Regional Network development and Re-triage Workgroup

Co-chairs
John T. Steele, MD, FACS
Jay Goldman, MD, FACEP

California State Trauma Summit, San Francisco, June 7-8, 2016

Palomar Medical Center

Opened August 19, 2012

PALOMAR HEALTH
SPECIALIZING IN YOU

ICEMA CASE

- FD is dispatched to an infant choking.
- VSS HR 79-125, RR 14-52, O2 Sat 91-100% on high flow GCS 6.
- Spinal precautions, IO, Transported to NTC due to airway concerns
- A-OK, B-OK, C-OK, D-GCS 6 with anisocoria
- Transport to Peds TC within 35 min of arrival to first hospital
- NAT, discharged after 20 days to foster care

Pt Scenario

- "Home boy dropoff" to non-trauma center with gsw left lower abdomen
- A-intubated for low GCS
- B-OK after intubation
- C-tachycardic with no appreciable BP
- D-GCS 3
- E-Single gsw left lower abdomen with active arterial hemorrhage

Pt Scenario

- Cardiac arrest
- Emergency release blood, some perfusion
- Immediate transport to LII center 2 miles away
- MTP, OR, Resus thoracotomy, Ex Lap, Control of iliac a, Exploration left groin for common femoral artery and vein injuries, fasciotomies
- Recovered, discharged

Pt Scenario

- MCC at high rate of speed, unresponsive, difficult airway, TC 25 minutes away, NTC 5 min away
- To NTC where pt intubated with advanced techniques
- B-OK following intubation
- C-tachycardic with SBP 110
- D-GCS 3T with unequal pupils
- E-boggy scalp and clinical pelvic fracture
- Continuation of Care to LI TC, did not respond to treatment

Cross Border

- GSW to head with low GCS
- Intubated and brought to the border
- Transported to LII TC within 2 hours of event
- A-orally intubated
- B-OK, C-OK
- D GCS 3T with fixed pupils
- E GSW to head

Many issues

- Consideration for citizenship
- Severity of injury, GCS 3T with unreactive pupils and no movement
- Border call

Cross Border

- Vacationer in Cancun fell from a 4th floor balcony
- Clinically paraplegic
- Transferred by air to LII TC
- A-OK, B-OK, C-OK
- D-Sensory and motor level T10 with complete paraplegia
- Operative stabilization followed by rehab

Statement of Problem

While trauma systems plans and field triage schemes are used to get the "right patient to the right place at the right time", under-triage, both planned and un-planned, inevitably occurs. In an ideal system, under-triaged patients arriving at a non-trauma center or a lower level trauma center should undergo immediate resuscitation and transfer (re-triage) to a higher level of trauma care, with the early management of specific injuries begun prior to transport. Based on discharge data in California it appears that appropriate triage or re-triage of major trauma patients fails to occur as much as 30% of the time. When re-triage does occur, it is often inappropriately delayed, and patients may be inappropriately managed during the re-triage interval.

Sub-Committee members

Name	Organization	Email	Contact Numbers	LEMSA	RTCC	STAC
Christy Fritcovic, RN	Trauma Program Manager, Kaiser South Sacramento	Christy.A.Fritcovic@kp.org	(916) 688 3286	Sacramento	North	
Jay Goldman, MD **CO-CHAIR**	Kaiser Foundation Health Plans and Hospitals	jay.goldman@kp.org	(510) 987-1919	Alameda	Bay Area	Yes
Lynn Henckel RN	Trauma Program Manager, Marin General Hospital	lhenckel@maringeneral.org	(415) 925-7256 (W) (415) 246-7997(C)	Marin	Bay Area	
Rick Kline, MD	Trauma Director, Regional Medical Center (San Jose)	Richard.kline@hcahealthcare.com	(408) 272-6407 (W) (408) 313-4926 (C)	Santa Clara	Bay Area	Yes
Tracy Leet, RN	Trauma Coordinator, San Francisco EMS Agency	Tracy.leet@sfgov.org	(415) 487-5033	San Francisco	Bay Area	
Farid Nasr, MD	EMSA	Farid.nasr@emsa.ca.gov	(916) 431 3685			Yes
Chris Newton, MD	Surgeon, Oakland Children's Hospital	cnewton@mail.chro.org	(510) 428-3823 (W)	Alameda	Bay Area	Yes
Sharon Perry, RN	Trauma Program Manager, Memorial Medical Center (Modesto)	PerrysZ@sutterhealth.org	(209) 668-7361 (W) (209) 402-4643	Mountain Valley	Central	
Christy Preston, RN	Trauma System Manager, Los Angeles County EMS Agency	cpreston@ems.lacounty.gov	(562) 347- 1660 (W) (909) 730-6579 (C)	Los Angeles	South West	
Kirk Schmitt	Director, Monterey County EMS Agency	schmittke@co.monterey.ca.us	(831) 755-4964 (W)	Monterey	Bay Area	
John Steele, MD **CO-CHAIR**	Trauma Director, Palomar Medical Center	Jsteele2@gmail.com	(760) 737-3513	San Diego	South East	Yes
Ewen Wang, MD	Pediatric Emergency Medicine, Stanford University Medical Center	Ewen@stanford.edu	(650) 723-5757 (W)	Santa Clara	Bay Area	
Ron Wilson	Paramedic Coordinator CHP Office of Air Operations	rowilson@chp.ca.gov	(916) 843-3303	State	North	
Jennifer Wodag, RN	Trauma Program Manager, Santa Barbara Cottage Hospital	jwodag@sbch.org	(805) 569-7575 (W) (805) 890-5551 (C)	Santa Barbara	South West	
Joseph Gallante, MD	Trauma Medical Director UCDMC	Joseph.gallante@ucdmc.ucdavis.edu	(916) 734 2296 (W)	Sacramento		
Robert Mackersie, MD	Trauma Medical Director San Francisco General	rmackersie@sfghtrauma.ucsf.edu				Yes

The Prime Directive

- "right patient to the right place at the right time"

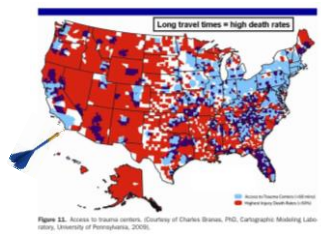


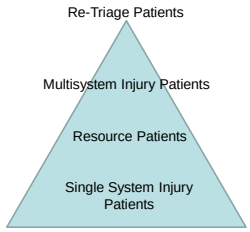
Figure 11. Access to trauma centers. (Courtesy of Charles Branas, PhD, Cartographic Modeling Laboratory, University of Pennsylvania, 2009).

Eastman Scudder Oration, JACS, Vol. 211, No. 2, August 2010

Definitions

- **Re-Triage**
  - The immediate or early transfer of a non-admitted trauma patient from ED to ED based on injury or mechanism-based criteria (e.g. hypotension, GCS, GSW abdomen) or specific injury diagnoses (e.g. SDH, liver laceration, etc.) Re-triage usually occurs as the result of a patient arriving at a facility lacking the resources to provide definitive care for injuries diagnosed or suspected as the result of evaluation in the Emergency Department. The decision to re-triage a trauma patient is typically made during the initial evaluation and resuscitation, but it may also occur following the diagnosis of injuries not initially suspected (e.g. TBI). Re-triage results in transport to a local or regional designated trauma facility with capabilities commensurate with the severity of suspected or diagnosed injuries. Ideally, re-triage is protocol-driven in a manner similar to field triage, and does not require extended physician-to-physician discussions or a formal approval process
- Interfacility transfer (IFT)
  - The planned transfer of an admitted trauma patient from one acute care institution to another. IFT typically occurs following initial resuscitation, hospital admission, and the diagnosis and initial management of specific injuries. IFT is made at the request of the attending-physician (surgeon) of record. It is based on individual patient needs and the type and severity of specific diagnosed injuries rather than on protocols or defined criteria.
- Repatriation
  - The planned and approved transfer of admitted or ED (non-admitted) patients to a hospital that is part of their HMO or covered within their insurance plan. The primary goal of repatriation is to reduce out-of-service costs to the HMO or insurance plan. Repatriation may or may not involve a change in the trauma level of care provided by the receiving institution.

The Trauma Pyramid



Major Issue and obstacles

- Poor understanding of the extent of the problem – lacking good data on frequency, location, type/severity of injury for re-triage & IFT patients.
- Lack of re-triage protocols tailored to resources & geography of the region
- Lack of implementation of early patient management protocols for specific injuries (e.g. TBI, pelvic fractures, blunt aortic injury, etc.)
- Inability to rapidly identify a receiving facility for a given injury in a given region (need for 'hospital shopping')
- Lack of centralized re-triage/IFT coordination; lack of real-time hospital capacity status
- Poor implementation & understanding of EMTALA laws for trauma patients
- Lack of / limited critical care transport in many regions
- Limited scope of practice for more critical EMS re-triage transport
- Limited capacity / willingness of NTC or lower level TC to manage specific condition or injuries (i.e. minimal TBI)
- Lack of operational MOUs defining re-triage & "pre-acceptance" of patients meeting re-triage criteria

Proposed Project Plan elements

1. Obtain preliminary data from California hospitals RE the re-triage of trauma patients
   a. Short survey to be (hopefully) conducted by each RTCC
2. Develop rudimentary map of trauma re-triage traffic & groups ('buddy system')
3. Develop & promote general re-triage guidelines
   a. Tailor these general guidelines to specific systems or regions (rural vs urban)
   b. Encourage adaptation for each set of sending/receiving hospitals
4. Develop a template for a general Regional Cooperative Agreements (aka 'transfer agreement') between two acute care facilities. This would be an operational MOU that includes (not limited to) the following:
   a. Re-triage guidelines
   b. Unconditional acceptance of eligible patients – no delays
   c. PI data sharing: outcome, registry, PI issues
   d. Compensation agreement
   e. Repatriation agreement
   f. PI participation agreement
   g. Educational outreach agreement: includes PMGs from receiving center, conferences, etc.
   h. Tele-med or phone consultation (timely) agreement
   i. More?

Proposed Project Plan elements

5. Formally and officially address EMTALA questions:
   a. Re-triage of unstable patients to TC
   b. EMTALA non-discrimination provision to accept (or not) non-level-of-care patients
      i. From within a given community
      ii. From outside a given community
6. Expand CEMSIS to capture re-triage & IFT data & develop a map of re-triage & IFT traffic within the state.
7. Development / adaptation of BASIC early management guidelines for specific high risk RT/IFT injuries
   a. TBI
   b. pelvic fx.
   c. mangled extremity
   d. penetrating torso injuries
   e. peripheral vascular injuries
   f. others
8. Develop a state-wide system for periodic assessment of "time-to-definitive-care" for trauma center transfers-in.
9. Improve the state-wide identification of receiving centers for major trauma/burns
   a. Develop web-based compendium of trauma centers, burn centers, pedi TCs, their specialized capabilities & contact information (first step)
   b. Explore development of real-time access to California TC status: open/on-diversion/ partial diversion, etc.
   c. Explore development of centralized re-triage/transfer coordination within the state
10. Develop a 'work around' to the scope-of-practice limitations that may interfere with the immediate re-triage of a critically injured trauma patient in lieu of a critical care transport unit.

Considerations

- Primary vs re-triage
  - Because field (primary) triage to the highest level of care is not possible, or required, under every circumstance, delayed re-triage (secondary triage) triage from the ED of one receiving facility to the ED of another is being used increasingly. This re-triage should be protocol-driven and occur in the setting of pre-existing arrangements between sending and receiving hospitals that allows the immediate movement of a patient meeting re-triage criteria from one ED to another. Re-triage is not inter-facility transfer (IFT) and should not require the more cumbersome IFT process of procuring 'acceptance' by an individual physician and clearance by a transfer center. A high degree of cooperation, often codified in 'transfer agreements', is required between receiving Level I or II trauma centers and sending centers which may be NTC, Level IV centers, or Level III centers. With Inclusive trauma systems improve the chances of earlier and more frequent re-triage transfer of severely injured patients from small rural hospitals.

Managing Undertriage

- Trauma systems should recognize that some degree of undertriage is inevitable. System- and institution-based methods for managing this undertriage must be developed to minimize any associated adverse sequelae. This is particularly important for time-sensitive injuries that manifest after initial field triage, such as hemorrhagic shock, traumatic brain injury (TBI), and limb ischemia.

Managing Undertriage

- Time sensitivity, geography, and other considerations that are part of the overall regional system;
- No alternatives due to lack of resources, facilities, or other factors;
- Deficiencies in the field triage protocols that are inconsistent with established standards;
- The inherent inability of any triage tool to capture 100% of major trauma patients without disproportionate overtriage;
- Errors in patient evaluation, errors in interpreting or executing the established triage protocol, inability to accurately assess injury mechanism, or deliberate non-compliance with triage protocols;
- Delayed physiologic presentations or occult anatomic injures

Re-triage Criteria

Re-triage Criterion	FROM: TO	Basis & timing	Diagnosis	Mgmt protocols	comments
PHYSIOLOGICAL DERANGEMENTS					
GCS < 12 with documented or suspected TBI	All non-tertiary to LIII	Immediate re-triage	CXR.	Per traumatic brain injury guidelines: Airway & ventilation control GCS<9-10, BP control, glycemic control, mannitol for sx. of herniation or neurological deterioration, preload monitoring if possible	Transport should not be delayed for diagnostic imaging. Maintaining normal preload volume is essential.
12 ≤ GCS < 14 CT abnormal	All non-tertiary to LI,LII	Clinically based – immediate if deteriorating	CTh	See above.	
GCS 14-15 CT abnormal	All NTC to LI,LII Selected LIII to LI, LII	Potential for progression of lesion – timing based on CT findings	CTh		Some institutional protocols may allow neurological observations for low-risk TBI at selected LIII centers
Hypotension w/ BPsys. < 90 torr (confirmed)	All NTC to LI, LII Selected LIII to LI, LII	Dependent upon response to treatment: ("responders", "transient reponders", "non-responders"), and source of hemorrhage.	CXR, pelvis XR, FAST (if available), DPL, CTa as conditions warrant	Treat correctable causes prior to transfer: tension pneumothorax, spinal cord vasodilation, etc. For intra-abdominal source – consider laparotomy if qualified surgeon immediately available. Pelvic binder for amenable pelvic fx. Type-specific or O-neg blood available for transport	Hemorrhage from abdominal source, most blunt chest sources, and non-vascular extremity sources may be manageable at LIII center. "Damage control" laparotomy may be required at LIII centers for patients in decompensated shock
Paralysis or focal neuro-deficits w/ probable SCI	All non-tertiary to LII, LI	Clinical – early, immediate if higher cervical	CXR, plain radiographs	Airway for C>7 level Pressors for MAP < 70 Preload monitoring if possible	Transport should not be delayed for diagnostic imaging.
Respiratory distress / flail chest	All NTC to LI, LII Selected LIII to LI, LII	Establishment of a secure airway, chest drainage, and control of oxygenation & ventilation is essential prior to immediate transport.		Chest tube for hemo/pneumo thorax Airway control, mechanical ventilation for hypoxia, hypoventilation, or airway compromise	

Examples of re-triage guidelines for non-trauma centers (NTC) and non-tertiary (NTC & LIII) centers

Re-triage Criteria

ANATOMICAL DERANGEMENTS (SPECIFIC INJURIES)					
Penetrating wounds to head, neck	Most NTC to LIII, LII, LI	Clinically based – immediate if altered physiology and external hemorrhage is controlled	CThead, CTneck	Control of external hemorrhage & establishment of secure airway for higher risk patients prior to transport	
Penetrating wounds to torso	Most NTC to LIII, LII, LI	Clinically based. Immediate transport for all but superficial wounds.	CXR, KUB DPL, CTabd in selected cases	Patients with wounds thought and confirmed to be superficial by CT may be managed at NTC, depending on system.	Patients in refractory decompensated shock may require "damage control" laparotomy or thoracotomy prior to transfer if resources available
Penetrating wounds to extremities	Selected non-tertiary to LI, LII	Clinically based. Immediate transport for pulse deficits or hemorrhage.	Exam, Doppler ABIs, radiographs	Control hemorrhage, shunts depending on transfer distance, surgeon resources. Tourniquet for hemorrhage preferable to massive blood loss	Transport should not be delayed for diagnostic imaging.
Flail chest	All non-tertiary to LII, LI	Clinical – exam + ABG + CXR	CXR, plain radiographs	Airway, intubation based on physiology	
Suspected blunt aortic injury or major vascular injury to great vessels	All non-tertiary to LI Selected LII to LI	High untreated mortality within 24 hrs. Re-triage should be immediate	CXR, CTchest	PMGs designed to control of systemic blood pressure is critical. Use of B-blockade (esmolol) + vasodilators thought to prevent premature rupture of aortic pseudoaneurysm.	Majority of patients with simple widened mediastinum will not have BAI, but transfer should be expedited based on CXR (wide mediastinum) + mechanism alone.
Pelvic fracture – severe	Most non-tertiary to LII, LI	Clinical – evidence of shock (hypotension, BD) + radiological	CXR, plain radiographs	Binder, blood availability, OS consult (LIII)	
Pelvic fracture – minor	All NTC to LI, LI	Isolated PR fx. without	CXR, plain radiographs		
Extremity injuries – open or complex fracture		NTC to LII, LI Selected LIII to LI, LII	Plain radiographs Assess for compt. Syndrome	Splint stabilization, Consider washout in ED or OR for open fx. Decompression prior to transfer	Transport should not be delayed for diagnostic imaging.
Skull fractures	Most non-tertiary to LII, LI	May be time-sensitive, depending on underlying TBI	Exam, CTh	Per TBI guidelines. Management dependent on GCS & exam or CT findings.	
Amputations	Most non-tertiary to LII, LI. To LI for re-implants	Immediate			Transport should not be delayed for diagnostic imaging.
Major or complex wounds	All non-tertiary to LII, LI Selected LIII to LII, LI	Major tissue loss, degloving wounds require complete early debridement & washout. Flap coverage often required	Exam, plain radiographs	Maintenance of normovolemia , avoid hypothermia, relief of pain. Consider early wash-out if transfer will be delayed	

Examples of re-triage guidelines for non-trauma centers (NTC) and non-tertiary (NTC & LIII) centers

The "Red" box

Determine if patient meets Emergency Re-Triage Criteria:

Blood pressure / perfusion:

- Systolic pressure <90 or
- Need for high volume fluid resuscitation (> 2 L NS) or immediate blood replacement

GCS / Neurologic

- GCS less than 9
- Blown pupil
- GCS deteriorating by 2 or more during observation
- Obvious open skull fracture

Anatomic criteria:

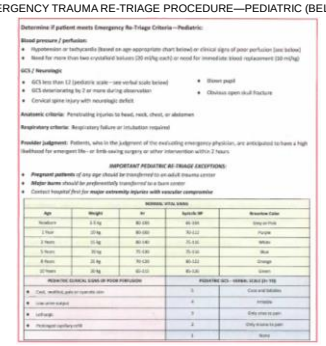
- Penetrating injuries to head, neck, chest or abdomen
- Extremity injury with ischemia evident or loss of pulses

Provider judgment: Patients, who in the judgment of the evaluating emergency physician, are anticipated to have a high likelihood for emergent life– or limb-saving surgery or other intervention within 2 hours

CONTRA COSTA EMERGENCY TRAUMA RE-TRIAGE PROCEDURE—ADULT (AGE 15 AND OVER)

The "Red" Box-Peds

CONTRA COSTA EMERGENCY TRAUMA RE-TRIAGE PROCEDURE—PEDIATRIC (BELOW AGE 15 YEARS)



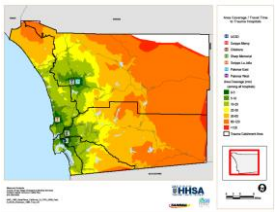
San Diego TC "Buddies"

- Palomar Medical Center
  - Pomerado Hospital, Palomar Med Center Downtown Campus
- UCSD
  - Scripps Mercy Chula Vista, Sharp Coronado Hosp, Naval Base Coronado, El Centro Regional Med Ctr, Pioneer Memorial Hospital, Yuma Regional Med Ctr
- Scripps Mercy
  - Alvarado Hospital, NMCSD, Paradise Vally Hospital, Sharp Chula Vista
- Sharp Memorial
  - Sharp Grossmont Hospital, Kaiser Permanente-Zion
- Scripps La Jolla
  - Tri City Med Ctr, UCSD-Thornton Hospital, Scripps Encinitas, Naval Hospital Camp Pendleton
- Rady Children's Hospital
  - Regional asset

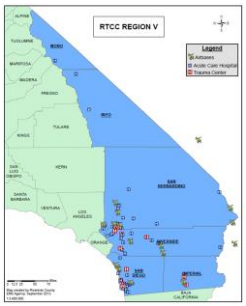
Misperceptions

- EMTALA prevents this approach
  - Not true
- Patients will be dumped on the TC's
  - These are patients that should be at a TC
- This will include a large number of patients
  - This should be a small percentage of injured patients
- This will result in improved patient care
  - True

A System of Systems



Time to TC



A System of Systems

What can we do about it?

"Lack of proximity to a trauma center or the appropriate level of care results in high death rates."
Brent Eastman, MD, FACS
Scudder Oration, 2010

Access to Trauma Centers (<60 mins)
Highest Injury Death Rates (>50%)

?