



MASSACHUSETTS

Special Emphasis Report: Traumatic Brain Injury - 2010

Understanding TBI

Traumatic brain injury (TBI) is a serious public health problem in the United States. A TBI is caused by a bump, blow, jolt, or penetration to the head that disrupts the normal function of the brain. Each year, traumatic brain injuries contribute to a substantial number of deaths and cases of permanent disability.

Impact and Magnitude of TBI

During 2010, there were 68,285 deaths, hospitalizations or emergency department (ED) visits of Massachusetts (MA) residents that involved a traumatic brain injury.¹ Of these, there were 830 TBI-related deaths of MA residents in 2010 (11.3 per 100,000). In addition, there were 5,428 hospitalizations (75.8 per 100,000) and 62,027 emergency department visits (948.1 per 100,000) of MA residents involving a TBI. An unknown number of individuals sustained injuries that were treated in other settings or went untreated. This report defines TBI-related deaths or injuries as cases in which TBI was reported alone or in combination with other injuries or conditions.

Causes of TBI

Unintentional falls were the leading cause of TBI-related deaths, hospitalizations and ED visits. Motor vehicle traffic crashes were the second leading cause of TBI-related deaths, hospitalizations and ED visits. Suicides were the third leading cause of TBI-related deaths, whereas assaults were the third leading cause of TBI-related hospitalizations and ED visits.²

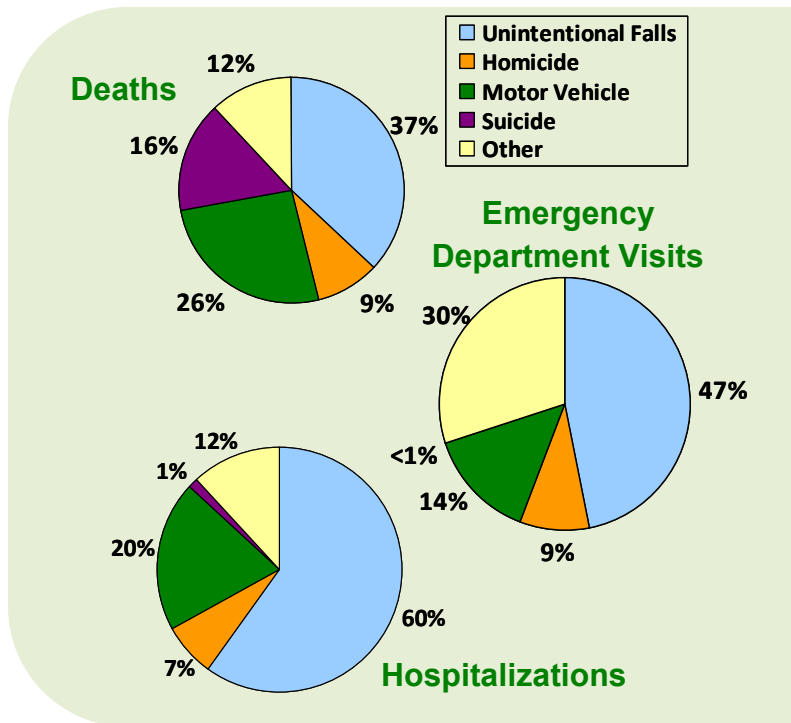


Figure 1. Percentage of Annual TBI-Related Deaths, Hospitalizations and Emergency Department Visits, by External Cause³, MA Residents, 2010

TBI by Age

MA residents ages 65 and older had the highest number and rate of TBI-related deaths and hospitalizations, accounting for 42% of TBI-related deaths and 46% of TBI-related hospitalizations. MA children ages 0 to 14 had the highest number and rate of TBI-related emergency department visits, accounting for 25% of such visits.

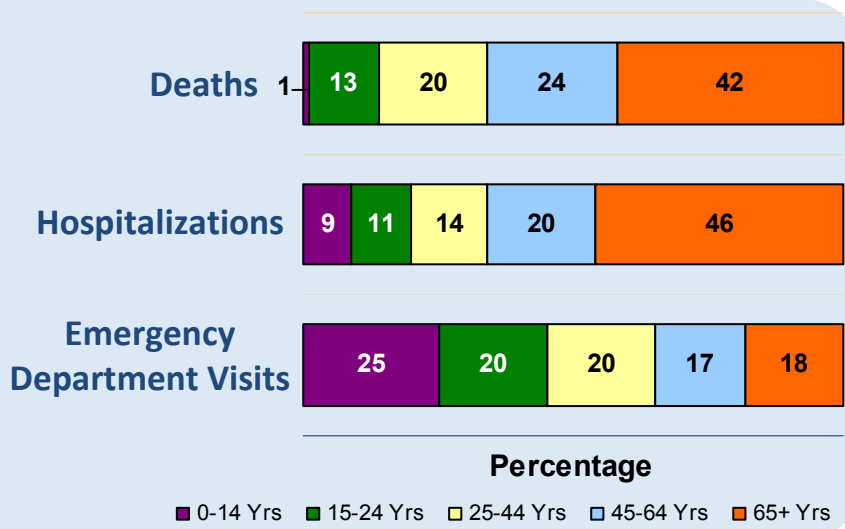


Figure 2. Percentage of Annual TBI-Related Deaths, Hospitalizations and Emergency Department Visits, by Age, MA Residents, 2010

1. Death, hospitalization and ED data are mutually exclusive, e.g. an ED visit that leads to a hospitalization is counted in hospitalization data, not ED data. Hospitalization and ED data are visit- rather than person-based, however, e.g. a person hospitalized twice in one year for the same or different injuries would be counted as two hospitalizations.
 2. Completeness of external-cause coding for TBI-related cases can impact the accuracy of the cause classifications for hospitalizations and emergency department visits.

3. Firearm-related injuries were reported but excluded from Figure 1 due to overlap with multiple categories (e.g., homicide/assault, suicide). Firearms were involved in 21% of TBI deaths, 1% of TBI hospitalizations, and <1% of TBI emergency department visits.



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TBI by Gender

Men were more likely to sustain a traumatic brain injury than women. The magnitude of this difference was greatest for TBI-related deaths. In Massachusetts, the rate of TBI deaths among men was 195% higher than among women (17.4 vs. 5.9 per 100,000). TBI-related hospitalization rates were 76% higher among men than women (97.4 vs. 55.4 per 100,000), and rates of TBI-related emergency department visits were 26% higher among men than women (1,055.1 vs. 835.2 per 100,000).³

3. All rates for comparison by gender are age-adjusted.

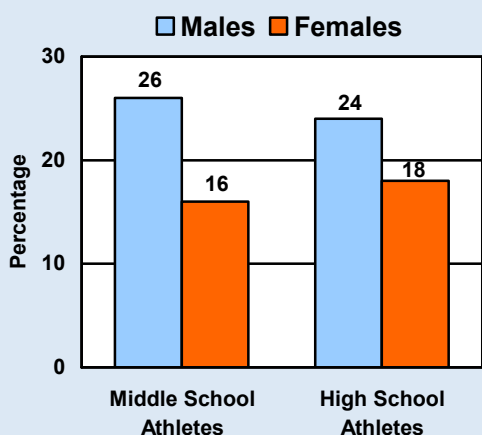


Figure 3. Percentage of Student Athletes Reporting Sports-related TBI Symptoms in the Past Year, by Gender, MA Residents, 2011

Unintentional Falls & TBI

In 2010, unintentional falls were the leading cause of fatal and nonfatal TBIs among MA residents, accounting for 37% of TBI-related deaths, 60% of TBI-related hospitalizations and 47% of TBI-related emergency department visits. Fall-related TBI death and injury rates increase dramatically in residents ages 65 and older; rates are highest in MA residents ages 85 and older (84.6 per 100,000 for TBI-related deaths, 588.2 per 100,000 for TBI-related hospitalizations, and 2,170.1 per 100,000 for TBI-related emergency department visits). Rates of emergency department visits for fall-related TBIs are also very high in MA infants under age one (2,117.8 per 100,000) and children ages 1-4 (1,227.0 per 100,000).



Sports-related TBI

In 2011, 21% of MA middle and high school students who had played on a sports team reported experiencing TBI symptoms due to a sports-related injury in the past year.⁴ Boys were more likely than girls to report experiencing sports-related TBI symptoms in the past year (26% vs. 16% of middle school athletes and 24% vs. 18% of high school athletes). Sports-related TBI symptoms were reported most frequently by 8th grade (24%), followed by 9th and 10th grade athletes (22%).

4. TBI symptoms defined as “suffered a blow or jolt to your head that caused you to get “knocked out”, have memory problems, double or blurry vision, headaches or “pressure” in the head or nausea or vomiting”. Eighty percent of middle school and 72% of high school students reported that they played on a sports team in the past year.

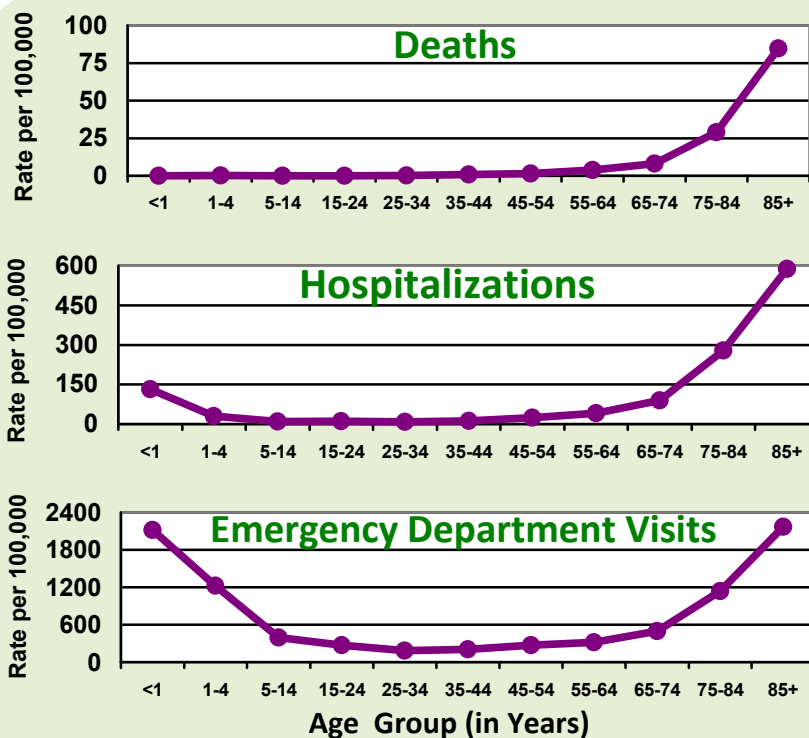


Figure 4. Rates of Death, Hospitalization and Emergency Department Visits for Unintentional Fall-related TBIs, by Age Group, MA Residents, 2010



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TBI Prevention Strategies

CDC's National Center for Injury Prevention and Control (Injury Center) is committed to protecting people against preventable TBI by putting science into action.

- **State Injury Prevention Programs** - The Injury Center's Core Violence and Injury Prevention Program (Core VIPP) funds state health departments to estimate the impact of TBIs and define the groups most affected. www.cdc.gov/injury
- **Heads Up** – Injury Center campaigns with free tools for health care providers, school administrators, nurses, teachers, coaches, and parents to help them recognize and respond to a TBI. www.cdc.gov/traumaticbraininjury
- **Motor Vehicle Safety** – Motor vehicle crashes are a leading cause of death, injury and TBI in the US. CDC's primary prevention focuses on child passenger safety, seat belt use and reducing impaired driving. www.thecommunityguide.org/mvoi ; www.cdc.gov/motorvehiclesafety

MASSACHUSETTS TBI Activities

Prevention – The Massachusetts Department of Public Health (MDPH) works in close collaboration with the MA Prevent Injuries Now! Network (MassPINN), a statewide coalition of injury prevention practitioners, public agencies, and advocates, to prevent TBI and reduce its consequences in Massachusetts. This work utilizes data, in combination with evidence-based/best practice methods, to inform injury prevention policy development, programming and reduction of environmental hazards. Our three priority areas for TBI prevention are falls in older adults, motor vehicle injuries and sports-related TBI in youth.

Partnerships – Preventing TBI depends upon the work and collaboration of many partners. MDPH works closely with MassPINN, representatives from the Brain Injury Association of MA, the MA Falls Prevention Coalition, the MA Medical Society, Blue Cross/Blue Shield of MA, Partnership for Passenger Safety, AAA Southern New England, the MA Department of Transportation, the MA Interscholastic Athletic Association, the MA Rehabilitation Commission, trauma coordinators from MA hospitals, injury research and prevention experts from MA academic centers, and others to reduce TBI.

Accomplishments – Significant policy advances have been made in MA to help prevent or reduce the impact of TBI.

- MA has convened a statutory Commission on Falls Prevention to study and recommend evidence-based strategies to prevent falls among older adults in both community and health care settings. Massachusetts also has an active Falls Prevention Coalition which works to raise awareness of the preventability of falls and promote prevention strategies.
- In 2010, MA passed an expanded junior operator law and MDPH is working with the Registry of Motor Vehicles to optimize its implementation. Since passage of this law, the 3-year average annual number of MV occupant deaths among MA 16-17 year olds has dropped 48% compared with the 3 years prior to its passage.
- Massachusetts has also been a leader in the implementation of "Return to Play" (sports concussion) legislation, by developing regulations, model policies for schools, concussion history and medical clearance forms, and conducting numerous trainings for a range of stakeholders.

Surveillance – MDPH uses state vital records, hospital, health survey and other data to monitor the causes, risk factors and frequencies of TBI-related deaths and injuries among MA residents.

Data Sources - Deaths: MDPH Registry of Vital Records and Statistics, 2010.

Nonfatal injuries: MA Inpatient Hospital Discharge, Outpatient Observation Stay and Emergency Department Discharge Databases, MA Division of Health Care, Finance and Policy, 2010.

Sports-related head injuries: MDPH MA Youth Health Survey, 2011.

Note: This report used CDC criteria to identify TBI cases, i.e. injury cases were first selected based on external cause of injury (deaths), primary diagnosis (hospitalizations), or both (ED visits). All fields were then searched for TBI diagnostic codes. Results may differ from reports that use MA criteria to define injury cases. Reference to any commercial entity or product or service in this report should not be construed as an endorsement by the Government of the company or its products or services.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH, INJURY SURVEILLANCE PROGRAM

<http://www.mass.gov/dph/injury>

Released April, 2013