Injury and violence prevention program Data Brief

Cause of Injury for Youth with TBI

Oregon Health Authority

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A traumatic brain injury (TBI) is an injury caused by a blow, jolt, or penetrating object that disrupts normal functioning of the brain. These brain injuries can cause problems with speaking and understanding, movement or mobility, thinking or memory, and personality or mood.[1]

It is crucial that youth suffering from a TBI receive comprehensive medical, rehabilitative, educational, and psychological care to promote healing, lessen cognitive fatigue, lessen risk for further unintentional injuries, and mitigate long term problems they may face.[2]

Between 2018-2021, there were 235 TBI-related deaths involving Oregonians younger than 22 years of age. This translates to 14,883 years of potential life lost.[3]

In addition, this population had 1,065 TBI-related hospitalizations and 26,794 ED discharges during this four-year time period.

Information provided in this report describes the mechanism, or "cause of injury[4]" included in TBI-related death, hospitalization, and emergency department (ED) discharge records[5] for Oregon residents under 22 years of age.[6] These data are presented by sex and age group. Counts and rates (counts of a TBI per 100,000) show population differences.[7] These data can inform policy, resource allocation, and health promotion efforts so that the most lethal and most frequent causes of TBI can be prevented.

The "cause of injury" categories that are included are those with the highest frequency of occurrence: 1) firearm, 2) suicide attempt, 3) motor vehicle/transportation (MVT), 4) assault, and 5) fall. There are limitations to reporting injury causes - especially within healthcare systems. There still is room to improve emergency department and hospitalization "cause of injury" coding for ongoing and future injury prevention efforts.

1 https://www.cdc.gov/injury/features/traumatic-brain-injury/index.html

2 https://pubmed.ncbi.nlm.nih.gov/27497469/
Kolakowsky-Hayner SA, Bellon K, Yang Y. Unintentional injuries after TBI: Potential risk factors, impacts, and prevention. NeuroRehabilitation. 2016 Jun 30;39(3):363-70. doi: 10.3233/NRE-161368. PMID: 27497469.
https://pubmed.ncbi.nlm.nih.gov/33656467/
Riccardi JS, Ciccia A. Cognitive Fatigue in Pediatric Traumatic Brain Injury: A Meta-Analysis and Scoping Review. J Head Trauma Rehabil. 2021 Jul-Aug 01;36(4):226-241. doi: 10.1097/HTR.0000000000000644. PMID: 33656467.

3 Premature mortality is measured by the Years of Potential Life Lost (YPLL) statistic, which is the sum of the years of life lost annually by persons who suffered early deaths. For the purpose of calculating YPLL, premature death is defined as death occurring before the age of 65.

4 Deaths, hospitalizations, and ED discharges can be included more than once. For example, if a death is recorded as a suicide attempt and a firearm was used, this death would be counted both categories.

5 https://resources.cste.org/Injury-Surveillance-Methods-Toolkit/Home/GeneralInjuryIndicators
https://resources.cste.org/ICD-10-CM/Standardized%20Validation%20Datasets/Indicator-Specific%20Regular%20Expressions_4-8-21.pdf

6 Including youth up to 21 years and 364 days old.

7 These rates include counts less than 20 so trends may be not as pronounced as they appear.

Sex

During 2018-2021, information about sex was limited to “female,” “male,” “other,” and “unknown.” As a result of Oregon House Bill 3159,[8] information on sex, gender-identify and sexual orientation will be available in the next couple of years. This improvement will facilitate a better understanding of unintentional and intentional injury across populations. Based on the current limitations of data collection, the following information is provided only for “female” and “male,” as there were no records with “unknown” or “other” in any of the three data systems for 2018-2021.

As figures 1-3 illustrate[9] males have significantly higher TBI rates than females, especially for firearm deaths and suicide.

The primary causes associated with hospitalizations show a different distribution (still with males having higher rates), with motor vehicle transportation (MVT) and falls being the largest contributors.

The data for emergency visits, which may involve less severe injuries, are most often associated with falls and motor vehicle transportation. Differences between males and females are less pronounced.

Figure 1. Oregon TBI-Related **Deaths** per 100,000 Youth by Cause and Sex 2018-2021

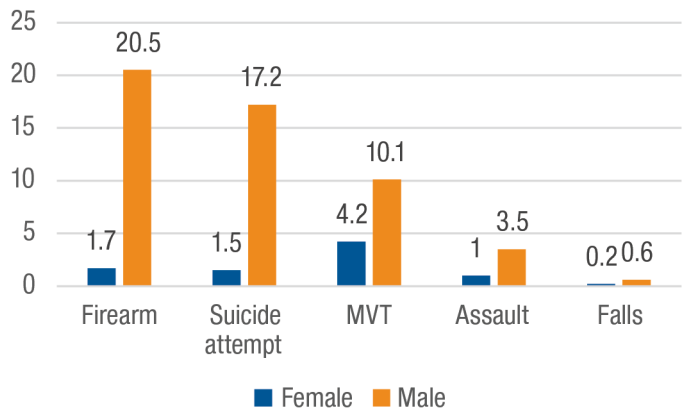


Figure 2. Oregon TBI-Related **Hospitalizations** per 100,000 Youth by Cause and Sex 2018-2021

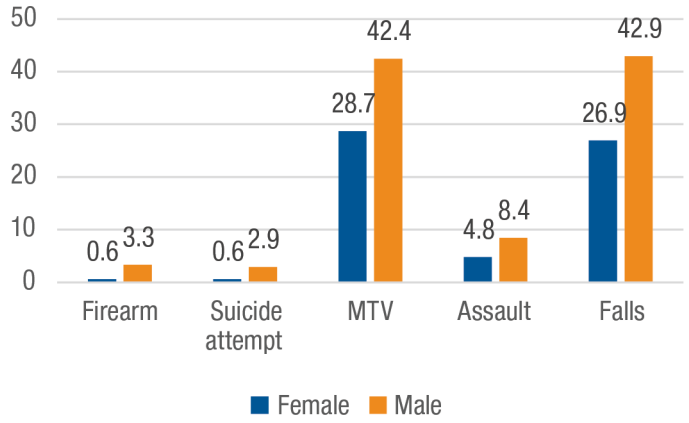
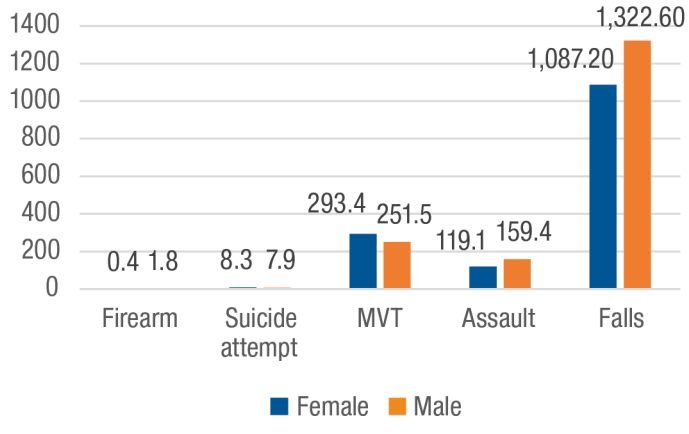


Figure 3. Oregon TBI-Related **ED Discharges** per 100,000 Youth by Cause and Sex 2018-2021



8 https://olis.oregonlegislature.gov/liz/2021R1/Measures/Overview/HB3159

9 Note for any counts less than 20 — rate is limited in its statistical significance hence why multiple years were used.

Age

Figures 4-6 show[10] a striking difference in TBI-related injury rates by age. Youth aged 13-21 have significantly higher death rates for each "cause of injury" category.

Ages five years old or less have a higher rate of MVT deaths compared to ages six to twelve years old.

Hospitalization data show a different distribution by "cause of injury" and age groups than that in death data. Children five years old and less had the highest rate of hospitalizations due to falls and a notable rate due to assault. Youth ages 13-21 had a significantly higher rate of hospitalizations related to motor vehicle transportation accidents than any other age group.

Ages 13-21 years old show higher hospitalization rates related to motor vehicle transportation, followed by falls.

Youth aged five years or less had the highest rate of emergency department visits. The most common cause was falls.

Falls, MVT, and assault were the most common "cause of injury" for youth ages 13-21 years.

Figure 4. Oregon TBI-Related **Deaths** per 100,000 Youth by Cause and Age Group 2018-2021

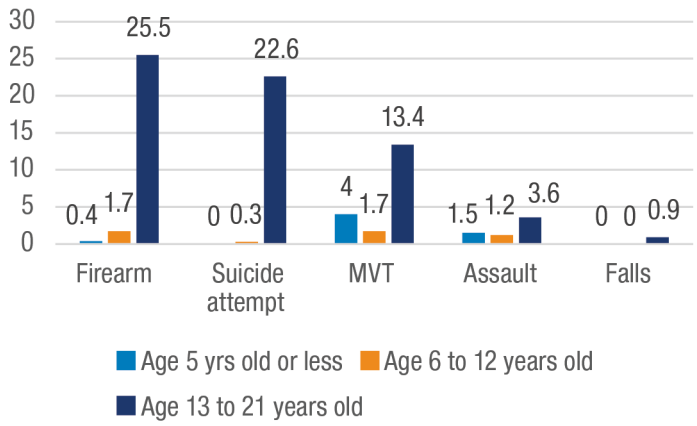


Figure 5. Oregon TBI-Related **Hospitalizations** per 100,000 Youth by Cause and Age Group 2018-2021

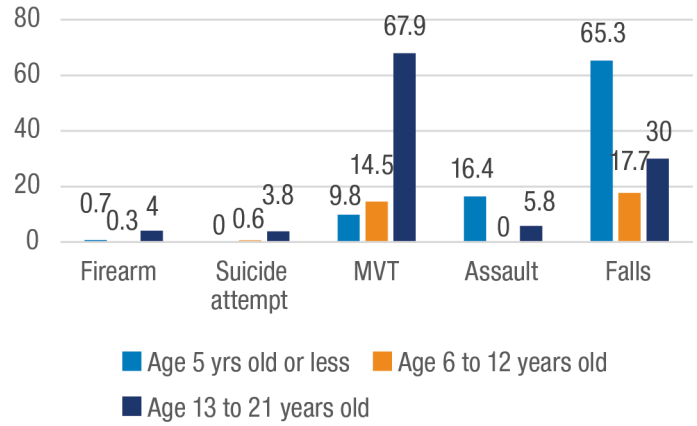
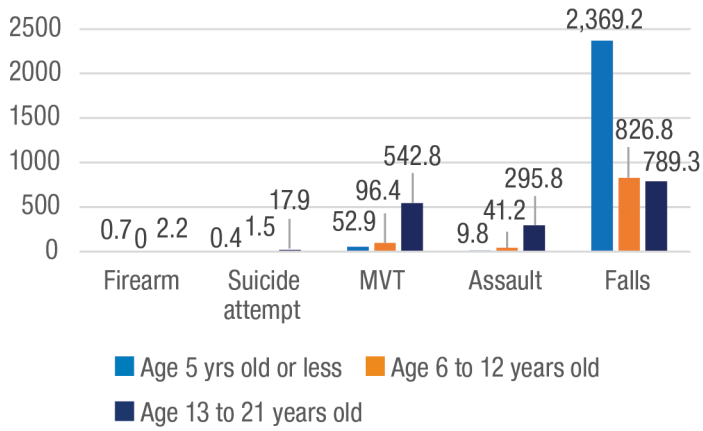


Figure 6. Oregon TBI-Related **ED Discharges** per 100,000 Youth by Cause and Age Group 2018-2021



10 Note for any counts less than 20 — rate is limited in its statistical significance hence why multiple years were used.

Data Sources and Descriptions

Death Data

Center for Health Statistics (CHS)

Death certificates are registered with CHS. Death certificates are completed and signed by a physician, physician assistant, nurse practitioner, or medical examiner. Information is reported in two ways: "resident deaths," which include the deaths of all Oregon residents, even if the death happened out of state; and "occurrence deaths," which include all deaths that happened in the state, including those who died here but were not Oregon residents. The data presented in this report are for "resident deaths."

Hospital and ED Discharge Data

Oregon Association of Hospitals and Health Systems (OAHHS)

Discharge data includes hospital and emergency department (ED) information. Hospitals and EDs report data to OAHHS on visits and stays **when** there is a charge for services. This information includes diagnosis, care received, and demographic information. Hospital and ED discharge data **do not** overlap. If a patient goes to an ED first and then is admitted to the hospital, their information will appear in the hospital discharge data only.

Population Estimates

National Center for Health Statistics provides estimates of population size down to a county level. There is an approximately 18-month delay for this information. For example, estimates for 2021 will be released in summer 2022. These population estimates are used as the denominator when calculating rates (in this case per 100,000 residents). For example, the count of events (i.e., injury, hospitalization, or ED visit) for a given age group, sex, region, race, or ethnicity would be divided by the population estimate for the respective age group, sex, region, race, or ethnicity population estimate.

More Information

https://www.cdc.gov/traumaticbraininjury/index.html

https://www.cdc.gov/traumaticbraininjury/health-disparities-tbi.html

https://www.oregon.gov/oha/PH/PREVENTIONWELLNESS/SAFELIVING/Pages/index.aspx

https://cbirt.org/

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