Riverside University HEALTH SYSTEM
Public Health

HEALTH MATTERS BRIEF

Traumatic Brain Injuries Overview in Riverside County, CA

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INTRODUCTION

Worldwide, there are 50–60 million people affected by traumatic brain injuries (TBI) annually, which costs the global economy $400 billion each year (Deng T. et al., 2024). In the United States, 1.7 million new cases occur each year (Bennett, E.R. et al., 2016). Other organs can self-repair after injury or damage; however, for the brain, any form of TBI, including mild cases, can result in long-term neurological issues that create cognitive, behavioral, and immunologic challenges (Das M. et al., 2012). It impacts not only individuals with TBI but also their families and caregivers (Matney, C., Bowman, K., & Berwick, D., 2022).

In this brief, TBI is defined as a bump, blow, jolt or penetrating unintentional injury to the head that results in mild to severe diagnosis or death. Data and methodology applied can be referenced within the State Injury Indicators Report (CDC, 2021a). Between 2018 and 2022, Riverside County recorded a total of 1,496 TBI-related fatalities, with an age-adjusted rate of 10.9 per 100,000 population. For reference, the closest available comparison is California's age-adjusted rate of 12.3 per 100,000 population from 2016 to 2018 (CDC, 2021b).

RIVERSIDE COUNTY KEY FINDINGS / 2018-2022

There were a total of 1.5K TBI fatalities, 11.6K non-fatal TBI hospitalizations, and 20K non-fatal TBI ED visits.

Men have a traumatic brain injury (TBI) fatality rate that is 4X higher than women.

Black residents had the highest rate 219.2 per 100,000 population for non-fatal TBI ED visits.

The largest number of TBI hospitalizations were due to falls in adults aged 65 and older.

TBI FATALITY

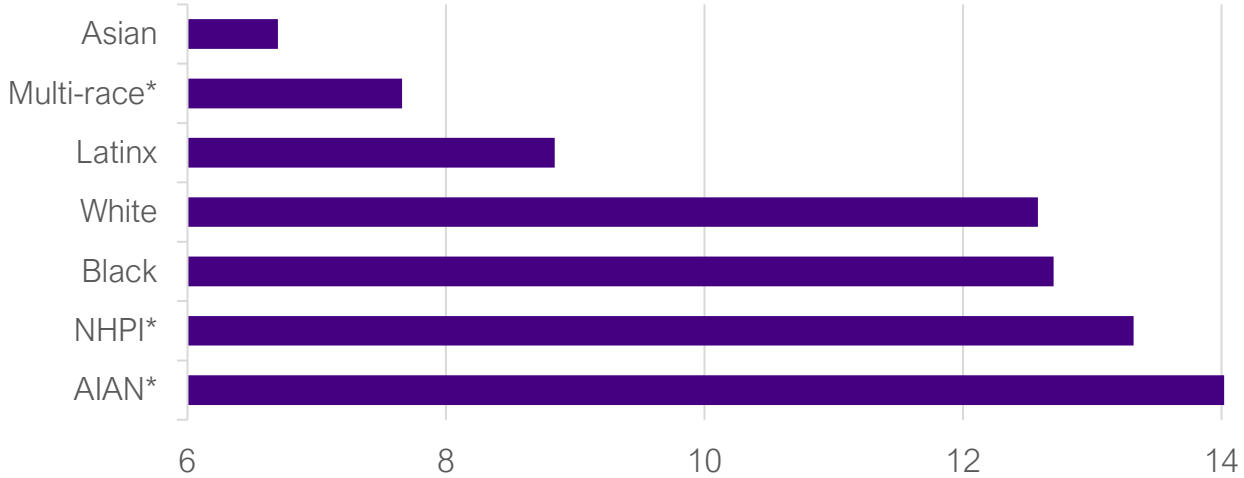
Older adults are more prone to severe TBI outcomes due to lower resilience and comorbidities (CDC, 2024a). This trend is evident in Riverside County data, with the 65+ age group accounting for 49% (n = 727) of TBI deaths—a proportion 39% higher than that of youth and young adults under 25. Males tend to have higher rates of TBI mortality due to higher risk behaviors and exposure to trauma (Mollayeva, 2019). This is supported by males having an almost 4x greater age-adjusted rate than females (Figure 1).

Figure 1. 5-Year Age-Adjusted Fatality Rates per 100,000 Population by Gender, Riverside County, CA 2018-2022

RACIAL DISPARITIES

American Indian/Alaska Native (AI/AN) have the highest rate of TBI-related deaths though, the rates are unstable due to small numbers (Figure 2), with a 5-year age-adjusted rate of 14.1 per 100,000 population from 2018-2022. Rate for American Indian/Alaska Native groups reflect national trends, highlighting poorer TBI outcomes among historically under-resourced populations facing socioeconomic and healthcare access disparities (CDC, 2024a; CDC, 2024b).

Figure 2. 5-Year Age-Adjusted Race/Ethnicity Fatality Rates per 100,000 Population by Racial/Ethnicity Group, Riverside County, CA 2018-2022



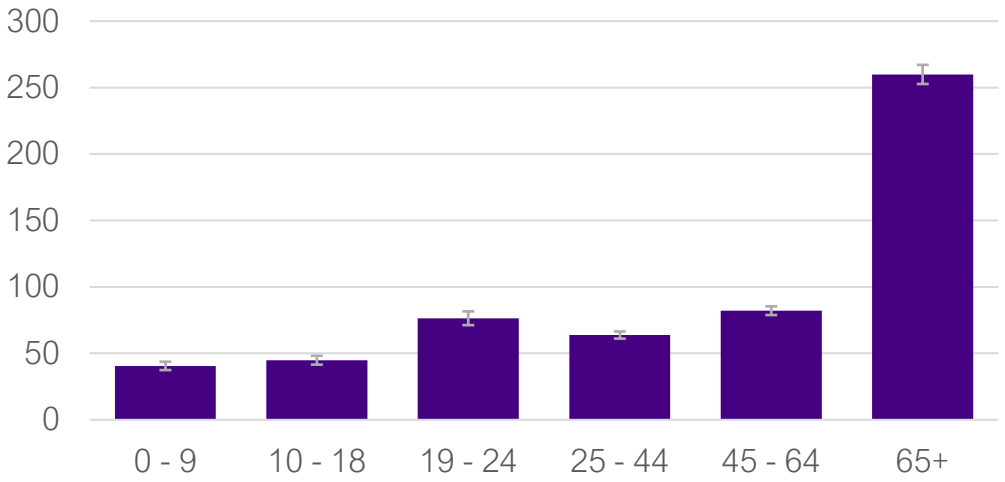
*Note: Racial groups with an asterisk * have unstable rates due to low counts.*
Abbreviations: American Indian/Alaska Native (AI/AN) and Native Hawaiian or Pacific Islander (NHPI)

NON-FATAL TBI HOSPITALIZATIONS

Between 2006 and 2014, California reported an average age-adjusted rate of 86.1 TBI hospitalizations per 100,000 population (CDC, n.d.). Similarly, during the 2018–2022 period, Riverside County recorded an average age-adjusted rate of 86.0 TBI hospitalizations per 100,000 population. During this time, Riverside County saw 11,639 non-fatal TBI hospitalizations, with individuals aged 65 and older accounting for the highest percentage at 43%. This age group experienced a five-year age-specific rate of 259.9 per 100,000 population (Figure 3).

From 2018-2022, the average age-adjusted rate for TBI hospitalizations was 86.0 per 100,000 population

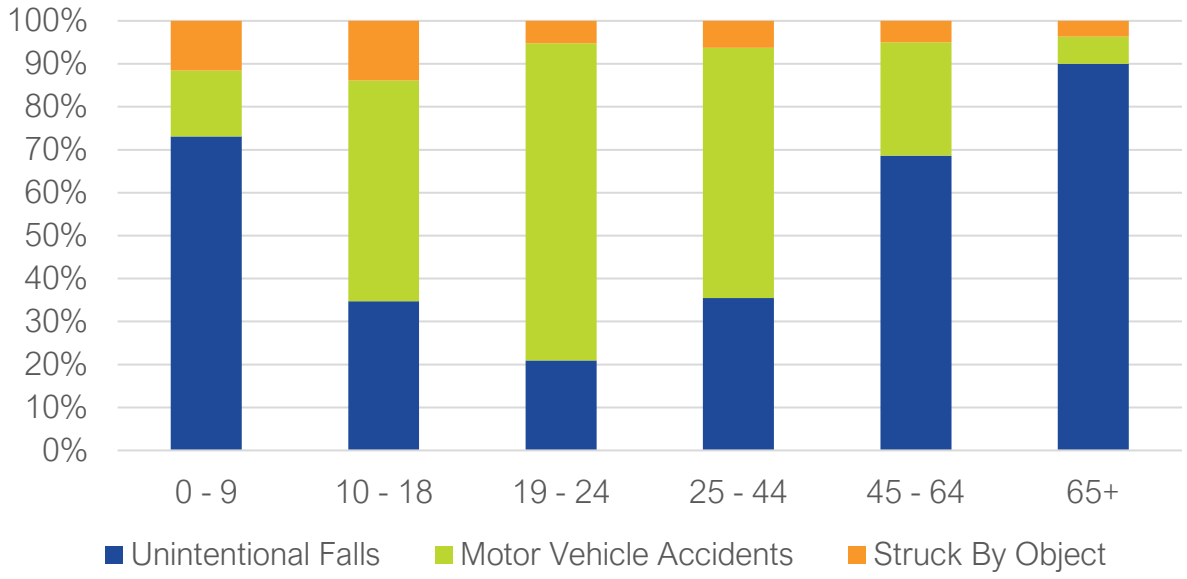
Figure 3. 5-Year Age-Specific TBI Hospitalizations Rates by Age Group, Riverside County, CA 2018-2022



TOP 3 CAUSES OF TBI HOSPITALIZATIONS BY AGE GROUP

Youth under 9 and older adults (ages 45-64 and 65+) are hospitalized for TBI primarily due to falls, while young adults (ages 10-18) and adults (ages 19-24 and 25-44) are admitted for TBI mainly due to motor vehicle accidents (Figure 4).

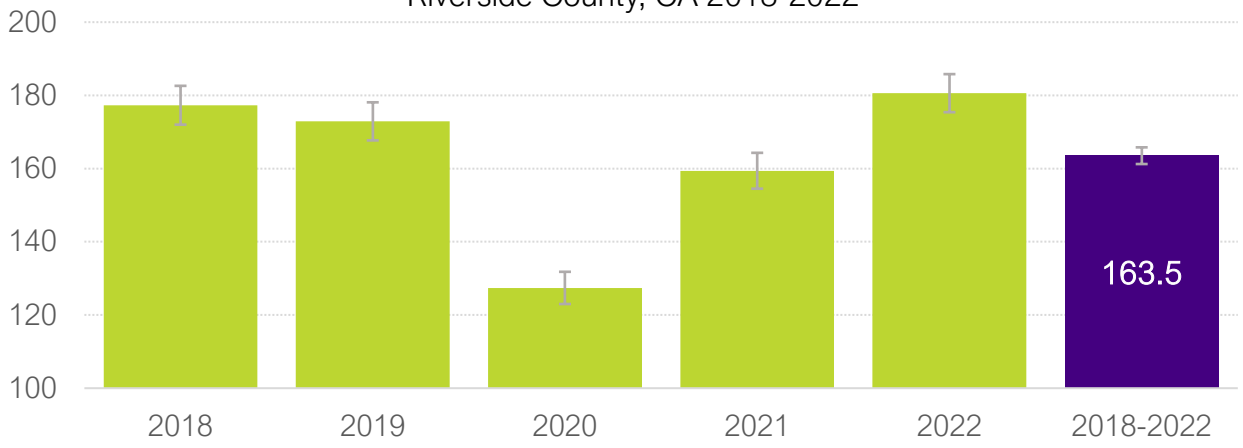
Figure 4. Percentage of TBI Hospitalizations by Age Group and Cause, Riverside County, CA 2018-2022



NON-FATAL TBI EMERGENCY DEPARTMENT VISITS

The overall age-adjusted rate for TBI Emergency Department (ED) visits for Riverside County was 163.5 per 100,000 population (2018-2022), with the lowest number of TBI ED visits occurring in 2020 (Figure 5). Most non-fatal TBI ED visits (N = 20,491) involved youth aged 10–18 (23%) and adults aged 25–44 (24%). The proportion of hospitalizations by cause is similar to what is seen in the ED, indicating consistent patterns across care settings in how TBIs occur and impact different age groups.

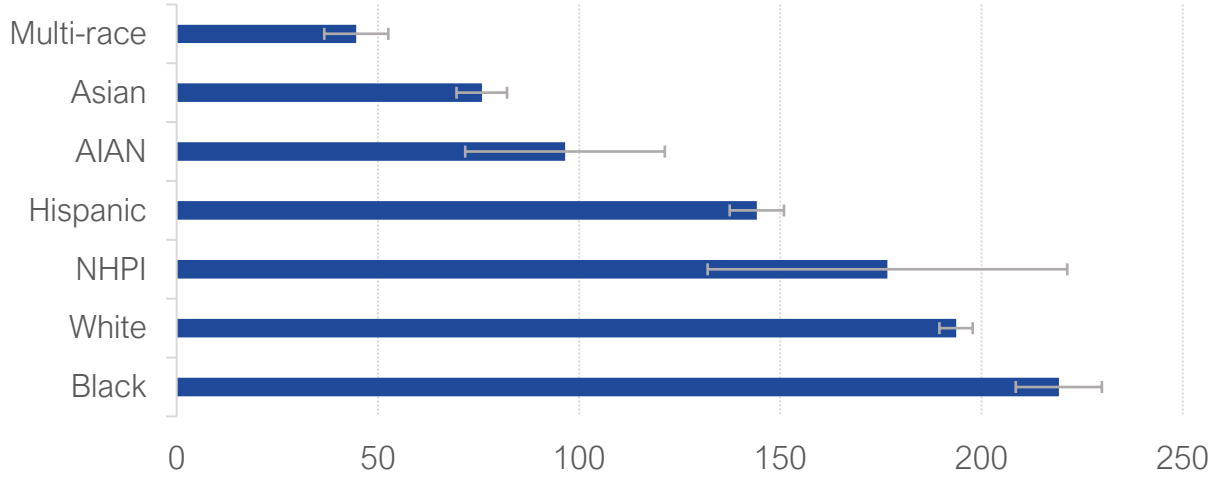
Figure 5. TBI ED Visits Age-Adjusted Rates per 100,000 Population by Year, Riverside County, CA 2018-2022



From 2018-2022, the Top 3 causes of TBI Injuries treated in the ED were Unintentional Falls (41%), Motor Vehicle Accidents (21%), and Being Struck by Objects (14%)

While Latinx (n = 8,689) and White (n = 8,257) predominate TBI ED visits by overall volume, Black residents had the highest rate of non-fatal TBI ED visits compared to any other racial group (Figure 6).

Figure 6. TBI ED Visits 5-Year Average Age-Adjusted Rates per 100,000 Population by Racial/Ethnicity Group, Riverside County, CA 2018-2022



DATA LIMITATIONS

TBI- Specific Limitations: According to the literature, one of the challenges of studying TBI, is that nearly all estimates are undercounts. Because traumatic deaths tend to occur outside of a hospital, they are subject to a medical examiner's investigation. In cases where the cause of death is clear, such as with falls or motor vehicle injury, no autopsy is required although these are the leading causes of TBI (Matney, C., Bowman, K., & Berwick, D., 2022). Numerous TBI deaths are coded as "blunt traumatic injury" as opposed to TBI in vital statistics data systems. In addition, long-term disability deaths that are a result of an earlier instance of TBI run the risk of being miscoded as the death is not connected to the initial injury. These missing data points produce inaccuracies in reporting mortality, hospitalizations, emergency department care, and rates of incidence (Matney, C., Bowman, K., & Berwick, D., 2022).

County-Specific Limitations: Comparing fatality rates of race/ethnicity groups by each year was not possible due to low counts for several race/ethnicity groups. To account for this, 5-year rates from 2018-2022 were used instead, but the American Indian/Alaska Native (AIAN), Pacific Islander (PI), and Multi-racial groups still had unstable rates due to low counts, and caution should be used in their interpretation (Figure 2). Each of those groups had fewer than 20 fatalities for the years 2018-2022; however, the total did mirror nationally observed trends (CDC, 2024a).

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SUGGESTED CITATION

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