

Indiana Trauma Registry

Statewide Quarter 4 Data Report October 1, 2014 to December 31, 2014 8,052 Incidents

97 Total Hospitals Reporting		
Level I and II:	9 facilities	44.3% of data
Level III:	10 facilities	14.4% of data
(Non-Trauma) Hospitals:	78 facilities	41.3% of data

For Quarter 4 2014, which spanned from October 1, 2014 to December 31, 2014, there were 8,052 incidents reported to the Indiana Trauma Registry at the Indiana State Department of Health. There were 97 hospitals that reported data, of which 9 were level I or II trauma centers and 10 were level II trauma centers. There were 7 hospitals that either started to report again or were new to reporting during this quarter compared to the previous quarter, while 2 hospitals dropped off from reporting this quarter from the previous quarter. A map of the state with the reporting hospitals can be found on page 49. Trauma centers represented 58.7% of the data. There were 2,857 incidents reported for October, 2,696 reported for November, and 2,499 incidents reported for December.

The content of this report has changed due to suggestions and additions requested by the Indiana State Trauma Care Committee at the February 20, 2015 meeting. Explanations of the changes requested and adapted from the ISTCC meeting can be found on page 21.

Some general reminders include that the blue columns represent an Indiana average, red columns represent level I and II trauma centers, green columns represent level III trauma centers and orange non-trauma centers. If a single percent is listed above a group of bars, the percent listed represents the average for Indiana. If a number is listed above a group of bars, it represents the count for Indiana. The category 'All Transfers' denotes the patient group where ED Disposition = Transferred to Another Hospital. **The category 'Linked Transfers' represents the patient group for whom the initial hospital and final hospital information could be linked.**

The E-codes used in this report follow the ICD-9 CDC matrix of external cause of injury.

Definitions:

Direct Admit: Patient is admitted directly to the hospital and does not spend time in Emergency Department. The ED Length of Stay should reflect a direct admittance.

External Cause of Injury: ICD-9-CM codes that are used to describe the mechanism or external factor that caused the injury event.

Trauma Type: The classification of the force applied to the body. Trauma type categories include blunt, penetrating, thermal, and other trauma.

Injury Severity Score: An anatomical scoring system defined as the sum of the three highest squared maximum Abbreviated Injury Scale (AIS) values to account for multiple injuries in the six body regions.

Acronyms:

E-code: External Cause of Injury	MVC: Motor Vehicle Collision
ED: Emergency Department	OR: Operating Room
ICU: Intensive Care Unit	Ps: Probability of Survival
ISS: Injury Severity Score	CAHs: Critical Access Hospital
LOS: Length of Stay	

Calculations:

$Ps = 1/(1+e^{-b})$ where $b=b_0+b1(RTS) + b2(ISS) + b3(\text{Age Index})$

Total GCS = Verbal GCS + Motor GCS + Eye GCS

$RTS = 0.94 * GCS + 0.73 * SBP + 0.29 * RR$

$ISS = (AIS)^2 + (AIS)^2 + (AIS)^2$

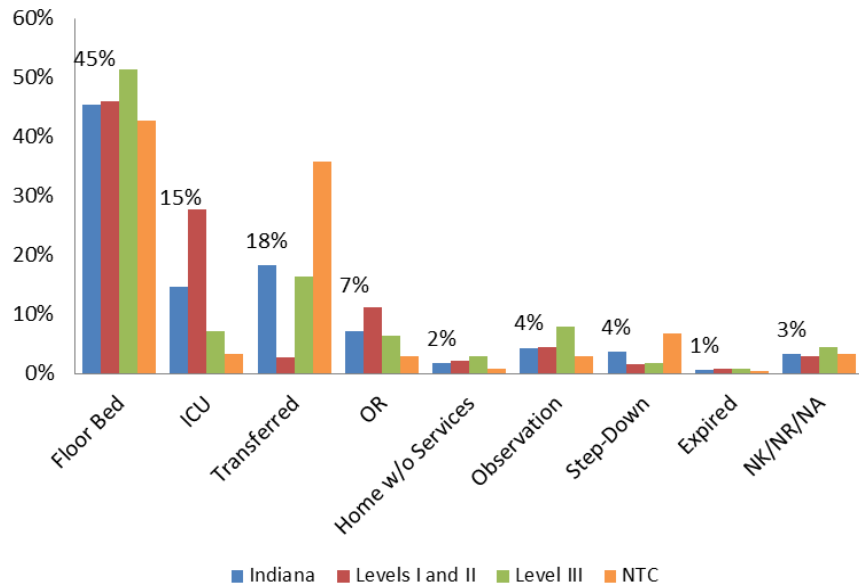


Indiana Trauma Registry

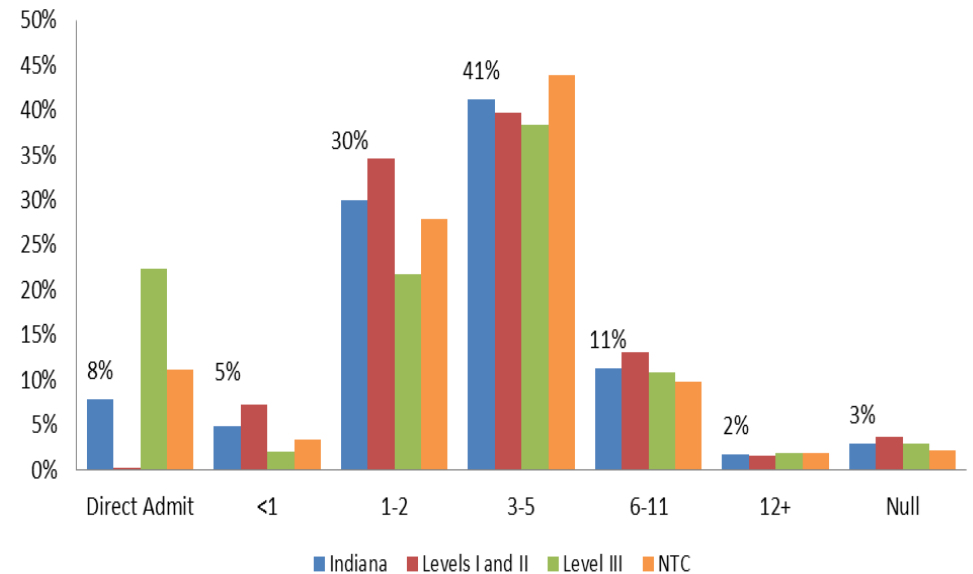
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ED Disposition by Percentage



ED Length of Stay (Hours)



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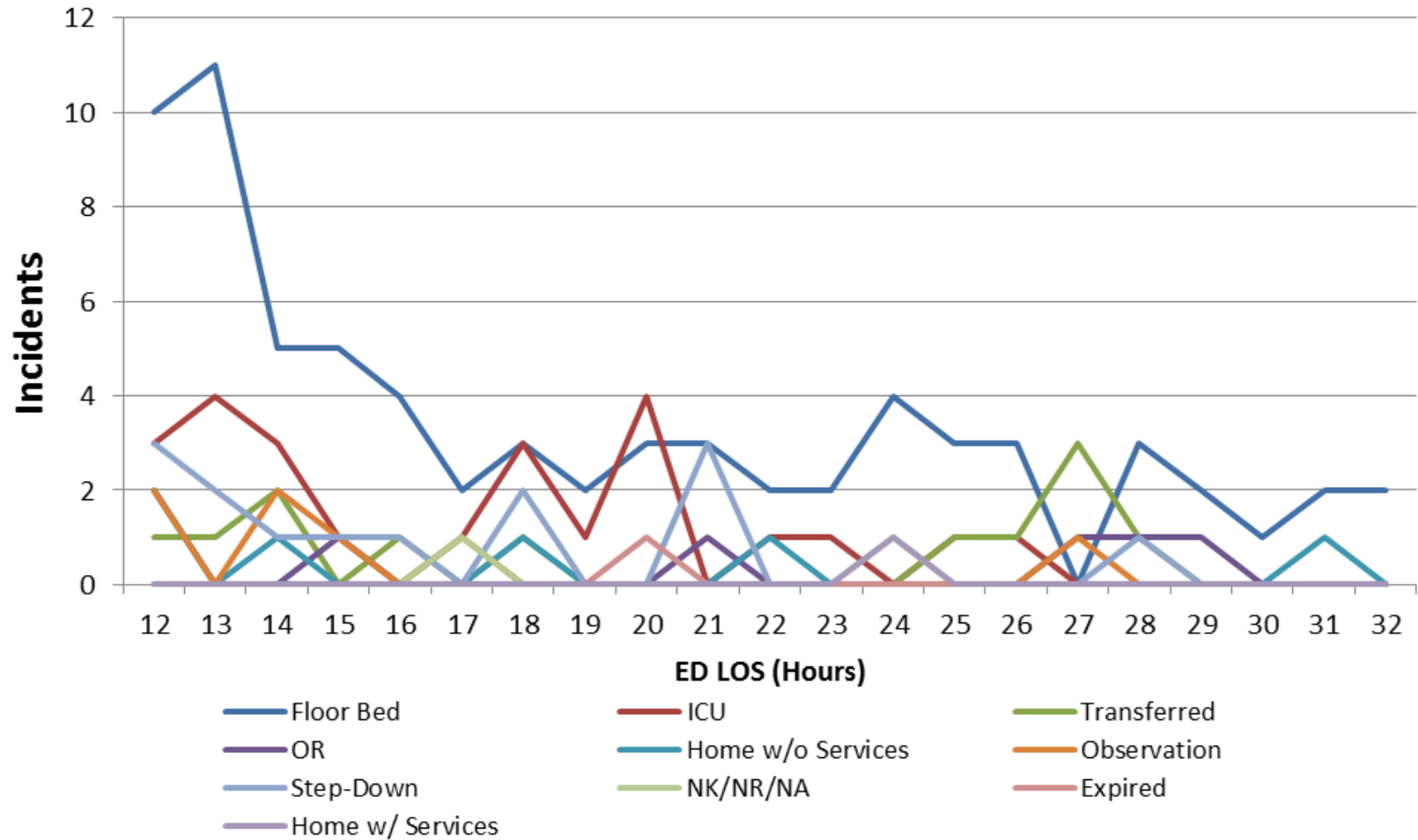
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ED Disposition for ED LOS >12 Hours



N=146

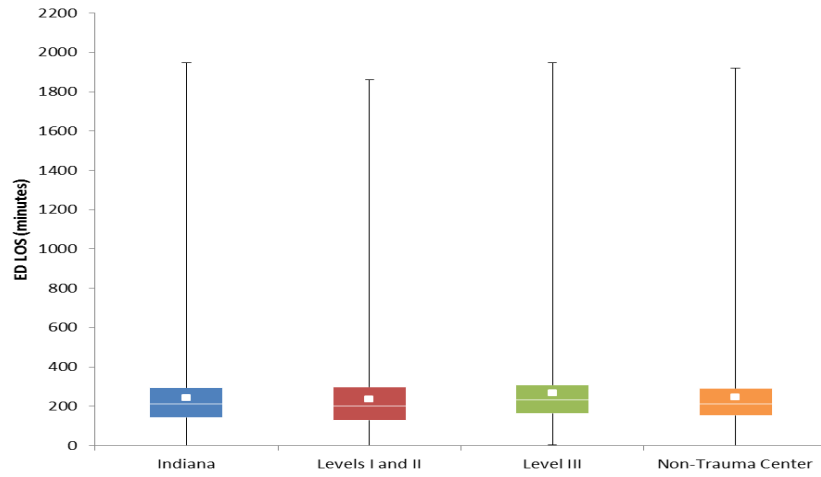
*One case expired > 12 hours

Indiana Trauma Registry

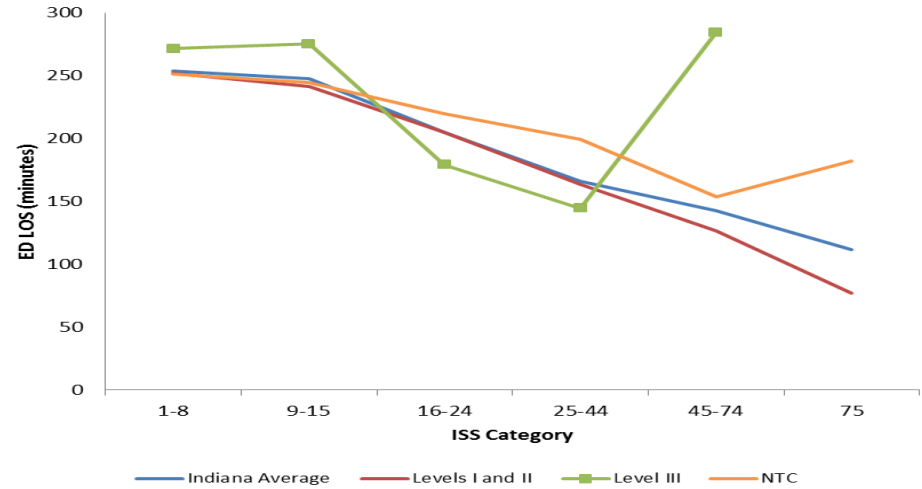
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ED LOS (Minutes) - All Patients



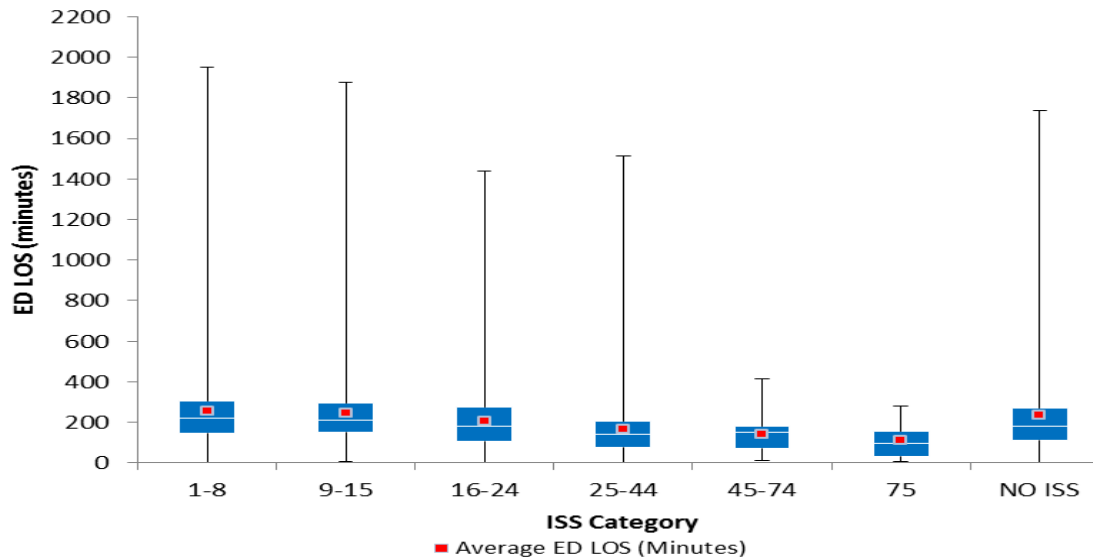
ED LOS (Minutes) by ISS



A table with all the values for ED LOS is found on page 47.

ED LOS (Minutes) by ISS

Note for EDLOS by ISS, there were 3 cases at Non-Trauma Centers with ISS greater than 45.



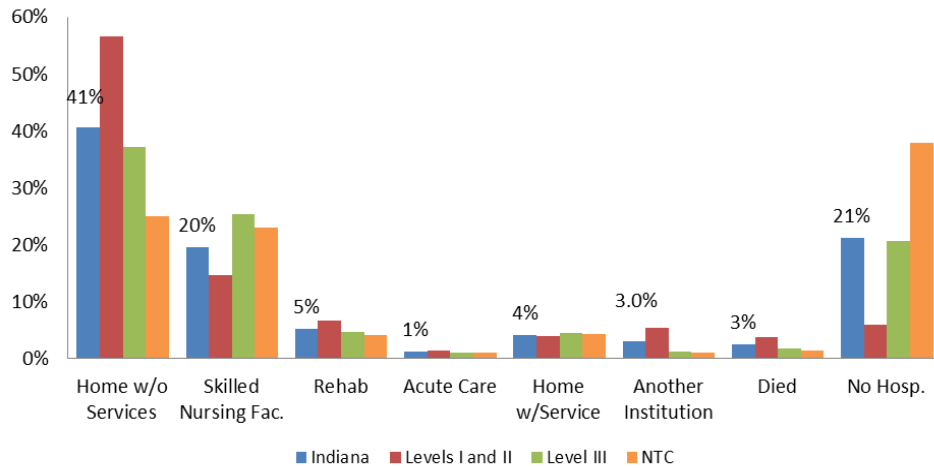
A table with values for ED LOS by ISS may be found on page 48.

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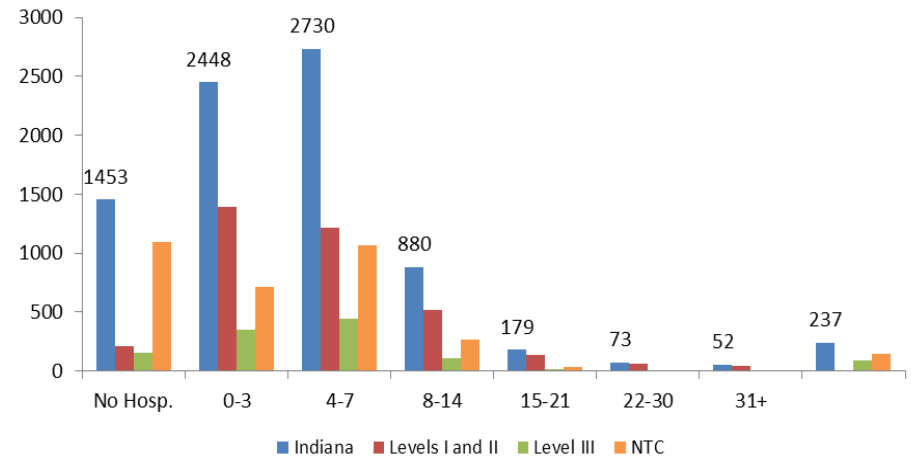
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Hospital Disposition



Hospital Length of Stay (days)



*There are new categories for the Hospital Disposition for the 2014 Data Dictionary
 <1%: null, psych., long term care hospital, AMS, hospice and intermediate care

Indiana Trauma Registry

Statewide Quarter 4 Data Report

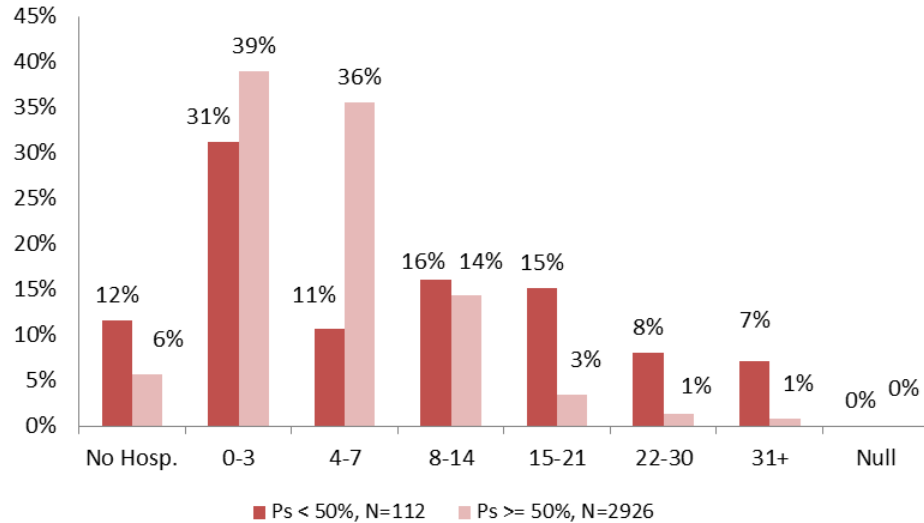
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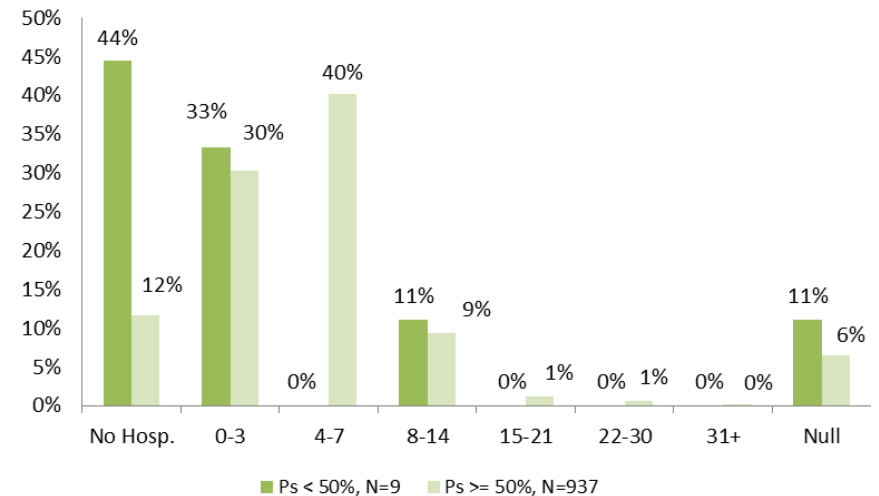
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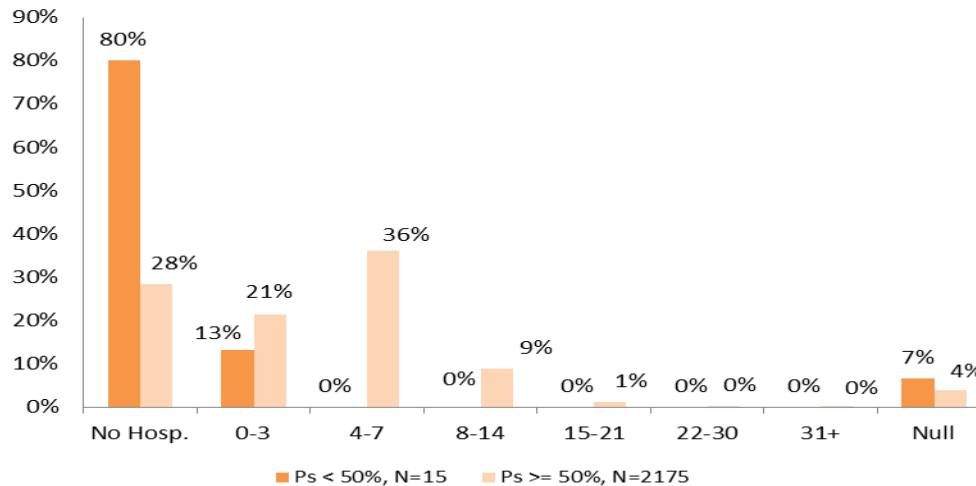
Hospital LOS (days) by Ps Levels I and II



Hospital LOS (days) by Ps Level III



Hospital LOS (days) by Ps Non-Trauma Centers



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ED Disposition of Expired for Ps \geq 50%, N=7

Facilities	6 Non-Trauma Centers 1 Trauma Centers	ISS	2 (1-8 cat.); 2 (9-15 cat.); 1 (16-24 cat.); 2 (25-44 cat.)
Average Distance from Scene to Facility	8.5 Miles	RTS—Systolic	3.7 (2-4)
Transport Type	3 Ground ambulance; 3 Helicopter; 1 Private/Public Vehicle/Walk-In	RTS—GCS Scale	1.7 (0-4)
Trauma Type	6 Blunt; 1 Penetrating	RTS—Resp. Scale	3.1 (3-4)
Cause of Injury	3 Falls; 3 MVC; 1 Firearm	RTS	5.2 (3.8-7.8)
Signs of Life	5 Yes; 2 Missing	B Value	1.3 (0.1-3.8)
Age	63.3 Years (3-86 Years)	Ps	0.7 (0.5-0.98)
Gender	2 Female; 5 Male	Resp. Assistance	2 Yes; 5 No
Interfacility Transfer	1 Yes; 6 No	ED LOS	1.7 hours (0.5-3.3 hours)
Region	5 North; 1 Central; 1 Missing		

-Region was created from injury zip code.

-Numbers represent counts per category or mean with minimum and maximum in parentheses.

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ED LOS > 12 Hours, N=110

Facilities	53 Level I and II 18 Level III 39 Non-trauma Centers	ISS	65 (1-8 cat); 39 (9-15 cat); 2 (16-24); 3 (25-44); 1 (No ISS)
Average Distance from Scene to Facility	8.0 Miles	RTS—Systolic	4 (4-4)
Transport Type	79 Ambulance; 4 Helicopter, 27 Private Vehicle/Walk-In	RTS—GCS Scale	3.8 (0-4)
Trauma Type	104 Blunt; 6 Penetrating	RTS—Resp. Scale	3 (3-4)
Cause of Injury	72 Fall; 22 MVC; 4 Struck by, Against; 4 Firearm; 5 Transport; 2 Cut/Pierce; 1 Bicyclist	RTS	7.4 (3.8-7.8)
Signs of Life	107 Yes; 1 No; 1 NA	B Value	3.96 (0.4-5.6)
Age	58.5 Years (4-96 Years)	Ps	0.97 (0.61-0.996)
Gender	51 Female; 58 Male; 1 NK	Resp. Assistance	8 Yes; 96 No; 6 NK
Interfacility Transfer	16 Yes; 94 No	ED LOS	18.9 (12-32.5)
Region	32 North; 55 Central; 3 South; 20 Unknown		
ED Disposition	57 Floor Bed; 4 Home w/o Services; 22 ICU; 1 NA; 3 Observation	7 OR; 8 Telemetry/Step-Down Unit; 8 Transferred	

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ED Dispo ≠ Expired, Hospital Dispo = Expired for Ps ≥ 50%, N=101, Trauma Centers

Interfacility Transfer	38 Yes		Interfacility Transfer	63 No
Average Distance from Scene to Facility	15.6 Miles		Average Distance from Scene to Facility	9.5 Miles
Transport Type	26 Ambulance; 12 Helicopter		Transport Type	51 Ambulance; 10 Helicopter; 1 Fixed Wing; 1 Private Vehicle
Trauma Type	32 Blunt; 3 Penetrating; 1 Burn; 2 Other		Trauma Type	48 Blunt; 8 Penetrating; 3 Burn; 4 Other
Cause of Injury	24 Fall; 7 MVC; 3 Firearm; 1 Fire/Burn; 1 Transport; 2 Not Categorized		Cause of Injury	35 Fall; 10 MVC; 8 Firearm; 3 Fire/Burn; 1 Transport; 2 Struck By, Against; 4 Not Categorized
Signs of Life	27 Yes; 11 No		Signs of Life	50 Yes; 13 Unknown
Age	68 Years (27-91 Years)		Age	71 Years (19-96 Years)
Gender	13 Female; 25 Male		Gender	24 Female; 39 Male
Region	2 North; 19 Central; 7 South		Region	22 North; 26 Central; 10 South
ISS	5 (1-8); 8 (9-15); 7 (16-24); 16 (25-44); 1 (45-74); 1 (75)		ISS	10 (1-8); 17 (9-15); 15 (16-24); 18 (25-44); 3 (45-74)
RTS—Systolic	4 (4-4)		RTS—Systolic	3.9 (2-4)
RTS—GCS Scale	2.5 (0-4)		RTS—GCS Scale	3.4 (0-4)
RTS—Resp. Scale	3 (3-4)		RTS—Resp. Scale	3 (0-4)
RTS	6.2 (3.8-7.6)		RTS	6.9 (3.8-7.8)
B Value	1.8 (0.12-3.6)		B Value	2.3 (0.04-3.8)
Ps	0.8 (0.5-0.97)		Ps	0.9 (0.5—0.98)
Resp. Assistance	19 Yes; 19 No		Resp. Assistance	17 Yes; 41 No; 5 Unknown
ED LOS	2.5 Hours (0.6-6.9 Hours)		ED LOS	3.7 Hours (0.45-26.95 Hours)

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ED Dispo ≠ Expired, Hospital Dispo = Expired for Ps ≥ 50%, N=45, Non-trauma Centers

Interfacility Transfer	2 Yes		Interfacility Transfer	43 No
Average Distance from Scene to Facility	5.8 Miles		Average Distance from Scene to Facility	7.5 Miles
Transport Type	2 Ambulance		Transport Type	35 Ambulance; 6 Private Vehicle; 2 NK
Trauma Type	1 Blunt; 1 Unknown		Trauma Type	41 Blunt; 2 Other
Cause of Injury	2 Falls		Cause of Injury	41 Falls; 1 Bites/Stings; 1 Not Categorized
Signs of Life	2 Yes		Signs of Life	43 Yes
Age	Geriatric		Age	81.6 Years (50-103 Years)
Gender	2 Male		Gender	23 Females; 20 Males
Region			Region	12 North; 17 Central; 11 South
ISS	2 (9-15)		ISS	13 (1-8); 26 (9-15); 2 (16-24); 2 (25-44)
RTS—Systolic	4		RTS—Systolic	3.9 (2-4)
RTS—GCS Scale	4		RTS—GCS Scale	3.6 (0-4)
RTS—Resp. Scale	3		RTS—Resp. Scale	3.08 (3-4)
RTS	7.55		RTS	7.4 (4.7-7.8)
B Value	3.16		B Value	3.25 (0.9-5.5)
Ps	0.96		Ps	0.95 (0.7-0.996)
Resp. Assistance	1 Yes; 1 No		Resp. Assistance	12 Yes; 22 No; 9 Unknown
ED LOS	1 Unknown; 1 Direct Admit		ED LOS	4.79 Hours (1.15-13.6)

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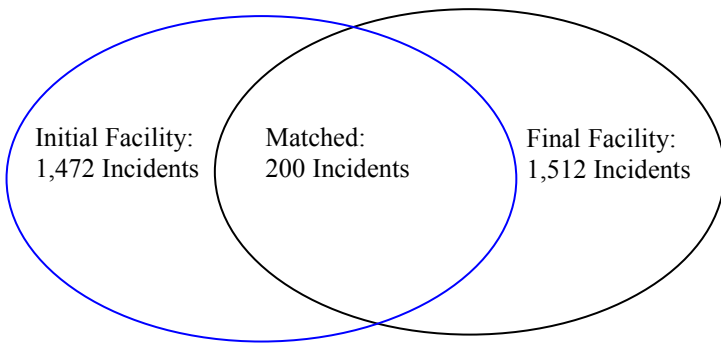
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For Quarter 4, 2014, of the 8,052 incidents reported to the Indiana Trauma Registry, 1472 cases that had an ED Disposition of “Transferred to another acute care facility” at the initial facility or that had the Inter-Facility Transfer equal to “Yes” at the Trauma Center. Of those transferred, 200 cases were probabilistically matched. The linked cases make up 6.7% of the Q4 2014 data. All public health preparedness districts are represented. The diagram below illustrates the overlap between the transfers reported from the initial facility and from the final facility that can be matched.



The initial facility in which transfers come from may be considered Critical Access Hospitals (CAHs). All Indiana CAHs are considered Rural, and must meet additional requirements to have a CAH designation, such as having no more than 25 inpatient beds and being located in a rural area. Facilities that are highlighted indicate that these facilities reported data for Quarter 4, 2014.

Within this transfer data section, the purple columns represent the transfer cases and the single percentages represent the percent for the transfer cases. For two demographic variables, patient age groupings and gender, the Indiana average is included to provide more insight to this transfer population.

Indiana Critical Access Hospitals (CAHs)

Adams Memorial Hospital	Pulaski Memorial Hospital
Cameron Memorial Community Hospital Inc	Putnam County Hospital
Community Hospital of Bremen Inc	Rush Memorial Hospital
Decatur County Memorial Hospital	Scott Memorial Hospital
Dukes Memorial Hospital	St Vincent Frankfort Hospital Inc
Gibson General Hospital	St Vincent Jennings Hospital Inc
Greene County General Hospital	St Vincent Mercy Hospital
Harrison County Hospital	St Vincent Randolph Hospital Inc
IU Health Bedford Hospital	St Vincent Salem Hospital Inc
IU Health Blackford Hospital	St. Mary's Warrick Hospital Inc
IU Health Paoli Hospital	St. Vincent Clay Hospital Inc
IU Health Tipton Hospital	St. Vincent Dunn Hospital Inc
IU Health White Memorial Hospital	St. Vincent Williamsport Hospital, Inc.
Jasper County Hospital	Sullivan County Community Hospital
Jay County Hospital	Union Hospital Clinton
Margaret Mary Community Hospital Inc	Wabash County Hospital
Parkview LaGrange Hospital	Woodlawn Hospital
Perry County Memorial Hospital	

Rural Hospitals

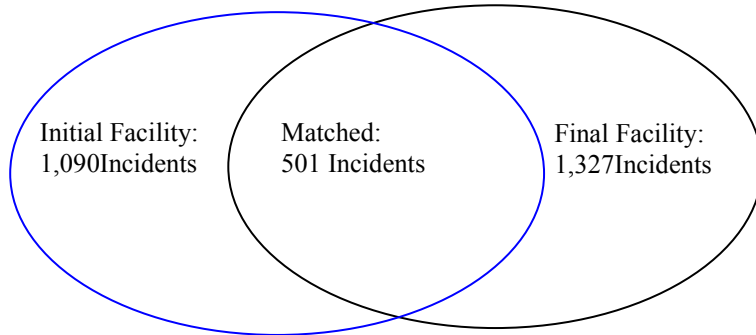
Columbus Regional Hospital	King's Daughters' Health
Daviess Community Hospital	Kosciusko Community Hospital
Doctor's Neuromedical	Marion General Hospital
Fayette Regional Health System	Memorial Hospital
Franciscan St Anthony Health - Michigan City	Memorial Hospital and Health Care Center
Franciscan St Elizabeth Health - Crawfordsville	Parkview Noble Hospital
Good Samaritan Hospital	Reid Hospital & Health Care Services
Henry County Memorial Hospital	Saint Joseph RMC - Plymouth
Indiana University Health La Porte Hospital	Schneck Medical Center
Indiana University Health Starke Hospital	

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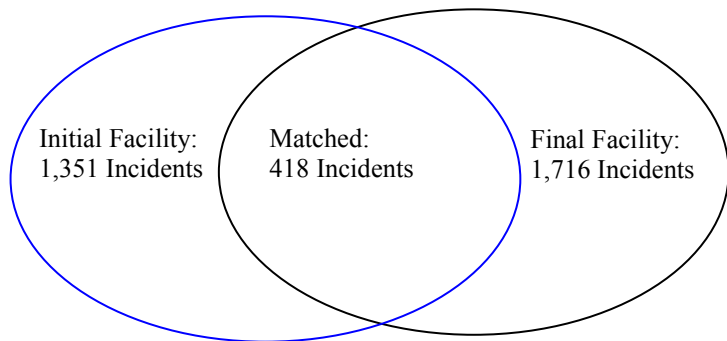
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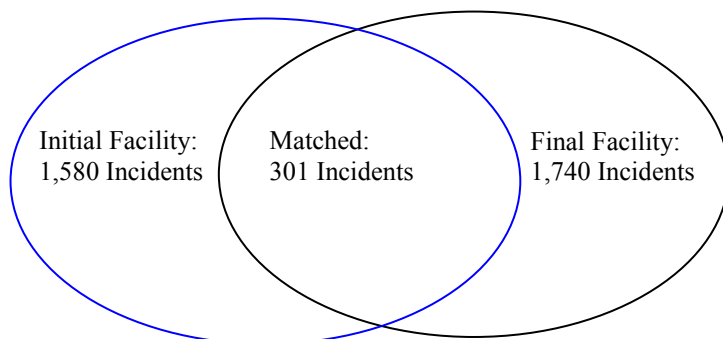
Historical Links



For Quarter 1 2014, of the 6,824 incidents reported to the Indiana Trauma Registry, 1,090 cases that had an ED Disposition of “Transferred to another acute care facility” at the initial facility or that had the Inter-Facility Transfer equal to “Yes” at the Trauma Center. Of those transferred, 501 cases were probabilistically matched. The linked cases make up 14.7% of the Q1 2014 data. All public health preparedness districts are represented. The diagram below illustrates the overlap between the transfers reported from the initial facility and from the final facility that can be matched.



For Quarter 2, 2014, of the 8,272 incidents reported to the Indiana Trauma Registry, 1,716 cases that had an ED Disposition of “Transferred to another acute care facility” at the initial facility or that had the Inter-Facility Transfer equal to “Yes” at the Trauma Center. Of those transferred, 418 cases were probabilistically matched. The linked cases make up 13.7% of the Q2 2014 data. All public health preparedness districts are represented. The diagram below illustrates the overlap between the transfers reported from the initial facility and from the final facility that can be matched.



For Quarter 3, 2014, of the 8,814 incidents reported to the Indiana Trauma Registry, 1,580 cases that had an ED Disposition of “Transferred to another acute care facility” at the initial facility or that had the Inter-Facility Transfer equal to “Yes” at the Trauma Center. Of those transferred, 301 cases were probabilistically matched. The linked cases make up 9.1% of the Q3 2014 data. All public health preparedness districts are represented. The diagram below illustrates the overlap between the transfers reported from the initial facility and from the final facility that can be matched.

Indiana Trauma Registry

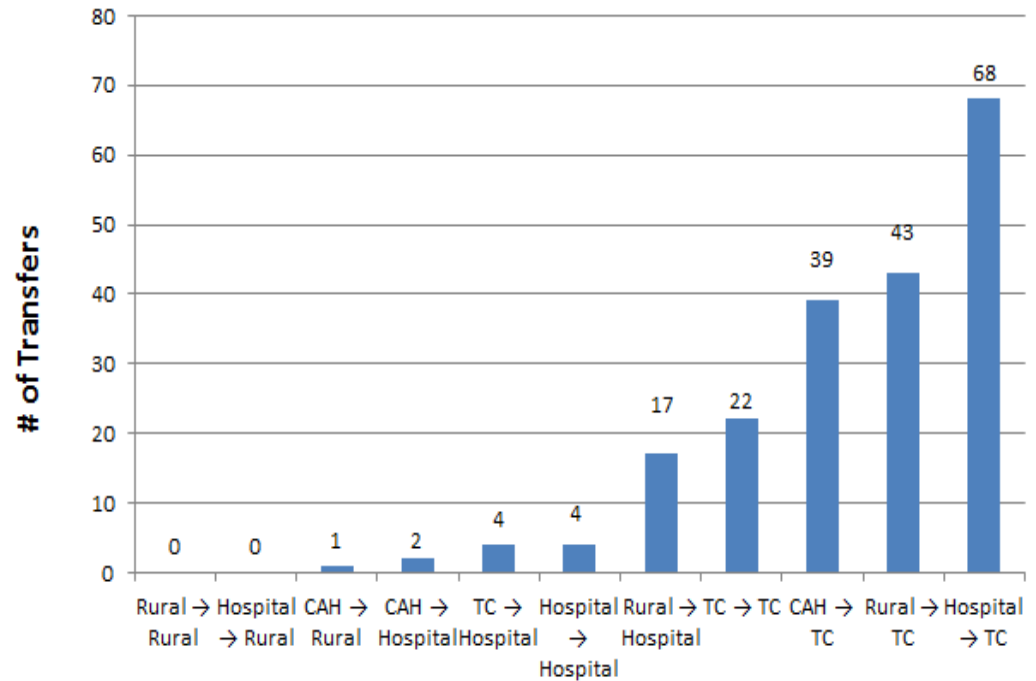
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Facility to Facility Transfers

For Transfer Patients:		
Initial Hospital Type	Final Hospital Type	Incident Counts
Rural Hospital	Rural Hospital	0
Hospital	Rural Hospital	0
Critical Access Hospital	Rural	1
Critical Access Hospital	Hospital	2
Trauma Center	Hospital	4
Hospital	Hospital	4
Rural Hospital	Hospital	17
Trauma Center	Trauma Center	22
Critical Access Hospital	Trauma Center	39
Rural Hospital	Trauma Center	43
Hospital	Trauma Center	68

Facility Transfer Type



Rural = Rural Hospital; TC = ACS Verified or In Process Trauma Center;
 CAH = Critical Access Hospital; Hospital = does not fall into above categories

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For Linked Transfer Patients:

For Transfer Patients:					
	All Transfer Patients	Critical*	Physiological Critical**	ISS Critical***	<u>Ps <0.5****</u>
Number of Patients	200	126	118	19	1
EMS Notified to Scene	8 minutes	7.1 minutes	7.2 minutes	9.4 minutes	-
EMS Scene Arrival to Departure	15.9 minutes	15.8 minutes	14.5 minutes	22.4 minutes	-
EMS Scene Departure to Initial Hospital ED Arrival	18.1 minutes	18.6 minutes	18.5 minutes	23.7 minutes	-
Initial Hospital ED Arrival to Departure	2 hours 48.2 minutes	2 hours 46.7 minutes	2 hours 49.5 minutes	1 hour 50.1 minutes	40 minutes
Initial Hospital ED Departure to Final Hospital ED Arrival	1 hour 22.7 minutes	1 hour 5.3 minutes	1 hour 4 minutes	1 hour 42.7 minutes	1 hour 1 minute
TOTAL TIME	4 hours 52.9 minutes	4 hours 33.5 minutes	4 hours 33.7 minutes	4 hours 28.3 minutes	

*Critical patient is defined as having a GCS \leq 12, OR Shock Index $>$ 0.9 OR ISS $>$ 15 at the initial hospital.

**Physiological Critical Transfer patient is defined as having a Shock Index $>$ 0.9 OR GCS \leq 12 at the initial hospital.

***ISS Critical Transfer patient is defined as having an ISS $>$ 15.

****Patients with a probability of survival \leq 0.5.

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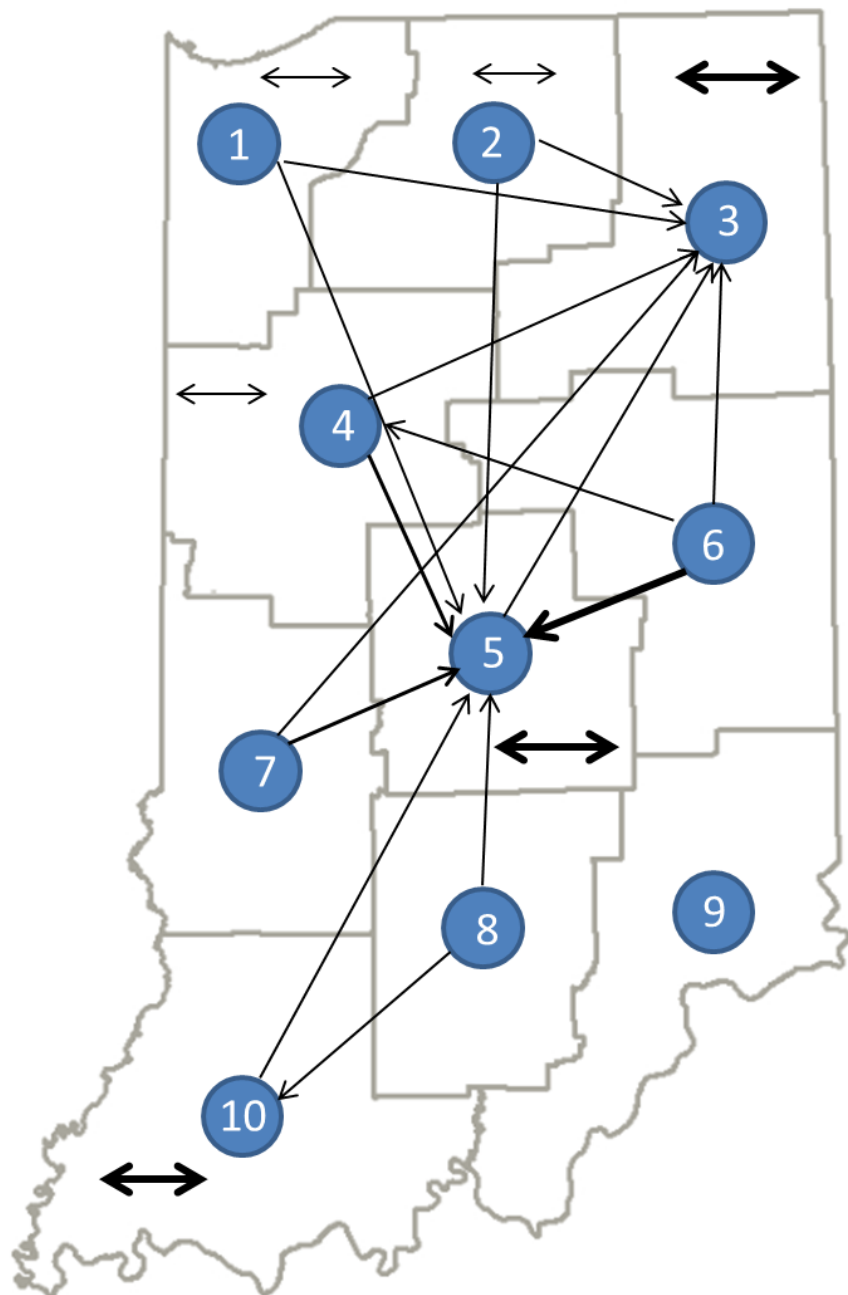
10 facilities

14.4% of data

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78 facilities

41.3% of data



For Transfer Patients:

Public Health Preparedness District Initial Hospital	Public Health Preparedness District Final Hospital	Incident Counts
1	1	4
1	3	2
1	5	9
2	2	1
2	3	3
2	5	3
3	3	39
4	3	2
4	4	1
4	5	12
5	3	3
5	5	34
6	3	3
6	4	2
6	5	36
7	3	1
7	5	14
8	5	7
8	10	1
10	5	2
10	10	21

*The thickness of the line indicates the frequency of transfers out of or within the public health preparedness district. The circles represent transfers from a specific PHPD, not of a specific hospital or county.

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For Linked Transfer Patients:

For Transfer Patients:					
	All Transfer Patients	<i>Critical*</i>	<i>Physiological Critical**</i>	<i>ISS Critical***</i>	<u><i>Ps <0.5****</i></u>
Number of Patients	200	126	118	19	1
Total Time	4 hours 52.9 minutes	4 hours 33.5 minutes	4 hours 33.7 minutes	4 hours 28.3 minutes	1 hours 1 minute
Total Mileage	58.2	58.2	64.7	66.7	51.2
Injury Scene to Initial Hospital Mileage***	8.6	8.6	9.8	9.3	1.2
Initial Facility to Final Facility Mileage	49.7	49.7	54.9	57.5	50

Estimated Average Distance (miles) by Region (region of final hospital):					
Region	Injury Scene to Initial Facility Mileage†	Initial Facility to Final Facility Mileage	Total Mileage	Drive Count	Air Count
Indiana Average	8.6	49.7	58.2	159	41
North Region	6.9	41.5	48.4	82	11
Central Region	10	59.7	69.7	59	23
South Region	10	47.3	57.2	18	7

*Critical patient is defined as having a GCS \leq 12, OR Shock Index $>$ 0.9 OR ISS $>$ 15 at the initial hospital.

**Physiological Critical Transfer patient is defined as having a Shock Index $>$ 0.9 OR GCS \leq 12 at the initial hospital.

*** ISS Critical Transfer patient is defined as ISS $>$ 15 at the initial hospital.

****Probability of Survival $<$ 0.5

†Injury Scene to Initial Facility Mileage location estimated by zip code centroid

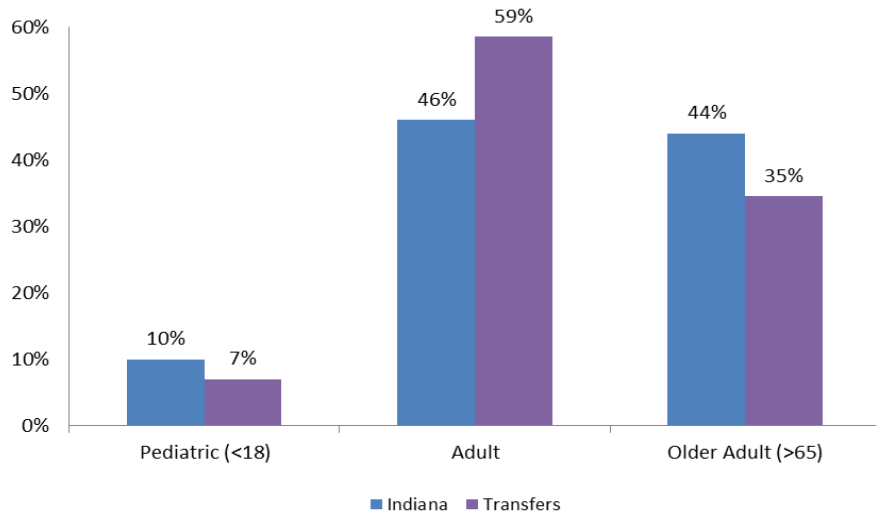
Statistics for Estimated Average Distance by Region calculated by Public Health Geographics, Epidemiology Resource Center, ISDH

Indiana Trauma Registry

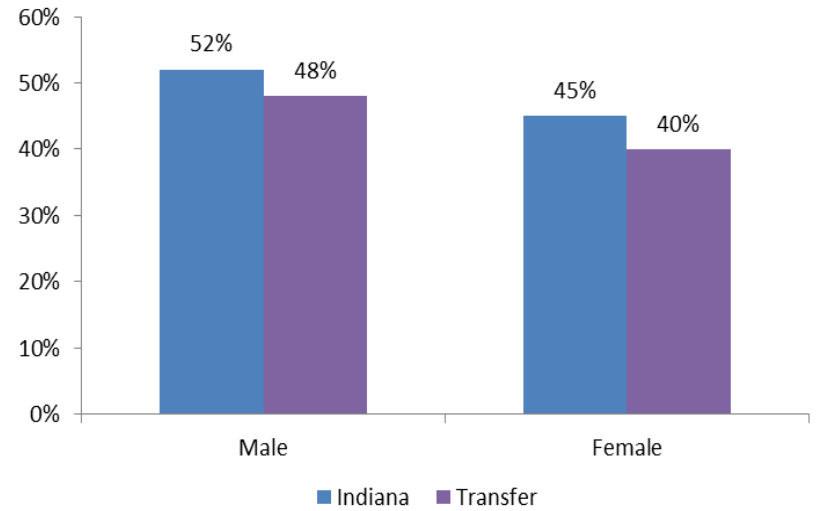
Statewide Quarter 3 Data Report
October 1, 2014 to December 31, 2014
8,052 Incidents—200 Transfers

97 Total Hospitals Reporting
 Level I and II: **9 facilities** **44.3% of data**
 Level III: **10 facilities** **14.4% of data**
 (Non-Trauma) Hospitals: **78 facilities** **41.3% of data**

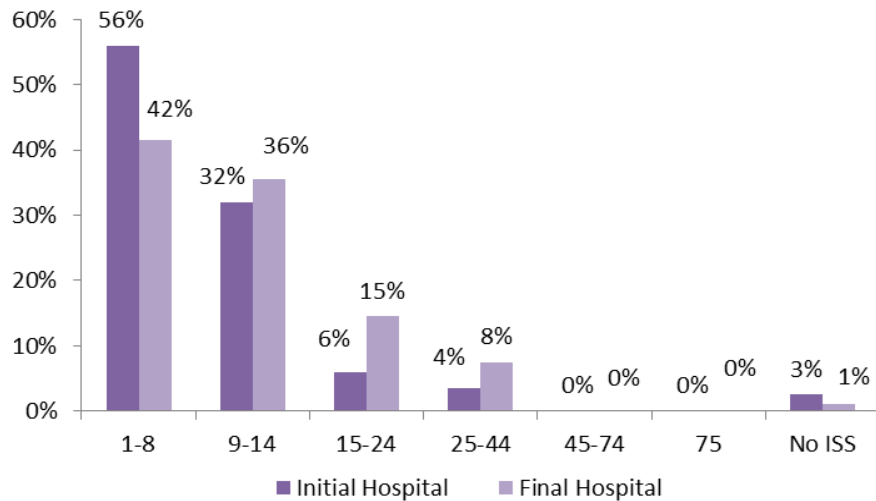
Patient Age Groupings



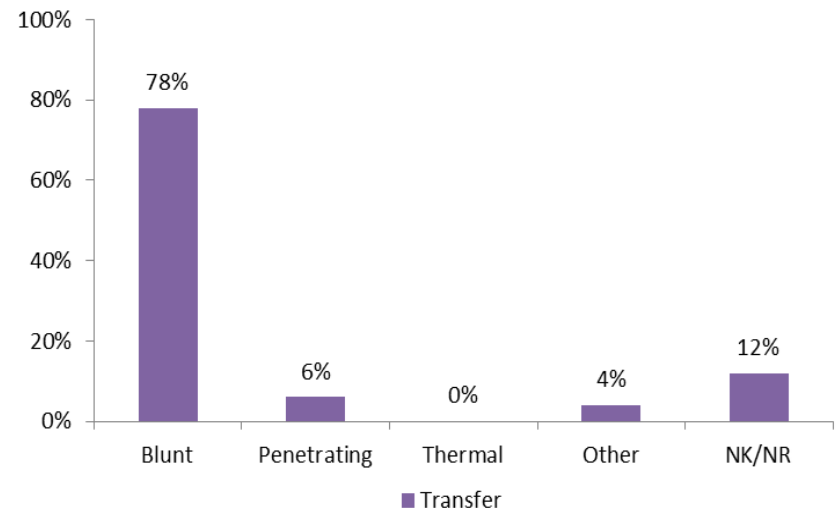
Patient Gender



Injury Severity Score (ISS)



Trauma Type- Final Hospital



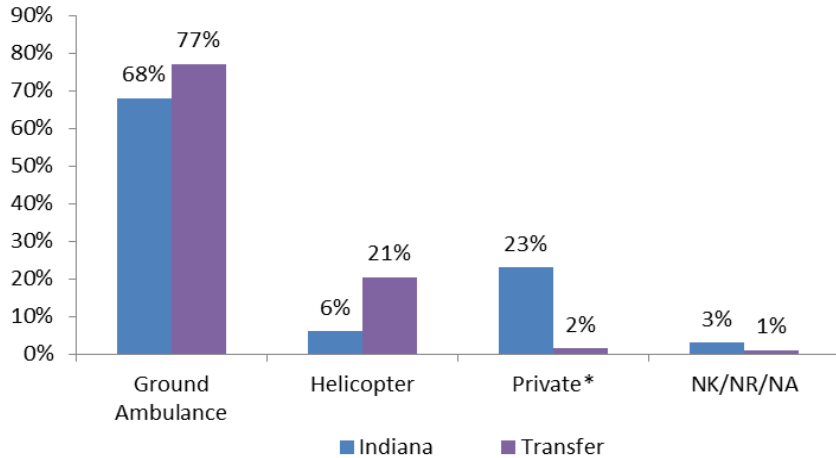
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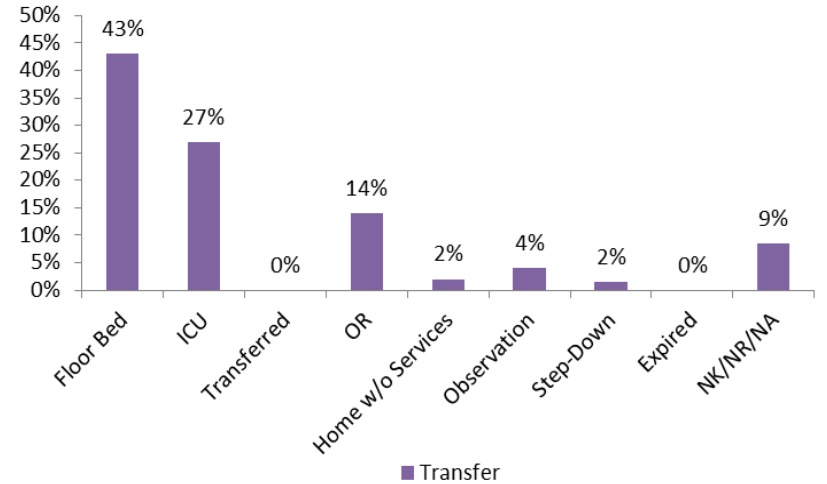
Level I and II:	9 facilities	44.3% of data
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Transport Mode— Final Hospital

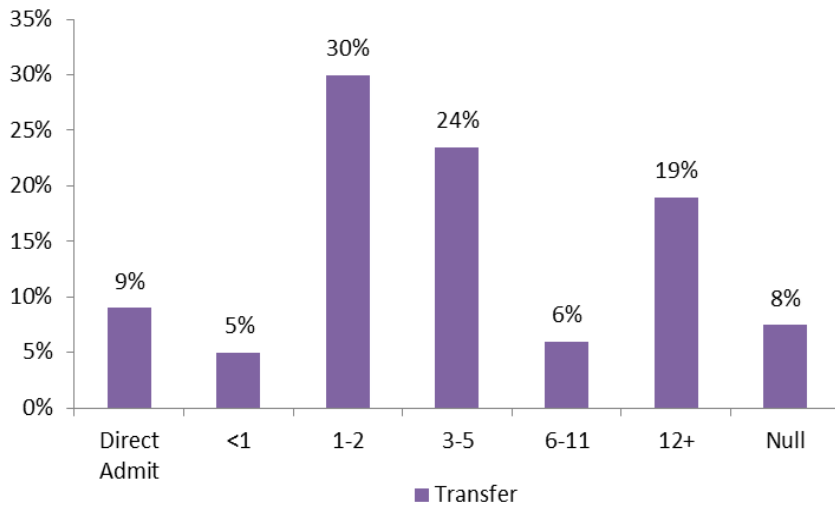


<1% Transport Mode: Police, Other * Indicates Private/ Public Vehicle, Walk-in

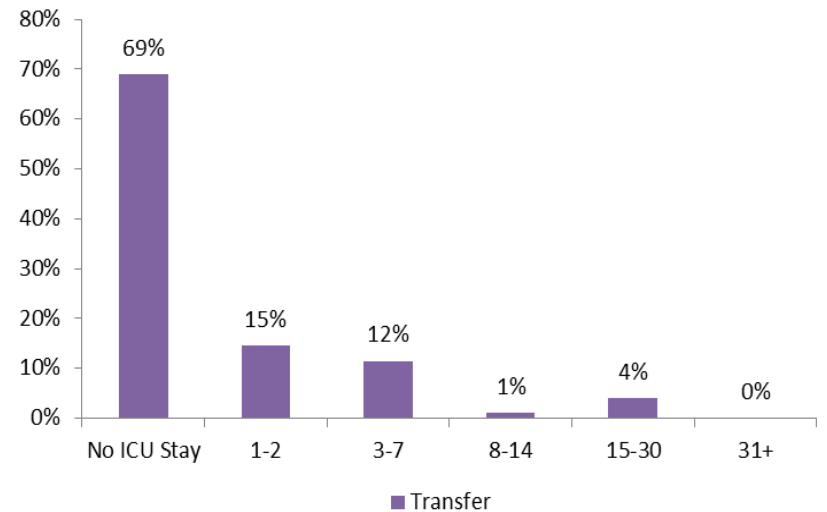
ED Disposition by Percentage- Final Hospital



ED Length of Stay (hours)- Final Hospital



ICU Length of Stay (days)- Final Hospital

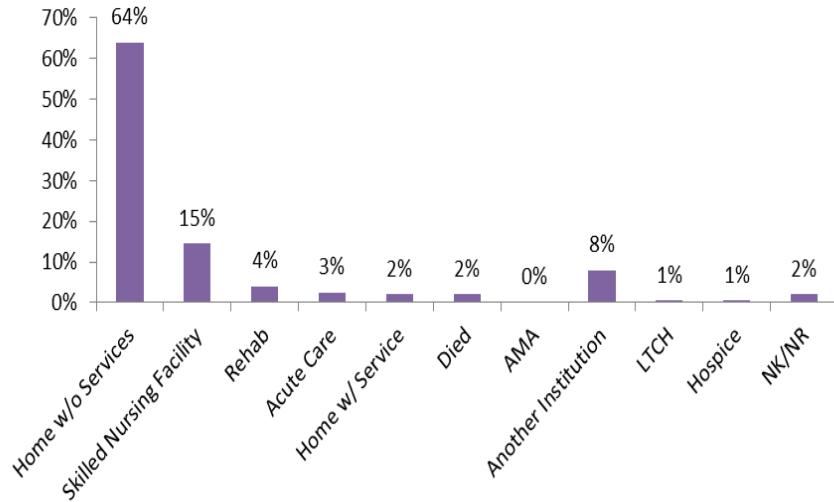


Indiana Trauma Registry

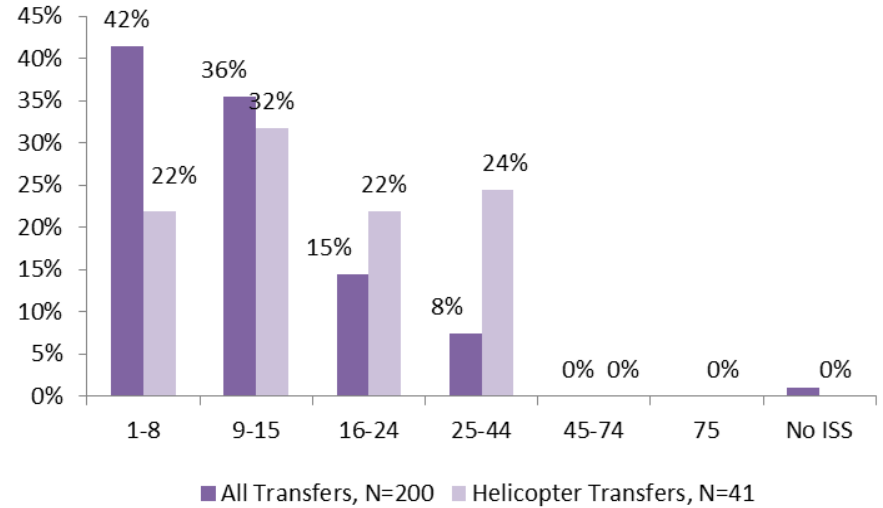
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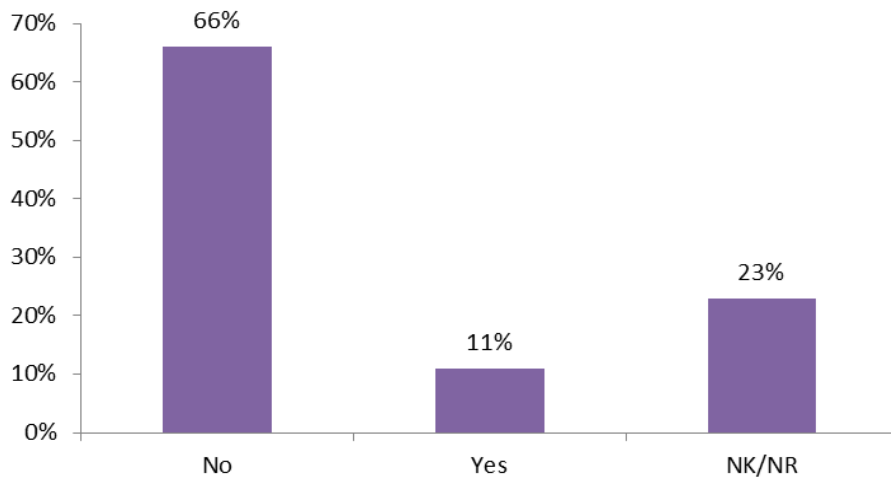
Discharge Disposition— Final Hospital



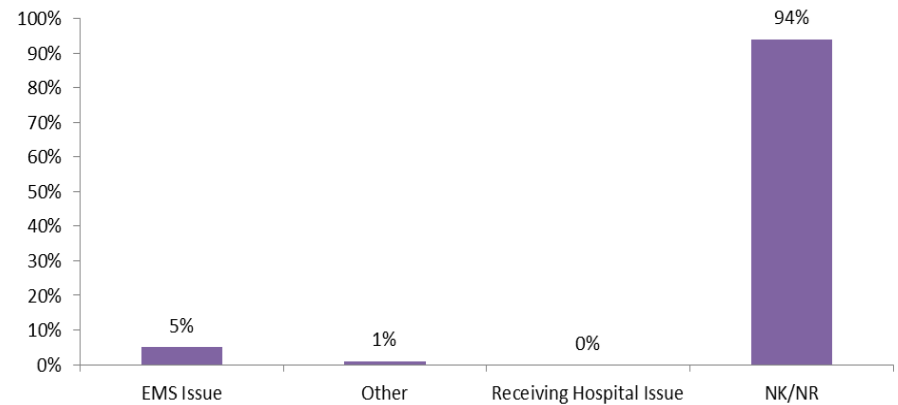
Helicopter Transfers by ISS— Final Hospital



Transfer Delay Indicated- Initial Hospital



Initial Facility Transfer Delay Reason



Indiana Trauma Registry

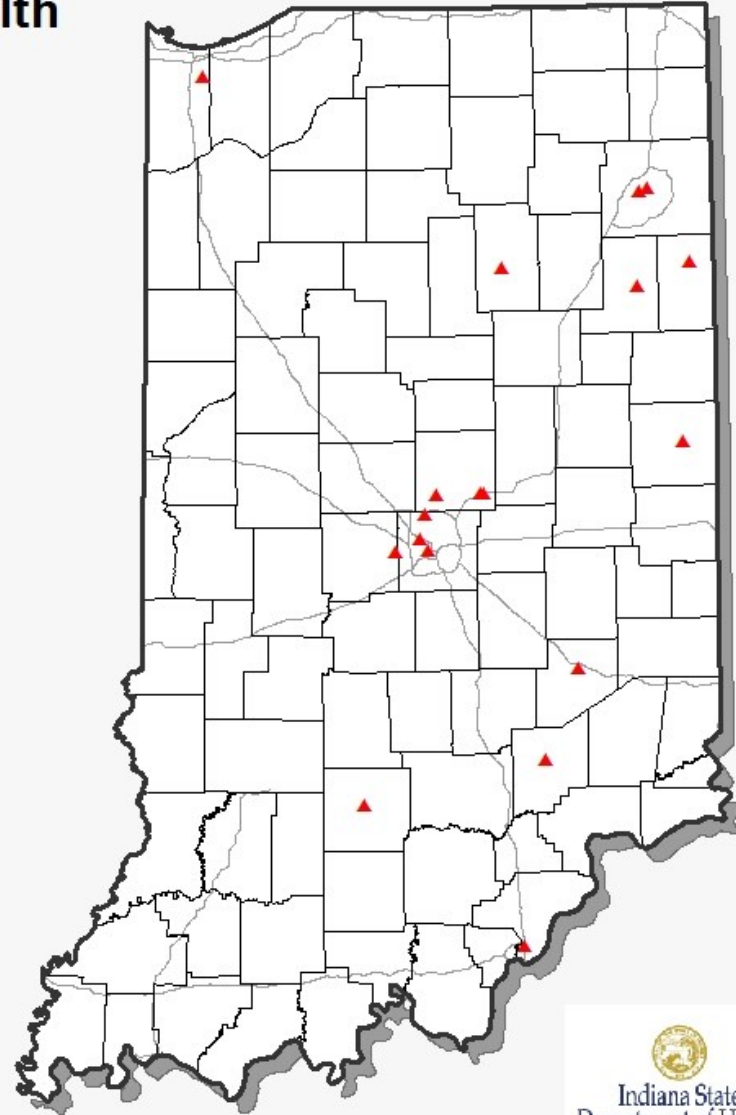
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Indiana State Department of Health Indiana Trauma Registry

Hospitals Not Reporting Trauma Data
to the Indiana Trauma Registry

Adams Memorial Hospital
Bluffton Regional Medical Center
Community Westview Hospital
Decatur County Memorial Hospital
IU Health - Saxony Hospital
IU Health - West Hospital
Kentuckiana Medical Center
Parkview Wabash Hospital
Richard L Roudebush VA Medical Center
St. Joseph Hospital (Fort Wayne)
St. Mary Medical Center Hobart
St. Vincent - Carmel Hospital
St. Vincent - Dunn Hospital
St. Vincent - Fishers Hospital
St. Vincent - Jennings Hospital
St. Vincent - Peyton Manning Children's Hospital
St. Vincent - Randolph Hospital
VA Northern IN Healthcare System



Not reporting as of 5/1/2015

Indiana Trauma Registry

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Requests and Changes to the Report from Trauma Care Committee members at the February 2015 ISTCC Meeting:

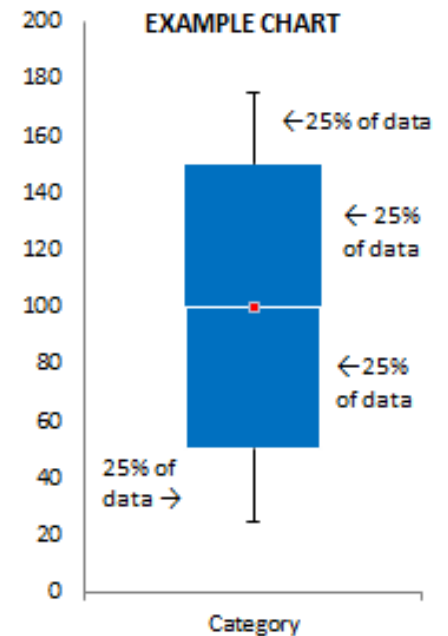
General Report:

- The hospital categories are now: Level I or II trauma centers, Level III trauma centers, and non-trauma hospitals. The trauma center categories include both verified and in process trauma centers. This is the first report with that uses this categorization.
- The first half of the report (pages 1-21) focuses on data and timely topics for the past quarter. The second half of the report (Supplemental Report, pages 22-50) contain demographic information, data that stays nearly constant from quarter to quarter, and reference tables and maps.
- We are continuing to track the number of cases that fell into the ED LOS >12 hours category, which is on page 3.
- A map of all reporting hospitals is found on page 50.
- A map of all hospital not reporting is found on page 20.
- Average ED LOS by district may be found on pages 24. ED LOS is split out into transfers and critical transfers.
- There were seven cases with Ps $\geq 50\%$ and ED Disposition of expired.
- A fifth column for transferred patients with Ps < 0.50 was added on pages 14 and 16.

Example Bar and Whisker Plot:

-Bar and whisker plots were requested at the November, 2013 ISTCC meeting in order to show more than just an average ED LOS and ED LOS by ISS. The bar and whisker plots represent the four quartiles of data, as illustrated on the example graph to the right. The blue boxes each contain 25% of the values and the error bars each represent where 25% of the values fell. The median is represented in the middle of the two blue boxes with the white line. The red dot in the center indicates the average for that category. The cap on the error bars indicates the minimum and maximum of each category and all the values fall within the two caps.

-For the ED LOS bar and whisker plots to the right, the average is represented by the white dot and the color boxes reflect the hospital type. The ED LOS by ISS plots on the next page follow the same layout and the red dots indicate the average for each of the ISS categories.



Indiana Trauma Registry

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Supplemental Report

-The Supplemental Report (pages 22-50) contain demographic information, data that stays nearly constant from quarter to quarter, and reference tables and maps.

Definitions:

Direct Admit: Patient is admitted directly to the hospital and does not spend time in Emergency Department. The ED Length of Stay should reflect a direct admittance.

External Cause of Injury: ICD-9-CM codes that are used to describe the mechanism or external factor that caused the injury event.

Trauma Type: The classification of the force applied to the body. Trauma type categories include blunt, penetrating, thermal, and other trauma.

Injury Severity Score: An anatomical scoring system defined as the sum of the three highest squared maximum Abbreviated Injury Scale (AIS) values to account for multiple injuries in the six body regions.

Acronyms:

E-code: External Cause of Injury MVC: Motor Vehicle Collision
ED: Emergency Department OR: Operating Room
ICU: Intensive Care Unit Ps: Probability of Survival
ISS: Injury Severity Score CAHs: Critical Access Hospital
LOS: Length of Stay

Calculations:

$Ps = 1/(1+e^{-b})$ where $b=b_0+b1(RTS) + b2(ISS) + b3(\text{Age Index})$

Total GCS = Verbal GCS + Motor GCS + Eye GCS

$RTS = 0.94 * GCS + 0.73 * SBP + 0.29 * RR$

$ISS = (AIS)^2 + (AIS)^2 + (AIS)^2$



Indiana Trauma Registry

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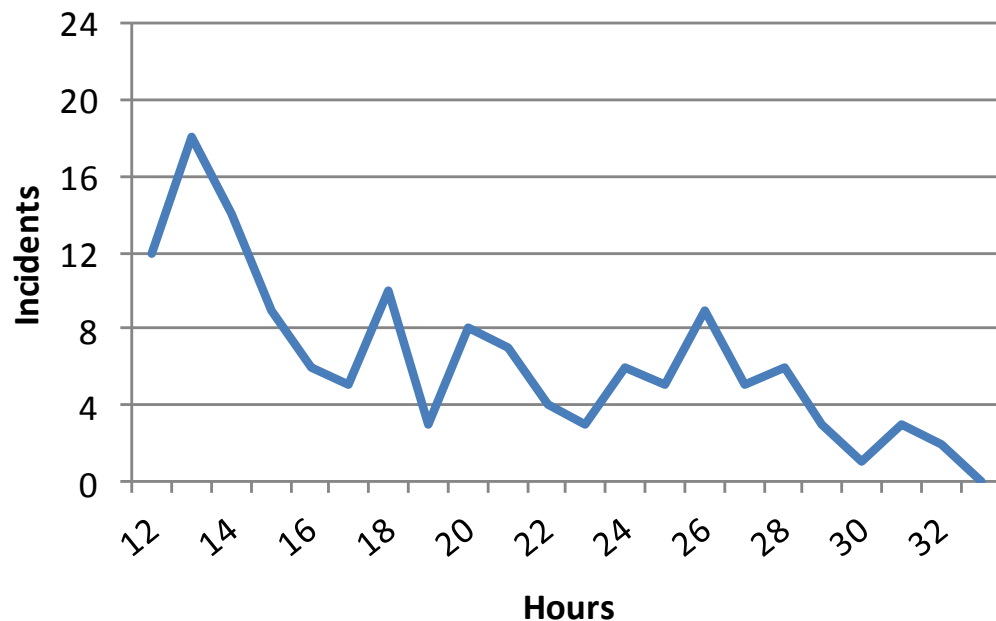
14.4% of data

(Non-Trauma) Hospitals:

78 facilities

41.3% of data

ED LOS \geq 12 Hours



N=139

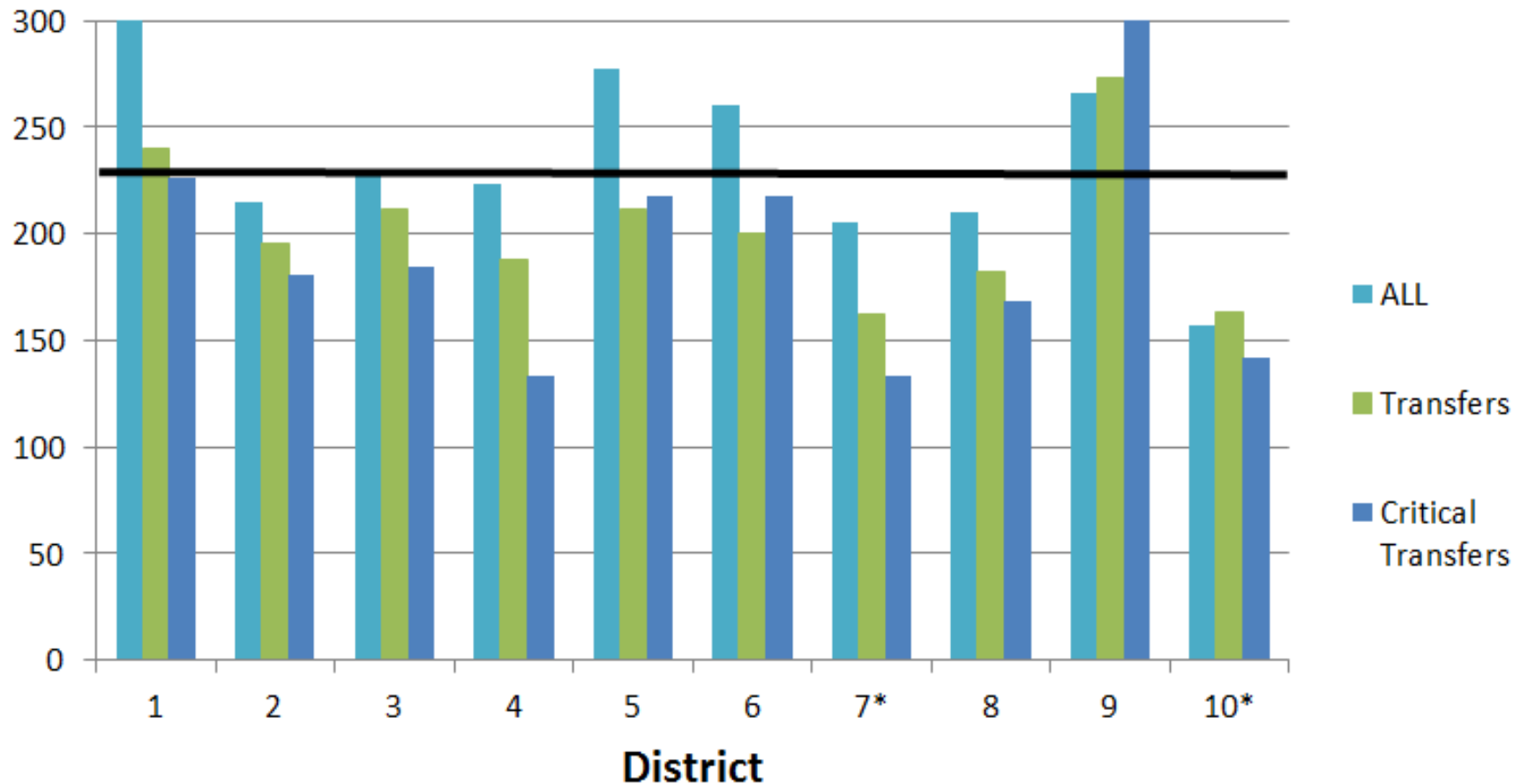
ED Length of Stay \geq 12 Hours			
Hour	Count	Hour	Count
12th	12	23rd	3
13th	18	24th	6
14th	14	25th	5
15th	9	26th	9
16th	6	27th	5
17th	5	28th	6
18th	10	29th	3
19th	3	30th	1
20th	8	31st	3
21st	7	32nd	2
22nd	4		

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Average ED LOS (Minutes)



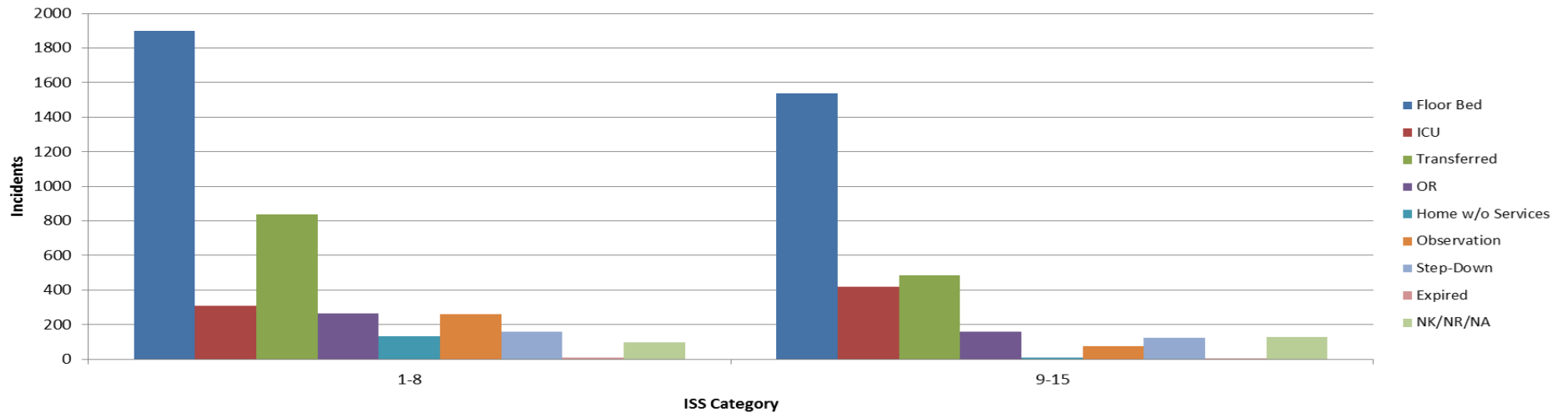
*Districts 7 and 10 have all hospitals reporting. The average bar is for all patients.

Indiana Trauma Registry

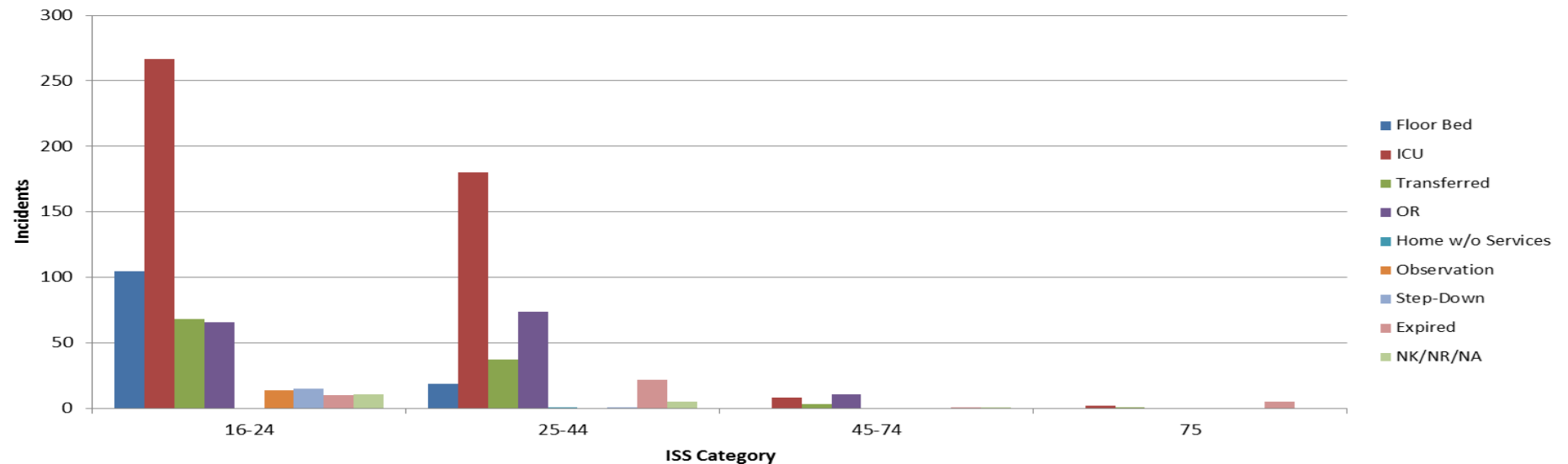
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ED Disposition by ISS 1-14



ED Disposition by ISS 15-75



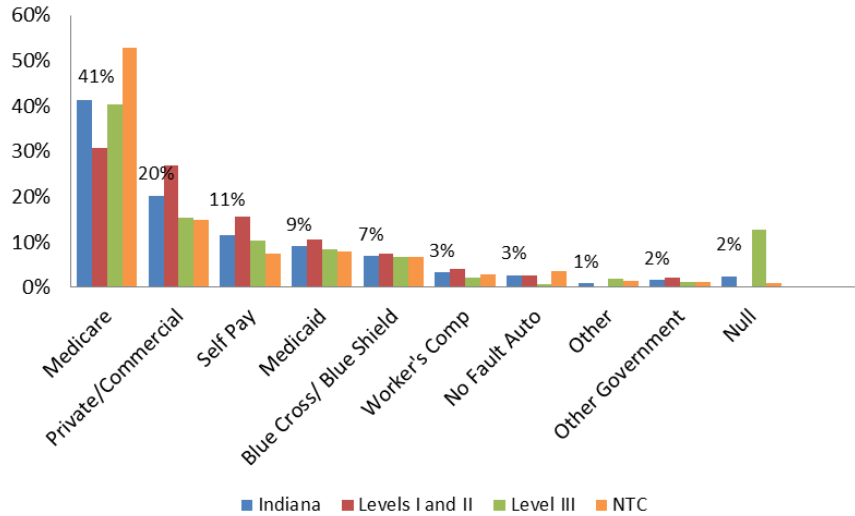
ED Disposition <1%: AMA; Home with services; Other (Jail, Mental Institution, etc.). Please note the difference in axis scale between the top and bottom graphs.

Indiana Trauma Registry

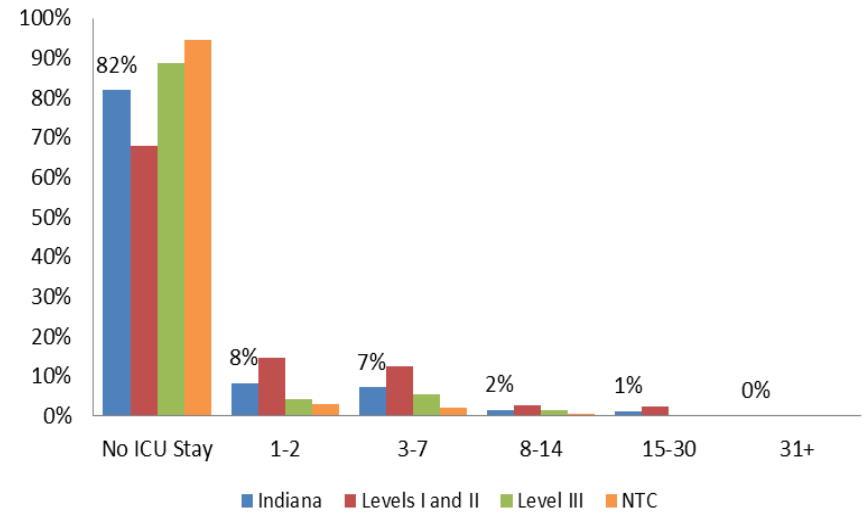
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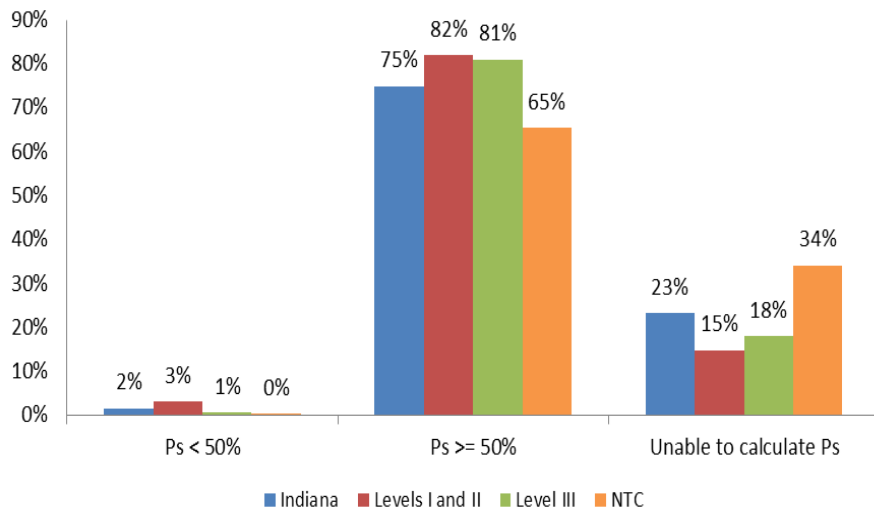
Primary Payer Mix



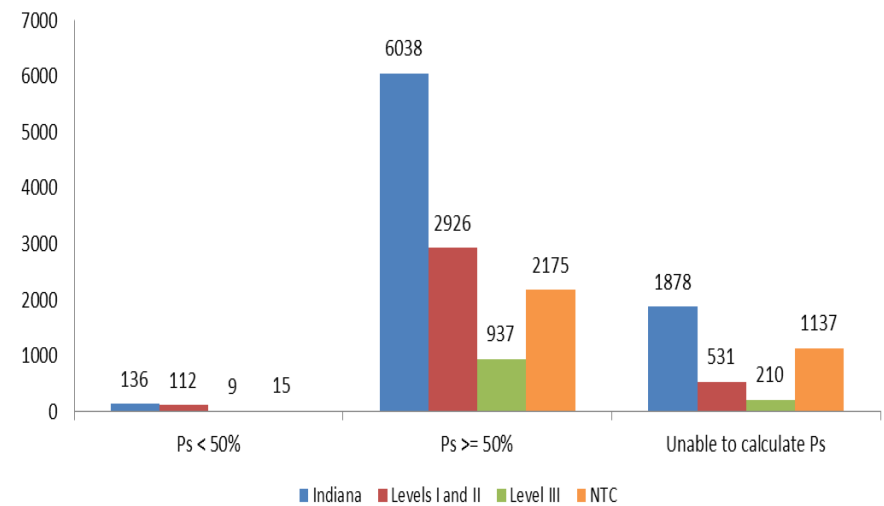
ICU Length of Stay (Days)



Probability of Survival (Ps) by Percent



Probability of Survival (Ps) by Count



Due to the many data points required to calculate Ps, not every patient has a calculated Ps. These two graph represents 6,174 incidents with calculated Ps.

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Probability of Survival Components—All Patients									
		Count Missing				Percent Missing			
Components		Indiana	Levels I and II	Level III	Non-Trauma Center	Indiana	Levels I and II	Level III	Non-Trauma Centers
RTS	GCS	1637	436	176	1025	20.33%	12.22%	15.22%	30.81%
	SBP	478	110	66	302	5.94%	3.08%	5.71%	9.08%
	Respiratory Rate	444	109	63	272	5.51%	3.05%	5.45%	8.18%
ISS		3	0	0	3	0.04%	0%	0%	0.09%
Age		1	0	0	1	0.01%	0%	0%	0.03%

$$RTS = 0.9368 * GCS + 0.7326 * SBP + 0.2908 * \text{Respiratory Rate}$$

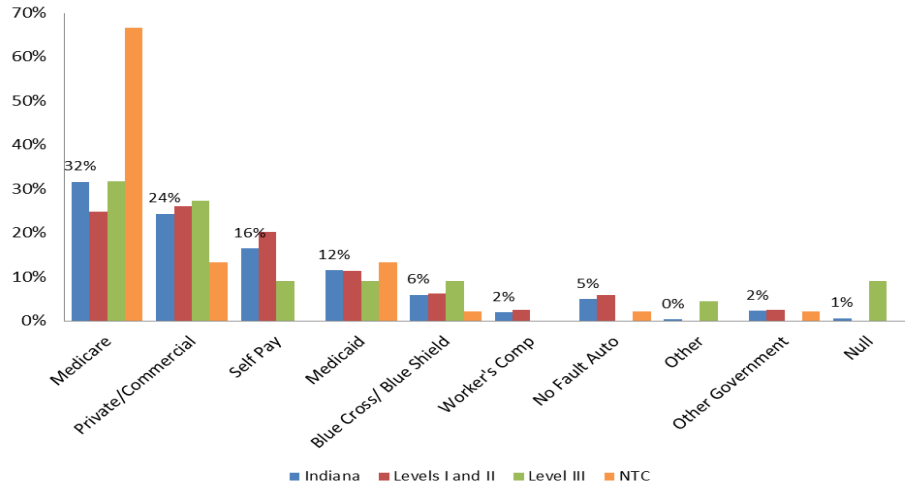
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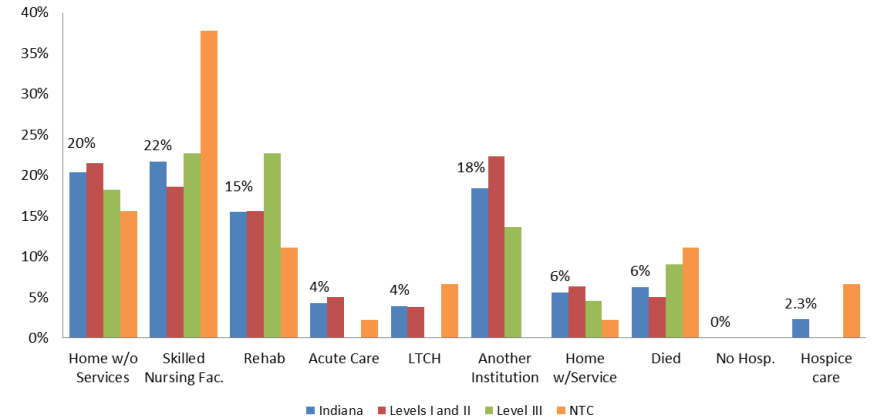
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Hospital Length of Stay > 15 days, N=294

Primary Payer Mix

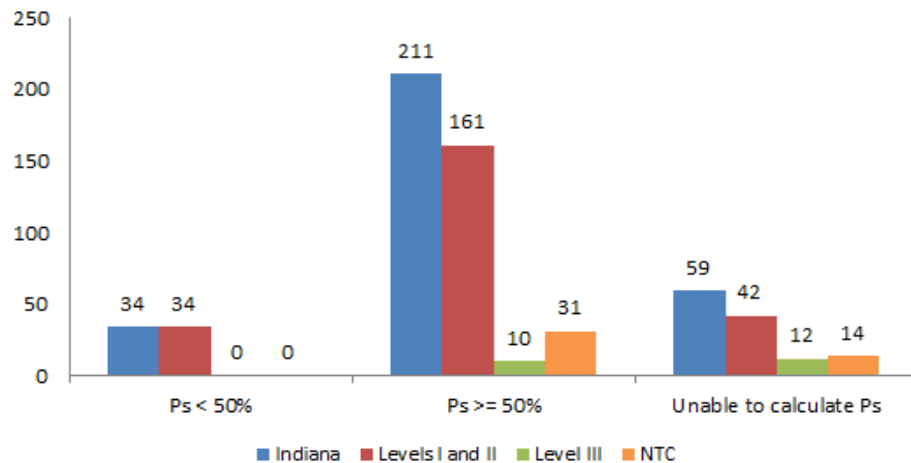


Hospital Disposition

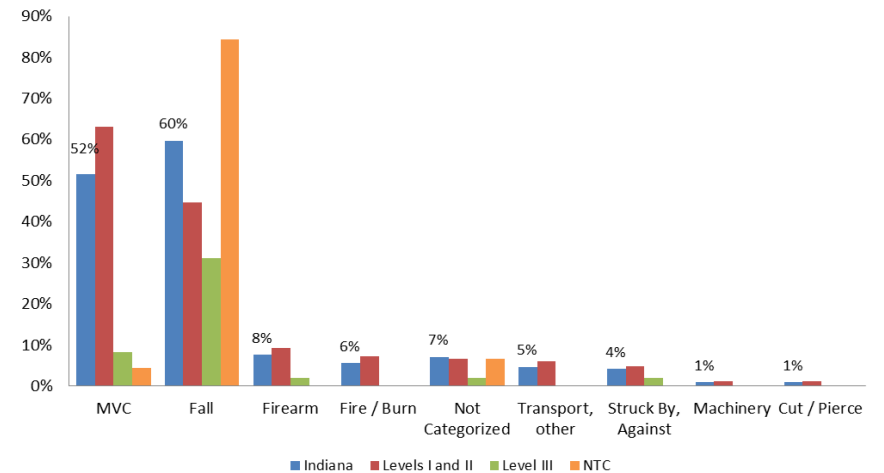


Another Institution includes any other medical facility not defined in the other categories

Probability of Survival



Cause of Injury



Hospital Length of Stay > 15 Days: Total N=294; Levels I and II N= 237; Level III N=12; NTC N=45

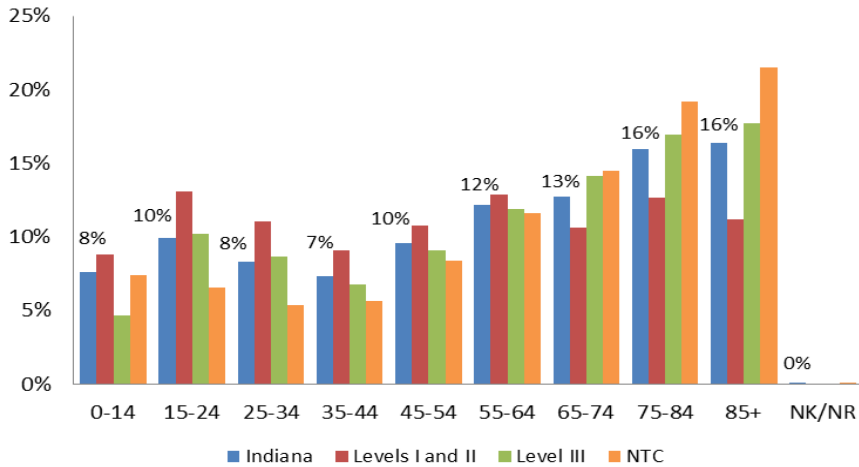
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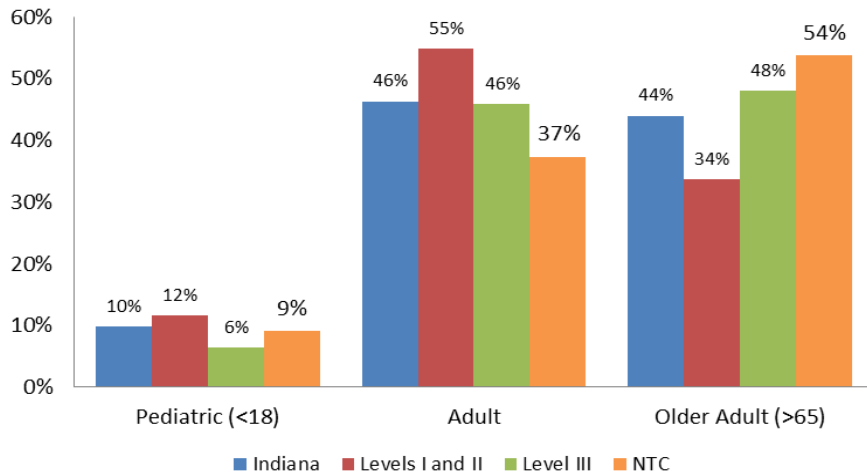
Patient Age (Years)



There was 1 unknown age.

Age Group	Indiana	I and II	III	NTC
0-14	613	314	54	245
15-24	801	466	118	217
25-34	671	393	100	178
35-44	591	325	78	188
45-54	769	385	105	279
55-64	980	458	137	385
65-74	1022	378	163	481
75-84	1285	451	196	638
85+	1319	399	205	715
NK/NR	1	0	0	1
Total	8052	3569	1156	3327

Patient Age Groupings



Age Group	Indiana	I and II	III	NTC
Pediatric	786	414	73	299
Adult	3727	1957	529	1241
Older Adult	3538	1198	554	1786
Total	8051	3569	1156	3326

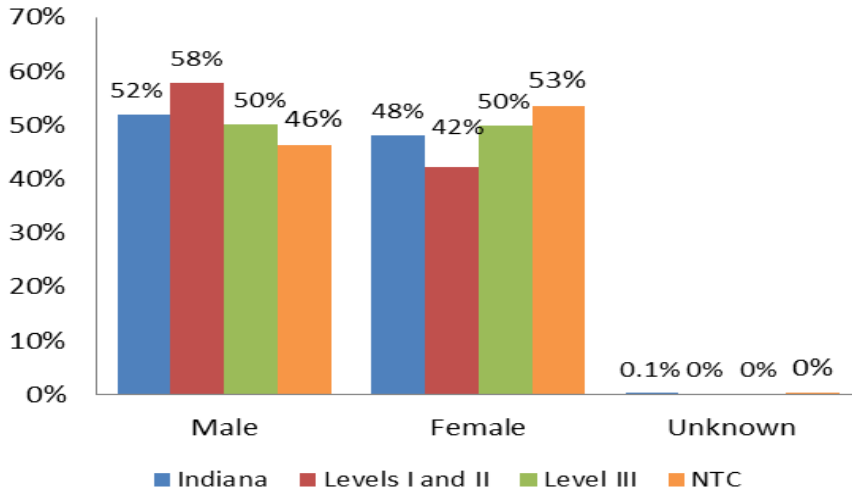
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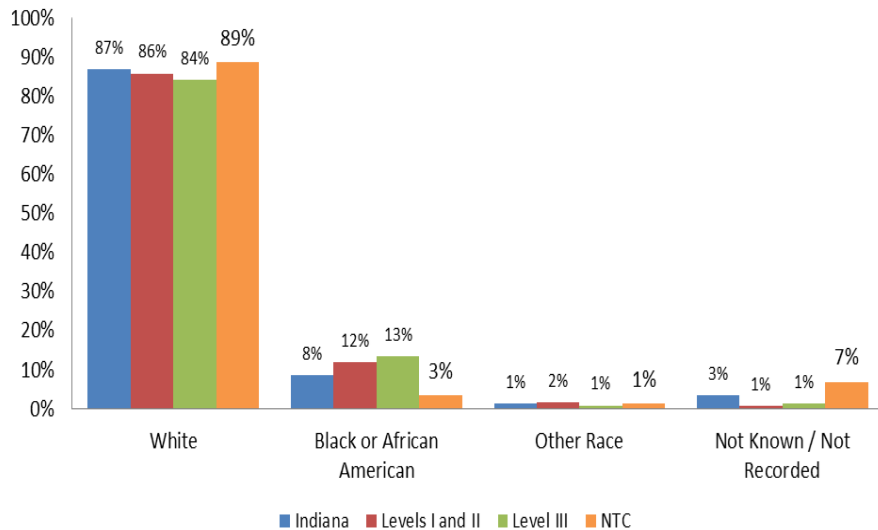
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Patient Gender



Gender	Indiana	I and II	III	NTC
Male	4184	2062	579	1543
Female	3863	1507	577	1779
Unknown	5	0	0	5
Total	8052	3569	1156	3327

Patient Race



Race	Indiana	I and II	III	NTC
White	6973	3057	971	2945
Black or African American	683	421	154	108
Other	100	54	8	38
Not Known/Not Recorded	259	20	13	226
American Indian or Alaska Native	3	1	2	0
Asian	29	13	8	8
Native Hawaiian or Pacific Islander	5	3	0	2
Total	8052	3569	1156	3327

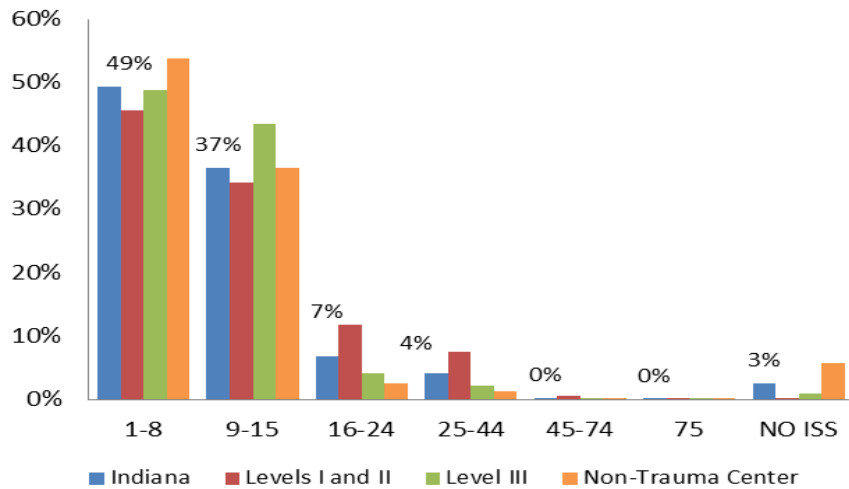
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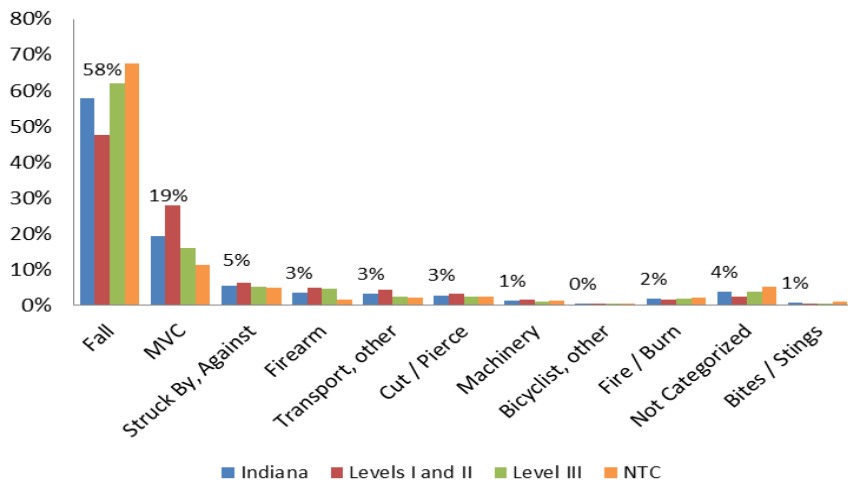
Injury Severity Score (ISS)



ISS Category	Indiana	I and II	III	NTC
1-8	3978	1625	565	1788
9-15	2940	1221	502	1217
16-24	556	421	48	87
25-44	339	272	26	41
45-74	24	20	2	2
75	8	5	2	1
No ISS	207	5	11	191
Total	8052	3569	1156	3327

There were 24 and 8 cases in the 45-74 and 75+ categories, respectively

Cause of Injury



Cause of Injury	Indiana	I and II	III	NTC
Fall	4659	1694	718	2247
MVC	1549	992	184	373
Struck By, Against	427	215	57	155
Firearm	269	171	52	46
Transport	240	146	26	68
Cut/Pierce	216	113	27	76
Machinery	103	54	10	39
Bicyclist	31	12	5	14
Fire/Burn	141	56	19	66
Not Categorized	293	81	41	171
Bites/Stings	42	9	5	28

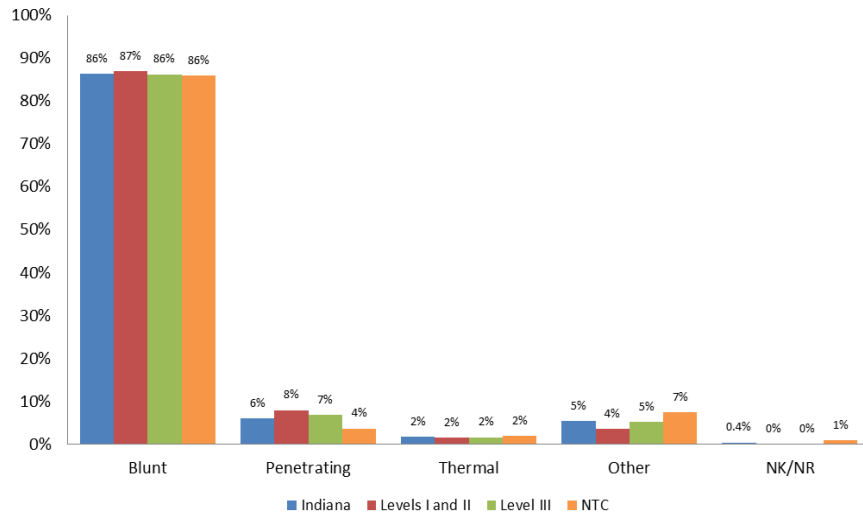
<1% COI: Pedestrian Traffic Accident, Natural/Environment, Overexertion, No E-Code

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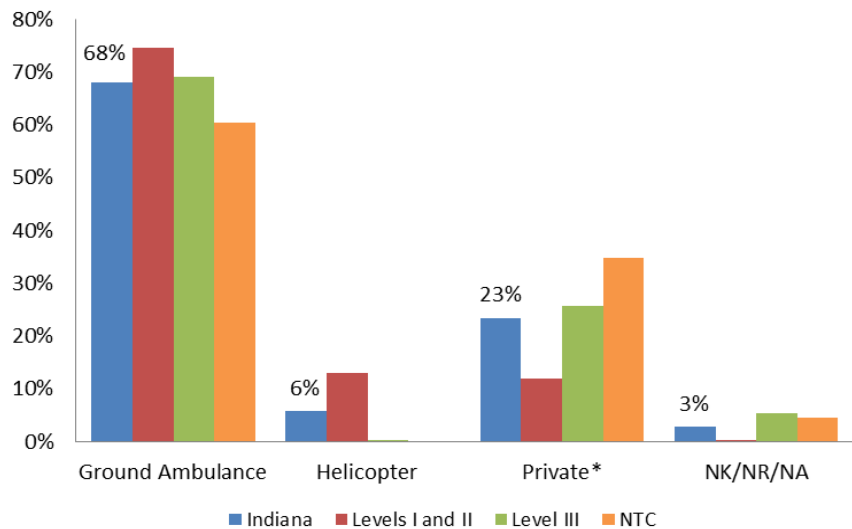
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Trauma Type



Trauma Type	Indiana	I and II	III	NTC
Blunt	6958	3102	997	2859
Penetrating	485	284	79	122
Thermal	141	56	19	66
Other	435	126	61	248
NK/NR	33	1	0	32
Total	8052	3569	1156	3327

Transport Mode



Transport Mode	Indiana	I and II	III	NTC
Ground Ambulance	5467	2662	797	2008
Helicopter	462	461	1	0
Private	1883	428	296	1159
NK/NR/NA	217	10	61	146
Police	21	7	1	13
Other	2	1	0	1
Total	8052	3569	1156	3327

<1% Transport Mode: Police, Other

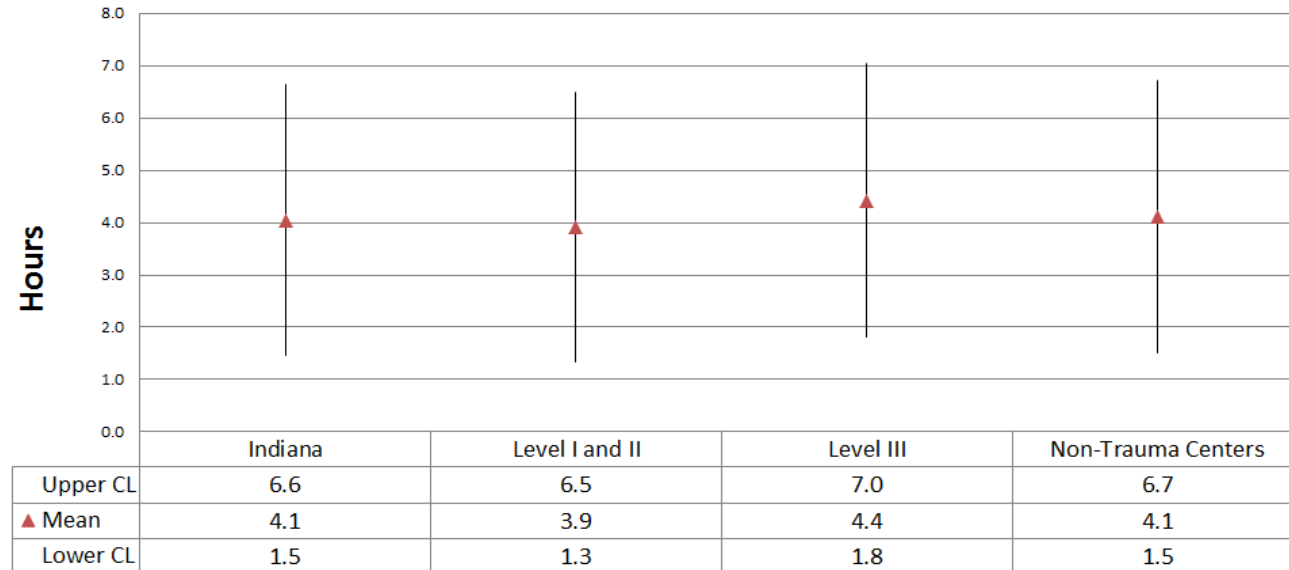
* Indicates Private/ Public Vehicle, Walk-in

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All Patients Average ED LOS (Hours)



The purpose of the caterpillar graphs is to compare different groups to the average ED LOS. The Indiana mean is the comparison group, which is represented by the black line.

The ED LOS for these graphs was modeled using time-to-event analysis. The purposes of using this analysis were to account for censoring (death) and to see how variables influence ED LOS. The outcome variable was ED LOS and the independent variables were total GCS and age. If total GCS was missing but manual total GCS was recorded, then the manual total GCS was used. These two variables were used because they were the most similar to variables used in the published, peer-reviewed literature on ED LOS. Both were significant in the model. Increasing total GCS and age led to a slightly shorter ED LOS. Hospitals that did not have enough incidents with total GCS or age could not be modeled.

In the chart on the left, note the trauma center average is above the mean and the non-trauma center is below the mean. The mean, 95% confidence limit and lower confidence limit are listed for each group.

In the chart on the right, the data is for the trauma centers. The trauma center average is in the first column on the left side. The information for each trauma center has been assigned a random number for confidentiality. The mean, 95% confidence limit and lower confidence limit are listed for each group.

Indiana Trauma Registry

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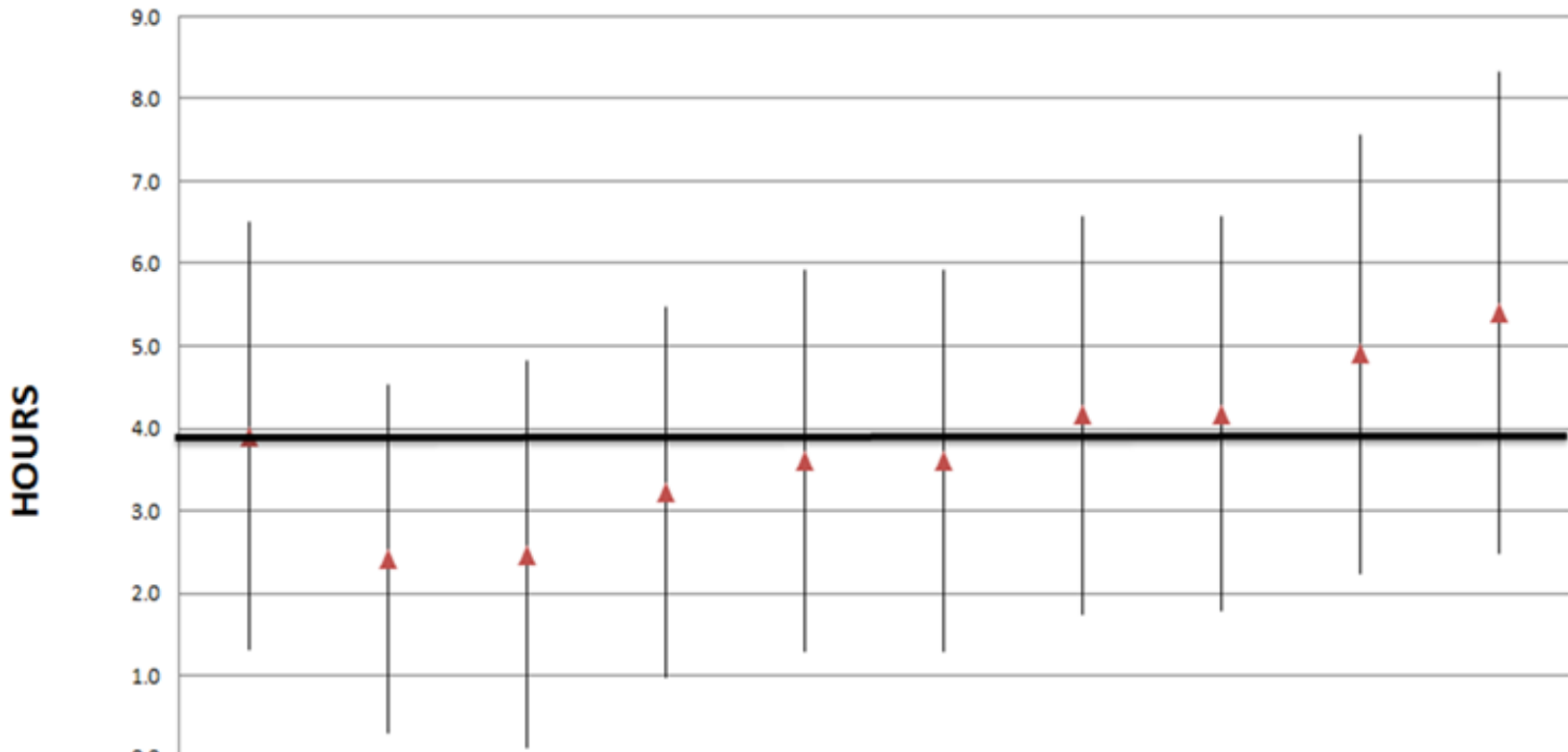
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All Patients

Level I and II Trauma Centers ED LOS (Hours)



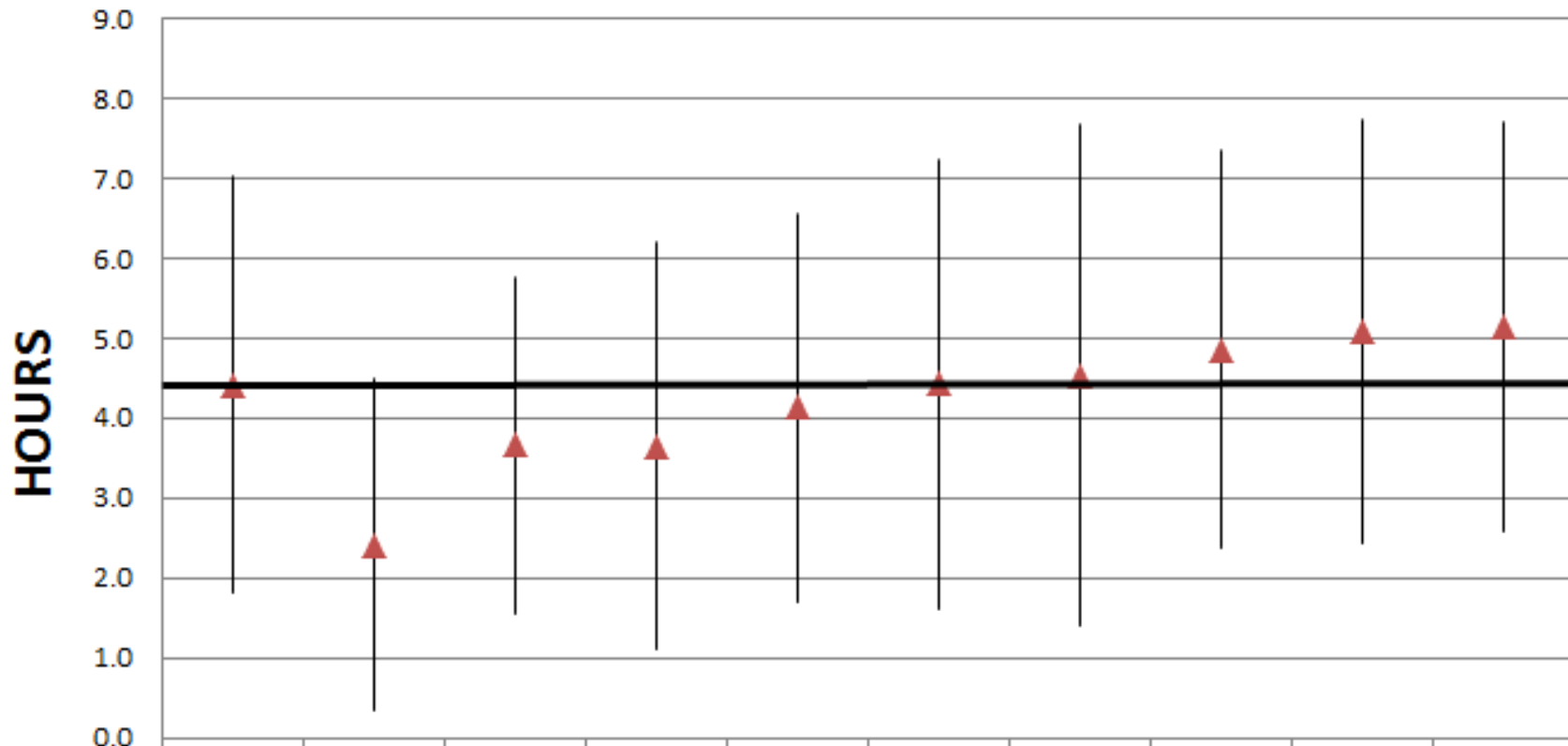
	Levels I and II	ID 36	ID 71	ID 117	ID 107	ID 107	ID 8	ID 126	ID 51	ID 116
Upper CL	6.5	4.5	4.8	5.5	5.9	5.9	6.6	6.6	7.6	8.3
▲ Mean	3.9	2.4	2.5	3.2	3.6	3.6	4.2	4.2	4.9	5.4
Lower CL	1.3	0.3	0.1	1.0	1.3	1.3	1.7	1.8	2.2	2.5

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All Patients Level III Trauma Centers ED LOS (Hours)



	Level III	ID 17	ID 26	ID 114	ID 88	ID 50	ID 113	ID 56	ID 98	ID 96
Upper CL	7.0	4.5	5.8	6.2	6.6	7.2	7.7	7.3	7.7	7.7
▲ Mean	4.4	2.4	3.7	3.7	4.1	4.4	4.5	4.9	5.1	5.1
Lower CL	1.8	0.4	1.6	1.1	1.7	1.6	1.4	2.4	2.4	2.6

Indiana Trauma Registry

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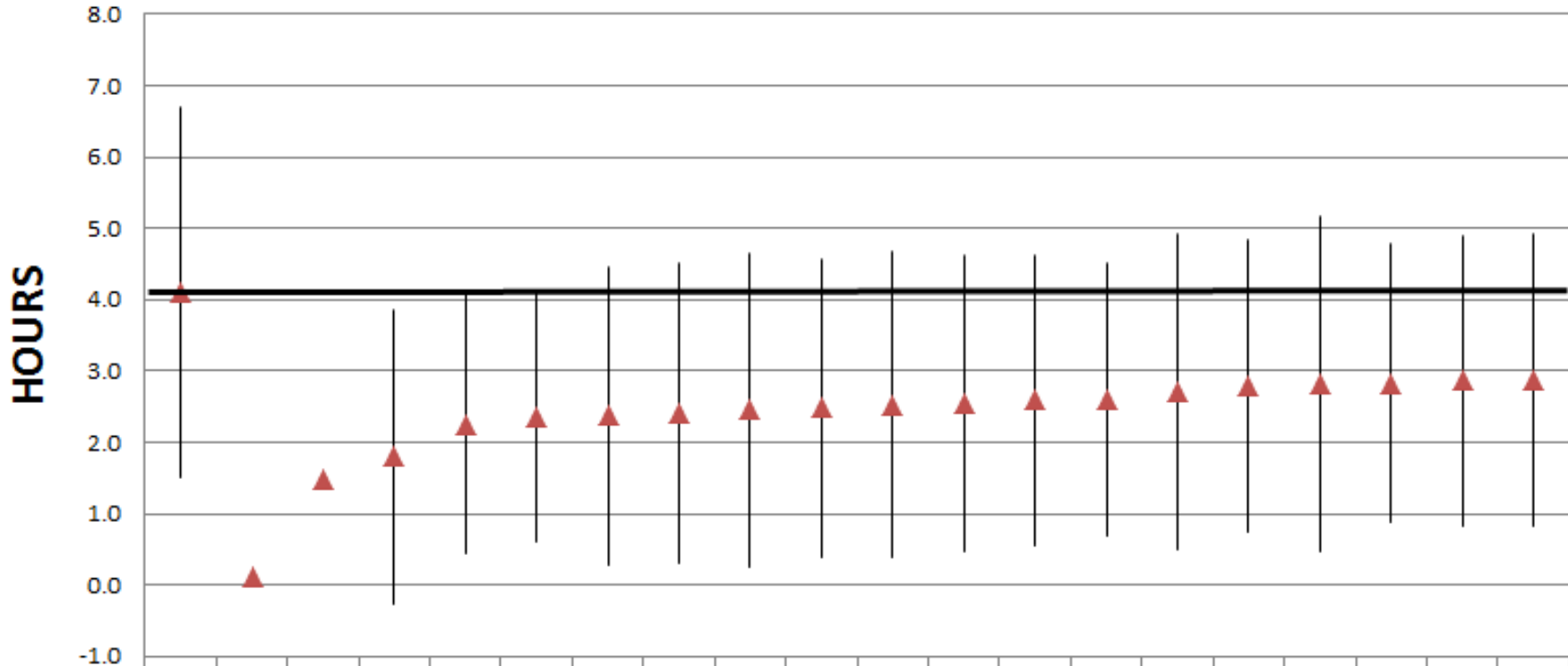
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All Patients Non-Trauma Centers- Average ED LOS (Hours)



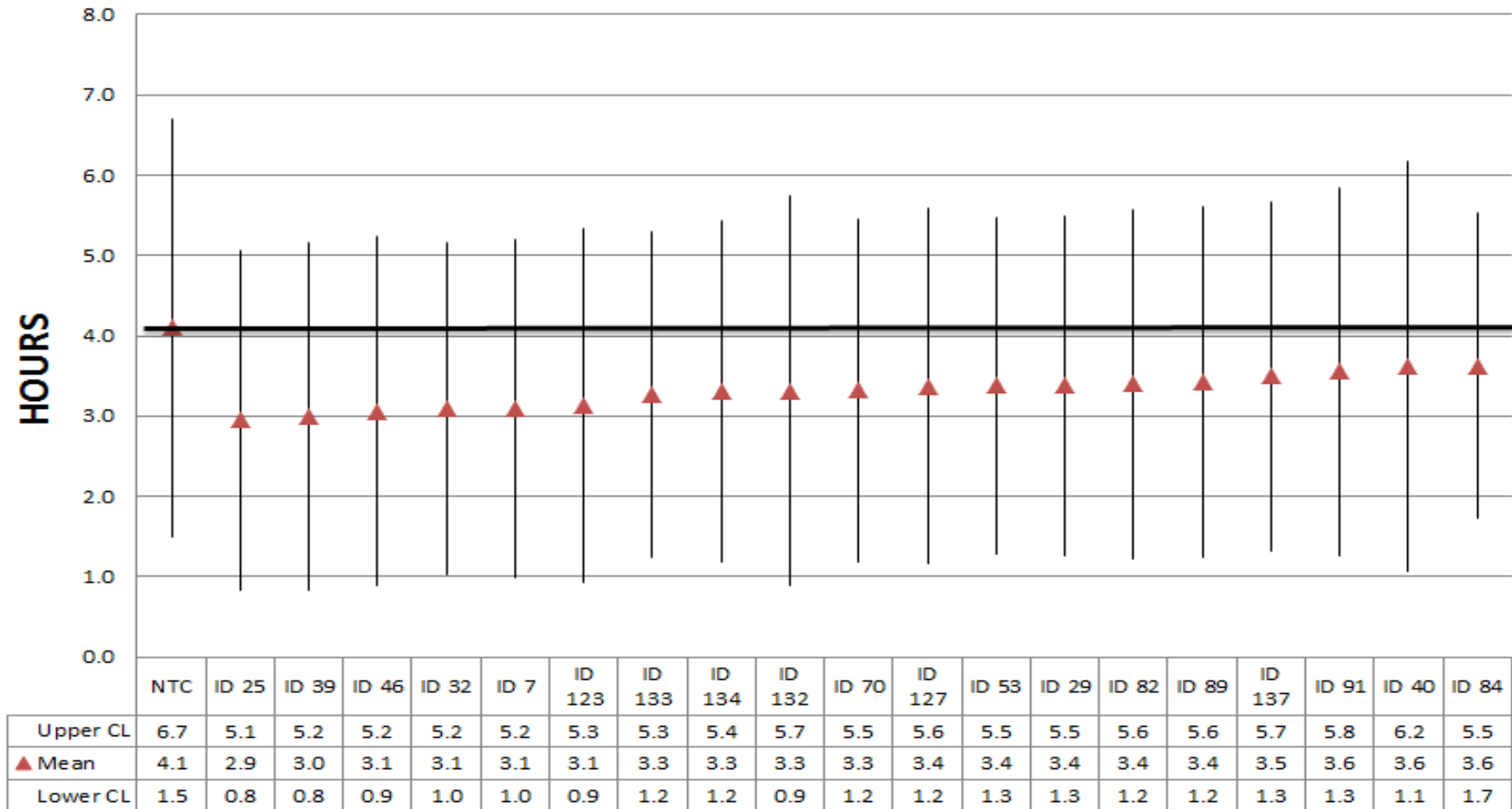
	NTC	ID 86	ID 109	ID 94	ID 6	ID 44	ID 78	ID 42	ID 81	ID 9	ID 64	ID 65	ID 76	ID 73	ID 23	ID 112	ID 38	ID 119	ID 68	ID 41
Upper CL	6.7	0.1	1.5	3.9	4.1	4.1	4.5	4.5	4.7	4.6	4.7	4.6	4.6	4.5	4.9	4.8	5.2	4.8	4.9	4.9
▲ Mean	4.1	0.1	1.5	1.8	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.6	2.7	2.8	2.8	2.8	2.9	2.9
Lower CL	1.5	0.1	1.5	-0.3	0.4	0.6	0.3	0.3	0.2	0.4	0.4	0.5	0.5	0.7	0.5	0.7	0.5	0.9	0.8	0.8

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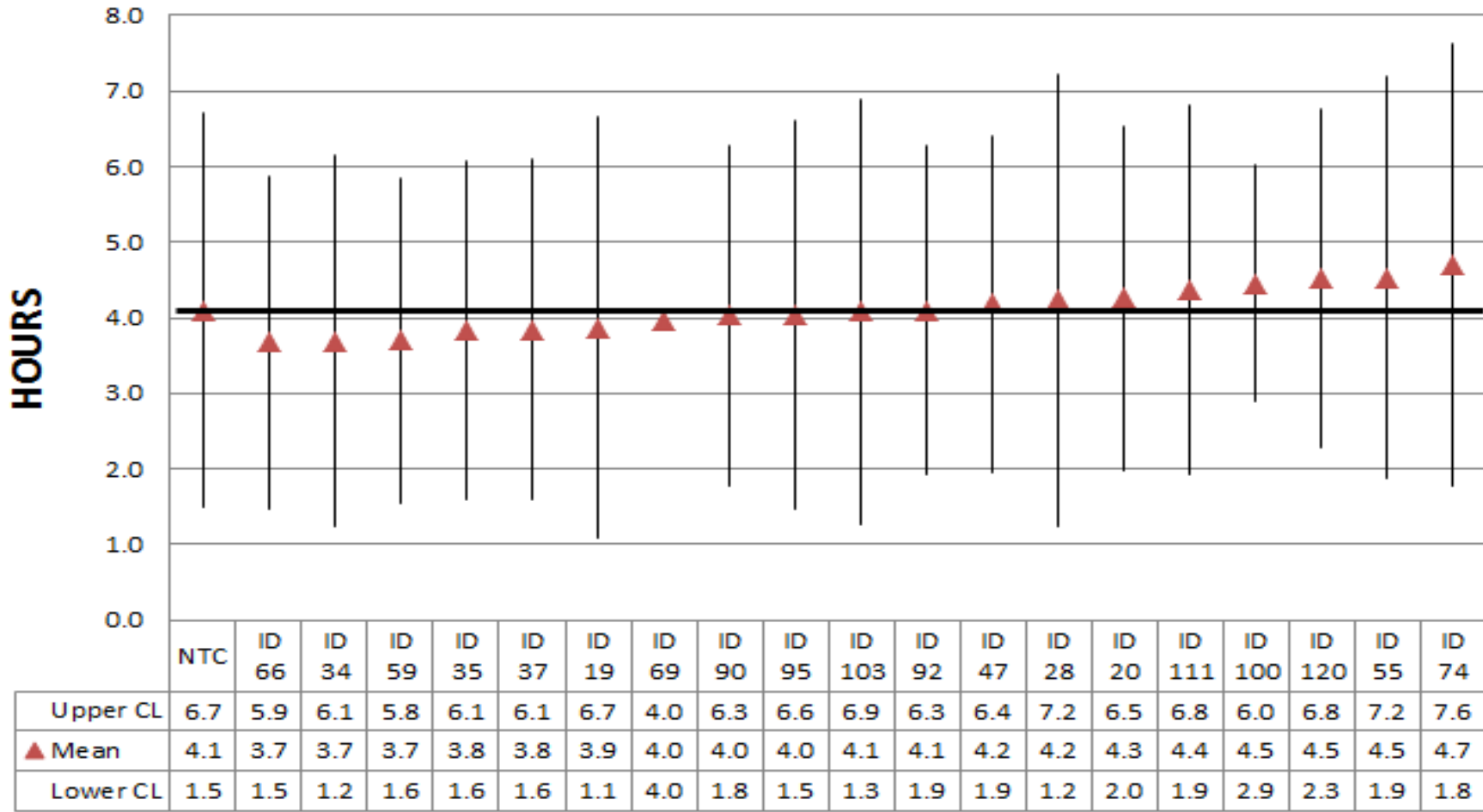
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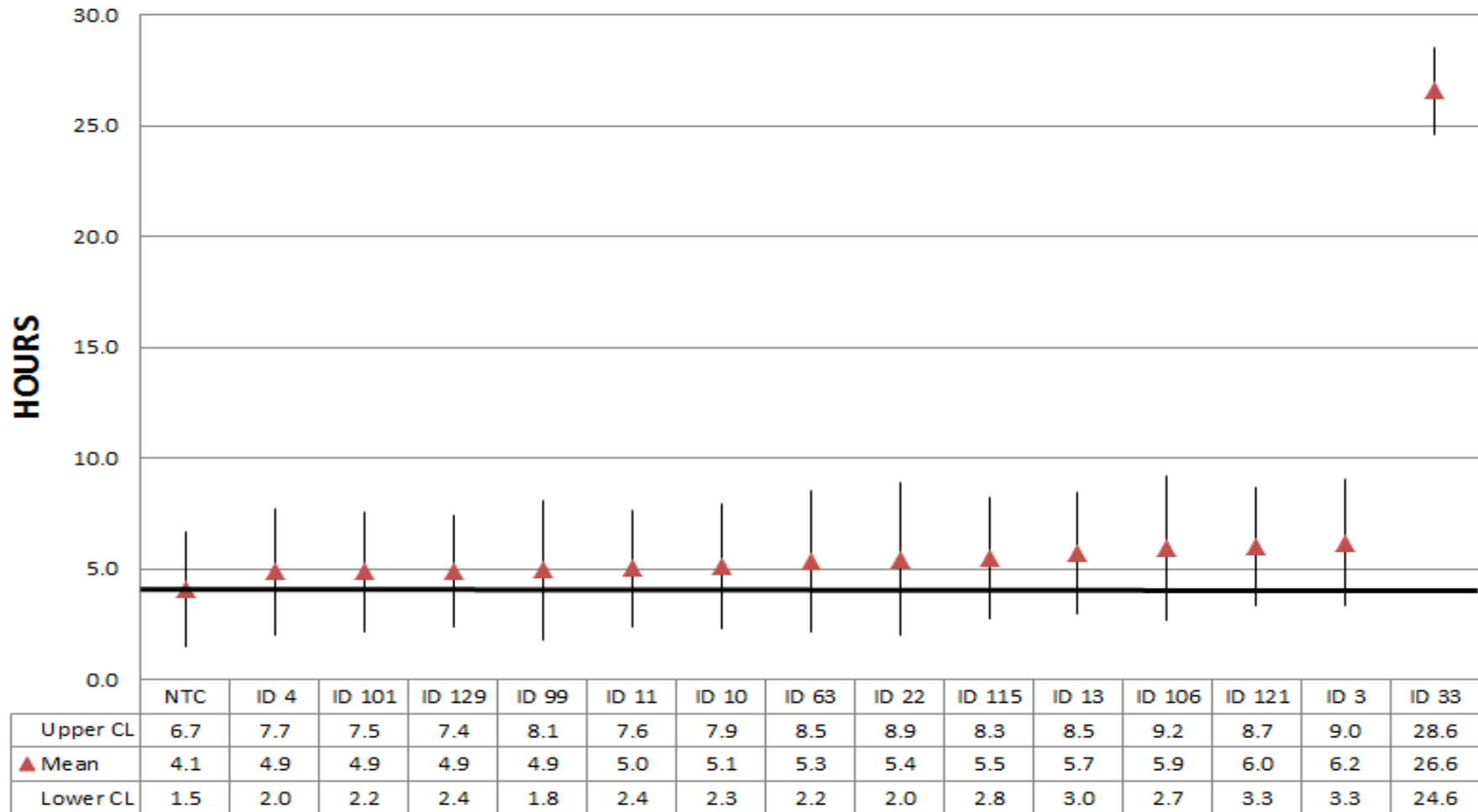
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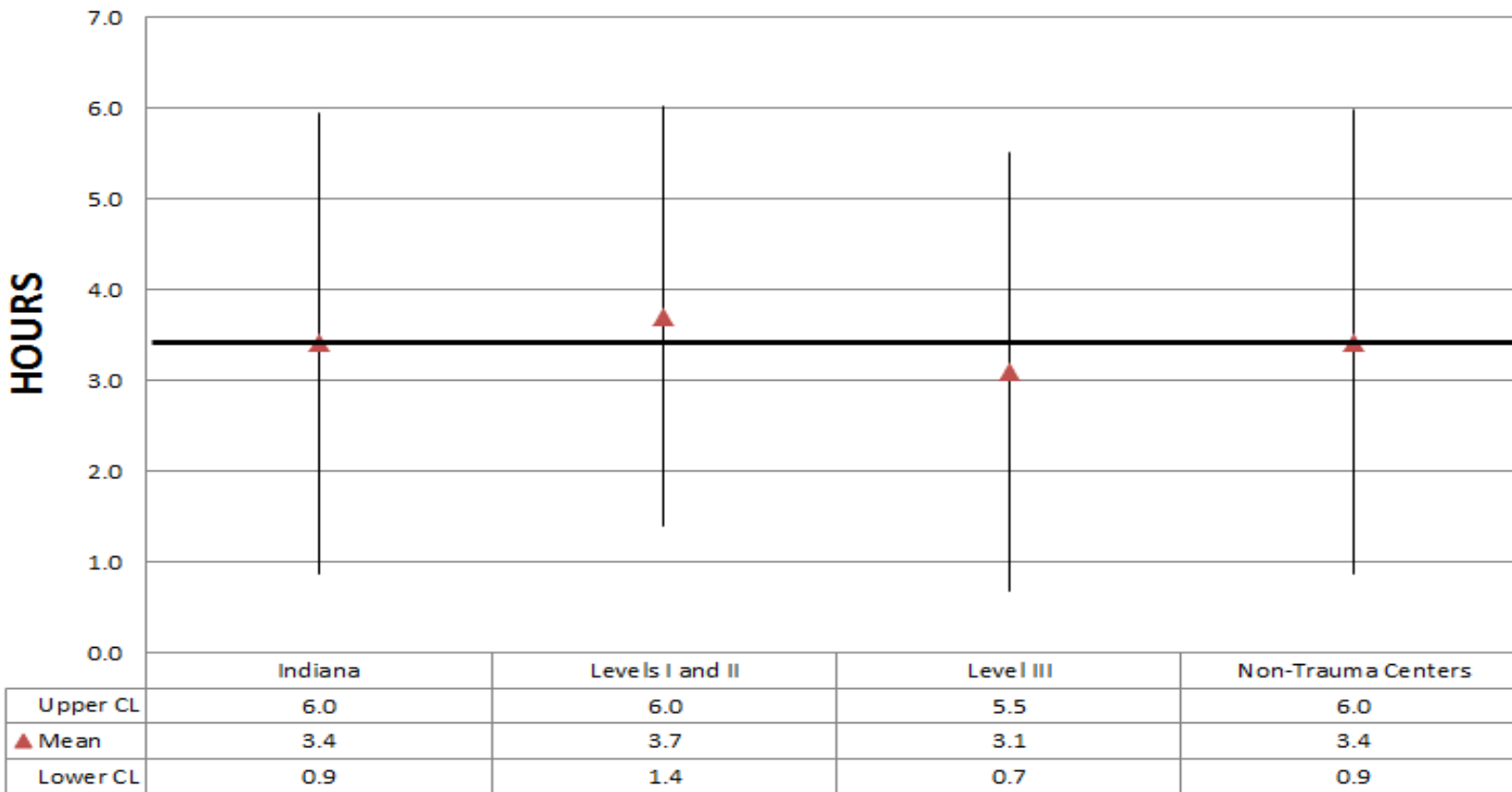
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ED Disposition = Transferred

Average ED LOS (Hours)



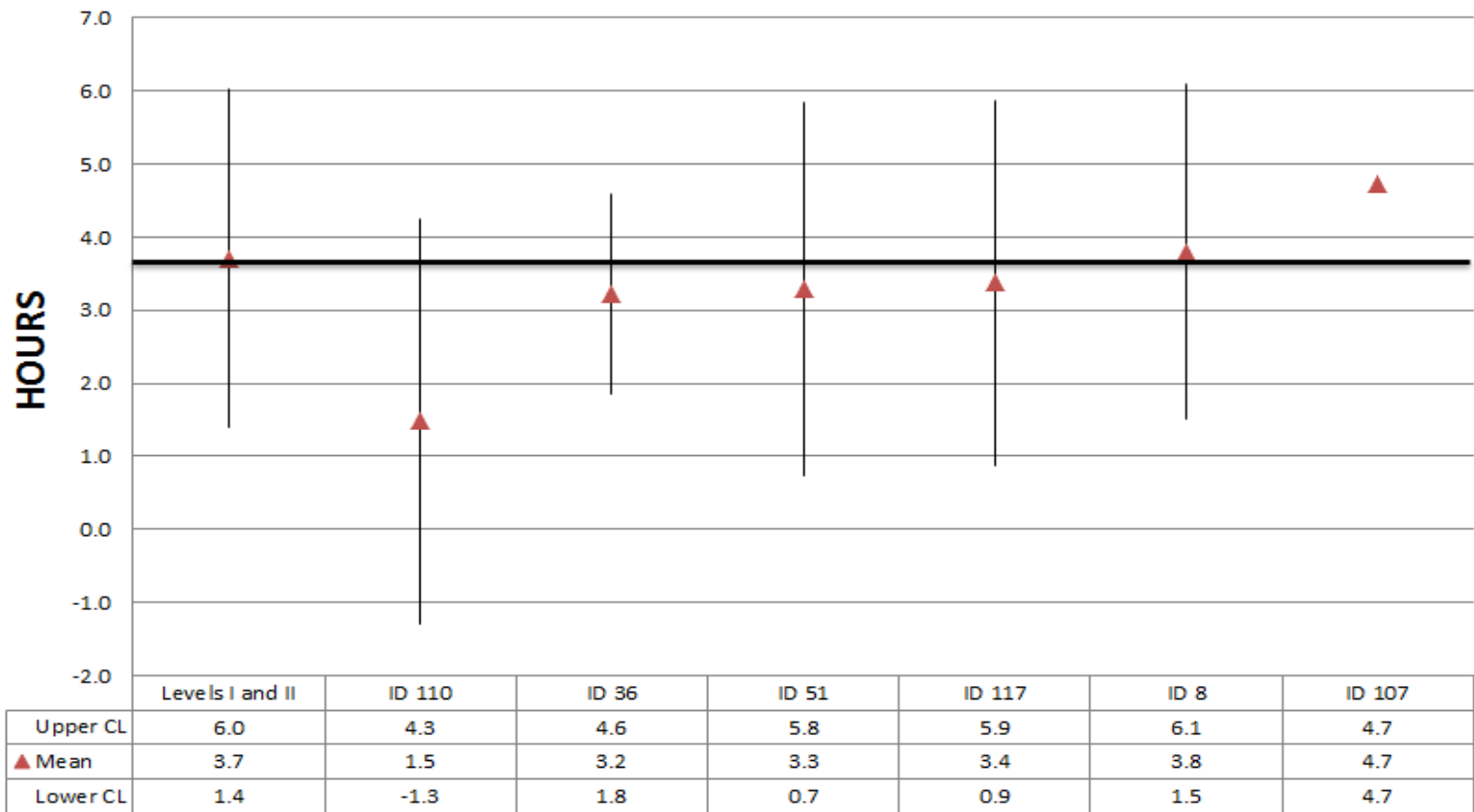
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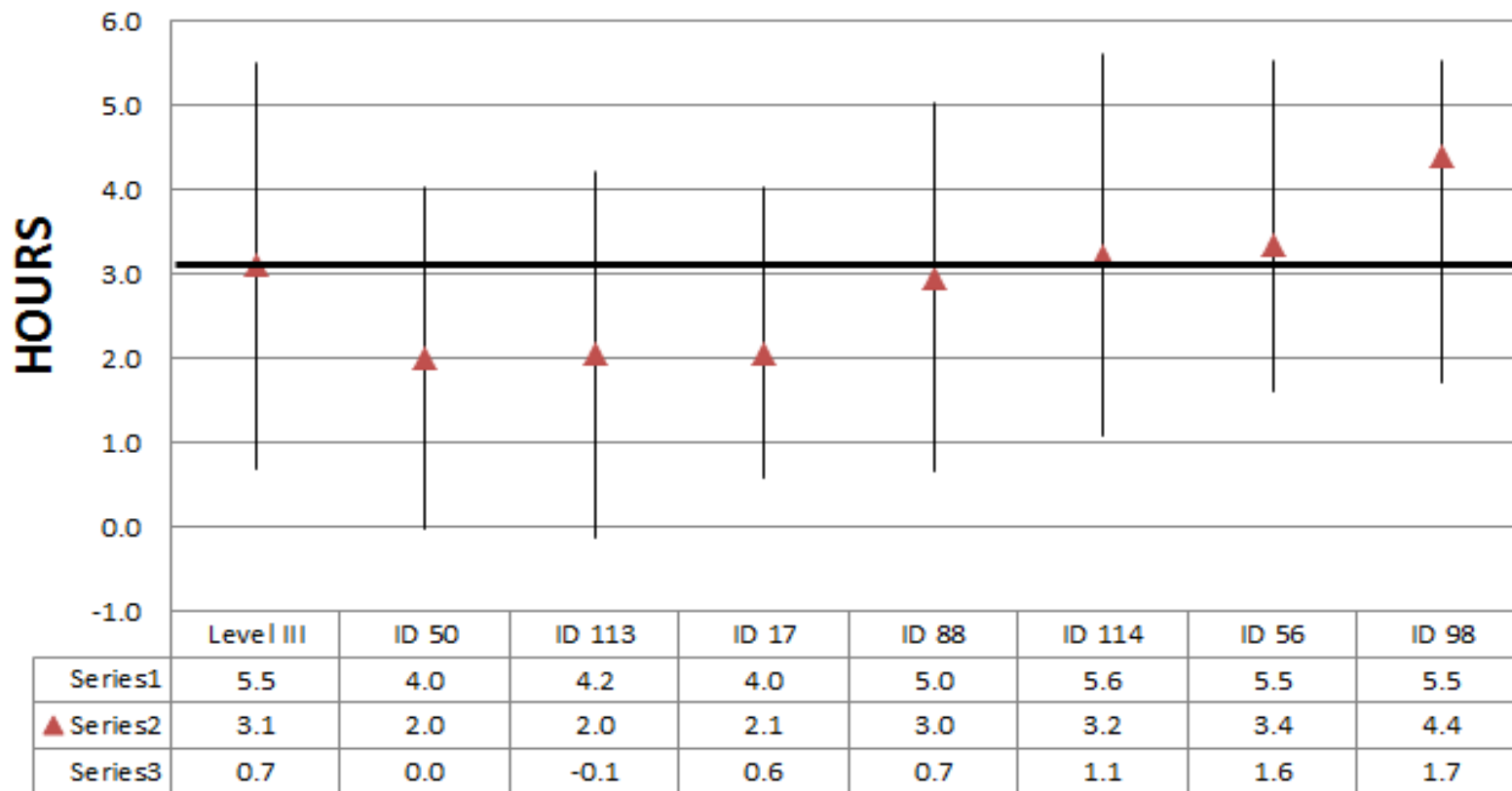
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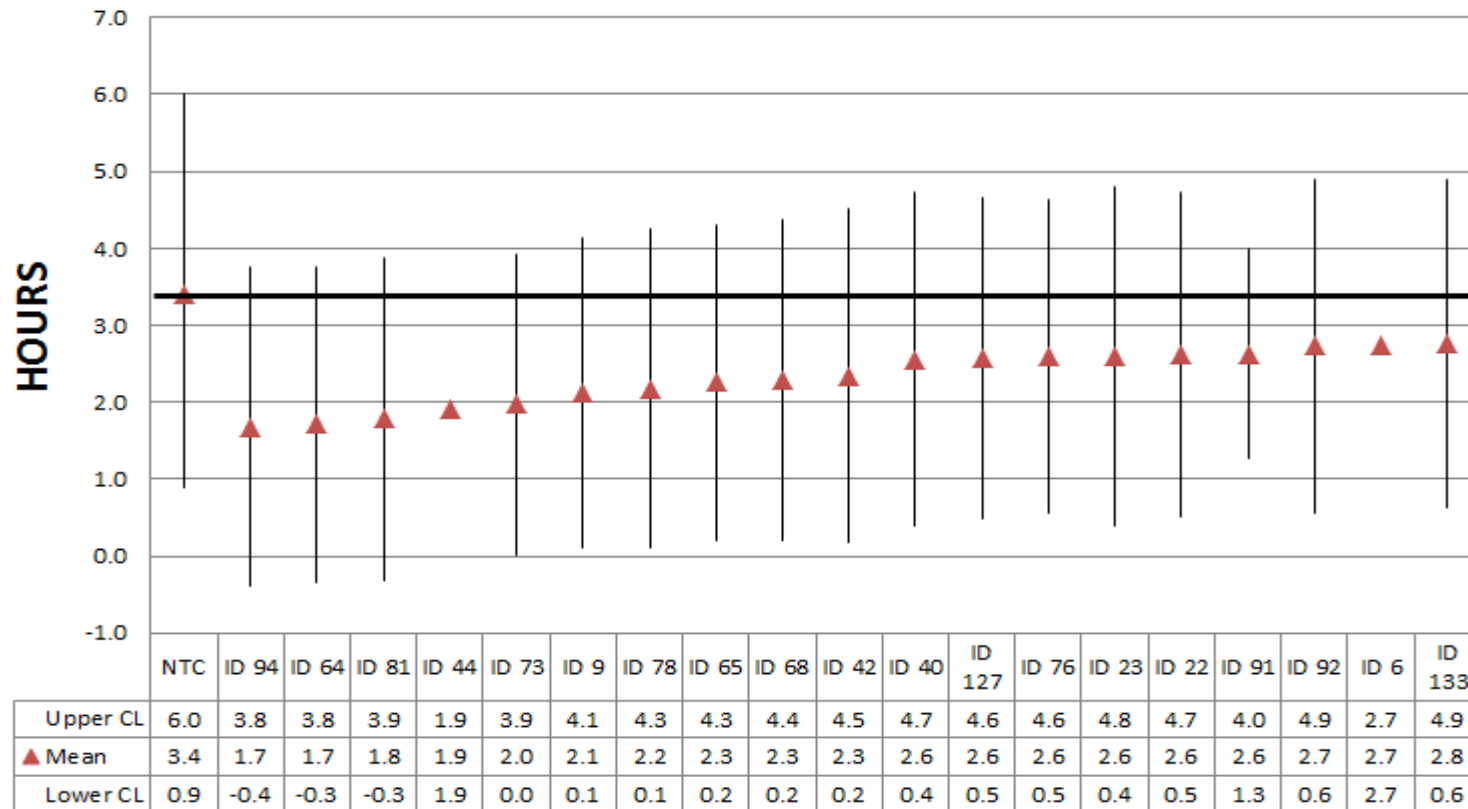
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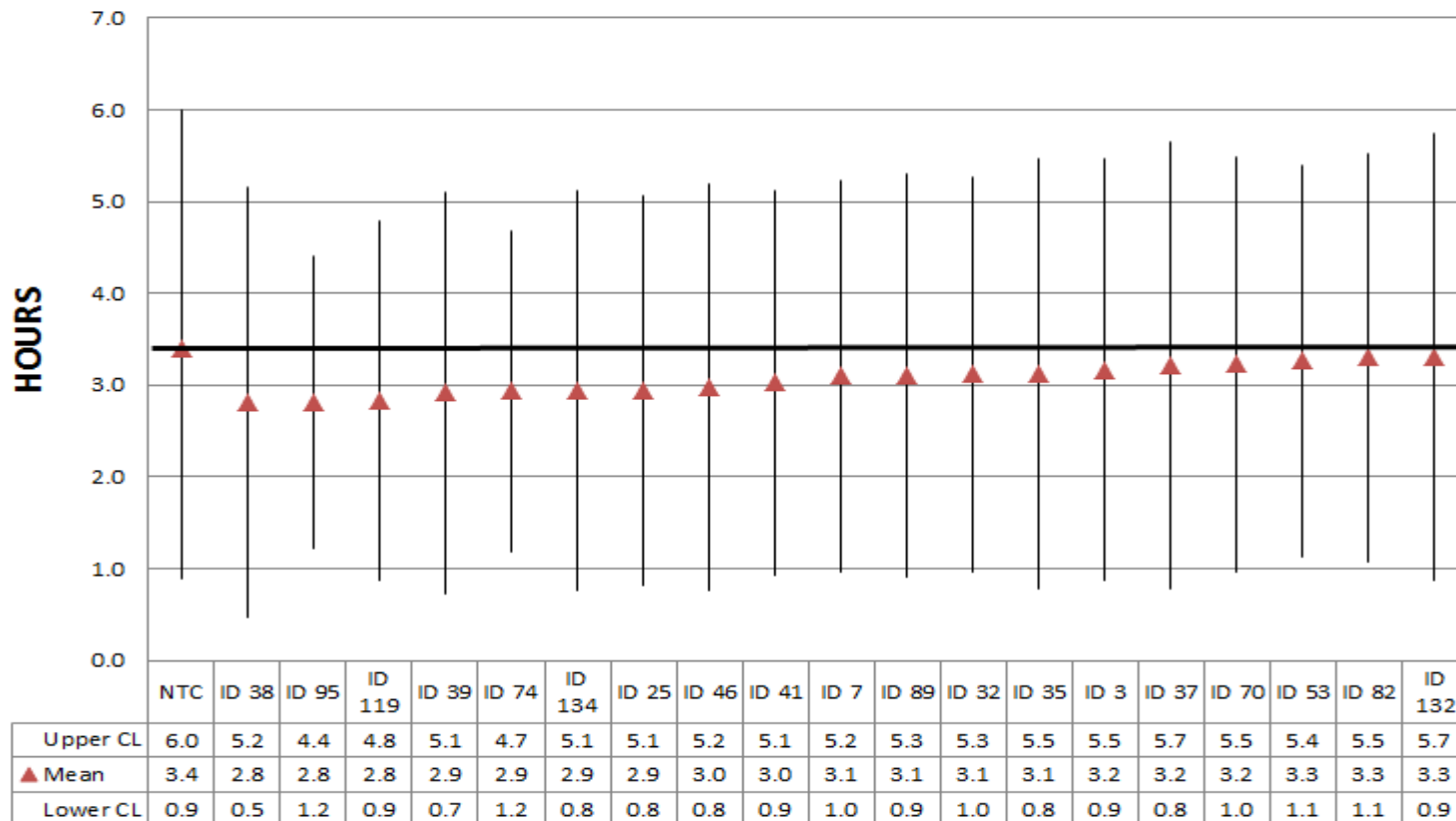
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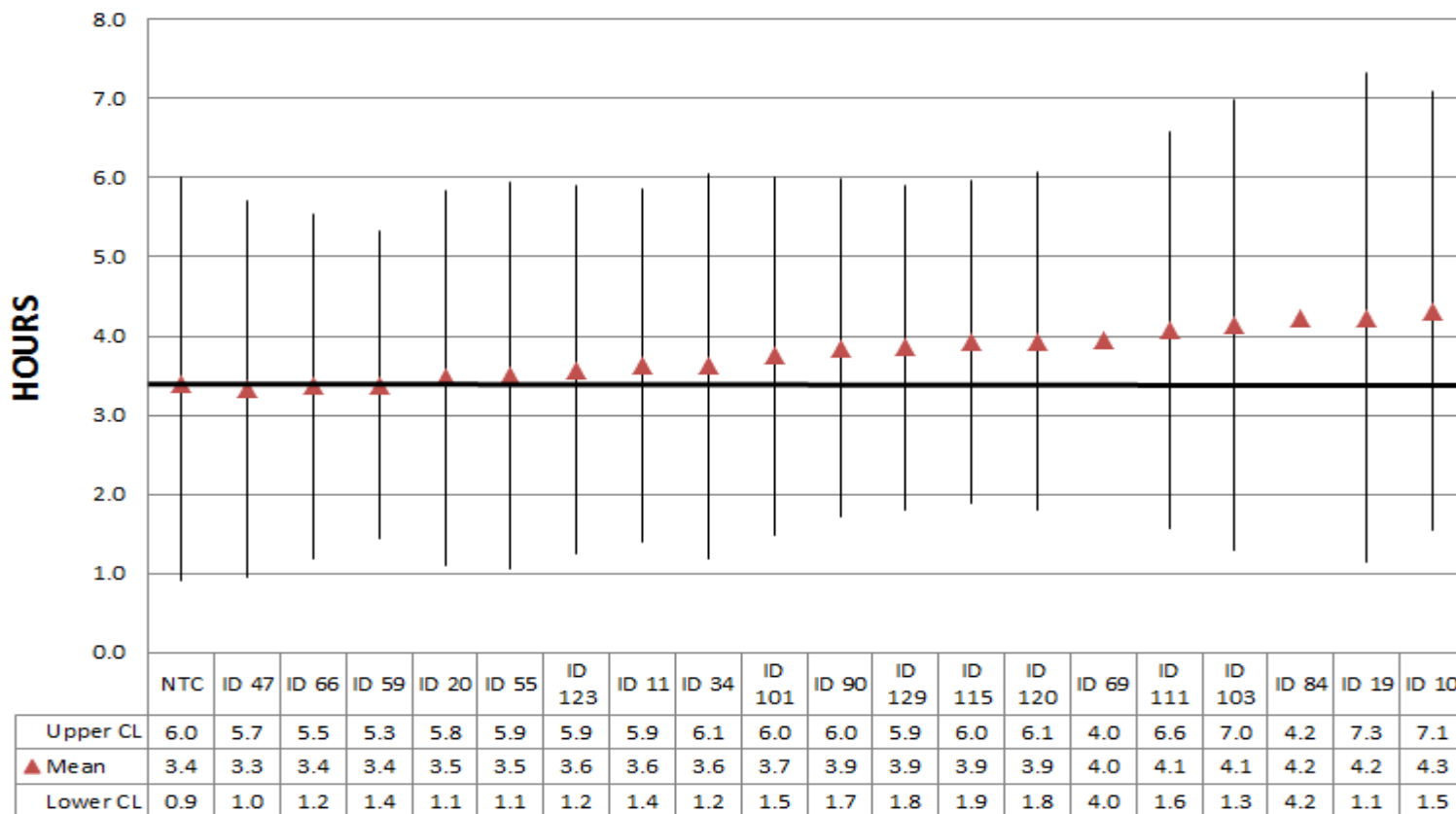
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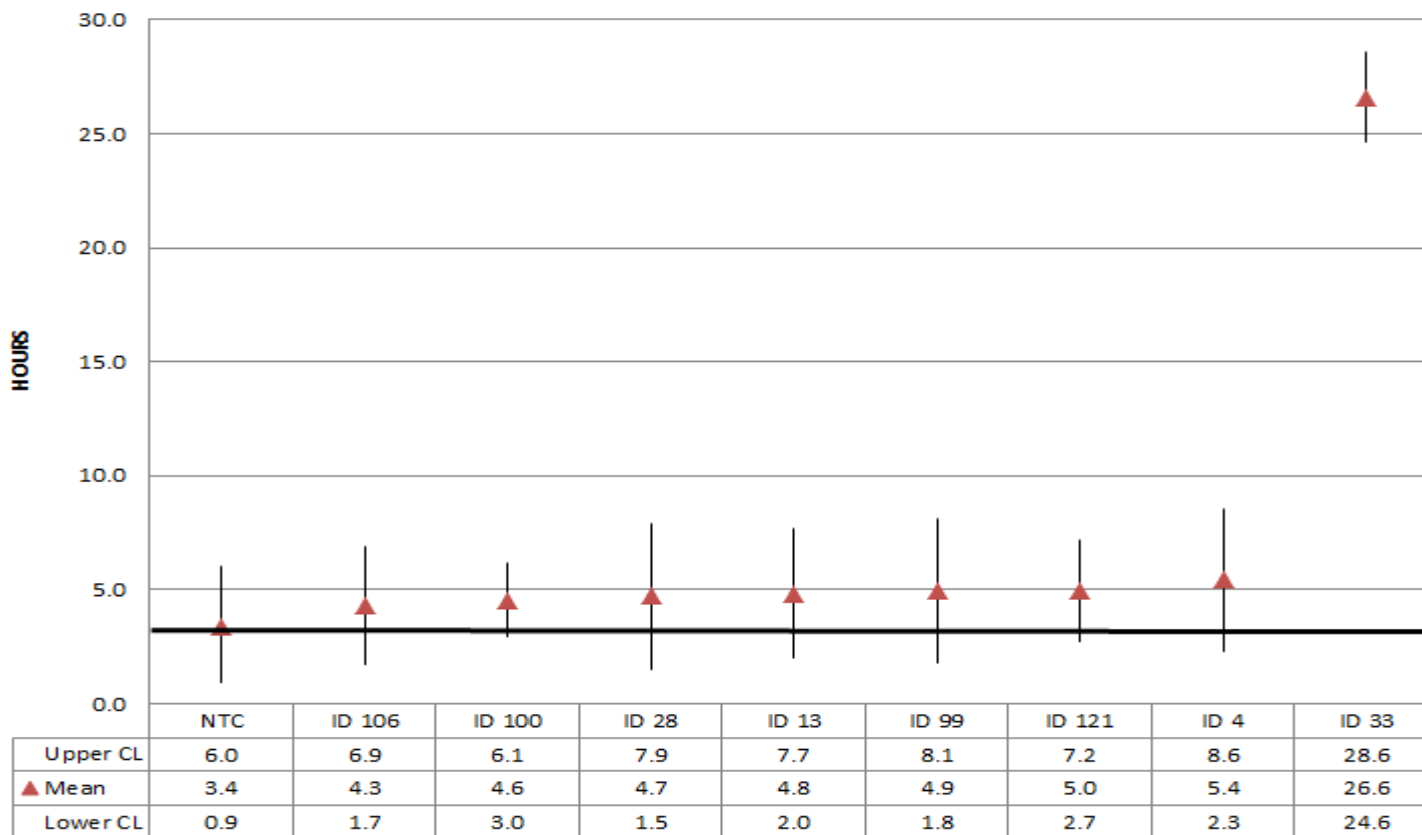


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ED Length of Stay

ED Length of Stay (minutes)				
	Indiana Average	Levels I and II	Level III	NTC
N=	7181	3431	864	2886
Average	243.4	234.8	265.3	247
Std. Deviation	183	178.8	191	184.9
Minimum	0	1	5	0
Quartile 1	141	127	164	152
Median	210	200	232	213
Quartile 3	296	298	308.5	290
Maximum	1948	1860	1948	1919

ED Disposition

ED Disposition (count)				
	Indiana	Levels I and II	Level III	NTC
Floor Bed	3656	1639	594	1423
ICU	1187	993	83	111
Transferred	1482	97	190	1195
OR	579	404	75	100
Home w/o Services	148	82	34	32
Observation	354	160	92	102
Step-Down	304	56	22	226
Expired	53	28	10	15
AMA	7	4	1	2
Home W/ Services	2	0	0	2
Other	10	1	3	6
NK/NR/NA	270	105	52	113

*A bar graph of ED Disposition is found on page 2.

*A bar graph of ED Length of Stay is found on page 2.

*A Box and Whisker plot of ED LOS is found on page 4.

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ED Length of Stay by ISS

ED Length of Stay (minutes)								
ISS Category	Indiana Average	Indiana Average	Levels I and II	Levels I and II	Level III	Level III	Non-Trauma Centers	Non-Trauma Centers
	Counts	Minutes	Counts	Minutes	Counts	Minutes	Counts	Minutes
1-8	3576	253.9	1569	251.8	406	271.5	1601	251.6
9-15	2630	247.8	1159	241.6	388	275.2	1083	244.7
16-24	526	205.1	408	205.1	42	179.1	526	219.6
25-44	324	166.1	267	163.3	21	144.6	36	199.1
45-74	23	142.6	19	126.3	2	284.5	2	153.5
75	6	111.3	5	77.2	0	-	1	182
No ISS	95	233.1	4	92.8	5	221	86	240.3

*A Box and Whisker plot of ED Length of Stay by ISS is found on page 4.

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ED Disposition (count) by ISS Category

	Floor Bed	ICU	Transferred	OR	Observation	NK/NR/NA	Step-Down	Home w/o Services	Expired	Other	AMA	Home w/ Services	Total
1-8	1901	308	838	265	259	96	159	133	7	5	5	2	3978
9-15	1537	417	487	157	74	130	124	8	4	0	2	0	2940
16-24	105	267	68	66	14	11	15	0	10	0	0	0	556
25-44	19	180	37	74	0	5	1	1	22	0	0	0	339
45-74	0	8	3	11	0	1	0	0	1	0	0	0	24
75	0	2	1	0	0	0	0	0	5	0	0	0	8
NO ISS	94	5	48	6	7	27	5	6	4	5	0	0	207
Total	3656	1187	1482	579	354	270	304	148	53	10	7	2	8052

*Bar graph of ED Disposition by ISS is found on page 25.

Indiana State Department of Health Indiana Trauma Registry

Hospitals Reporting Trauma Data
Quarter 4, 2014
October 1- December 31, 2014

I II Level I and II Trauma Centers

Deaconess Hospital
Eskenazi Health
IU Health - Methodist Hospital
Lutheran Hospital of Indiana
Memorial Hospital of South Bend
Parkview Regional Medical Center
Riley Hospital for Children at IU Health
St. Mary's Medical Center of Evansville
St. Vincent Indianapolis Hospital

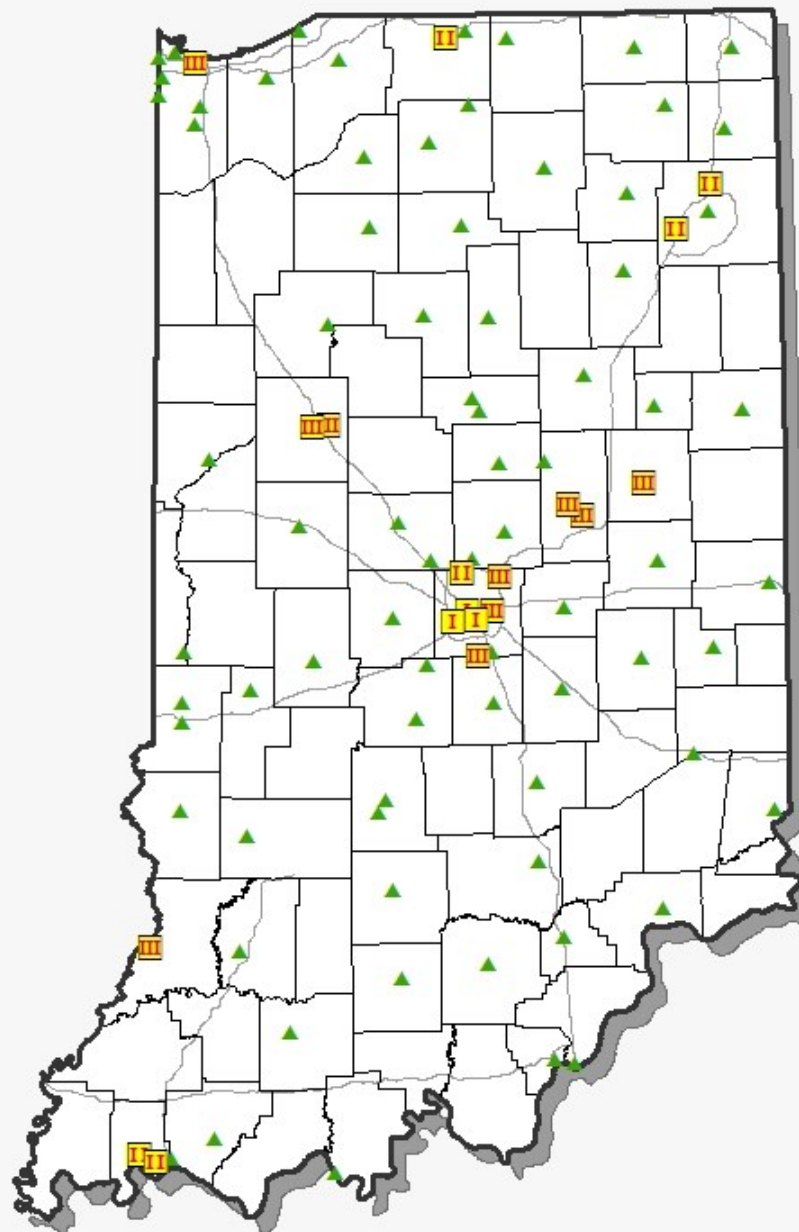
III Level III Trauma Centers

Community Hospital of Anderson
Community Hospital - East
Community Hospital - North
Community Hospital - South
Franciscan St. Elizabeth East Hospital
Good Samaritan Hospital
IU Health - Arnett Hospital
IU Health - Ball Memorial Hospital
Methodist Hospital - Northlake Campus
St. Vincent Anderson Regional Hospital

▲ Non-Trauma Hospitals

78 Non-Trauma Hospitals

Hospital categories include Verified and "In the Process" Trauma Centers



Map Author: ISDH ERC PHG and ISDH Trauma & Injury Prevention - May 2015

Indiana Trauma Registry

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General Report:

- The caterpillar plots with the anonymous ID's for all patients per hospital may be found on pages 33-39.
- The caterpillar plots with the anonymous ID's for transferred patients per hospital may be found on pages 40-46.
- Reference tables now accompany the graphs for demographic data on pages 29-32.