Collaboration with Rural EMS and Hospitals for Trauma Care

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Outline

• Issues in rural trauma care
• Strategies in addressing the issues
• Case study of collaboration with Rural EMS and hospitals at a single hospital
  – Identifying the local need
  – Integrated approach to addressing the need
  – Establishing integrated quality improvement
  – Enhance human resource capacity
  – Examine possible statewide implications
Issues

• Longer travel distances to trauma care is associated with higher mortality rates

![Figure 1: Ambulance Response Time in Rural vs. Urban Areas](Source: NHTSA FARS, 1997)

• General contribution mortality rates
  – 25% population live in rural areas but contribute up to 60% of trauma deaths


Population Access To Trauma Care Services In Urban And Rural Areas

<table>
<thead>
<tr>
<th>Access Level</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy access (less than 10 miles)</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td>Moderate access (10–30 miles)</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Difficult access (more than 30 miles)</td>
<td>15</td>
<td>30</td>
</tr>
</tbody>
</table>

*Hsia R Y, and Shen Y Health Aff 2011;30:1912-1920

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Issues

• Lack of adequate resources
  – Specialty services (orthopedics, neurosurgery, optho)
  – Physical plant and equipment
  – Blood bank and laboratory

• Vulnerable infrastructure

• All of this leads to a vulnerable population due to inadequate access and resources
The Institute of Medicine (IOM) committee on the *Future of Rural Health Care* proposed a five-pronged strategy to address the quality challenges in rural communities:

- **Strategy 1:** Adopt an integrated, priority approach to addressing both personal and population health needs at the community level.
The Strategy

- **Strategy 2**: Establish a stronger quality improvement support structure to rural health systems and professionals in acquiring knowledge and tools to improve quality.

- **Strategy 3**: Enhance the human resource capacity of rural communities, including the education, training, and deployment of health care professionals, and the preparedness of rural residents to engage actively in improving their health and health care.
The Strategy

• **Strategy 4**: Monitor rural health care systems to ensure that they are financially stable and provide assistance in securing the necessary capital for system redesign.

• **Strategy 5**: Invest in building an information and communication technology (ICT) infrastructure, which has enormous potential to enhance health and health care over the coming decade.
Case Study

scenario of a rural trauma center
Initiating Contact and Aligning Goals (Strategy 1)

- **Strategy 1:** Adopt an integrated, priority approach to addressing both personal and population health needs at the community level

- If there is an obvious gap in access and infrastructure, then EMS and rural hospitals will readily identify with the mission.
The Need Geographically

- 50 miles from the closest trauma center

Figure IV.6.1: TSA 06 Counties and Trauma Center with 50 Mile Buffer around Trauma center

http://doh.state.fl.us/demo/trauma/PDFs/A-TSA-Analysis_update.pdf
 Patients leaving for trauma care

We had the most patients leave for trauma care

Figure V.1: Net Flow of ISS9+ Trauma Patients at the TSA Level for 2000 and 2010

http://doh.state.fl.us/demo/trauma/PDFs/A-TSA-Analysis_update.pdf
Marion and surrounding counties among the highest in Driver Fatality in Florida

Growing Gap as Population Grows

Data Source: Florida Agency of Healthcare Administration (AHCA)
Begin with Alignment of Principles

- Citrus Memorial
- Munroe Regional
- Air Ambulance Services
- Villages Hospital
- Villages EMS
- MCFR EMS
- Nature Coast EMS
- Rural Metro EMS
- Seven Rivers
- Leesburg
- Lake County EMS
- Ocala EMS
Would result in...

• Provide regular and timely feedback
• Provide an infrastructure for an all inclusive process improvement program
• A concerted effort for outreach
• Providing timely and life saving care for the injured
• A transparent trauma system that could grow and improve
• These would dovetail into the next strategy...
Feedback (strategy 2)

• Strategy 2: Establish a stronger quality improvement support structure to rural health systems and professionals in acquiring knowledge and tools to improve quality.
Integrating EMS Process

PERFORMANCE IMPROVEMENT for the TRAUMA PATIENT -
Mechanism of injury
ICD9 800-959.9
Trauma Team Activation

PRE-HOSPITAL

EMS Coordinator
EMS Agency ad hoc meetings

EMS Advisory Council (Systems)

North Central Florida Trauma Agency (Regions 4-6) (Systems)

PRIMARY REVIEW (concurrent)

Trauma Registry
Trauma Program Director/PI RN
Patient identification
Initial review - all phases of care
(EMS, ED, OR, ICU, floor, provider, discharge)

Action?

Closure

SECONDARY and TERTIARY REVIEW

Review Trauma Medical Director (TMD-TPD)
(monthly)

Counseling Individual education
Letters PI letters response

M&M Meeting (weekly)

Trauma Quality Management and Multidisciplinary Committee (monthly)

Practice Management Guidelines
Process change
Educational Program/Inservice

Post-Discharge – Trauma Transitional Care Network; Trauma Clinic
### EMS Information

- **Date of Report:** 2013
- **Date of Call:** 2013  
  **Time of Call:** 23:14  
  **Arrival to Patient/Contact:** 23:35
- **Agency/Crew EMS Agency:** Rural/Metro Corporation Of Florida-Su  
  **Initial Trauma Assessment EMS:**
  - **GCS:** 15  
  - **Pulse:** 74  
  - **RR:** 15  
  - **SBP:** 146  
  - **O2 sat:** 100
- **Did EMS Crew Activate Trauma Team:** Level 3  
  **Arrival at Hospital:** 00:08
- **EMS Report:** Complete

### Hospital Information

- **Trauma Team Activation:**
- **Trauma Team Interventions:**
- **Arrival of Patient - Date:** 07/26/2013  
  **Time:** 00:13
- **Initial Hospital Trauma Score/Assessment:**
  - **GCS:** 15  
  - **Pulse:** 73  
  - **RR:** 18  
  - **SBP:** 150  
  - **O2 sat:** 98
- **ED Disposition:** Floor

### X-rays/CT

- **Study:** CT Scan  
  **Bodypart:** Head  
  **Result:** Negative
- **CT Scan:** Face  
  **Bodypart:** Head  
  **Result:** Negative
- **CT Scan:** Face  
  **Bodypart:** Negative  
  **Result:** Positive

### Patient Information

- **EMS Scorecard:**
  - **EMS Patient History:** JET SKI STRUCK PT IN FACE

### Hospital Diagnosis (Trauma Related Only):

- ORBITAL FLOOR (BLOW-OUT) CLOSED FRACTURE
- MALAR AND MAXILLARY BONES, CLOSED FRACTURE
- CONTUSION OF FACE, SCALP, AND NECK EXCEPT EYE(S)
- MALAR AND MAXILLARY BONES, CLOSED FRACTURE

### Hospital Interventions (Trauma Related Only):

- OPEN REDUCTION OF MALAR AND ZYGOMATIC FRACTURE
- OPEN REDUCTION OF MAXILLARY FRACTURE

### Injury Severity Score

- **Injury Severity Score:** 5

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**Ocala Health**

**Trauma Alert - EMS Follow-up Report**

**Daily report to EMS**

**Disposition**

**vitals**

**CT results**

**Hospital Diagnosis**

**Hospital Interventions**

**Injury Severity Score**
Daily report to Hospitals and Physicians

- Time and date of admission
- Initials of patient with registry number
- List of injuries
- Disposition
- Indication that the letter is to serve in their PI process

Dear Dr.,

The Trauma Service at Ocala Regional Medical Center would like to thank you for the referral of [patient] on [date]. The patient was a 24 y.o. male who was involved in a [specific incident]. He was transferred by ambulance to Ocala Regional Medical Center arriving on [date] at [time]. His injuries included:

- Orbital floor (blow-out) closed fracture
- Malar and maxillary bones, closed fracture
- Contusion of face, scalp, and neck except eye(s)
- Malar and maxillary bones, closed fracture
- Malar and maxillary bones, closed fracture
- Contusion of face, scalp, and neck except eye(s)
- Malar and maxillary bones, closed fracture

The Emergency Department consulted trauma services and he was admitted to floor and discharged to home with no services on [date]. Please feel comfortable with calling the trauma surgeon directly to accept these patients through the ED here. The Trauma service is happy to accept any trauma patient. Please use the ONE-STEP Transfer Center at [hospital].

We appreciate the referral of this patient and look forward to continuing to serve you and your facility as the local trauma center. Please do not hesitate to consult the trauma service on any question or referral you may have.

Respectfully yours,

[Name]
Trauma Medical Director

CC:

This information is provided for use in your Quality Improvement program.
## EMS Weekly Report

<table>
<thead>
<tr>
<th>Arrival</th>
<th>Time</th>
<th>Age</th>
<th>M/F</th>
<th>MOI</th>
<th>Injuries</th>
<th>ED Disp</th>
<th>ED d/c time</th>
<th>Admit MD</th>
<th>Hosp Disp</th>
<th>PI</th>
<th>RUN SHEETS</th>
<th>Follow Up</th>
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<tbody>
<tr>
<td>Aeromed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bilat fem fx and left patella ICU fx</td>
<td></td>
<td>0029</td>
<td>Trop</td>
<td>Still in House</td>
<td>nsg doc 7-28</td>
<td>Sent 08/09/2013</td>
<td></td>
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<tr>
<td>Xx/xx/xxxx</td>
<td>2240</td>
<td>26</td>
<td>F</td>
<td>MVC</td>
<td>Bilat fem fx and left patella ICU fx</td>
<td></td>
<td>0029</td>
<td>Trop</td>
<td>Still in House</td>
<td>nsg doc 7-28</td>
<td>Sent 08/09/2013</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2141</td>
<td>38</td>
<td>F</td>
<td>mvc</td>
<td>FEM FX, L1-4 TP FX, PNUMOTX</td>
<td>FLOOR</td>
<td>2301</td>
<td>TROP</td>
<td>Still in House</td>
<td>MISSING RUN SHEET</td>
<td>ü Sent 07/26/2013</td>
<td></td>
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<tr>
<td></td>
<td>1416</td>
<td>78</td>
<td>M</td>
<td>MVC</td>
<td>Head and neck injury</td>
<td>ICU</td>
<td>1513</td>
<td>HAGAN</td>
<td>Still in House</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1617</td>
<td>27</td>
<td>F</td>
<td>MVC</td>
<td>NO INJURIES</td>
<td>FLOOR</td>
<td>1730</td>
<td>GARCIA</td>
<td>HOME</td>
<td></td>
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<tr>
<td></td>
<td>2020</td>
<td>41</td>
<td>F</td>
<td>MVC-roll</td>
<td>B pulm contus, mandible, B pulm contus</td>
<td>ICU</td>
<td>2145</td>
<td>Trop</td>
<td>Still in House</td>
<td></td>
<td></td>
<td>Sent 7/11/13</td>
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<tr>
<td></td>
<td>1519</td>
<td>38</td>
<td>M</td>
<td>Assault</td>
<td>mandible, B pulm contus</td>
<td>ICU</td>
<td>1612</td>
<td>Farrah</td>
<td>(jail)</td>
<td></td>
<td></td>
<td>Missing RUN SHEET</td>
</tr>
</tbody>
</table>

- Arrival date
- Arrival time
- name
- MRN
- Acct
- age
- gender
- DOB
- Method of arrival
- MOI
- Injuries
- ED disp
- Room
- Admit MD
- Hosp dispo
- D/C date
- PI
- Follow up
Monthly Trauma Quality Management and Quality Improvement

- Provide a framework for an integrated, organization-wide approach to designing, measuring, assessing, improving and redesigning systems, and strategies to improve performance, outcomes and patient safety and to proactively reduce risks to patients.

- Trauma service, EMS agencies (air and ground), consulting physicians, hospital staff and administration,
Evidence for TQM in underserved areas

• 4.9 times less likely to die and 2.6 times less likely to have complications at some institutions around the world
  – J Trauma Acute Care Surg. 2013 Jul;75(1):60-8; discussion 68. doi: 0.1097/TA.0b013e31829880a0. Hospital-based trauma quality improvement initiatives: first step toward improving trauma outcomes in the developing world.

• Non-discoverable, honest, open, and complete assessment of issues that arise for all health care professionals involved in the trauma system.
Feedback on Ocala Trauma Center

• Marion County EMS analysis

<table>
<thead>
<tr>
<th></th>
<th>Trauma Alerts</th>
<th>Miles</th>
<th>Time per Call</th>
<th>Transport Time</th>
<th>Pt Contact to Trauma Care</th>
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<tr>
<td>Jan 1- Jun 30 2012</td>
<td>81</td>
<td>2600</td>
<td>1hr 24m</td>
<td>32m 17s</td>
<td>50m 22s</td>
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<tr>
<td>Jan 1- Jun 30 2013</td>
<td>186</td>
<td>2163</td>
<td>1hr 4m</td>
<td>15m 54s</td>
<td>28m 35s</td>
</tr>
<tr>
<td>△</td>
<td>+105</td>
<td>-437 mi</td>
<td>-20min</td>
<td>-16m 11s</td>
<td>-20m 57s</td>
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</table>

• 9 months 1,400+ patients with a 3.2% mortality rate (Florida average 4.9%, national av. 4.4%)  
  = transparency, teamwork, better access, and hard work

http://www.doh.state.fl.us/planning_eval/phstats/flperforms/AccessTraumaCare.pdf
Enhance Human Resource (Strategy 3)

• Enhance the human resource capacity of rural communities, including the education, training, and deployment of health care professionals, and the preparedness of rural residents to engage actively in improving their health and health care.
Education and Training
Education Outreach: Trauma 101

Trauma Education for EMS

Presented by: Darwin Ang, MD Trauma Medical Director
Hosted by: Ocala Health
Location: Ocala Regional Medical Center – Classroom A

➢ Thursday March 28, 2013 – 0800-1200

This program has been approved for 4 hours of Continuing Education for Paramedics & EMTs.

For more information or to sign up for this class, please contact Peter Kaminski, EMS Coordinator at (352) 401-1387.

• 4 hour lectures
• Abdominal trauma
• Thoracic trauma
• Pediatric trauma
• Neurologic trauma
• Obstetric trauma
• Shock physiology
• Trauma system and organization
County EMS Agencies: Trauma 101 course

- Marion
  - Marion County Fire Rescue
  - Ocala Fire Rescue
- Citrus
  - Nature Coast EMS
- Lake
  - Lake County EMS
- Sumter
  - Rural Metro

- Have everyone on the same page
- Highlight and share the latest evidence based protocols
- Act as a resource
- Emphasize the more they know, the better they can care for the patients...
Hospital Education

• Rural Trauma Team Development Course (RTTDC)
  – Developed by the American College of Surgeons, Committee on Trauma
  – Train rural hospital staff in the initial approach of resuscitation
  – Rapidly initiate transfer to definitive care when appropriate
  – Goal is to improve care in the rural trauma patient by developing a team approach to trauma.
Information and Communication Technology (Strategy 5)

• **Strategy 5:** *Invest in building an information and communication technology (ICT) infrastructure, which has enormous potential to enhance health and health care over the coming decade.*
USF/HCA Trauma Registry

• Generated the daily, weekly, and monthly Process Improvement reports for local EMS and hospitals.

• Provided large scale patient data for Trauma Quality Improvement initiatives
  – Reports
  – Benchmarking
  – Statistical modelling

• Clinical Research
Registry Investment

- Network Registry Director
- 7 Local PI Coordinators
- 13 registrars
- Database maintained and housed at the University of South Florida

**Figure 1:** Areas with less than 1 trauma center per 1 million residents

Florida Map showing regions with less than 1 trauma center per 1 million residents.
Network Registry

• Tracking data for complications
  – Investigating trends
  – Providing risk adjusted observed to expected mortality rates among trauma centers in the network

• Validating with Florida DOH database (AHCA) to create statewide benchmarking tool to study outcomes among different trauma centers in Florida
Meeting a purpose

- **Recall:** (Strategy 5) *Invest in building an information and communication technology (ICT) infrastructure, which has enormous potential to enhance health and health care over the coming decade.*

- The primary purpose of the trauma registry is system based performance improvement.

- Secondary purpose is to advance the science of trauma by research and development
In Summary

• Partnerships with rural EMS agencies and hospitals are possible when goals are aligned with the help of sound principles.

• Improving access to patients injured in rural areas can improve outcomes.

• Outreach is an essential for alignment of clinical practices, patient outcome expectations, and continuing communication within a community based trauma system.
Steps for Successful Collaboration

• Step 1: Rally your catchment area for a common cause
• Step 2: Commit yourself in providing an all inclusive PI system that is open and transparent
• Step 3: Be willing to provide and commit time for education, or provide resources to do so
• Step 4: Keep a good registry and track outcomes for everyone
Ocala Health Trauma Center

Thank You

USF Health Trauma Network

Ocala Health