



SOUTH DAKOTA  
DEPARTMENT OF HEALTH



# Traumatic Brain Injury

SOUTH DAKOTA

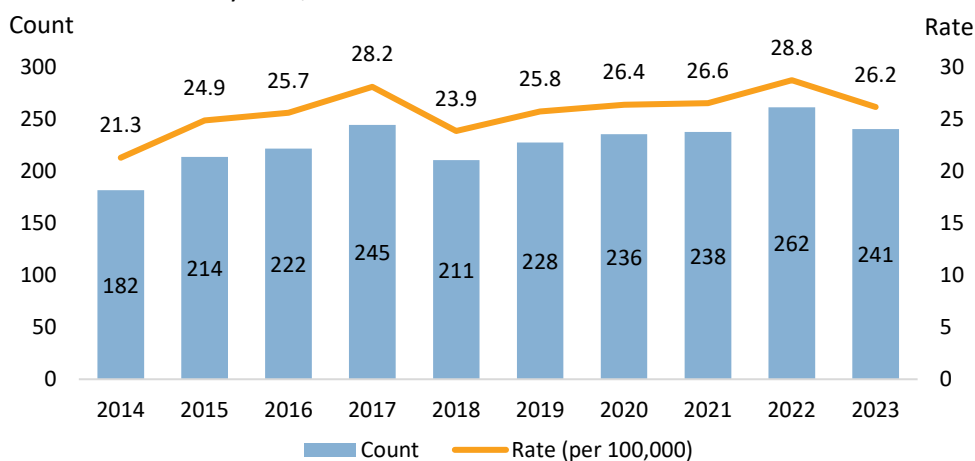
## Background

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, and other injuries. There are multiple types of brain injury, such as fracture of the skull, intracranial injury, etc. This report examines the 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 2014 to 2023, there were 2,279 TBI-related deaths among South Dakota residents. In 2023, there were 241 TBI-related deaths, which was a 32% increase from 182 deaths in 2014, see Figure 1. South Dakota had the 9<sup>th</sup> highest age-adjusted TBI-related death rate in 2022. The age-adjusted rate for South Dakota in 2022 was 26.4 per 100,000, and the United States rate was 19.2 per 100,000.

Figure 1: TBI-Related Deaths by Year, South Dakota

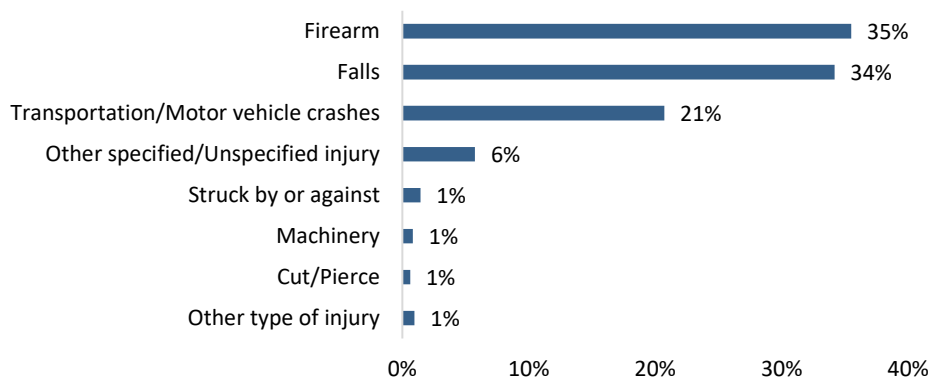


## Causes of TBI-Related Deaths

**35%**  
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 2,279 TBI-related deaths, all had a cause other than TBI listed as the primary cause of death. The top three primary causes of death were firearms (35%), falls (34%), and transportation (21%), Figure 2.

Figure 2: TBI-Related Deaths by Cause, 2014-2023



## TBI-Related Deaths by Type

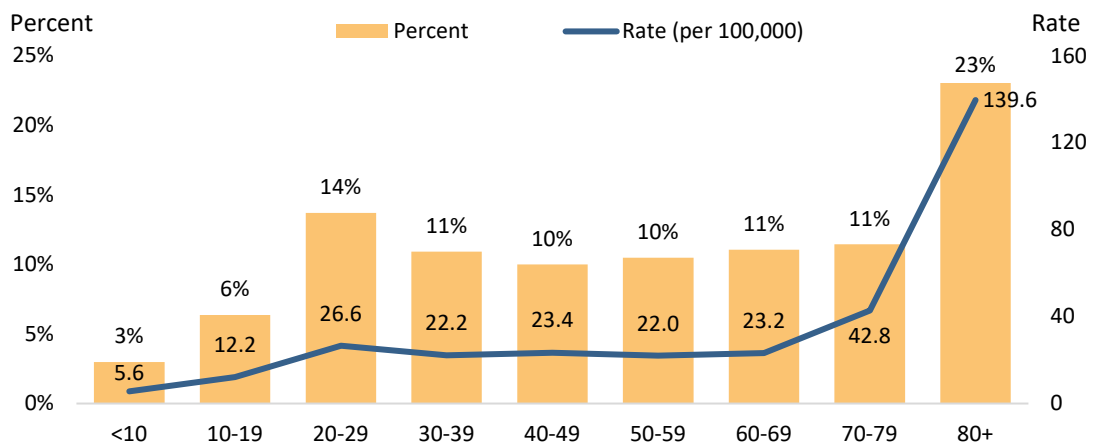
TBI-related deaths can also be categorized by injury type, which describes the head injury sustained. Intracranial injuries made up the largest proportion of TBI-related deaths at 38%. The second most common type was open wounds of the head (30%), followed by other and unspecified injuries of the head (28%) 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.

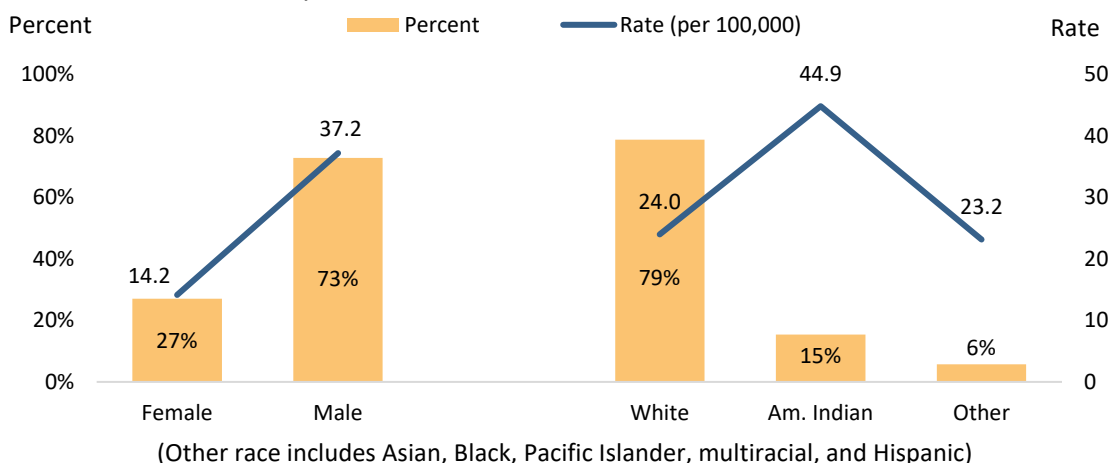
Figure 3: TBI-Related Deaths by Age Group, 2014-2023



### Sex and Race

Overall, males were more likely to die from a TBI-related death than females. Males made up 73% of deaths and had a rate 2.6 times higher than the female rate (37.2 vs 14.2 per 100,000). The largest proportion of TBI-related deaths were among the White population (79%). However, American Indians experienced TBI-related deaths at nearly twice the rate of the White population (44.9 vs 24.0 per 100,000), Figure 4.

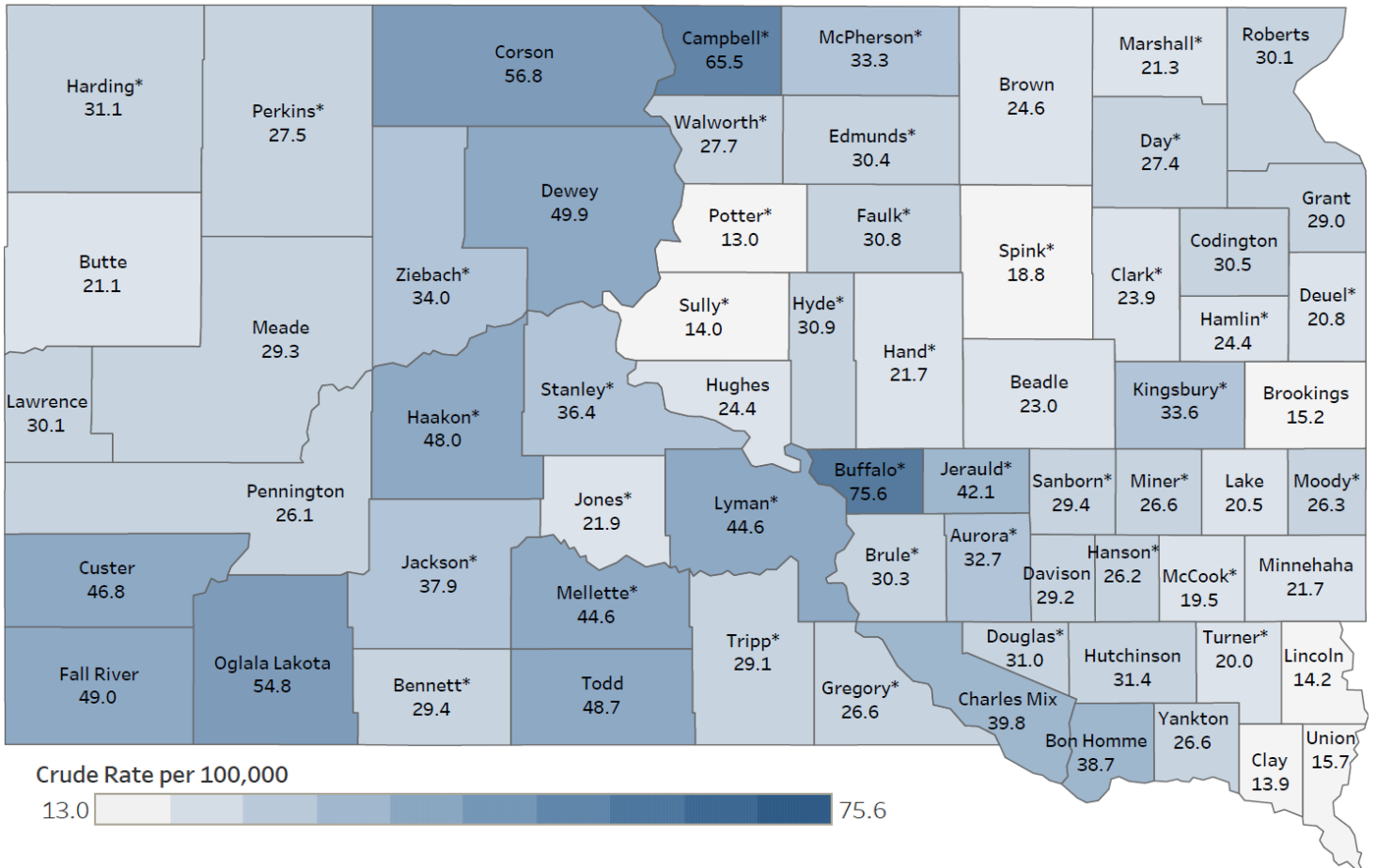
Figure 4: TBI-Related Deaths by Sex and Race, 2014-2023



## TBI-Related Deaths by County

The figure below shows TBI-related death rates (crude rates per 100,000) by county. Among counties with stable rates for comparison ( $\geq 20$  deaths), counties with the top 5 highest rates included Corson (56.8 per 100,000), Oglala Lakota (54.8 per 100,000), Dewey (49.9 per 100,000), Fall River (49.0 per 100,000), and Todd (48.7 per 100,000).

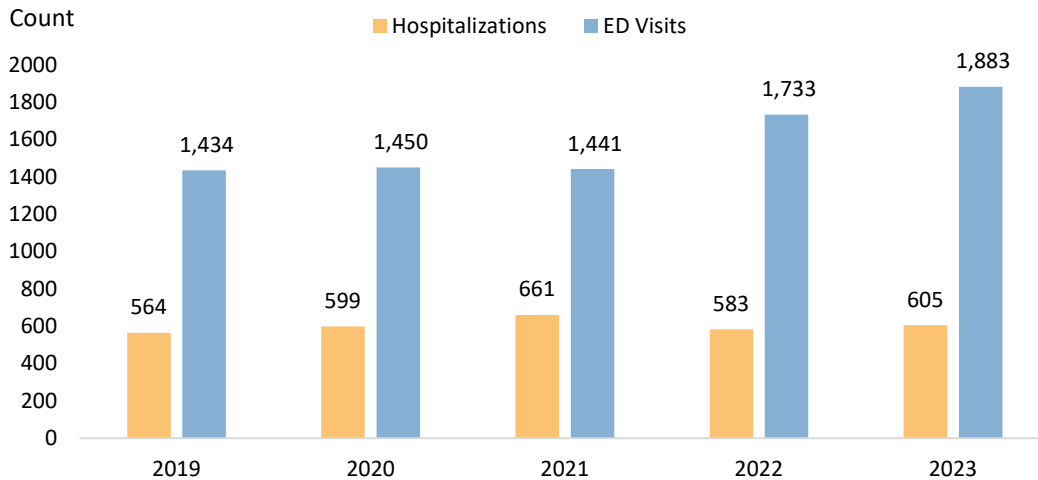
Figure 5: TBI-Related Deaths by County, 2014-2023



## TBI-Related Hospitalizations and Emergency Department Visits in South Dakota

Not all head-related injuries lead to death. From 2019 to 2023, there were 3,012 TBI-related hospitalizations and 7,941 emergency department (ED) visits among South Dakota residents, Figure 6. In 2023, there were 1,883 ED visits, a 31% increase from 1,434 visits in 2019.

Figure 6: TBI-Related Hospitalizations and ED Visits, 2019-2023

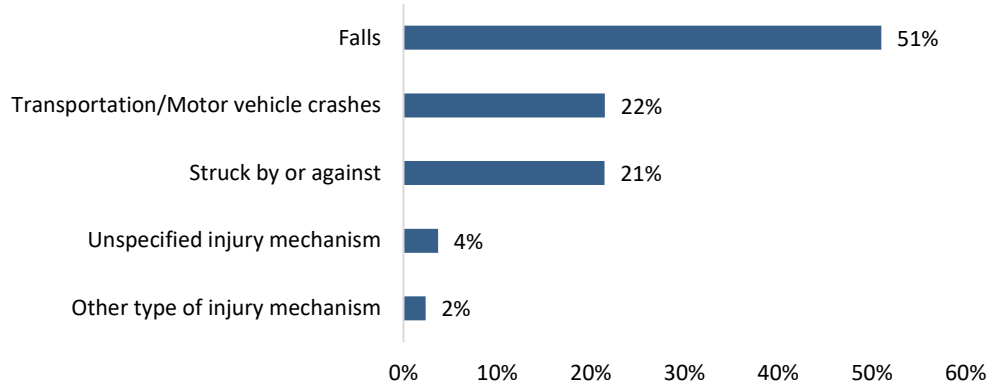


## Causes of TBI-Related Hospitalizations and ED Visits

**51%**  
of TBI-related  
hospitalizations  
& ED visits were  
due to falls

Of the 10,953 TBI-related visits, nearly all (92%) had a valid external cause of injury code listed. External cause of injury refers to the intent and mechanism by which an individual sustained their injury. Of the records with a valid external cause of injury listed (n=10,065), 89% were unintentional, 11% were due to assault, and less than 1% were other intent. By mechanism, 51% were due to falls, 22% were due to transportation/motor vehicle crashes, and 21% were due to being struck by or against, see Figure 7.

Figure 7: TBI-Related Hospitalizations and ED Visits by Cause, 2019-2023



## TBI-Related Hospitalizations and ED Visits by Type

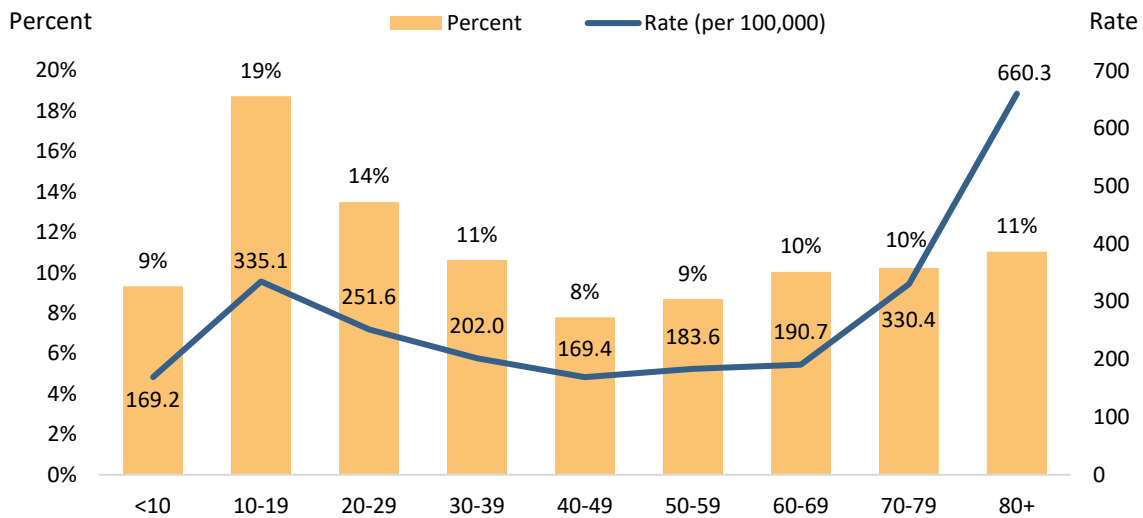
The most common head injury type sustained was an intracranial injury, which accounted for 95% of visits. Fractures of the skull accounted for 5% of visits, and fractures of other specified skull and facial bones accounted for less than 1% of visits.

## High Risk Populations

### Age

South Dakotans are at risk for a TBI at any age, but certain age groups are at an increased risk for TBI-related hospitalizations and ED visits. South Dakotans aged 10-19 years made up the largest proportion of visits from 2019 to 2023, but adults aged 80 years and older had the highest rate of TBI-related visits (660.3 per 100,000), Figure 9.

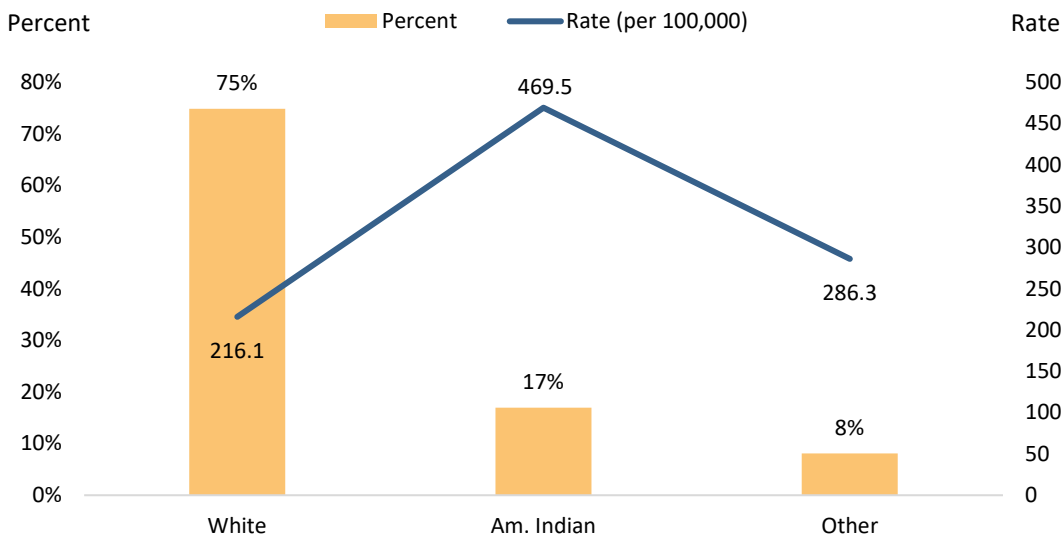
Figure 8: TBI-Related Hospitalizations and ED Visits by Age Group, 2019-2023



### Sex and Race

Overall, males are more likely to suffer from a TBI and seek medical care. Males made up 57% of TBI-related visits. The largest proportion of TBI-related hospitalizations and ED visits were among the White population (75%). However, American Indians were seen for TBI-related injuries at a rate 2.2 times higher than the White rate (469.5 per 100,000 vs. 216.1 per 100,000), Figure 9.

Figure 9: TBI-Related Hospitalizations and ED Visits by Race, 2019-2023



(Other race includes Asian, Black, Pacific Islander, multiracial, Hispanic, and unknown race)

## 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 80+ year age group to be at the highest risk of TBI-related hospitalizations/ED visits and 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.

## Prevention Resources

To learn about available state and national resources, visit <https://doh.sd.gov/health-data-reports/injury-prevention/traumatic-brain-injury-data/>.

To view additional injury prevention resources, visit <https://doh.sd.gov/health-data-reports/injury-prevention/>.

## 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-core-sipp/media/pdfs/2024/06/CORRECTED-2022-Injury-Indicator-Instructions.pdf>.

National data was pulled from CDC WISQARS.