Field Trauma Triage & Air Ambulance Utilization

SWORBHP Answers

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Introduction/History

What’s this all about?

• Revisions made – 2014
• FTT and AAUS are now separate
• Incorporated into the next BLS
Introduction/History

Why, what’s the purpose?

- Avoid under triage
- Prevent over triage
- Decrease mortality
- Trauma teams improve efficiency of care
Field Trauma Triage (FTT)

Step 1: Physiological

Step 2: Anatomical

Step 3: Mechanism of Injury

Step 4: Special Considerations
• **GCS <13:**
  • ISS >15 OR 33.1

• **SBP < 90**
  • major surgery or death
    multivariate analysis (OR: 14.0; CI = 2.3–84.0)
  • OR for ISS > 15 = 46

• **Step 2:**
  • Generally identify 20–30% with major trauma
  • 86% admission
Air Ambulance Utilization Standards

What is the purpose of the AAUS?

• Providing prompt transport to the most appropriate facility
Association Between Helicopter vs Ground Emergency Medical Services and Survival for Adults With Major Trauma

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Context Helicopter emergency medical services and their possible effect on outcomes for traumatically injured patients remain a subject of debate. Because helicopter services are a limited and expensive resource, a methodologically rigorous investigation of its effectiveness compared with ground emergency medical services is warranted.

Objective To assess the association between the use of helicopter vs ground services and survival among adults with serious traumatic injuries.

Design, Setting, and Participants Retrospective cohort study involving 223,475 patients older than 15 years, having an injury severity score higher than 15, and sustaining blunt or penetrating trauma that required transport to US level I or II trauma centers and whose data were recorded in the 2007-2009 versions of the American College of Surgeons National Trauma Data Bank.
• Retrospective cohort study

• 223,475 patients >15yo

• ISS>15 transported to US Level I or II LTH

• Outcome measures:
  ▪ Survival to discharge
  ▪ Discharge disposition

• Propensity score matched multivariate regression model used to compare groups
• Results for level I LTH Transport

• Helicopter transport was associated with an improved odds of survival compared to ground transport

• Odds ratio 1.16; 95% CI, 1.14–1.17; P<0.001

• ARR 1.5%

• NNT 65
• 18.2% transported by helicopter to level I LTH were discharged to rehabilitation compared to 12.7% transported by ground services (P<0.001)

• 9.3% transported by helicopter were discharged to intermediate facilities compared to 6.5% by ground services (P<0.001)
APPROPRIATE AND SAFE UTILIZATION OF HELICOPTER EMERGENCY MEDICAL SERVICES: A JOINT POSITION STATEMENT WITH RESOURCE DOCUMENT

Douglas J. Floccare, MD, MPH, David F. E. Stuhlmiiller, MD, Sabina A. Braithwaite, MD, MPH, Stephen H. Thomas, MD, MPH, John F. Madden, MD, Daniel G. Hankins, MD, Harinder Dhindsa, MD, Michael G. Millin, MD, MPH
• HEMS manipulates time

• Time to reach definitive care

• Time to receive critical interventions

• Time to match a complex patient being moved to a higher level of care with a transport crew that is skilled in maintaining advanced care and anticipating complications

• **Medical helicopters do not constitute an actual treatment**
A Systematic Review and Meta-Analysis Comparing Outcome of Severely Injured Patients Treated in Trauma Centers Following the Establishment of Trauma Systems

Brian Celso, PhD, Joseph Tepas, MD, Barbara Langland-Orban, PhD, Etienne Pracht, PhD, Linda Papa, MD, Lawrence Lottenberg, MD, and Lewis Flint, MD
J Trauma. 2006;60:371–378

- Systematic literature review of all population based studies that evaluated trauma system performance

- Overall quality weighted odds ratio was 0.85 lower mortality following trauma system implementation

- 15% reduction in mortality
AN EVIDENCE-BASED GUIDELINE FOR THE AIR MEDICAL TRANSPORTATION OF PREHOSPITAL TRAUMA PATIENTS

• Recommend that field triage criteria for all trauma patients should be used to guide destinations

• Recommend that HEMS be used to transport patients meeting appropriate physiologic and anatomic criteria for serious injury to an appropriate trauma centre if there will be a significant time savings
AAUS – Criteria

Operational Guidelines
- >30min response time
- >30min transport to the appropriate ED (and air is faster)
- >30min transport by land or air, but advanced care is required
- MCI and local land resources are being fully utilized

Clinical Guidelines
- Shock
- Acute Stroke
- GCS < 10
- Acute respiratory failure/distress
- Suspected AMI or lethal dysrhythmia
- Resuscitation post cardiac/respiratory arrest
- Status epilepticus
- Unstable airway or partial airway obstruction
- Active labour with abnormal presentation or multiple gestation
- Umbilical cord prolapse
- Pregnancy with significant vaginal bleeding

Other
- Perceived severity of reported injuries without confirmation of clinical guidelines
- Patient cannot be reached by land
FTT Questions

What is the definition of a LTH and can you provide a list of them within the province?
My service is not close to a LTH, does this still apply to me?
My service is not anywhere near a LTH. What options do I have to ensure that the patient gets to the appropriate facility in a timely manner?
FTT Questions

What is different between the last edition of the FTTG and the new ones in terms of transport time and extrication time?
If I have a patient who meets step 1 or step 2 but I suspect that they are unlikely to survive transport to the LTH, what should I do?
Why does Step 2 state that penetrating trauma should be brought to the LTH according to the 30min transport time independent of vital signs? Is this not contrary to the “closest ED rule” in Step 1?
For a patient who meets Step 1/2 of the FTTS, where LTH is > 30min drive away and is also not the closest hospital from my location. Should I request the Air Ambulance?
FTT Questions

Do I still follow my Trauma Cardiac Arrest Medical Directive and when indicated patch for Termination of Resuscitation (TOR)? Do the FTT Guidelines change my TOR rules?
If a Trauma TOR is not authorized by the BHP, which hospital should I go to: the LTH or the closest ED?
If I am transporting to the LTH, should I patch ahead and tell the ED to activate the Trauma Team?
If a patient meets Step 3 and/or Step 4, should I transport to the LTH?
**STEP THREE**

**Mechanism**

1. Falls
   a. Adults ≥6 metres (one story is equal to 3 metres)
   b. Children (age<15) ≥3 metres or two or three times the height of the child
2. High Risk Auto Crash
   a. Intrusion ≥0.3 metres occupant site; ≥0.5 metres any site, including the roof
   b. Ejection (partial or complete) from automobile
   c. Death in same passenger compartment
   d. Vehicle telemetry data consistent with high risk injury (if available)
3. Auto vs. pedestrian/bicyclist data consistent with high risk injury (if available) Impact
4. Motorcycle crash ≥30 km/h

**YES**

Transport to a LTH. Patching with the base hospital physician is an option.

**NO**

Assess special patient or system considerations.

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**STEP FOUR**

**Special Consideration**

1. Age
   a. Older Adults
      Risk of Injury/death increases after age 55
      SBP < 110 may represent shock after age 65
   b. Children
      Should be triaged preferentially to pediatric-capable trauma centre
2. Anticoagulation and bleeding disorders
3. Burns
   a. With trauma mechanism: triage to LTH
4. Pregnancy ≥20 weeks

**YES**

Transport to a LTH. Paramedic judgement and local Patient Priority Systems Bypass agreements can be used to help determine transport destination. Patching with the base hospital physician is an option.

**NO**

Transport to the closest most appropriate ED.

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5. The criteria used for bypass to a LTH in Steps 3 and 4 are not absolute; rather are indicators of the potential for significant injury or indicate the patient may require other support services at the LTH. Not all patients in these two categories require transport to a LTH and the paramedic must use their judgement coupled with these criteria to determine the need for transport to a LTH.

6. Local variances in transport time may occur based upon appropriate Patient Priority Bypass Agreements.
### TABLE 5. Appropriate triage* and overtriage† rates of mechanism-of-injury criteria

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Appropriate triage (%)</th>
<th>Overtriage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrusion</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>Extrication &gt;20 min</td>
<td>73</td>
<td>27</td>
</tr>
<tr>
<td>Ejected from vehicle</td>
<td>65</td>
<td>35</td>
</tr>
<tr>
<td>Fall &gt;15 ft</td>
<td>59</td>
<td>41</td>
</tr>
<tr>
<td>Death of occupant</td>
<td>84</td>
<td>16</td>
</tr>
<tr>
<td>Child (age &lt;12 yrs) struck by car</td>
<td>39</td>
<td>61</td>
</tr>
<tr>
<td>Pedestrian struck by car</td>
<td>64</td>
<td>36</td>
</tr>
</tbody>
</table>


### TABLE 7. Age-specific weighted injury mortality rates among persons aged 18–84 years — National Study on the Costs and Outcomes of Trauma, United States, July 2001–November 2002

<table>
<thead>
<tr>
<th>Age group (yrs)</th>
<th>Patients (No.)</th>
<th>Weighted 1-yr mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18–54</td>
<td>336</td>
<td>6.9</td>
</tr>
<tr>
<td>55–64</td>
<td>559</td>
<td>10.8</td>
</tr>
<tr>
<td>65–74</td>
<td>607</td>
<td>17.3</td>
</tr>
<tr>
<td>75–84</td>
<td>781</td>
<td>32.2</td>
</tr>
</tbody>
</table>

I recently transported a trauma patient who did not meet the current FTTG from the scene to the closest ED. An hour later I transferred the patient to the LTH. When does an ED decide to transfer a patient to a LTH and why is this different than my own FTTG?
# Trauma Interfacility Transfer Criteria

## ALL TRAUMA PATIENTS

For ALL paediatric and adult injuries, contact CritiCall for the appropriate Trauma Centre.

### Systems Criteria

Any patient (with a major traumatic injury (severe multisystem; life-or-limb threatening single system)) requiring trauma consultation or who requires more care than can be provided at the referring centre based on the assessment of the ED physician. Not all patients with single system injuries will need to be transferred to a Lead Trauma Hospital and may be able to receive care where local expertise exists.

### Anatomical Criteria (one or more of the following):

- Suspected spinal cord injury with paraplegia or quadriplegia
- Moderate-to-severe head trauma
- Severe (or suspected severe) penetrating injury to the head, neck, torso or groin (stab wound or GSW)
- A requirement for blood products to maintain vital signs
- Amputation above the wrist or ankle
- Pelvic fractures with hemodynamic instability or significant hematoma
- Major crush or vascular injury
- Trauma with burn or inhalation injury

### Physiological Criteria

- GCS <10 due to traumatic injury
- Significant alteration of consciousness due to trauma
- Hypotension (due to trauma) that is unresponsive or only transiently responsive to fluids
- Hypothermia (Body Temp) < 32°C (with traumatic injuries)

## SPECIAL CONSIDERATIONS

High risk considerations which may warrant transfer to Lead Trauma Center at a lower threshold. These considerations include:

- Age > 55;
- Anticoagulation;
- Immunosuppression;
- Pregnancy; or
- Other significant medical problems.

A CT Scan may not always be required for the decision to transfer if it will delay definitive management.

For any considerations, consult with on-call trauma team leader through CritiCall.
FTT Questions

What are the guidelines for cancelling an Air Ambulance request and what information is CACC to provide the Communications Officers at ORNGE?
FTT Questions

Regarding step 4, does it infer that any trauma patient over the age of 55 meets FTTG? If a paramedic uses their judgment and doesn’t transport a 60 year old to a trauma center and it turns out they did have an occult injury. Would the paramedics be held liable because that patient met the guidelines?
FTT Questions

When referring to “paralysis”, does that refer to any extremity, paraplegia, parasthesia or full paralysis?
When assessing the severity of an MVC, must telemetry data come from a computer in the vehicle or can our own judgment be used based on the scene to determine "high risk injury" (i.e. - you’re on the 401 and you know speeds are 100+km/hr., or a T-bone at a one way stop on an 80km/hr. highway)?
FTT states: “Patients with penetrating trauma to the torso or head/neck are to be transported to a LTH for higher level of surgical care, and the 30 minutes transport time rule in this case is independent of lack of vital signs. This means that should this type of patient arrest en route, paramedics should keep going to the LTH.” Should the paramedics continue to pull over to perform their 1 rhythm analysis under the Trauma Cardiac Arrest Medical Directive?
Page 1-6 in the BLS-PCS states that the paramedics should initiate transport prior to measuring vital signs if the patient meets the load and go criteria. This standard contradicts that standard by suggesting measuring vital signs prior to making a transport decision. Which is it?
FTT Questions

Management have expressed concern regarding the new FTT stating that they do not feel comfortable allowing crews to bypass the closest ED or allowing multiple resources to leave the community when an MVC or MCI has occurred. Can the decision of the supervisor override the BLS/FTT guidelines?
FTT Questions

Are the new FTTG mandatory and what are the implications of not following them?
FTT Questions

Do the guidelines change when an on-scene landing occurs at a Provincial Park?

Are there predetermined landing sites or do the pilots determine the landing site?
FTT Questions

If the closest, most appropriate hospital for patient transfer has critical equipment ‘down’ (i.e. CT or surgical floor) can the air ambulance be tiered to bring the patient to another hospital although they don’t meet the trauma triage guidelines?
Can the FTTG be expanded to allow CACC to tier the air ambulance based on their good judgment?
FTT Questions

How are we going to remember all these steps?
FTT Questions

What is the benefit of transporting to a LTH vs. the closest facility?
FTT Questions

Why are we doing this? Usually when there is a change it's because people have died. How many people died?
Trauma Systems—Do they work?

Improved trauma patient outcomes after implementation of a dedicated trauma admitting service

Caesar Ursic a, Kate Curtis a,b,* , Yi Zou a, Deborah Black c

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b Faculty of Nursing and Midwifery, University of Sydney, Australia
c Faculty of Health Sciences, University of Sydney, Australia


• Same hospital: pre/post

• Implemented a trauma service
  ▪ Director
  ▪ TTL who worked with the ED and then admitting and coordinating care
  ▪ In-patient service
  ▪ QA process

• Overall death rate decreased 20.2 to 12.2%
• 18 Level 1 vs 51 hospitals non–trauma center (17 had Trauma Teams)

• In–hospital mortality 7.6 – 9.5

• 1 year mortality 10.4 – 13.8
Emergency Department Length of Stay Is an Independent Predictor of Hospital Mortality in Trauma Activation Patients

Nathan T. Mowery, MD, Stacy D. Dougherty, MD, Amy N. Hildreth, MD, James H. Holmes, IV, MD, Michael C. Chang, MD, R. Shayn Martin, MD, J. Jason Hoth, MD, J. Wayne Meredith, MD, and Preston R. Miller, MD

(J Trauma. 2011;70: 1317–1325)

Figure 2. Mortality as a function of time spent in the ED. p value represents linear association.

Figure 3. Relationship between ED LOS and the number of consultants.
FTT Questions

Any additional questions?
What is meant by a Modified Scene Response?
What is the difference between a “rendezvous” and a “modified” response, and what is the best location for a modified scene in the absence of a helipad/airport?
If I am transporting a patient meeting the FTTS to my closest ED, am I able to rendezvous with the Air Ambulance if I hear they are responding?
My patient meets Step 1/2 of the FTTS and the LTH is > 30min drive time from my location, should I request the Air Ambulance even though I can be at the closest ED faster than the Air Ambulance can get to my location?
AAUS Questions

Are we to use the helicopter for medical calls where we have a significant transport time to the most appropriate hospital?

Example 1: Stroke patient that is over an hour drive to the stroke center by land.

Example 2: Pediatric VSA an hour from the closest pediatric ED, but 35 mins from the closest county ED.

Also: Is the helicopter allowed to meet us enroute to transport these patients to the most appropriate ED?
If an air ambulance on-scene response is cancelled because the patient does not meet guidelines, can the paramedics request continued air response to the hospital due to special circumstances (ex. Rural/remote hospital’s without CT scanners)?
AAUS Questions

What is the process when a land ambulance calls for an air ambulance?
How long does it take an air ambulance to prepare for takeoff and how long does it typically take air to respond?
What if I arrive at my closest ED with a patient who meets the FTTS and I see the Air Ambulance on the helipad. Should I go into the ED with my patient or should I go to the helipad to transfer care to the Air Ambulance paramedic crew?
AAUS Questions

What if I am attending to a trauma patient on scene and the Air Ambulance arrives at the scene but determines that the patient does not meet the FTTS?
Can the Air Ambulance paramedic crew perform a “Modified Scene Response” with any of the Medical or Obstetrical conditions?
I have heard of cases where the receiving air ambulance crew is dual PCP. If the patient requires intubation or chest needle insertion and the crew cannot hand over the patient safely with these pieces of equipment in place, what is the process?
AAUS Questions

If the crew arrives at the ED and the air ambulance has already landed, is this still considered a modified, or does the ED accept care of the patient and it becomes an interfacility transport?
Can a paramedic request Air Ambulance outside of the standard based on judgment? For example, a patient who is having signs and symptoms consistent with a dissecting aortic aneurysm. The crew can get to the closest ED in less than 30 minutes but assume that hospital cannot provide definitive care due to limited resources.
AAUS Questions

Any additional questions?