



Iowa Trauma Registry Report 2018

**Authorship - Bureau of Emergency and Trauma Services
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Iowa Department of Public Health
Protecting and Improving the Health of Iowans



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Executive Summary

The Iowa Trauma Registry Report 2018 provides an analysis of data reported to the Iowa Trauma Registry, inpatient and outpatient data, and death data. The development of this report assists in understanding the state of Iowa's trauma system. This report supports data driven decision making for developing improvements within the trauma system to reduce morbidity and mortality from trauma.

The following is an overview of data from the report:

- 117 of 118 hospitals reporting to the Trauma Registry
 - Data retrieved from the Iowa Trauma Registry
 - All level I, II and III facilities are reporting
 - 21,519 incidents
 - 19,055 unique patients
 - 216/321 incidents of physical abuse investigated
 - 6.8% of incidents were work-related
 - 2.5% of incidents were farm-related
 - 53.4% of incidents were falls
 - 21.0% of incidents were motor vehicle crashes
 - 6,843 trauma alerts
 - 1,994 level 1
 - 4,849 level 2
 - 271 self-inflicted injuries
 - 1,622 assault injuries
 - 1,556 incidents of transfer delay
 - 43.1% female, 56.6% male, 0.3% unknown
- 353,751 EMS Incident Reports (an incident report occurs each time an EMS program is notified to respond)
 - 240,691 EMS transport incident reports
 - 84,044 trauma-related incident reports
 - 42,124 trauma-related transport incident reports

List of Acronyms

| | |
|-------|--|
| ACS | American College of Surgeons |
| AIS | Abbreviated Injury Scale |
| ATLS | Advanced Trauma Life Support |
| CDC | Centers for Disease Control and Prevention |
| GCS | Glasgow Coma Scale |
| IDPH | Iowa Department of Public Health |
| ISS | Injury Severity Score |
| RTS | Revised Trauma Score |
| SEQIS | System Evaluation Quality Improvement Subcommittee |
| TSAC | Trauma System Advisory Council |

Trauma in Iowa

Overview

In 1995, the state legislature established the Iowa Trauma Care System Development Act. The Act designated the Iowa Department of Public Health (IDPH) as the lead agency for system development and implementation, and established the Trauma System Advisory Council (TSAC) to advise the department and to evaluate system effectiveness. The legislation also established the State Trauma Registry for statewide injury reporting as a reportable condition. On January 1, 2001, the Iowa Trauma System became fully operational. The committee structure for oversight and evaluation was established and the State Trauma Registry was in place. An all-inclusive system engages the participation of hospitals, transporting ambulance services and rehabilitation centers.

In 2015, the American College of Surgeons-Committee on Trauma (ACS) completed a trauma system consultation visit to assess Iowa's trauma system. The ACS review team made multiple recommendations for improvement, including improving the use of data to drive and document changes in the trauma system. The full ACS Trauma System Consultation Report is available at <https://idph.iowa.gov/Portals/1/userfiles/61/Iowa%20TSC%20Report%20Final.pdf>. Significant progress has been made in meeting the data reporting and other recommendations identified by ACS.

The continuing goal of the trauma system is to provide timely, specialized care by matching trauma patient needs to appropriate resources, from the time of injury through rehabilitation. Meeting this goal requires the cooperation of trauma care providers and resources throughout the state along each phase of trauma care. A systems approach recognizes this continuum of care and has been shown to reduce overall costs, disability and death associated with traumatic injury. To accelerate the progress already being made in reducing morbidity and mortality of traumatic injuries, the three injury control components of prevention, acute care and rehabilitation must work together.

State Trauma Registry

Iowa Code Chapter 147A and Iowa Administrative Code 641 Chapter 136 (IAC 641-136) established the State Trauma Registry in 1996. Trauma was identified as a reportable condition. A "trauma patient" is defined as a victim of an external cause of injury that results in major or minor tissue damage or destruction caused by intentional or unintentional exposure to thermal, mechanical, electrical or chemical energy, or by the absence of heat or oxygen. Chapter 136-Trauma Registry was updated in July 2018. The registry collects and can be used to analyze reportable patient data on the incidence, severity and causes of trauma. The Iowa Trauma Patient Data Dictionary (January 2017) specifies the inclusion criteria and reportable patient data to be reported to the trauma registry.

Iowa Trauma Registry Report

The data collected is compiled in this annual report, which includes the magnitude of injuries in Iowa, the organization of trauma care, the performance of care, and outcomes of injured patients in Iowa. The Trauma System Advisory Council's System Evaluation and Quality Improvement Subcommittee routinely reviews the data for system improvement recommendations. The data is used by hospitals to drive performance improvement and injury prevention activities. Aggregate data from the registry is used by the trauma service areas to help inform overall improvements to the trauma system. The data has been used for the Burden of Injury Report, statewide injury prevention efforts and research.

Trauma Hospitals

Iowa has an inclusive trauma system. All 118 hospitals in Iowa are verified as a trauma care facility at some level. There are four levels of trauma care facilities in Iowa. Level I facilities have the resources necessary to provide trauma care to patients with significant traumatic injuries and conduct trauma research. Level II facilities have similar resources for care of the trauma patient, but may not actively conduct research activities. Level III facilities have surgical capabilities 24/7/365 including orthopedic surgery, but may not have the resources needed to provide definitive care for the most significantly injured trauma patients. Level IV facilities have the resources and training needed to stabilize traumatically-injured patients and provide definitive care for those with minor injuries. The following map shows the location and level of all Iowa trauma care facilities in 2018.

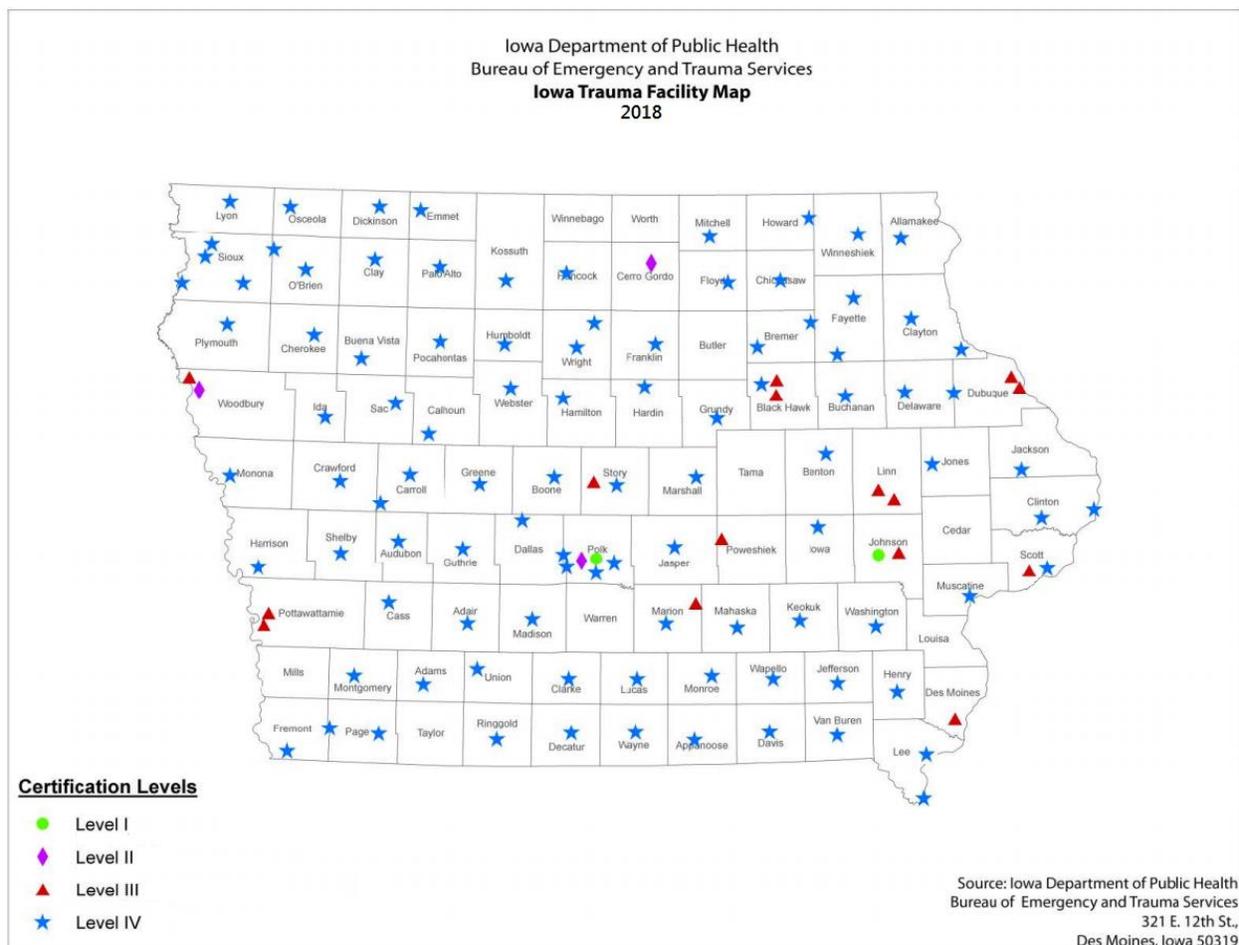


Figure 1: Map of trauma care facilities

Trauma Facility Level Count

Source: Iowa Department of Public Health | 2018

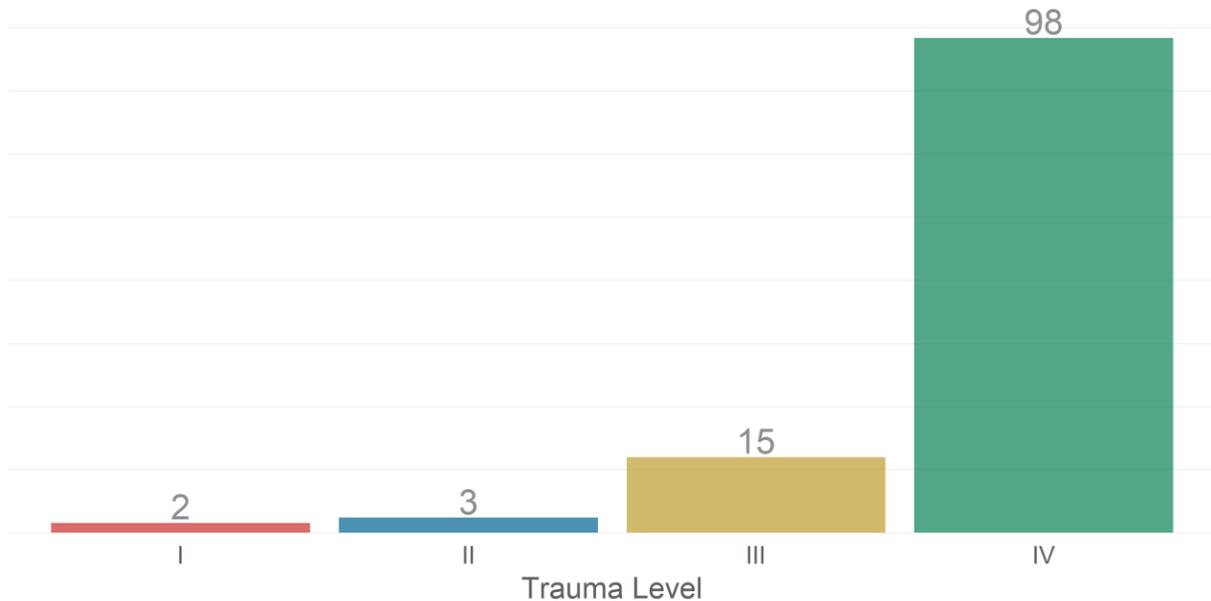


Figure 2: Number of facilities for each level of care

All 118 trauma care facilities in Iowa are required to submit data to the state trauma registry. Both Level I and II of the four Level II facilities are verified as trauma care facilities by the American College of Surgeons (ACS). The remaining hospitals in Iowa are verified as trauma care facilities by the Iowa Department of Public Health and the Iowa Trauma Survey Team. The trauma survey team is a group of health care providers contracted by IDPH to assist in verifying trauma care facilities' compliance with trauma criteria. This group of health care providers is made up of trauma surgeons, emergency medicine physicians and trauma nurses from across the state. The trauma survey team uses the criteria adopted in Iowa Administrative Code 641 Chapter 134-Trauma Care Facility Categorization and Verification to assess the hospitals.

Count of Incidents by Trauma Facility Level

Source: Iowa Trauma Registry | 2018

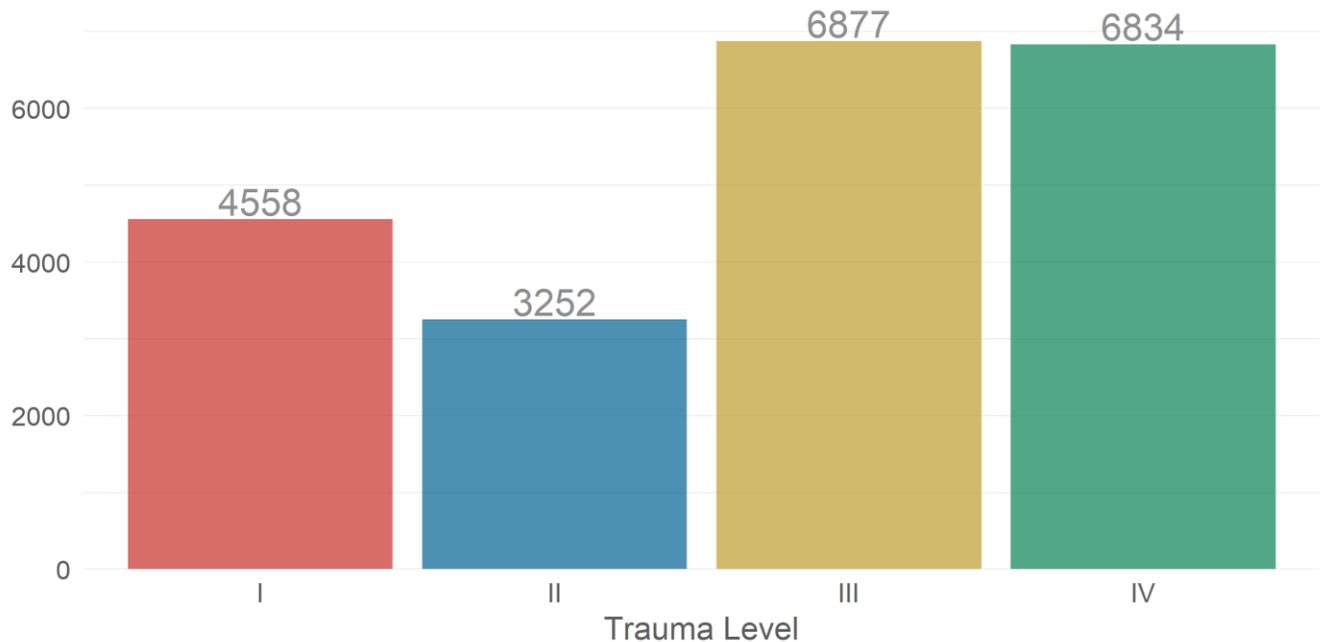


Figure 3: Number of trauma incidents reported through State Trauma registry in 2018

The Iowa Department of Public Health transitioned the trauma registry to a new vendor in 2015. At that time, department staff provided training to hospital staff in multiple locations across the state. This has resulted in more incidents being reported to the state trauma registry. In 2014, Level IV facilities reported 2,005 incidents, as compared to 6,834 in 2018. All level I, II and III facilities reported data for patients seen in 2018. Ninety-nine percent of level IV facilities reported patients seen in 2018 to the registry. The department continues to support hospital data reporting education and training.

Response to Trauma

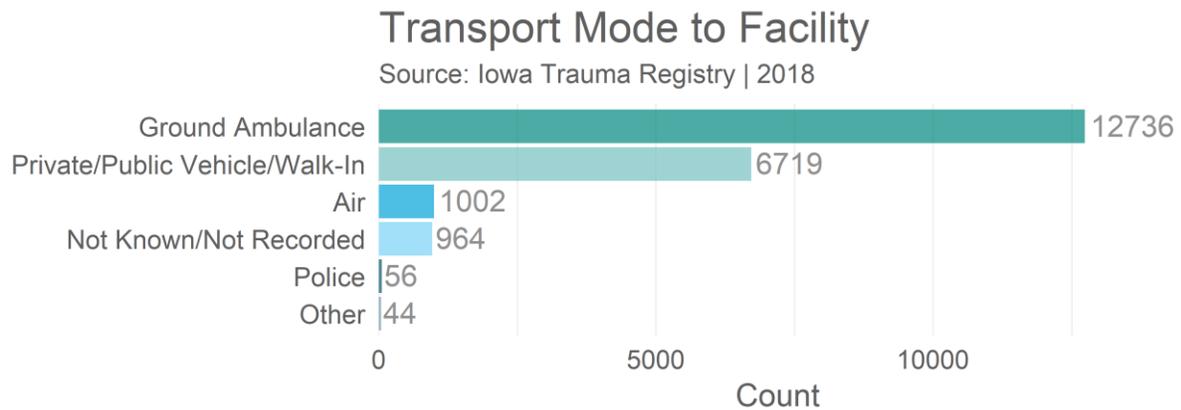


Figure 4: Method used to transport trauma patients to emergency care

The data depicted in this table shows the mode or mechanism of transport of trauma patients for trauma care. Based on the Iowa Trauma Registry, 59% of patients were transported to the trauma care facility by ground ambulance; 31% of patients were transported by private/public vehicle/walk-in; 5% of patients were transported by air (helicopter or fixed-wing aircraft); the mechanism for transport for 4% of the patients is unknown (up from 1% in 2017); and less than 1% of trauma patients were transported by police or other.

Incident Count by ISS Range

Source: Iowa Trauma Registry | 2018

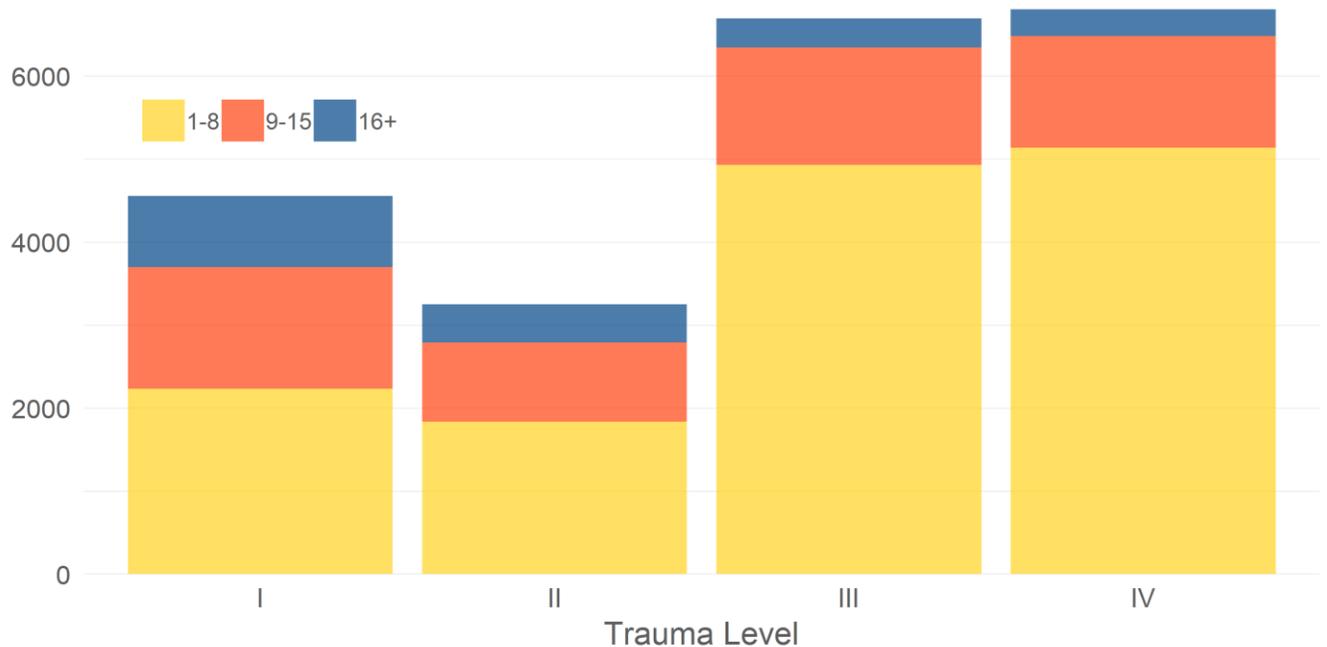


Figure 5: Incidents by trauma care level within each Injury Severity Score (ISS) range

The Injury Severity Score, or ISS, is a method used to rate the severity of the patient’s injury. It correlates with morbidity, mortality and hospital length of stay for injured patients. This score is based on the patient’s diagnosed injuries. ISS scores can range from 0 to 75. Any score greater than 15 is considered major trauma, also known as polytrauma. A score of 1-8 is considered minor trauma, and scores ranging from 9-15 are considered moderate trauma.

The data in the chart is from all levels of hospitals, and does not solely depict data from hospitals that provided definitive care for the trauma patient. Level IV and some Level III facilities provide stabilizing care for significantly injured trauma patients before transferring that patient to a definitive care hospital that is able to perform a higher level of stabilizing treatment. The ISS is retrospective and based on all the patient’s diagnosed injuries. The ISS ratings for patients seen at Level IV and Level III facilities is likely to be artificially low. The Level IV and Level III facilities may not identify all of the trauma patient’s injuries before transport. Level IV and Level III facilities may only identify the most critical injuries that require stabilization before transport. This may impact the reported ISS of some patients seen at Level IV and Level III facilities who are then transported to a definitive care facility for a higher level of treatment.

Trauma registry data shows 51% of incidents at Level I facilities had an ISS over 8 and Level II facilities had 44% of incidents with an ISS over 8. Level III and Level IV facilities had 26% and 24% of incidents with an ISS over 8, respectively.

Cause of Injury Frequency

Source: Iowa Trauma Registry | 2018

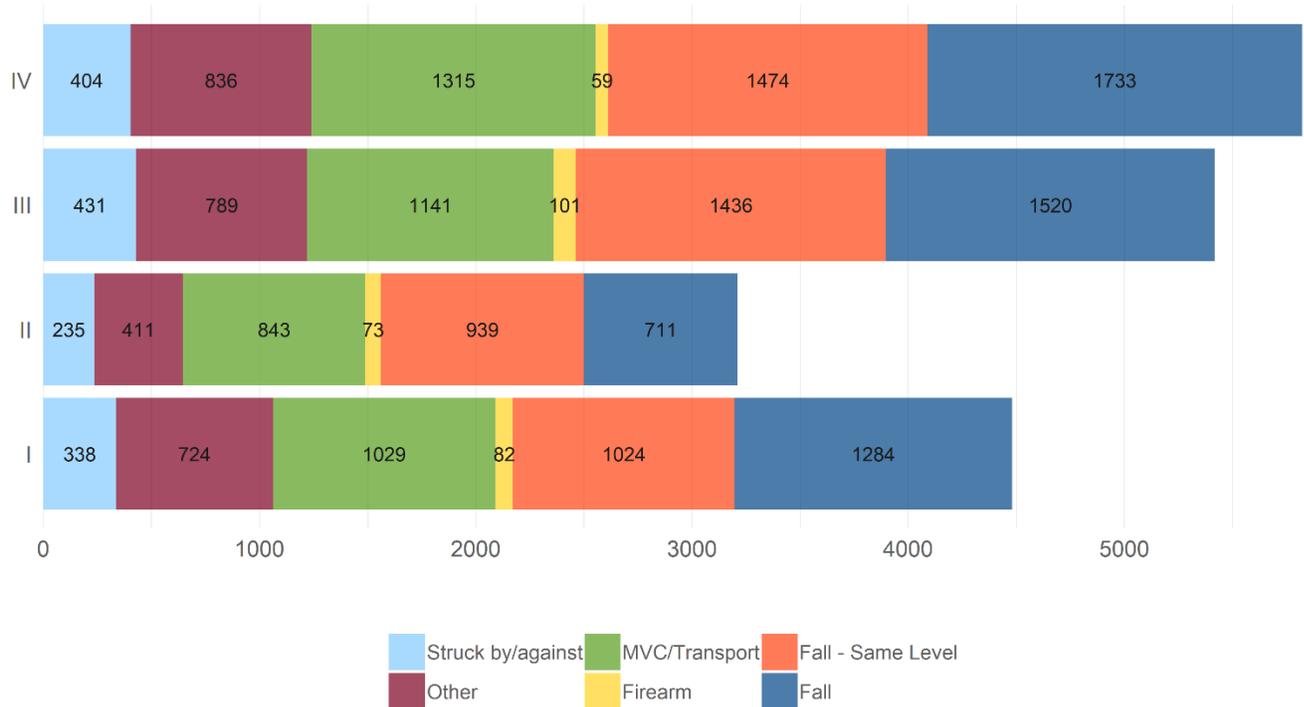


Figure 6: Incidents by cause of injury and trauma care level

Level III and IV facilities saw a greater percentage of their incidents as falls compared to level I and II facilities. An injury type that is not shown as its own category in the table is burn injuries; they are in the "Other" category due to relatively small counts. Level I facilities see burn patients at a rate about 3 to 4 times higher than the other levels. The state's only verified burn center is a Level I trauma care facility. The subcategories of the Other category in Figure 6 are expanded out to greater specificity in Figure 7, albeit not split out by trauma level. Burn injuries are listed as Fire/Flame.

Cause of Injury Frequency

Source: Iowa Trauma Registry | 2018

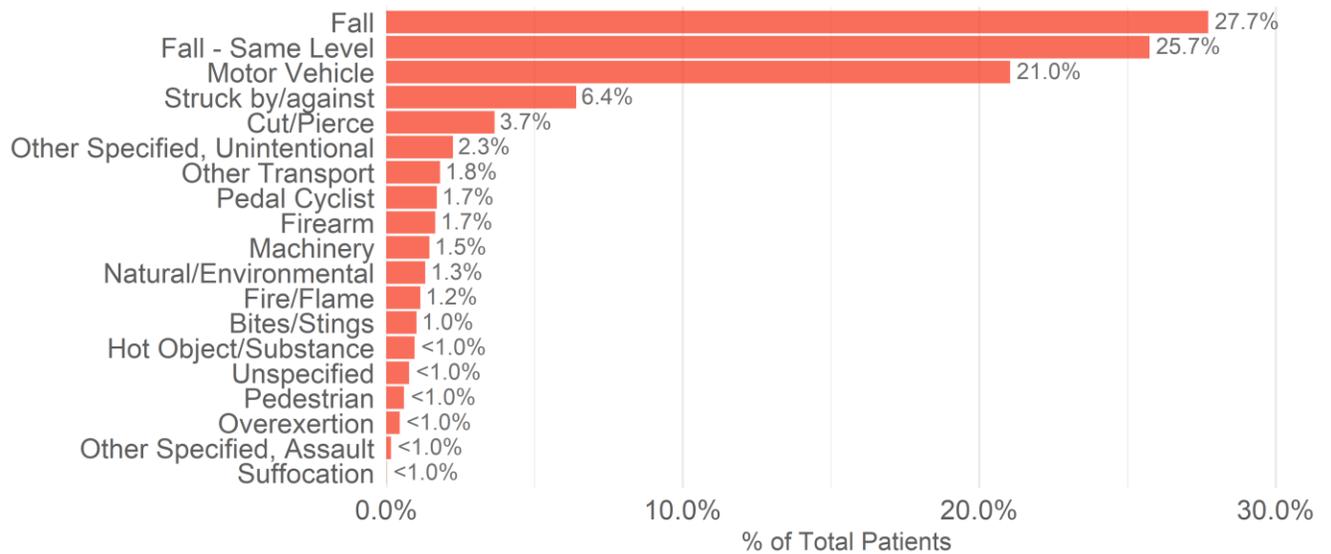


Figure 7: Percentage of registry incidents per cause of injury category

Non-same-level falls do outnumber the same-level falls. All falls account for over half of all the injuries in the registry. Since the trauma registry inclusion criteria do not require registrars to submit isolated hip fractures due to same-level falls, this percentage is significantly lower than the numbers from the Iowa Hospital Association’s Inpatient and Outpatient Data Registry.

Transfers Out by Trauma Facility Level

Source: Iowa Trauma Registry | 2018

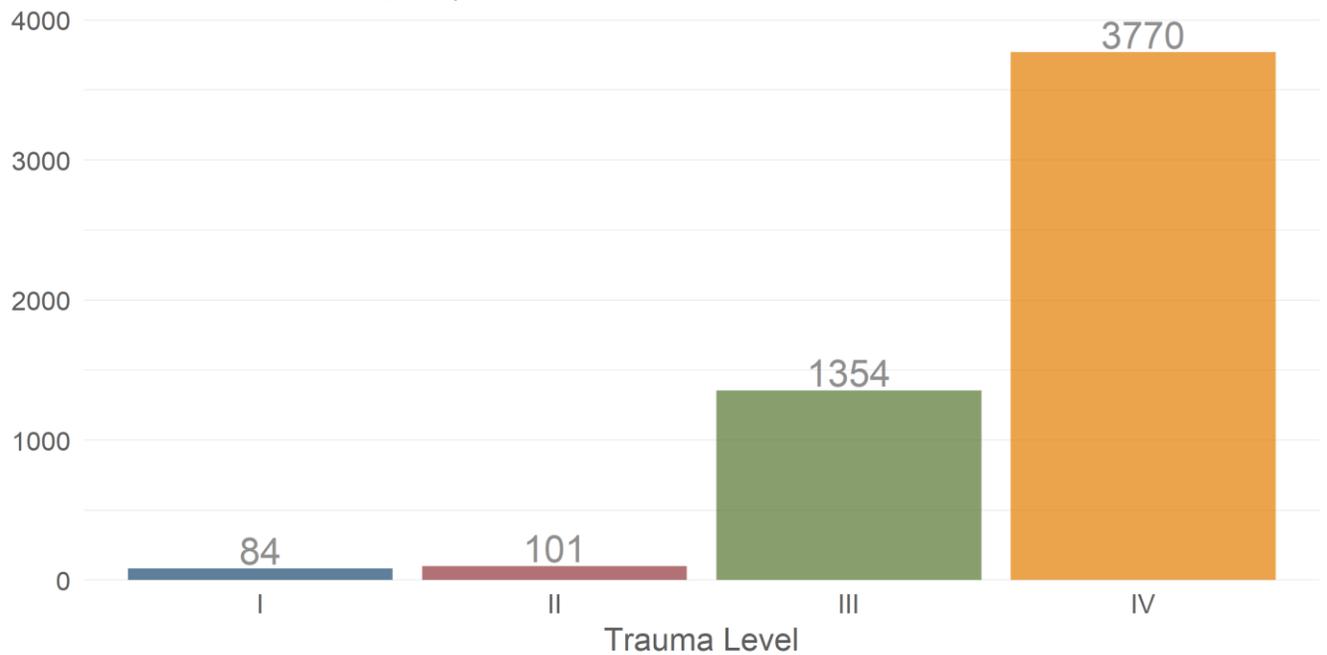


Figure 8: Number of transfers out to definitive care from each trauma care level

When a trauma patient requires resources that are unavailable at the initial facility, the patient is transferred to a trauma facility capable of providing definitive care for their injuries. Since level I and II facilities generally have the highest level of care possible, transfers out are rare, and are often due to unavailability of a certain type of specialist. Of these 5,309 transfers out, 71.0% are from level IV facilities, 25.5% are from level III facilities, and the remaining 3.5% are from level I and II facilities. 24.7% of the trauma registry incidents from 2018 were transfers out to definitive care.

Average ED Stay Prior to Transfer by ISS Range

Source: Iowa Trauma Registry | 2018

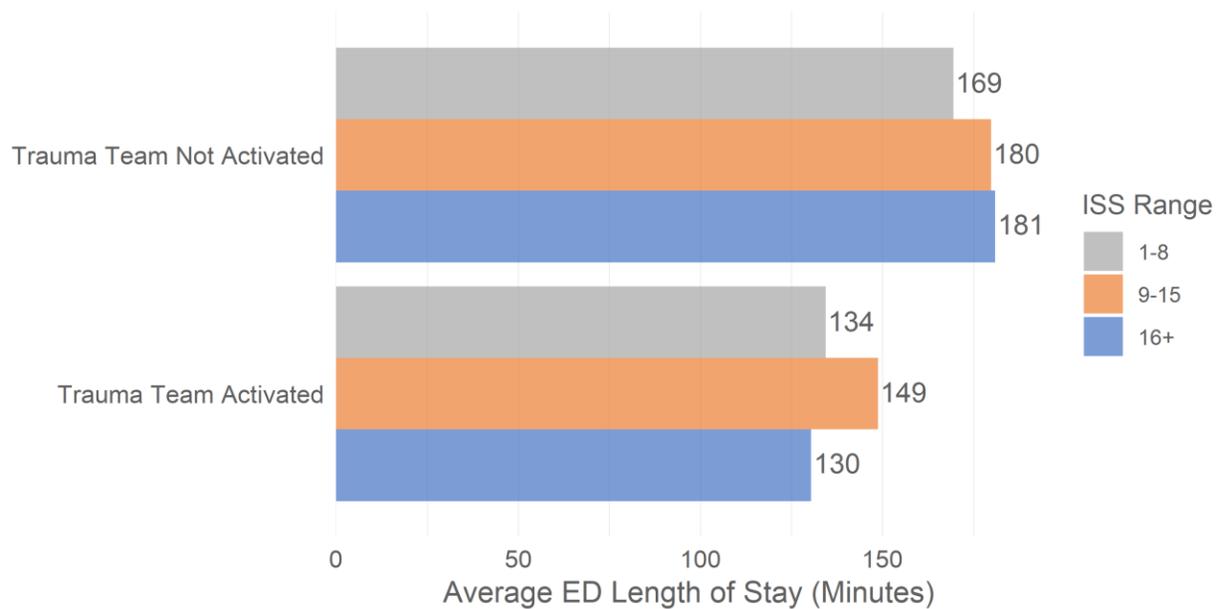


Figure 9: Average length of stay in emergency department for patients transferred to subsequent definitive care facility

On average, patients who were transferred to a subsequent trauma care facility for definitive care stayed in the initial hospital’s emergency department for 2 hours and 45 minutes. Of these transfers, 21.3% had trauma teams activated. When the trauma team was activated, patients stayed 36 fewer minutes in the emergency department on average compared to patients who did not have a trauma team activation.

When split into the given ISS ranges, it’s clear that patients of all injury severities have shorter stays in the emergency department when the trauma team is activated. Patients with an ISS between 9 and 15 had lengths of stay decreased by 31 minutes on average when the trauma team was activated and that was the smallest decrease. For ISS between 1 and 8, the difference was 35 minutes, and 51 minutes for ISS of 16 or greater. The most severely injured patients had the highest average length of stay when the trauma team was not activated and the lowest average length of stay when the trauma team was activated.

Average ED Stay Prior to Transfer by ISS and Trauma Level

Source: Iowa Trauma Registry | 2018

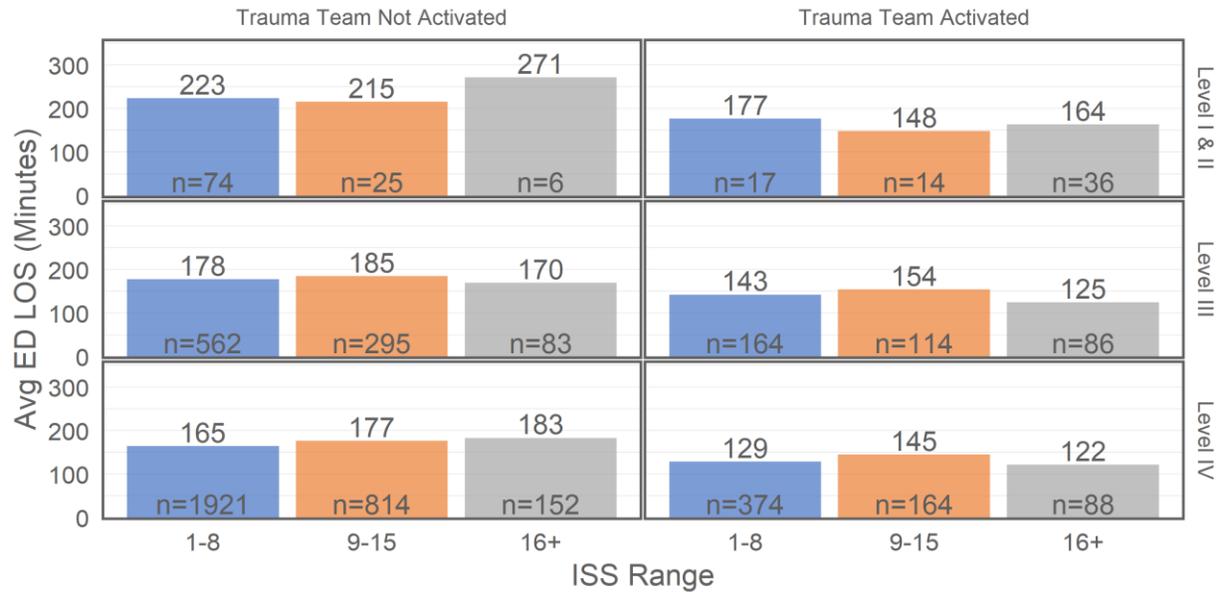


Figure 10: Same as the previous figure, but split out by trauma level

When split out by trauma level, it is clear that the average emergency department length of stay prior to transfer is consistently lower when the trauma team is activated. There are some inconsistencies in trends, such as the ISS 16+ patients at Level III facilities having shorter stays than ISS 1-15 patients when the trauma team is not activated; whereas, the averages for Level I, II and IV facilities was highest for the most critically injured patients when the trauma team was not activated. When the trauma team is activated, the ISS 16+ patients at Level III and IV facilities averaged the shortest stays of the ISS ranges, but this was not the case for the Level I and II facilities, as the ISS 9-15 patients had the shortest average length of stay. It's worth noting that the sample sizes for the Level I and II facilities are relatively small, as most trauma patients are admitted to the facility; transfers out of Level I and II facilities rarely occur.

Average ED Stay Prior to Transfer

Source: Iowa Trauma Registry | 2016-2018

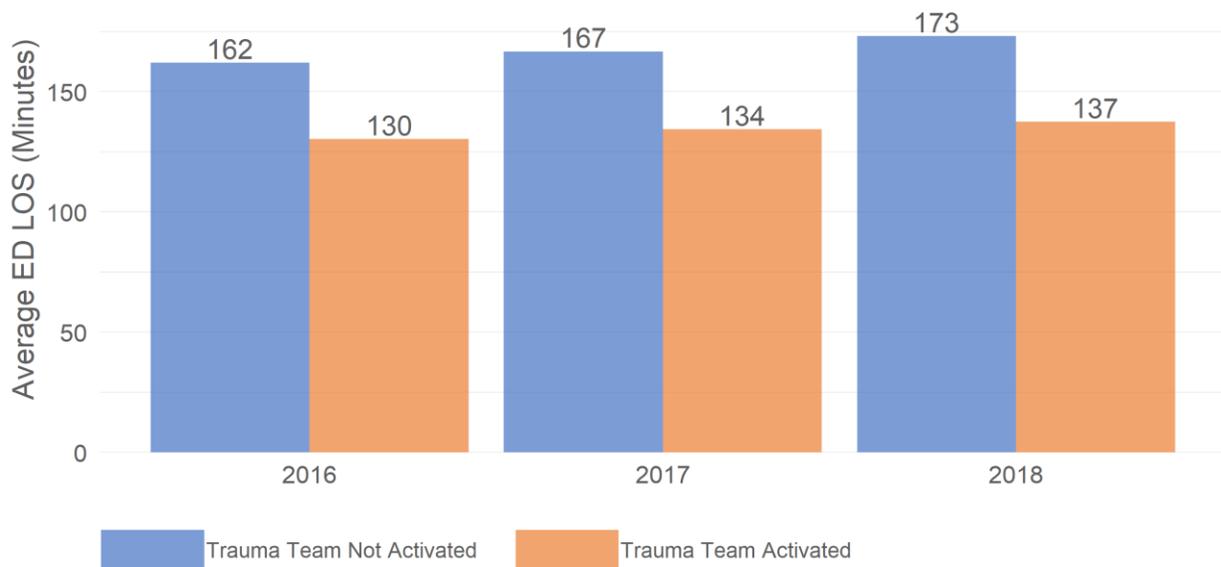


Figure 11: Average length of stay in the emergency department since 2016 split by trauma team activation

The average length of stay in the emergency department for transfers out of the emergency department has increased since 2016. There were slight increases for the average lengths of stay for trauma activations and non-activations from 2016 to 2017, and again from 2017 to 2018.

Hospital Admissions

Hospital admissions data are obtained from the Iowa Hospital Association's Inpatient and Outpatient Data Registry. A trauma injury must be either the admitting or principal diagnosis to be included in this data set. A trauma injury has a diagnosis code that falls within the ICD-10 ranges shown starting on page 10 of the Iowa Trauma Patient Data Dictionary (https://idph.iowa.gov/Portals/1/userfiles/43/Trauma%20Registry%20Data%20Dictionary%20Jan_%202017.pdf). Based on these criteria, there were 12,119 patients with a trauma diagnosis code as the admitting or principal diagnosis code for first-hospital admissions at Iowa facilities.

Trauma Admissions by Age Range

Source: Iowa Inpatient Database | 2018

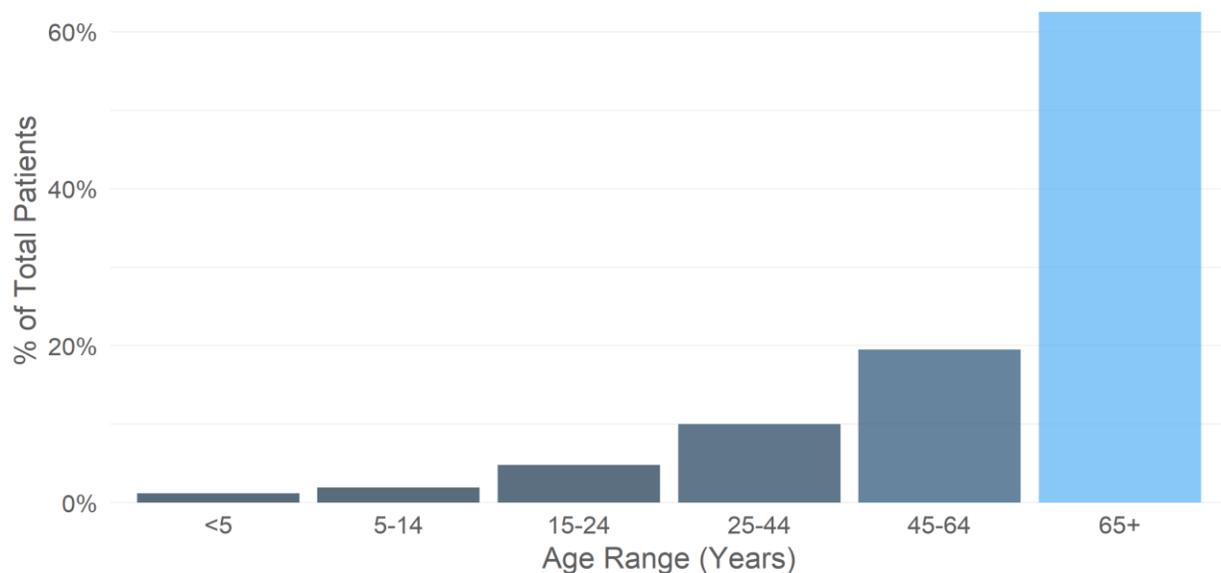


Figure 12: Percentage of trauma admissions by age range from Inpatient database

Patients 65 and older accounted for the majority of trauma admissions. Note that the age ranges are not of equal length; there are 5-, 10- and 20-year ranges, as well as the open-ended 65+ range. Since the inpatient database does not exclude isolated hip fractures due to same-level falls like the state trauma registry, the inpatient database has more patients in the 65+ range.

Nature of Injury Frequency

Source: Iowa Inpatient Database | 2018

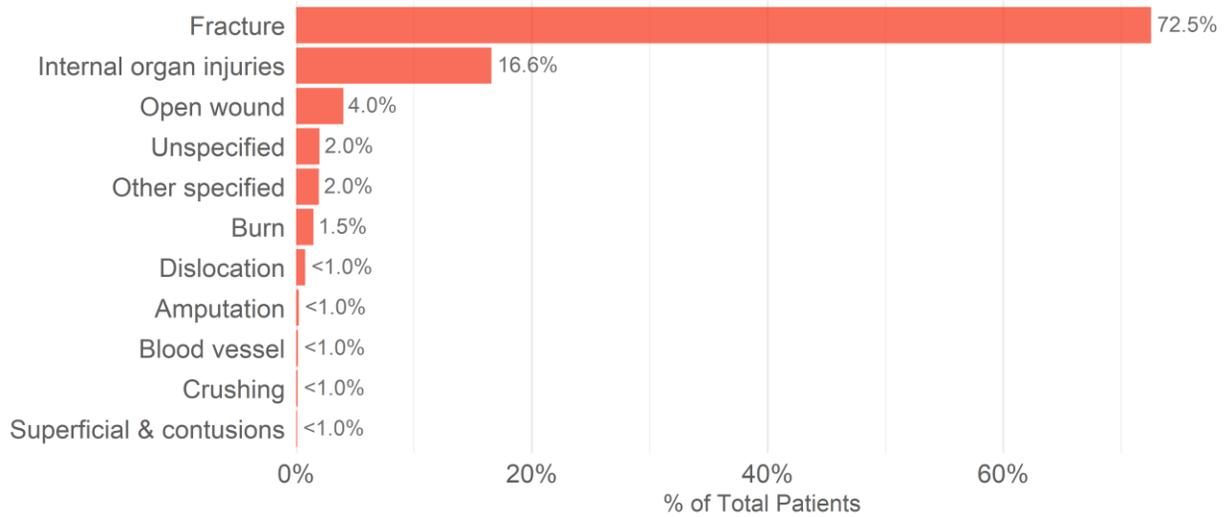


Figure 13: Percentage of trauma admissions by nature/type of injury

Fractures account for nearly three-quarters of the primary trauma diagnoses for admitted patients. The nature of injury is derived from the ICD-10 diagnosis code.

Injury Body Region Frequency

Source: Iowa Inpatient Database | 2018

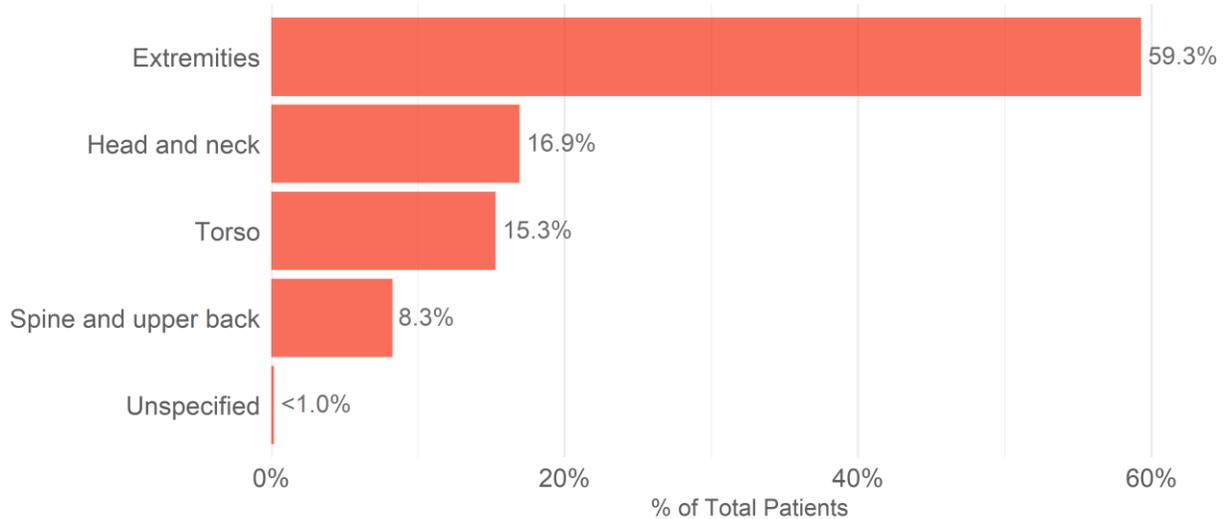


Figure 14: Percentage of trauma admissions by body region of primary diagnosis

The body region is also derived from the ICD-10 diagnosis code. Most primary diagnosis codes for trauma injuries are for the extremities. Under 1% of the admissions had unspecified body regions for the primary diagnoses, which is considerably less than the nearly 3% last year.

Deaths

Death data was compiled from publicly available reports from the Iowa Bureau of Health Statistics (see Iowa Death Certificate Data in Data Sources).

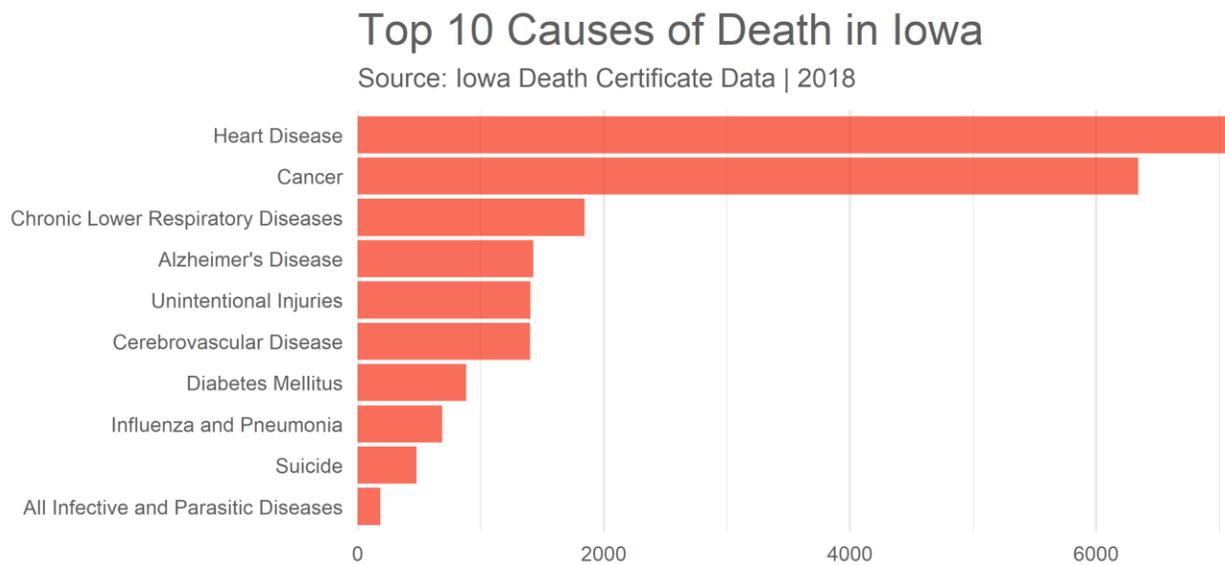


Figure 15: Top causes of death in Iowa

Unintentional injuries account for most trauma deaths in Iowa for 2018. The suicide category of this figure also includes trauma injuries. According to the CDC, injury is the leading cause of death among person 1-44 years of age

(https://www.cdc.gov/injury/wisqars/overview/key_data.html).

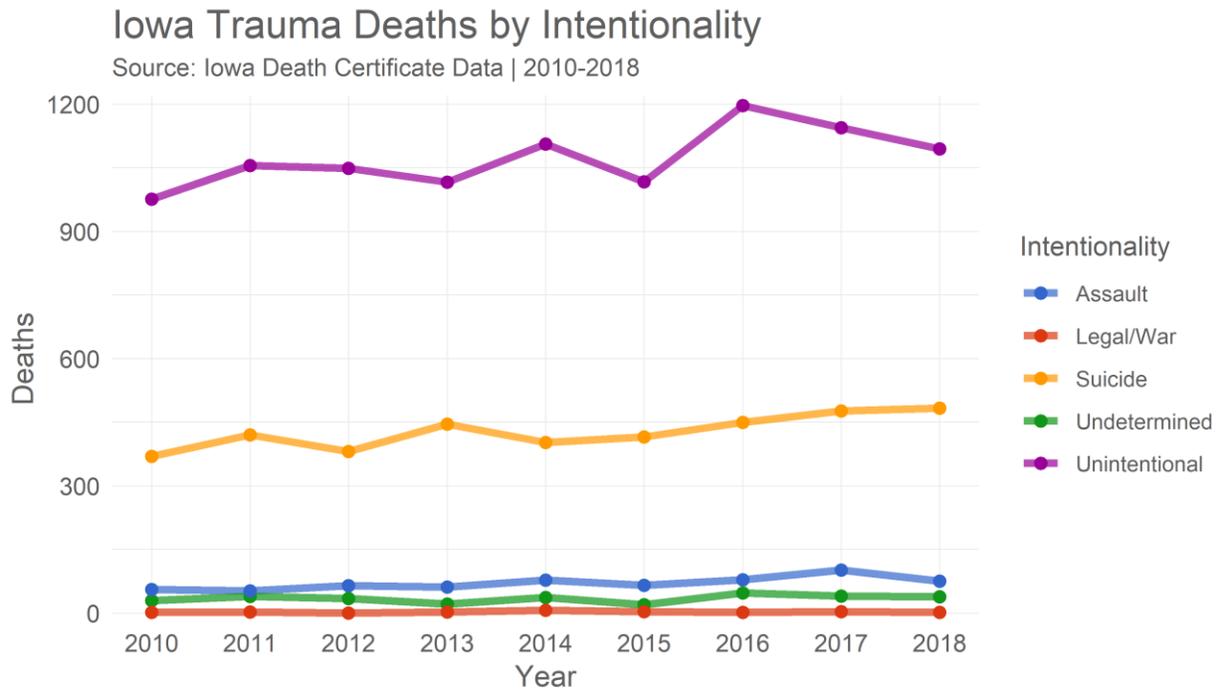


Figure 16: Trauma deaths in Iowa by intentionality

Unintentional injury deaths have fallen the past two years since they spiked in 2016. Assault deaths also decreased slightly after last year’s increase. Suicide deaths have increased slightly, and have increased each of the past four years from 402 in 2014 to 483 in 2018.

Iowa Unintentional Trauma Deaths by Cause

Source: Iowa Death Certificate Data | 2010-2018

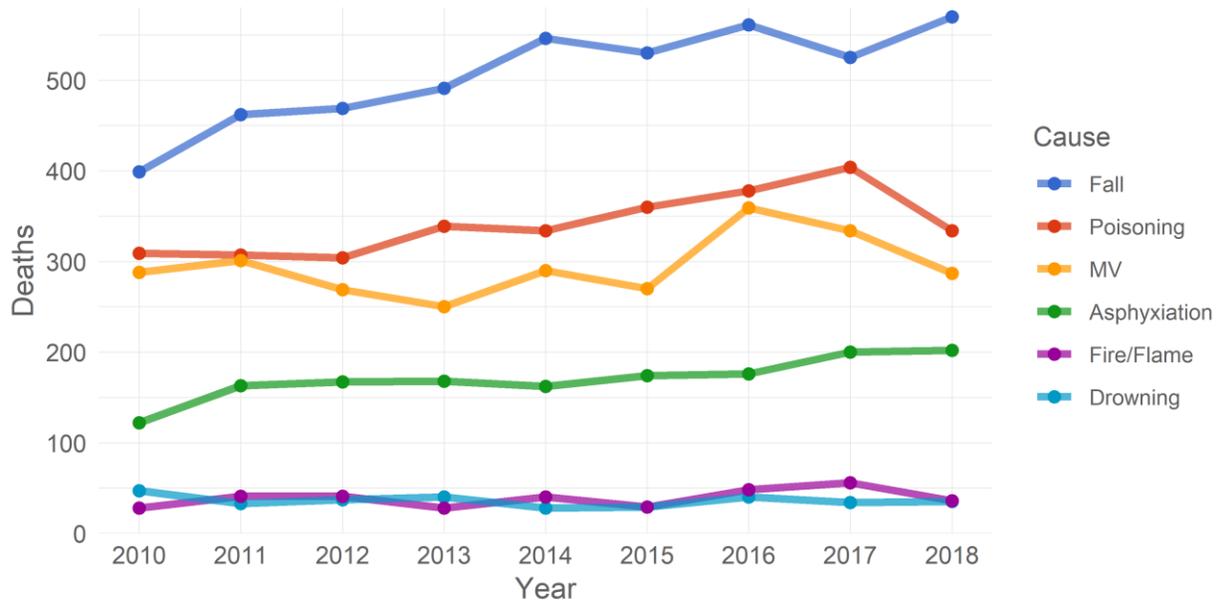


Figure 17: Unintentional trauma deaths in Iowa by cause of injury

After the decrease in unintentional fall deaths in 2017, the figure has risen slightly higher in 2018 than it was in 2016. The unintentional deaths due to poisonings and motor vehicle collisions both saw significant decreases, and the fire/flame deaths saw a slight decrease as well.

Iowa Trauma Suicides by Cause

Source: Iowa Death Certificate Data | 2010-2018

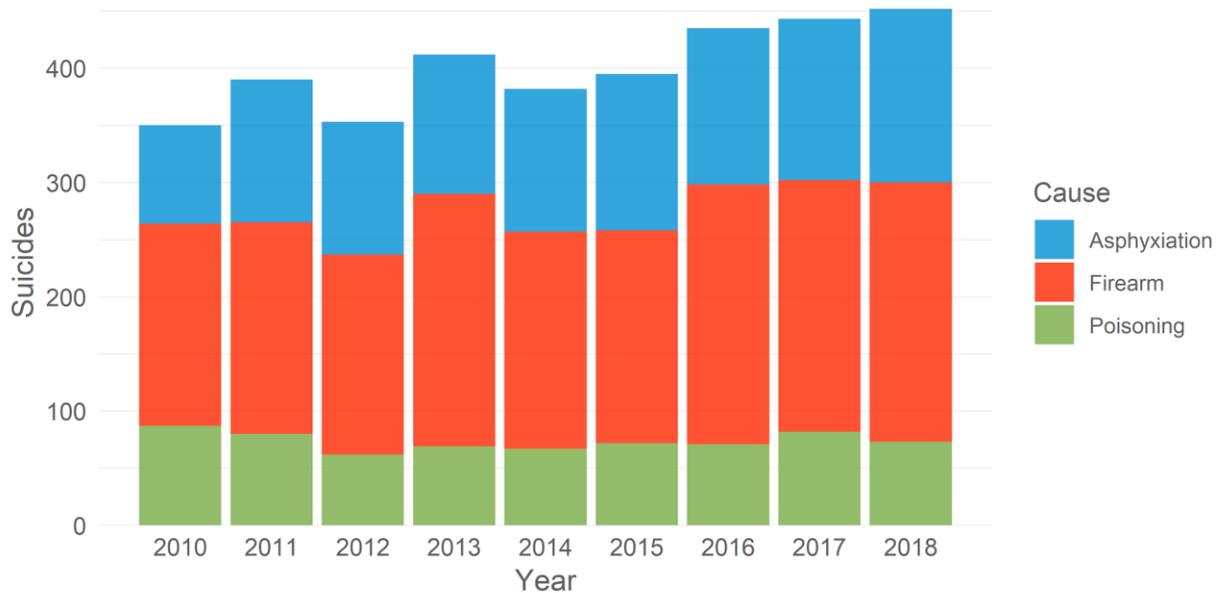


Figure 18: Trauma suicide counts in Iowa by method

Poisoning suicides saw a decrease after increasing in 2017, and is now at a similar level to 2015 and 2016. Asphyxiation suicides are now at their highest level after a 7.8% increase from 2017, and have generally been trending upward since 2010. Firearm suicides have remained around 225 per year for the past three years, a similar level to the spike in 2013. All other years since 2010 were between 175 and 190 firearm suicides.

| Cause | 5-Year Average | 2018 Deaths | % 1/↓ |
|--------------|----------------|-------------|--------|
| Drowning | 34 | 35 | 2.3% |
| Fall | 531 | 570 | 7.4% |
| Fire/Flame | 40 | 36 | -10.5% |
| MV | 301 | 287 | -4.5% |
| Poisoning | 363 | 334 | -8.0% |
| Asphyxiation | 176 | 202 | 14.8% |

Table 1: Trends in Iowa trauma deaths

The above table shows deaths from the six listed categories, regardless of intentionality. The 2018 totals for three of the categories were higher than the 5-year trailing averages (2013 to 2017), and the other three categories had lower totals than the averages. Fall deaths rose, but it's a similar number to 2016, as can be seen in the next figure. Asphyxiations saw a large increase, owing mostly to the increase in suicides by asphyxiation in 2018. The fire/flame deaths had the largest percentage drop, mostly due to the large spike in 2017. Poisonings saw the largest nominal decrease in deaths, also due to a spike in 2017. Motor vehicle deaths are back under 300 after the unusually high numbers in 2016 and 2017 at 359 and 334, respectively.

Iowa Unintentional Fall Deaths

Source: Iowa Death Certificate Data | 2002-2018

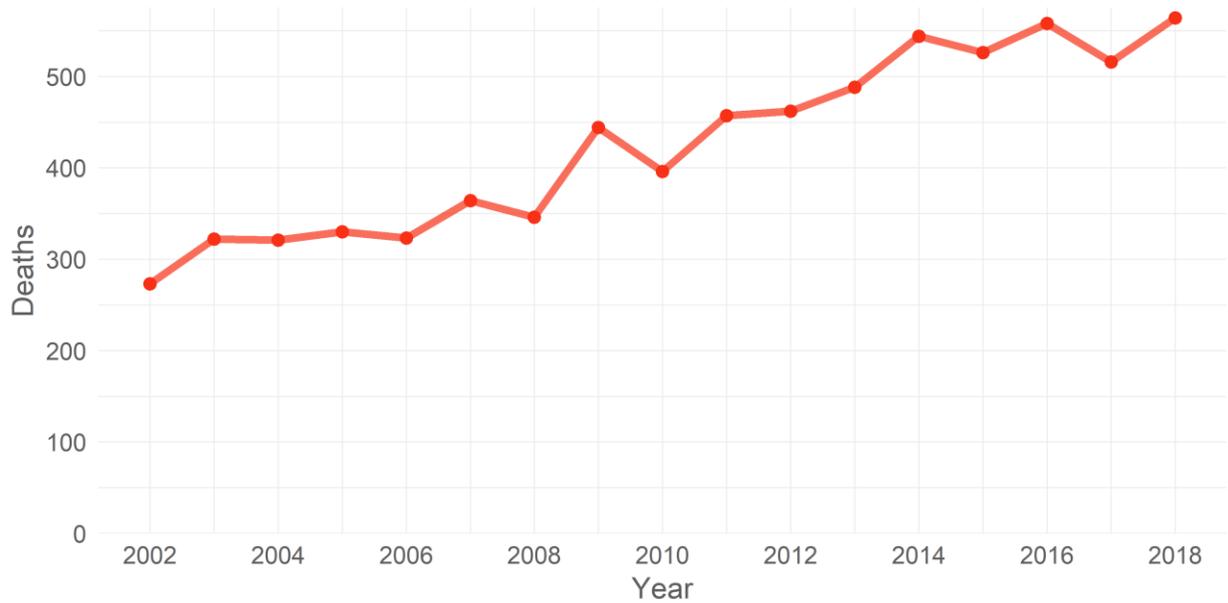


Figure 19: Unintentional fall deaths in Iowa since 2002

Deaths due to unintentional falls increased from 2017 to 2018 to a new peak of 564. This is not much higher than the numbers in 2016 and 2014. Prior to 2014, unintentional fall deaths had never reached 500, and a clear upward trend can be seen in the graph, with some periods of stagnation and variability. Since 2002, the number of deaths due to unintentional falls have more than doubled, while the population of Iowa has increased by 7.5%.

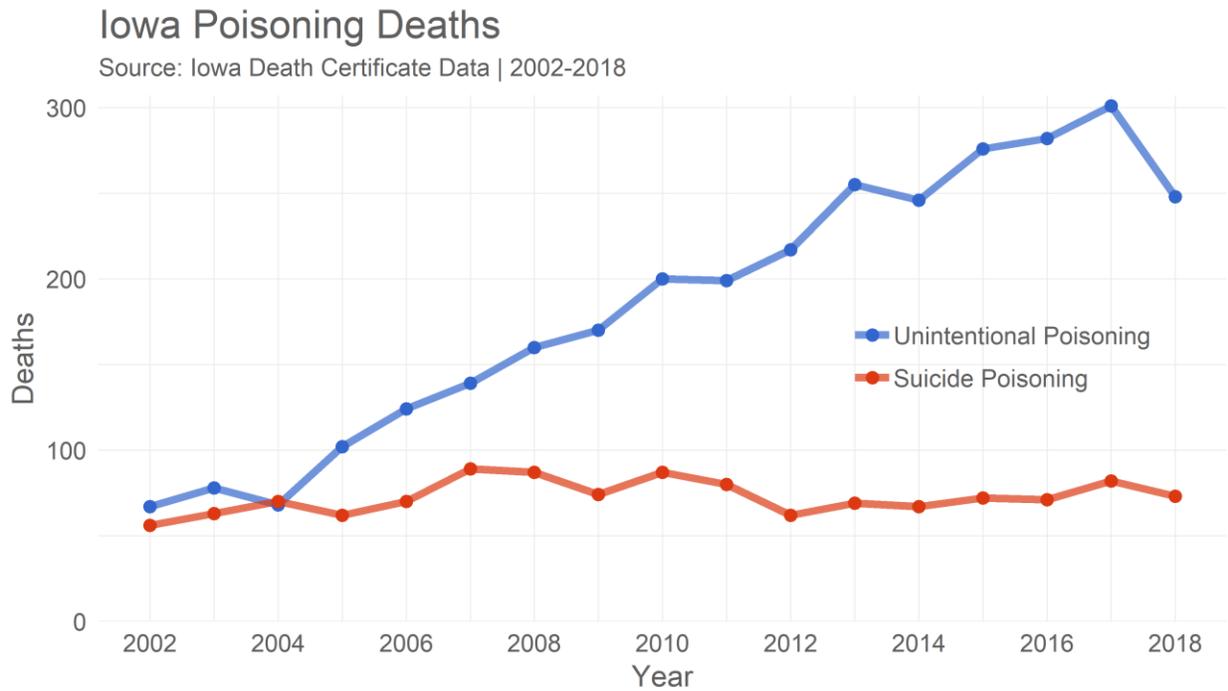


Figure 20: Suicide poisoning deaths in Iowa by intentionality since 2002

Poisonings saw a significant decrease from 2017. Unintentional poisonings fell by 17.6% and suicides by poisoning fell by 11.0%. The deaths by unintentional poisoning had been rising since 2014, so a large decrease goes strongly against the trend of the last few years. Suicides by poisoning have remained between 56 and 89 deaths per year since 2002, so the 73 deaths in 2018 continues a trend of little change, falling about halfway between the minimum and maximum figures in this timespan.

Performance Indicators

The System Evaluation and Quality Improvement Subcommittee (SEQIS) of the Trauma System Advisory Council (TSAC) established a set of indicators to measure the trends in performance of the statewide trauma system. In order to calculate these indicators, data is extracted from the state trauma registry, processed according to the accompanying Hospital System State Indicators document (Attachment 1), and distributed to all reporting facilities. Using these indicators, trauma programs are able to see their own performance compared to other hospitals of the same level, as well as compared to the state as a whole. Below are the indicator results for the state in the far right column, as well as divided by trauma facility level (with levels I and II combined).

Trauma indicator data is provided to all Iowa hospitals and trauma service areas on a quarterly basis. The data is used to drive performance improvement processes and prevention programs. The quarterly data reports assist hospitals and service areas in monitoring changes within the trauma system.

| Indicators Calculated for 2018 | Level I & II | Level III | Level IV | State | Goal |
|---|-------------------------|------------------|-----------------|--------------|-------------|
| Indicator 1a - Trauma Surgeon Responding Within 15 Minutes | 94.0% | 67.2% | N/A | 78.9% | 80.0% |
| Indicator 1b - Trauma Surgeon Responding Within 30 Minutes | 98.4% | 92.3% | N/A | 95.0% | 80.0% |
| Indicator 1c - Trauma Surgeon Response Time Unknown | 2.9% | 2.8% | N/A | 2.9% | 0.0% |
| Indicator 1d - Physician Responding Within 5 Minutes | 91.8% | 52.7% | 81.2% | 69.4% | 80.0% |
| Indicator 1e - Physician Responding Within 20 Minutes | 98.2% | 87.3% | 95.4% | 92.0% | 100.0% |
| Indicator 1f - Physician Response Time Unknown | 1.2% | 2.3% | 20.1% | 7.7% | 0.0% |
| Indicator 2 - Injury Time Blank | 29.6% | 16.0% | 14.3% | 20.4% | 0.0% |
| Indicator 3 - Probability of Survival Calculated | 92.3% | 87.7% | 81.2% | 87.4% | 100.0% |
| Indicator 4a - Deceased Trauma Patient Autopsied | 26.5% | 26.0% | 36.0% | 29.1% | N/A |
| Indicator 4b - No Autopsy On Death With LOS Greater Than 72 Hours | 92.9% | 95.2% | 100.0% | 95.1% | N/A |
| Indicator 5a - Blood ETOH Measured | 45.9% | 20.2% | 17.1% | 28.5% | N/A |
| Indicator 5b - Blood ETOH Positive | 29.5% | 57.6% | 57.1% | 41.1% | N/A |
| Indicator 6a - 1st Hospital Initial GCS Less Than 9 With No Head CT Before Transfer To Definitive Care | N/A | 38.3% | 59.4% | 51.3% | 100.0% |
| Indicator 6b - 1st Hospital Initial GCS Less Than 9 And Arrived To Definitive Care Over 3 Hours From Injury | 32.0% | 12.5% | 7.7% | 26.4% | 0.0% |
| Indicator 7 - Patients To Definitive Care Greater Than 3 Hours | 50.6% | 20.9% | 15.5% | 32.6% | 0.0% |
| Indicator 8 - Survival Rate For All Traumas | 96.2% | 98.3% | 98.4% | 97.5% | N/A |

Iowa Trauma Registry Report

| | | | | | |
|---|-------|-------|-------|-------|-------|
| Indicator 8 - Survival Rate For Low Risk Traumas | 99.1% | 98.9% | 99.0% | 99.0% | N/A |
| Indicator 8 - Survival Rate For Moderate Risk Traumas | 91.8% | 91.9% | 90.0% | 91.5% | N/A |
| Indicator 8 - Survival Rate For High Risk Traumas | 43.2% | 35.3% | 50.0% | 43.0% | N/A |
| Other Indicator 1 - Incidents Submitted Within 60 Days Of Patient Discharge | 97.8% | 86.7% | 74.5% | 84.2% | 80.0% |
| Other Indicator 2 - Incidents With Validity Score Greater Than 84 | 99.9% | 96.1% | 98.4% | 97.7% | 90.0% |

Table 2: SEQIS indicator results for 2018 by level and entire state

The indicator results are listed below for the service areas as well, anonymized with letters. Cells with a * did not contain enough data to meet reporting requirements.

| Indicators Calculated for 2018 | A | B | C | D | E | F | G | Goal |
|---|--------|--------|--------|-------|--------|--------|-------|--------|
| Indicator 1a - Trauma Surgeon Responding Within 15 Minutes | 70.6% | 53.8% | * | 96.0% | 98.4% | 80.7% | 65.4% | 80.0% |
| Indicator 1b - Trauma Surgeon Responding Within 30 Minutes | 90.8% | 80.8% | * | 98.0% | 99.5% | 95.2% | 95.1% | 80.0% |
| Indicator 1c - Trauma Surgeon Response Time Unknown | 1.8% | 6.7% | * | 11.4% | 0.0% | 5.6% | 1.9% | 0.0% |
| Indicator 1d - Physician Responding Within 5 Minutes | 82.9% | 76.5% | 79.9% | 87.6% | 80.3% | 84.1% | 47.7% | 80.0% |
| Indicator 1e - Physician Responding Within 20 Minutes | 92.9% | 93.8% | 100.0% | 99.1% | 94.4% | 95.2% | 87.1% | 100.0% |
| Indicator 1f - Physician Response Time Unknown | 4.2% | 9.0% | 4.0% | 16.3% | 14.9% | 9.7% | 2.0% | 0.0% |
| Indicator 2 - Injury Time Blank | 14.1% | 10.5% | 11.5% | 7.9% | 24.9% | 45.6% | 16.6% | 0.0% |
| Indicator 3 - Probability of Survival Calculated | 91.2% | 75.7% | 77.8% | 78.1% | 89.3% | 88.8% | 86.8% | 100.0% |
| Indicator 4a - Deceased Trauma Patient Autopsied | 22.2% | 33.3% | 60.0% | 38.9% | 42.3% | 6.0% | 34.7% | N/A |
| Indicator 4b - No Autopsy On Death With LOS Greater Than 72 Hours | 100.0% | 100.0% | * | 66.7% | 100.0% | 100.0% | 90.0% | N/A |

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| | | | | | | | | |
|---|-------|-------|--------|-------|-------|-------|-------|--------|
| Indicator 5a - Blood ETOH Measured | 38.6% | 16.2% | 23.5% | 21.1% | 34.0% | 15.8% | 21.1% | N/A |
| Indicator 5b - Blood ETOH Positive | 37.5% | 53.6% | 41.9% | 43.0% | 34.8% | 51.4% | 55.4% | N/A |
| Indicator 6a - 1st Hospital Initial GCS Less Than 9 With No Head CT Before Transfer To Definitive Care | 48.6% | 45.5% | 36.4% | 87.5% | 47.6% | 73.9% | 42.6% | 100.0% |
| Indicator 6b - 1st Hospital Initial GCS Less Than 9 And Arrived To Definitive Care Over 3 Hours From Injury | 42.9% | 33.3% | 0.0% | 9.1% | 9.9% | 0.0% | 7.0% | 0.0% |
| Indicator 7 - Patients To Definitive Care Greater Than 3 Hours | 49.0% | 24.2% | 12.6% | 30.8% | 32.8% | 17.0% | 18.9% | 0.0% |
| Indicator 8 - Survival Rate For All Traumas | 96.6% | 98.2% | 98.8% | 98.2% | 97.6% | 97.2% | 98.3% | N/A |
| Indicator 8 - Survival Rate For Low Risk Traumas | 98.7% | 98.7% | 99.3% | 99.2% | 99.3% | 98.5% | 99.1% | N/A |
| Indicator 8 - Survival Rate For Moderate Risk Traumas | 92.5% | 90.2% | 100.0% | 90.6% | 92.3% | 88.0% | 88.6% | N/A |
| Indicator 8 - Survival Rate For High Risk Traumas | 43.1% | 71.4% | 0.0% | 58.3% | 40.8% | 51.4% | 28.0% | N/A |
| Other Indicator 1 - Incidents Submitted Within 60 Days Of Patient Discharge | 83.7% | 80.4% | 59.4% | 87.7% | 91.2% | 72.1% | 87.2% | 80.0% |
| Other Indicator 2 - Incidents With Validity Score Greater Than 84 | 97.5% | 99.1% | 99.3% | 99.3% | 98.5% | 91.1% | 99.5% | 90.0% |

Table 3: SEQIS indicator results for 2018 by service area

Data Sources

IHA Inpatient and Outpatient Data Registry: These are patients who were admitted to a given facility. The incidents used for analysis were the patients whose admitting or principal diagnosis was a trauma diagnosis code based on the state's trauma registry inclusion criteria.

Iowa Death Certificate Data: The Bureau of Health Statistics provides the trauma program with trauma-related death statistics. This data is preliminary for 2018, as the finalization of data typically occurs during the summer of the following year.

Iowa EMS Registry: This registry contains the EMS run reports for the state of Iowa in 2018. During this year, the registry transitioned from www.iowafirebridge.com to www.imagetrendelite.com/Elite/?organizationId=iowa. Data is pulled from both sources to complete the year's data.

Iowa Trauma Registry: This is the trauma registry that hospitals are required to submit data to as defined by the inclusion criteria on page 10 of the Iowa Trauma Registry Data Dictionary (https://idph.iowa.gov/Portals/1/userfiles/43/Trauma%20Registry%20Data%20Dictionary%20Jan_%202017.pdf). Note that some facilities track same-level falls resulting in isolated hip fractures, but this data is not required. The information is collected on <https://iowa.imagetrendregistry.com/>.

Attachment 1 – Hospital System State Indicators

Details regarding the calculation of the performance indicators are described below.

- Indicator 1a – Trauma surgeon present in ED within 15 mins. of patient arrival
 - For level 1 trauma activations, how often did the first responding trauma surgeon arrive within 15 minutes of the arrival of the patient.
 - Trauma surgeons are defined as trauma team members who have “Surgery/Trauma” selected for the Trauma Team Member Service Type on the incident form.
 - The response time is calculated as the minutes from the ED/Acute Care Admission Time to the Trauma Team Member Arrived Time.
 - 15 minutes is the indicator for Level I and II facilities.
 - This indicator disregards incidents for which there was no calculable response time for a “Surgery/Trauma” trauma team member.
- Indicator 1b – Trauma surgeon present in ED within 30 mins. of patient arrival
 - Calculated the same as 1a, but 30 minutes is the indicator for Level III facilities.
- Indicator 1c – Trauma surgeon response time unknown
 - For level 1 trauma activations, how often are we unable to calculate the response time of the trauma surgeon.
 - If we are unable to calculate the response time, the incident is missing at least one of ED/Acute Care Admission Date/Time or Trauma Team Member Arrived Date/Time.
- Indicator 1d – 1st physician (Trauma surgeon or ED physician) present in ED within 5 mins. of patient arrival
 - For level 1 and 2 trauma activations, how often did the first responding physician arrive within 5 minutes of the arrival of the patient.
 - Physicians are defined as trauma team members who have “Surgery/Trauma,” “Emergency Medicine,” or “Surgery Senior Resident” selected for the Trauma Team Member Service Type on the incident form.
 - The response time is calculated as the minutes from the ED/Acute Care Admission Time to the Trauma Team Member Arrived Time.
 - 5 minutes is the indicator for Level I and II facilities.
 - This indicator disregards incidents for which there was no calculable response time for a “Surgery/Trauma” or “Emergency Medicine” trauma team member.
- Indicator 1e – 1st physician (Trauma surgeon or ED physician) present in ED within 20 mins. of patient arrival
 - Calculated the same as 1d, but 20 minutes is the indicator for Level III and IV facilities.
- Indicator 1f – Physician response time unknown

- For level 1 and 2 trauma activations, how often are we unable to calculate the response time of the physician.
- If we are unable to calculate the response time, the incident is missing at least one of ED/Acute Care Admission Date/Time or Trauma Team Member Arrived Date/Time.
- Indicator 2 – Missing injury time
 - Calculated as the number of incidents with a missing injury time divided by the total number of incidents for the period.
- Indicator 3 – Trauma patient had a Probability of Survival (Ps) score calculated
 - Calculated as the number of incidents with a valid Probability of Survival score divided by the total number of incidents for the period.
 - Probability of Survival is calculated using the following factors:
 - Injury Severity Score (ISS): Derived from the AIS codes associated with the diagnosis codes.
 - Revised Trauma Score (RTS): Derived from Glasgow Come Scale, systolic blood pressure, and respiratory rate.
 - Patient age.
 - Trauma type: Derived from the injury code (found on the Injury tab in ImageTrend) and its associated trauma type.
 - If any of those factors are missing, the Probability of Survival score will not be calculated.
 - Injuries with a trauma type of burn are excluded from this calculation.
- Indicator 4a – Deceased trauma patient was autopsied
 - Calculated as the number of incidents with a “Yes” value for Autopsy divided by the number of incidents with a value of “Deceased/Expired” for either ED/Acute Care Disposition or Hospital Discharge Disposition.
- Indicator 4b – No autopsy done on death with stay greater than 72 hours
 - Calculated as the number of deceased patients who were at the facility for over 72 hours and did not have an autopsy performed divided by all deceased patients who were at the facility for over 72 hours.
- Indicator 5a – Blood ETOH was measured
 - Calculated as the number of patients who had blood ETOH measured divided by all patients.
 - This does not exclude any patients, so pediatric patients are included.
- Indicator 5b – Blood ETOH was positive
 - Calculated as the number of patients who had a positive blood ETOH divided by the number of patients who had blood ETOH measured.
- Indicator 6a – 1st hospital initial GCS < 9 with no head CT done before transfer to definitive care

- Calculated as the number of patients with a GCS less than 9 at the first hospital who did not have a head CT prior to transfer divided by the number of patients with a GCS less than 9 at the first hospital who were transferred.
- The numbers for your hospital are only for patients who were not transferred out of your facility, so this indicator for your facility is for patients who received definitive care at your facility.
- Indicator 6b – 1st hospital initial GCS < 9 arrived to definitive care > 3 hours in transferred patients
 - Calculated as the number of patients with a GCS less than 9 at the first hospital who arrived to definitive care over 3 hours from injury time divided by the number of patients with a GCS less than 9 who were transferred.
- Indicator 7 – SEQIC population that arrived to definitive care in > 3 hours from injury time
 - Calculated as the number of patients who took more than 3 hours to arrive at the definitive care facility from injury time divided by all patients.
 - Definitive care is determined the same as in 6a, i.e. patient is not transferred out.
- Indicator 8 – Survival rate by risk for death (high, moderate, and low) stratified by trauma hospital level
 - The definitions for risk levels are as follows (Abnormal Physiology thresholds also listed):
 - Abnormal Physiology
 - GCS 3-5
 - Respiration <5 or >30 respirations per minute
 - Systolic Blood Pressure <60 mm Hg
 - Risk Definitions
 - High
 - Probability of Survival <2 **OR**
 - ISS >41 **OR**
 - ISS >24 if Abnormal Physiology
 - Moderate
 - Probability of Survival 0.2-<0.5 **OR**
 - ISS 16-41
 - Low
 - Probability of Survival 0.5-1.0 **OR**
 - ISS <16 **OR**
 - Normal range physiology
 - All survival rates are calculated as the number of patients who do not have an ED/Acute Care Disposition or Hospital Discharge Disposition of “Deceased/Expired” divided by all patients.

- Other Indicator 1 – Incident submitted within 60 days of patient discharge
 - Calculated as the number of incidents entered in the trauma registry within 60 days of patient discharge divided by the number of all incidents.
 - The data dictionary specifies that 80% of incidents should be entered within 60 days of patient discharge, and 100% of incidents should be entered within 120 days of patient discharge.
 - The patient discharge date is the later of ED/Acute Care Admission Date and Hospital Discharge Date.
- Other Indicator 2 – Incident has validity score of 85% or greater
 - Calculated as the number of incidents with a validity score of 85% or greater divided by all incidents.