A System Saving Lives

Satellite Conference and Live Webcast
Wednesday, March 30, 2011
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Produced by the Alabama Department of Public Health
Video Communications and Distance Learning Division

Faculty

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Survivor or Statistic?

Incidence of Trauma

- **Leading cause of death in U.S. in patients less than 45 years old (CDC 2008)**
  - **60 million injured**
    - **160,000 die – (56 per 100,000) and the rate is going up**
    - **9 million disabled - 300,000 permanently**

Incidence of Trauma

- **Trauma is more commonly a disease of the young (15-34) thus has a far greater economic impact**
- **Total yearly economic cost in Alabama is 6.5 billion dollars**

Alabama Trauma

- **11th highest per capita highway trauma death rate in the U.S.**
  - **Was 4th in 2006**
  - **Death rate is twice as high in the rural areas as in the metro areas**
- **80% of trauma is blunt**
  - **Motor vehicle crashes or falls**

Alabama Trauma

- 20% of trauma is due to penetrating injuries
  - Gunshot, stabbing
- Without the trauma system, 60% of trauma patients initially go to hospitals without trauma capabilities causing delay in treatment

What Are the Qualities of a Good Trauma System?

- Network of hospitals with the commitment and the resources to care for trauma system patients
- Organized plan to route critical patients to the right hospital that is ready to care for them

What Are the Qualities of a Good Trauma System?

- Constant monitoring of the system to correct problems, improve the system, and validate the quality of care provided

The Alabama system is one of only two in the U.S. that can do all three of these

Why Do We Need a Trauma System?

- THEY SAVE LIVES!
  - Voluntary trauma system started in seven counties around Birmingham in 1996
  - Between 1996 and 2005 there were over 23,000 patients treated for major trauma

Why Do We Need a Trauma System?

- There was a 12% decrease in the death rate from trauma in this area during this time
  - There was no change for the rest of the state

Alabama Trauma Plan

- Voluntary participation by hospitals
  - Hospitals are inspected and designated for the level of services they request and can provide
  - Out-of-state hospitals go through same process
  - No hospital has ever dropped out of the system once designated

Alabama Trauma Plan

- Trauma system patient routing is by a single high-tech communication center that coordinates patient transport to the appropriate facility initially and facilitates transfer of patients that must be stabilized locally before transfer to definitive care

Alabama Trauma Plan

- Done with computer intranet system and 24/7 staff that maintain up-to-the-minute status of all hospitals and resources
- This allows hospitals to always be in control of when they are available to accept a new patient
- Everything is monitored by Quality-Improvement process

Trauma System Total Patients: January 3 – February 3, 2011

- Total system volume – 517
  - NORTH – 104
    - HH – 77 (74%)
    - DGH – 3
    - Three's – 24

Trauma System Total Patients: January 3 – February 3, 2011

- BREMSS – 189
  - UAB – 159 (84%)
  - Children's – 7
  - Three's – 21
  - Community hospital – 2

Trauma System Total Patients: January 3 – February 3, 2011

- EAST – 22
  - Two – 7
  - Three's – 15

Trauma System Total Patients: January 3 – February 3, 2011

- GULF – 157
  - USA – 118 (75%)
  - Two – 6
  - Three's – 32
  - Community hospital – 1

Trauma System Total Patients: January 3 – February 3, 2011

- WEST – 38
  - DCH – 38
  - Other – 0
- SOUTHEAST – No report
  - Trauma system not complete
- Out of state hospitals – 7

Who Needs a "Trauma System"

- A "trauma" patient is any patient who is injured
- A "Trauma System" patient has life-threatening injuries that require rapid, specialized care
- Only 10-12% of patients with injuries need to go to a trauma center

Who Needs a "Trauma System"

- Most injuries are minor and should be treated at a local community hospital

The Method Behind the Madness

- In the field, all injured patients go through two triage processes
  - First, to determine if they should be entered into the trauma system
    - Have injuries that are life-threatening or potentially life-threatening
      - About 10-12% qualify

The Method Behind the Madness

- Second, to determine what level of trauma hospital to which they should be taken

Protocol for Which Patient is Entered into Trauma System

- Can be for any of 4 reasons
  - Physiologic
  - Anatomic
  - Mechanism of injury
  - EMT discretion

Physiologic Criteria

- Generally go to a Level I center if within an hour transport time
  - A systolic BP
    - < 90 mm/Hg in an adult
    - < 80 mm/Hg in a child five or younger

Physiologic Criteria

- Respiratory distress rate
  - < 10 or >29 in adults
  - < 20 or > 40 in a child one year or younger

Physiologic Criteria

- Altered mental status as evidenced by Glasgow Coma Score of 13 or less
  - 15 is normal
  - 3 is totally unresponsive
    - GCS of 9 or less go to Level I
    - GCS of 10 to 13 go to Level II or possibly to a Level III

Anatomic Criteria (Normal Vital Signs)

- Generally go to a Level I Center if within an hour transport time
  - Flail chest
  - Two or more obvious proximal long bone fractures
    - Humerus, femur

Anatomic Criteria (Normal Vital Signs)

- Penetrating injury of the head, neck, torso, or groin, associated with an energy transfer
- Has in the same body area a combination of trauma and burns of fifteen percent or greater
  - Partial and full thickness

Anatomic Criteria (Normal Vital Signs)

- Amputation proximal to the wrist or ankle
- One or more limbs which are paralyzed
- Unstable pelvic fracture, as evidenced by a positive “pelvic movement” exam

Mechanism of Injury Criteria (Normal Vital Signs)

- May go to Level II or III if closer than Level I
  - A patient with the same method of restraint and in the same seating area as a dead victim
  - Ejection of the patient from an enclosed vehicle

Mechanism of Injury Criteria (Normal Vital Signs)

- Motorcycle/bicycle/ATV crash with patient being thrown at least ten feet from the motorcycle/bicycle
- Auto versus pedestrian with significant impact with the patient thrown, or run over by a vehicle
- An unbroken fall of twenty feet or more onto a hard surface

EMT Discretion Criteria (Normal Vital Signs)

- May go to Level II or III if closer than a Level I
- If the EMT is convinced the patient could have a severe injury that is not yet obvious, the patient should be entered into the trauma system

EMT Discretion Criteria (Normal Vital Signs)

- The EMTs suspicion of severity of trauma/injury may be raised by the following factors:
  - Age > 55
  - Age < five
  - Environment (hot/cold)

EMT Discretion Criteria (Normal Vital Signs)

- Patient's previous medical history
  - Insulin dependent diabetes
  - Cardiac condition
  - Immunodeficiency disorder
  - Bleeding disorder
  - COPD/Emphysema

EMT Discretion Criteria (Normal Vital Signs)

- Pregnancy
- Extrication time > 20 minutes with heavy tools utilized
- History of more than momentary loss of consciousness

Process to Enter Patient from the Field

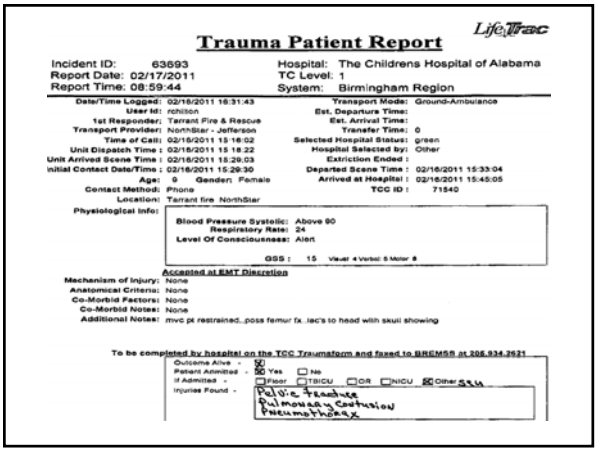
- EMT evaluates patient and determines they meet criteria to be entered into system
- EMT calls ATCC (Alabama trauma communications center) and gives patient report
  - EMT and ATCC agree on level of care the patient needs

Process to Enter Patient from the Field

- ATCC gives available hospitals and the appropriate ready hospital is selected
- EMT transports the patient
- ATCC fills out patient report and sends to the hospital (prints out in ED) and also calls the ED

Process to Enter Patient from the Field

- Within 48 hours the emergency department staff fill out the patient care feedback section of the patient report and faxes back to the ATCC



Trauma Patient Report

LifeTrac

Incident ID: 63693
Report Date: 02/17/2011
Report Time: 08:59:44

Hospital: The Childrens Hospital of Alabama
TC Level: 1
System: Birmingham Region

Date/Time Logged: 02/16/2011 16:31:43
User Id: rchilson
1st Responder: Tarrant Fire & Rescue
Transport Provider: NorthStar - Jefferson
Time of Call: 02/16/2011 15:16:02
Unit Dispatch Time : 02/16/2011 15:16:22
Unit Arrived Scene Time : 02/16/2011 15:29:03
Initial Contact Date/Time : 02/16/2011 15:29:30
Age: 0 Gender: Female
Contact Method: Phone
Location: Tarrant fire NorthStar

Transport Mode: Ground-Ambulance
Est. Departure Time:
Est. Arrival Time:
Transfer Time: 0
Selected Hospital Status: green
Hospital Selected by: Other
Extrication Ended :
Departed Scene Time : 02/16/2011 15:33:04
Arrived at Hospital : 02/16/2011 15:45:05
TCC ID : 71540

Physiological Info:
Blood Pressure Systolic: Above 90
Respiratory Rate: 24
Level Of Consciousness: Alert
GSS : 15 Visual: 4 Verbal: 5 Motor: 6

Accepted at EMT Discretion

Mechanism of Injury: None
Anatomical Criteria: None
Co-Morbid Factors: None
Co-Morbid Notes: None
Additional Notes: mvc pt restrained...poss femur fx..lac's to head with skull showing

To be completed by hospital on the TCC Traumaform and faxed to BIREMSS at 205.934.2621

Outcome Alive - [X]
Patient Admitted - [X] Yes [ ] No
If Admitted - [ ] Floor [ ] TBICU [ ] OR [ ] NICU [X] Other SICU
Injuries Found - Pelvic fracture, Pulmonary Contusion, Pneumothorax

Special Cases

- No airway
  - Closest ED
- Hemodynamically unstable – no IV
  - Closest ED
- Unable to stop severe hemorrhage
  - Closest ED

Special Cases

- Age 14 years or younger
  a. Pediatric Level I center if transport < 45 minutes

Special Cases

b. Closest Level I or II Trauma Center if > 45 minutes to Pediatric Center

c. Closest Level III if transport > 45 minutes to Level I or II

Special Cases

- Pregnancy
  a. Level I if < 45 minutes transport time
  b. Level II or III if > 45 minutes to Level I

Patients that Don't Come by EMS or Under Triaged

- They can be entered into the system by the hospital staff
  - Even if the hospital is not planning to transfer them

Patients that Don't Come by EMS or Under Triaged

- For patients that need to be transferred:
  - Patients with physiologic criteria can be routed by simply calling the ATCC

Patients that Don't Come by EMS or Under Triaged

- If the patient has stable vital signs (anatomic or burns) the ATCC will connect the physician with the receiving physician (surgeon or EM physician) to discuss the case

Criteria for Hospital to Enter Patient into Trauma System

- Physiological criteria is present on arrival or develops during evaluation
  - Same as pre-hospital criteria

Criteria for Hospital to Enter Patient into Trauma System

- Systolic BP
  - < 90 mm/Hg in an adult or child 6 years or older
  - < 80 mm/Hg in a child less than 6 years old

Criteria for Hospital to Enter Patient into Trauma System

- Respiratory distress rate
  - < 10 or > 29 in adults
  - < 20 or > 60 in a newborn
  - < 20 or > 40 in a child three years or younger
  - < 12 or > 29 in a child four years or older

Criteria for Hospital to Enter Patient into Trauma System

- Head trauma with Glasgow Coma Scale score of 13 or less or head trauma with any neurologic changes in a child five or younger

Criteria for Hospital to Enter Patient into Trauma System

- The level of trauma center to which this patient would be transferred would depend on regional secondary triage criteria
  - Generally only GCS scores of 9 or less are triaged to Level I Trauma Hospital unless CT scan reveals intracranial bleeding

Criteria for Hospital to Enter Patient into Trauma System

- Anatomic criteria is present on arrival or is found during evaluation
  - Stable vital signs
  - Same criteria as pre-hospital
- The patient has a flail chest

Criteria for Hospital to Enter Patient into Trauma System

- The patient has two or more obvious proximal long bone fractures
  - Humerus, femur
- The patient has a penetrating injury of the head, neck, torso, or groin, associated with an energy transfer

Criteria for Hospital to Enter Patient into Trauma System

- The patient has in the same body area a combination of trauma and burns (partial and full thickness) of 15% or greater
- The patient has an amputation proximal to the wrist or ankle
- The patient has one or more limbs which are paralyzed

Criteria for Hospital to Enter Patient into Trauma System

- The patient has a pelvic fracture demonstrated by x-ray or other imaging technique
- Significant internal injuries are found during hospital evaluation and the referring hospital does not have the surgical resources to manage them

Burn Criteria

- Indications for entering the patient into the trauma system and transferring to a burn center include the following (same as pre-hospital criteria):
  1. Partial thickness burn of greater than 10% of the total body surface area

Burn Criteria

2. Burns that involve the face, hands, feet, genitalia, perineum, or major joints
3. Third-degree burns in any age group
4. Electrical burns, including lightning injury
5. Chemical burns

Burn Criteria

6. Inhalation injury
7. Burn injuries in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality

Burn Criteria

8. Any patient with burns and concomitant trauma (fractures) in which burn injury poses greatest risk of morbidity or mortality
   - In such cases, if trauma poses greater immediate risk, patient's condition may be stabilized initially in trauma center before transfer to burn center

Burn Criteria

9. Burned children in hospitals without qualified personnel or equipment for the care of children
10. Burn injury in patients who will require special social, emotional, or rehabilitative intervention

As a General Rule, Mechanism of Injury and "Hospital Discretion" are Not Reasons to Enter a Patient Into the Trauma System

Trauma System Patient Routing

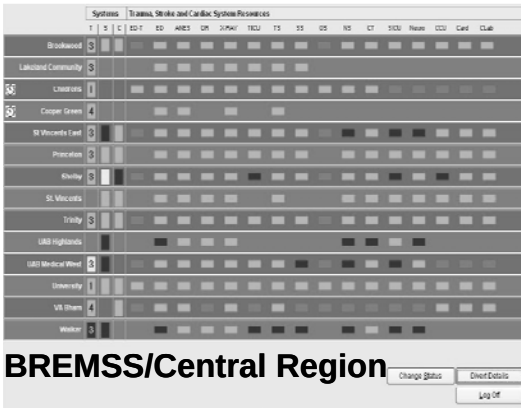
- Each participating hospital will be connected to the ATCC so that there is a constant monitoring of the status of all hospitals

Trauma System Patient Routing

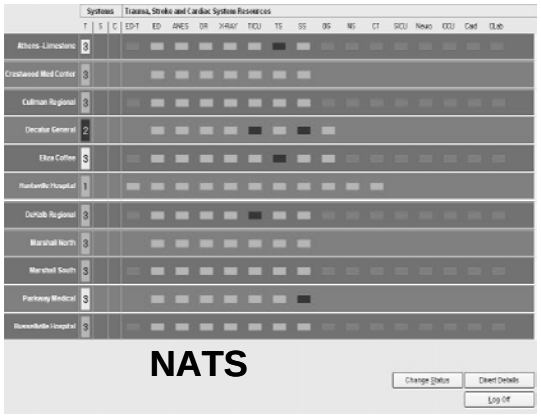
- When a patient needs the trauma system the EMT will call the ATCC who will route the patient to the correct ready hospital depending on the patient's injuries
- Transportation (air or ground) can be arranged by the ATCC if needed

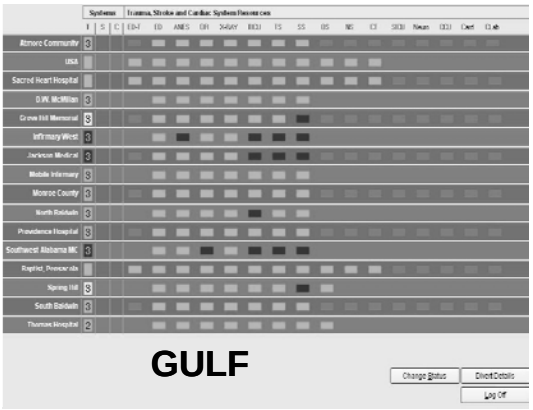
Trauma System Patient Routing

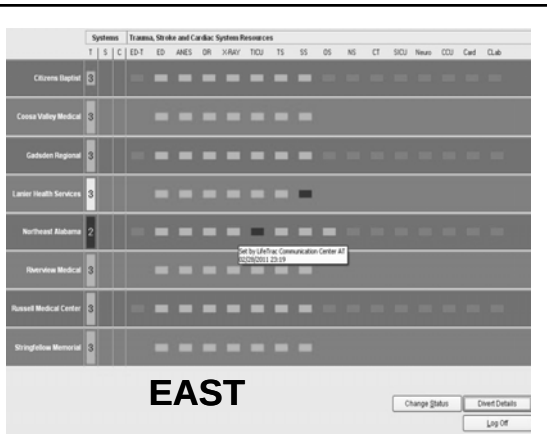
- Transfer of patients from local hospitals to the correct trauma center can also be coordinated by the ATCC

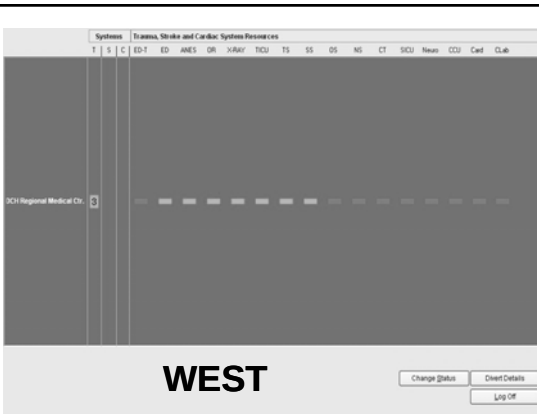


BREMSS/Central Region









Participating Hospitals

- **Hospitals can voluntarily join the trauma system**
  - **No hospital will be forced to join**
    - **Administration and surgical staff must agree to participate**
  - **Participating hospitals will be surveyed to certify the level of trauma care they can provide**

Participating Hospitals

- Each participating hospital will determine when they are available to take a trauma patient
  - Each decides when RED or GREEN
    - Communication Center cannot override this
    - Patient can override system

Participating Hospitals

- Hospital must keep status up to date or will get patients when resources are not available to care for them

What Makes Alabama's Trauma System Better

- It correctly identifies the patients who need trauma care
- Anticipates the resources needed to treat the patients
- Locates the available needed resources

What Makes Alabama's Trauma System Better

- Routes the patient "right" the first time to reduce time to appropriate care
- Arranges inter-facility transfers if needed to reduce time to appropriate care
- Improves care by the QI process

What Makes Alabama's Trauma System Better

- Keeps the hospital and doctors in control of the process