Traumatic Brain Injury in Young Californians Aged 0-24, 2022

Injury and Violence Prevention Branch

CDPH California Department of Public Health

About Traumatic Brain Injuries

A traumatic brain injury (TBI) can result from a bump, blow, jolt, or penetration to the head and can disrupt normal brain functions, with short- to long-term effects. TBIs can negatively affect cognitive, behavioral, emotional, and physical health.

Depending on the severity of the injury, TBIs can have varying effects on development across the lifespan, impacting learning, social participation, and cognitive abilities. For young Californians aged 0-24, TBIs may present unique challenges, as severe cases often result in hospitalizations, require specialized care, and may lead to life-long health challenges[1].

What's Inside This Report

This data brief highlights TBI cases among young Californians aged 0-24, focusing on non-fatal TBIs that resulted in emergency department (ED) visits and hospitalizations in 2022 using data from the California Department of Healthcare Access and Information (HCAI). Injury hospitalizations are generally considered more severe than those treated during an ED visit. This brief examines injury trends for both severities by age group, sex, and ethnicity, and identifies leading causes within these demographics. By analyzing these trends, we can better understand the risks from TBIs in each age group and support efforts to inform public health prevention strategies to improve the safety and well-being of younger Californians.

Young Californians: Ages 0-24

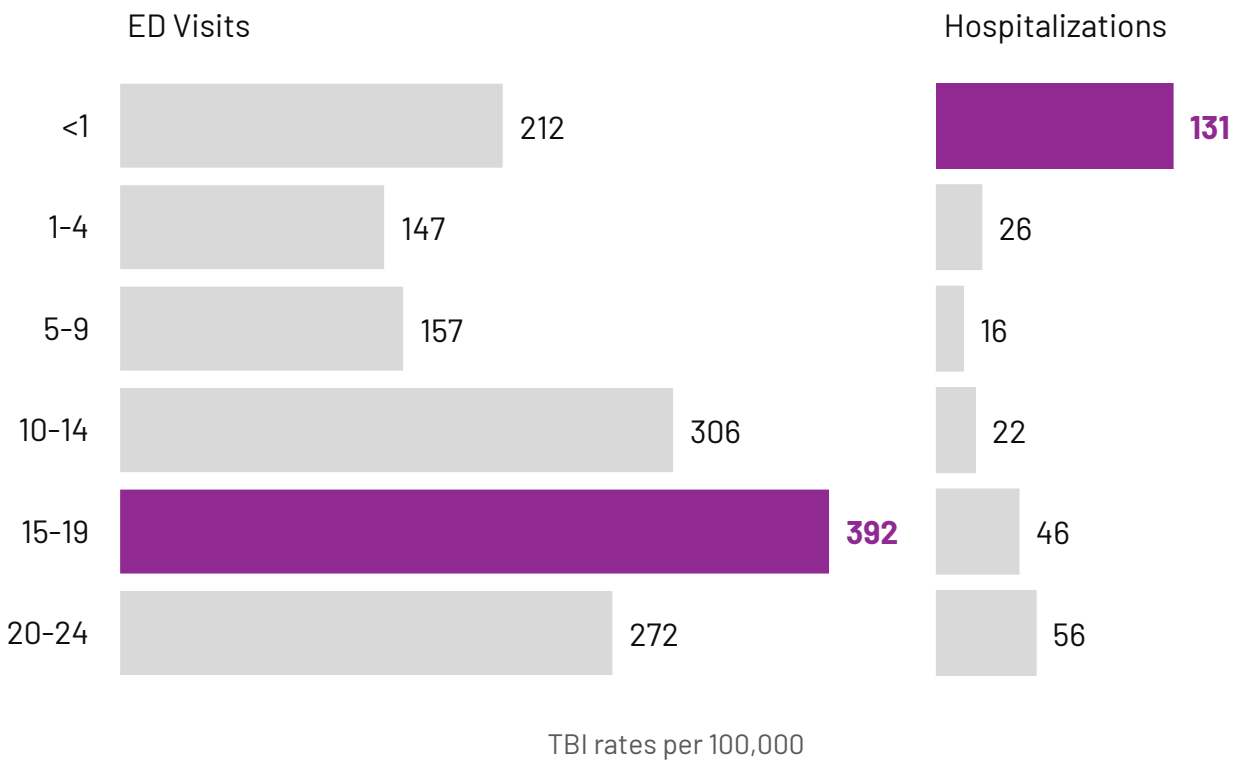
In 2022, there were **33,626 ED visits** and **4,827 hospitalizations related to TBI among young Californians aged 0-24**. Due to variability in risk and outcomes by age throughout childhood and young adulthood, this brief focuses on the following age groups:

- **<1 year**
- **1-4 years**
- **5-9 years**
- **10-14 years**
- **15-19 years**
- **20-24 years**

[1] About Moderate and Severe TBI https://www.cdc.gov/traumatic-brain-injury/about/moderate-severe-tbi.html

TBI by Age Group

The highest rate of TBI-related ED visits occurred among teenagers aged 15-19, while the highest rate of TBI-related hospitalizations occurred among infants under 1 year old.



Infants under 1 year old experienced the highest rate for hospitalizations (131 per 100,000) but had the third lowest rate for ED visits (212 per 100,000) across all age groups. This may indicate that infants tend to experience greater severity of TBI, requiring hospitalizations more frequently than other age groups.

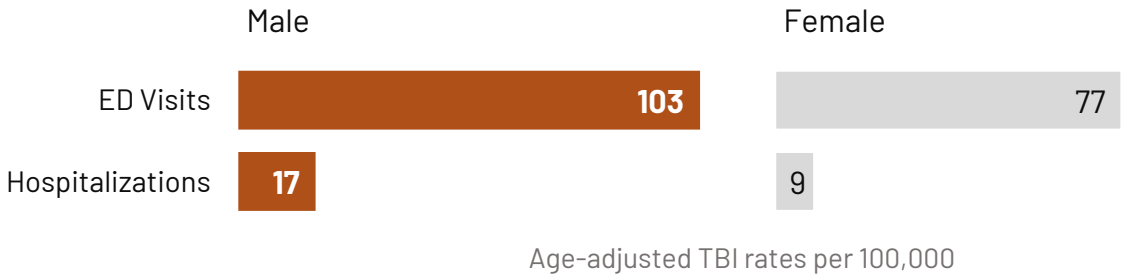
Among adolescents aged 10-14, ED visit rates increased to 306 per 100,000, nearly doubling the rate for children ages 5-9. This may suggest an increase in the risk of TBIs as young people begin to transition from childhood to adolescence.

Teenagers aged 15-19 experienced the highest rate of ED visits; however, their hospitalization rate was only the third highest across all age groups. This suggests that while TBIs are more frequent among teenagers aged 15-19, they are less likely to require hospitalization compared to the other age groups.

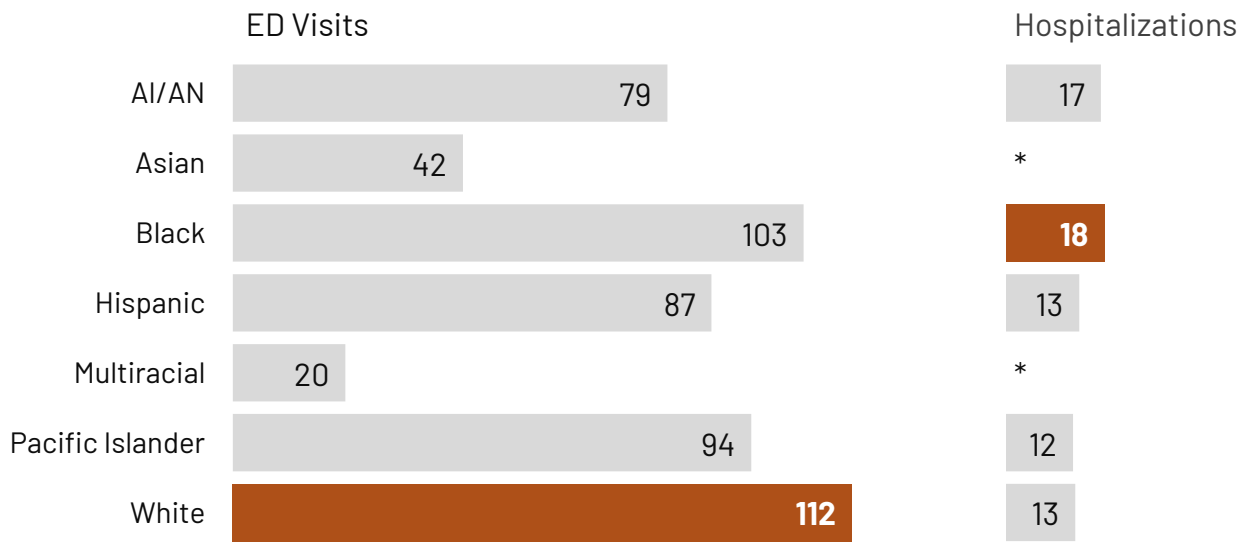
While young adults aged 20-24 had the third-highest ED visit rate overall, they had the second highest hospitalization rate compared to the other age groups. This may indicate an increase in TBI injury severity within this age group.

TBI by Sex and Race/Ethnicity

The highest age-adjusted rate of TBI-related ED visits occurred among male young Californians compared to female young Californians[†]. Similarly, age-adjusted hospitalization rates in male young Californians were nearly double those of female young Californians.



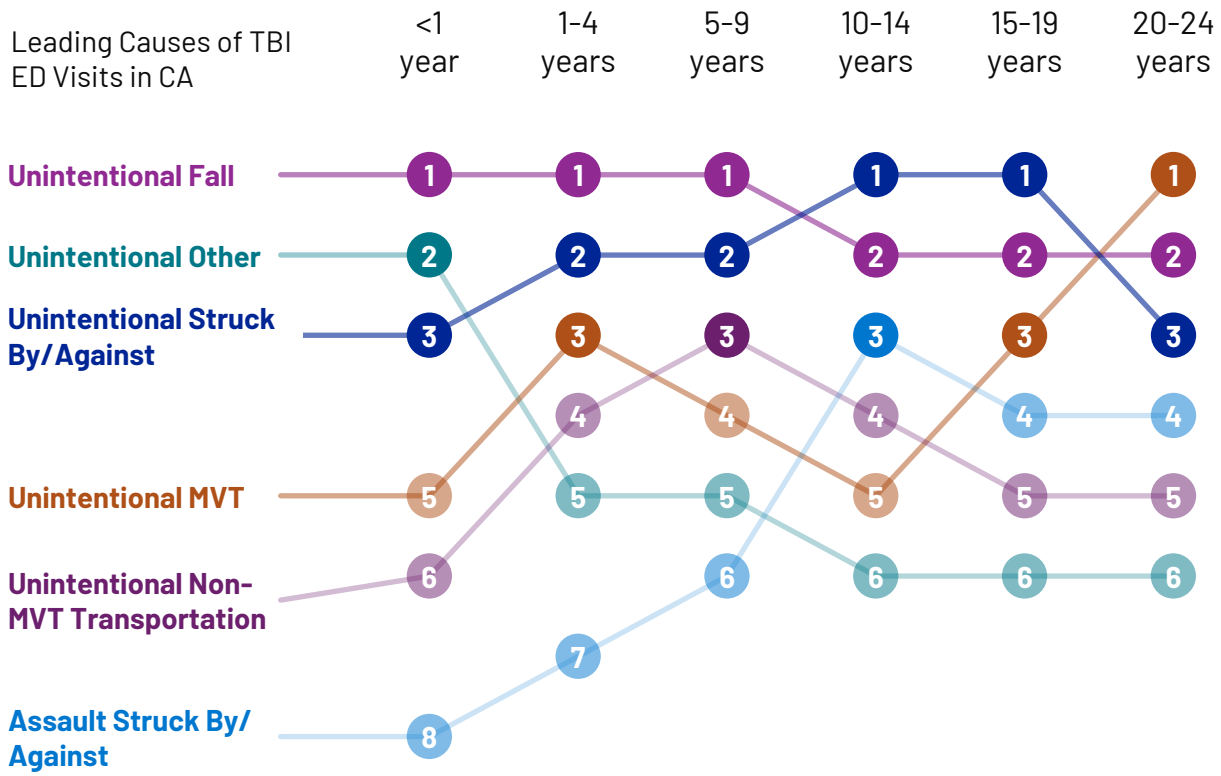
Young Californians who are White had the highest rate of ED visits, while young Californians who are Black had the highest rate of hospitalizations.



*Age-adjusted rates for hospitalizations suppressed due to small number of incidents in Asian and Multiracial populations.

Age-adjusted rates for ED visits for ages 0-24 by race/ethnicity were highest among young Californians who are White, followed by young Californians who are Black, and Pacific Islander young Californians. For hospitalizations, age-adjusted rates were highest among young Californians who are Black, followed by young Californians who are American Indian/Alaskan Native (AI/AN).

Leading Causes of TBI-related ED Visits

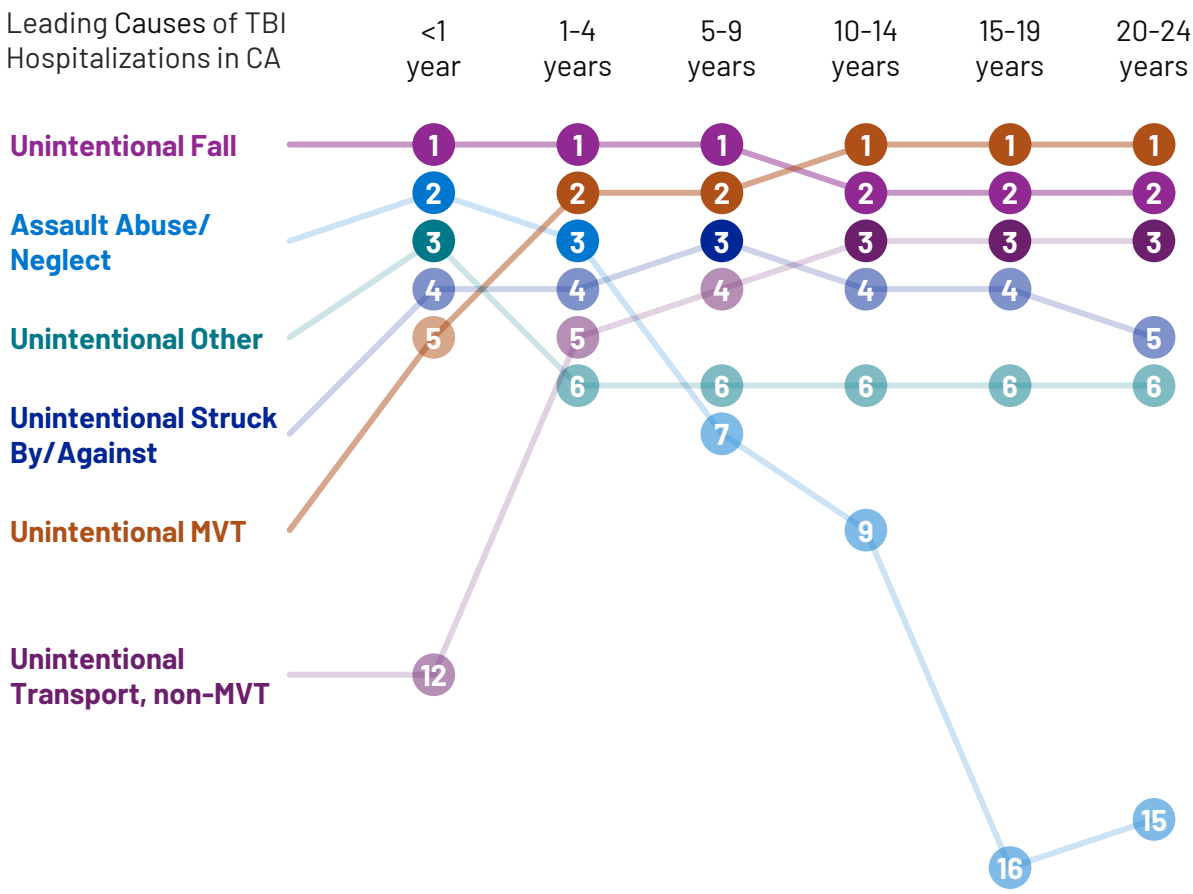


Unintentional falls were ranked as the leading cause of TBI ED visits among ages 0-9 in 2022 representing 84% of TBI-related ED visits for children under 1 year old and 79% for children aged 1-4 years. For ages 10-24, unintentional falls were ranked as the second leading cause for TBI-related ED visits.

Unintentional struck-by/against was ranked as the leading cause of TBI ED visits for ages 10-19 in 2022 and struck by/against injuries consistently ranked in the top three causes of TBI across all age groups. The most common descriptions for the unintentional struck by/against included: striking against or being struck by other objects, accidental hit or strike by another person, and accidentally striking against or bumped into by another person.

Unintentional motor vehicle traffic (MVT) was ranked as the leading cause of TBI ED visits for ages 20-24 in 2022. MVT-related TBI injuries ranked within the top five causes across all age groups, highlighting the need for robust transportation safety education and injury prevention efforts.

Leading Causes of TBI-related Hospitalization



Unintentional falls were ranked as the leading cause of TBI-related hospitalizations for ages 0-9 in 2022, representing 71% of TBI-related hospitalizations among infants under 1 year and 65% for children aged 1-4 years. For ages 10-24, unintentional falls were ranked second for TBI-related hospitalizations.

Unintentional Motor Vehicle Traffic (MVT) injuries were ranked as the leading cause of TBI in older children aged 10-14 through young adulthood ages 20-24 in 2022. For ages 1-9, MVT was ranked second. This highlights the importance of transportation safety education across all age groups and a focus on proper car seat usage for younger age groups.

TBIs resulting from unintentional non-motor vehicle transportation were ranked third for ages 10-24 in 2022. Unintentional non-MVT includes injuries related to bicycles and scooters, highlighting the need for active transportation safety programs.

TBI Resources for Public Health Professionals

To support efforts in addressing TBIs in children, the Centers for Disease Control and Prevention (CDC) released the report to Congress on the Management of Traumatic Brain Injury in Children: Opportunities for Action, which highlights the impact of TBIs on the health and well-being of children, identifies gaps in current systems, and offers actionable strategies to improve care and outcomes. TBIs in Californians aged 0-24 are often associated with unintentional falls, and commonly addressed through fall prevention programs and education. See below for resources to support public health prevention efforts for leading causes of TBI in young Californians.

1 Falls Prevention

The CDC created Protect the Ones You Love From Falls to educate and raise awareness about falls, which often occur at home, on playgrounds, or during sports and outdoor activities. Additionally, the Early Care and Education (ECE) Portal offers up-to-date information to support ECE professionals in promoting child safety and development.

2 Transportation Safety

CDPH's Vehicle Occupant Safety Program (VSOP) oversees the Child Passenger Safety in California program, which provides resources such as: car seat installation and safety information, education on California laws and regulations, and training courses for instructors and technicians.

To address the safety of young drivers, the CDC provides resources such as the Teen Drivers program and the Graduated Driver Licensing (GDL) System Planning Guide, which assists states in creating, implementing, and improving GDL practices.

UC Berkely's Safe Transportation Research and Education Center (SafeTREC) developed the Transportation Injury Mapping System (TIMS) as a data resource to provide quick and free access to California crash data.

3 Active Transportation and Sports Related Injury Prevention

CDPH's Active Transportation Safety Program (ATSP) assists local communities in promoting and encouraging safe active transportation education for Californians. Some resources include Safe Routes to School (SRTS) and ATSP's Resource Center.

The CDC created the HEADS UP concussion program to provide free tools and resources for healthcare providers, school professionals, and athletic trainers to help them recognize and respond to TBI including concussions and head injuries. The program also provides guidelines for proper helmet safety for a variety of activities.

Technical Notes

†The California Department of Health Care Access and Information Patient Discharge Data and ED data used in this analysis reports only the biological sex of the patient, so it was not possible to explore variation based on gender identity.

Methods

1 Source Data

Hospitalizations identified from the 2022 California Department of Health Care Access and Information (HCAI) Patient Discharge Data (PDD); and **ED visits** identified from the 2022 HCAI ED data, respectively.

2 TBI Case Definition

TBI non-fatal hospitalizations and ED visit case definition diagnosis codes from Thomas KE, Johnson RL. State injury indicators report: Instructions for preparing 2022 data. Atlanta (GA): Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2024.

3 Rates per 100,000 Population

Calculated using 2022 population data from California Department of Finance. Demographic Research Unit. Report P-3: Population Projections, California, 2020-2060 (Baseline 2019 Population Projections; Vintage 2023 Release). Sacramento: California. July 2023. Age-adjusted rates calculated using the direct method with the year 2000 U.S. standard population.

Mission

This data brief is a product of the California Department of Public Health (CDPH) Injury and Violence Prevention Branch (IVPB). IVPB's mission is to help Californians achieve their full potential by ensuring that everyone has safe places in which to live, work, play, and fully participate in all activities of daily life free of violence or injury.

Suggested Citation

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