

Trauma Summit: Field Triage and Re-triage – Obstacles and Solutions

James W Davis MD, FACS
Clinical Professor of Surgery, UCSF
Steven N Parks Endowed Chair-Surgery
UCSF/Fresno

Objectives:

■ Field Triage

- Criteria (as is)
- Evidence (problems?)

■ 'Re-Triage'

- Define
- Delineate

Field Triage: CDC 2012

■ Physiologic Criteria (Step 1)

– ‘Highest level of care’

- $GCS \leq 13$ or
- Systolic BP < 90 or
- Respiratory rate < 10 or > 29 (< 20 in infant) or need for ventilatory support

■ Did not change to include

- GCS motor score
- Systolic BP < 110 in patients > 65 years
- shock index

Field Triage: CDC 2012

■ Anatomic Criteria (step 2)

- All penetrating injuries head, neck, torso, extremities proximal to elbow or knee
- Chest wall instability or deformity (e.g. flail chest)
- 2 or more proximal long bone fractures
- Crushed, degloved, mangled or pulseless extremity
- Amputations proximal to wrist or ankle
- Pelvic fractures
- Open or depressed skull fractures
- Paralysis

Field Triage: CDC 2012

■ Mechanism of Injury (Step 3)

– Falls

- Adults: > 20 feet (one story = 10 feet)

- Children: > 10 feet or 2-3 times child's height

– High risk auto crash

- Intrusion: > 12 inches occupant, > 18 inches any site

- Ejection (partial or complete)

- Death in the same passenger compartment

- Vehicle telemetry

– Auto- pedestrian

– Motorcycle crash > 20 mph

Field Triage: CDC 2012

■ Special Considerations (Step 4)

– Older Adults

- Risk for injury/death increases with age > 55
- SBP < 110 might represent shock after age 65
- Low impact mechanisms (GLF) might result in severe injury

– Children

- Should be triaged preferentially to pediatric capable trauma centers

Field Triage: CDC 2012

- Special Considerations (Step 4)
 - Anticoagulants and bleeding disorders
 - Patients with CHI at risk for rapid deterioration
 - Burns
 - Without trauma: burn center
 - With trauma: triage to trauma center
 - Pregnancy > 20 weeks
 - EMS provider judgment

Field Triage: Obstacles

- Evidence Basis for Mechanism of Injury guidelines is flawed
 - Retrospective
 - Do NOT control for whether the patients met physiologic or anatomic criteria
 - Vehicle space intrusion; with new vehicles, ‘crumple zones’, etc, perhaps the focus should be the patient, not the body shop

Mechanism of Injury?

- Trauma Team Activation Criteria
- Retrospective review of 809 patients, 185 with ISS,
 - Overall sensitivity of 87%, PPV 22% and overtriage of 78%
 - Mechanism had sensitivity of 14%, PPV of 7% and overtriage of 93%
 - Acta Anaesthesiol Scand 2007; 51: 1178-83

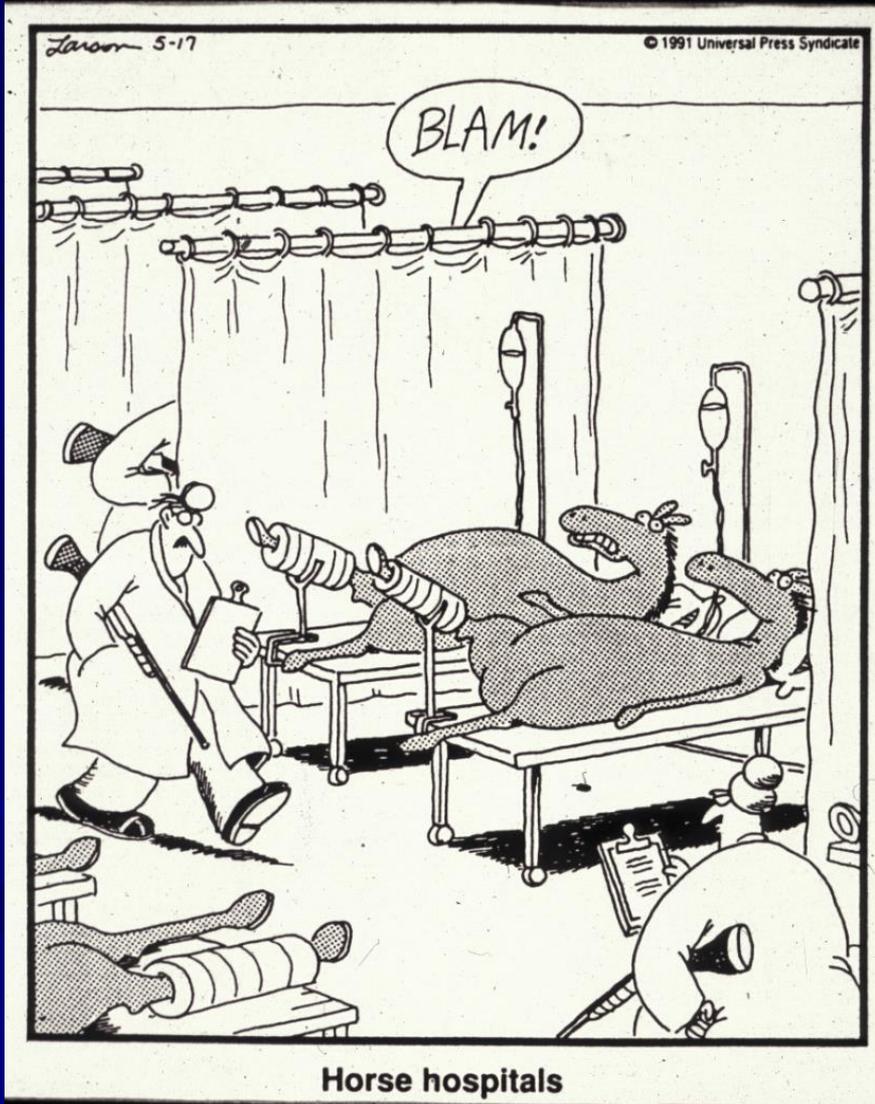
Field Triage: Obstacles

■ Inexact science

- ISS > 15 as threshold for severe injury
- ISS is derived retrospectively after all injuries identified (usually after discharge)
- NOT available to pre-hospital or even ED personnel
- Other factors (need for ICU, immediate surgery) also used

■ Not everyone arrives via EMS

Re-Triage



- What to do with the patient that doesn't belong where he is.....
 - Nothing, just get him outta here...
 - Stabilize and Transfer....
 - The best that you can....
 - Depends
 - Urban trauma system
 - Rural hospital

Direct Transport vs. Transfer

- Retrospective study, comparing direct transport (2765) versus transferred (1608) trauma patients
 - Similar for age, gender, mechanism of injury
 - Mean ISS 14
 - Transferred patients with
 - Higher overall mortality (8.9% vs 4.8%, $p < 0.003$)
 - Longer LOS (16 vs. 13 days, $p = 0.02$)
 - J Trauma 1997; 43: 288-295

Inter-Facility Transfer

- J Trauma 2011; 71; 1885-1900
 - No difference in mortality between transfer and direct admissions
 - Excluded patients dying at outlying facilities
- J Trauma 2003; 55: 444-449
 - Interfacility transfers in mature urban system do not appear to impact outcome
 - Lower mortality
 - Greater resource use

Secondary Overtriage

- Secondary overtriage defined as patients transferred with ISS < 10, no surgery required and discharged < 48 hrs
 - 64 of transfer patients with minor injury
 - 39% met overtriage criteria
 - Excessive overtriage calls for development of *regional inclusive system* with established primary and secondary (re-triage) guidelines to improve access and system efficiency
 - J Am Coll Surg 2008; 206: 131-137.

Trauma Transfer Poster

Re-TRIAGE

- Developed based upon recommendations from the American College of Surgeons
- Reflective of current practices
- Developed by all trauma centers and two local EMS Agency representatives within the Central RTCC
- GOAL:
 - To improve uniformity of transfers
 - Decrease variability & therefore decrease error

EMERGENCY TRANSFER: Call Trauma Center immediately for immediate acceptance. Avoid unnecessary studies that would delay the transfer. The goal is to transfer the patient within 1 hour of arrival.

- **Blood Pressure**

- Blood Pressure less than 90

- Labile BP despite 2L of crystalloids

- Patient requires blood products to maintain their blood pressure

- **GCS**

- Less than or equal to 8 or lateralizing signs (intubate)

- **Penetrating injuries to the head, neck, torso**

- **Fracture/dislocation with loss of distal pulses and/or ischemia**

- **Pelvic ring disruption or unstable pelvic fracture**

- **Vascular Injuries with active arterial bleeding**

URGENT TRANSFER: Call Trauma Center and initiate transfer as soon as any of the following are identified. Avoid unnecessary studies that would delay the transfer. The goal is to transfer the patient less than 4 hours of arrival

■ **Central Nervous System**

- GCS deteriorating by 2 during observation
- Open or depressed skull fracture
- GCS less than 14 with abnormal CT scan (not meeting criteria above)
- Spinal cord injury

■ **Chest**

- Major chest wall injury with more than 2 unilateral rib fractures
- Bilateral rib fractures with pulmonary contusion
- Bilateral pulmonary contusions
- Wide mediastinum or other signs suggesting great vessel injury
- Cardiac injury

■ **Pelvis/Abdomen**

- Intra-abdominal injury confirmed by CT scan or ultrasound demonstrating abdominal fluid

■ **Major Extremity Injuries**

- Open long-bone fractures
- Two or more long bone fractures
- Crush injury/mangled extremity

■ **Multi-System Trauma**

- Burns with associated injuries (Transfer to a combined Trauma/Burn Center)
- Major injury to more than two body regions
- Signs of hypo-perfusion with a base deficit worse than -6

■ **Other**

- Co-Morbid Factors (consider these special circumstances when deciding whether to transfer)
 - Adults greater than 55 years of age with significant trauma
 - Children less than 6 years of age with significant trauma
 - Significant torso injury with advanced co-morbid disease (cardiac or respiratory disease, insulin-dependent diabetes, morbid obesity, or immunosuppression)
 - Pregnancy greater than 20 weeks gestation
 - End Stage Renal Disease requiring dialysis

CRTCC System Guidelines for Arranging for a Trauma Transfer

- Developed to expedite the transfer and ultimate care of the critically injured trauma patient
- Use conjunction with the “CRTCC Suggested Criteria for Consideration of Transfer to a Trauma Center”.
- Contact the appropriate trauma center for transfer. Using the **MIVT** acronym, the follow information should be provided in a concise manner:
 - Age of patient
 - Mechanism of injury
 - Identified injuries
 - Vital sign and pertinent symptoms
 - Treatment initiated
- Contact EMS dispatch and request an ambulance or helicopter “stat”
- Send copies of all pertinent paperwork and a CD containing any radiological studies already done

Summary

- CDC/ACS Triage criteria are the current 'standard'
 - Better research NEEDED
- Goal is to facilitate the right patient to the right place at the right time
- Goal of re-triage is to transfer as soon as possible to the right place
 - Avoid any unnecessary tests/studies that would delay the transfer
 - Use of a tool might facilitate the process



UCSF

**UCSF/Fresno
Department of Surgery**