



SOUTH DAKOTA
DEPARTMENT OF HEALTH



Traumatic Brain Injury

SOUTH DAKOTA

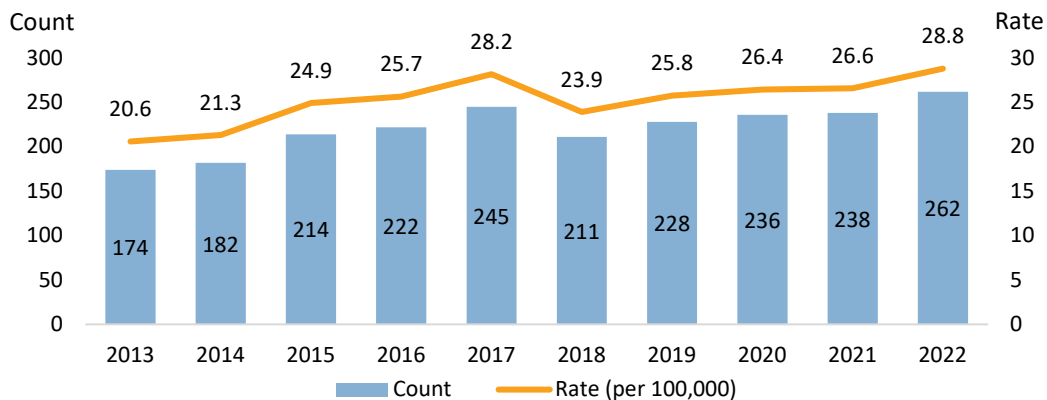
Background

Traumatic brain injury (TBI) is a head injury caused by an external force to the head or body resulting in disruption of normal brain function. TBI has multiple causes, including motor vehicle accidents, firearm injuries, falls, etc., and there are multiple types of brain injury, such as fracture of skull, intracranial injury, etc. This report examines causes of TBI-related deaths and morbidity among South Dakota residents and which populations are at greater risk of getting a TBI.

TBI-Related Deaths in South Dakota

From 2013 to 2022, there were 2,212 TBI-related deaths among South Dakota residents. In 2022, there were 262 TBI-related deaths, which was a 51% increase from 174 deaths in 2013, see Figure 1. South Dakota had the 12th highest age-adjusted TBI-related death rate in 2021. The age-adjusted rate for South Dakota in 2021 was 25.9 per 100,000 and the United States rate was 19.5 per 100,000.

Figure 1: TBI-Related Deaths by Year, 2013-2022

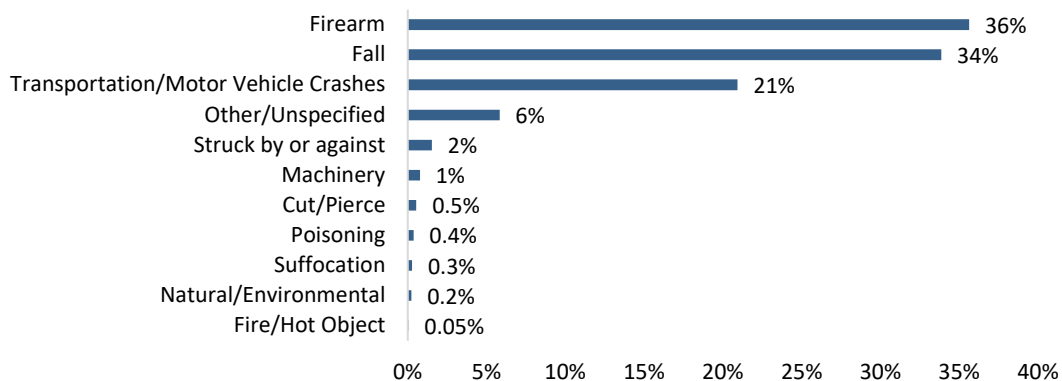


Causes of TBI-Related Deaths

36%
of TBI-related
deaths were
due to firearms

Most TBI-related deaths were unintentional (59%). Suicides accounted for 32% of TBI-related deaths, homicide 7%, undetermined intent 1%, and legal intervention <1%. Of the 2,212 TBI-related deaths, all had a cause other than TBI listed as the primary cause of death. The three top primary causes of death were firearms (36%), falls (34%), and transportation (21%), Figure 2.

Figure 2: TBI-Related Deaths by Cause, 2013-2022



TBI-Related Deaths by Type

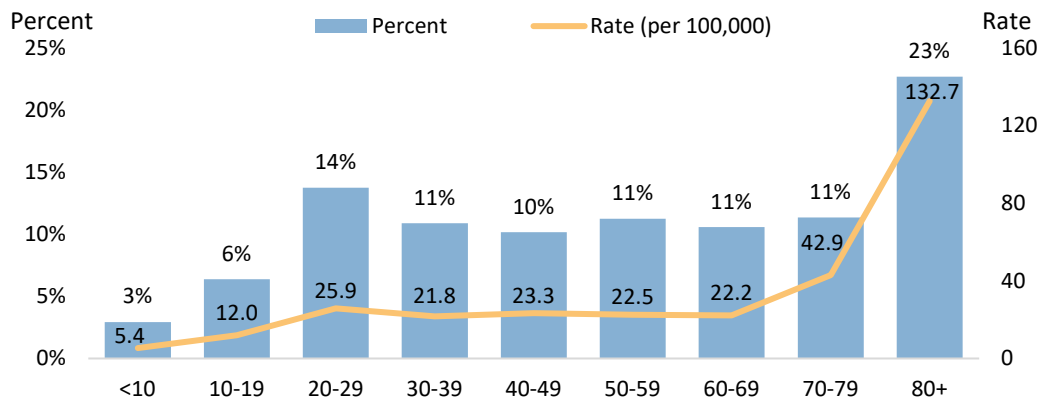
TBI-related deaths can also be categorized by injury type, which describes the head injury sustained. Intracranial injuries made up the largest proportion of TBI-related deaths at 37%. The second most common type was open wounds of the head (30%), followed by other and unspecified injuries of the head (29%), and other types of injuries (4%).

High Risk Populations

Age

Although TBI-related deaths can occur at any age, the likelihood of dying from a TBI-related cause increases with age. The highest percentage and rate of TBI-related deaths were among South Dakotans aged 80 years and older, and the second-highest percentage was among 20-29-year-olds, Figure 3.

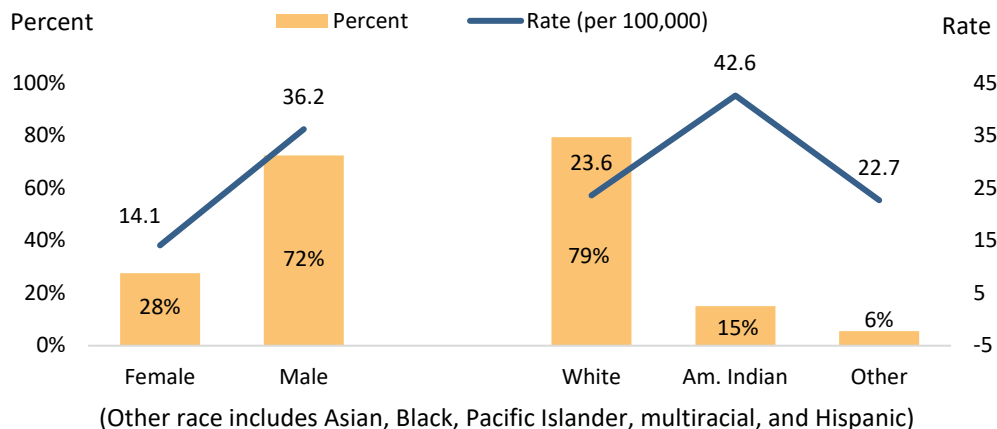
Figure 3: TBI-Related Deaths by Age Group, 2013-2022



Sex and Race

Overall, males were more likely to die from a TBI-related death than females. Males made up 72% of deaths and had a rate 2.6 times higher than the female rate (36.2 vs 14.1 per 100,000). The largest proportion of TBI-related deaths were among the White population (79%), but American Indians died from TBI-related causes at a rate almost two times higher than the White population (42.6 vs 23.6 per 100,000), Figure 4.

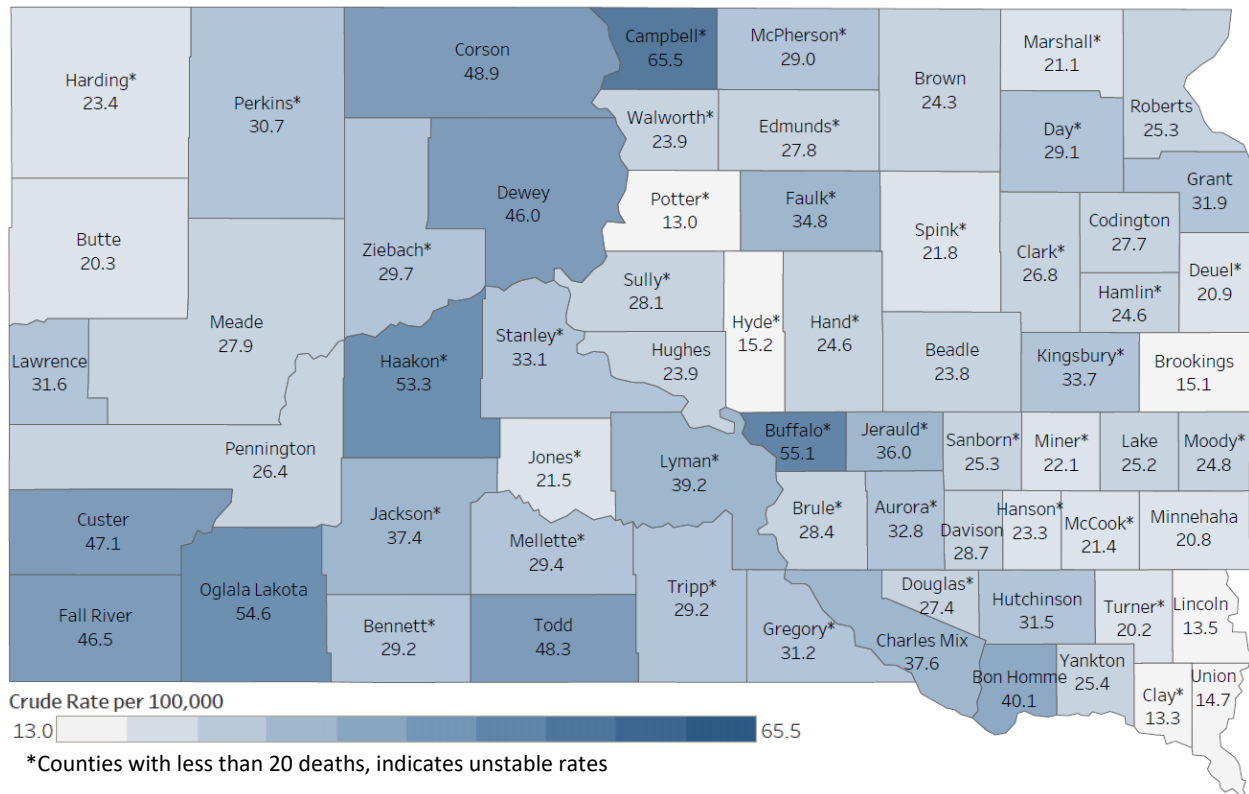
Figure 4: TBI-Related Deaths by Sex and Race, 2013-2022



TBI-Related Deaths by County

The figure below shows TBI-related death rates by county. Among counties with stable rates for comparison (≥ 20 deaths), the top five counties included Oglala Lakota (54.6 per 100,000), Corson (48.9), Todd (48.3), Custer (47.1), and Fall River (46.5).

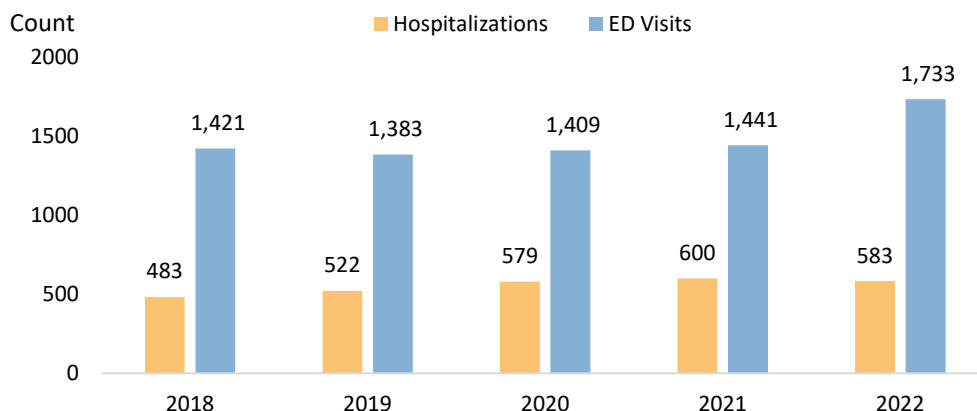
Figure 5: TBI-Related Deaths by County, 2013-2022



TBI-Related Hospitalizations and Emergency Department Visits in South Dakota

Not all head injuries lead to death. From 2018 to 2022, there were 2,767 TBI-related hospitalizations and 7,387 emergency department (ED) visits among South Dakota residents, Figure 6. In 2022, there were 1,733 ED visits, which was a 22% increase from 1,421 visits in 2018. There was a similar (21%) increase among TBI-related hospitalizations during the same period.

Figure 6: TBI-Related Hospitalizations and ED Visits, 2018-2022

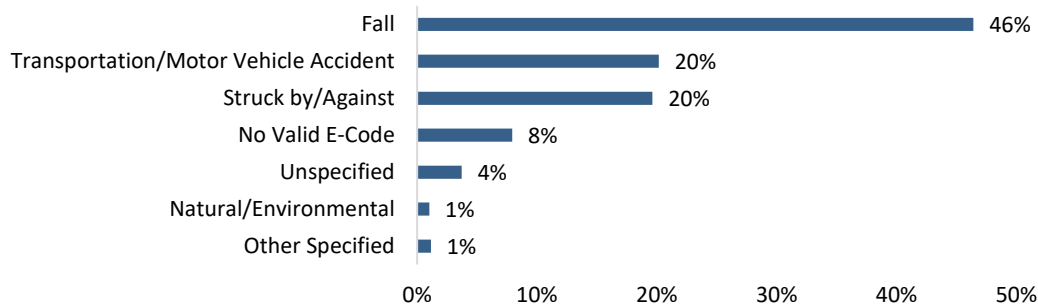


Causes of TBI-Related Hospitalizations and ED Visits

46%
of TBI-related hospitalizations & ED visits were due to falls

Nearly all (92%) TBI-related hospitalizations and ED visits had an external cause of injury listed. External cause of injury refers to the intent and mechanism by which an individual sustained their injury, sometimes this information is unknown (about 8% of hospitalizations and ED visits). Of the records with a valid external cause of injury listed, 82% were unintentional and 10% were due to assault. By mechanism, 46% were due to falls, 20% were due to transportation/motor vehicle crashes, and 20% were due to being struck by/against, see Figure 7.

Figure 7: TBI-Related Hospitalizations and ED Visits by Cause, 2018-2022



TBI-Related Hospitalizations and ED Visits by Type

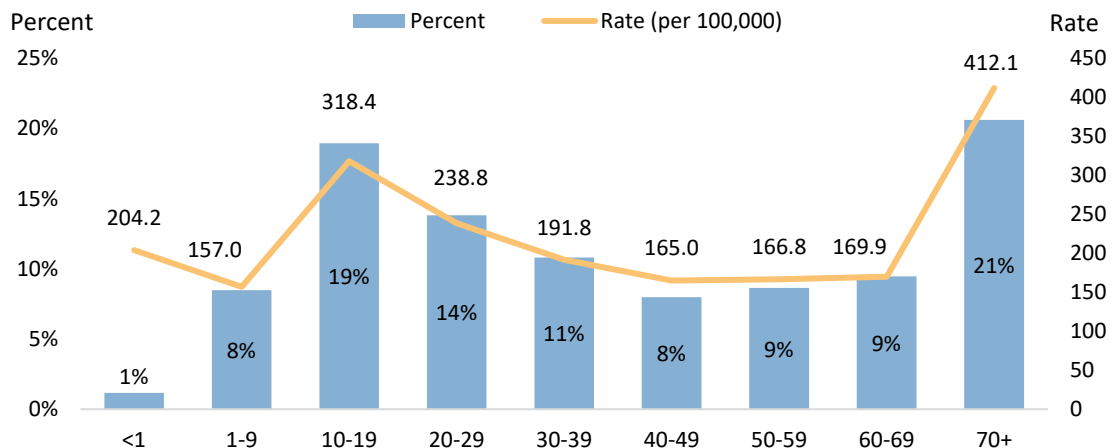
The most common head injury type sustained was an intracranial injury, which accounted for 93% of visits. Fractures of the skull accounted for 5% of visits, and fractures of other specified skull and facial bones/unspecified fractures accounted for 2% of visits.

High Risk Populations

Age

South Dakotans are at risk for a TBI at any age, but there are certain age groups that are at an increased risk for TBI-related hospitalizations and ED visits. South Dakotans aged 70+ years (412.1 per 100,000) followed by 10-19 years (318.4) made up the largest proportion and have some of the highest rates of TBI-related visits, Figure 8.

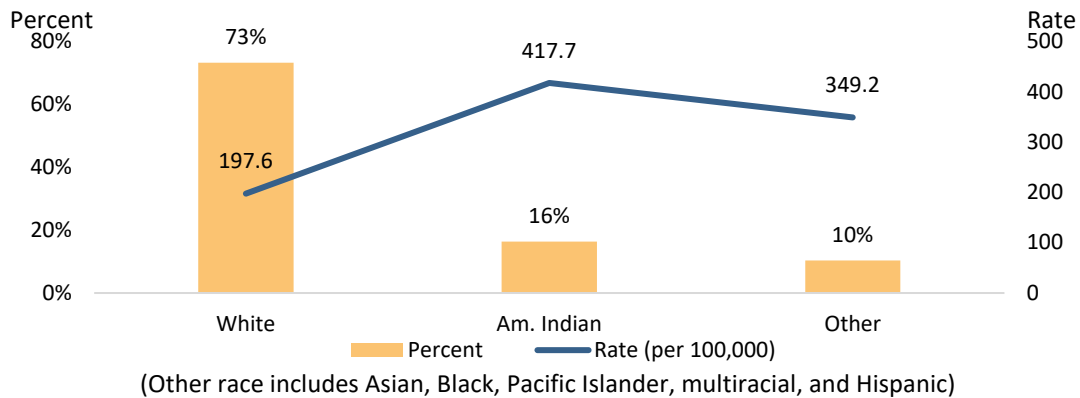
Figure 8: TBI-Related Healthcare Encounters (Hospitalizations and ED Visits) by Age Group, 2018-2022



Sex and Race

Overall, males are more likely to suffer from a TBI and seek medical care. Males made up 64% of TBI-related hospitalizations and 54% of ED visits. The largest proportion of TBI-related hospitalizations and ED visits were among the White population (73%). However, American Indians were seen for TBI-related medical care at a rate two times higher than the White rate (417.7 per 100,000 vs. 197.6 per 100,000), Figure 9.

Figure 9: TBI-Related Hospitalizations and ED Visits by Race, 2018-2022



Conclusion

Traumatic brain injury contributes to a substantial proportion of death and disability in South Dakota. This report identified falls and transportation/motor vehicle crashes as some of the top causes of TBI-related mortality and morbidity. This report also identified persons in the 10-19 and 70+ year age group to be at highest risk of TBI hospitalizations/ED visits, but persons in the 80+ year age group at highest risk of TBI mortality. The higher rate of TBI hospitalization/ED visits and death among American Indians is an opportunity for health equity-focused prevention through awareness and risk mitigation. The findings in this report emphasizes the continued need for injury prevention resources.

Data Sources and Methods

Data Sources

South Dakota Department of Health (DOH) Vital Statistics
South Dakota Association of Healthcare Organizations (SDAHO)
Centers for Disease Control and Prevention (CDC) WISQARS

Data Methods

Mortality (Vital Statistics data) and nonfatal visits (SDAHO) data sets were created following guidance from the State Injury Indicators (SII) Report. The SII Report can be found at the following link: https://www.cdc.gov/injury/pdfs/2019_state_injury_indicator_instructions-508.pdf. National data was pulled from CDC WISQARS.

For more information on traumatic brain injury visit:

Brain Injury Association of America: <https://www.biausa.org/brain-injury/about-brain-injury/nbiic/what-is-the-difference-between-an-acquired-brain-injury-and-a-traumatic-brain-injury>
National Institute of Neurological Disorders and Stroke: <https://www.ninds.nih.gov/health-information/disorders/traumatic-brain-injury-tbi>