

Daniel K. Nishijima, MD, MAS*; Samuel D. Gaona, BS; Trent Waechter, RN; Ric Maloney, RN; Troy Bair, EMT-P, BA; Adam Blitz, EMT-P, BA; Andrew R. Elms, MD; Roel D. Farrales, MD; Calvin Howard, MBE; James Montoya, MD; Jeneita M. Bell, MD; Mark Faul, PhD, MA; David R. Vinson, MD; Hernando Garzon, MD; James F. Holmes, MD, MPH; Dustin W. Ballard, MD; for the Sacramento County Prehospital Research Consortium

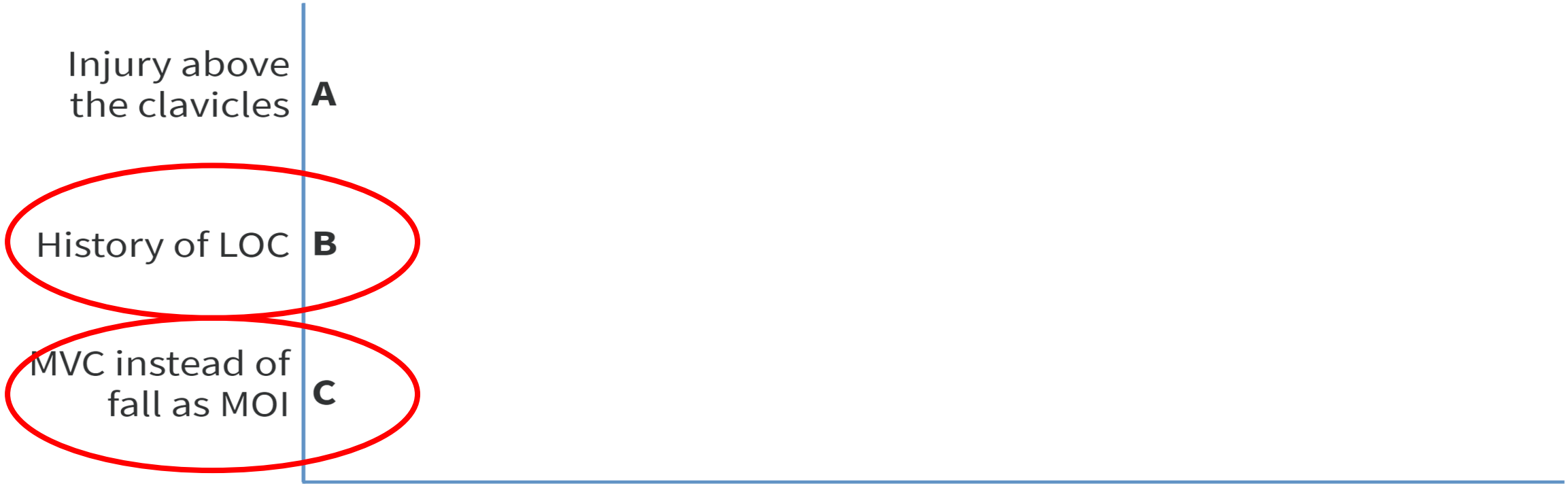
Risk Assessment



http://www.crash.lshtm.ac.uk/Risk%20calculator/index.html

What predicted intracranial hemorrhage with minor head trauma Brewer's 2011 study?

Respond at **PollEv.com/sabinabraith973** Text **SABINABRAITH973** to **37607** once to join, then **A, B, or C**



Fall prevention

GERIATRICS/ORIGINAL RESEARCH

Paramedic Assessment of Older Adults After Falls, Including Community Care Referral Pathway: Cluster Randomized Trial

Helen A. Snooks, PhD*; Rebecca Anthony; Robin Chatters; Jeremy Dale, PhD; Rachael T. Fothergill, Dr (Clinical); Sarah Gaze; Mary Halter, PhD; Ioan Humphreys; Marina Koniotou; Phillipa Logan, PhD; Ronan A. Lyons, PhD; Suzanne Mason, PhD; Jon Nicholl, PhD; Julie Peconi, PhD; Ceri Phillips, PhD; Alison Porter, PhD; Aloysius Niroshan Siriwardena, PhD; Mushtaq Wani; Alan Watkins, PhD; Lynsey Wilson; Ian T. Russell, PhD

Take-Homes:

- Old people break very easily, and they are “sneaky” so exam and GCS are not reliable.
- Broken old people die more often
- Badness:
  - LOC in anticoagulated patient
  - Decreased LOC, inability to follow commands
  - Shock index > 1
- NEXUS criteria less useful and reliable, threshold for imaging is lower
- Trauma center destination criteria should differ

Thank You

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