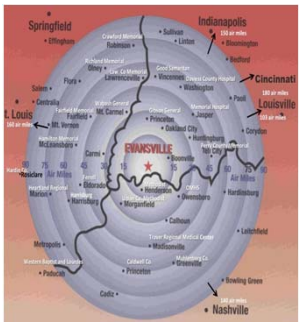
Eastern Association for the Surgery of Trauma

Sunrise Session 03
Oh No an Injured Child!
How Can We Be More Prepared & Who Needs to Be Transferred?

January 15, 2014
Waldorf Astoria Naples
Naples, Florida

Limitations to providing Pediatric Trauma Care

- Pediatric Surgeon Availability
  - Indianapolis
  - Ft. Wayne
  - Only 1125 in the US
- Geography
  - Serve IN, KY, IL
  - Rural access to pediatric care



St. Mary's Level II Trauma Center

- 391 bed hospital
- 65,000 ED visits
  - 12,000 pediatric visits
- 23 bed Pediatric unit
- 7 bed PICU
  - 2 Intensivists
  - 2 Hospitalists
  - 0 Pediatric general or subspecialty surgeons

Challenges to Providing Pediatric Trauma Care

- ACS-COT change in requirements to be a Level II Pediatric Trauma Center
  - Must have full time pediatric surgeon
- How can Trauma Centers achieve Pediatric Trauma Center verification with adult trauma surgeons?
- Aligning with a Pediatric Trauma Center renowned for clinical expertise and outcomes

Limitations to a collaborative approach

- Geography
- Community barriers: educating staff and families on why we chose CCHMC
- Cost

Pediatric Trauma Care in the Rural Community

- Organizing pediatric trauma care within a region
- Know capabilities and resources available in your institution
- Participate in your regional trauma system with leadership from Level I and Level II trauma centers

Rural Trauma Care in Indiana

- Indiana has more miles of interstate highway per square mile than any other state.
- Indiana's 92 counties ranging from 2,171 per square mile to fewer than 25 per square mile.
- Rural trauma and the required transportation of trauma patients is a **significant challenge** in portions of Indiana and across the Tri-State region

Limitations: Adult Surgeons Caring for Kids

How to get buy in from physicians?

- CME requirements
- Pediatric sub-speciality needs
- Comfort level with the pediatric patient
- Knowledge of protocols
- Family/Caregiver dynamics

Pediatric trauma care in the rural community

- How to organize pediatric trauma care within a region using a collaborative approach
- Regional – Indiana Region 10
  - All hospitals and pre-hospital services within a geographical region develop transfer agreements and protocols to guarantee rapid flow of injured children
  - Pediatric trauma care can be facilitated from outside the region

Building a regional trauma system plan

- Goal: improve quality of pediatric care in the rural community by developing a timely, organized, rational response to the care of the pediatric trauma patient
- Performance Improvement
  - Formal feedback process with your referring center
  - Collaborative approach
    - Open communication
- Education
- Web conferencing
  - Benefit of visual/virtual interaction

Building a regional trauma system plan

- Real time clinical questions

Improving Pediatric Trauma Care

- Increasing quality and improved outcomes with this model
  - Solid organ injury
  - Radiographic imaging
  - Activation Response Team/Communication model
  - Child Protection Team

Improving pediatric trauma care

- Future of trauma care requires the development of regional, state and national trauma system plans specific to the pediatric population

RTTDC picture

Conclusion

- Why does it work?
- Pediatric trauma care can be facilitated from outside the region
- Collaboration results in increased quality and improved care with this model

Pediatric RTTDC

Collaborative approaches to improving pediatric injury care: Telemedicine and Beyond

Richard A. Falcone, Jr, MD, MPH
Associate Professor of Surgery
Director, Trauma Services

Cincinnati Children's
change the outcome

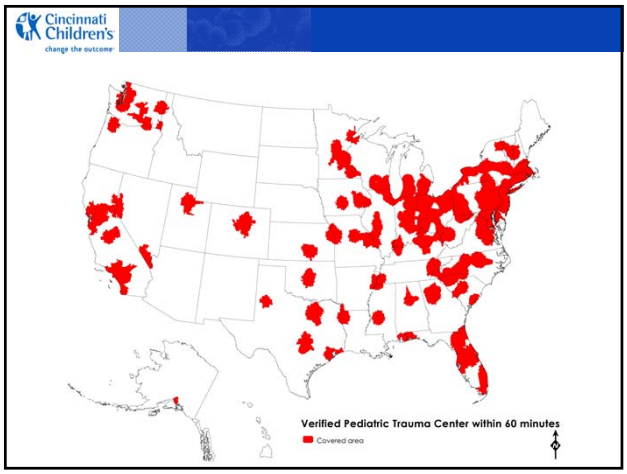
Objectives

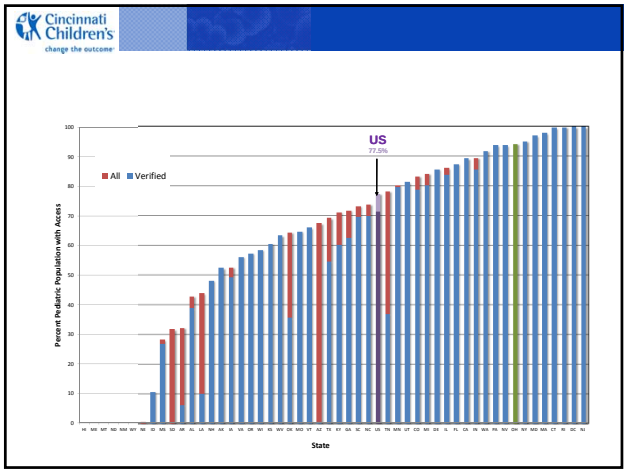
- Access to Pediatric Trauma Centers
- Telemedicine roles and benefits
- Collaborative partnerships

Cincinnati Children's
change the outcome

Do children have access to trauma care?

Cincinnati Children's
change the outcome


Cincinnati Children's
change the outcome
Verified Pediatric Trauma Center within 60 minutes
Covered area


Cincinnati Children's
change the outcome
US
77.5%
All
Verified
Percent Pediatric Population with Access
State


Where are injured children in the U.S. going for their care?
It is estimated 13% of the injured children are treated at a hospital with trauma credentialing
Approximately 11% of the injured children are treated at a free-standing verified pediatric trauma center
Cincinnati Children's
change the outcome

The Use of Telemedicine for Children Presenting to Remote Emergency Departments

Jim Marcin, MD
Pediatric ICU
UC Davis Children's Hospital
Sacramento, CA
jpmarcin@ucdavis.edu
916-734-4726

Cincinnati Children's change the outcome

What is Telemedicine?

- Interactive health care over distance using telecommunications technology
  - Live-interactive (synchronous)
  - Store-and-forward (asynchronous)
  - Remote patient monitoring (RPM)

Telemedicine in the ED

Initial experiences and outcomes of telepresence in the management of trauma and emergency surgical patients

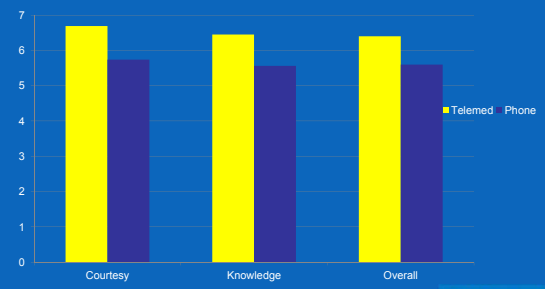
Rifat Latifi, M.D.[a,b,*], George J. Hadeed, M.P.H.[a], Peter Rhee, M.D.[a], Terrence O'Keeffe, M.D.[a], Randall S. Friese, M.D.[a], Julie L. Wynne, M.D.[a], Michelle L. Ziemba, R.N.[c], Dan Judkins, R.N.[c] The American Journal of Surgery (2009) 198, 905–910

Using robotic telecommunications to triage pediatric disaster victims

Rita V. Burke[a], Bridget M. Berg[a], Paul Vee[b], Inge Morton[c], Alan Nager[c], Robert Neches[d], Randall Wetzel[b], Jeffrey S. Upperman[a, e,*] Journal of Pediatric Surgery (2012) 47, 221–224

Cincinnati Children's change the outcome

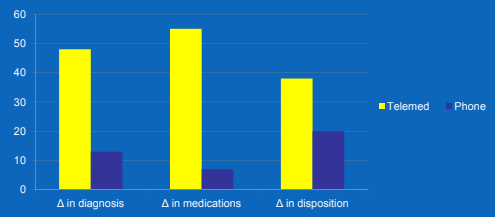
Parent Satisfaction



Dharmar, et al: Impact of Critical Care Telemedicine Consultations on Children in Rural Emergency Departments. Crit Care Med. 2013 Oct; 41(10): 2388-95.

Cincinnati Children's change the outcome

Remote Provider Survey

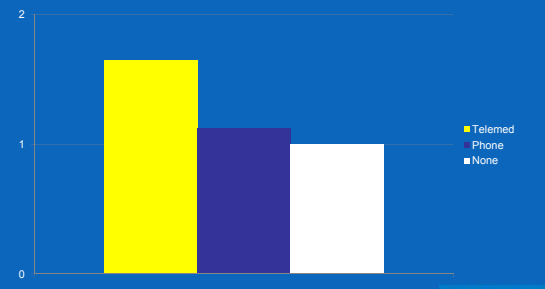


Dharmar, et al: Impact of Critical Care Telemedicine Consultations on Children in Rural Emergency Departments. Crit Care Med. 2013 Oct; 41(10): 2388-95.

Cincinnati Children's change the outcome

Quality of Care

Implicit Review; Multivariable Analysis; Adjusted for age, PRISA, time

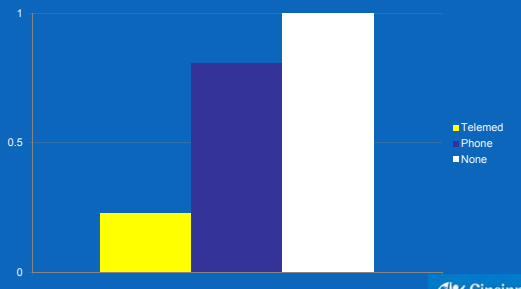


Dharmar, et al: Impact of Critical Care Telemedicine Consultations on Children in Rural Emergency Departments. Crit Care Med. 2013 Oct; 41(10): 2388-95.

Cincinnati Children's change the outcome

Medication Errors

Pharmacy Review; Multivariable Analysis; Adjusted for age, PRISA, time



Dharmar, et al: Telemedicine Consultations and Medication Errors in Rural Emergency Departments. Pediatrics. In Press

Cincinnati Children's change the outcome

Cost Savings & Effectiveness

- The mean cost for a telemedicine consultation:
  - $2,096/child/ED/year
- 31% lower transfer rate among similarly ill children receiving telemedicine compared to telephone consults
- Telemedicine consultations cost-saving
- Assuming 10 seriously ill children/year receiving telemedicine results in cost-savings of $38,366/year
- For every dollar invested in the telemedicine program, society saved twelve dollars

Cincinnati Children's change the outcome

PEDIATRIC TRAUMA TRANSFORMATION COLLABORATIVE

American College of Surgeon Committee on Trauma Changes

- 2006 New edition released
- No longer allowed "added qualifications in pediatrics"
- Required participation of a pediatric surgeon to qualify

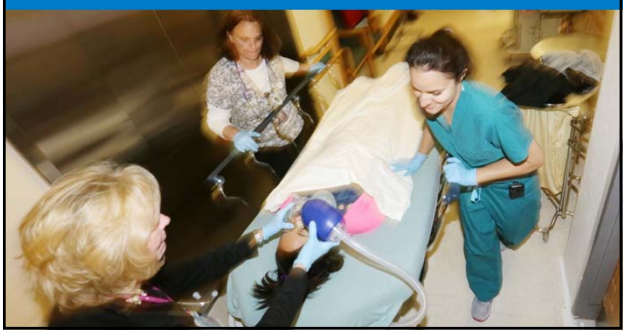
Cincinnati Children's
change the outcome

Goals of Collaborative Partnership

- Support hospitals committed to improving the care of injured children in their regions
- Help provide high quality of care in regions of need to reduce the need to transfer patients away from their families and support systems

Cincinnati Children's
change the outcome

Customizable Components



Participation in monthly performance improvement meetings

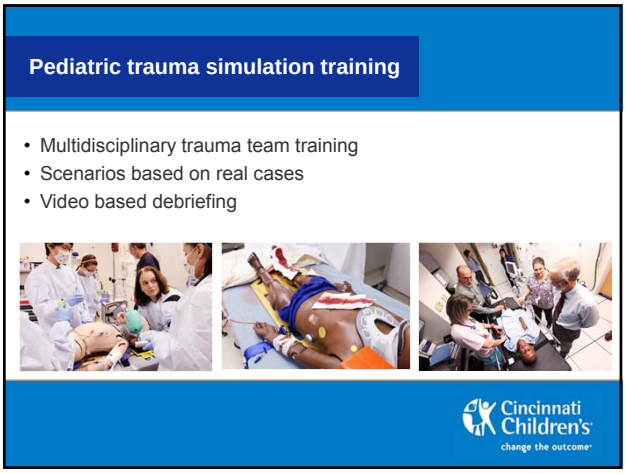
- Review of cases identified by participating hospitals
- Video conference participation in monthly multidisciplinary team meetings
- Identification of improvement opportunities and sharing of resources

Guideline development and support

All current trauma guidelines are made available to collaborative partners

Specific needs of individual partners are reviewed and support provided in developing and reviewing new guidelines


Pediatric trauma focused CME/CEU
Quarterly trauma lecture series available on-line for pediatric trauma CME/CEU
Comprehensive Children's Injury Center monthly lecture series available on-line
CME/CEU provided for performance improvement meetings
Cincinnati Children's
change the outcome


Pediatric trauma simulation training
• Multidisciplinary trauma team training
• Scenarios based on real cases
• Video based debriefing
Cincinnati Children's
change the outcome


24/7 availability for phone consultation
Pediatric Trauma Surgeons are available for immediate phone consultation regarding the care of an injured child
Cincinnati Children's
change the outcome

Support for trauma center verification process

- Collaboration with individuals who have extensive experience with the ACS review process during preparation
- Mock reviews
- Participation on site on day of review

Peer to Peer Support

- Physician and nurse shadowing opportunities
- Registrar expertise support
- Program Manager collaboration
- Pediatric Trauma Nurse Practitioner

Outcomes

ACS Verification

- St. Mary's Hospital in Evansville, IN successfully verified twice as Level II Pediatric Trauma Center
  - First under new rules without an on-site pediatric surgeon
- Parkview Hospital in Fort Wayne, IN verified as Level II Pediatric Trauma Center
- Sanford Hospital in Fargo, ND beginning verification process since starting collaboration

Both verified sites had the PTTC listed as one of the key strengths of their program

Cincinnati Children's change the outcome

Improvement Initiatives

- Image/radiation reduction
- Cervical Spine clearance
- Non-accidental trauma evaluation process
- Safe transport checklists for children
- Trauma team notification system to include pediatric critical care physician
- Pediatric trauma outreach/follow up

Cincinnati Children's change the outcome

Solid Organ Management

	Pre-Partnership N=32 (10.7/year)	Post-Partnership N=48 (11.8/year)	P
Age	11.7	12.5	0.1329
LOS	7.7	4.3	0.0319
# of lab draws	10.9	6.0	0.0014
Injury grade (median)	2.5	2.4	0.4129
% repeat abdominal CT scan	46.4	11.0	0.0001
Total abdominal CT scans (mean)	1.7	1.1	<0.0005



Future Steps

- Expand the number of partners
- Increase collaborative learning opportunities across centers
- Increase the quality and benchmark metrics across sites to improve care and patient safety
- Grow emergency pediatric care component of the collaborative program

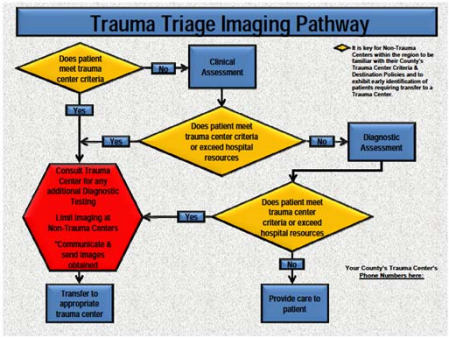
Cincinnati Children's
change the outcome

Thank You!

Cincinnati Children's
change the outcome

PEDIATRIC TRAUMA TRANSFER

Resources, Guidelines, Pathways and Surge



Pediatric Trauma Interfacility Transfer Guidelines

I. Goal:
Guide the expedient and appropriate inter-facility transfer of pediatric patients from the first facility providing care to definitive care at a hospital with pediatric trauma care resources.

II. Definition:
A pediatric patient is anyone who has not reached their 15th birthday or anyone with an injury requiring specific pediatric expertise.

III. Criteria for Appropriate/Recommended Transfer:

Physiologic Criteria (as referenced in the ATLS manual and curricula)

1. Decreased or deteriorating neurologic status GCS < 14
2. Respiratory distress or failure
3. Endotracheal intubation and/or ventilatory support and children requiring anesthesia
4. Shock of any type, compensated or uncompensated
5. Injuries requiring blood transfusion
6. Care requiring any one of the following:
   a. Invasive monitoring (arterial and/or central venous pressure)
   b. Intracranial pressure monitoring
   c. Vasoactive medications

Anatomic Criteria

1. Fractures and penetrating injuries to an extremity which may be complicated by neurovascular and/or compartment injury
2. Fracture of two or more long bones (femur, humerus, tibia/fibula)
3. Suspected injury to the axial skeleton or spinal cord
4. Traumatic amputation and crush injuries
5. Significant head injury with any of the following either suspected or documented (No need to validate with imaging studies prior to transfer.):
   a. Basilar skull fractures with potential for cerebrospinal fluid leaks e.g., hemotympanum
   b. Open and/or penetrating head injuries
   c. Depressed skull fractures
   d. Decreased level of consciousness e.g., GCS < 14
   e. Intracranial hemorrhage or contusion

f. Suspected concussion syndrome with persistent symptoms (emesis, confusion and/or headache)

6. Penetrating (into the subcutaneous tissue) wounds to the head, neck, thorax, abdomen, pelvis or proximal extremity
7. Pelvic fracture
8. Blunt injury to the chest or abdomen
9. Ocular injuries
10. Degloving injuries especially with possible tendon injury

IV Guidelines for transfer

1. Hospital resources: If the child's injuries or potential injuries exceed or have the potential to exceed the resources available at the initial point of care, that child should be transferred expeditiously to a facility with the resources and experience to provide the optimal care for the pediatric patient. This recognizes that special skills, equipment and personnel are necessary for the optimal care of the pediatric patient.
2. Contact receiving trauma surgeon (or designated receiving physician): The trauma surgeon at the receiving trauma center should be contacted as soon as possible to discuss appropriate care and transfer.
3. Contact receiving trauma surgeon prior to diagnostic imaging. This should be done prior to diagnostics including imaging studies so that quality studies will be obtained without exposure to radiation.
4. Expeditious transfer: Collaborate with receiving facility regarding the specific mode of transportation and patient care requirements during transfer.
5. Transfer facility responsibilities: The sending facility will identify the accepting trauma surgeon and provide the trauma surgeon with a concise summary of the following:
   a. Age of patient
   b. Mechanism of injury
   c. Time of injury
   d. GCS
   e. List of injuries already diagnosed
   f. Hemodynamic stability
   g. List of interventions (including volume and type of fluids given)
   h. Proposed mode of transfer
   i. Diagnostic results, including radiographic imaging (if already completed)
6. Information to accompany patient: Hospital and healthcare facilities are strongly urged to establish inter-facility transfer agreements and establish feasible modes and mechanisms of transfer and to explore mechanisms of data collection and quality review. This would provide a mechanism for expedient and appropriate transfer to definitive care. (See attached template)

Washington State Department of Health Office of Emergency Medical Services & Trauma System

Template for an Inter-facility Transfer Check-list

Items to send with patient and transfer crew:

- ☐ (2) Face Sheet (name, address, etc)
- ☐ EMS Run Sheet (if available)
- ☐ ED Physician Notes (H&P or other document)
- ☐ Copies of lab work
- ☐ Copies of x-rays, ultrasounds, CT scan, *etc* (Forward electronically via VPN network if possible, Digital if available; or copies of images)
- ☐ Copy of ECG (if applicable)
- ☐ Radiologist reports on all imaging (if available)
- ☐ Copy of medication administration record
- ☐ Intake and output record for past 24 hrs (if applicable) or ED amounts
- ☐ (2) Copies of past 24 hrs of vital signs or ED record
- ☐ Copy of signed transport transfer consent
- ☐ Discharge Dictation (if applicable)

Name of pt:_____ age:_____

Diagnosis:_____

Transfer to:_____

Accepting Physician:_____

Transferring Physician:_____

Transferring Hospital:_____

Transfer Level of care:	Method of transfer:
☐ Basic Life Support ☐ Advanced Life Support ☐ Pediatric Transport Team	☐ Ground BLS ambulance ☐ Medic or ALS unit ☐ Rotary Wing (helicopter) Name of Service:_____ ☐ Fixed Wing (airplane) Name of Service:_____

- ☐ Family given written directions to facility
- ☐ Family given phone number of receiving unit or receiving Emergency Department
- ☐ Family given patient belongings
- ☐ Family contact phone number:_____

Opportunities

- Children are not little adults
- Good – many pediatric trauma patients are not even cared for at trauma centers
- Better – adult trauma centers are required to care for a minimum number of pediatric patients in order to be designated for pediatric care
- Best – a pediatric trauma center
- Establish transfer agreements in advance

Disaster Surge

- Same basic principles apply
- You may need to treat patients longer
- Send most in need of pediatric expertise first
- Review resources in advance
- One size does not fit all in pediatrics

Summary

- Know your resources
  - Tool kit (D. Fendya paper in Pediatric Emergency Care 27:900-906, 2011
- Know what you and your staff are comfortable with
- Please do not perform diagnostic studies unless you are treating at your facility
  - Less radiation at pediatric centers
- Remember collaboration
  - Telemedicine
  - Critical care team assessment
  - Collaborative arrangements