

Indiana Trauma Registry

Statewide Quarter 3 Data Report

July 1, 2018—September 30, 2018

10,646 Incidents

108 Total Hospitals Reporting

Level I and II:	10 facilities	47.6% of data
Level III:	13 facilities	19.9% of data
(Non-Trauma) Hospitals:	85 facilities	32.5% of data

For Quarter 3 2018 which spanned from July 1, 2018—September 30, 2018 there were 10,646 incidents reported to the Indiana Trauma Registry at the Indiana State Department of Health. There were 108 hospitals that reported data, of which 10 were level I or II trauma centers, 13 were level III trauma centers and 85 were non-trauma centers. There were 8 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. A map of the state with the reporting hospitals can be found on page 11. Trauma centers represented 67.5% of the data. There were 3,625 incidents reported for July, 3,604 reported for August, and 3,417 incidents reported for September.

The content of this report has changed due to suggestions and additions requested by the Indiana State Trauma Care Committee at the August 17, 2018 meeting. Explanations of the changes requested and adapted from the ISTCC meeting can be found on page 12.

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.**

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-10-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.

Formulas:

Acronyms:

ED: Emergency Department	MVC: Motor Vehicle Collision
ICU: Intensive Care Unit	OR: Operating Room
ISS: Injury Severity Score	Ps: Probability of Survival
LOS: Length of Stay	Level I, II and III: Verified and In Process Trauma Centers
NTC: Non-trauma Center	CAHs: Critical Access Hospital

Calculations:

$$P_s = 1/(1+e^{-b}) \text{ where } b=b_0+b_1(RTS) + b_2(ISS) + b_3(\text{Age Index})$$

$$\text{Total GCS} = \text{Verbal GCS} + \text{Motor GCS} + \text{Eye GCS}$$

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

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

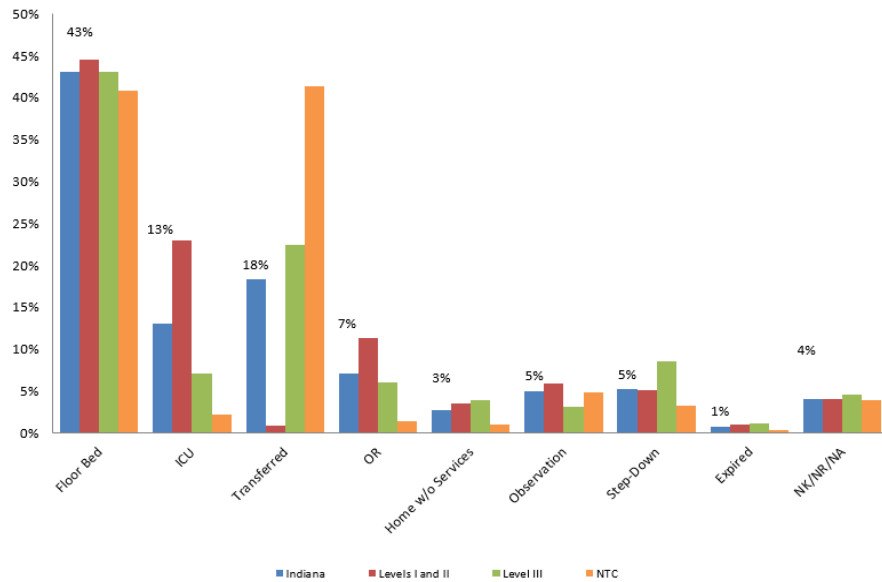


Indiana Trauma Registry

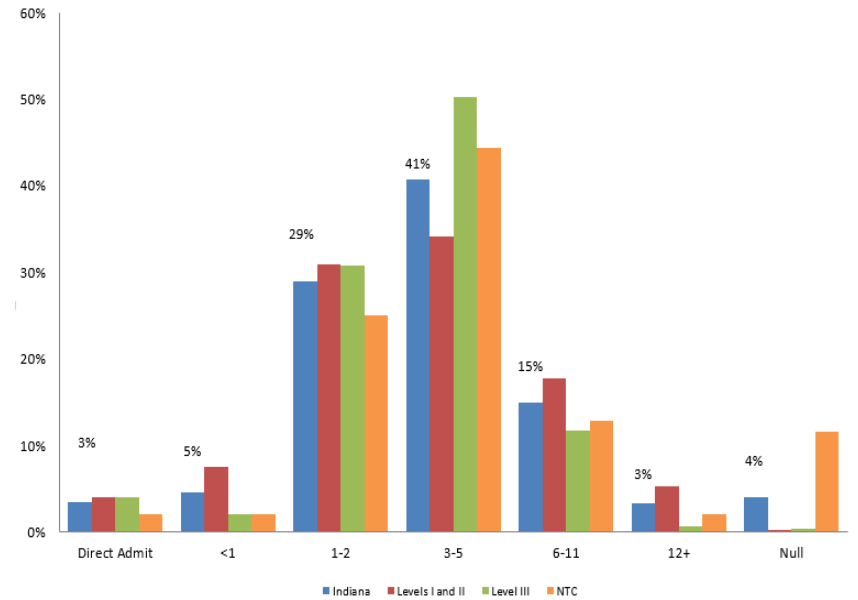
Statewide Quarter 3 Data Report
July 1, 2018—September 30, 2018
10,646 Incidents

108 Total Hospitals Reporting
 Level I and II: 10 facilities 47.6% of data
 Level III: 13 facilities 19.9% of data
 (Non-Trauma) Hospitals: 85 facilities 32.5% of data

ED Disposition by Percentage



ED Length of Stay (Hours)



Indiana Trauma Registry

Statewide Quarter 3 Data Report

July 1, 2018—September 30, 2018

10,646 Incidents

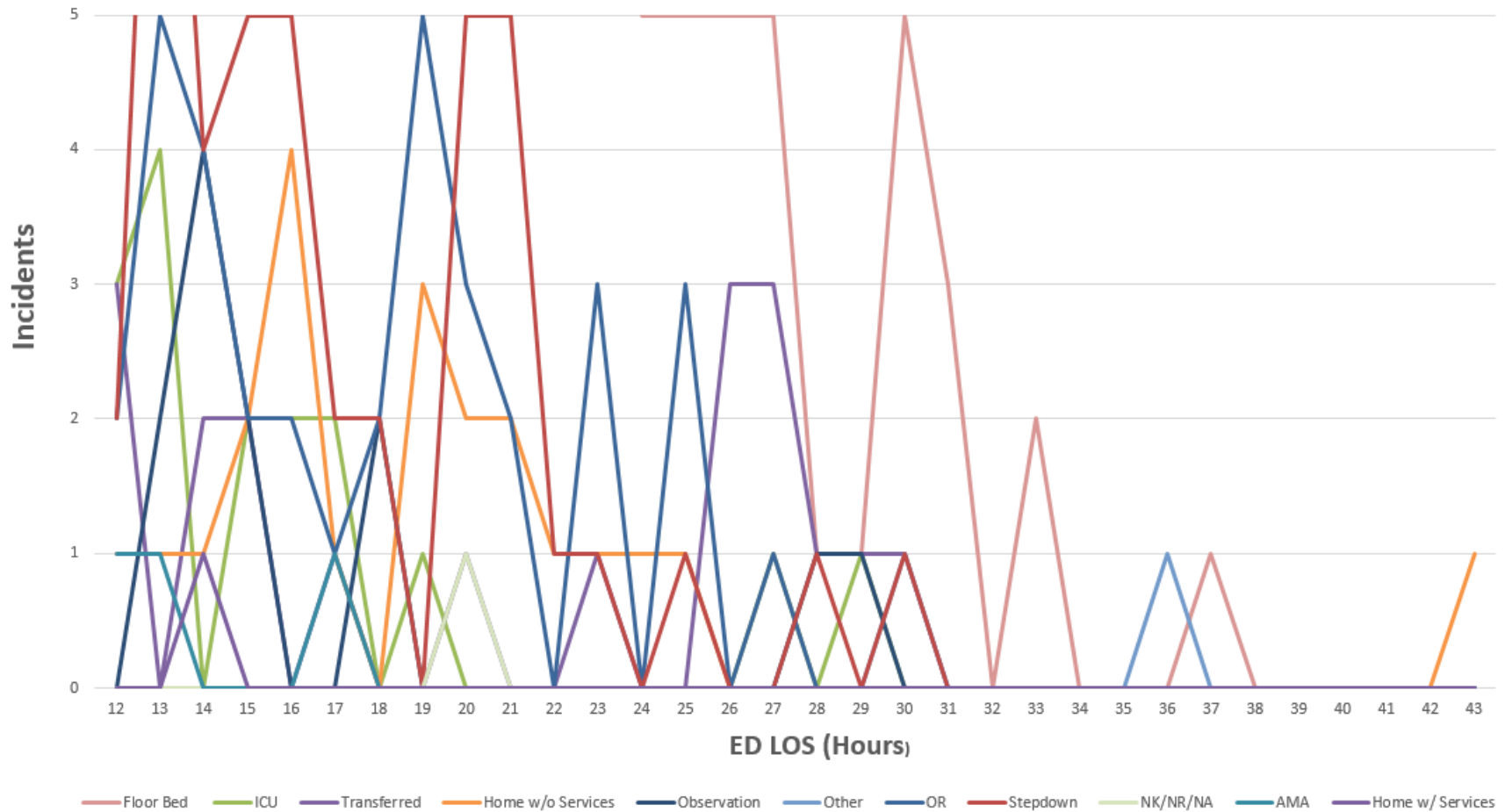
108 Total Hospitals Reporting

Level I and II: 10 facilities 47.6% of data

Level III: 13 facilities 19.9% of data

(Non-Trauma) Hospitals: 85 facilities 32.5% of data

ED Disposition for ED LOS >12 Hours



N=353

*No cases expired

Indiana Trauma Registry

Statewide Quarter 3 Data Report

July 1, 2018—September 30, 2018

10,646 Incidents

108 Total Hospitals Reporting

Level I and II:	10 facilities	47.6% of data
Level III:	13 facilities	19.9% of data
(Non-Trauma) Hospitals:	85 facilities	32.5% of data

ED LOS > 12 Hours, N=353

Facilities	268 Level I and II 13 Level III 72 Non-trauma Centers	Region	86 North; 170 Central; 28 South; 69 Unknown/Out of State
Average Distance from Scene to Facility	22.71 Miles	ISS	163 (1-8 cat); 141 (9-15 cat); 31 (16-24), 5 (25-44), 13 (No ISS)
Transport Type	279 Ambulance, 58 Private; 2 Police; 14 Other	GCS Motor	1 (category 4); 130 (category 6); 18 (Unknown); 204 (Missing)
Cause of Injury	5 Cut/Pierce; 173 Fall; 1 Fire; 9 Fire-arm; 6 Machinery; 104 Transportation; 2 Natural; 33 Struck by/Against; 8 Other specified; 12 Other	RTS—Systolic	1 (category 2); 2 (category 2); 331 (category 4); 19 (Unknown)
Signs of Life	352 Yes; 1 No	RTS—Resp. Scale	1 (category 0); 320 (category 3); 8 (category 4); 24 (Unknown)
Age	56.4 Years (5-96 Years)	Resp. Assistance	4 Yes; 328 No; 21 Unknown
Gender	157 Female; 196 Male	ED LOS Hours	18 (12-42)
Interfacility Transfer	260 No; 93 Yes	ED Disposition	3 AMA; 198 Floor bed; Home w/ Services; 22 Home w/o Services; 16 ICU; 1 Unknown; 12 Observation; 35 OR; 2 Other; 44 Telemetry; 19 Transferred

-Region was created from injury zip code. Missing = no injury zip or injury zip from out of state.

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

-No signs of life is defined as having none of the following: organized EKG activity, papillary responses, spontaneous respiratory attempts or movement, and unassisted blood pressure. This usually implies the patient was brought to the ED with CPR in progress (2018 Trauma Registry Data Dictionary, page 207).

Indiana Trauma Registry

Statewide Quarter 3 Data Report

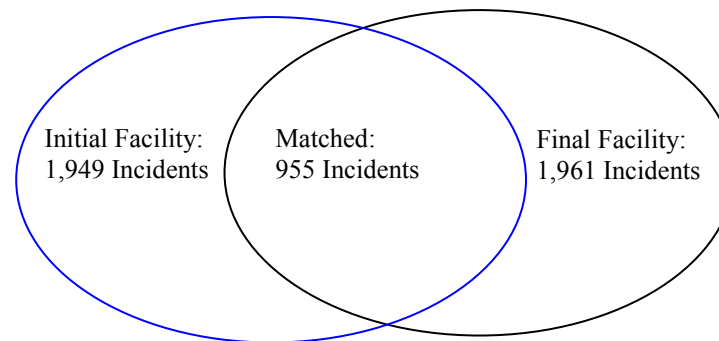
July 1, 2018—September 30, 2018

10,646 Incidents

108 Total Hospitals Reporting

Level I and II:	10 facilities	47.6% of data
Level III:	13 facilities	19.9% of data
(Non-Trauma) Hospitals:	85 facilities	32.5% of data

For Quarter 3 2018 of the 10,646 incidents reported to the Indiana Trauma Registry, 1,949 cases that had an ED Disposition of “Transferred to another acute care facility” at the initial facility and 1961 had the Inter-Facility Transfer equal to “Yes” at the Trauma Center. Of those transferred, 714 cases were probabilistically matched. The linked cases make up 24% of the Q3 2018 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.

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 Trauma Registry

Statewide Quarter 3 Data Report

July 1, 2018—September 30, 2018

10,646 Incidents

108 Total Hospitals Reporting

Level I and II:

10 facilities

47.6% of data

Level III:

13 facilities

19.9% of data

(Non-Trauma) Hospitals:

85 facilities

32.5% of data

For Linked Transfer Patients:

For Transfer Patients:				
	All Transfer Patients	Critical*	Physiological Critical**	ISS Critical***
Number of Patients	955	402	325	116
EMS Notified to Scene	9.8 minutes	8.9 minutes	8.4 minutes	10.3 minutes
EMS Scene Arrival to Departure	16.1 minutes	16.1 minutes	16 minutes	16.8 minutes
EMS Scene Departure to Initial Hospital ED Arrival	18.3 minutes	17.5 minutes	16.7 minutes	18.9 minutes
Initial Hospital ED Arrival to Departure	2 hours 11.8 minutes	2 hours 7.7 minutes	2 hours 6.1 minutes	2 hours 8.9 minutes
Initial Hospital ED Departure to Final Hospital ED Arrival	2 hours 0.7 minutes	2 hours 1.8 minutes	2 hours 5.6 minutes	1 hour 53.7 minutes
TOTAL TIME	4 hours 56.7 minutes	4 hours 52 minutes	4 hours 52.8 minutes	4 hours 48.6 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 at the initial hospital

Indiana Trauma Registry

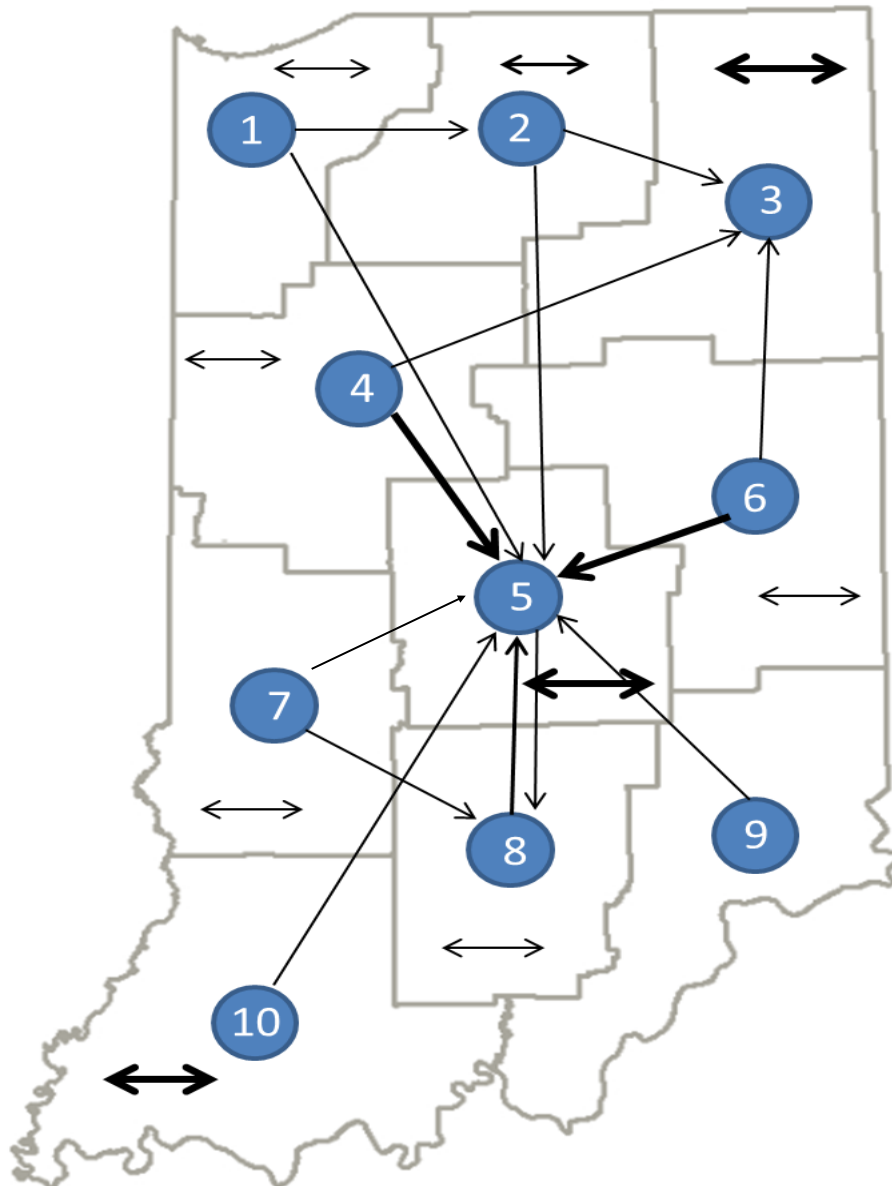
Statewide Quarter 3 Data Report

July 1, 2018—September 30, 2018

10,646 Incidents

108 Total Hospitals Reporting

Level I and II:	10 facilities	47.6% of data
Level III:	13 facilities	19.9% of data
(Non-Trauma) Hospitals:	85 facilities	32.5% of data



For Transfer Patients:		
Public Health Preparedness District Initial Hospital	Public Health Preparedness District Final Hospital	Incident Counts
1	1	8
1	2	33
1	5	10
2	2	11
2	5	11
3	2	2
3	3	155
3	5	4
4	4	22
4	5	66
5	5	209
6	3	15
6	5	134
6	6	7
7	5	39
7	7	28
8	5	63
8	8	12
9	5	6
10	5	8
10	10	112

*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.

Indiana Trauma Registry

Statewide Quarter 3 Data Report

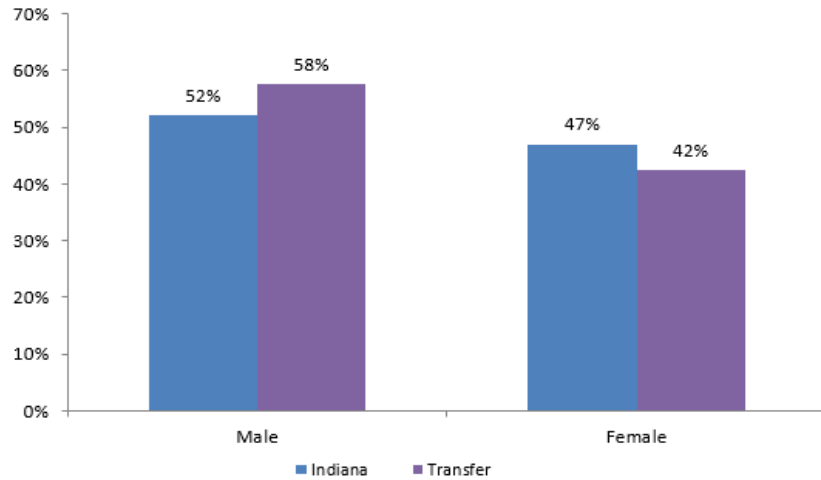
July 1, 2018—September 30, 2018

10,646 Incidents

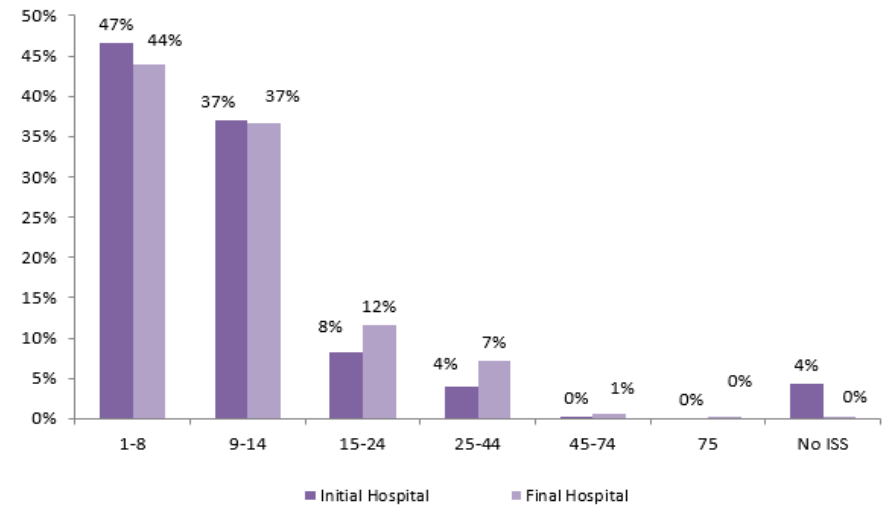
108 Total Hospitals Reporting

Level I and II:	10 facilities	47.6% of data
Level III:	13 facilities	19.9% of data
(Non-Trauma) Hospitals:	85 facilities	32.5% of data

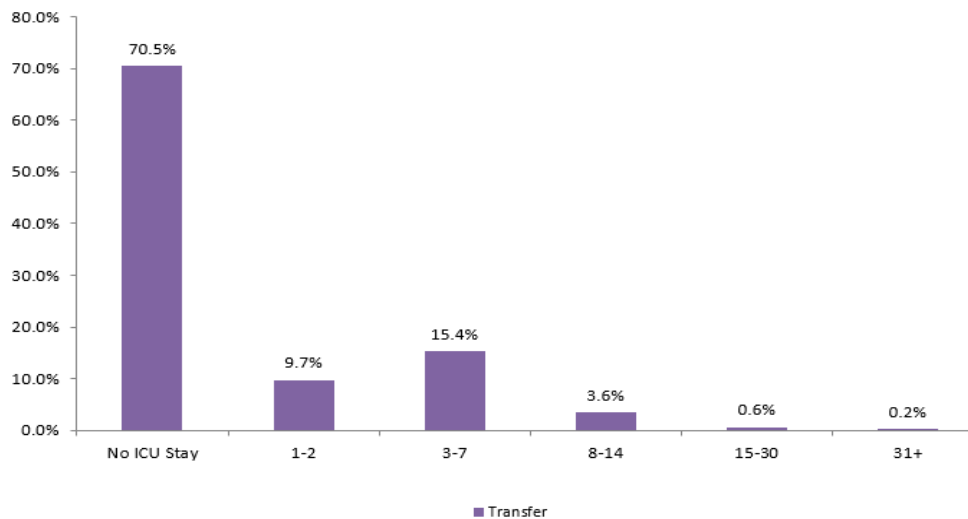
Patient Gender



Injury Severity Score (ISS)



ICU Length of Stay (days)- Final Hospital



Indiana Trauma Registry

Statewide Quarter 3 Data Report

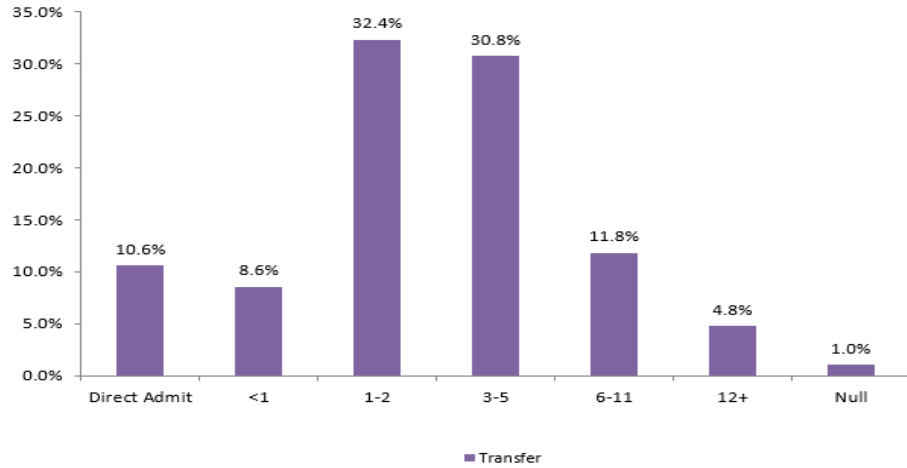
July 1, 2018—September 30, 2018

10,646 Incidents

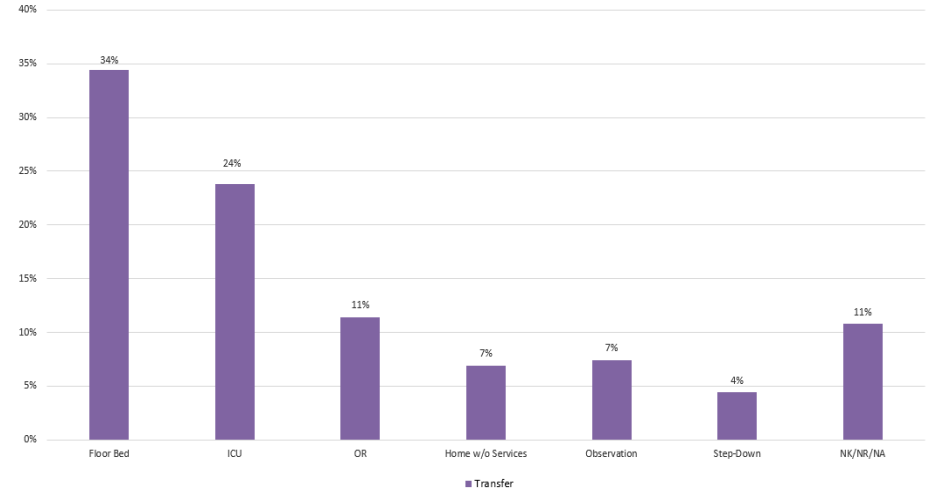
108 Total Hospitals Reporting

Level I and II:	10 facilities	47.6% of data
Level III:	13 facilities	19.9% of data
(Non-Trauma) Hospitals:	85 facilities	32.5% of data

ED Length of Stay (hours)- Final Hospital

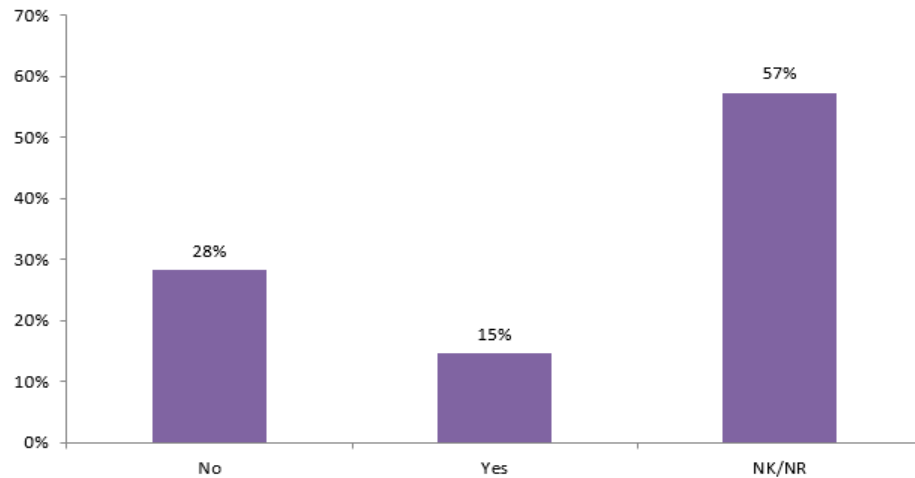


ED Disposition by Percentage- Final Hospital

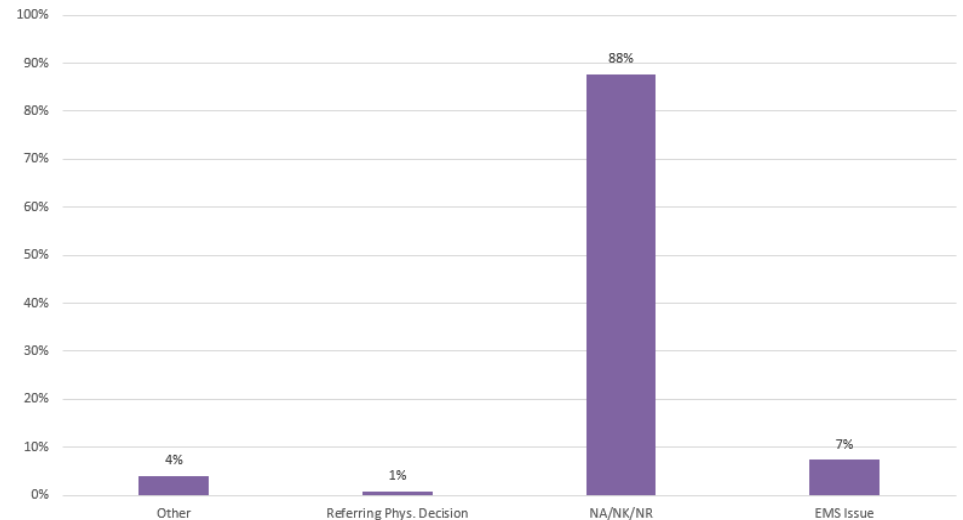


<1% : Expired, Other, Expired, AMA, and Transferred

Transfer Delay Indicated- Initial Hospital



Initial Facility Transfer Delay Reason



Indiana Trauma Registry

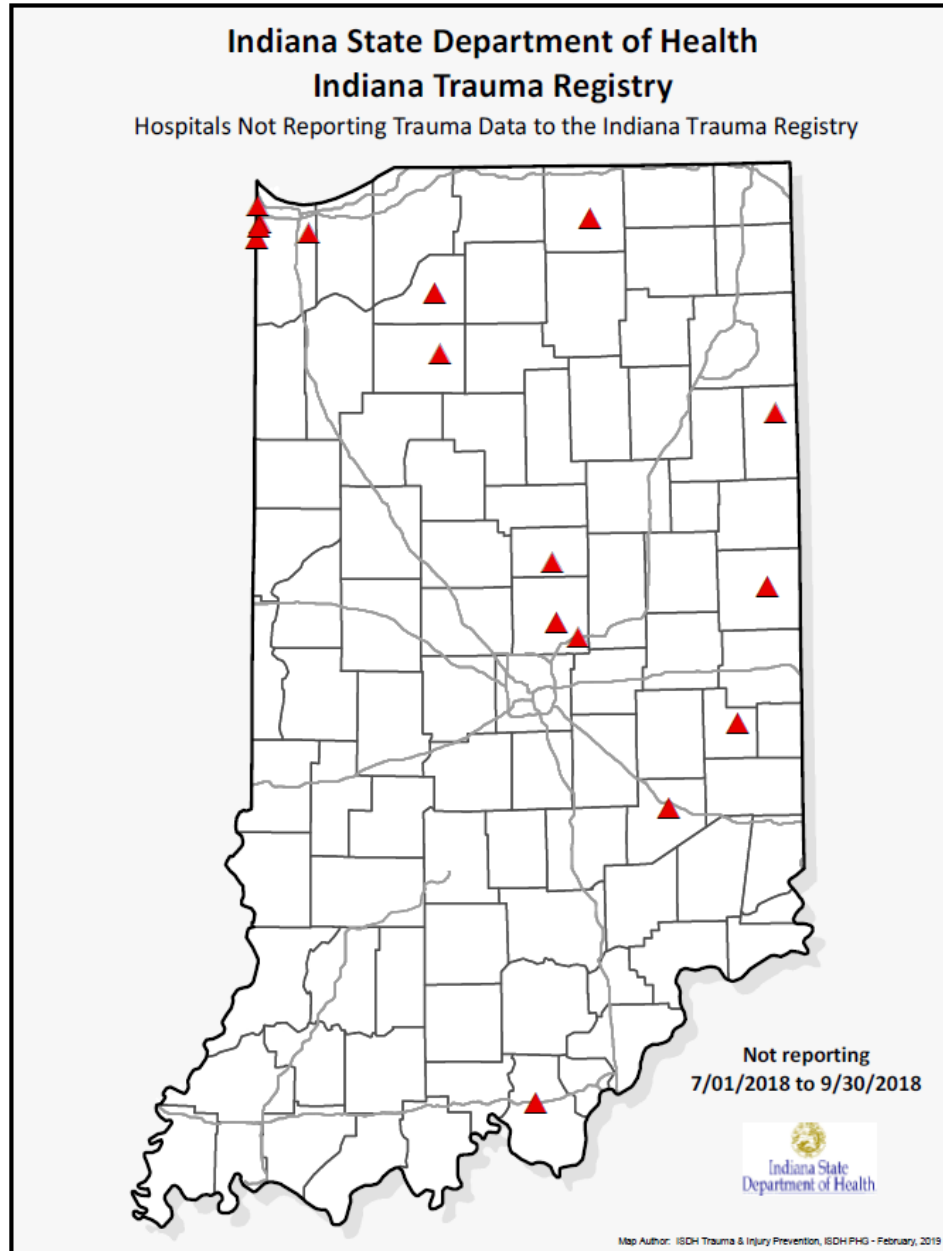
Statewide Quarter 3 Data Report

July 1, 2018—September 30, 2018

10,646 Incidents

108 Total Hospitals Reporting

Level I and II:	10 facilities	47.6% of data
Level III:	13 facilities	19.9% of data
(Non-Trauma) Hospitals:	85 facilities	32.5% of data



Hospital that did not report during Q3 2018:

- Adams Memorial Hospital
- Decatur County Memorial
- Fayette Regional Health
- Goshen Hospital
- Harrison County Hospital
- IU Health—Jay
- Pulaski Memorial
- Riverview Health

Indiana State Department of Health Indiana Trauma Registry

Hospitals Reporting Trauma Data Quarter 3
July 1, 2018 to September 30, 2018

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 & Health Services
Terre Haute Regional Hospital

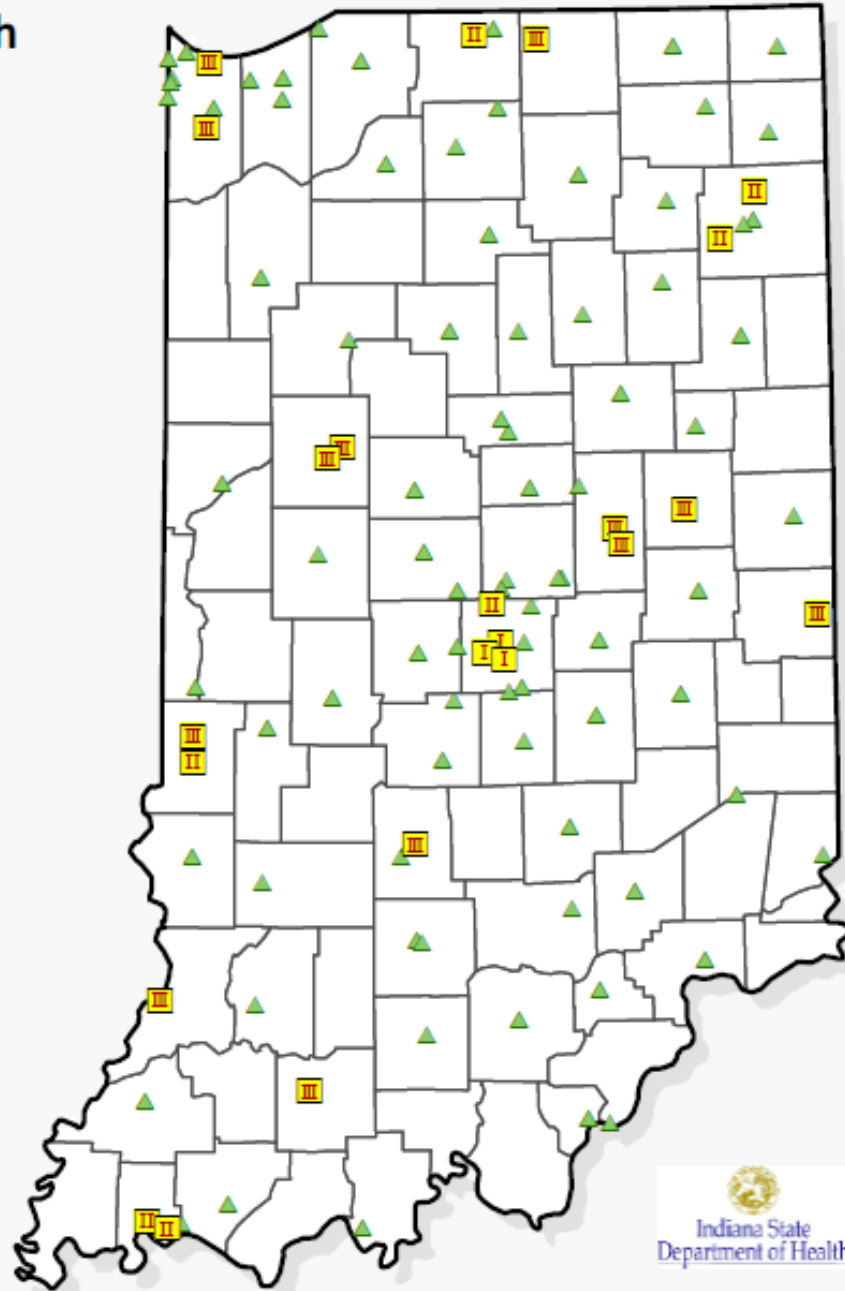
III Level III Trauma Centers

Community Hospital of Anderson & Madison Co.
Franciscan St Anthony Health - Crown Point
Franciscan St Elizabeth Health - Lafayette East
Good Samaritan Hospital
Elkhart General Hospital
IU Health Arnett Hospital
IU Health Ball Memorial Hospital
IU Health Bloomington Hospital
Memorial Hospital and Health Care Center
Methodist Hospitals - Northlake Campus
Reid Hospital & Health Care Services
St Vincent Anderson
Union Hospital Terre Haute

▲ Non-Trauma Hospitals

88 Non-Trauma Hospitals

Hospital categories include Verified and "In the Process"
Trauma Centers as of October 31, 2018.



Indiana Trauma Registry

Statewide Quarter 3 Data Report

July 1, 2018—September 30, 2018

10,646 Incidents

108 Total Hospitals Reporting

Level I and II:	10 facilities	47.6% of data
Level III:	13 facilities	19.9% of data
(Non-Trauma) Hospitals:	85 facilities	32.5% of data

Requests and Changes to the Report from Trauma Care Committee members at the August 2018 ISTCC meeting:

-The report was shortened for the quarterly report and an annual report will be presented at the end of the year.

General Report:

-ED LOS caterpillar plots were done for groups only (Indiana, Levels I and II, Level III, and non-trauma centers). They were also done for districts.

-Signs of Life: The two field values for this variable are: 1) Arrived with no signs of life, 2) Arrived with signs of life. A patient with no signs of life is defined as having none of the following: organized EKG activity, pupillary responses, spontaneous respiratory attempts or movement, and unassisted blood pressure. This usually implies the patient was brought to the ED with CPR in progress.

Indiana Trauma Registry

Statewide Quarter 3 Data Report

July 1, 2018—September 30, 2018

10,646 Incidents

108 Total Hospitals Reporting

Level I and II:	10 facilities	47.6% of data
Level III:	13 facilities	19.9% of data
(Non-Trauma) Hospitals:	85 facilities	32.5% of data

Supplemental Report

The Supplemental Report (pages 14 and 15) contains information on emergency department length of stay.

Definitions:

Emergency Department Length of Stay (ED LOS): The time from ED Admission to ED Discharge (Physical Exit). This changed to time from ED Admission to ED Discharge (Orders Written) beginning with Quarter 3 2016 data (July 1, 2016—September 30, 2016). There is a 120 minute performance improvement filter that is tracked for various hospital groups.

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-10-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.

Signs of Life: The two field values for this variable are: 1) Arrived with no signs of life, 2) Arrived with signs of life. A patient with no signs of life is defined as having none of the following: organized EKG activity, pupillary responses, spontaneous respiratory attempts or movement, and unassisted blood pressure. This usually implies the patient was brought to the ED with CPR in progress.

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 $b=b_0+b1(RTS) + b2(ISS) + b3(Age\ Index)$

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

Statewide Quarter 3 Data Report

July 1, 2018—September 30, 2018

10,646 Incidents

108 Total Hospitals Reporting

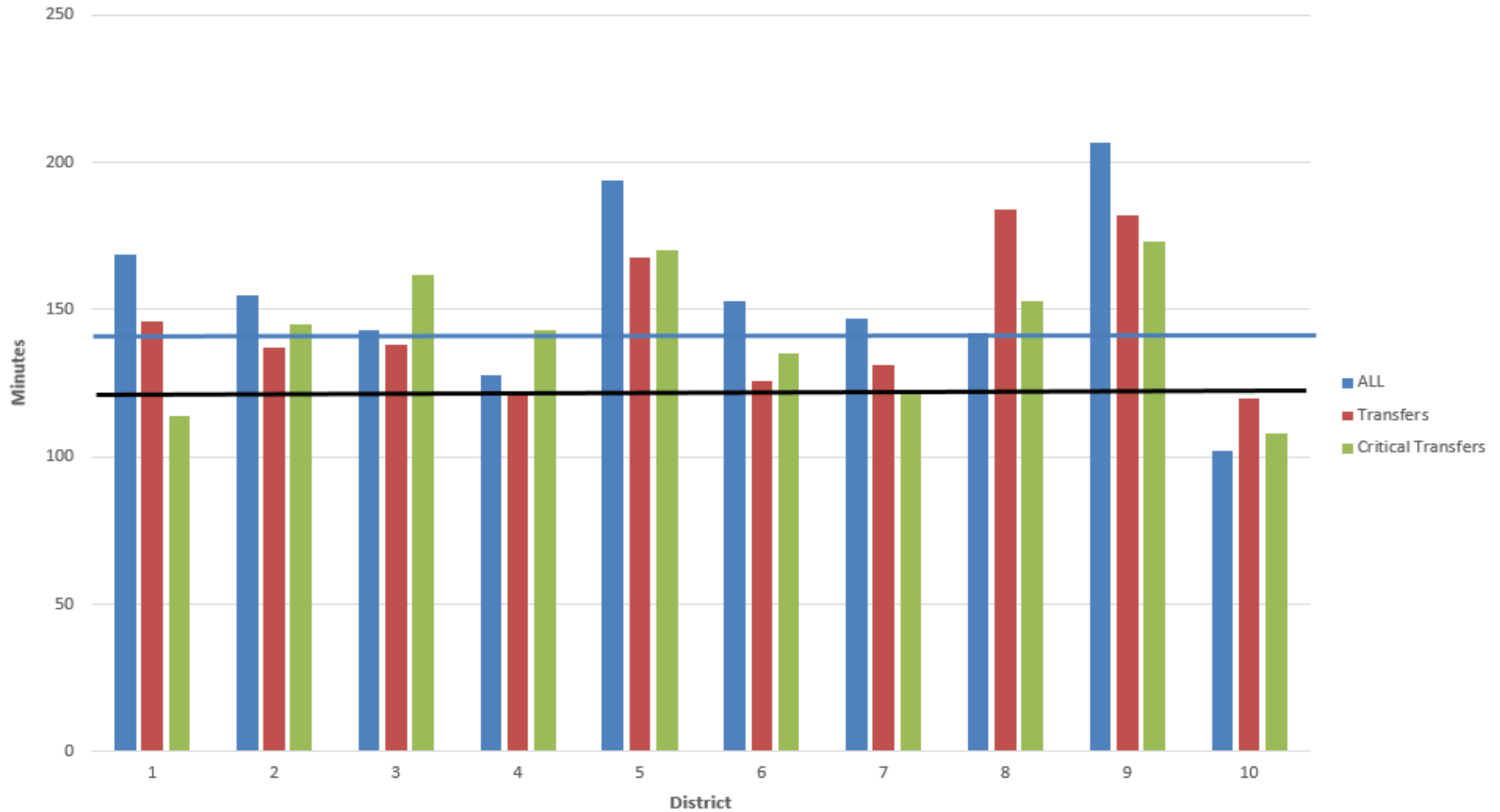
Level I and II: 10 facilities 47.6% of data

Level III: 13 facilities 19.9% of data

(Non-Trauma) Hospitals: 85 facilities 32.5% of data

ED LOS by District

Average ED LOS (Minutes)



*Black line represents the 120 minute performance improvement filter

**Blue line represents the state average

Indiana Trauma Registry

Statewide Quarter 3 Data Report

July 1, 2018—September 30, 2018

10,646 Incidents

108 Total Hospitals Reporting

Level I and II:

10 facilities

47.6% of data

Level III:

13 facilities

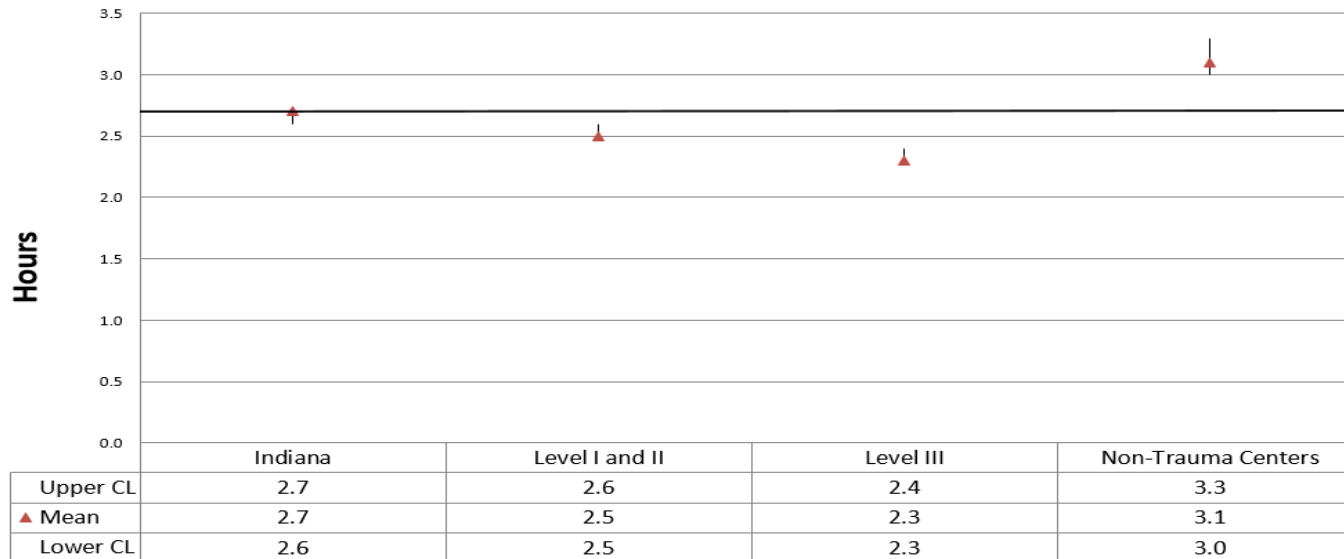
19.9% of data

(Non-Trauma) Hospitals:

85 facilities

32.5% of data

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.