

Trauma & Trauma System

A trauma system is an organized, coordinated approach to treating individuals who have sustained severe injuries requiring rapid evaluation and transport to specific hospitals with trauma care staff, equipment, and capabilities to provide the needed comprehensive care. The ultimate goal of an efficient and effective trauma system is to get the right patient the right care, at the right place, at the right time. Research indicates there is a 25% reduction in deaths for severely injured patients who receive care at a American College of Surgeons (ACS) verified level I trauma center rather than a non-trauma center.¹ However, not all injured patients can or should be transported to a level I center, therefore Emergency Medical Service (EMS) providers must perform field triage to assist in determining the most appropriate level of care needed for the patient. Injuries and violence have a significant impact on the well-being of Americans by contributing to premature death, disability, poor mental health, high medical costs, and lost productivity. The effects of injuries and violence extend beyond the injured person or victim of violence to family members, friends, employers, and communities.²

How does trauma affect the United States?

Fatal data

- Injury is the leading cause of death for people ages 1–44 years in the United States.³
- Nearly 193,000 people died from injuries in 2013—1 person every 3 minutes.³
- More children die due to injury than all other causes combined, thus all trauma systems should consider the unique needs of injured children and develop appropriate strategies to meet these needs.⁴

Non-fatal data

- Injury is a leading cause of disability for all ages, regardless of sex, race/ethnicity, or socioeconomic status.³
- Non-fatal injuries contributed to more than 27 million emergency department (ED) visits and 2.5 million hospitalizations³
- Regardless of age, injured children most commonly die of, or are disabled by, central nervous system injury.⁴

Cost data

- In 2010, the estimated medical and work loss lifetime costs in United States totaled \$113.2 billion for unintentional injury deaths, \$44.6 billion for suicide deaths and \$25 billion for homicide deaths.³
- It is estimated that medical costs of injury account for 12% of national health care expenditures.⁴
- The ultimate goal of trauma care is to restore the patient to pre-injury status, which is not only best for the patient but it also is less costly. When rehabilitation results in independent patient function, there is a 90% cost savings compared to costs for repeated hospitalizations and custodial care.⁴

How does trauma affect Indiana?

- Injury is the leading cause of death for Hoosiers age 1 through 44 years and the fifth leading cause of death overall.
- In 2013, more than 4,400 Hoosiers died from injuries. More than 33,000 Hoosiers are hospitalized and more than 600,000 visit EDs for injuries each year.⁵
- Indiana does not have an integrated statewide trauma system, but has components of one, including: EMS providers, trauma centers, a trauma registry, and rehabilitation facilities.
- Indiana’s trauma system includes 11 trauma centers around the state: three ACS verified Level I, six verified Level II, and two Level III verified facilities.
- As of January 2015, 78% of the population was able to access trauma care within a 45 minute driving distance. Additionally, 51% of the land area and 89% of interstates in Indiana have access to trauma care within a 45-minute driving distance.

How do we address this problem?

Policy:

- In 2006, Governor Daniels signed Public Law 155 (now codified at [IC 16-19-3-28](#)) ordering the **ISDH to develop, implement and oversee a statewide comprehensive trauma care system**. Indiana Code states:
 - (a) The state department is the lead agency for the development, implementation, and oversight of a statewide comprehensive trauma care system to prevent injuries, save lives, and improve the care and outcome of individuals injured in Indiana.
 - (b) The state department may adopt rules under [IC 4-22-2](#) concerning the development and implementation of the following: (1) A state trauma registry; (2) Standards and procedures for trauma care level designation of hospitals.
- In November 2009, Gov. Daniels signed an Executive Order creating the **Indiana Trauma Care Committee**, which serves as an advisory body to the ISDH on all issues involving trauma. In January 2013, Governor Pence re-issued Gov. Daniels' original Executive Order.
- Gov. Daniels signed the **Triage and Transport rule** into law in August 2012, after ISDH and EMS staff worked for more than a year to get the rule passed. The rule mandates that the most seriously injured patients, those classified Step 1 and Step 2 by the CDC Field Triage Decision Scheme, be taken to a trauma center unless the trauma center is more than 45 minutes away or if the patient's life is endangered by going directly to a trauma center. In either case, the ambulance may take the patient to the nearest hospital.
- In November 2014, the **Trauma Registry rule** was published, requiring all hospitals with EDs, EMS providers, and rehabilitation hospitals, to report trauma cases to the **Indiana Trauma Registry**.

Data collection:

- The trauma registry is a core component of any statewide trauma system. The **Indiana Trauma Registry** collects pre-hospital (EMS), hospital, and rehabilitation data for trauma incidents, and serves as the repository into which statewide trauma data has been brought together to support three foundational activities: identification of the trauma population, statewide process improvement activities, and research.
 - The hospital component of the Indiana Trauma Registry was implemented in 2007, with initial participation by the seven American College of Surgeons (ACS) trauma centers at that time. This dynamic data registry can assess system improvement and outcomes. As of February 2015, 84 hospitals and 11 trauma centers in Indiana report to the Indiana Trauma Registry. Trauma data is reported on a quarterly basis.
 - The pre-hospital component started collecting EMS run sheets in January 2013, and has captured more than 1 million runs from 207 EMS providers as of June, 2015.
 - The rehabilitation component began data collection in June 2014.
- The **Indiana Trauma Registry** requires the National Trauma Data Bank (NTDB) data elements for each incident submitted and follows strict inclusion/exclusion criteria. The Indiana Trauma Registry Data Dictionary can be accessed here: <http://www.in.gov/isdh/25407.htm>

Education:

- The CDC provides the "**Field Triage Decision Scheme: The National Trauma Triage Protocol**" (Decision Scheme), to help emergency medical responders better and more quickly determine if an injured person needs care at a trauma center. The Decision Scheme is based on current best practices in trauma triage. Widespread use can ensure that injured people get the right level of care as quickly as possible. Website: <http://www.cdc.gov/fieldtriage/index.html>
- The **Rural Trauma Team Development Course** (RTTDC) emphasizes the important role of smaller, often rural, non-trauma hospitals in the overall state trauma system. The program covers key concepts in the triage of trauma patients, including the decision whether the hospital can meet the patient's needs or needs to transfer the patient to a trauma center. Understanding everyone's role in a statewide trauma system is crucial in providing good care to trauma patients, especially when at least 60% of all trauma deaths occur where only 25% of the population lives.

Interventions:

- Trauma centers have opportunities to reduce the burden of injury and trauma through reducing trauma recidivism and injury prevention activities. **ACS Verified Level I and II trauma centers are required to have a designated injury prevention coordinator.** Trauma-center based injury prevention programs, outreach activities, and community partnerships are strategies to reduce injury-related morbidity and mortality.⁴
- The ACS Committee on Trauma requires all trauma centers to implement universal **screening and brief intervention** for alcohol use for all injured patients.⁴ Brief alcohol interventions conducted at trauma centers have been shown to reduce trauma recidivism by as much as half.⁷

Collaborations:

- The **Indiana State Trauma Care Committee** is established through Executive Order. Governor Daniels originally created the committee in 2009 and Governor Pence re-issued the Executive Order in 2013. The Committee serves as an advisory group for the Governor and State Health Commissioner regarding the development and implementation of a comprehensive statewide trauma system. The Committee meets quarterly and has several subcommittees: Designation, Performance Improvement, and Trauma System Planning. Website: <http://www.in.gov/isdh/25400.htm>

Measures: Healthy People 2020:

Injury and Violence Prevention (IVP)-8: Increase access to trauma care in the United States

IVP-8.1: Increase the proportion of the population residing within the continental U.S. with access to trauma care

IVP-8.2: Increase the proportion of the land mass of the continental U.S. with access to trauma care

Additional resources:

- a. ISDH Division of Trauma and Injury Prevention: <http://www.in.gov/isdh/19537.htm>
- b. Indiana State Trauma Care Committee: <http://www.in.gov/isdh/25400.htm>
- c. Indiana Trauma Network: <http://www.in.gov/isdh/25966.htm>
- d. American Association for the Surgery of Trauma(AAST) : <http://www.aast.org/Default.aspx>
- e. American Academy of Orthopaedic Surgeons/ Orthopaedic Trauma Society: <http://www.aaos.org/home.asp>
- f. American College of Surgeons Committee on Trauma (ACS-COT): <https://www.facs.org/quality-programs/trauma>
- g. American Trauma Society (ATS): <http://www.amtrauma.org/>
- h. Pediatric Trauma Society (PTS): <http://pediatrictraumasociety.org/>
- i. National EMS Advisory Council: <http://ems.gov/>
- j. Society of Trauma Nurses (STN): <http://www.traumanurses.org/>
- k. Trauma Prevention Coalition: <http://www.aast.org/trauma-prevention-coalition>
- l. Trauma Survivors Network (TSN): <http://www.traumasurvivorsnetwork.org/>
- m. Resources for Optimal Care of the Injured Patient- 6th Edition: <https://www.facs.org/quality-programs/trauma/vrc/resources>

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2. Finkelstein, E.A., Corso, P.S., Miller, T.R. (2006). *Incidence and economic burden of injuries in the United States*. New York: Oxford University Press.
3. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) [online]. (2015). Retrieved from <http://www.cdc.gov/injury/wisqars/fatal.html>.
4. American College of Surgeons Committee on Trauma. (2014). Resources for Optimal Care of the Injured Patient 2014 (6th edition) [Electronic]
5. Indiana State Department of Health, Epidemiology Resource Center, Data Analysis Team.
6. American College of Surgeons Committee on Trauma. Rural Trauma Team Development Course, 3rd Edition.
7. Gentilello, L.M., Rivara, F.P., et al. (1999). Alcohol interventions in a trauma center as a means of reducing the risk of injury recurrence. *Ann Surg*, 230(4):473-80.