2016

ISTCC Orientation

Division of Trauma and Injury Prevention
Indiana State Department of Health
8/25/2016

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1 Indiana State Trauma Care Committee (ISTCC)

1.1 Indiana's Trauma System

A trauma system is an organized approach to treating patients with acute injuries. We need to evaluate the ***entire*** trauma system to get a better understanding of the continuum of trauma patient care in Indiana.

1.2 Executive Order

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.

1.3 ISTCC Structure

Every committee member is appointed by the governor and fulfills the roles listed in the Executive Order.

Executive Order Role:	Role/Representing	Member	Representing
a. The State Health Commissioner or the Commissioner's designee.	Chair	Jerome M. Adams, MD, MPH	ISDH
b. The Executive Director of the Department of Homeland Security or the Executive Director's designee.	Vice Chair	David Kane	IDHS
c. One physician licensed under IC 25-22.5 from each hospital in Indiana that has an accredited level I or level II trauma center.	Level I Trauma Center Physician	Gerardo Gomez, MD	Eskenazi Health
	Level I Trauma Center Physician	R. Lawrence Reed, MD, FACS, FCCM	IU Health – Methodist Hospital
	Level I Trauma Center Physician	Thomas M. Rouse, MD	IU Health – Riley Hospital for Children
	Level II Trauma Center Physician	Lewis E. Jacobson, MD, FACS	St. Vincent Indianapolis Hospital
	Level II Trauma Center Physician	*Vacant*	St. Mary's Hospital
	Level II Trauma Center Physician	Donald Reed, MD, FACS	Lutheran Hospital
	Level II Trauma Center Physician	Scott Thomas, MD	Memorial Hospital of South Bend
	Level II Trauma Center Physician	W. Matthew Vassy, MD	Deaconess Hospital
	Level II Trauma Center Physician	*Vacant*	Parkview Regional Medical Center
One emergency medicine physician licensed under IC 22-22.5 recommended by the Indiana Chapter of the American College of Emergency Physicians.	Emergency Medicine Physician	Chris Hartman, MD	St. Francis Hospital and Health Centers
One emergency medical services provider.	Emergency Medical Services Provider	Ryan E. Williams, RN, BSN, EMT-P	Reid Memorial Hospital

One individual representing fire rescue services appointed by the Governor.	Fire Rescue Services Representative	Tim Smith, Fire Chief	Vincennes Township Fire Department
Two nurses licensed under IC 25-23 who are employed as trauma care coordinators appointed by the Governor.	Nurse	Rebekah Dillon, RN	IU Health – Ball Memorial Hospital
	Nurse	Lisa Hollister, RN	Parkview Regional Medical Center
Two physicians licensed under IC 22-22.5 affiliated with a hospital that is 1) Is not accredited as a level I or level II trauma care center; and 2) Is located in either a rural area or Gary; recommended by the Indiana State Medical Association	Physician – Rural	David J. Welsh, MD	General Surgeon
	Physician – Gary	Michael A. McGee, MD	Methodist Hospital of Gary
A representative from the Indiana Hospital Association who is not from Marion County.	IHA Representative	Spencer Grover	Indiana Hospital Association
	Ex-Officio	Tony Murray	Professional Fire Fighters' Union of Indiana

1.4 ISTCC Meeting Information

The ISTCC meets on a bi-monthly basis at the Indiana State Department of Health located at 2 North Meridian Street in Indianapolis. The ISTCC provides a broad range of guidance. Meeting topics have included:

- Trauma system updates.
    - Subcommittee updates.
- Trauma registry data reports.
- Trauma system rules and regulations.

- Review of "in the process of ACS verification" trauma center status applications and one year review documents.
- Updates/information from Office of EMS and prehospital care by the Indiana Department of Homeland Security.
- Updates/information from the Indiana Disaster Management and Emergency Preparedness division at ISDH.
- Regional trauma system development information.
- Injury prevention updates/information from the Injury Prevention Advisory Council.
- Statewide trauma tour events.
- Trauma education opportunities.

1.5 ISTCC Subcommittees

The ISTCC has several subcommittees that meet on a regular basis. As the development of the statewide trauma system evolves, so will the subcommittees.

Designation Subcommittee

The ISTCC designation subcommittee was established in 2012. They advise the ISDH on all matters regarding state designation. They helped the EMS Commission create the guidelines for the "in the process of ACS verification" trauma center status, review applications and 1 year review documents, and make recommendations to the ISTCC. The ISTCC designation subcommittee will also help draft the state's trauma center designation rule.

ISTCC Designation Subcommittee Members	
ISTCC members	
Gerardo Gomez, *Chair*	Smith Level I Shock Trauma Center at Eskenazi Health
Lewis E. Jacobson	St. Vincent Indianapolis Hospital
Lisa Hollister	Parkview Regional Medical Center
R. Lawrence Reed	IU Health – Methodist Hospital
Spencer Grover	Indiana Hospital Association
Subcommittee participants	
Amanda Pickett	St. Vincent Indianapolis Hospital
Emily Fitz	Indiana American College of Emergency Physicians
Jennifer Konger	Parkview Regional Medical Center
Jennifer Mullen	Methodist Hospitals, Northlake Campus
Judi Holsinger	St. Vincent Indianapolis Hospital
Kevin Loeb	Indiana American College of Emergency Physicians
Matthew Sutter	Indiana American College of Emergency Physicians
Melissa Hockaday	IU Health – Methodist Hospital
Terri Joy	Smith Level I Shock Trauma Center at Eskenazi Health
Wendy St. John	Smith Level I Shock Trauma Center at Eskenazi Health
ISDH Staff	
Art Logsdon	Assistant Commissioner, Health & Human Services Commission
Katie Hokanson	Director, Trauma and Injury Prevention
Ramzi Nimry	Trauma System Performance Improvement Manager

Performance Improvement Subcommittee

The performance improvement subcommittee was established January 2013. They identify areas of opportunity in the statewide trauma system utilizing aggregate data from the Indiana Trauma Registry to track and trend results of their efforts in improving the overall system.

ISTCC Performance Improvement Subcommittee Members	
ISTCC members	
R. Lawrence Reed, *Chair*	IU Health – Methodist Hospital
Spencer Grover	Indiana Hospital Association
Lisa Hollister	Parkview Regional Medical Center
Rebekah Dillon	IU Health – Ball Memorial Hospital
Subcommittee participants	
Adam Weddle	Community Health Network, Community North
Amanda Rardon	IU Health – Arnett Hospital
Annette Chard	Lutheran Hospital
Brittanie Fell	Terre Haute Regional Hospital
Carrie Malone	Terre Haute Regional Hospital
Chris Wagoner	St. Vincent Indianapolis Hospital
Christine Claborn	Franciscan Alliance St. Francis Hospital - Indianapolis
Chuck Stein	Eskenazi Health
Dawn Daniels	IU Health – Riley Hospital for Children
Dusten Roe	Memorial Hospital of South Bend
Emily Grooms	Memorial Hospital of South Bend
Gene Reiss	Franciscan St. Francis – Indianapolis Hospital
Jennifer Mullen	Methodist Hospitals, Northlake Campus
Jeremey Malloch	Community Health Network, Community North
Jodi Hackworth	IU Health – Riley Hospital for Children
Kasey May	Community Health Network
Kelly Mills	Union Hospital
Kristi Croddy	Community Health Network, Community East
Latasha Taylor	Methodist Hospitals, Northlake Campus
Lesley Lopossa	IU Health - Bloomington Hospital
Lindsey Williams	IU Health - Bloomington Hospital
Lynne Bunch	IU Health – Ball Memorial Hospital
Marie Stewart	St. Mary's Hospital of Evansville
Mark Rohlfing	Community Hospital of Anderson
Mary Schober	Community Health Network, Community East & South
Melissa Hockaday	IU Health – Methodist Hospital
Meredith Addison	Terre Haute Regional Hospital
Michele Jolly	Deaconess Hospital
Peter Jenkins	IU Health – Methodist Hospital
Regina Nuseibeh	Franciscan St. Elizabeth – East Hospital
Sarah Quaglio	St. Vincent – Kokomo Hospital
Sean Kennedy	Community Health Network, Community East
Stephanie Savage	IU Health – Methodist Hospital
Tammy Robinson	Terre Haute Regional Hospital
Tara Roberts	IU Health – Methodist Hospital

Tracy Spitzer	IU Health – Methodist Hospital
Wendy St. John	Smith Level I Shock Trauma Center at Eskenazi Health
ISDH Staff	
Katie Hokanson	Director, Trauma and Injury Prevention
Ramzi Nimry	Trauma System Performance Improvement Manager
Camry Hess	Database Analyst

Trauma System Planning Subcommittee

The trauma system planning subcommittee was established the summer of 2014. They assist the ISDH Division of Trauma and Injury Prevention in identifying priorities and establishing deadlines for trauma system development initiatives.

ISTCC Trauma System Planning Subcommittee Members	
ISTCC members	
Scott Thomas, *Co-Chair*	Memorial Hospital of South Bend
W. Matthew Vassy, *Co-Chair*	Deaconess Hospital
David Welsh	St. Margaret Mary Hospital
Spencer Grover	Indiana Hospital Association
Ryan Williams	Reid Hospital
Lisa Hollister	Parkview Regional Medical Center
Subcommittee participants	
Annette Chard	Lutheran Hospital
Carrie Malone	Terre Haute Regional Hospital
Jennifer Mullen	Methodist Hospitals, Northlake Campus
Jennifer Konger	Parkview Regional Medical Center
Lisa Gray	St. Mary's Hospital of Evansville
Judi Holsinger	St. Vincent Indianapolis Hospital
ISDH Staff	
Art Logsdon	Assistant Commissioner, Health & Human Services Commission
Katie Hokanson	Director, Trauma and Injury Prevention
Jessica Skiba	Injury Prevention Epidemiologist
Ramzi Nimry	Trauma System Performance Improvement Manager
Murray Lawry	EMS Registry Manager / INVDRS Coroner Records Coordinator
Camry Hess	Database Analyst

Indiana Trauma Quality Improvement Program Subcommittee

The Indiana trauma quality improvement program subcommittee was established the summer of 2016. They assist the ISDH Division of Trauma and Injury Prevention with creating an Indiana Trauma Quality Improvement Program (InTQIP) – a data analysis tool that hospitals can utilize to improve patient safety while reducing the cost of trauma care.

ISTCC Indiana Trauma Quality Improvement Program Subcommittee Members	
ISTCC members	
David Welsh	St. Margaret Mary Hospital

Lisa Hollister	Parkview Regional Medical Center
Subcommittee participants	
Amanda Rardon	IU Health – Arnett Hospital
Annette Chard	Lutheran Hospital
Carrie Malone	Terre Haute Regional Hospital
Chris Wagoner	St. Vincent Indianapolis Hospital
Dawn Daniels	IU Health Riley Hospital for Children
Jennifer Homan	Franciscan St. Anthony Hospital – Crown Point
Jonathan Saxe	St. Vincent Indianapolis Hospital
Mark Rohlfing	Community Hospital of Anderson
Mary Pargin	Good Samaritan Hospital
Melissa Hockaday	IU Health – Methodist Hospital
Meredith Addison	Terre Haute Regional Hospital
Michelle Ritchey	Union Hospital in Terre Haute
Peter Jenkins	IU Health – Methodist Hospital
Tracy Spitzer	IU Health – Methodist Hospital
ISDH Staff	
Katie Hokanson	Director, Trauma and Injury Prevention
Ramzi Nimry	Trauma System Performance Improvement Manager
Camry Hess	Database Analyst

2 State Leadership

2.1 State Government Leadership

- Governor
  - Mike Pence
- State Health Commissioner
  - Jerome M. Adams, MD, MPH
- Deputy Commissioner
  - Jennifer Walthall, MD, MPH
- Chief of Staff
  - Eric Miller
- Assistant Commissioner, Health & Human Services Commission
  - Arthur L. Logsdon, JD

2.2 Division of Trauma and Injury Prevention Staff

Katie Hokanson, Director, Trauma and Injury Prevention Division
Katie graduated from Purdue University with a Bachelor of Science degree in industrial engineering and a minor in management. She worked at Frito-Lay as a front line supervisor for a year and a half prior to joining ISDH in 2012. She started in the Division of Trauma and Injury Prevention as the Trauma Registry Manager and served in that role for two and a half years before moving into her current role as division director.
Contact information: khokanson@isdh.in.gov, 317-234-2865

Jessica Schultz, Injury Prevention Epidemiologist Consultant
Jessica graduated from Purdue University with a Bachelor of Science degree in Cellular, Molecular, and Developmental Biology and from the University Of Michigan School Of Public Health with a Master's degree in Epidemiology and a Certificate in Public Health Genetics. She worked at the UMSPH Center for Public Health and Community Genomics, St. Joseph Community Health Foundation, and the McMillen Center for Health Education prior to joining ISDH in 2013.
Contact information: jschultz@isdh.in.gov, 317-617-4155

Murray Lawry, INVDRS Coroner Records Coordinator
Murray graduated from Ball State University with a Bachelor of Science degree in Political Science and a Master's in Public Administration. He is also a certified EMT. Murray has been with the Indiana State Department of Health for over 40 years. He transferred to the Trauma Program from the ISDH Hospital Preparedness Program in 2014, where he was responsible for the hospitals in Preparedness Planning Districts 1,2,3,4 and 6.
Contact information: mlawry@isdh.in.gov, 317-233-7695

Camry Hess, Data Analyst
Camry graduated from Goshen College with a Bachelor of Science degree in Biochemistry and Environmental Science and from the Richard M. Fairbanks School of Public Health with a Master's

degree in biostatistics. She worked at the Center for Health Policy at IUPUI prior to joining ISDH in 2014.
Contact information: chess1@isdh.in.gov, 317-234-3265

Ramzi Nimry, Trauma System Performance Improvement Manager
Ramzi graduated from Indiana University (Indianapolis) with a Bachelor of Arts in Communication Studies and a minor in Psychology. He spent three years with the Family and Social Services Administration, Division of Mental Health and Addiction, and two years with Regenstrief Institute, IU Center for Aging Research, prior to joining ISDH in 2014.
Contact information: rnimry@isdh.in.gov, 317-234-7321

Rachel Kenny, INVDRS Epidemiologist
Rachel graduated from Syracuse University with a Bachelor of Arts in Anthropology and Forensic Science. She is currently working towards a Master's Degree in Epidemiology at the IU Richard M. Fairbanks School of Public Health. She worked at the University of Indianapolis prior to joining ISDH in 2015.
Contact information: rkenney@isdh.in.gov, 317-233-8197

John O'Boyle, INVDRS Law Enforcement Records Coordinator
John graduated from Indiana University with a Bachelor of Science degree in Public and Environmental Affairs and a minor in Criminal Justice. He worked at the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) as a special for nearly 25 years prior to joining ISDH in 2015.
Contact Information: joboyle@isdh.in.gov, 317-233-7987.

Lauren Savitskas, Injury Prevention Program Coordinator
Lauren graduated from Indiana University with a Bachelor of Arts degree in journalism and a Master's degree in Public Health from the Richard M. Fairbanks School of Public Health with a concentration in Social and Behavioral Sciences. She worked at the King County Health Department in Seattle, Washington prior to joining ISDH in 2015. Lauren recently became a certified passenger safety technician for Safe Kids.
Contact information: lsavitskas@isdh.in.gov, 317-234-9657

Ryan Cunningham, INVDRS Records Consultant
Ryan was a student at the College for Creative Studies School of Art and Design focusing on Illustrative Painting and Sculpture projects emphasized on victims of violent acts and crimes. His study of both the physiology of injury and psychological impact led to the creation of pieces endeavored to inform the public and provide solace to victims. He is a commissioned artist painting and sculpting both private and commercial works. Ryan was a team leader at Chrysler Fiat, prior to joining ISDH in 2016.
Contact Information: rycunningham@isdh.in.gov, 317-233-8460

Tanya Barrett, Event Project Coordinator
Tanya holds a Bachelor of Arts degree in Communication Studies from the University of Maryland University College and a Master's of Science in Sport Management from Drexel University. She has managed meetings, conventions, workshops, galas and events from U.S. Pharmacopeia, The American Institute of Architects, Belmont Country Club and the Ritz-Carlton, prior to joining ISDH in 2016.
Contact Information: tabarrett@isdh.in.gov, 317-234-9758

Annie Hayden, Prescription Drug Overdose Records Consultant
Annie graduated with a Bachelor of Arts degree in English Literature from Kansas State University and a Master's degree in Library Science from Emporia State University. She worked for many years as an academic librarian at the University of Kansas, prior to joining ISDH in 2016.
Contact Information: Anhayden@isdh.in.gov

Bonnie Bernard, Prescription Drug Overdose Community Outreach Coordinator
Bonnie graduated from Anderson University with a B.S. in Organization Leadership. She has 20 years' experience with law enforcement and spent the majority of her career in the Drug Enforcement Section with the Indiana State Police conducting undercover investigations mainly of diverted prescription drugs. She continues to be involved with NASCSA and NADDI and Vice President of NADDI of Indiana. After her career with the Indiana State Police, she was the Loss Prevention District Manager with Walgreens conducting internal investigations of employees for 13 years, prior to joining ISDH in 2016.
Contact Information: bbernard@isdh.in.gov, 317-234-1304

Kayley Dotson, Prescription Drug Overdose Epidemiologist
Kayley graduated from Purdue University with a Bachelor of Science degree in Environmental Health and earned a Master's degree in Public Health from East Tennessee State University with a concentration in Epidemiology. She worked at East Tennessee State University in Community Service Programs prior to joining ISDH in 2016.
Contact Information: kdotson@isdh.in.gov, 317-233-1239

2.3 Division of Trauma and Injury Prevention Mission & Vision

Mission

To develop, implement and provide oversight of a statewide comprehensive trauma care system that:

- Prevents injuries.
- Saves lives.
- Improves the care and outcomes of trauma patients.

Vision

Prevent injuries in Indiana.

2.4 Current State of Indiana's Trauma System

Indiana does not have an integrated statewide trauma system—we are one of only 6 states without one. Indiana has components of a system:

- Emergency medical services (EMS) providers.
- Trauma centers.
- A trauma registry (repository of data on patients who receive hospital care for certain types of injuries).
- Rehabilitation facilities.

3 Trauma Facts

3.1 U.S. Trauma Facts

- Injury is the number 1 killer of Americans between the ages of 1-44.

10 Leading Causes of Death by Age Group, United States – 2014

	Age Groups										
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Congenital Anomalies 4,746	Unintentional Injury 1,216	Unintentional Injury 730	Unintentional Injury 750	Unintentional Injury 11,836	Unintentional Injury 17,357	Unintentional Injury 16,048	Malignant Neoplasms 44,834	Malignant Neoplasms 115,282	Heart Disease 489,722	Heart Disease 614,348
2	Short Gestation 4,173	Congenital Anomalies 399	Malignant Neoplasms 436	Suicide 425	Suicide 5,079	Suicide 6,569	Malignant Neoplasms 11,267	Heart Disease 34,791	Heart Disease 74,473	Malignant Neoplasms 413,885	Malignant Neoplasms 591,699
3	Maternal Pregnancy Comp. 1,574	Homicide 364	Congenital Anomalies 192	Malignant Neoplasms 416	Homicide 4,144	Homicide 4,159	Heart Disease 10,368	Unintentional Injury 20,610	Unintentional Injury 18,030	Chronic Low. Respiratory Disease 124,693	Chronic Low. Respiratory Disease 147,101
4	SIDS 1,545	Malignant Neoplasms 321	Homicide 123	Congenital Anomalies 156	Malignant Neoplasms 1,569	Malignant Neoplasms 3,624	Suicide 6,706	Suicide 8,767	Chronic Low. Respiratory Disease 16,492	Cerebro-vascular 113,308	Unintentional Injury 136,053
5	Unintentional Injury 1,161	Heart Disease 149	Heart Disease 69	Homicide 156	Heart Disease 953	Heart Disease 3,341	Homicide 2,588	Liver Disease 8,627	Diabetes Mellitus 13,342	Alzheimer's Disease 92,604	Cerebro-vascular 133,103
6	Placenta Cord. Membranes 965	Influenza & Pneumonia 109	Chronic Low. Respiratory Disease 68	Heart Disease 122	Congenital Anomalies 377	Liver Disease 725	Liver Disease 2,582	Diabetes Mellitus 6,062	Liver Disease 12,792	Diabetes Mellitus 54,161	Alzheimer's Disease 93,541
7	Bacterial Sepsis 544	Chronic Low Respiratory Disease 53	Influenza & Pneumonia 57	Chronic Low Respiratory Disease 71	Influenza & Pneumonia 199	Diabetes Mellitus 709	Diabetes Mellitus 1,999	Cerebro-vascular 5,349	Cerebro-vascular 11,727	Unintentional Injury 48,295	Diabetes Mellitus 76,488
8	Respiratory Distress 460	Septicemia 53	Cerebro-vascular 45	Cerebro-vascular 43	Diabetes Mellitus 181	HIV 583	Cerebro-vascular 1,745	Chronic Low. Respiratory Disease 4,402	Suicide 7,527	Influenza & Pneumonia 44,836	Influenza & Pneumonia 55,227
9	Circulatory System Disease 444	Benign Neoplasms 38	Benign Neoplasms 36	Influenza & Pneumonia 41	Chronic Low Respiratory Disease 178	Cerebro-vascular 579	HIV 1,174	Influenza & Pneumonia 2,731	Septicemia 5,709	Nephritis 39,957	Nephritis 48,146
10	Neonatal Hemorrhage 441	Perinatal Period 38	Septicemia 33	Benign Neoplasms 38	Cerebro-vascular 177	Influenza & Pneumonia 549	Influenza & Pneumonia 1,125	Septicemia 2,514	Influenza & Pneumonia 5,390	Septicemia 29,124	Suicide 42,773

Data Source: National Vital Statistics System, National Center for Health Statistics, CDC.
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™.

Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

- For every trauma death in the United States:
  - Approximately 10 people are hospitalized and transferred to specialized medical care.
  - 178 people are treated and released from hospital emergency departments.[1]

- Problems posed by injury are most acute in our rural areas:
  - 60% of all trauma deaths occur in areas of the United States where only 25% of the population lives.[2]

3.2 Indiana Trauma Facts

- Injury is the number 1 killer of Hoosiers between the ages of 1-44.
- A traumatic injury is a severe injury or injuries requiring rapid evaluation and transport to specific hospitals with trauma care capabilities – "worst of the worst".
- More than 4,421 died from injuries in Indiana in 2014.[3]
    - Fifth leading cause of death overall.
    - Contributed to nearly 7% of all deaths in Indiana.
- Nearly 32,000 Hoosiers are hospitalized every year from injuries.[4]
- About 11 people per day died from injuries in Indiana during the years 2009-2013.

4 Trauma Lessons

4.1 Trauma Lessons Learned

Trauma injuries require rapid evaluation by skilled personnel and immediate transportation to a qualified care center. Trauma centers are unique in capabilities and are NOT the community "emergency rooms." When trauma patients are transported, by ground or air, to trauma centers the preventable death rate DROPS by up to 25% and there are significant reductions of chronic disabilities and overall community care costs[5]. Oregon's trauma system, for example has reduced mortality by more than 25%, reduced morbidity by more than 40%, and reduced health care costs[6]. Another study showed that the costs of trauma in states with trauma systems dropped 9%[6].

Early trauma care was learned through war. Thousands more were saved in World War II versus World War I, because field doctors learned:

- The importance of close coordination.
- The importance of rapid stabilization and transport of severe trauma patients.
- The importance of "intense care" centers.

Lessons learned during the Vietnam War:

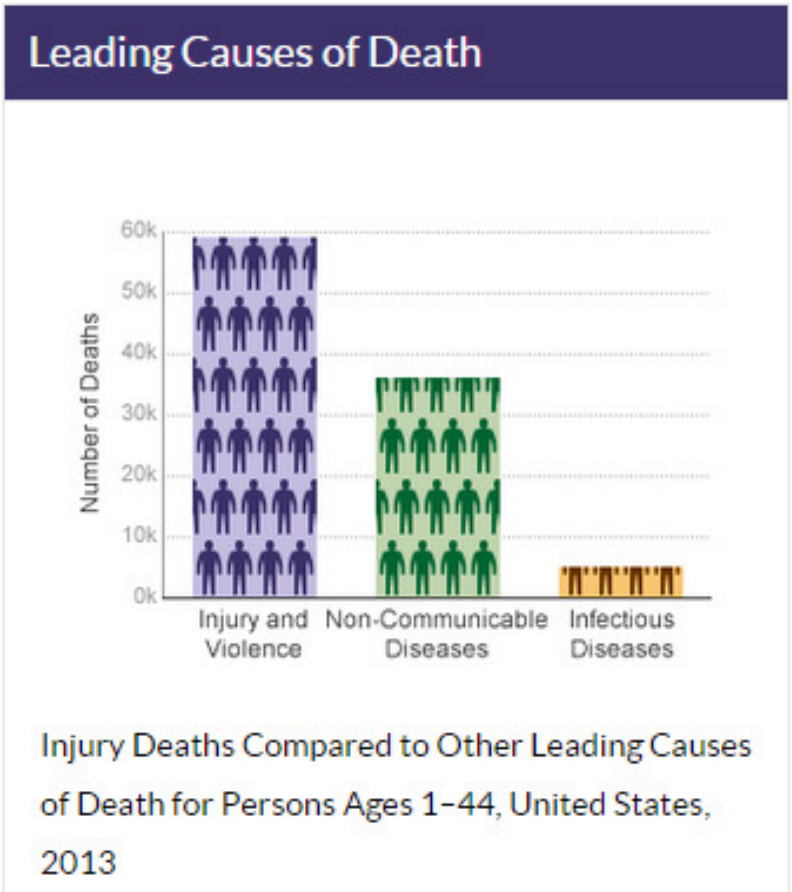
- "Golden hour" from injury to care is crucial.
    - The hour immediately following injury.
    - The most reliable predictor of trauma survival.
- Field and hospital coordination and integration are vital.
- Airlift medical services were introduced.

5 Injury Prevention

5.1 What is Injury?

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. Injuries affect all regardless of age, race, or economic status.

In 2011 in the United States, injuries, including all causes of unintentional and violence-related injuries combined, accounted for 51.3% of all deaths among persons ages 1-44 years of age – this is more deaths than non-communicable diseases and infectious diseases combined[7].



5.2 Cause of Injury Categories[8]

- Cut/Pierce
- Drowning/Submersion*
- Fall
- Fire/Burn
  - Fire/Flame
  - Hot object/substance
- Firearm
- Machinery
- Motor Vehicle Traffic

- Pedal Cyclist, Other
- Pedestrian, Other
- Transport, Other
- Natural/Environmental
    - Bites and Stings
- Overexertion
- Poisoning*
- Struck By, against
- Suffocation*

*Not considered a traumatic injury

5.3 Injury Intent

- Unintentional: Not inflicted by deliberate means.
    - Motor vehicle collision, fall, cut

10 Leading Causes of Injury Deaths by Age Group Highlighting Unintentional Injury Deaths, United States – 2014

	Age Groups										
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Unintentional Suffocation 991	Unintentional Drowning 388	Unintentional MV Traffic 345	Unintentional MV Traffic 384	Unintentional MV Traffic 6,531	Unintentional Poisoning 9,334	Unintentional Poisoning 9,116	Unintentional Poisoning 11,009	Unintentional Poisoning 7,013	Unintentional Fall 27,044	Unintentional Poisoning 42,032
2	Homicide Unspecified 119	Unintentional MV Traffic 293	Unintentional Drowning 125	Suicide Suffocation 225	Homicide Firearm 3,587	Unintentional MV Traffic 5,856	Unintentional MV Traffic 4,308	Unintentional MV Traffic 5,024	Unintentional MV Traffic 4,554	Unintentional MV Traffic 6,373	Unintentional MV Traffic 33,736
3	Homicide Other Spec., Classifiable 83	Homicide Unspecified 149	Unintentional Fire/Burn 68	Suicide Firearm 174	Unintentional Poisoning 3,492	Homicide Firearm 3,260	Suicide Firearm 2,830	Suicide Firearm 3,953	Suicide Firearm 3,910	Suicide Firearm 5,367	Unintentional Fall 31,959
4	Unintentional MV Traffic 61	Unintentional Suffocation 120	Homicide Firearm 58	Homicide Firearm 115	Suicide Firearm 2,270	Suicide Firearm 2,829	Suicide Suffocation 2,057	Suicide Suffocation 2,321	Unintentional Fall 2,558	Unintentional Unspecified 4,590	Suicide Firearm 21,334
5	Undetermined Suffocation 40	Unintentional Fire/Burn 117	Unintentional Other Land Transport 36	Unintentional Drowning 105	Suicide Suffocation 2,010	Suicide Suffocation 2,402	Homicide Firearm 1,835	Suicide Poisoning 1,795	Suicide Poisoning 1,529	Unintentional Suffocation 3,692	Suicide Suffocation 11,407
6	Unintentional Drowning 29	Unintentional Pedestrian, Other 107	Unintentional Suffocation 34	Unintentional Fire/Burn 49	Unintentional Drowning 507	Suicide Poisoning 800	Suicide Poisoning 1,274	Unintentional Fall 1,340	Suicide Suffocation 1,509	Unintentional Poisoning 1,993	Homicide Firearm 10,945
7	Homicide Suffocation 26	Homicide Other Spec., Classifiable 73	Unintentional Natural/ Environment 22	Unintentional Other Land Transport 49	Suicide Poisoning 363	Undetermined Poisoning 575	Undetermined Poisoning 637	Homicide Firearm 1,132	Unintentional Suffocation 698	Adverse Effects 1,554	Suicide Poisoning 6,808
8	Unintentional Natural/ Environment 17	Homicide Firearm 47	Unintentional Pedestrian, Other 18	Unintentional Suffocation 33	Homicide Cut/Pierce 314	Homicide Cut/Pierce 430	Unintentional Fall 504	Undetermined Poisoning 820	Undetermined Poisoning 539	Unintentional Fire/Burn 1,151	Unintentional Suffocation 6,580
9	Undetermined Unspecified 16	Unintentional Struck by or Against 38	Unintentional Struck by or Against 16	Unintentional Poisoning 22	Undetermined Poisoning 229	Unintentional Drowning 399	Unintentional Drowning 363	Unintentional Suffocation 452	Homicide Firearm 538	Suicide Poisoning 1,028	Unintentional Unspecified 5,848
10	Unintentional Fire/Burn 15	Unintentional Natural/ Environment 35	Unintentional Firearm (fied) 14	Homicide Cut/Pierce 19	Unintentional Other Land Transport 177	Unintentional Fall 285	Homicide Cut/Pierce 313	Unintentional Drowning 442	Unintentional Unspecified 530	Suicide Suffocation 880	Unintentional Drowning 3,406

Data Source: National Center for Health Statistics (NCHS), National Vital Statistics System.
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™.

- Intentional: Results from the purposeful use of force to a destructive (or self-destructive) end.
    - Assault, homicide, suicide.

10 Leading Causes of Injury Deaths by Age Group Highlighting Violence-Related Injury Deaths, United States – 2014

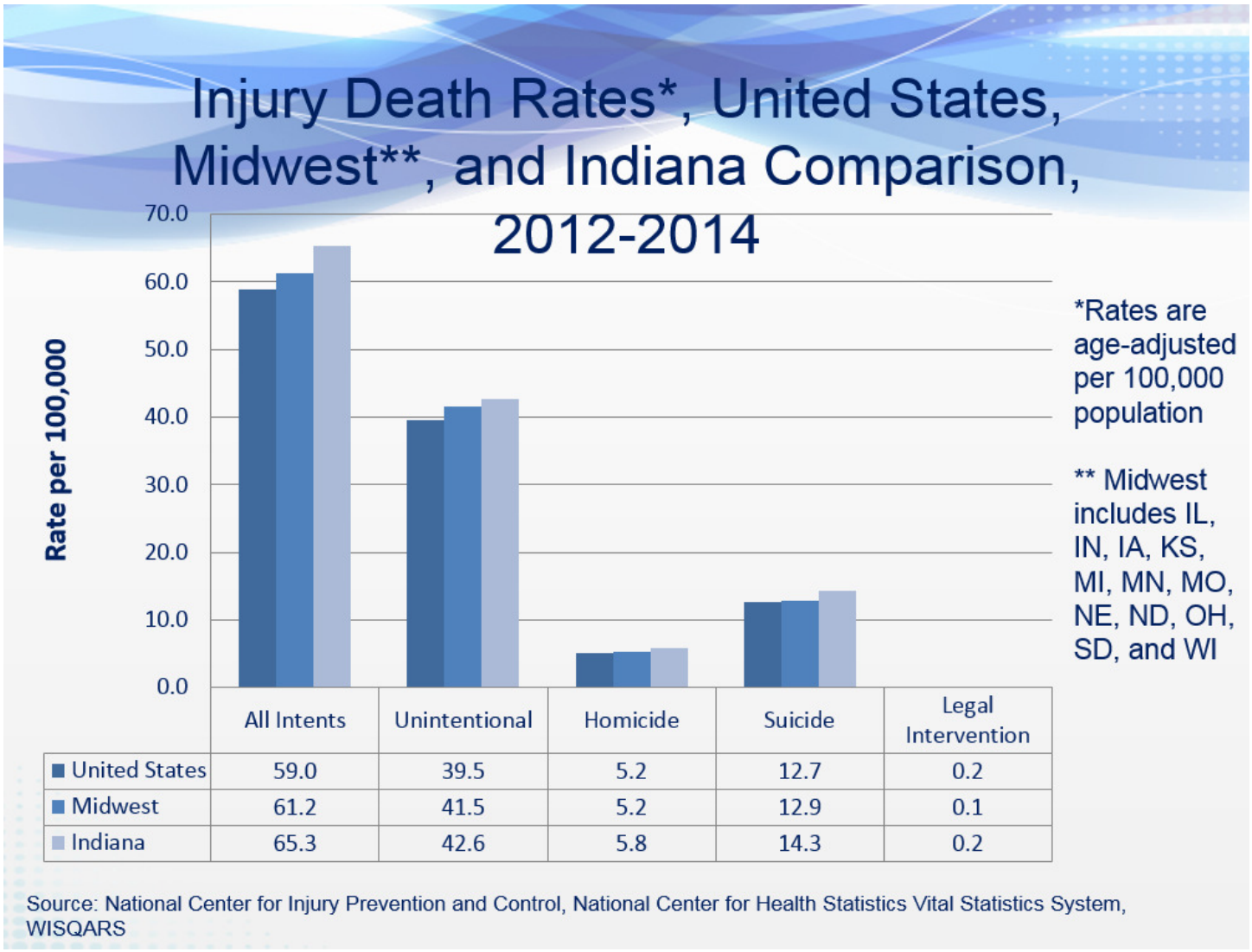
	Age Groups										
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Unintentional Suffocation 991	Unintentional Drowning 388	Unintentional MV Traffic 345	Unintentional MV Traffic 384	Unintentional MV Traffic 6,531	Unintentional Poisoning 9,334	Unintentional Poisoning 9,116	Unintentional Poisoning 11,009	Unintentional Poisoning 7,013	Unintentional Fall 27,044	Unintentional Poisoning 42,032
2	Homicide Unspecified 119	Unintentional MV Traffic 293	Unintentional Drowning 125	Suicide Suffocation 225	Homicide Firearm 3,587	Unintentional MV Traffic 5,856	Unintentional MV Traffic 4,308	Unintentional MV Traffic 5,024	Unintentional MV Traffic 4,554	Unintentional MV Traffic 6,373	Unintentional MV Traffic 33,736
3	Homicide Other Spec., Classifiable 83	Homicide Unspecified 149	Unintentional Fire/Burn 68	Suicide Firearm 174	Unintentional Poisoning 3,492	Homicide Firearm 3,260	Suicide Firearm 2,830	Suicide Firearm 3,953	Suicide Firearm 3,910	Suicide Firearm 5,367	Unintentional Fall 31,959
4	Unintentional MV Traffic 61	Unintentional Suffocation 120	Homicide Firearm 58	Homicide Firearm 115	Suicide Firearm 2,270	Suicide Firearm 2,829	Suicide Suffocation 2,057	Suicide Suffocation 2,321	Unintentional Fall 2,558	Unintentional Unspecified 4,590	Suicide Firearm 21,334
5	Undetermined Suffocation 40	Unintentional Fire/Burn 117	Unintentional Other Land Transport 36	Unintentional Drowning 105	Suicide Suffocation 2,010	Suicide Suffocation 2,402	Homicide Firearm 1,835	Suicide Poisoning 1,795	Suicide Poisoning 1,529	Unintentional Suffocation 3,692	Suicide Suffocation 11,407
6	Unintentional Drowning 29	Unintentional Pedestrian, Other 107	Unintentional Suffocation 34	Unintentional Fire/Burn 49	Unintentional Drowning 507	Suicide Poisoning 800	Suicide Poisoning 1,274	Unintentional Fall 1,340	Suicide Suffocation 1,509	Unintentional Poisoning 1,993	Homicide Firearm 10,945
7	Homicide Suffocation 26	Homicide Other Spec., Classifiable 73	Unintentional Natural/ Environment 22	Unintentional Other Land Transport 49	Suicide Poisoning 363	Undetermined Poisoning 575	Undetermined Poisoning 637	Homicide Firearm 1,132	Unintentional Suffocation 698	Adverse Effects 1,554	Suicide Poisoning 6,808
8	Unintentional Natural/ Environment 17	Homicide Firearm 47	Unintentional Pedestrian, Other 18	Unintentional Suffocation 33	Homicide Cut/Pierce 314	Homicide Cut/Pierce 430	Unintentional Fall 504	Undetermined Poisoning 820	Undetermined Poisoning 539	Unintentional Fire/Burn 1,151	Unintentional Suffocation 6,580
9	Undetermined Unspecified 16	Unintentional Struck by or Against 38	Unintentional Struck by or Against 16	Unintentional Poisoning 22	Undetermined Poisoning 229	Unintentional Drowning 399	Unintentional Drowning 363	Unintentional Suffocation 452	Homicide Firearm 538	Suicide Poisoning 1,028	Unintentional Unspecified 5,848
10	Unintentional Fire/Burn 15	Unintentional Natural/ Environment 35	Homicide Unspecified (Tied) 14	Homicide Cut/Pierce 19	Unintentional Other Land Transport 177	Unintentional Fall 285	Homicide Cut/Pierce 313	Unintentional Drowning 442	Unintentional Unspecified 530	Suicide Suffocation 880	Unintentional Drowning 3,406

Data Source: National Center for Health Statistics (NCHS), National Vital Statistics System.
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™.

Centers for Disease Control and Prevention National Center for Injury Prevention and Control

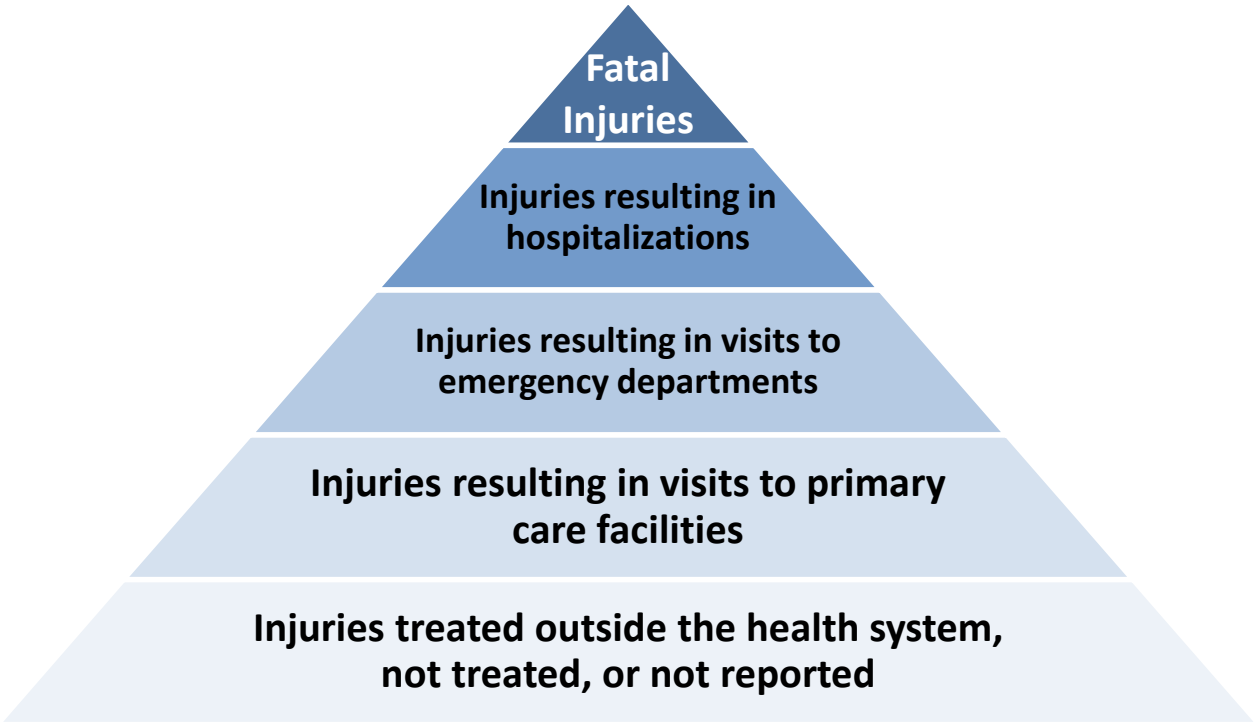
Intent is often uncertain, ambiguous, or unknown

5.4 Injury Death Rates



	All Intents	Unintentional	Homicide	Suicide	Legal Intervention
United States	59.0	39.5	5.2	12.7	0.2
Midwest	61.2	41.5	5.2	12.9	0.1
Indiana	65.3	42.6	5.8	14.3	0.2

5.5 Injury Pyramid



5.6 Injuries in the United States

- More than 180,000 deaths per year[8].
  - 1 person every 3 minutes[8].
- 2.5 million people are hospitalized each year.
- 31.6 million treated in ED each year[8].

National Estimates of the 10 Leading Causes of Nonfatal Injuries Treated in Hospital Emergency Departments, United States – 2013

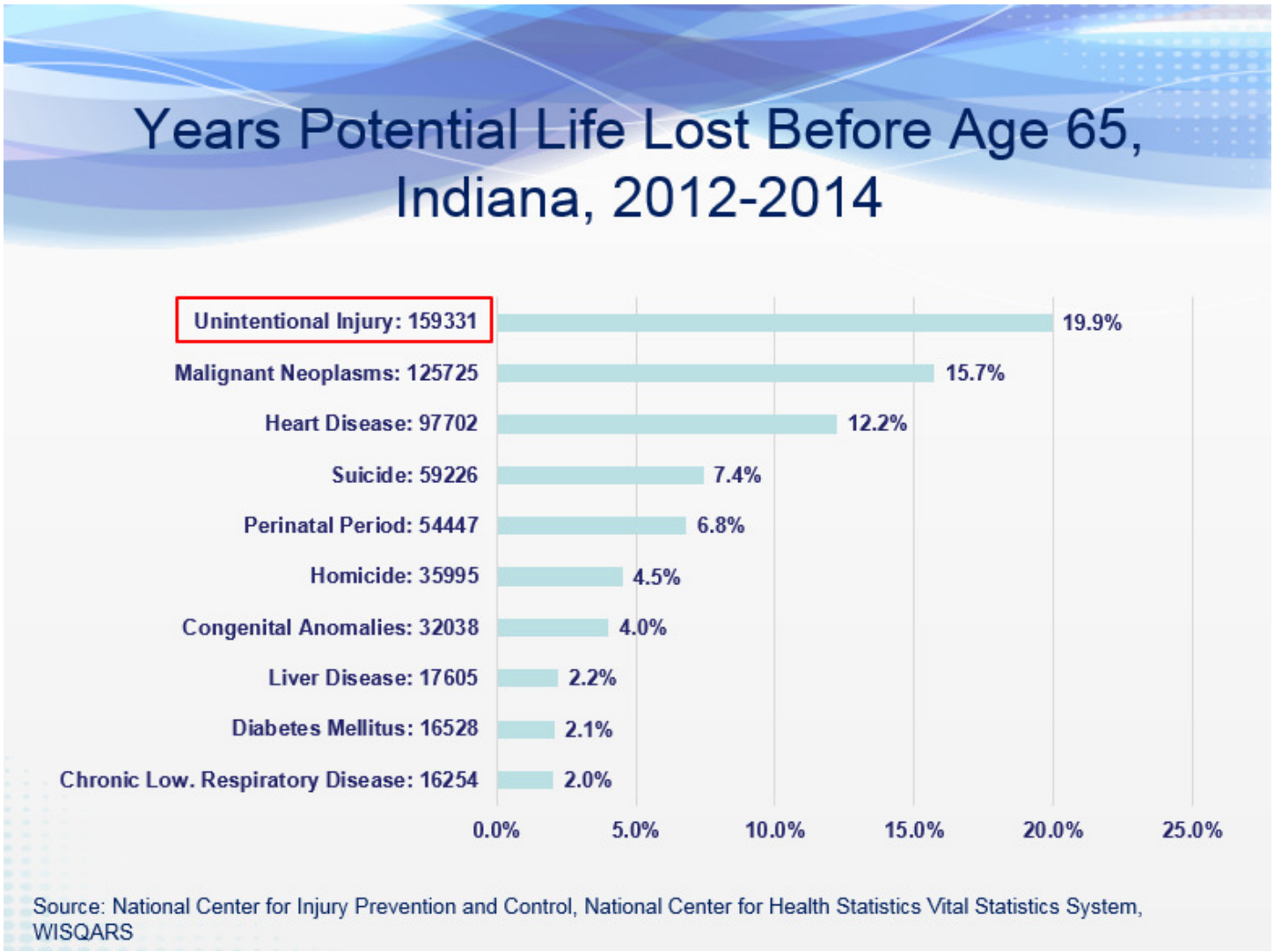
	Age Groups										
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Unintentional Fall 134,229	Unintentional Fall 852,884	Unintentional Fall 624,890	Unintentional Struck By/Against 561,690	Unintentional Struck By/Against 905,659	Unintentional Fall 742,177	Unintentional Fall 704,264	Unintentional Fall 913,871	Unintentional Fall 930,521	Unintentional Fall 2,495,397	Unintentional Fall 8,771,656
2	Unintentional Struck By/Against 28,786	Unintentional Struck By/Against 336,917	Unintentional Struck By/Against 403,522	Unintentional Fall 558,177	Unintentional Fall 814,829	Unintentional Overexertion 638,745	Unintentional Overexertion 530,422	Unintentional Overexertion 461,114	Unintentional Overexertion 266,126	Unintentional Struck By/Against 281,279	Unintentional Struck By/Against 4,214,125
3	Unintentional Other Bite/Sting 12,186	Unintentional Other Bite/Sting 158,587	Unintentional Cut/Pierce 112,633	Unintentional Overexertion 294,669	Unintentional Overexertion 672,946	Unintentional Struck By/Against 599,340	Unintentional Struck By/Against 444,089	Unintentional Struck By/Against 390,931	Unintentional Struck By/Against 261,840	Unintentional Overexertion 212,293	Unintentional Overexertion 3,256,567
4	Unintentional Foreign Body 10,650	Unintentional Foreign Body 139,597	Unintentional Other Bite/Sting 107,975	Unintentional Cut/Pierce 114,285	Unintentional MV-Occupant 627,565	Unintentional MV-Occupant 526,303	Unintentional MV-Occupant 374,231	Unintentional Other Specified 385,221	Unintentional MV-Occupant 227,620	Unintentional MV-Occupant 197,646	Unintentional MV-Occupant 2,462,684
5	Unintentional Other Specified 10,511	Unintentional Cut/Pierce 83,575	Unintentional Overexertion 93,612	Unintentional Pedal Cyclist 84,732	Unintentional Cut/Pierce 431,691	Unintentional Cut/Pierce 402,197	Unintentional Other Specified 300,154	Unintentional MV-Occupant 343,470	Unintentional Other Specified 212,168	Unintentional Cut/Pierce 156,693	Unintentional Cut/Pierce 2,077,775
6	Unintentional Fire/Burn 9,816	Unintentional Overexertion 81,588	Unintentional Pedal Cyclist 74,831	Unintentional Unknown/ Unspecified 84,668	Other Assault* Struck By/Against 381,522	Other Assault* Struck By/Against 342,514	Unintentional Cut/Pierce 297,769	Unintentional Cut/Pierce 282,353	Unintentional Cut/Pierce 189,440	Unintentional Poisoning 100,988	Unintentional Other Specified 1,767,630
7	Unintentional** Inhalation/ Suffocation 8,294	Unintentional Other Specified 65,120	Unintentional Foreign Body 63,450	Unintentional MV-Occupant 73,692	Unintentional Other Specified 321,914	Unintentional Other Specified 336,990	Other Assault* Struck By/Against 207,287	Unintentional Poisoning 237,328	Unintentional Poisoning 153,767	Unintentional Other Bite/Sting 90,850	Other Assault* Struck By/Against 1,291,100
8	Unintentional Cut/Pierce 7,139	Unintentional Fire/Burn 52,884	Unintentional MV-Occupant 58,114	Unintentional Other Bite/Sting 64,848	Unintentional Other Bite/Sting 177,665	Unintentional Other Bite/Sting 180,922	Unintentional Poisoning 175,870	Other Assault* Struck By/Against 169,688	Unintentional Other Bite/Sting 97,474	Unintentional Other Specified 86,729	Unintentional Other Bite/Sting 1,174,267
9	Unintentional Unknown/ Unspecified 5,735	Unintentional Unknown/ Unspecified 41,297	Unintentional Dog Bite 43,499	Other Assault* Struck By/Against 62,829	Unintentional Unknown/ Unspecified 163,923	Unintentional Poisoning 180,448	Unintentional Other Bite/Sting 138,410	Unintentional Other Bite/Sting 145,349	Other Assault* Struck By/Against 73,674	Unintentional Unknown/ Unspecified 74,864	Unintentional Poisoning 1,055,960
10	Unintentional Overexertion 4,985	Unintentional Poisoning 32,443	Unintentional Unknown/ Unspecified 35,303	Unintentional Other Transport 35,609	Unintentional Poisoning 152,962	Unintentional Unknown/ Unspecified 129,308	Unintentional Unknown/ Unspecified 106,498	Unintentional Unknown/ Unspecified 110,102	Unintentional Unknown/ Unspecified 67,974	Unintentional Other Transport 68,022	Unintentional Unknown/ Unspecified 819,878

*The "Other Assault" category includes all assaults that are **not** classified as sexual assault. It represents the majority of assaults.
**Injury estimate is unstable because of small sample size.
Data Source: NEISS All Injury Program operated by the Consumer Product Safety Commission (CPSC).
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™.

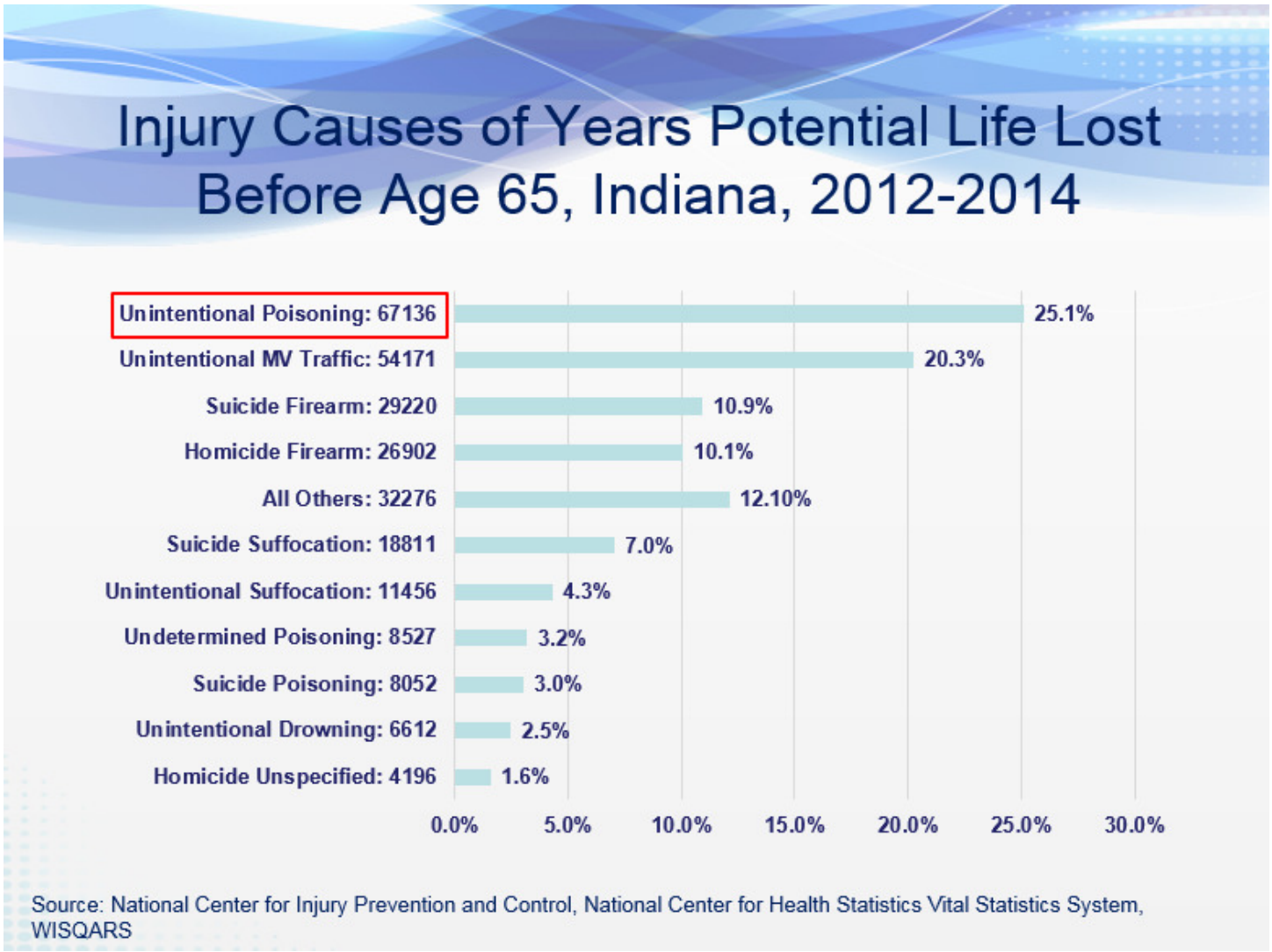
- ~$406 billion in medical care and lost productivity each year[9].

5.7 Injuries in Indiana

- Injury is the leading cause of death among persons age 1-44 years.
  - Unintentional injuries are the leading cause of Years of Potential Life Lost (YPLL). YPLL is an important mortality index, used to measure premature mortality or early death. This statistic recognizes that death at a younger age involves greater loss of future productive years compared to a death at an older age.
- Injury is the fifth leading cause of death overall and contributes to nearly 7% of all deaths in Indiana.
- There were nearly 32,000 hospitalizations for all injuries in 2013[4].



- The leading injury cause of YPLL before age 65 in Indiana from 2012-2014 is unintentional poisoning, followed by unintentional motor vehicle traffic collisions. It is important to note the causes of the high YPLL in order to guide injury prevention efforts and priorities among children and young adults.



5.8 Haddon's 10 Basic Strategies for Injury Prevention[10]

- Prevent creation of hazard.
- Reduce amount of hazard.
- Prevent release of hazard.
- Modify the rate or distribution of hazard.
- Separate (in space or time) hazard from that to be protected.
- Separate hazard from that to be protected with barrier.
- Modify relevant basic qualities of hazard.
- Make what is to be protected more resistant to damage.
- Counter damage already done by hazard.
- Stabilize, repair and rehabilitate the object of the damage.

6 Indiana's Journey to a Trauma System

6.1 Our Timeline

2004

- Trauma System Advisory Task Force formed.

2006

- IC 16-19-3-28 (Public Law 155) named the State Health Department (ISDH) the lead agency for statewide trauma system:
  State department designated as lead agency of a statewide trauma care system; rule making authority
  Sec. 28
  (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.
- ISDH hired a trauma system manager.

2007

- Federal funding from the National Highway Transportation Safety Administration (NHTSA 408) for the state trauma registry was received from the Indiana Criminal Justice Institute (ICJI). A contract with a trauma registry software vendor (ImageTrend) was completed.
  - ICJI funding continues today.

2008

- Senate Bill 249 gave the Department of Homeland Security (IDHS) the authority to adopt Emergency Medical Services (EMS) triage and transportation protocols.
- ISDH hired its first state trauma registry manager.
- The American College of Surgeons (ACS) conducted an evaluation of Indiana's trauma system.

2009

- ACS provided a set of recommendations for further development of Indiana's trauma system.
- Governor Daniels created by executive order the Indiana State Trauma Care Committee (ISTCC).

2010

- The first meeting of the ISTCC (previously the Trauma Care Task Force) was held. The ISTCC serves as an advisory body to the ISDH on all issues involving trauma.

2011

- The ISDH hired a trauma and injury prevention division director, prioritizing trauma as a division within the agency.
- ISDH created the Trauma and Injury Prevention Division.

2012

- The EMS Commission adopted the Triage and Transport Rule.

2013

- Governor Pence re-issued Governor Daniels' original Executive Order creating the Indiana Trauma Care Committee.
- The ISDH and IDHS EMS Commission worked together to approve "in the process of ACS verification" trauma centers for purposes of the Triage and Transport Rule, which will greatly increase the number of trauma centers in Indiana and will better prepare Indiana hospitals to become ACS verified trauma centers.
- Governor Pence signs the Trauma Registry Rule. The trauma registry rule requires all EMS providers, hospitals with emergency departments, and rehabilitation hospitals to submit their trauma data to the state trauma registry.

2014

- The ISDH hosted the first statewide EMS Medical Director's Conference.
- IU Health Arnett Hospital and IU Health Ball Memorial Hospital became the state's first ACS verified level III trauma centers.
- The ISDH received $1.4 million from the Centers for Disease Control and Prevention (CDC) to gather critical data on violent deaths using the National Violent Death Reporting System (NVDRS).

2015

- The ISDH hosted the first statewide Injury Prevention Conference.
- The ISDH hired an INVDRS Epidemiologist, INVDRS Law Enforcement Records Coordinator, INVDRS Records Consultant and Injury Prevention Program Coordinator.
- The ISDH hosted the second annual EMS Medical Directors' Conference.

2016

- The ISDH hired an Events Project Coordinator.
- The ISDH received $3.2 million from the CDC to support enhancements to INSPECT, the Indiana prescription drug monitoring program at the Indiana Professional Licensing agency, improve opioid prescribing practices, support prevention efforts at the state and community levels to address new and emerging problems related to prescription drug overdoses and a partnership with the IU Fairbanks School of Public Health to evaluate opioid prescribing practices in Indiana.
- The ISDH hired a PDO Community Outreach Coordinator, PDO Records Consultant and PDO Epidemiologist.

6.2 CDC Field Triage Decision Scheme[11]

The CDC Field Triage Decision Scheme states that the most seriously injured patients should go to a trauma center no matter how long it takes to get them there[11].

6.3 Triage and Transport Rule

The CDC Field Triage Decision Scheme states that the most seriously injured patients should go to a trauma center no matter how long it takes to get them there. The Indiana EMS Commission's Triage and Transport Rule (836 IAC 1-2.1) provides a regulatory plan to ensure that injured patients in the pre-hospital setting are transported to the most appropriate hospital facility within the Indiana state trauma system based on field assessment by EMS personnel of the potential severity of injury, available transportation, and hospital resources. The IDHS put together an "Indiana Trauma Field Triage and Transport Destination Protocol Template[12]". The following steps are outlined in the protocol template:

1. Upon arrival at an incident, Emergency Medical Services (EMS) personnel shall assess the condition of each patient using the CDC field triage decision scheme to determine the appropriate transport destination.
2. Patients determined to need trauma center care by virtue of their satisfying either step one or step two of the CDC field triage decision scheme shall be transported to a trauma center [level of trauma center not specified in Triage and Transport Rule], unless:
    a. If the nearest trauma center is more than 45 minutes away.
    b. Or, if in the judgment of the EMS certified responder, the patient's life is in danger if care is delayed by going directly to a trauma center.
        i. In which case the patient shall be transported to the nearest appropriate hospital as determined by the provider's protocols.
3. Patients determined to need trauma center care by virtue of their satisfying either step three or step four of the field triage decision scheme shall be transported to either a trauma center or the nearest appropriate hospital, as determined by the provider's protocols.
4. Patients who do not meet the field triage decision scheme criteria for trauma center care may be transported according to provider's protocol.

When in doubt, transport to a trauma center!

Competent patients always have the right to decide where to be taken.

The Triage and Transport Rule also permits hospitals to be considered "trauma centers" if the hospital is either:

- Verified by the American College of Surgeons (ACS).
- Designated a "trauma center" by a neighboring state's trauma center designation system (if comparable to ACS' system).
- Or, "in the process of ACS verification".

6.4 "In the ACS Verification Process" Trauma Centers

The EMS Commission partners with the ISTCC to designate hospitals as "in the ACS verification process" trauma center status. The ISTCC/State Health Commissioner will review the hospital's application. The State Health Commissioner recommends to the EMS Commission whether a hospital should be considered a "trauma center" for this Rule's purpose. The "In the ACS verification process" application is available on the Indiana Department of Homeland Security (EMS Commission) website. Hospitals must provide sufficient documentation for the ISDH to conclude that the hospital complies with a series of requirements. The provisional trauma center status shall not exceed two (2)

years from the date the provisional status begins. If the hospital is not able to become verified as a trauma center within that two (2)-year period:

- Provisional status is revoked.
- Hospital can't re-apply for "in the process" status for at least three (3) years.

6.5 Trauma Registry Rule

Rule (410 IAC 34) that requires these providers to report data to the trauma registry:

- EMS providers must submit National EMS Information System (NEMSIS) Silver on the 15th of the month
- All hospitals with EDs must submit the National Trauma Data Standard (NTDS) on a quarterly basis
- Rehabilitation hospitals must submit Centers for Medicare & Medicaid Services (CMS) – Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI) data on a quarterly basis

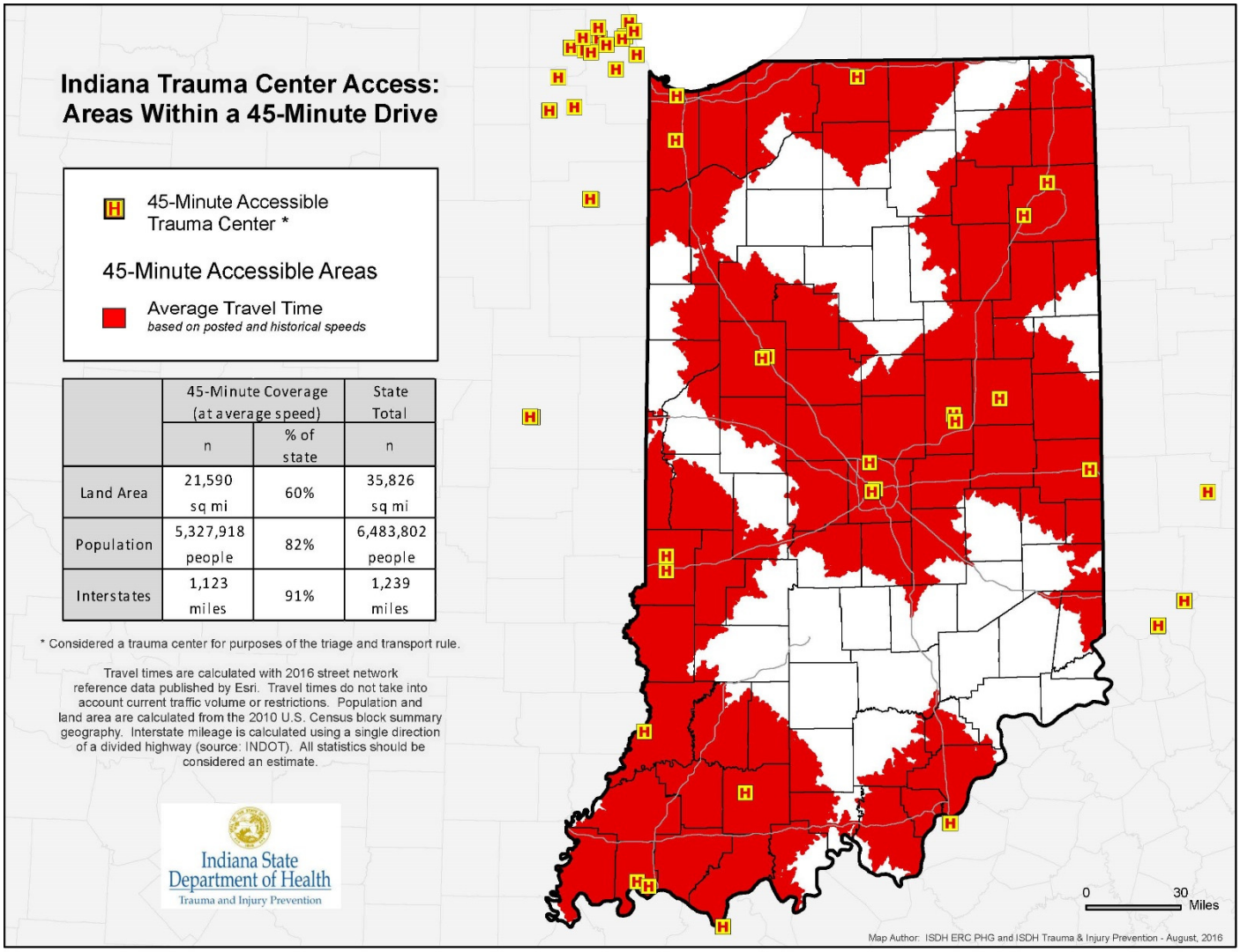
The Rule also permits ISDH to grant any person involved in a legitimate research activity access to confidential information.

6.6 Undertriage / Overtriage

- Undertriage: Transporting patients to non-trauma centers that should be taken directly to trauma centers
    - ACS recommends undertriage rate should be < 5%[13]
- Overtriage: Transporting patients to trauma centers that can be cared for appropriately at non-trauma centers
    - ACS recommends overtriage rate should be < 50%[14]

6.7 Trauma Center Access in Indiana

Trauma center access in Indiana is currently measured based on the EMS Commission's Triage and Transport Rule. The ultimate goal is to have 100% accessibility to trauma center care. The red areas on the map below indicate areas that are within 45 minutes of a trauma center. There are 12 ACS verified trauma centers and 9 "in the process of ACS verification" trauma centers.



	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

7 Trauma Care System Components

7.1 Trauma in Indiana Today – Agency Responsibilities

The Indiana State Department of Health (ISDH) has responsibilities for:

- Trauma and Injury Prevention Division.
- Trauma system development.
- Hospital and rehabilitation center regulation.
- Data collection/performance improvement.

The Indiana Department of Homeland Security (IDHS) has responsibility for:

- Emergency Medical Services (EMS).

7.2 Indiana's Trauma System Rules

1. Triage and Transport Rule (EMS Commission)
    - Right patient, right place, right time.
    - "In the process of ACS verification".
2. Trauma Registry Rule
    - EMS, hospitals and rehabilitation hospitals must report trauma data to the Indiana trauma registry.
3. Designation Rule (yet to be promulgated)
    - State approval process of trauma centers.

7.3 Trauma System Components

The U.S. Department of Health and Human Services Health Resources and Services Administration (HRSA) put together a Model Trauma System Planning and Evaluation tool. In the tool, elements of a trauma system were outlined. A mature trauma system seeks to minimize quality of care variations by[15]:

- Managing, at the State level, the coordination and facilitation of statewide trauma system development.
- Collaborating and coordinating with related health care and non-health care systems.
- Establishing, consistently using, and maintaining common standards of trauma care that address the needs of all populations.
- Assessing, planning, coordinating, monitoring, and ensuring consistent and optimal care.
- Applying scientifically evaluated injury prevention strategies that target specific populations at risk, the mechanisms that wound them, and their injury environments.
- Using data systems to enhance care.
- Providing sustained funding for system maintenance.
- Setting priorities for injury prevention initiatives.
- Providing statewide ongoing technical assistance to all regions within a State.
- Establishing effective evaluation processes to continuously improve trauma care performance.

Trauma system core components include (but are not limited to) [16]:

- Evaluation:
    - Needs assessment.

    - Data collection.
        - EMS.
        - Hospital.
        - Rehabilitation.
    - Research.
        - Problem identification.
        - Best practices.
- Public information and education:
    - Injury Prevention.
    - Trauma advisory committee.
- Legislation and regulations:
    - Trauma systems planning and operations.
    - Regulations and rules.
    - Lead agency at State level.
- Pre-hospital care:
    - Communications
    - Triage and Transport.
    - Medical Direction.
    - Treatment protocols.
- Definitive care:
    - Facilities (designation and/or verification).
    - Inter-facility transfer.
    - Rehabilitation.
- Human resources:
    - Workforce resources.
    - Education preparation.
- Evaluation:
    - Data collection.
    - Research.
    - Interdisciplinary review committee.

7.4 Verified vs. Designated Trauma Centers

- Verified:
    - National process through the American College of Surgeons (ACS).
    - Levels I, II, III.
        - Refer to kinds of resources available in a trauma center.
    - Verified Trauma Centers in Indiana:
        - Level I:
            - Smith Level I Shock Trauma Center at Eskenazi Health, Indianapolis.
            - Methodist Level I Trauma Center at IU Health, Indianapolis.

        - Riley Hospital's Emergency Medicine and Trauma Center (EMTC) at IU Health Riley Hospital for Children, Indianapolis.
        - St. Vincent Trauma Center at St. Vincent Indianapolis Hospital.
    - Level II:
        - Deaconess Regional Trauma Center at Deaconess Hospital, Evansville.
        - Lutheran Trauma Center at Lutheran Hospital, Fort Wayne.
        - Memorial Leighton Trauma Center at Memorial Hospital of South Bend.
        - Parkview Trauma Centers at Parkview Regional Medical Center, Fort Wayne.
        - St. Mary's Trauma Services at St. Mary's of Evansville.
    - Level III:
        - IU Health Arnett, Lafayette.
        - IU Health Ball Memorial, Muncie.
        - St. Vincent Anderson Regional Hospital, Anderson
- Designated
    - State process (not yet promulgated).
    - Levels I, II, III:
        - Refer to kinds of resources available in a trauma center.
    - Indiana's designation requirements will go hand-in-hand with the national verification requirements.
        - Additional, unique criteria.

8 Pre-Hospital Data

8.1 Importance of Pre-Hospital Data

- Focus on data-driven decision making:
  - National push for quality improvement in healthcare.
  - Tied to funding from the Centers for Disease Control and Prevention (CDC), Health Resources and Services Administration (HRSA), National Highway Traffic Safety Administration (NHTSA), etc.
  - Lower future healthcare costs.
  - Preventable injuries.
- Identify unmet needs & priorities:
  - Pockets of healthcare disparities.
  - Trends due to age, race, gender, etc.
- Determine which treatments are effective:
  - Local medical directors know their population.
  - Effective treatments or adjustments to training.
  - Stocking medication or equipment based on known runs.

8.2 ISDH EMS Registry Website

The ISDH purchased the ImageTrend EMS State Bridge and rolled it out for first responders to use starting January 2013. In December 2014, the ISDH signed a Memorandum of Understanding (MOU) turning the ImageTrend EMS State Bridge and the responsibility of EMS Data Collection over to the Indiana Department of Homeland Security (IDHS). IDHS took over the responsibilities of EMS Data Collection July 2015.

- Web-based software:
  - Provides an electronic patient care reporting (ePCR) system to EMS providers.
  - Allows EMS providers that use other software vendors to upload their data into the state's database.
- National Emergency Medical Services Information System (NEMSIS) (Silver & Gold) compliant.
  - In the future, it will be NEMSIS Version 3 compliant and include more trauma-related data elements as part of the reporting requirements.
- Secure, encrypted site.
- Unique username & password.
- Integrates data with Indiana trauma registry.
- Website: https://indianaems.isdh.in.gov .

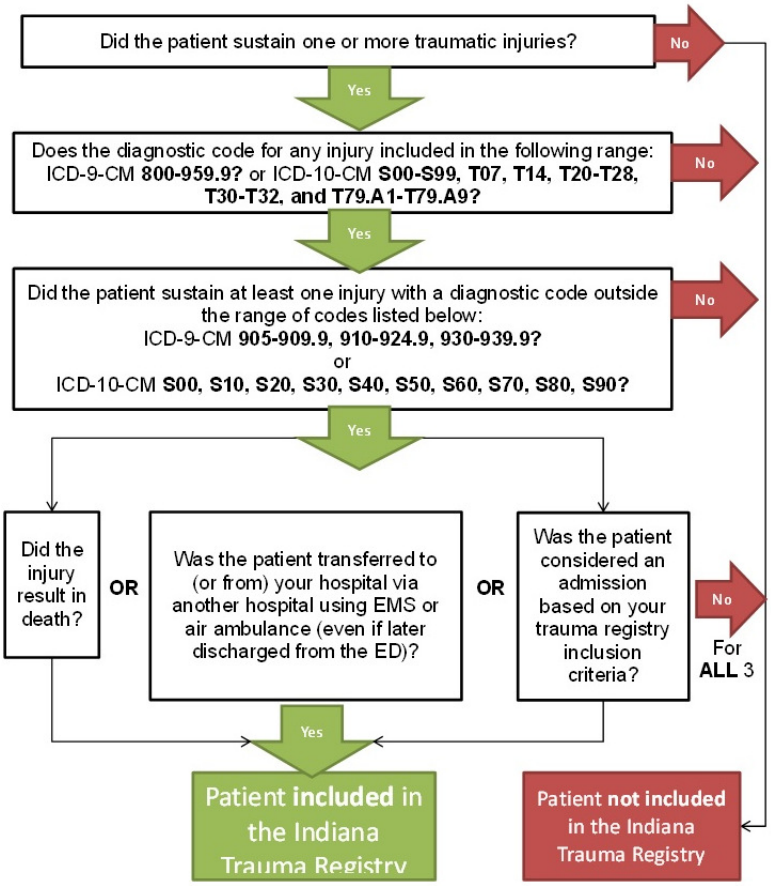
9 Indiana Trauma Registry

9.1 Scope of Indiana's Trauma Registry

- Began in 2007 with the 7 ACS verified trauma centers.
- State-wide, population-based registry. A directly defined population based on location (Indiana) and disease status (injury) allows ISDH to create programs tailored to the characteristics of our State.
- Trauma patients defined by the American College of Surgeons-Committee on Trauma (ACS-COT).
    - International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) codes: 800-959.9
        - ICD-10 (10th revision) has been designed to include new, more detailed diagnoses and treatments, which leads to enhanced coding accuracy.
- Utilized for overall management of the Indiana trauma system:
    - Monitor variations in incidence, outcomes.
    - Monitor system performance.

9.2 National Trauma Data Standard Patient Inclusion/Exclusion Criteria

To ensure consistent data collection across states into the National Trauma Data Bank (NTDB), a trauma patient is defined as a patient sustaining a trauma injury and meeting the following criteria.



9.3 ISDH Trauma Registry Website

- Compliant with ACS NTDB.
- Accessible with internet connection.
- Customizable user interface, easy to use.
- Capable of electronic data transfer from hospital's existing registries.
- HIPAA compliant.
- Website: https://indianatrauma.isdh.in.gov .
- The ISDH produces ad hoc data reports based on requests submitted.

9.4 Trauma Registry Data

- Data submitted quarterly by hospital.

Patient Admission Date Range	Report Due Date
April 1, 2016 – June 30, 2016	September 30, 2016
July 1, 2016 – September 30, 2016	January 15, 2017
October 1, 2016 – December 31, 2016	May 1, 2017
January 1, 2017 – March 30, 2017	June 30, 2017

- Analyzed for statewide process improvement.
- Quarter 4 2015 Report:
  - 16 trauma centers reported.
  - Total of 96 hospitals reported.
  - Includes 8,728 incidents.
- Currently 12 verified trauma centers in Indiana.

9.5 Trauma Registry Reports

- Reporting hospitals as of April 2016:
  - 11 trauma centers
  - 89 non-trauma centers
- 180,000+ records in the Indiana trauma registry.

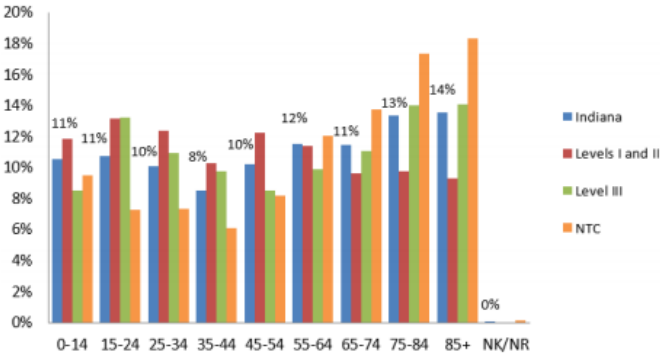
Indiana Trauma Registry

Statewide Quarter 3 Data Report
July 1, 2015—September 30, 2015
9,555 Incidents

99 Total Hospitals Reporting

Level I and II:	**9 facilities**	**48.4% of data**
Level III:	**7 facilities**	**9.9% of data**
(Non-Trauma) Hospitals:	**83 facilities**	**41.6% of data**

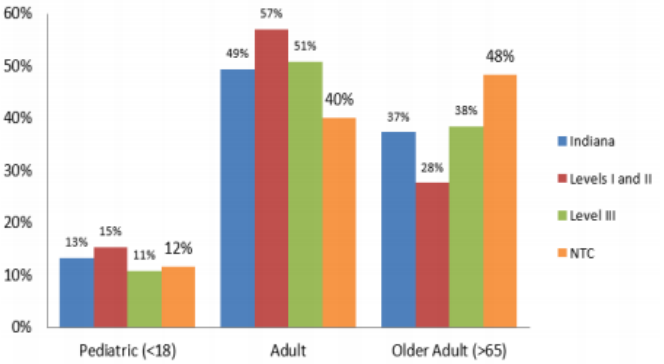
Patient Age (Years)



There were 6 unknown ages.

Age Group	Indiana	I and II	III	NTC
0-14	1009	550	81	378
15-24	1025	610	126	289
25-34	967	572	104	291
35-44	812	476	93	243
45-54	974	568	81	325
55-64	1100	526	94	480
65-74	1097	445	105	547
75-84	1275	451	133	691
85+	1294	430	134	730
NK/NR	6	0	0	6
Total	9559	4628	951	3980

Patient Age Groupings



Age Group	Indiana	I and II	III	NTC
Pediatric	1274	711	102	461
Adult	4713	2638	483	1592
Older Adult	3566	1279	366	1921
Total	9553	4628	951	3974

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9.6 Importance of Trauma Registry Data

Trauma registries are a potentially rich source of injury surveillance data, because they are typically able to:

- Show the size of the public health and economic impact of injuries.
- Describe, compare, and monitor trends in unintentional and violence-related injuries.
- Identify new or developing injury problems.
- Identify persons at risk of injury and poor injury-related health outcomes.
- Guide development of evidence-based patient transport and clinical management guidelines.
- Provide reliable data for program and policy decisions.

Trauma registries can be the basis for much of the research and quality assessment work that informs policy makers about optimizing the care of injured patients are essential for highly functioning regional and statewide trauma systems. Development of effective trauma systems are vital, as the literature has reported that when these systems are in place mortality rates among severely injured patients are reduced by 20 to 25%[17,18].

9.7 Factors Influencing Data Quality

Data quality reflects the completeness and validity of the data recorded in the Indiana trauma registry. A registry can have high data quality if it has the following components:

- Extensive database:
  - State requires what is required at the national level (NTDB).
  - Collects additional, optional data elements.
- Data standard:
  - NTDB.
  - Indiana-specific, optional data elements are clearly defined and explained.
- Inclusion criteria:
  - Only include trauma cases that meet the criteria.
  - Allows us to compare “apples to apples”.
- Data validation:
  - Checks and balances for data elements captured in the registry.
  - Verifies inclusion criteria.
- Feedback:
  - ISDH provides feedback to hospitals regarding completeness of data elements.
- Ongoing training/education:
  - Registry/Registrar-specific courses.
  - ISDH-specific training:
    - New registry user.
    - Refresher training.
- Ideal world: every hospital has a designated, trained trauma registrar.

9.8 Data Usages

- Injury Prevention:
  - Outreach.
  - Education.
  - Program Evaluation.
- Research.
- Case management.
- Performance Improvement (PI).
- Data drives the development of the statewide trauma system:
  -
- ISDH will link pre-hospital, hospital and rehabilitation data.
  - Result: Each entity will receive patient outcome data.

Data allows you to analytically evaluate your organization and identify areas that need to be improved—for example, procedures that your staff needs more training on. Since it's easy to find information and format it so that it's easy to understand, you may also find that it's a lot easier to provide your reports to administrative agencies, from the state to your billing company.

- Better budgeting.
  - Mileage.
  - Overtime.
  - Vehicle maintenance.
- Better inventory management.
  - Medications.
  - Supplies.
  - Equipment.
- Better understanding.
  - Better patient care.
  - Better operations.
- Easier reporting to administrative agencies.
  - Funding justification.

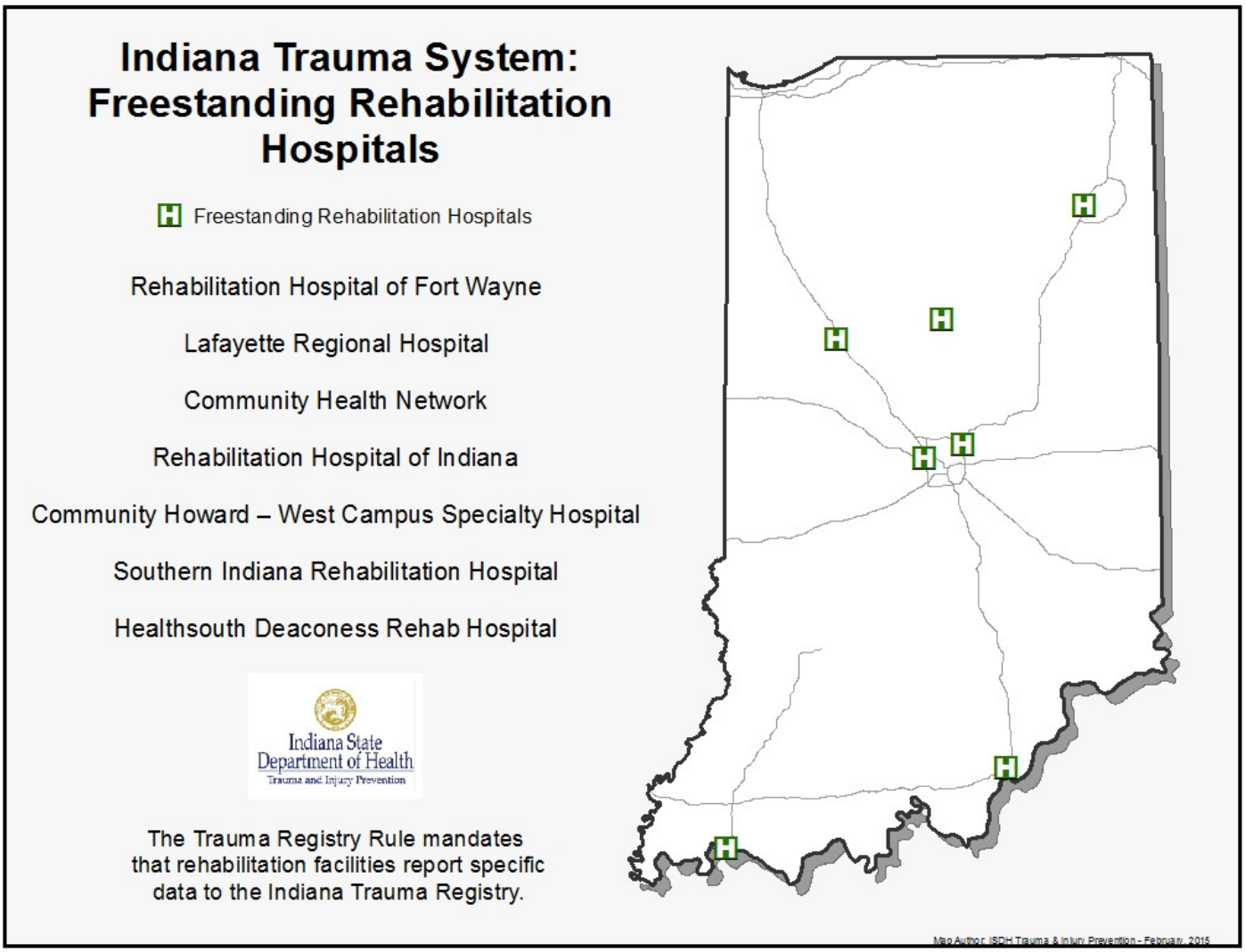
9.9 Linking Data to Evaluate Patient Care

- Pre-Hospital and hospital data are linked to look at patient outcomes through the continuation of patient care.
    - This aids in performance improvement.
- Linking can be done via deterministic or probabilistic matching.
    - Deterministic matching:
        - Use a unique identifier (often referred to as patient tracking) that exists in both datasets to match cases.
    - Probabilistically matching:
        - Use weights for multiple elements that exist in both datasets to link the data.
        - Steps in probabilistic matching:
            1. Define & clean the elements in both datasets
            2. Identify which elements to use for matching
            3. Apply weights
            4. Choose cut-offs
            5. Matches above upper cut-off are linked
            6. Matches below lower cut-off are not linked
            7. Matches between cut-offs manually reviewed
            8. Review links

10 Rehabilitation Data

10.1 Rehabilitation Data

- 8 rehabilitation hospitals around the state must report per the Trauma Registry Rule.
- The registry collects the Centers for Medicare & Medicaid Services (CMS)-required data elements for all traumatically injured patients.



11 Trauma Centers

11.1 Trauma Centers in Indiana

- **Level I American College of Surgeons (ACS) Verified Trauma Centers**
  1. Smith Level I Shock Trauma Center at Eskenazi Health
  2. Methodist Level I Trauma Center at IU Health
  3. Riley Hospital's Emergency Medicine and Trauma Center (EMTC) at IU Health Riley Hospital for Children
  4. St. Vincent Trauma Center at St. Vincent Indianapolis Hospital
- **Level II ACS Verified Trauma Centers**
  1. Deaconess Regional Trauma Center at Deaconess Hospital
  2. Lutheran Trauma Center at Lutheran Hospital
  3. Memorial Leighton Trauma Center at Memorial Hospital of South Bend
  4. Parkview Trauma Centers at Parkview Regional Medical Center
  5. St. Mary's Trauma Services at St. Mary's of Evansville
- **Level III ACS Verified Trauma Centers**
  1. IU Health Arnett
  2. IU Health Ball Memorial
  3. St. Vincent Anderson Regional Hospital
- **"In the Process of ACS Verification" Level II Trauma Centers**
  1. Terre Haute Regional
- **"In the Process of ACS Verification" Level III Trauma Centers**
  1. Franciscan St. Elizabeth – East
  2. Community Hospital of Anderson
  3. Good Samaritan Hospital
  4. Memorial Hospital and Health Care Center
  5. Methodist Northlake Campus
  6. Reid Health
  7. Franciscan St. Anthony Health – Crown Point
  8. Union Hospital – Terre Haute

11.2 American College of Surgeons (ACS) Requirements for Verified Trauma Centers

Level I ACS Verified Trauma Centers

- Capable of providing total care for every aspect of injury – prevention through rehabilitation
- Associated with a school of medicine
  - Facilitates research
  - Provides teaching opportunities to direct new advances in trauma care
- 24 hour in-house coverage by general surgeons
  - Prompt availability of care in specialties
- Receives patients from all levels of care

- Provides leadership in injury prevention
- Maintains a comprehensive Performance Improvement and Patient Safety (PIPS) program
- Program for substance abuse screening and patient intervention
- Meets minimum requirement for annual volume of severely injured patients (1200 patients / year)

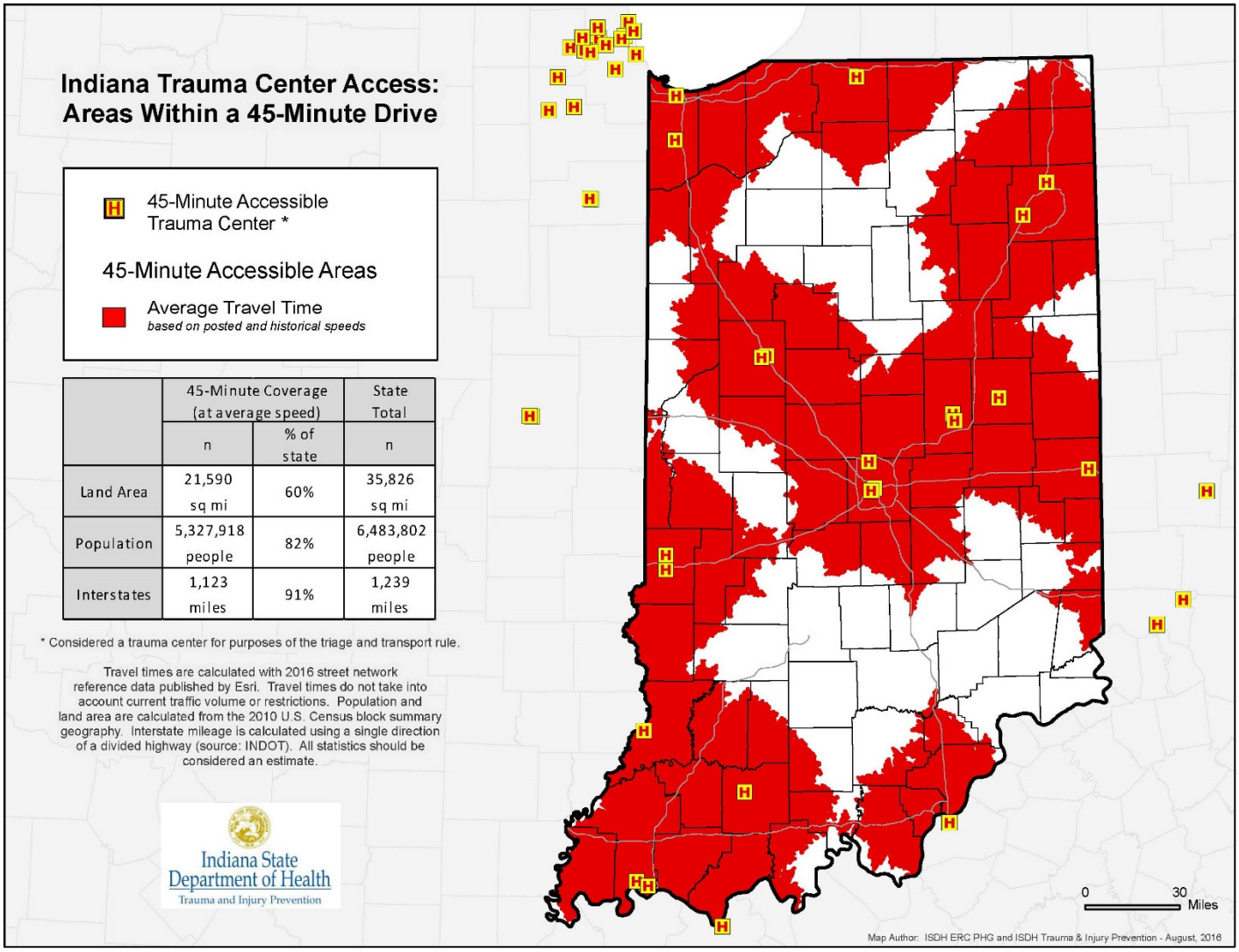
Level II ACS Verified Trauma Centers

- Capable of providing total care for every aspect of injury – prevention through rehabilitation
- 24 hour in-house coverage by general surgeons
    - Prompt availability of care in specialties
- Receives patients from all levels of care
- Provides leadership in injury prevention
- Maintains a comprehensive Performance Improvement and Patient Safety (PIPS) program
- Program for substance abuse screening and patient intervention
- Same as a level I trauma center
    - EXCEPT
        - Not associated with a school of medicine
        - Does not have a general surgery residency training program
        - Does not do research

Level III ACS Verified Trauma Centers

- 24 hour immediate coverage by emergency medicine physicians
    - Prompt availability of coverage by general surgeons and anesthesiologists
    - Not required to have neurosurgeons
- Transfer agreements for patients requiring more comprehensive care at a Level I or II trauma center

11.3 Trauma Center Access in Indiana

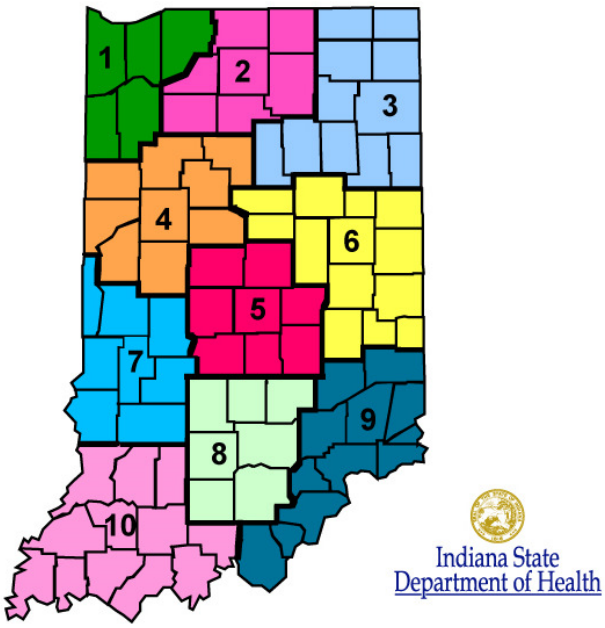


	45-Minute Coverage (at average speed)		State Total
	n	% of state	n
Land Area	21,590 sq mi	60%	35,826 sq mi
Population	5,327,918 people	82%	6,483,802 people
Interstates	1,123 miles	91%	1,239 miles

12 The Future of Indiana's Trauma System

12.1 Goals of the Trauma System

- Develop more ACS-verified trauma centers.
- Collect and analyze data on every trauma case in Indiana.
- Link EMS runs to Trauma incidents to Rehabilitation data to evaluate continuum of trauma patient care.
- Promulgate a Designation Rule that will go hand-in-hand with the national verification requirements.
- Identify the role of Community paramedicine in Indiana.
- Enhance the Blue Sky project: the ability to automatically transmit trauma data between the provider's server and the ISDH server that houses the trauma registry.
- Coordinate conference events, such as the Injury Prevention Conference and Annual EMS Medical Director's Conference, which increases the knowledge and expertise of Indiana's workforce.
- Provide and support trauma education opportunities throughout the state for prehospital, hospital, and rehabilitation workforce.
- Prevent injures in Indiana through collaborative efforts in leadership, education and policy, with a vision of an injury-free Indiana.
- Develop the regional trauma system that feeds into the state trauma system. These are the 10 regional trauma systems (identical to the public health preparedness districts).



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