ESKENAZI HEALTH

Urban Level 1 Trauma Center: What Can and Must We Do for the Rural Hospital?

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Disclosures

- Conflicts of Interest:

Objectives

- Participants will recognize the value in a tiered trauma center
- Participants will be able to name 3 ways that a Level One Trauma Center can help the rural community
- Participants will identify 1 way that they can partner with a Level One Trauma Center for improved patient care.

Why should we look at Trauma in the Rural Setting?

- Injury is the #1 killer of Hoosiers between the ages of 1-44.

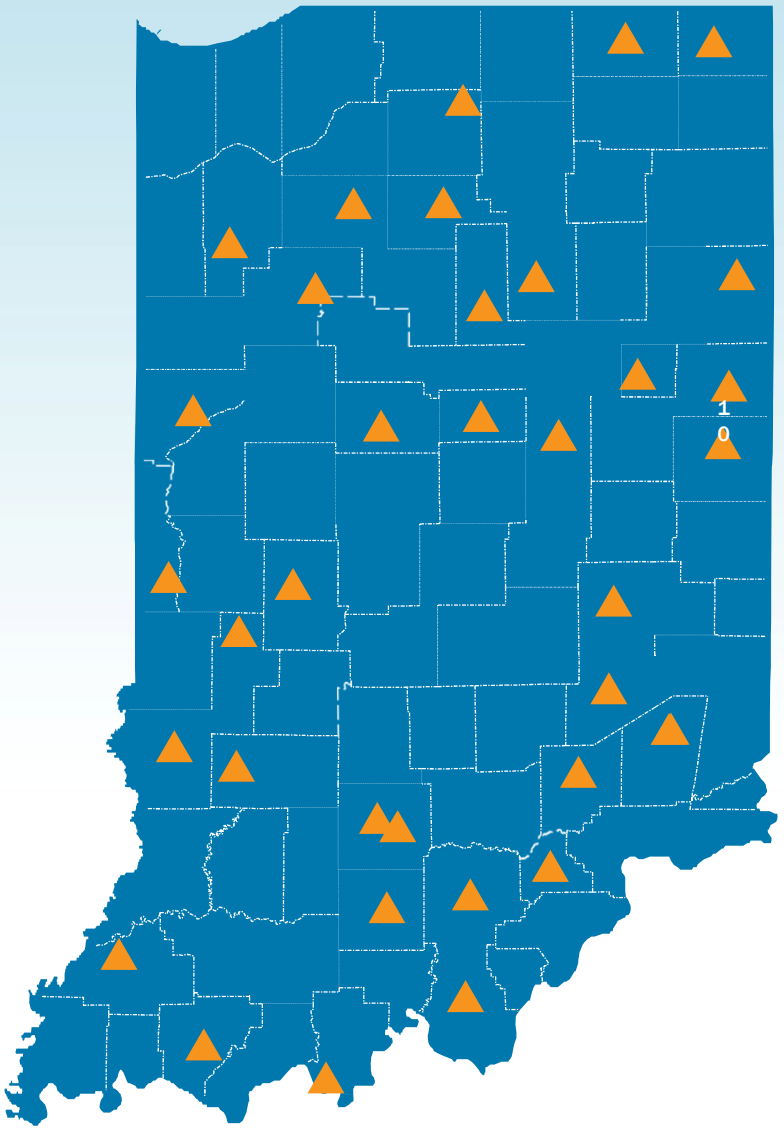
- Understanding everyone's role in a statewide trauma system is crucial in providing good care to trauma patients, especially in light of the fact that at least 60% of all trauma deaths occur in areas where only 25% of the population lives.-American College of Surgeons

Characteristics of Rural Trauma

- Lower volume of patients than urban settings
- High injury severity (really sick!)
- Limited resources
- Increased transport time to facilities

Critical Access Hospitals

-Located in rural setting
-25 beds or fewer
-35 miles from another hospital
-average length of stay <96 hours
-24/7 emergency care



Indiana Hospital Association 2017

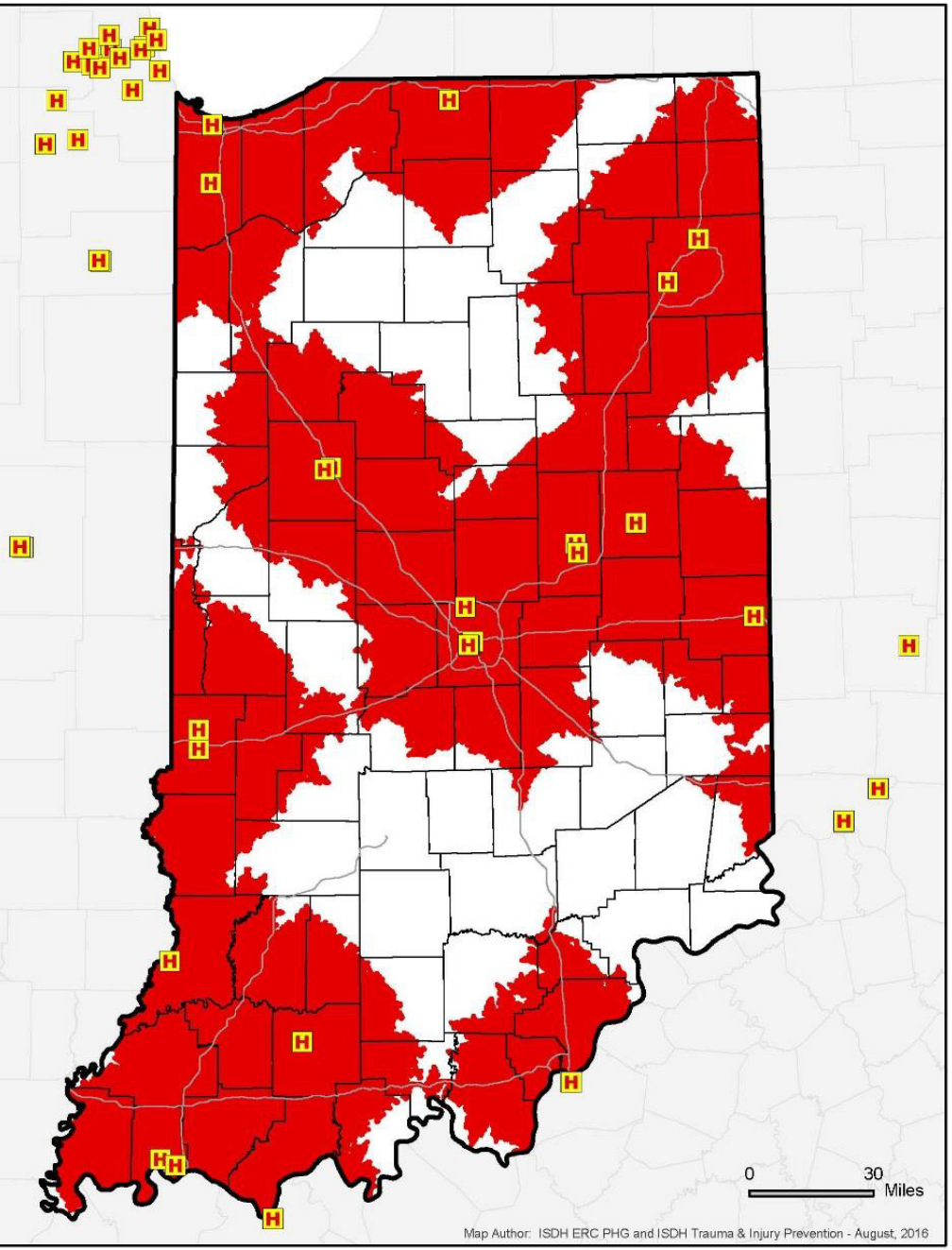
Indiana Trauma Center Access: Areas Within a 45-Minute Drive

	45-Minute Coverage (at average speed)		State Total
	n	% of state	n
Land Area	21,590 sq mi	60%	35,826 sq mi
Population	5,327,918 people	82%	6,483,802 people
Interstates	1,123 miles	91%	1,239 miles

* Considered a trauma center for purposes of the triage and transport rule.

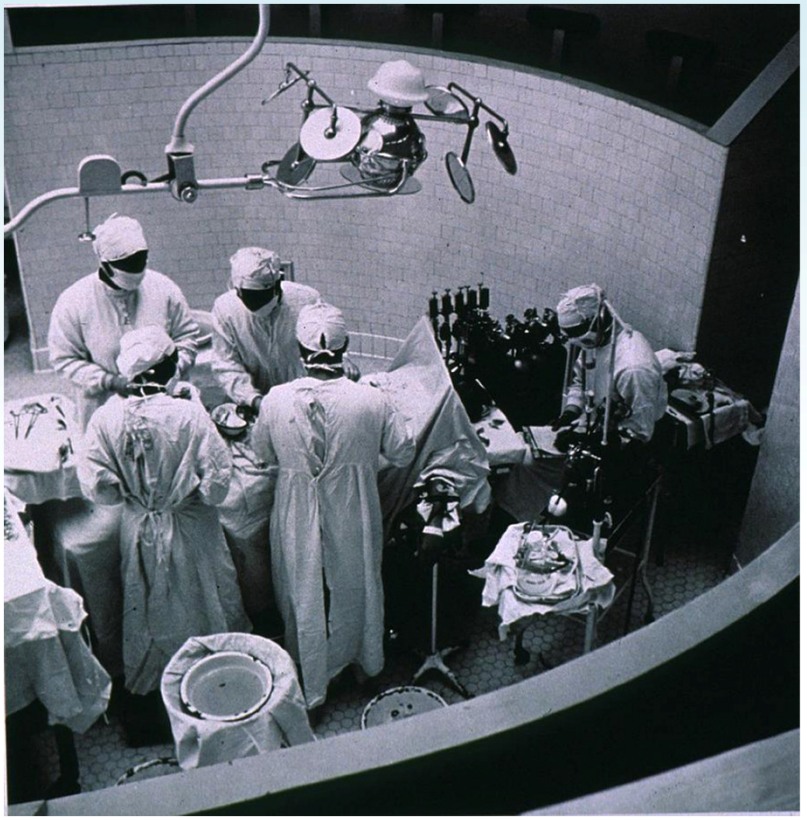
Travel times are calculated with 2016 street network reference data published by Esri. Travel times do not take into account current traffic volume or restrictions. Population and land area are calculated from the 2010 U.S. Census block summary geography. Interstate mileage is calculated using a single direction of a divided highway (source: INDOT). All statistics should be considered an estimate.

Indiana State Department of Health
Trauma and Injury Prevention



Cardiothoracic surgery in the 1950's

- Precision in medicine failed the heart surgeon
- The surgery was successful but the patient would die
- Cowley like others thought that these deaths were preventable
- Understand the causes of shock so that he could intervene but dog models would only go so far



The Study of Shock

- 1956 Cowley began investigations into the causes and treatments of shock
  - Shock was a complex problem that demanded a multidisciplinary program
  - “Death is not an event it is a process”
  - Through a system of observation attached real numbers to things – shock as a science with hard data
  - Developed a huge data bank
  - Began to predict survival and organ failure

R Adams Cowley

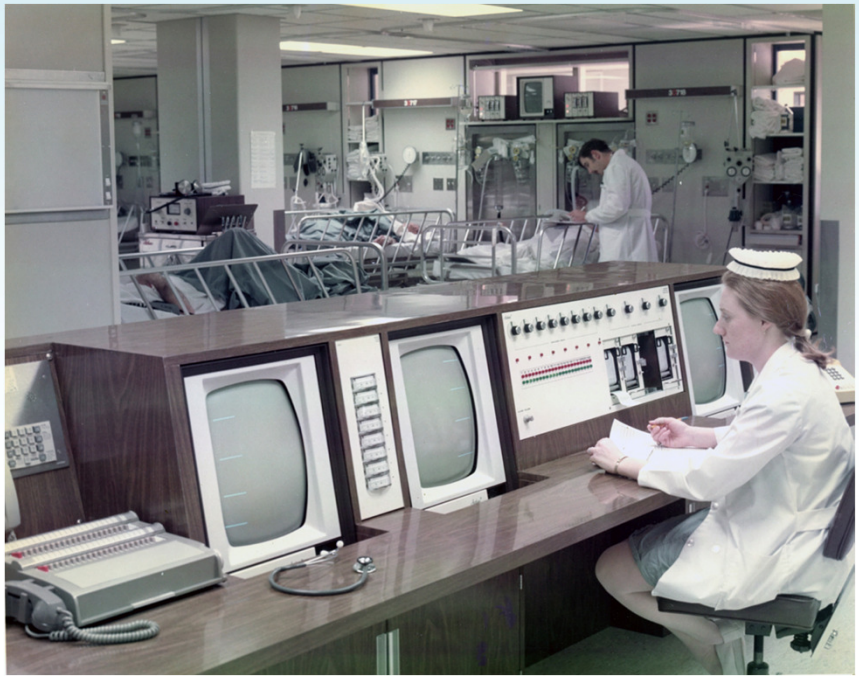
"There is an hour between life and death. If you are critically injured you have less then 60 minutes to survive. You might not die right then; it may be three days or two weeks later—but something has happened in your body that is irreparable . . . If I can get to you, and stop your bleeding, and restore your blood pressure, within an hour of your accident . . . Then I can probably save you. I call that the golden hour."

Trauma Center Concept in 1958-1961

- After many years of research shock should be studied in man not just animals
- First clinical shock trauma unit 2 then 4 beds
- Patients began to trickle in referred by other physicians but they came in dying
- Cowley were able to save some of those patients, getting them through the critical phase and then returning them to their own physicians
- “You don’t have to die”

Center for the Study of Trauma

- 1963 NIH grant for 800,000 with University of Maryland matching the grant ($10 million in today's dollars)
- Get the right people and the right equipment taking care of the right patients at the right time meant that timing was everything
- Treat shock more aggressively and not to let patients die while making the diagnosis
- System of protocols and methods that forced the medical community to treat trauma victims systematically rather than randomly



Trauma Centers Elsewhere

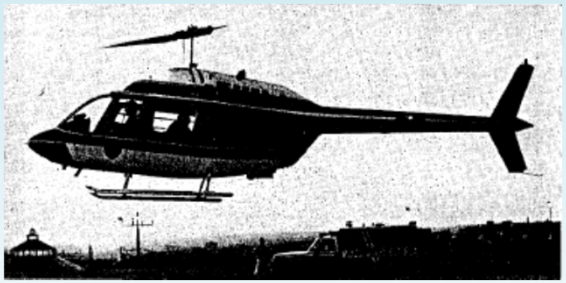
- 1966 trauma centers established at San Francisco General and Cook County Hospital in Chicago
- In response to increasing urban violence
- Keep inner-city hospitals full with loss of population to suburbs
- Passage of Medicare and Medicaid in 1965
- Recognized need for a systematic approach to trauma care

Intra-Professional Education

- Trained paramedics in life saving techniques
  - Trained paramedics to be paramedics not just orderlies
  - Iv access, airway management, and resuscitation
  - What has become PHTLS today
- Nurses given protocols and complete authority at the bedside in the shock trauma unit

Air Medical Transport

- 1968 negotiated to have patients brought in by helicopter to get patients to the shock trauma unit more quickly
- Maryland state police
  - They had the helicopters but only funding for one group
  - By combining forces they doubled the number of helicopters
  - Police run them but med-evac gets first priority
- First med-evac transported occurred in 1969 after the opening of the five-story, 32 bed Center for the Study of Trauma
  - Cowley et al. An econcomical and proven helicopter program for transporting the emergency critically ill and injured patient in Maryland. Journal of Trauma 1973;(13), 12:1029-1038.



Fortunes Fate

- 1970 Dr. Cowley felt that not a single patient should be denied the state-of-art treatment available at his center in Baltimore
- He envisioned a state wide system funded by the state of Maryland available to anyone who needed it
- When a Maryland Chief Clerk was injured Governor Mandel visited along with other legislators they met Dr. Cowley and learned about the program

Echelons System

- First statewide system
  - Communication system radio contact between scene, ambulances, hospitals and specialty referral centers
- Med-Evac system
- Local hospitals still provide 85%
- Regional referral hospitals 10%
- Specialty referral hospitals 5%
- Mortality in 1969 67% mortality in 1979 18% including all DOA's

Do Trauma Systems Improve Patient Outcomes?

Panel Review Studies

Mackenzie EJ. J of Trauma 1999;47:S34

- Expert panel reviews the medical records of injured patients who die to reach a conclusion regarding whether the patient could have survived given optimal treatment
  - Moylan et al. J Trauma 1976;16:516 => 21% ⇓
  - West et al. Arch Surg 1979;114:455 => 15% and 30% ⇓
  - Cales et al. Ann Emerg Med 1984;13:1 => 20% ⇓
  - Shackford et a. J Trauma 1986;26:812 => 11% ⇓

- All panel studies (12) show a significant reduction in the preventable death rate with implementation of trauma centers/system
  - Bulk of reduction from decreasing sub-optimal hospital care

Registry Comparisons

Jurkovich GJ and Mock C. J of Trauma 1999;47:S46

- A comparison of observed survival or mortality is made to the predicted survival or mortality rates in a“national” trauma database like MTOS
  - TRISS methodology
  - Shackford et al. Arch Surg 1987;122:523 => RR 0.87
  - Champion et al. Arch Surg 1992;127:333 => W=-8.22
  - Norwood et al. Arch Surg 1995;129:800 => RR 0.83
- 8 studies showed 15% to 20% reduction in mortality when compared with MTOS norms
  - Other studies that showed no statistical difference were rural hospitals and one Canadian study that showed an increased death rate without a system

Population Based Studies

Mullins RJ and Mann NC. J of Trauma 1999;47:S59

- Evaluate the outcomes of an entire population in a region or state using large existing databases
  - Death certificates, discharge data, FARS and registries
  - Multivariate modeling is used to control for covariates
  - Boyd et al. J Trauma 1973;13:276 => 2.7/100 to 1.8/100
  - Rutledge et al. Ann Surg 1993;218:512 => 5/10K to 4/10K
  - Rogers et al. Arch Surg 1997;132:376 =>4/10K to 2/10K
- 13 studies show a 15 to 20% reduction in the risk of death after a trauma center/system is in place
  - one study showed no statistical difference

Relationship Between Trauma Center Volume and Outcomes

Nathens et al. JAMA 2001;285:164

- Retrospective study of 1019 patients at 31 academic level I and level II trauma centers
- Severity of illness adjustment for patient characteristics and ISS
- Relative odds of death for penetrating abdominal trauma
  - Shock 0.02 (0.002-0.25 CI)
- Relative odds of death for multi-system blunt trauma
  - CHI 0.49 (0.26-0.93 CI)
- Significant improvement in mortality and LOS occurs after 650 cases per year with an ISS >15

Is trauma care able to restore health, function and employment?

QALY's in Trauma Care

Séguin J et al. An economic evaluation of Trauma Care in a Canadian Lead Trauma Hospital. J Trauma 1999;47:S99-105

- Quality Adjusted Life Year (QALY)
- Measures both the number of years gained by the health intervention and the person's preference for the achieved outcome
  - H.Pylori Rx in PUD $3100
  - CABG $9500
  - Dialysis $54,400
  - LVAD $150,000

QALY's in Trauma Care

Séguin J et al. An economic evaluation of Trauma Care in a Canadian Lead Trauma Hospital. J Trauma 1999;47:S99-105

	$ Canadian Cost/Patient	$ U.S. Cost/Patient	$ U.S. Cost/QALY
All Patients	$14,990	$21,757	$2,621
Survivors	$14,435	$20,951	$2,054
Non-Survivors	$17,308	$25,122	$0
ICU	$24,947	$36,209	$5,173
Non-ICU	$8,900	$12,917	$1,435
ISS			
13-24	$4,424	$6,421	$690
25-40	$17,350	$25,182	$3,270
41-49	$23,596	$34,247	$7,445
50-74	$11,563	$16,783	$3,051

Numbers updated from date of study using CPI and US$ and Canada$ exchange rate of 1.4514 from 4/23/03

- *What Does the Indiana System Look Like Today?*

Indiana's Journey to a Trauma System

Trauma System Task Force

- 2004-Formed
- 2006-State hired Trauma System Manager

ACS Recommendations

- 2009-Gov. Daniels reached out to Dr. Gomez to lead IN effort
- 2010-IN State Trauma Care Committee formed

ACS Verification Process

- 2013- ACS verification process approved statewide
  - Increase # of statewide centers
- Trauma Registry Rule
  - Gathers info from EMS, EDs, Rehabs

Trauma Centers *in Indiana*

Level I

Indianapolis

Eskenazi Health

IU Health Methodist Hospital

Riley Hospital for Children at IU Health

St. Vincent Hospital & Health Services

Level II

Evansville

Deaconess Hospital

St. Vincent - Evansville

Ft. Wayne

Lutheran Hospital of Indiana

Parkview Regional Medical Center

South Bend

Memorial Hospital of South Bend

Terre Haute

Terre Haute Regional

Level III

Lafayette

Franciscan St. Elizabeth Health - Lafayette East

IU Health - Arnett Hospital

Muncie

IU Health - Ball Memorial Hospital

Anderson

St. Vincent Regional Hospital

Community Hospital - Anderson

Vincennes

Good Samaritan Hospital

Bloomington

IU Health Bloomington

Gary

Methodist Hospitals - Northlake Campus

Terre Haute

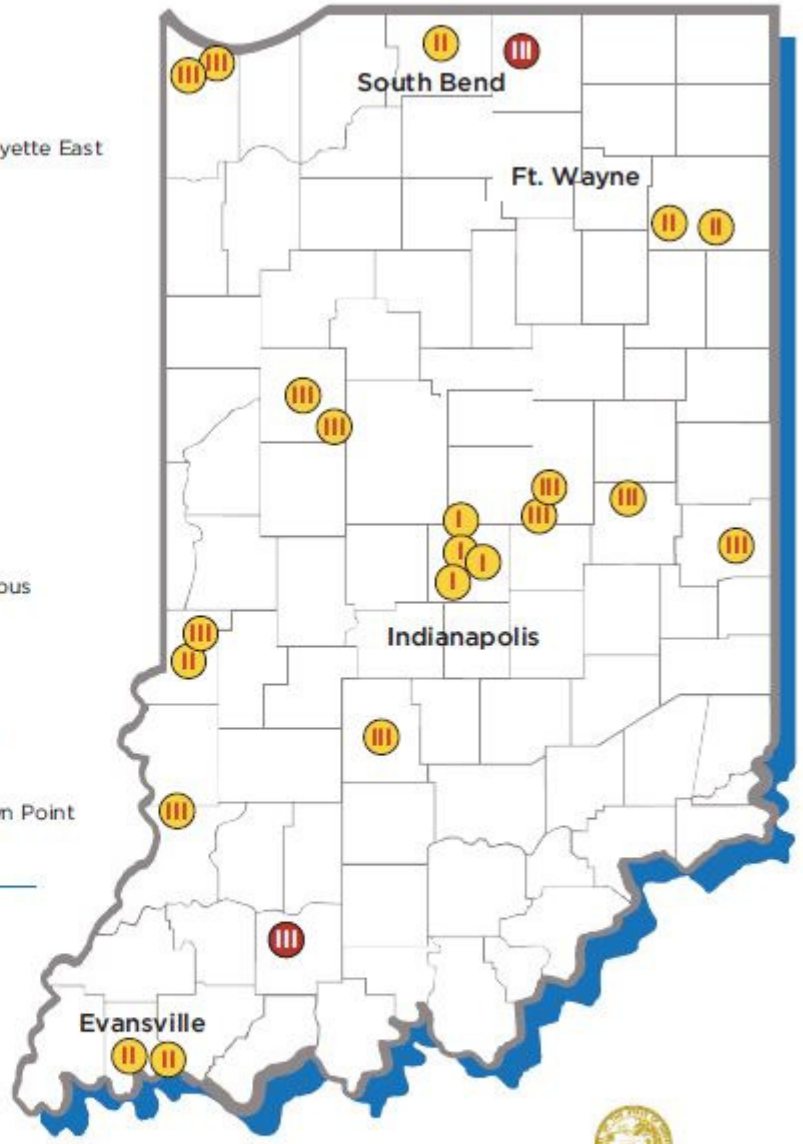
Union Hospital - Terre Haute

Richmond

Reid Hospital & Health Care Services

Crown Point

Franciscan St. Anthony Health - Crown Point



In the process of ACS Verification

Level III

Jasper

Memorial Hospital and Health Care Center

Elkhart

Elkhart General Hospital

Total Trauma Centers in Indiana*

- Level I = 4
- Level II = 6
- Level III = 13

Total = 23

Indiana State Department of Health

Trauma and Injury Prevention

* Total includes current and In Process Trauma Centers

Updated: 3-19-2018

Level 3 Center

- 24-hr immediate coverage by Emergency MD
- Prompt availability of general surgeon and anesthesia
- Transfer agreements in place for transfer to Level I or Level II facility

Level 2 Center

- Total care from prevention through rehab
- 24-hr in house coverage by surgery
- Leadership in injury prevention
- Comprehensive performance improvement program
- Substance abuse screening and intervention

Level 1 Center

- Total care from prevention through rehab
- Associated with a school of medicine
- Facilitates Research
- Provides teaching opportunities
- 24-hr in house coverage by surgery
- Leadership in injury prevention
- Comprehensive performance improvement program
- Substance abuse screening and intervention
- Minimum of 1200 pts/yr

Great Patient Care is a Collaborative Effort Between Us

Indiana Trauma Care
Elements of the System

Smith Level I
Shock Trauma Center

What We Have to Offer: Before the Trauma

- Prevention
- Education
- Assistance with planning

Prevention

"Injuries are NOT accidents! An accident is an unexpected occurrence, happening by chance. An injury is a definable, correctable event, with specific risks for occurrence."- Indiana State Department of Health

- Public education on risks
- Identification of common contributing factors in trauma in your community
  - Risky behaviors
  - Dangerous speed limits

Education

We Can Come to You!

- Training for MDs, RNs, EMS, Multidiscipline Teams
- Courses: Rural Trauma, TNCC, ENPC, ATLS
- Custom presentations
  - How to identify a sick patient before the work up is complete

Assistance with Planning

- Clinically
  - Tours of our facility
  - Shadow experiences for various disciplines
- System structure
  - Help other facilities become trauma centers
  - Reviews of other facilities' care areas (e.g ORs)

What We Have to Offer: During the Trauma

- Consults and Facility Transfer

1800-4-Trauma

(24/7 Access to our team)

What We Have to Offer: After the Trauma

- Patient outcome information
- Feedback on Care
  - Currently audit every transfer and send letter to facility
- Case Debrief with EMS and/or Hospital team
- Audit and Review for EMS
- Help with performance improvement
  - Case Based or System wide

What We Need From You

What We Need From You: Before

- Community Prevention
  - Unique to your community
- Aging Population Considerations

What We Need From You: During

- Great Patient Care
  - ABCs, Strong Basics
  - Good patient prep for transport
- Strong Communication
- Early Transport
- Family Support

What We Need From You: After

- Short term:
  - Patient follow up options to get patient back to their community.

We need to reintegrate these patients into YOUR health care system

- Long Term
  - Rehab services

Indiana Trauma System: Freestanding Rehabilitation Hospitals

H Freestanding Rehabilitation Hospitals

Rehabilitation Hospital of Fort Wayne

Lafayette Regional Hospital

Community Health Network

Rehabilitation Hospital of Indiana

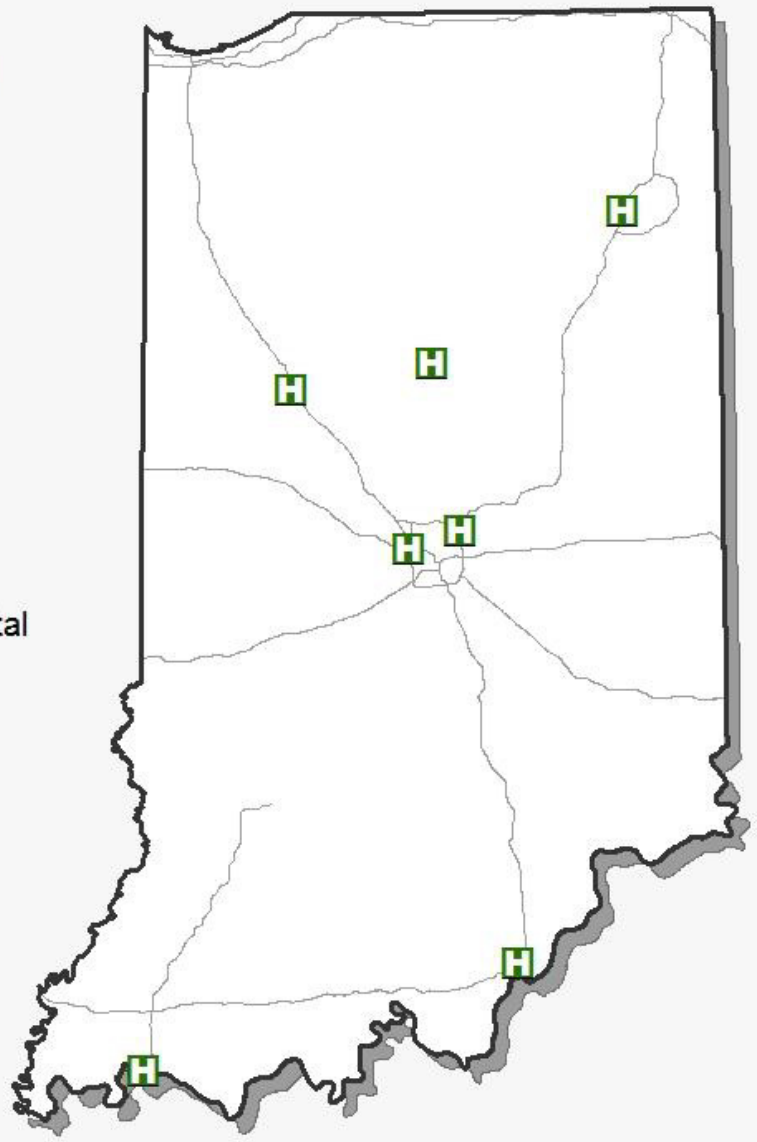
Community Howard – West Campus Specialty Hospital

Southern Indiana Rehabilitation Hospital

Healthsouth Deaconess Rehab Hospital

Indiana State Department of Health
Trauma and Injury Prevention

The Trauma Registry Rule mandates that rehabilitation facilities report specific data to the Indiana Trauma Registry.



Map Author: ISDH Trauma & Injury Prevention - February, 2015

Reach Out To Us!

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Booth #

Resources

- Indiana Trauma Transfer Guidelines
- Preventing Injuries in Indiana Resource Guide
- Indiana State Department of Health Trauma Website
- Indiana State Rural Health Plan
- Indiana State Office of Rural Health Programs
- Indiana State Trauma Care Committee Orientation