

Indiana Trauma Registry

Statewide Quarter 2 Data Report

April 1, 2014 to June 30, 2014

8,272 Incidents

93 Total Hospitals Reporting

Trauma Centers:	9 facilities	49.7% of data
(Non-Trauma) Hospitals:	84 facilities	50.3% of data

For Quarter 2 2014, which spanned from April 1, 2014 to June 30, 2014, there were 8,272 incidents reported to the Indiana Trauma Registry at the Indiana State Department of Health. There were 93 hospitals that reported data, of which 9 were trauma centers and 84 were non-trauma centers. There were 7 hospitals that either started to report again or were new to report 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 33. IU Health - Arnett Hospital, IU Health - Ball Memorial, St. Elizabeth East Hospital, and St. Vincent Anderson Hospital were the four hospitals with “in the process” status during the quarter. Trauma centers represented 49.7% of the data. There were 2,553 incidents reported for April, 2,929 reported for May, and 2,790 incidents reported for June.

The content of this report has changed due to suggestions and additions requested by the Indiana State Trauma Care Committee at the August, 8 2014 meeting. Explanations of the changes requested and adapted from the ISTCC meeting can be found on page 34.

Some general reminders include that the blue columns represent an Indiana average, red columns represent trauma centers, and green columns represent 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 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:

CAHs: Critical Access Hospital	LOS: Length of Stay
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	

Formulas:

$ISS = (AIS)^2 + (AIS)^2 + (AIS)^2$
Total GCS = Verbal GCS + Motor GCS + Eye GCS
 $Ps = 1/(1+e^{-b})$ where
 $b = b_0 + b_1(RTS) + b_2(ISS) + b_3(Age\ Index)$



Indiana State
Department of Health
Trauma and Injury Prevention

Indiana Trauma Registry

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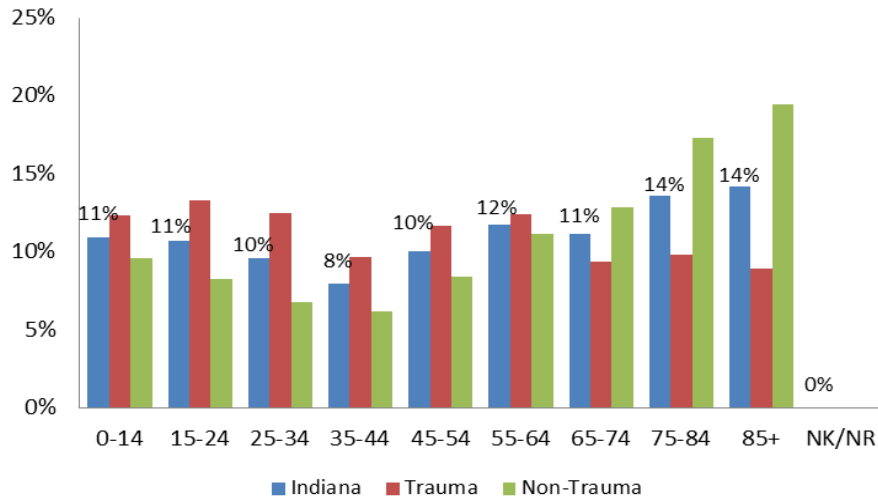
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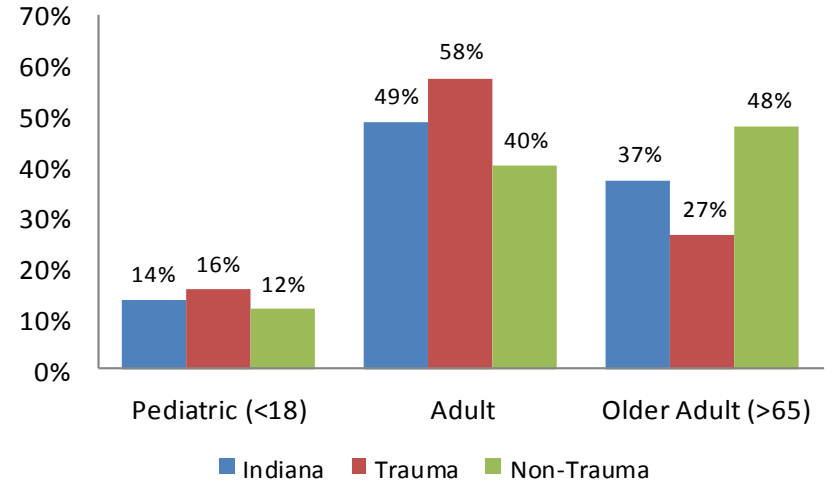
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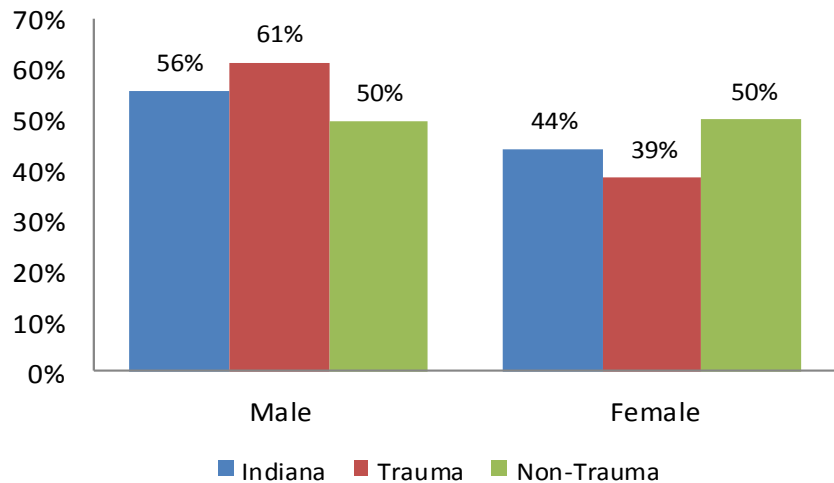
Patient Age (Years)



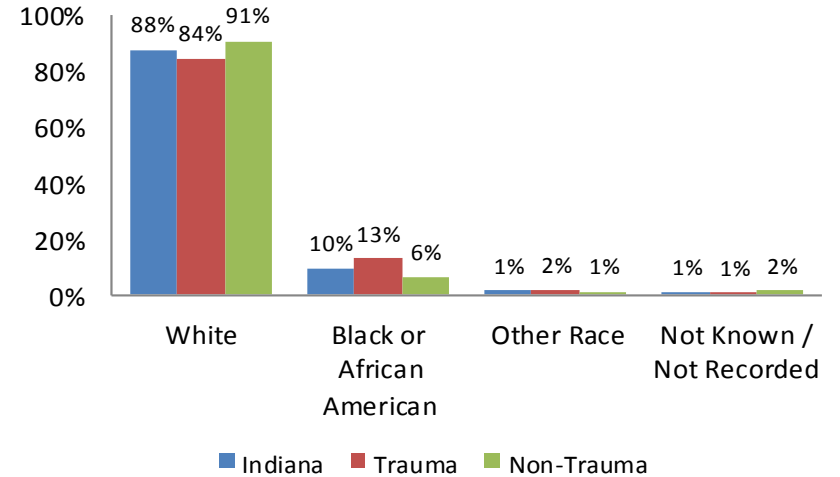
Patient Age Groupings



Patient Gender



Patient Race



There were five unknown ages reported, which represents 0.06% of the data.

<1% Race - Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native

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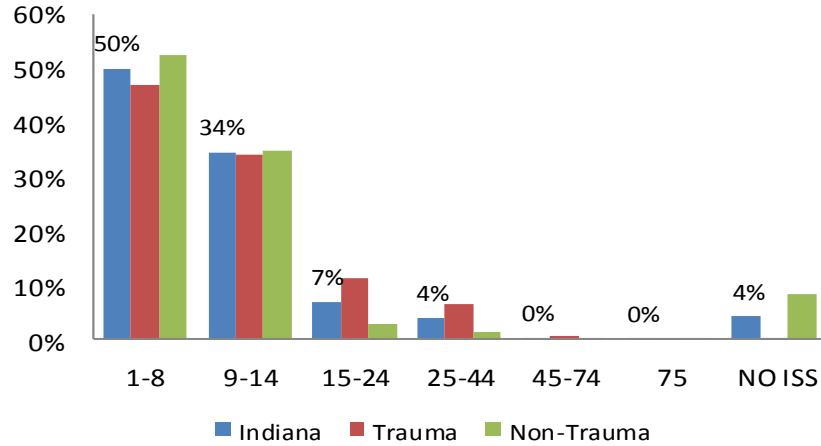
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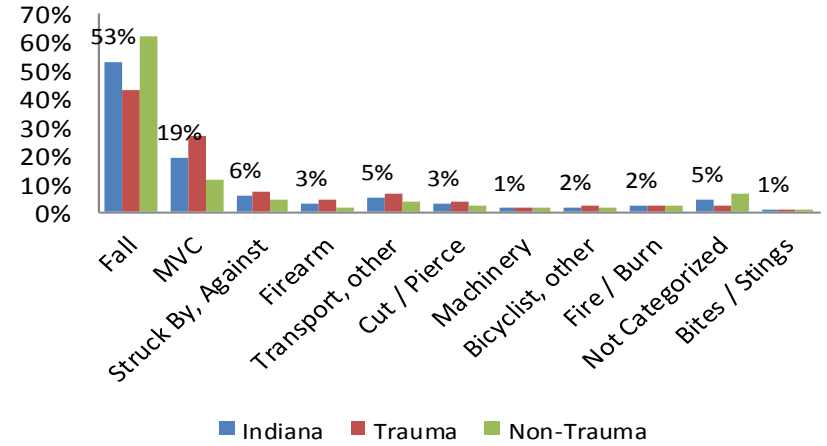
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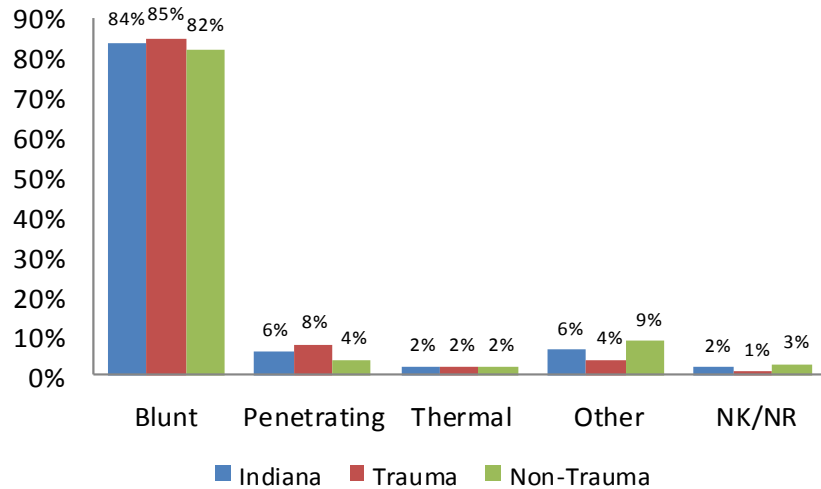
Injury Severity Score (ISS)



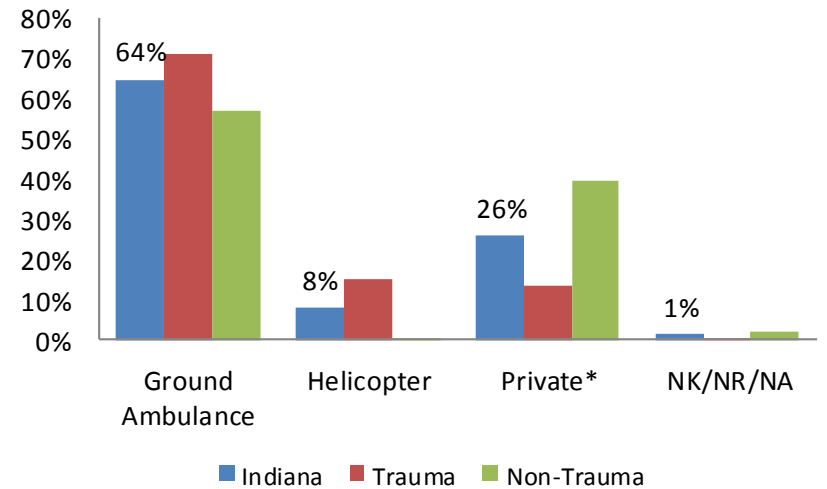
Cause of Injury



Trauma Type



Transport Mode



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

<1% Transport Mode: Police, Other

* Indicates Private/ Public Vehicle, Walk-in

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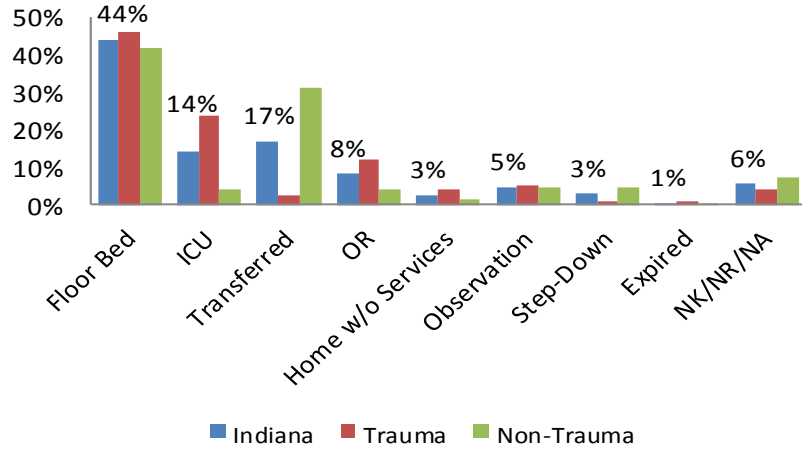
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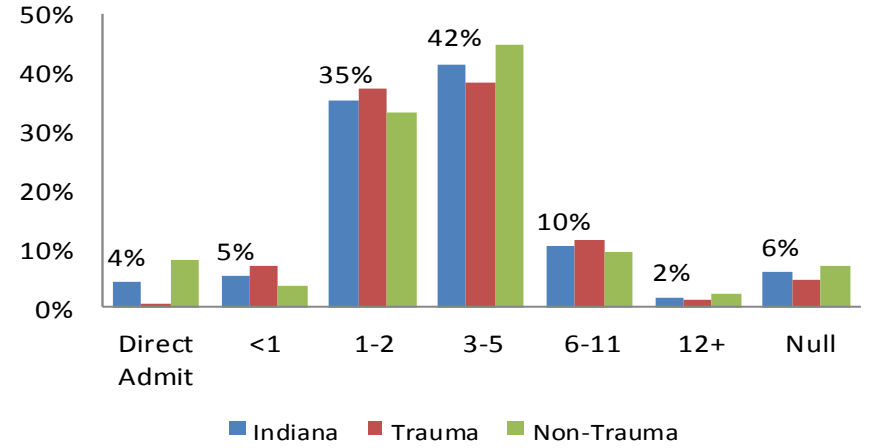
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ED Disposition by Percentage

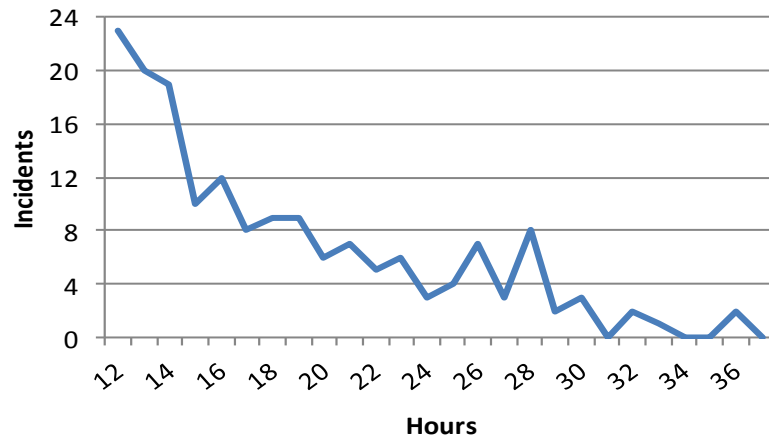


ED Length of Stay (Hours)



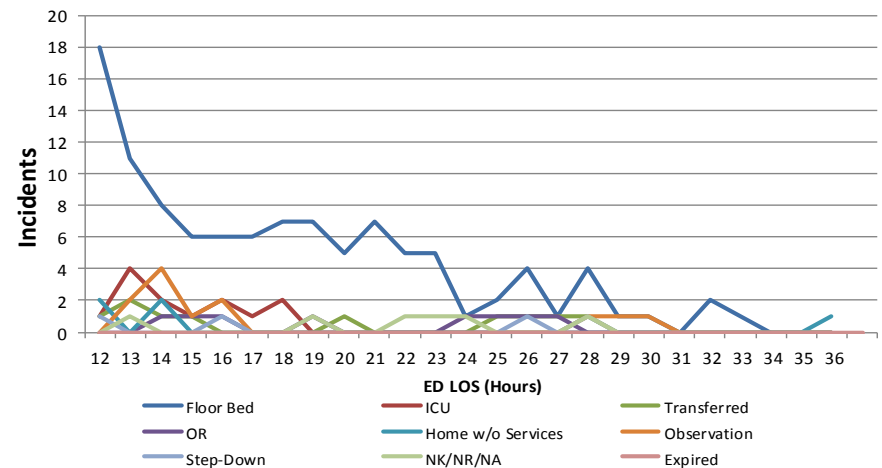
<1% ED Disposition: AMA; Home with Services; Other

ED LOS >12 Hours



N=169

ED Disposition for ED LOS >12 Hours



N=108

*No cases expired > 12 hours

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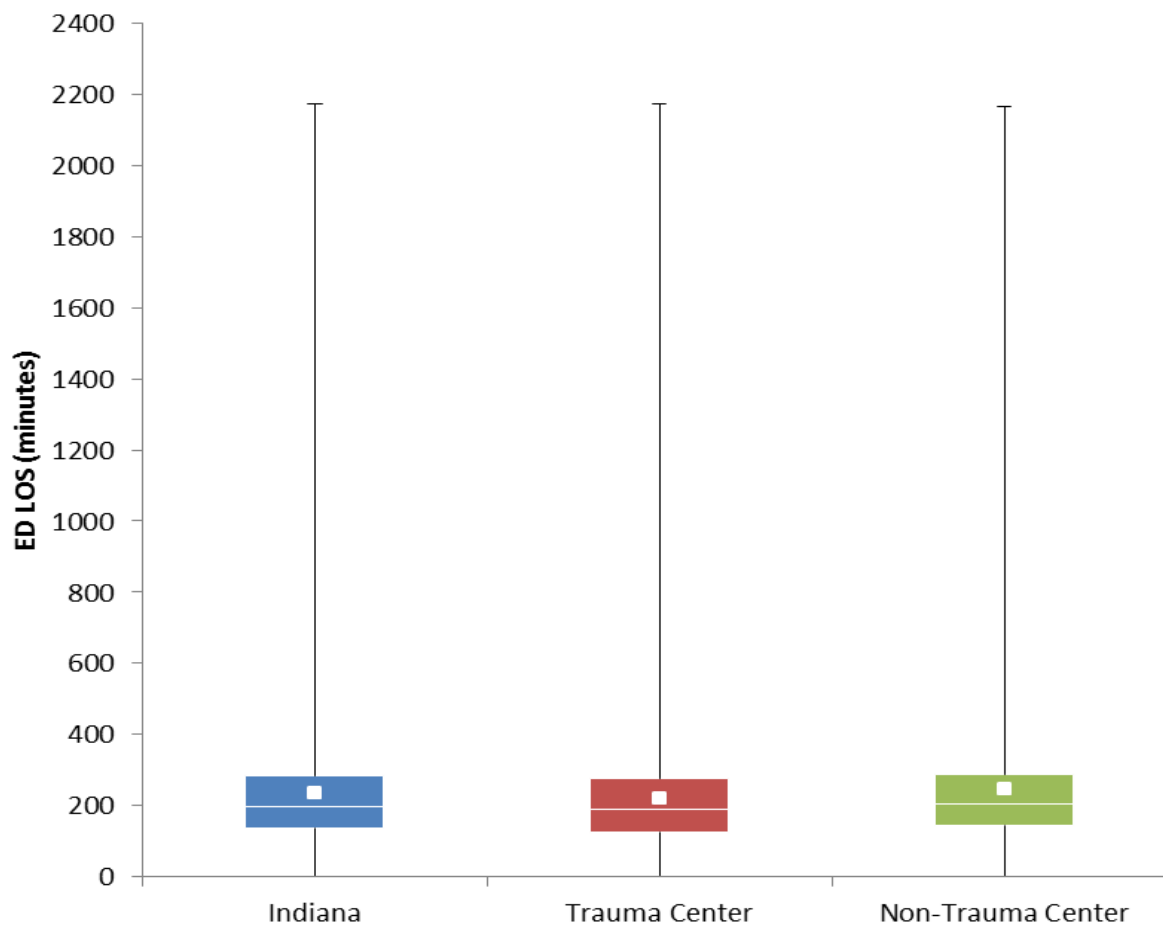
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ED LOS (Minutes) - All Patients



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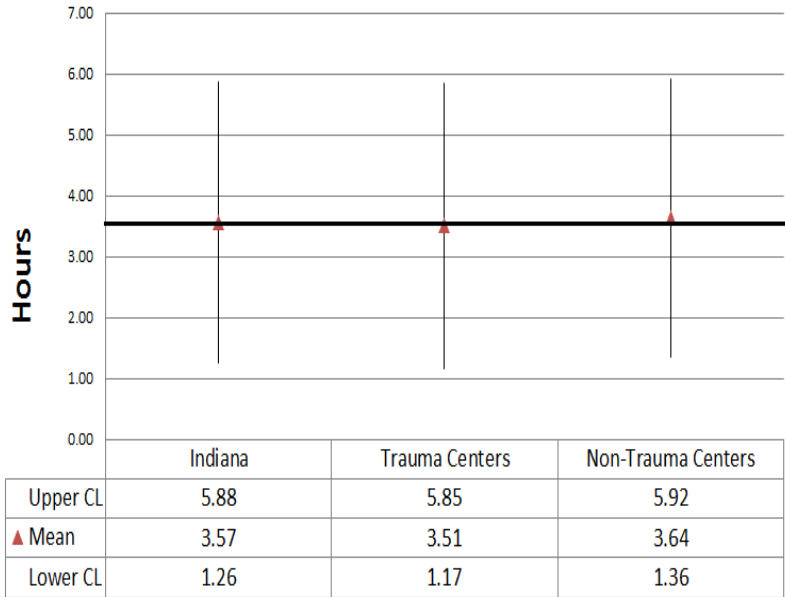
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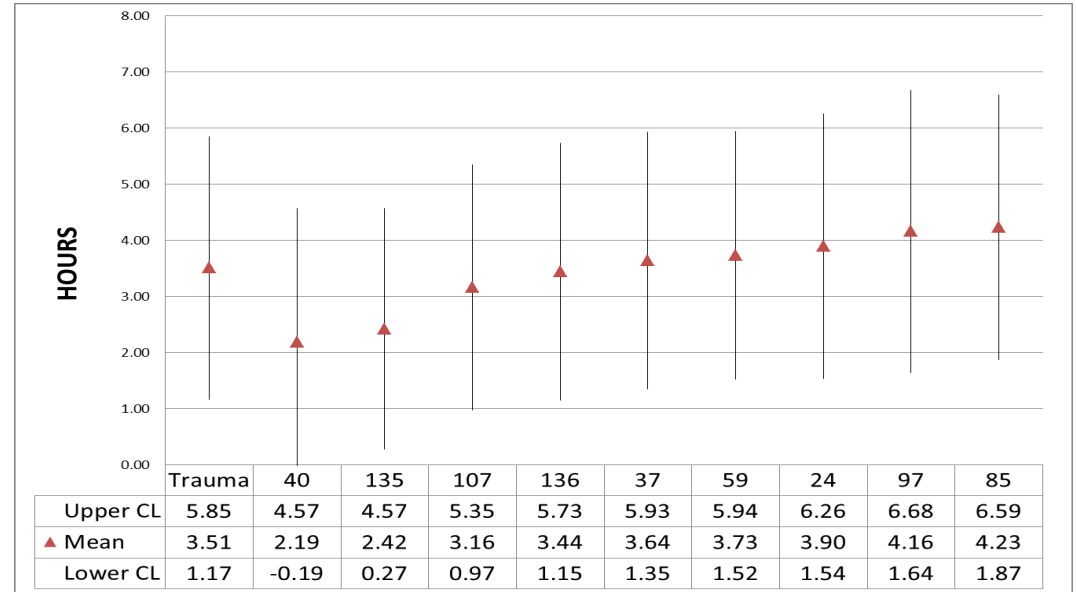
50.3% of data

All Patients

Average ED LOS (Hours)



Trauma Centers-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.

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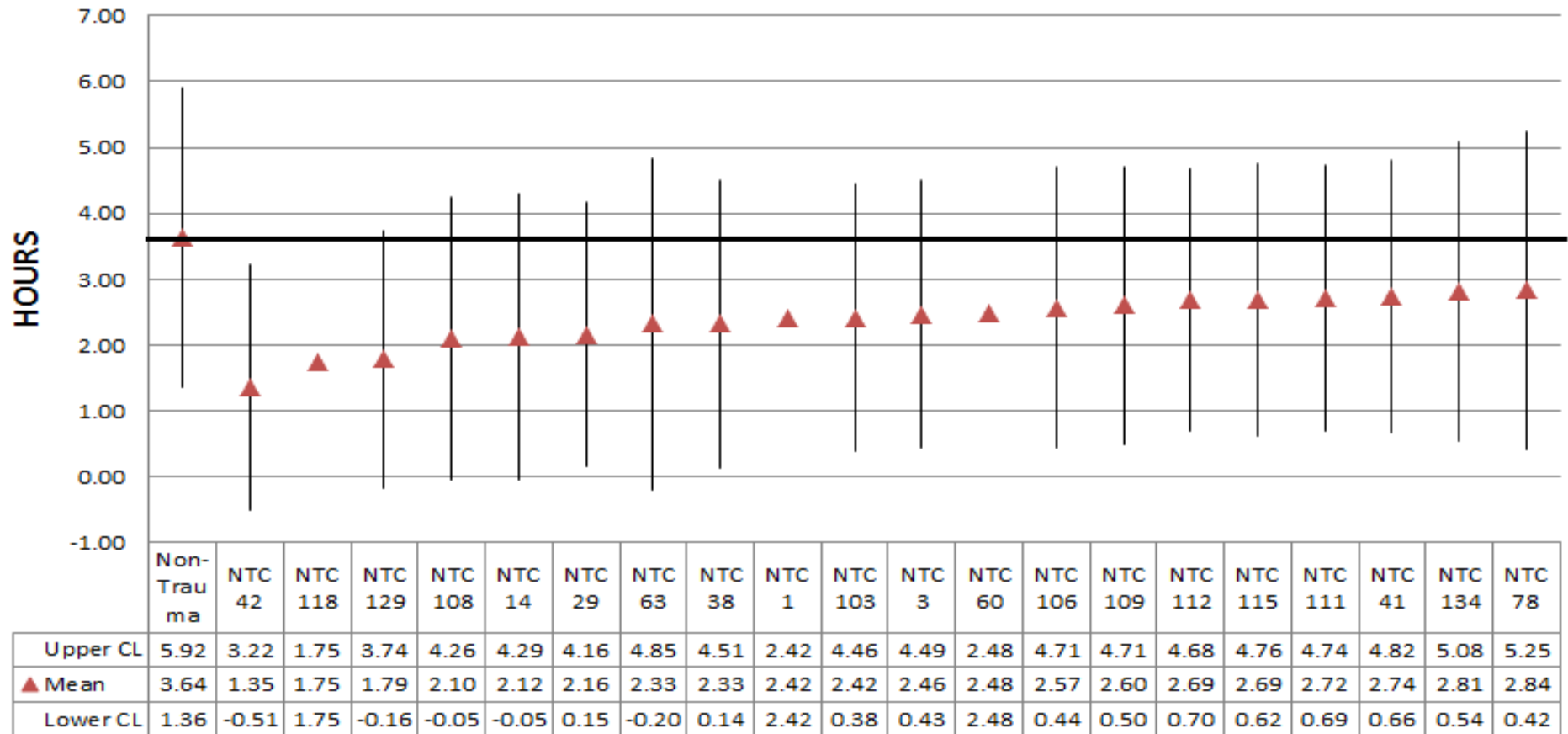
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All Patients Non-Trauma Centers- Average ED LOS (Hours)



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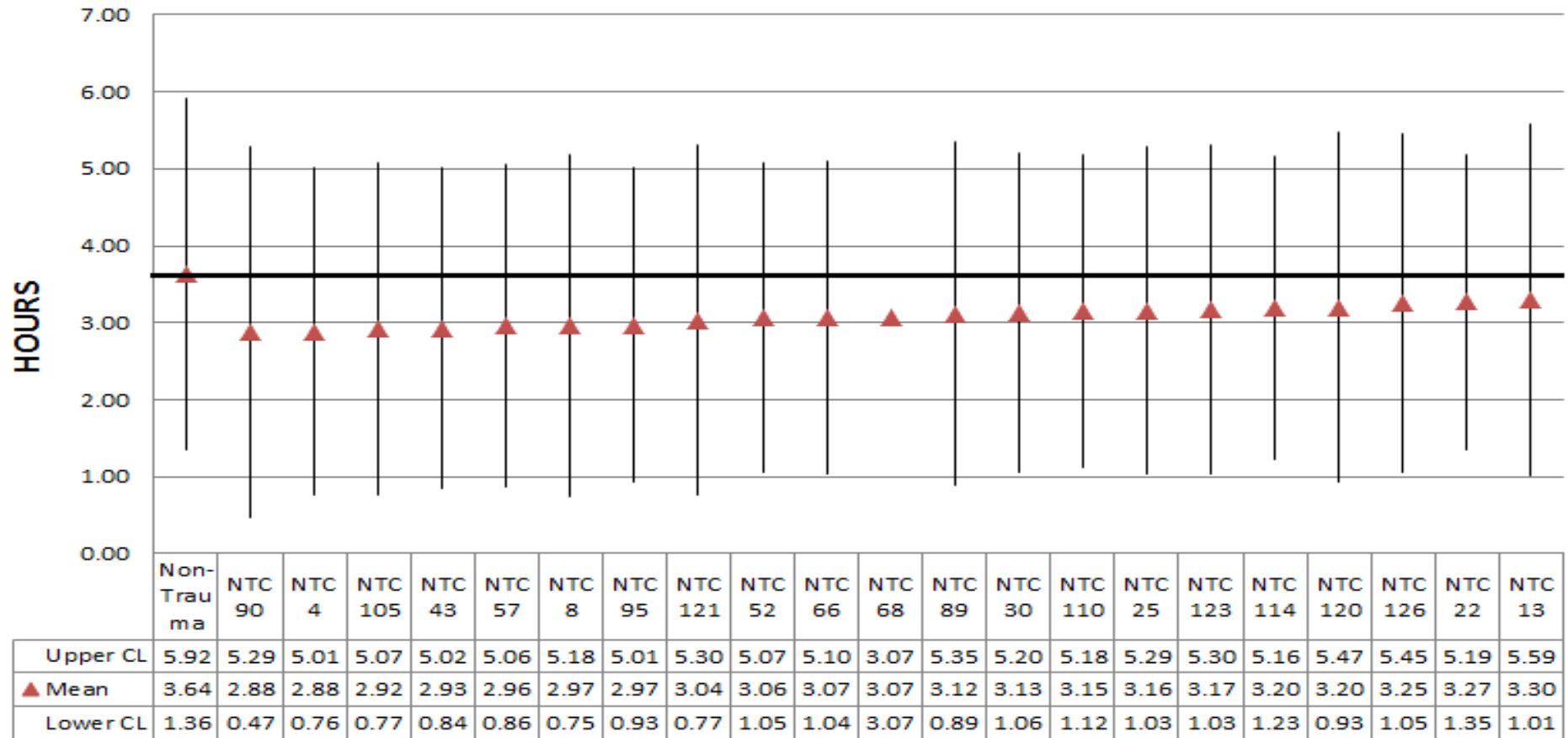
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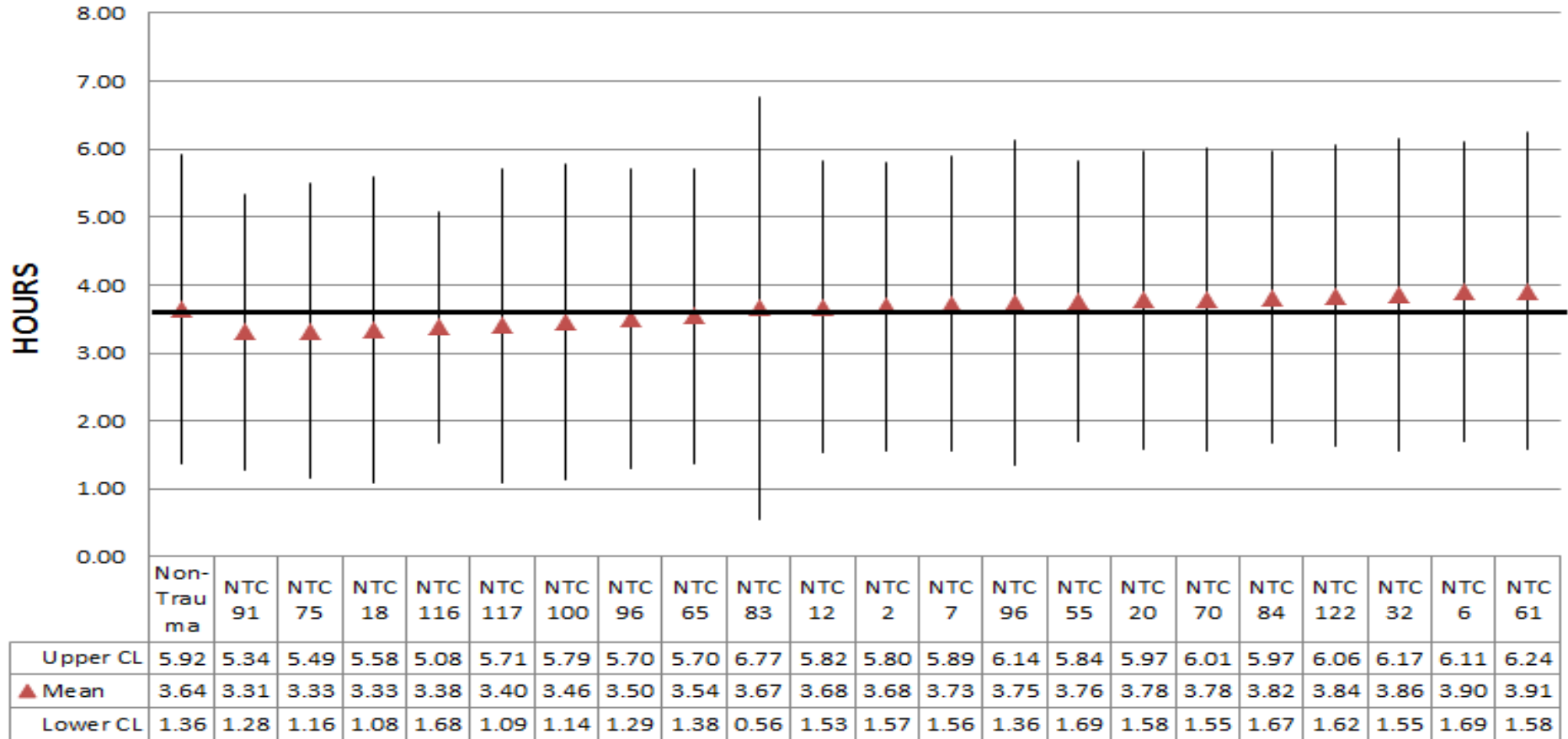
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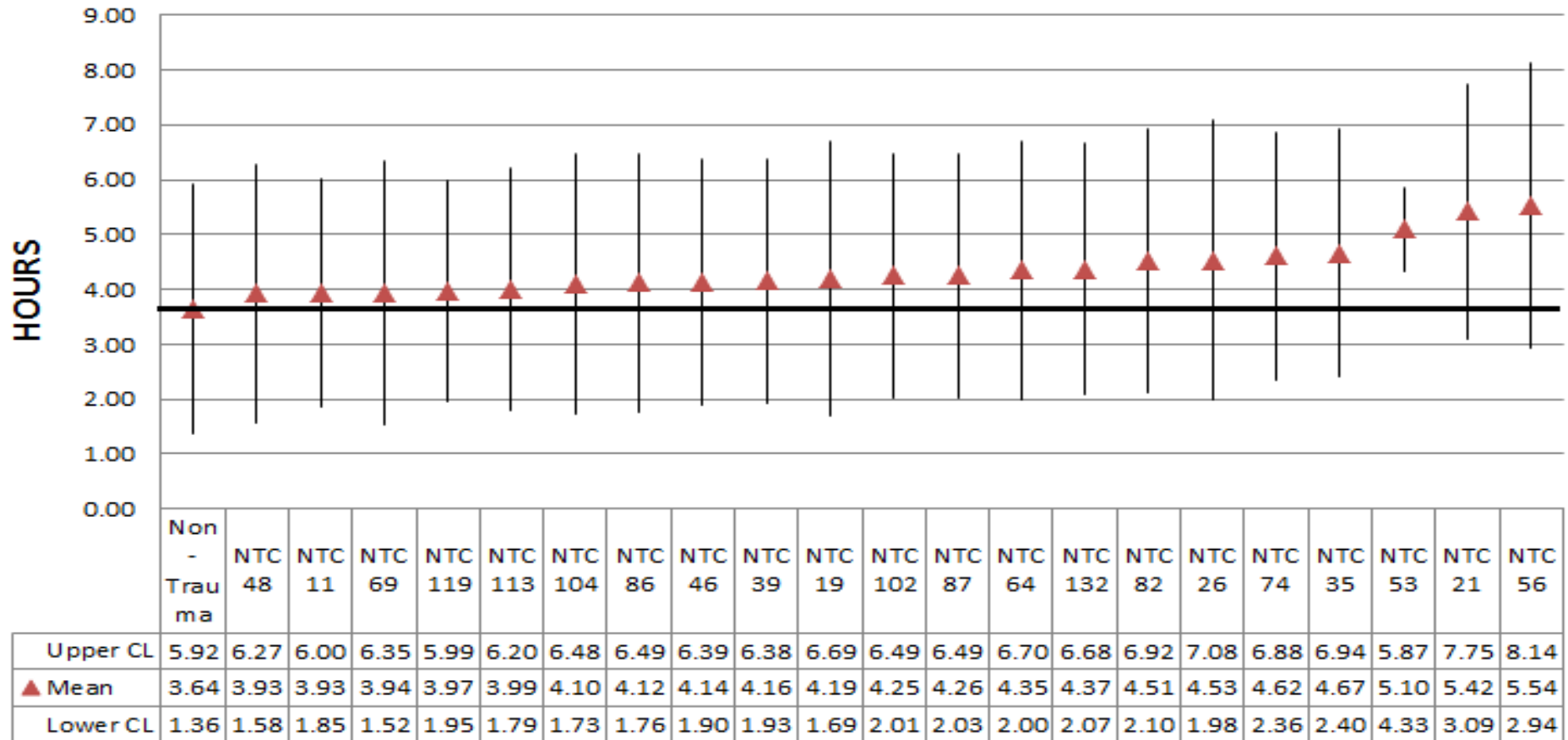
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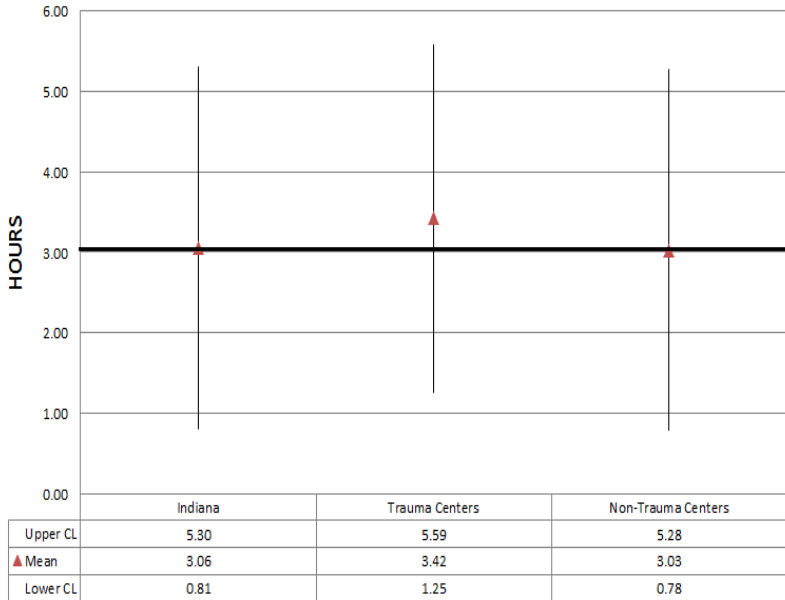
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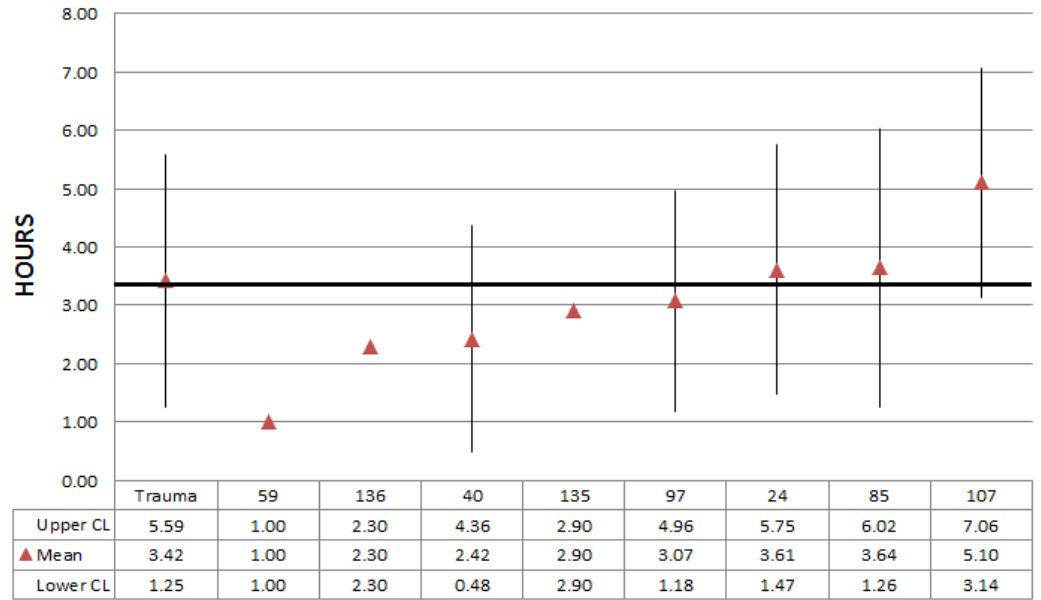
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Transferred Patients

Average ED LOS (Hours)



Trauma Centers-Average ED LOS (Hours)



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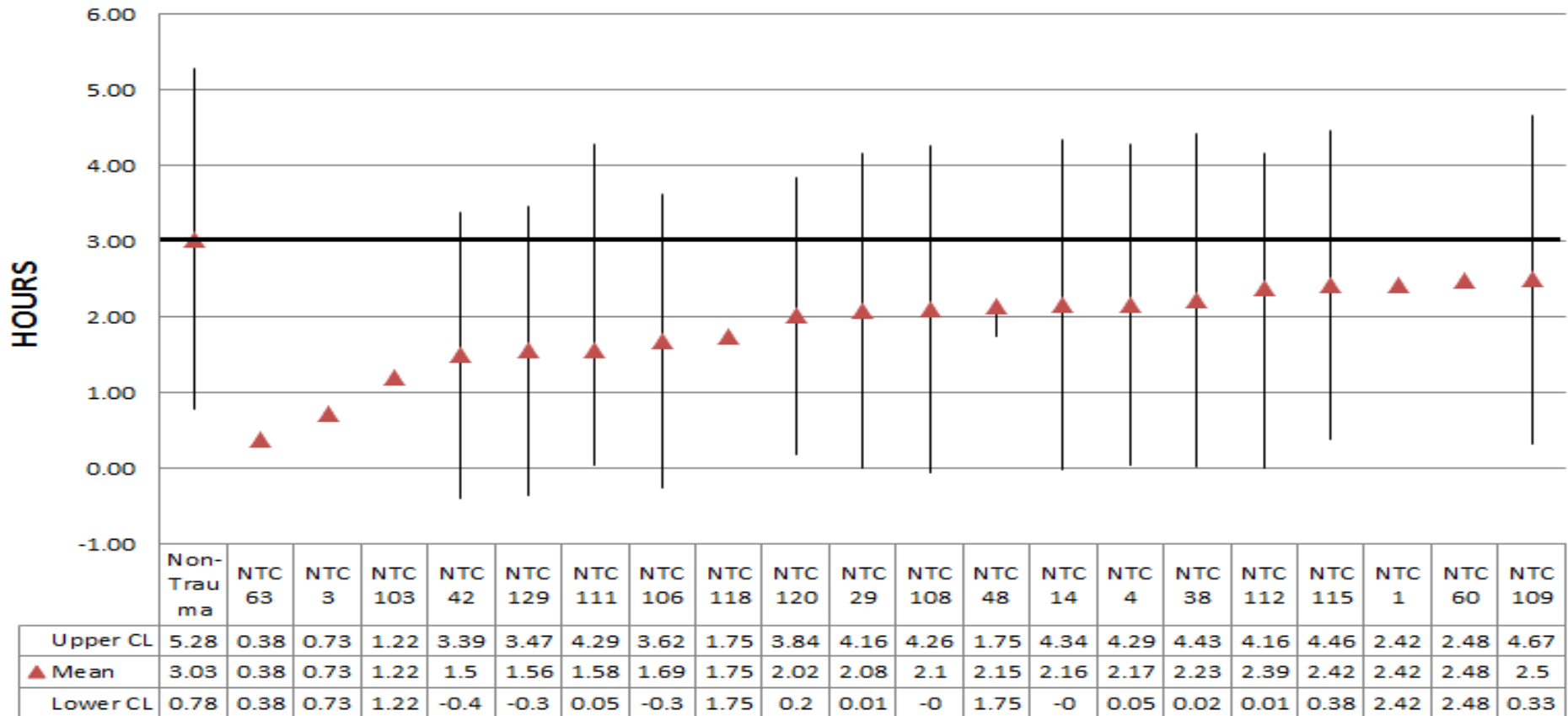
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Transferred Patients Non-Trauma Centers- Average ED LOS (Hours)



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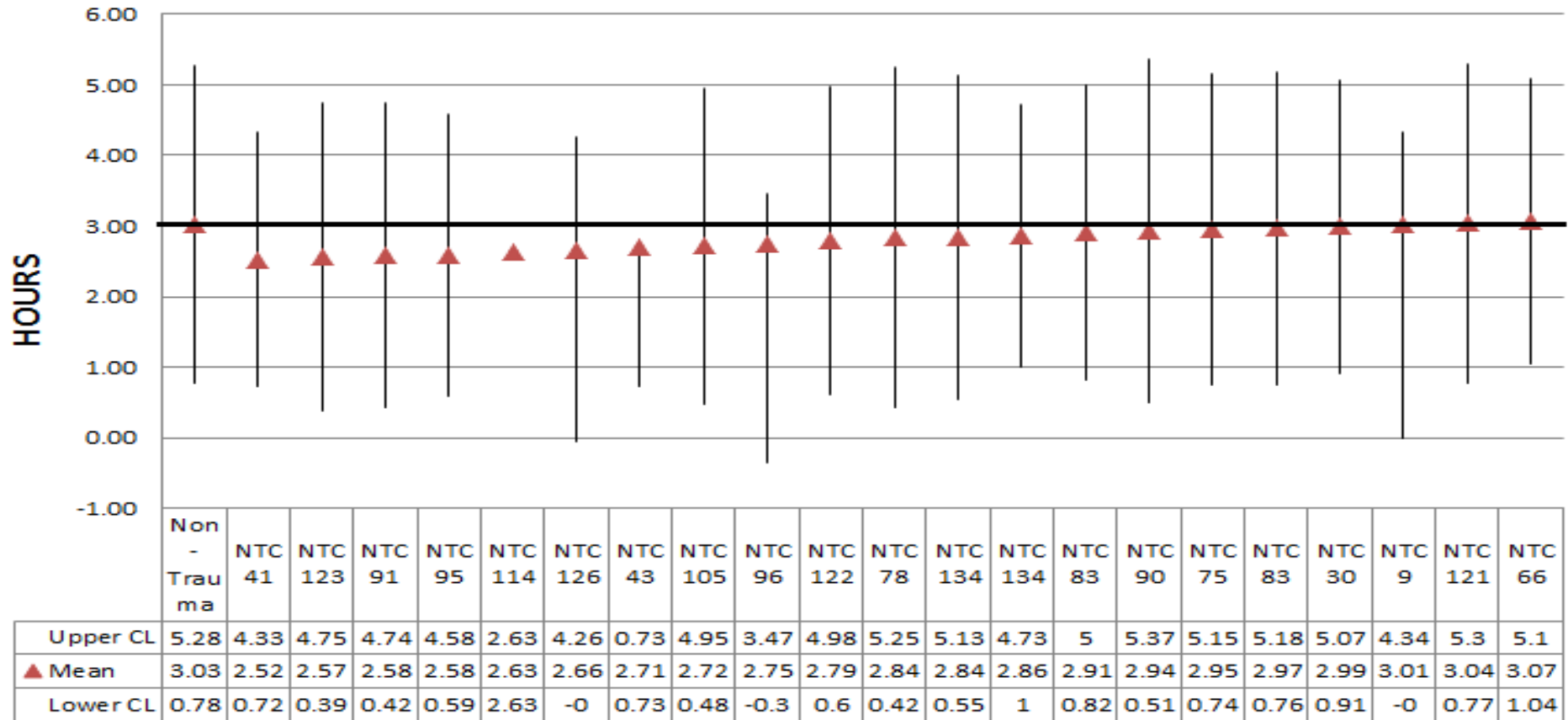
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Transferred Patients **Non-Trauma Centers- Average ED LOS (Hours)**



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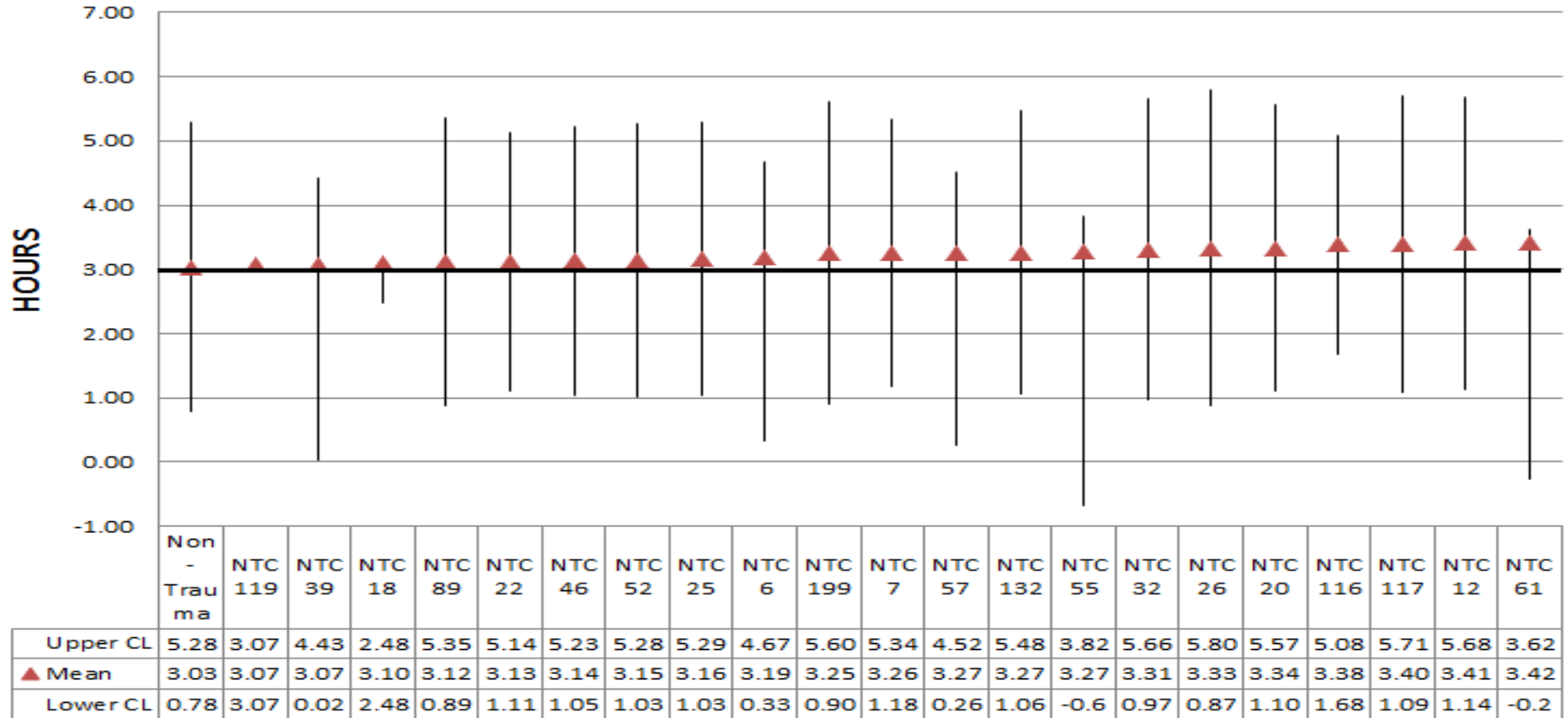
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Transferred Patients Non-Trauma Centers- Average ED LOS (Hours)



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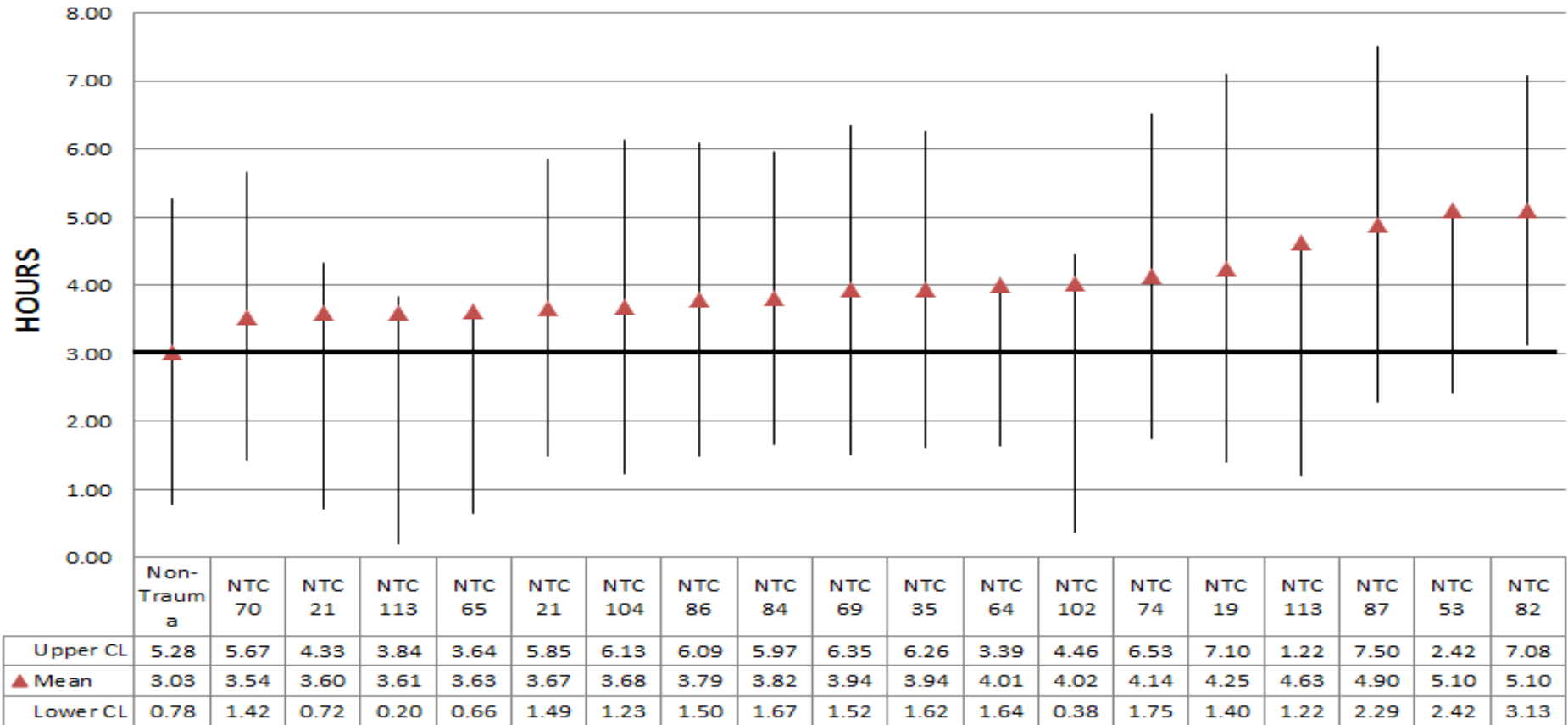
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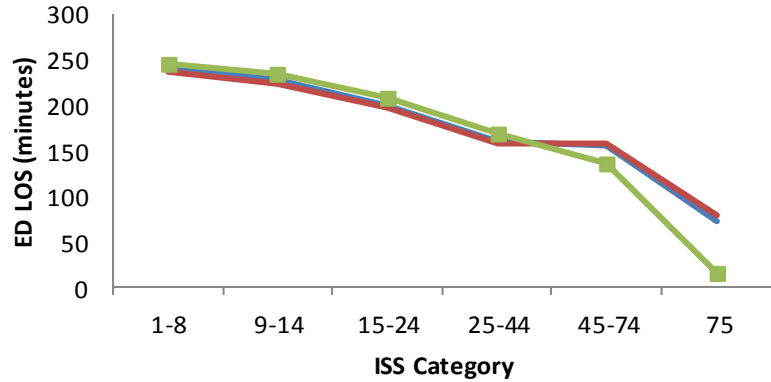
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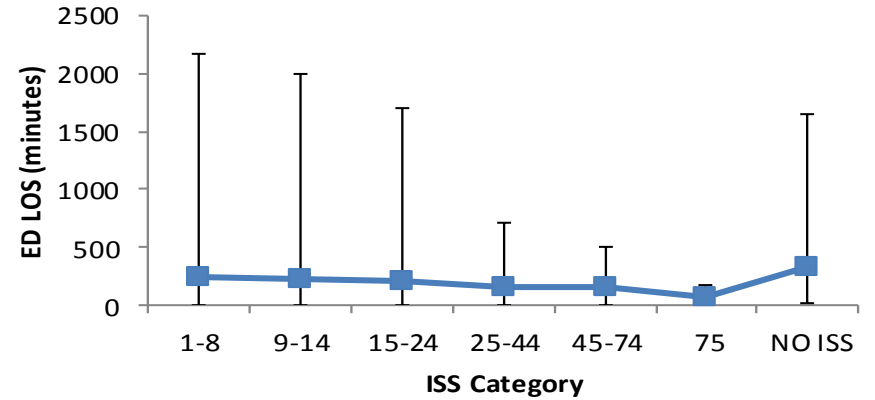
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ED LOS (Minutes) by ISS



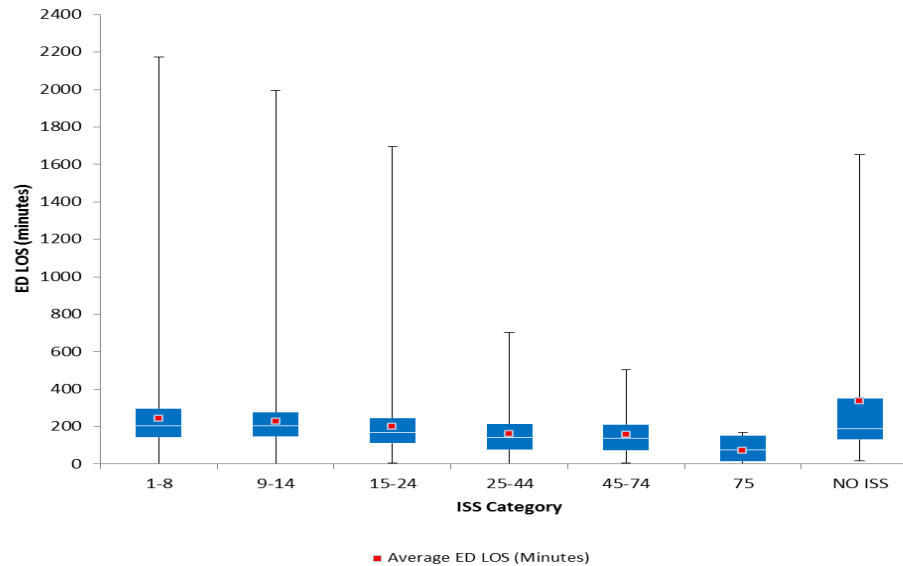
— Indiana Average — Trauma Center — Non-Trauma Center

ED LOS (Minutes) by ISS



■ Average ED LOS (Minutes)

ED LOS (Minutes) by ISS



■ Average ED LOS (Minutes)

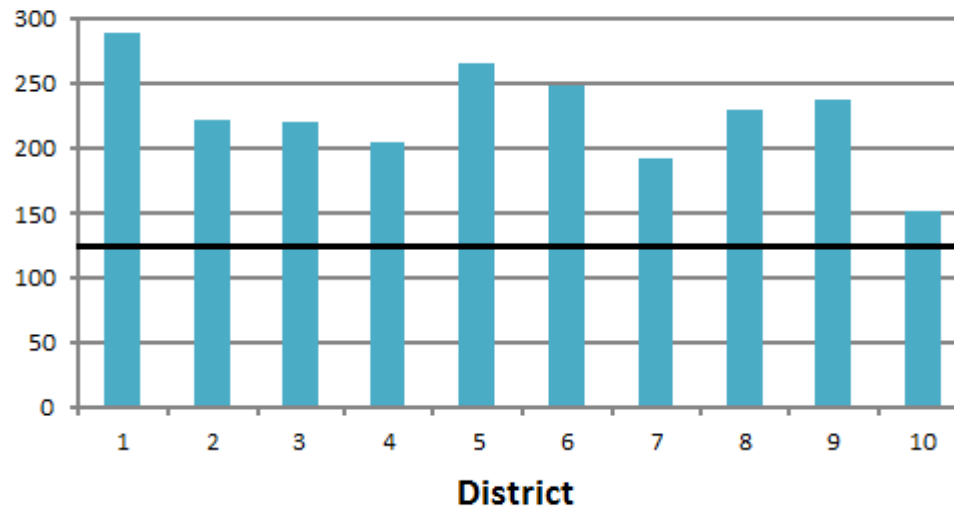
A table with values for ED LOS by ISS may be found on page 31. Note for ED LOS by ISS, there were 2 cases at Non-Trauma Centers with ISS greater than 45.

Indiana Trauma Registry

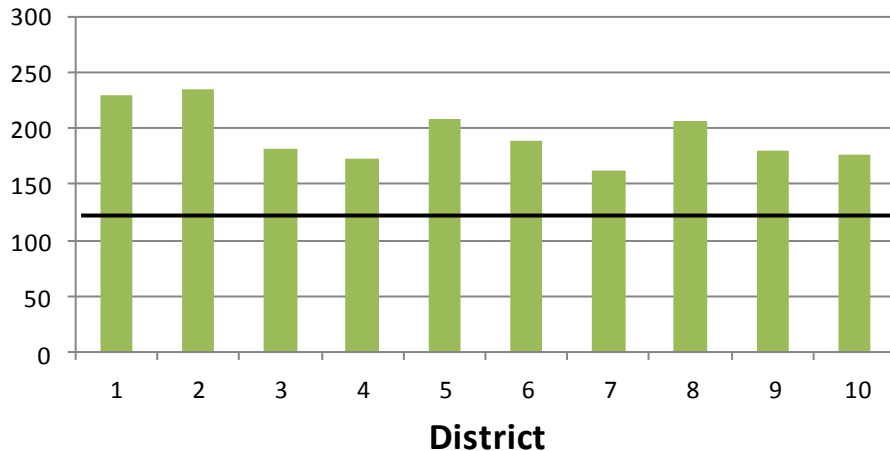
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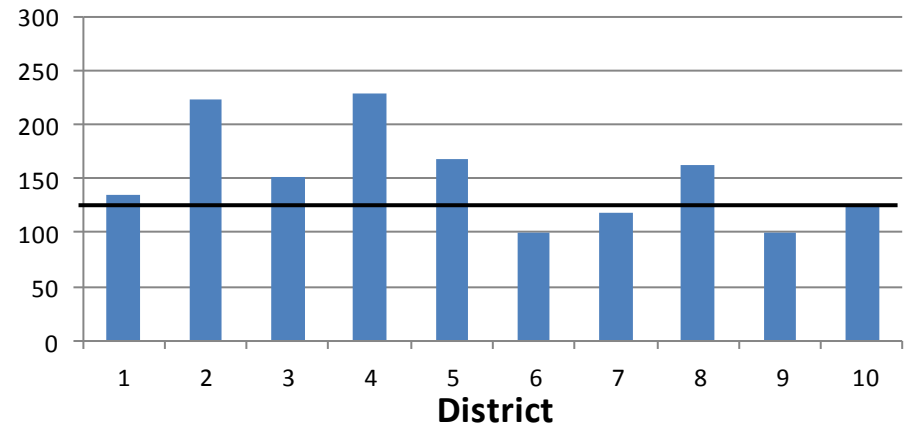
Average ED LOS (Minutes) - ALL



Average ED LOS (Minutes) - Transfers



Average ED LOS (Minutes) - Critical Transfers

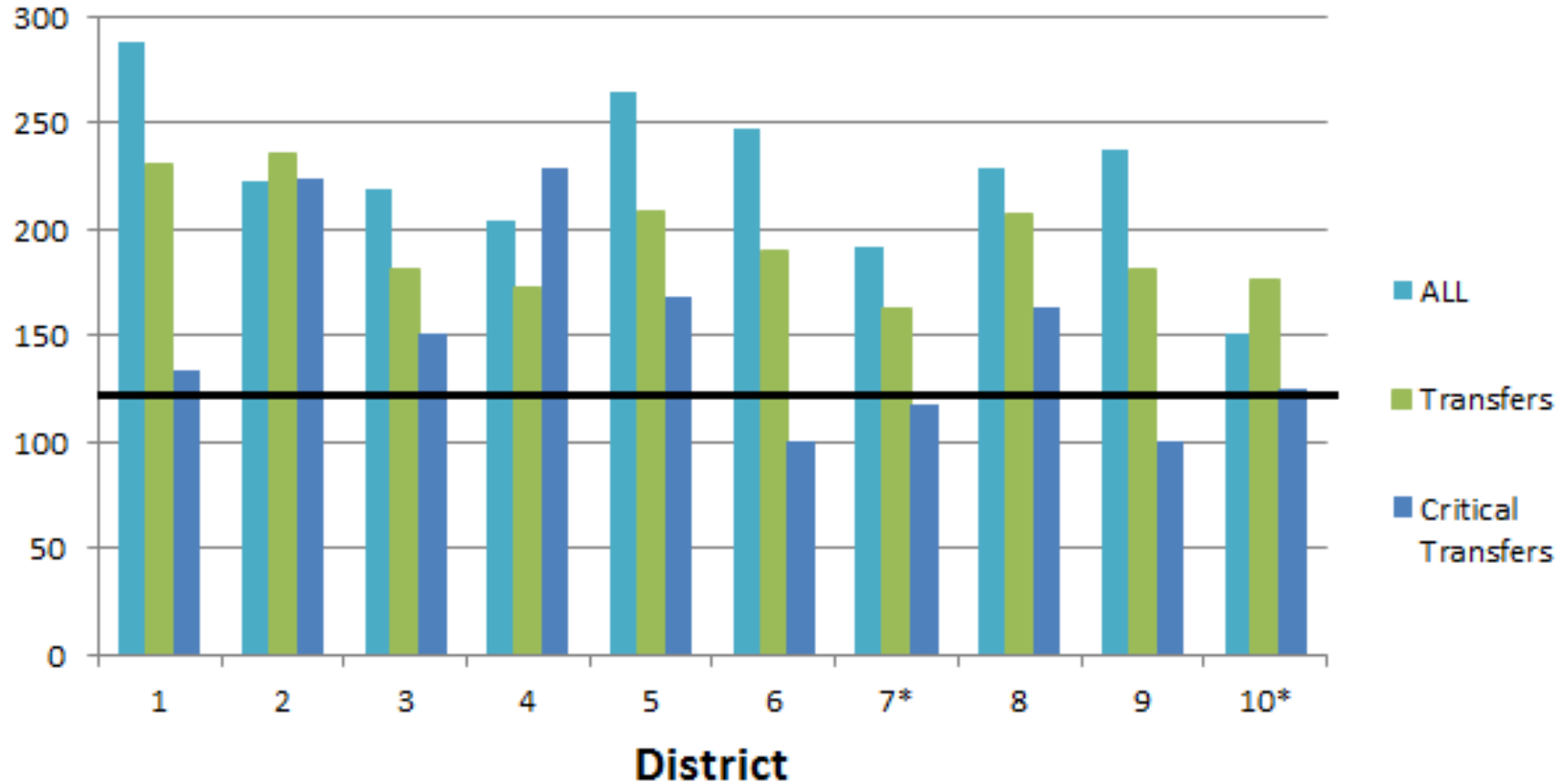


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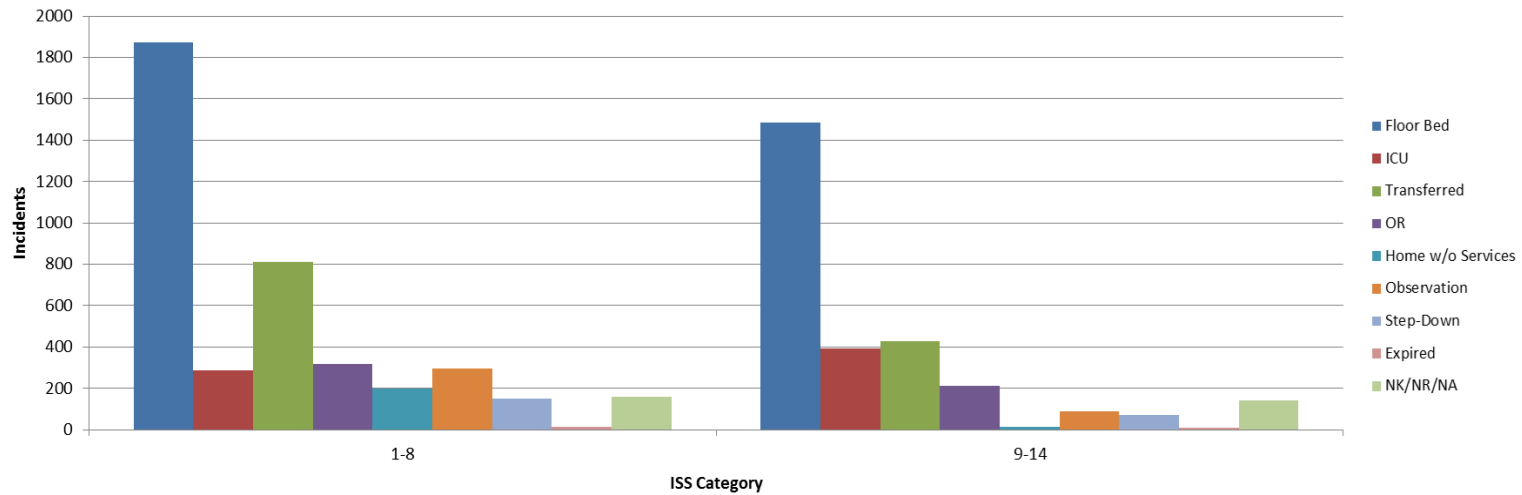
*Districts 7 and 10 have all hospitals reporting.

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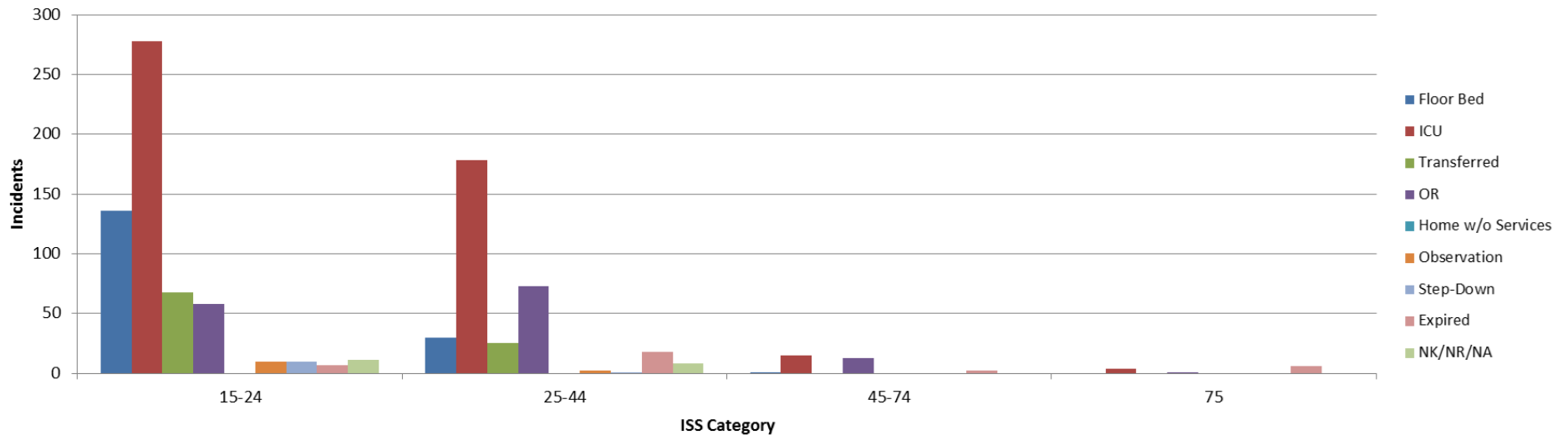
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ED Disposition by ISS 1-14



ED Disposition by ISS 15-75



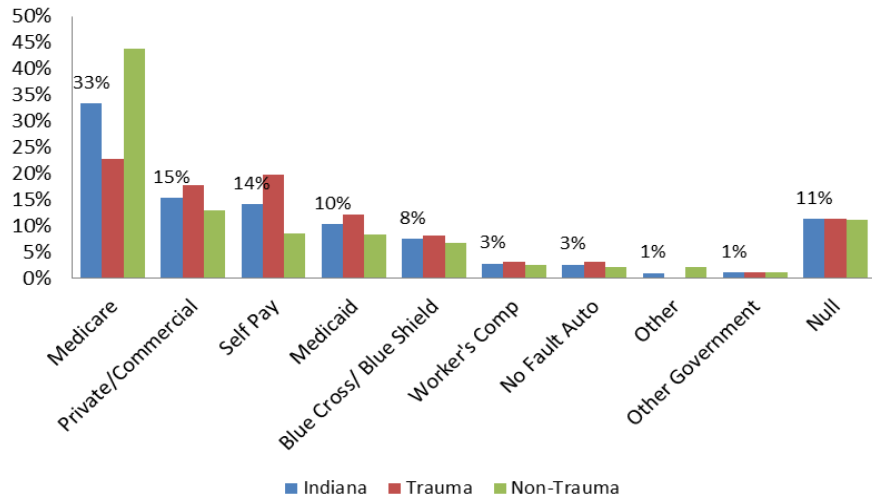
ED Disposition <1%: AMA; Home with services; Other (Jail, Mental Institution, etc.). Please note the difference in axis scale between the top and bottom graphs.
 *A table with values for ED Disposition by ISS is found on page 32.

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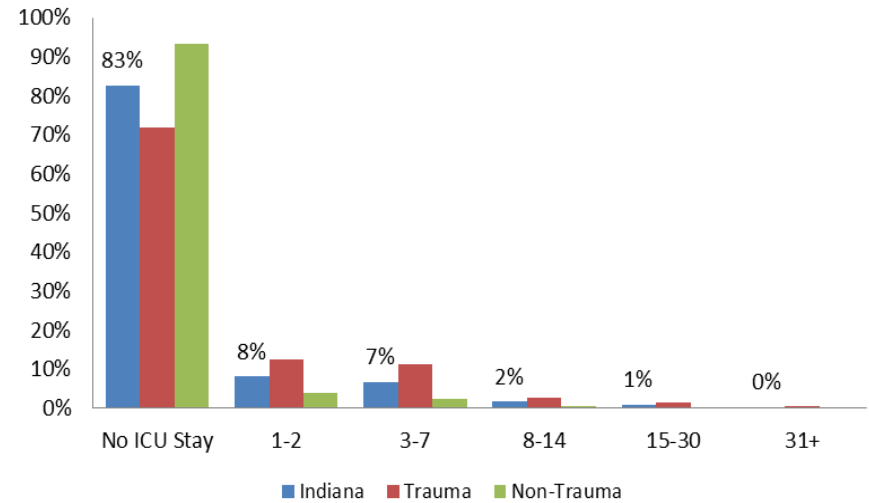
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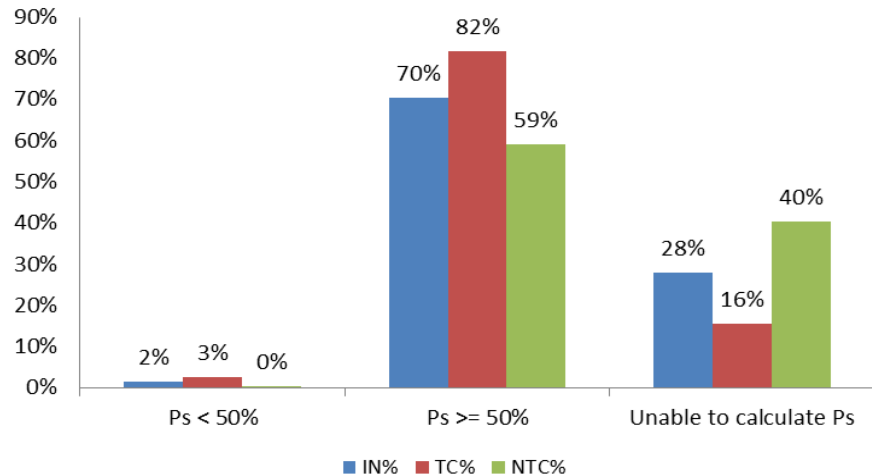
Primary Payer Mix



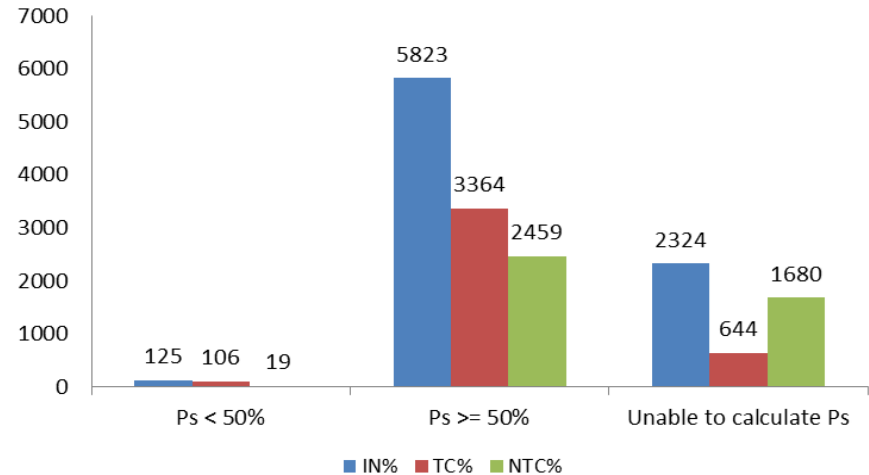
ICU Length of Stay (Days)



Probability of Survival (Ps) by Percent



Probability of Survival (Ps) by Count



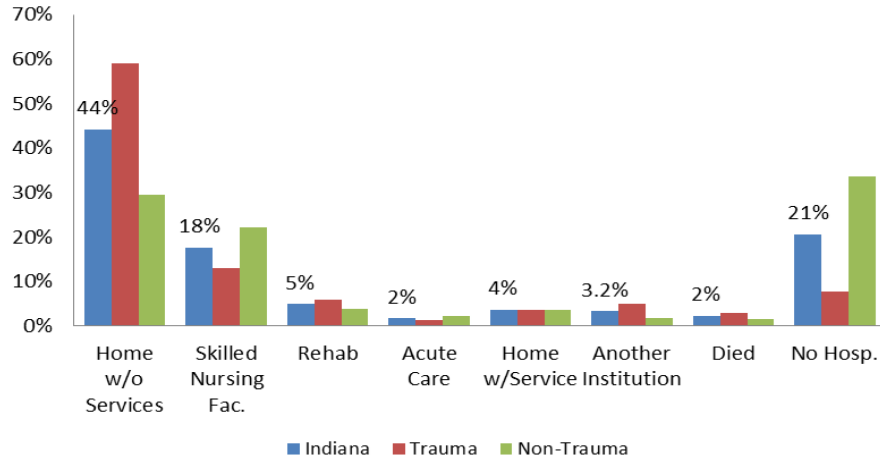
Due to the many data points required to calculate Ps, not every patient has a calculated Ps. These two graph represents 2,324 incidents with calculated Ps.

Indiana Trauma Registry

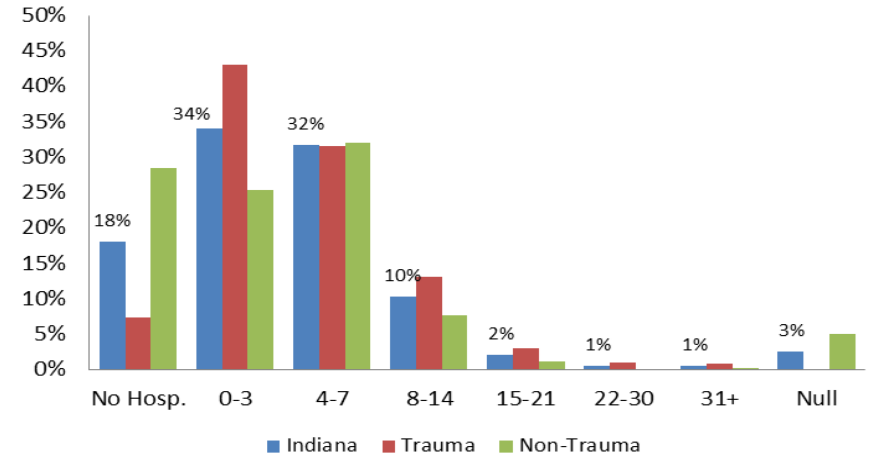
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Hospital Disposition

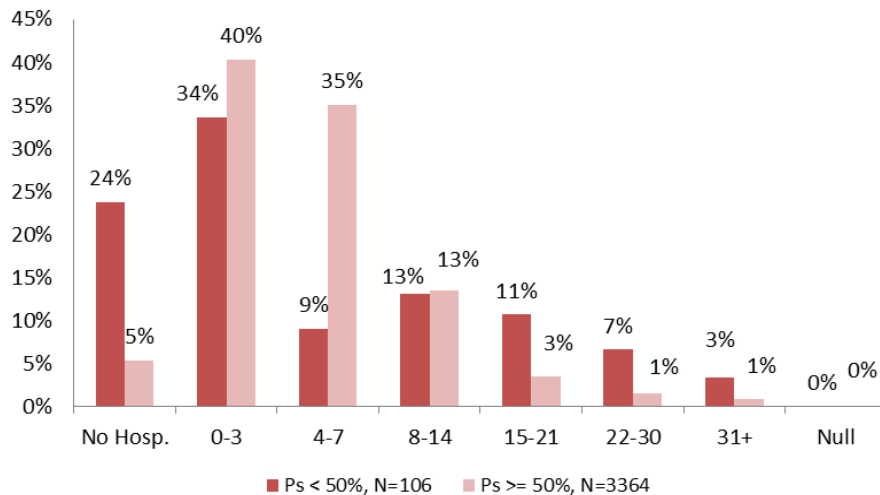


Hospital Length of Stay (days)

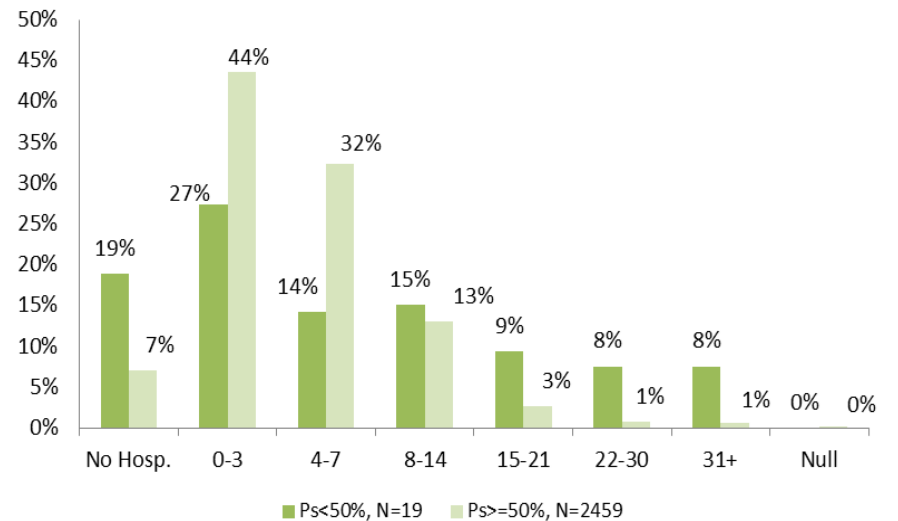


*There are new categories for the Hospital Disposition for the 2014 Data Dictionary

Hospital LOS (days) by Ps Trauma Centers



Hospital LOS (days) by Ps Non-Trauma Centers



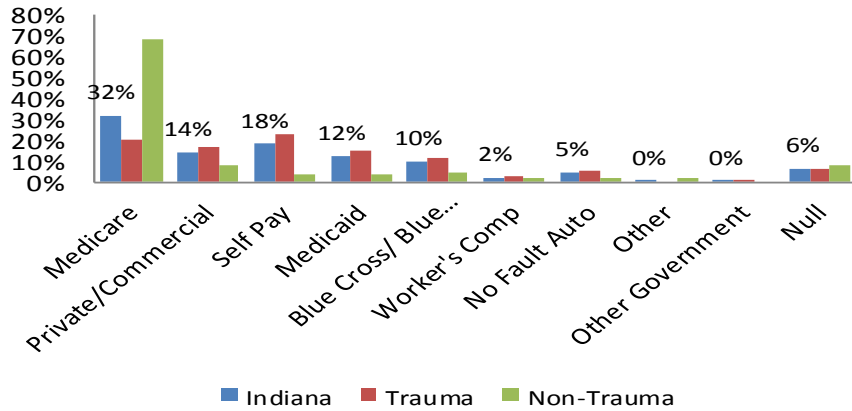
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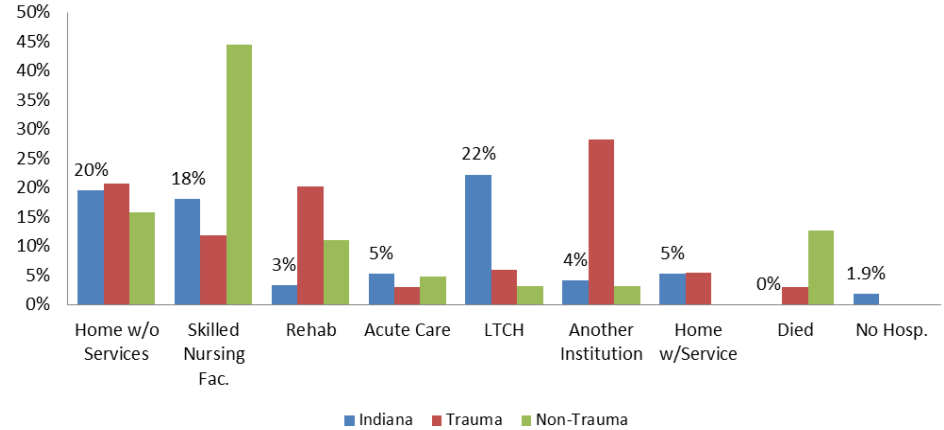
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(Non-Trauma) Hospitals: 84 facilities 50.3% of data

Hospital Length of Stay > 15 days, N=265

Primary Payer Mix

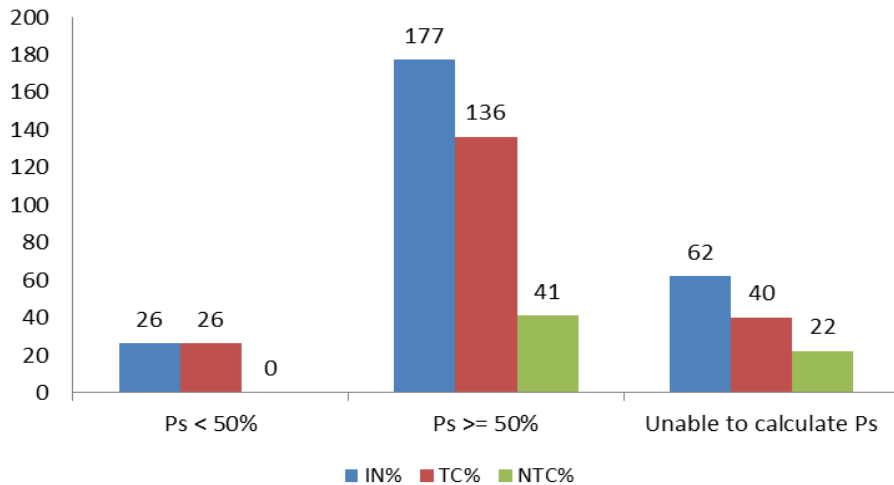


Hospital Disposition

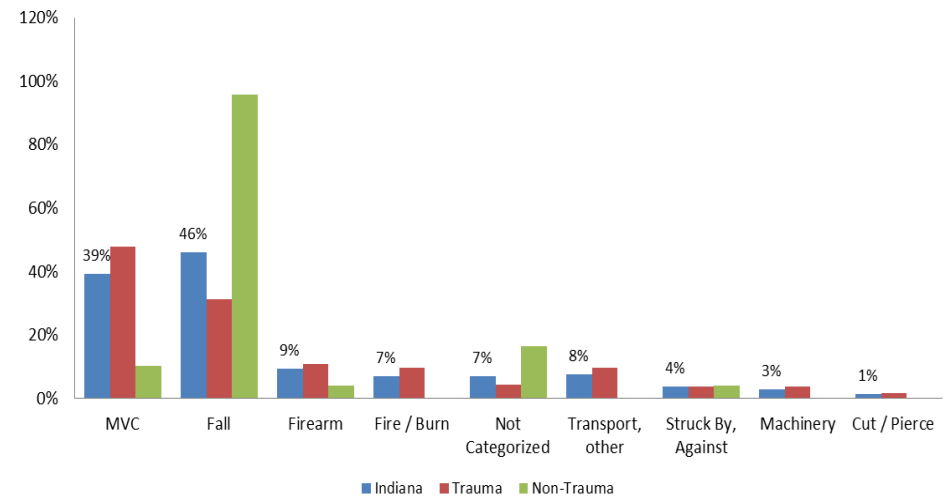


*There are new categories for the Hospital Disposition for the 2014 Data Dictionary

Probability of Survival



Cause of Injury



Indiana Trauma Registry

Statewide Quarter 2 Data Report

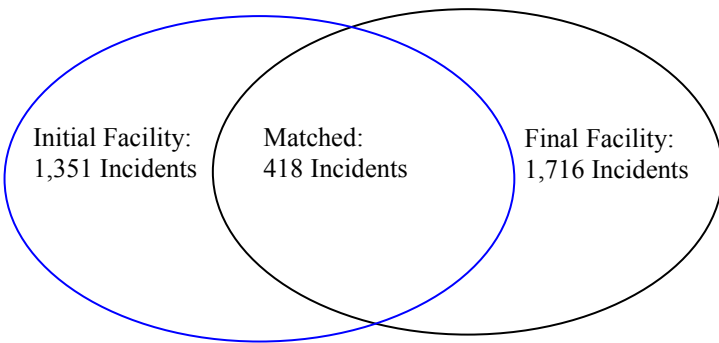
April 1, 2014 to June 30, 2014

8,272 Incidents

93 Total Hospitals Reporting

Trauma Centers: 9 facilities 49.7% of data
 (Non-Trauma) Hospitals: 84 facilities 50.3% of data

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.



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 2, 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	

Indiana Trauma Registry

Statewide Quarter 2 Data Report

April 1, 2014 to June 30, 2014

8,272 Incidents—418 Transfers

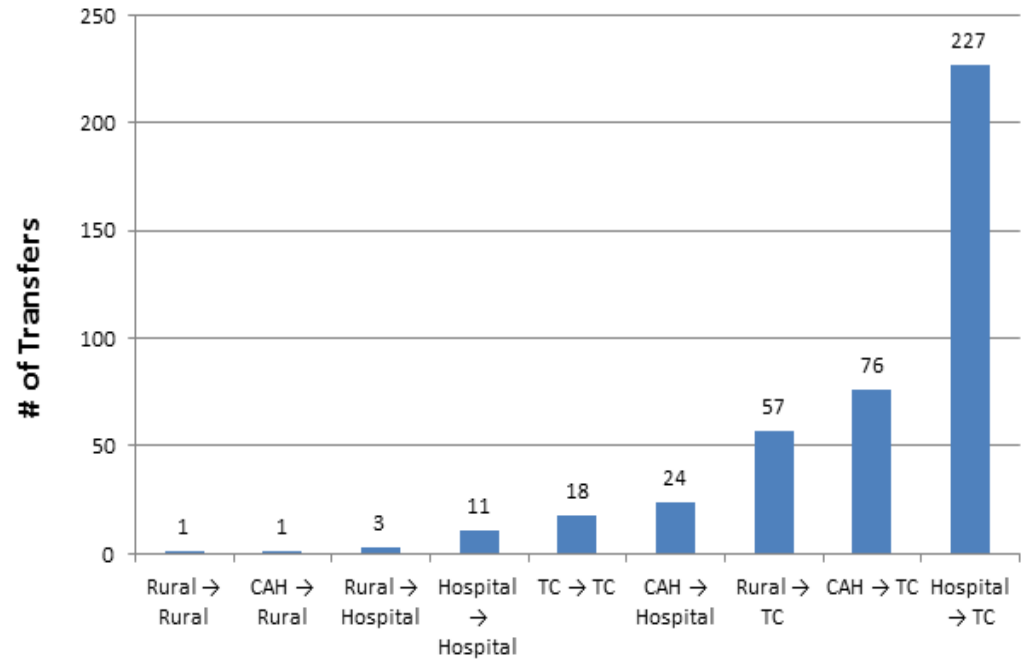
93 Total Hospitals Reporting

Trauma Centers: 9 facilities 49.7% of data
 (Non-Trauma) Hospitals: 84 facilities 50.3% of data

Facility to Facility Transfers

For Transfer Patients:		
Initial Hospital Type	Final Hospital Type	Incident Counts
Rural Hospital	Hospital	3
Rural Hospital	Rural Hospital	1
Hospital	Hospital	11
Trauma Center	Trauma Center	18
Critical Access Hospital	Rural Hospital	1
Critical Access Hospital	Hospital	24
Critical Access Hospital	Trauma Center	76
Rural Hospital	Trauma Center	57
Hospital	Trauma Center	227

Facility Transfer Type



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

*There were four hospitals deemed “in the process” trauma centers for the purposes of the triage and transport rule during Q2 2014. Because this report spans data from April 1, 2014 through June 30, 2014, and there were fewer than five hospitals with “in the process” status during the entire quarter, we cannot separate the “in the process” trauma centers from “hospitals” because of respect for patient privacy. Patients may be able to be identified due to isolating one hospital’s data.

Indiana Trauma Registry

Statewide Quarter 2 Data Report

April 1, 2014 to June 30, 2014

8,272 Incidents—418 Transfers

93 Total Hospitals Reporting

Trauma Centers:

9 facilities

49.7% of data

(Non-Trauma) Hospitals:

84 facilities

50.3% of data

For Linked Transfer Patients:

For Transfer Patients:			
	All Transfer Patients	<u>Critical*</u> Transfer Patients	<u>Physiological Critical**</u> Transfer Patients
Number of Patients	418	231	222
EMS Notified to Scene	8.5 minutes	8.1 minutes	8.2 minutes
EMS Scene Arrival to Departure	17.1 minutes	17.7 minutes	18.2 minutes
EMS Scene Departure to Initial Hospital ED Arrival	19.1 minutes	18.6 minutes	19.2 minutes
Initial Hospital ED Arrival to Departure	3 hours	2 hours 56 minutes	2 hours 56 minutes
Initial Hospital ED Departure to Final Hospital ED Arrival	1 hour 31 minutes	1 hour 26 minutes	1 hour 22 minutes
TOTAL TIME	5 hours 16 minutes	5 hours 6 minutes	5 hours 4 minutes

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

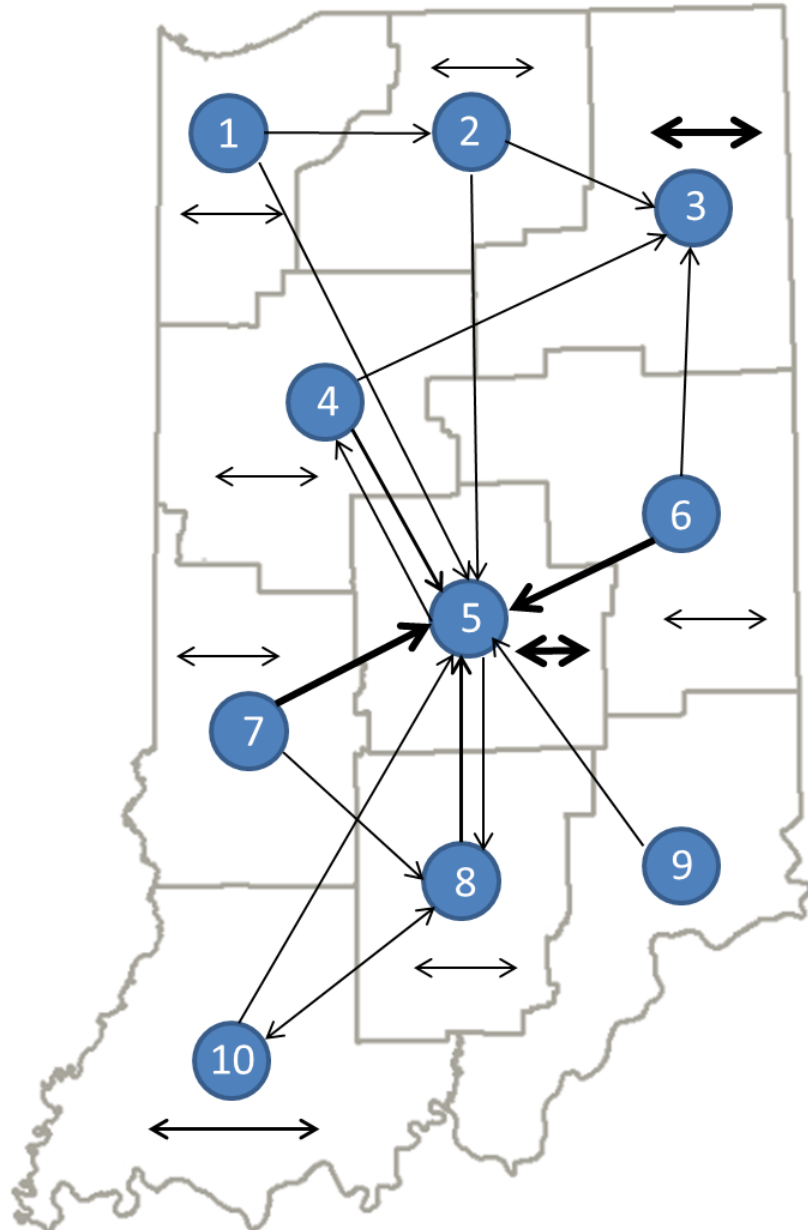
**Physiological Critical Transfer patient is defined as having a Shock Index $>$ 0.9 OR GCS \leq 12 at the initial hospital.

Indiana Trauma Registry

Statewide Quarter 2 Data Report

April 1, 2014 to June 30, 2014

8,272 Incidents—418 Transfers



*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 Public Health Preparedness District, not of a specific hospital or county.

For Transfer Patients:

Public Health Preparedness District Initial Hospital	Public Health Preparedness District Final Hospital	Incident Counts
1	1	7
1	2	5
1	5	3
2	2	6
2	3	9
2	5	6
3	3	64
4	3	1
4	4	4
4	5	34
5	4	1
5	5	62
5	8	1
6	3	11
6	5	58
6	6	2
7	5	60
7	7	8
7	8	3
8	5	20
8	8	9
8	10	1
9	5	1
10	5	5
10	8	1
10	10	36

Indiana Trauma Registry

Statewide Quarter 2 Data Report

April 1, 2014 to June 30, 2014

8,272 Incidents—418 Transfers

88 Total Hospitals Reporting

Trauma Centers:	9 facilities	47.03% of data
(Non-Trauma) Hospitals:	79 facilities	52.97% of data

For Linked Transfer Patients:

For Transfer Patients:			
	All Transfer Patients	<u>Critical*</u> Transfer Patients	<u>Physiological Critical**</u> Transfer Patients
Number of Patients	418	404	401
Total Time	5 hours 16 minutes	5 hours 6 minutes	5 hours 4 minutes
Total Mileage	61.2	60.8	60.5
Injury Scene to Initial Hospital Mileage***	8.5	8.6	8.6
Initial Facility to Final Facility Mileage	52.7	51.9	51.9

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	8.5	52.7	61.2	335	83
North Region	8.7	42.9	51.6	140	22
Central Region	8.3	58.0	66.3	98	40
South Region	8.6	60.0	68.6	97	21

*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.

***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 2 Data Report

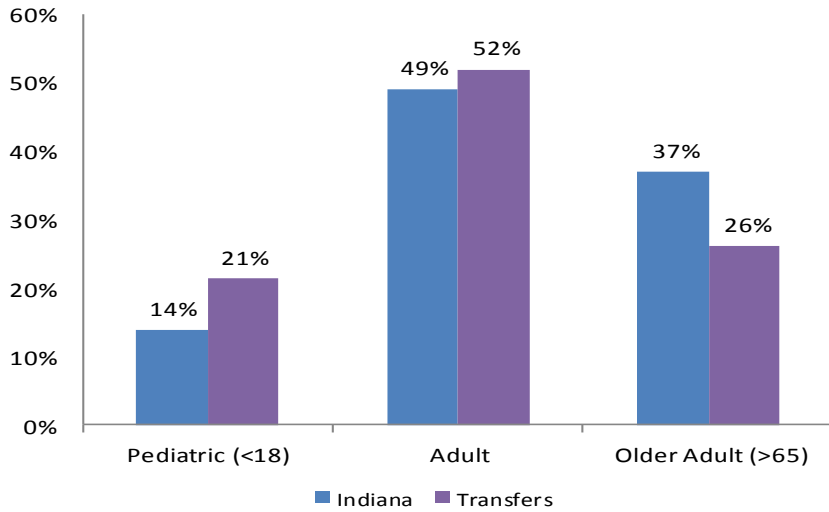
April 1, 2014 to June 30, 2014

8,272 Incidents—418 Transfers

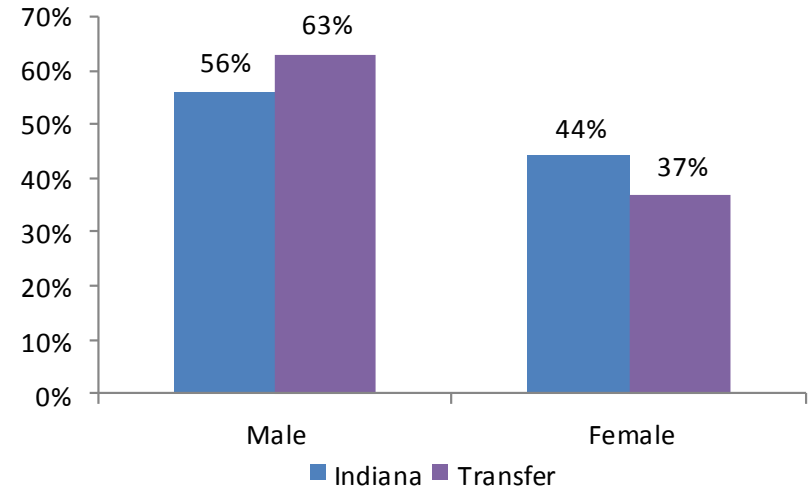
93 Total Hospitals Reporting

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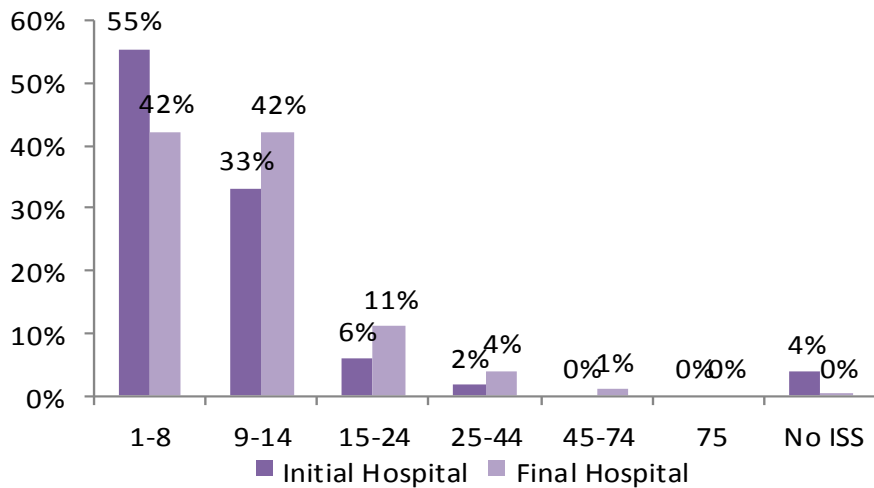
Patient Age Groupings



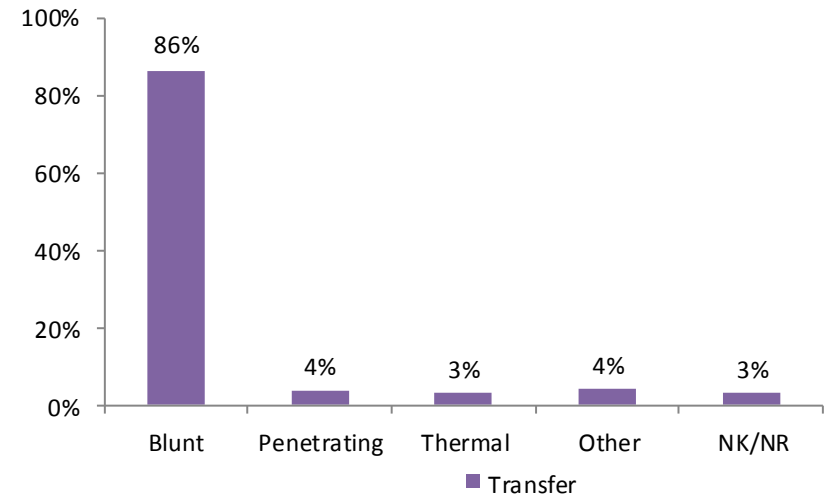
Patient Gender



Injury Severity Score (ISS)



Trauma Type- Final Hospital



Indiana Trauma Registry

Statewide Quarter 2 Data Report

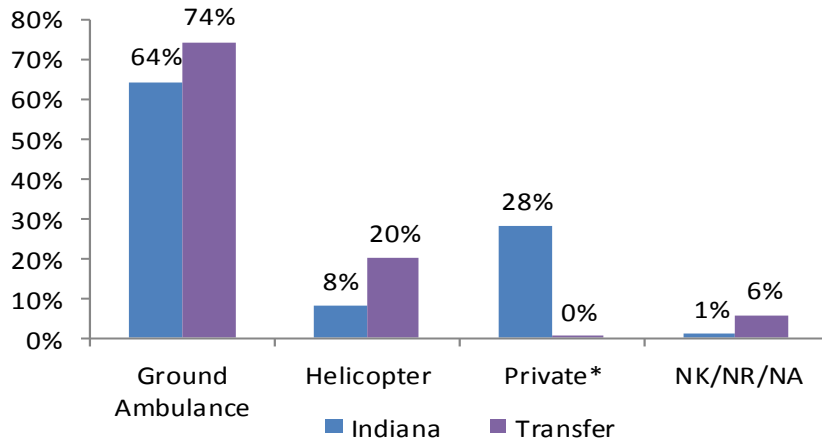
April 1, 2014 to June 30, 2014

8,272 Incidents—418 Transfers

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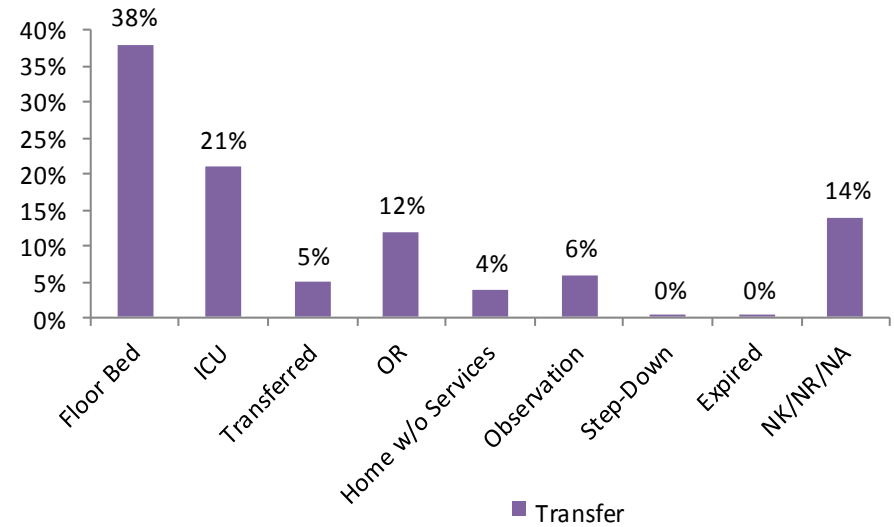
Transport Mode— Final Hospital



<1% Transport Mode: Police, Other

* Indicates Private/ Public Vehicle, Walk-in

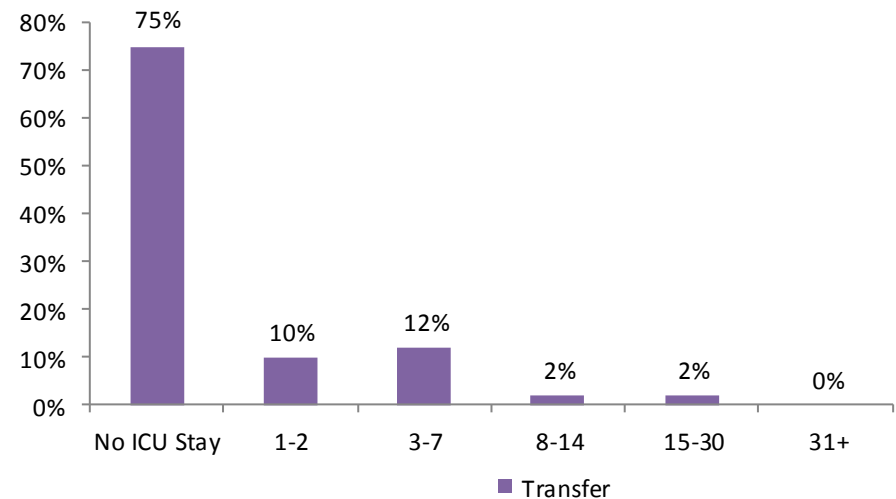
ED Disposition by Percentage- Final Hospital



ED Length of Stay (hours)- Final Hospital



ICU Length of Stay (days)- Final Hospital



Indiana Trauma Registry

Statewide Quarter 2 Data Report

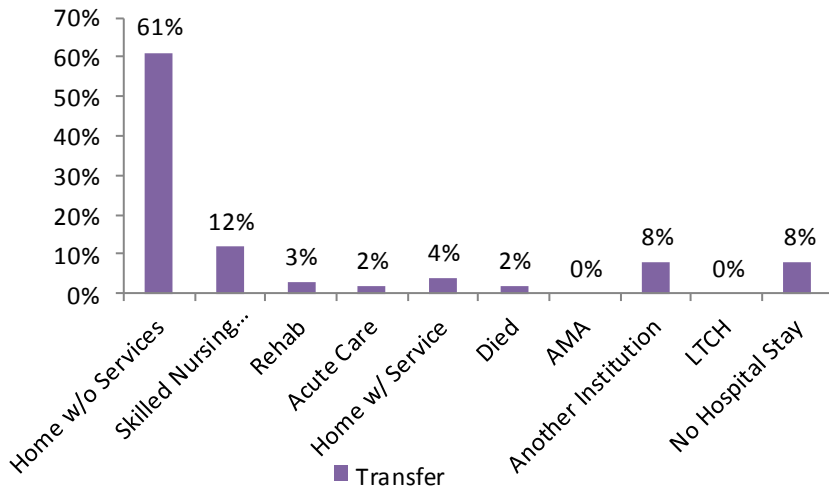
April 1, 2014 to June 30, 2014

8,272 Incidents—418 Transfers

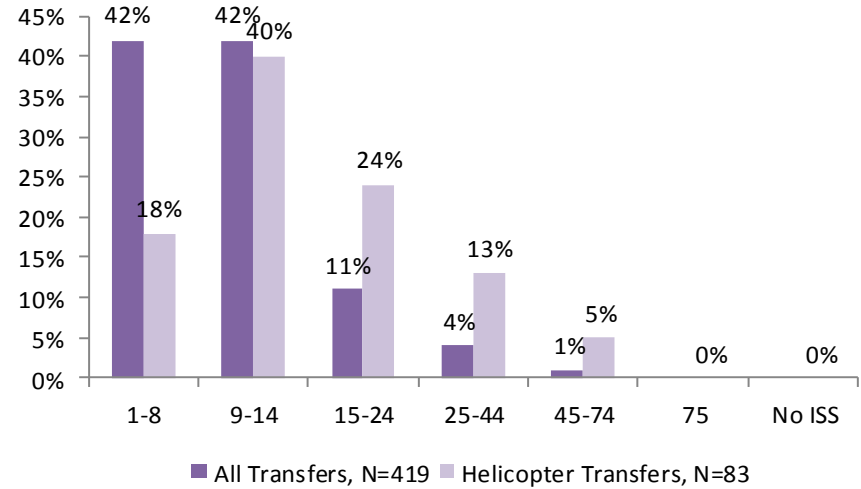
93 Total Hospitals Reporting

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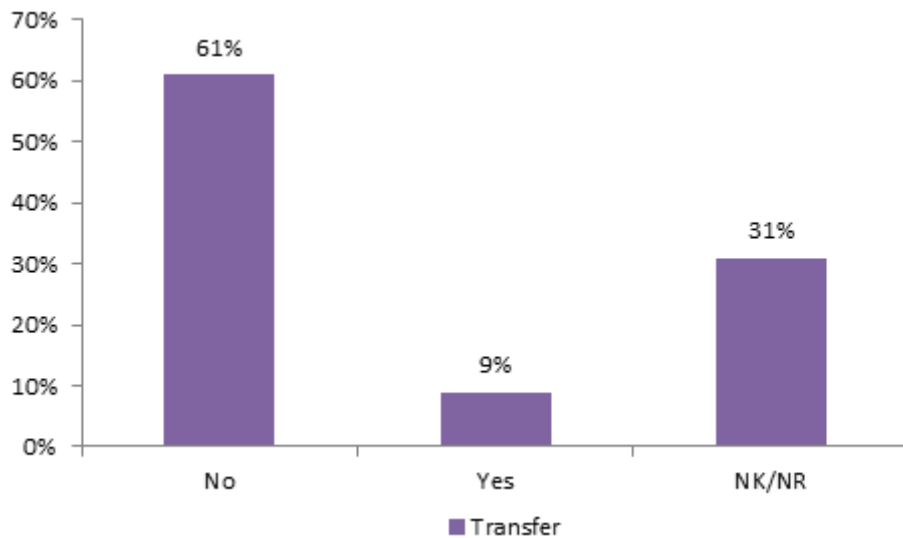
Discharge Disposition— Final Hospital



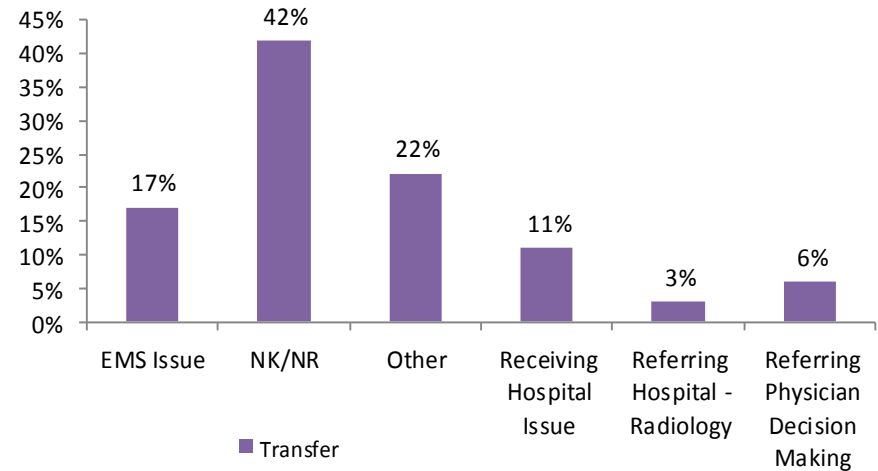
Helicopter Transfers by ISS— Final Hospital



Transfer Delay Indicated- Initial Hospital



Initial Facility Transfer Delay Reason - Initial Hospital



Indiana Trauma Registry

Statewide Quarter 2 Data Report

April 1, 2014 to June 30, 2014

8,272 Incidents

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ED Length of Stay

ED Length of Stay (minutes)			
	Indiana Average	Trauma Center	Non-Trauma Center
N=	7481	3901	3580
Average	232	222.4	242.4
Std. Deviation	177.8	162.3	192.7
Minimum	2	2	3
Quartile 1	137	126	146
Median	198	189	205
Quartile 3	283	278	288
Maximum	2174	2174	2164

ED Disposition

ED Disposition (count)			
	Indiana	Trauma Center	Non-Trauma Center
Floor Bed	3638	1893	1745
ICU	1165	988	177
Transferred	1395	97	1298
OR	677	495	182
Home w/o Services	214	160	54
Observation	399	215	184
Step-Down	240	41	199
Expired	53	34	19
AMA	5	5	0
Home W/ Services	4	2	2
Other	12	9	3
NK/NR/NA	470	175	295

ED Length of Stay by ISS

ED Length of Stay (minutes)						
ISS Category	Indiana Average	Indiana Average	Trauma Center	Trauma Center	Non-Trauma Center	Non-Trauma Center
	Counts	Minutes	Counts	Minutes	Counts	Minutes
1-8	3762	243.5	1829	238.2	1993	248.4
9-14	2588	230.4	1317	224.2	1271	236.9
15-24	553	198.8	450	198.3	103	201
25-44	316	160.1	264	157.8	52	172.1
45-74	30	157	28	158.4	2	137
75	11	72.5	10	78.3	1	15
No ISS	221	258.7	3	203.7	218	259.5

*A bar graph of ED Disposition is found on page 4.

*A bar graph of ED Length of Stay is found on page 4.

*A Box and Whisker plot of ED LOS is found on page 5.

*A Box and Whisker plot of ED Length of Stay by ISS is found on page 14.

Indiana Trauma Registry

Statewide Quarter 2 Data Report

April 1, 2014 to June 30, 2014

8,272 Incidents

93 Total Hospitals Reporting

Trauma Centers: 9 facilities 49.7% of data
 (Non-Trauma) Hospitals: 84 facilities 50.3% of data

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	1873	287	810	318	295	159	151	197	12	12	4	3	4121
9-14	1487	393	428	211	87	142	72	15	7	0	1	1	2844
15-24	136	278	68	58	10	11	10	0	7	0	0	0	578
25-44	30	178	25	73	2	8	1	0	18	0	0	0	335
45-74	1	15	0	13	0	0	0	0	2	0	0	0	31
75	0	4	0	1	0	0	0	0	6	0	0	0	11
NO ISS	111	10	64	3	5	150	6	2	1	0	0	0	352
Total	3638	1165	1395	677	399	470	240	214	53	12	5	4	8272

*Bar graph of ED Disposition by ISS is found on page 15.

Indiana State Department of Health Indiana Trauma Registry

Hospitals Reporting Trauma Data
Quarter 2, 2014

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

"In the Process" Hospital*

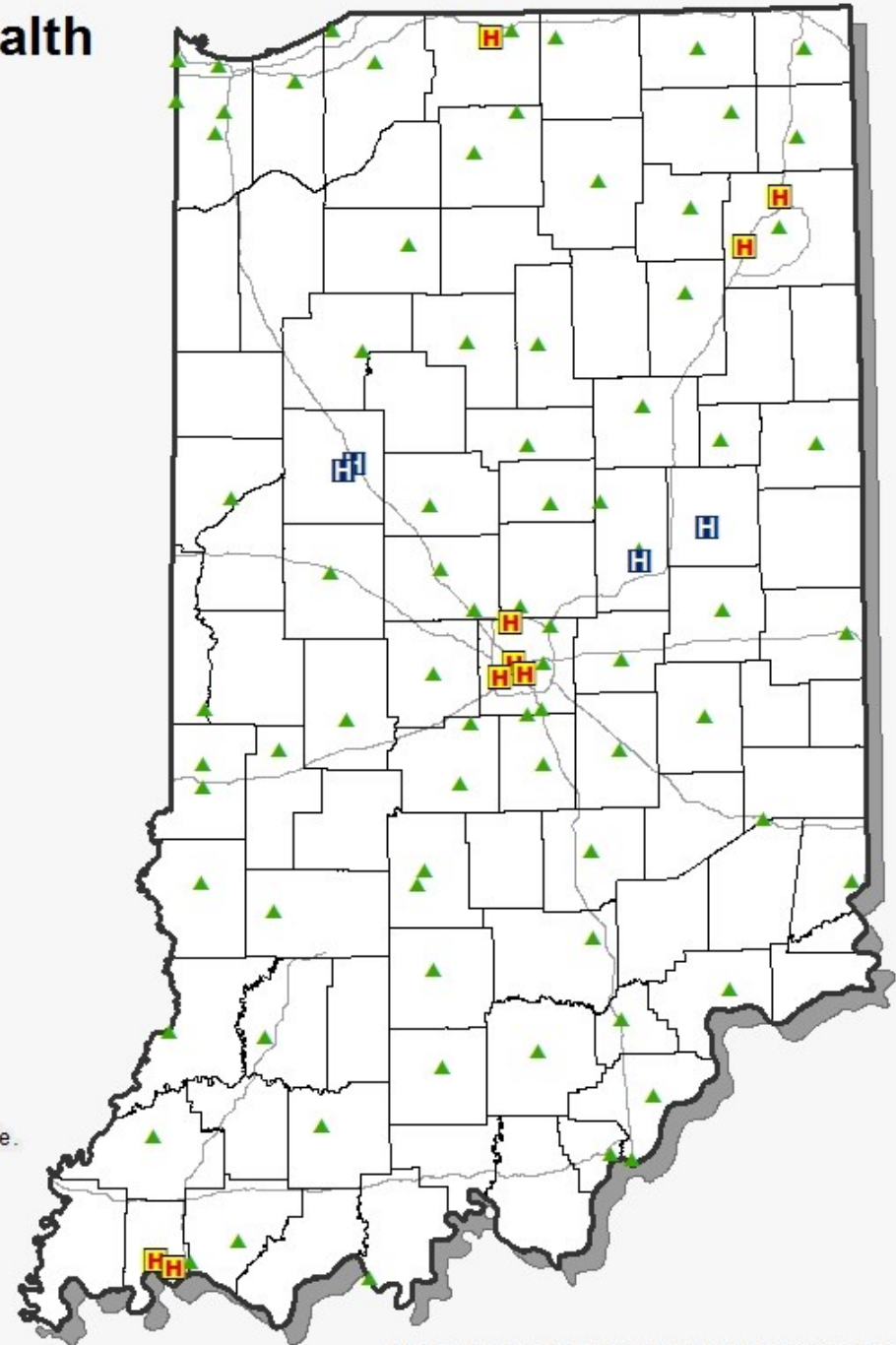
IU Health - Arnett Hospital
IU Health - Ball Memorial Hospital
St. Elizabeth East Hospital
St. Vincent Anderson Hospital

Non-Trauma Hospitals

80 Non-Trauma Hospitals

Quarter 2 2014
April 1- June 30, 2014

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



Map Author: ISDH ERC PHG and ISDH Trauma & Injury Prevention - October, 2014

Indiana Trauma Registry

Statewide Quarter 2 Data Report

April 1, 2014 to June 30, 2014

8,272 Incidents

93 Total Hospitals Reporting

Trauma Centers:	9 facilities	49.7% of data
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Requests and Changes to the Report from Trauma Care Committee members at the August 2014 ISTCC Meeting:

General Report:

- We are continuing to track the number of cases that fell into the ED LOS >12 hours category, which is on page 4.
- A map of all reporting hospitals is found on page 34. Note there were four “in the process” facility during Quarter 2, 2014.
- Average ED LOS by district may be found on pages 17 and 18. ED LOS is split out into transfers and critical transfers.
- We did not observe any cases with Ps \geq 50% and ED Disposition of expired. We recognized the suggestion of the Trauma Care Committee and will reconsider the suggestions at the previous meeting for the next report should there be cases next quarter with this case criteria.

Transfer data:

-At the time this report was created, there were four hospitals deemed “in the process” trauma centers for the purposes of the triage and transport rule. Because this report spans data from April 1—June 30, 2014, and there were fewer than 5 hospitals with “in the process” status during the entire quarter, we cannot separate the “in the process” trauma center into its own column due to patient privacy. We were also unable to tease out “in the process” centers from hospitals on page 21 because of the same issue. Patients may be able to be identified due to isolation of one hospital’s data. We recognized the suggestion of the Trauma Care Committee and will reconsider the idea for the next report.

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.

