



MASSACHUSETTS

Special Emphasis Report: Traumatic Brain Injury – 2013

April 2016

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

In 2013, there were 765 deaths of MA residents that involved a traumatic brain injury (10.0 per 100,000). In addition, there were 4,975 hospitalizations (66.3 per 100,000), and 67,749 emergency department (ED) visits (1,021.8 per 100,000) of MA residents that involved a TBI.¹ An unknown number of individuals sustained head 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 in 2013. Motor vehicle traffic crashes were the second leading cause of TBI-related deaths and hospitalizations, while being struck by or against an object or person was the second leading cause of TBI-related ED visits.³ (Fig. 1)

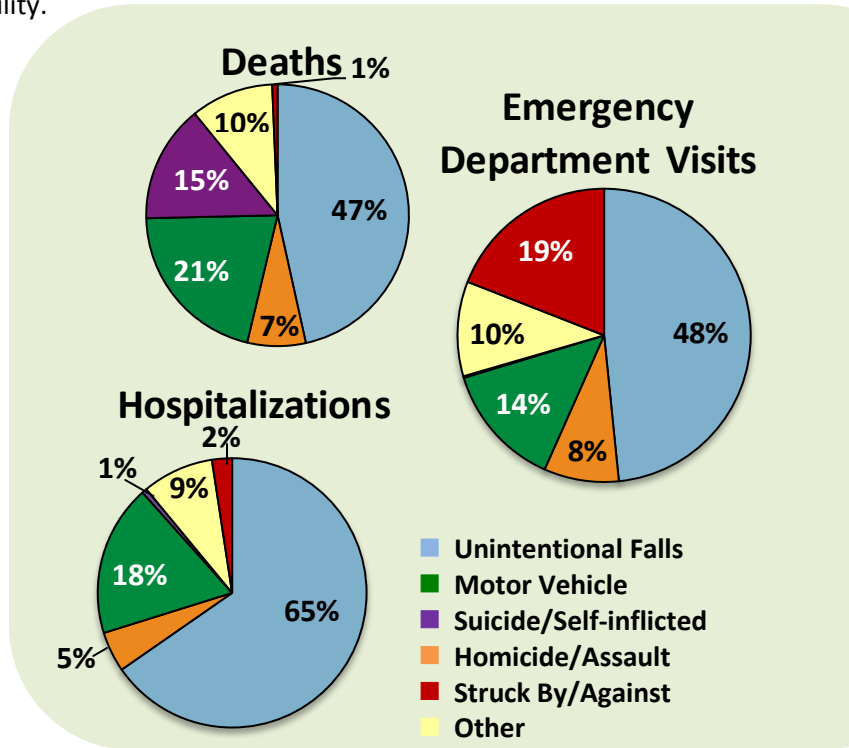


Figure 1: Percentage of Annual TBI-Related Deaths, Hospitalizations and Emergency Department Visits, by External Cause, MA Residents, 2013^{2,4}

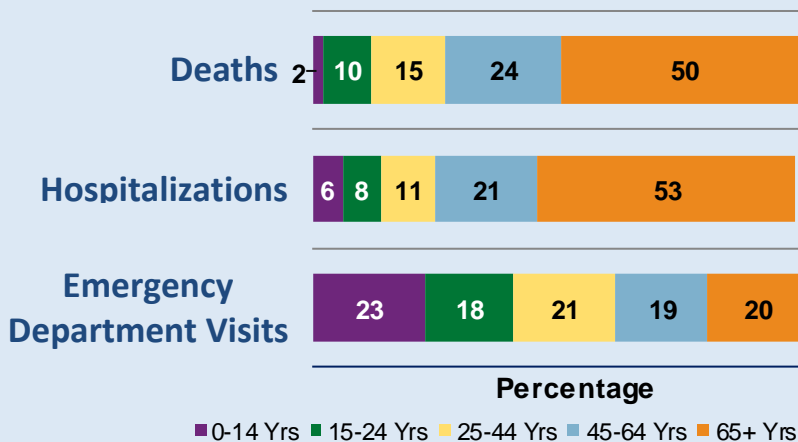


Figure 2. Percentage of Annual TBI-Related Deaths, Hospitalizations and Emergency Department Visits, by Age, MA Residents, 2013²

TBI by Age

MA residents aged 65 years and older had the highest number and rate of TBI-related deaths and hospitalizations, accounting for half of TBI-related deaths (50%) and over half of TBI-related hospitalizations (53%). MA children ages 0 to 14 years had the highest number and rate of TBI-related emergency department visits, accounting for 25% of such visits. (Fig. 2)



1. Death, hospitalization and ED data are mutually exclusive. Hospitalizations and ED Visits represent number of visits, not persons. A person hospitalized twice in one year for the same or different injuries is counted as two hospitalizations. All rates are age-adjusted per 100,000 MA residents, except for rates by age group, which are age-specific rates.
 2. Percentages may not total 100% due to rounding.
 3. Completeness of external-cause coding for TBI-related cases can impact the accuracy of the cause classifications for hospitalizations and ED visits.

4. Firearm-related injuries were excluded from Figure 1 due to overlap with other categories (e.g., homicide/assault, suicide). Firearms were involved in 17% of TBI deaths, 1% of TBI hospitalizations and <1% of TBI ED visits. Self-inflicted injuries made up <1% of TBI-related ED visits and therefore do not appear on the pie chart for ED visits.



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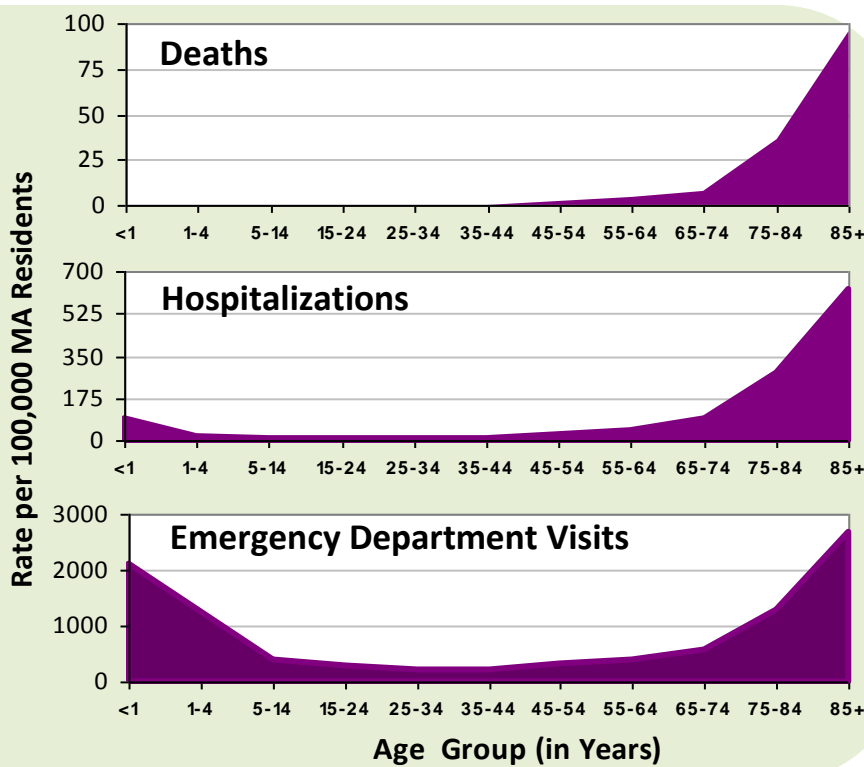
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TBI by Gender

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 more than twice as high as among women (14.3 vs. 6.3 per 100,000). TBI-related hospitalization rates were 74% higher among men than women (85.4 vs. 49.0 per 100,000), whereas rates of TBI-related ED visits were only 21% higher among men than women (1,114.2 vs. 922.3 per 100,000).⁵



Figure 3. Rates of Deaths, Hospitalizations and Emergency Department Visits for Unintentional Fall-related TBIs, by Age Group, MA Residents, 2013



Unintentional Falls & TBI

In 2013, unintentional falls were the leading cause of fatal and nonfatal TBI among MA residents, accounting for 47% of TBI-related deaths, 65% of TBI-related hospitalizations, and 48% of TBI-related ED visits. (Fig. 3)

Fall-related TBI death and injury rates increase dramatically among older adults. MA residents ages 85 and older had the highest rates of fall-related TBIs (96.0 per 100,000 for deaths, 626.2 per 100,000 for hospitalizations and 2,673.1 per 100,000 for ED visits).

ED visit rates for fall-related TBIs were also very high among MA infants under age one (2,097.7 per 100,000) and children ages 1-4 (1,264.6 per 100,000).

Sports-related TBI

In 2013, 20% of middle school and 16% of high school students in MA who participated in sports reported experiencing symptoms of a sports-related TBI in the past year.⁶ (Fig. 4)

Boys were more likely than girls to report experiencing such symptoms (24% vs. 15% of middle school athletes and 19% vs. 13% of high school athletes). Just over one-third (35%) of students reporting sports-related TBI symptoms reported that they stopped playing sports that day and got checked by a doctor or health care provider. Nearly half reported that they continued playing sports that day (47% of middle school and 49% of high school students).

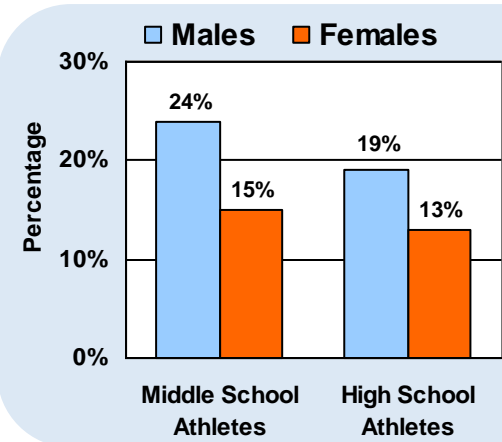


Figure 4. Percentage of Middle and High School Athletes Reporting Sports-related TBI Symptoms in the Past Year, by Sex, MA Residents, 2013⁶

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

6. Data from 2013 MA Youth Health Survey. 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”. Results do not include students who reported that they did not play on a sports team in the past year.



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ED Visits for Sports-related TBI

Between 2008 and 2014, there were approximately 4,000 ED visits for sports-related TBIs⁷ annually among MA residents of all ages (total N = 27,918). Due to coding limitations, this may not identify all sports-related TBIs treated in EDs and does not include sports-related TBIs, which were treated in other settings or not treated.

Youth in the middle and high school age ranges (ages 12-14 and 15-18) have the highest ED visit rates for sports-related TBI in MA. ED visits among middle and high school aged youth increased from 2008 to 2012 and declined in the subsequent two years.

In 2014, ED visit rates for sports-related TBIs were 135.4 per 100,000 elementary school aged children, 467.3 per 100,000 middle school aged youth and 351.5 per 100,000 high school aged youth. All other age groups had lower ED visit rates for sports-related TBIs.

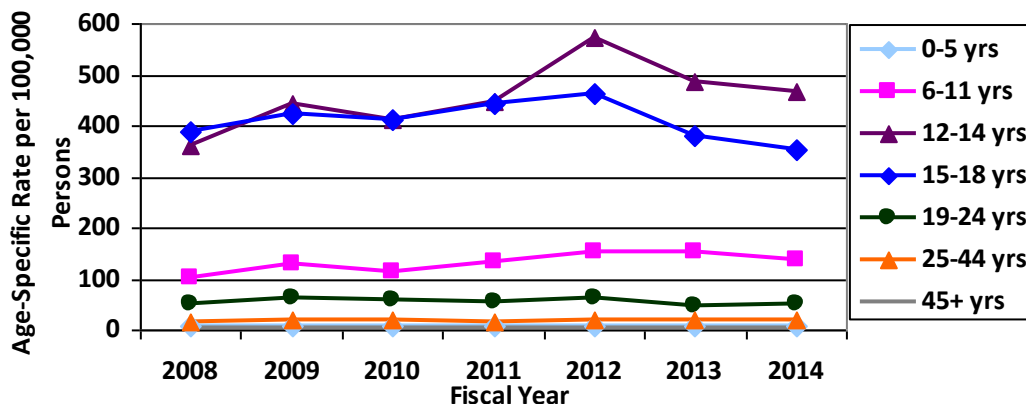


Figure 5. Rate of ED Visits associated with Sports-related TBI⁷, by Age Group, MA Residents, FY2008 - FY2014 (N = 27,918)

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
- **STEADI Tool Kit** - The Injury Center’s STEADI Tool Kit provides health care providers with the information and tools they need to assess and address their older patients’ fall risk. www.cdc.gov/homeandrecreationalafety/falls/steady
- **Heads Up** - Injury Center campaign 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. MDPH also administers The Prevention and Wellness Trust Fund, which aims to reduce health care costs by funding community partnerships to address leading health conditions, including falls among older adults. MDPH utilizes surveillance data and 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.

7. Includes TBI cases with an E-code of E886.0, E917.0 or E917.5 in any diagnosis field. All dispositions included. Sports-related TBI data are reported by fiscal year.



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MASSACHUSETTS TBI Accomplishments

- MA has convened a statutory Commission on Falls Prevention to study and recommend 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.
- Massachusetts has been a leader in the implementation of “Return to Play” (sports concussion) legislation, by developing regulations, providing model policies, concussion history and medical clearance forms, and technical assistance to middle and high schools, as well as conducting numerous trainings throughout the state for a range of stakeholders. MDPH is also collecting sports concussion data from schools and evaluating school policies on sports concussion.
- MDPH's injury epidemiologists collaborated with the Massachusetts Rehabilitation Commission to provide extensive data on TBIs among MA residents in a successful federal grant application. This funding will enhance awareness of and referrals for services in older adults with traumatic brain injury.

Resources

Injury Prevention and Control Program (IPCP)

Massachusetts Department of Public Health
Bureau of Community Health and Prevention
250 Washington Street, 4th Floor
Boston, MA 02108
Phone: (617) 624-5413

IPCP home page: www.mass.gov/dph/injury

IPCP Sports Concussion Program:

www.mass.gov/dph/sportsconcussion

Brain Injury and Statewide Specialized Community Service

Massachusetts Rehabilitation Commission
600 Washington Street
Boston, MA 02111
Phone: (617) 204-3852, (800) 223-2559 ext. 2 (toll-free)

www.mass.gov/eohhs/consumer/disability-services/services-by-type/head-injury/bisscs.html

Traumatic Brain Injury

Centers for Disease Control and Prevention
www.cdc.gov/traumaticbraininjury

Injury Surveillance Program (ISP)

Massachusetts Department of Public Health
Bureau of Community Health and Prevention
250 Washington Street, 4th Floor
Boston, MA 02108
Phone: (617) 624-5648

Email: MDPH-ISP@state.ma.us

ISP home page : www.mass.gov/dph/isp

Brain Injury Association of Massachusetts

30 Lyman Street, Suite 10
Westborough, MA 01581
Phone: (508) 475-0032

Email: biama@biama.org

www.biama.org

Heads Up Tool Kit for Youth Sports

Centers for Disease Control and Prevention
www.cdc.gov/concussion/headsup/youth.html

Data Sources - Deaths: MA Registry of Vital Records and Statistics, MDPH, 2013.

Nonfatal injuries: MA Inpatient Hospital Discharge and Emergency Department Discharge Databases, MA Center for Health Information and Analysis, 2013. Based on calendar year unless otherwise specified.

Sports-related head injuries: MA Youth Health Survey, MDPH, 2013.

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.