



MASSACHUSETTS

Special Emphasis Report: Traumatic Brain Injury – 2014

June 2018

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 2014, there were 796 deaths of MA residents that involved a traumatic brain injury (10.4 per 100,000). In addition, there were 4,917 hospitalizations (64.6 per 100,000), and 66,952 emergency department (ED) visits (998.4 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 2014. 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.

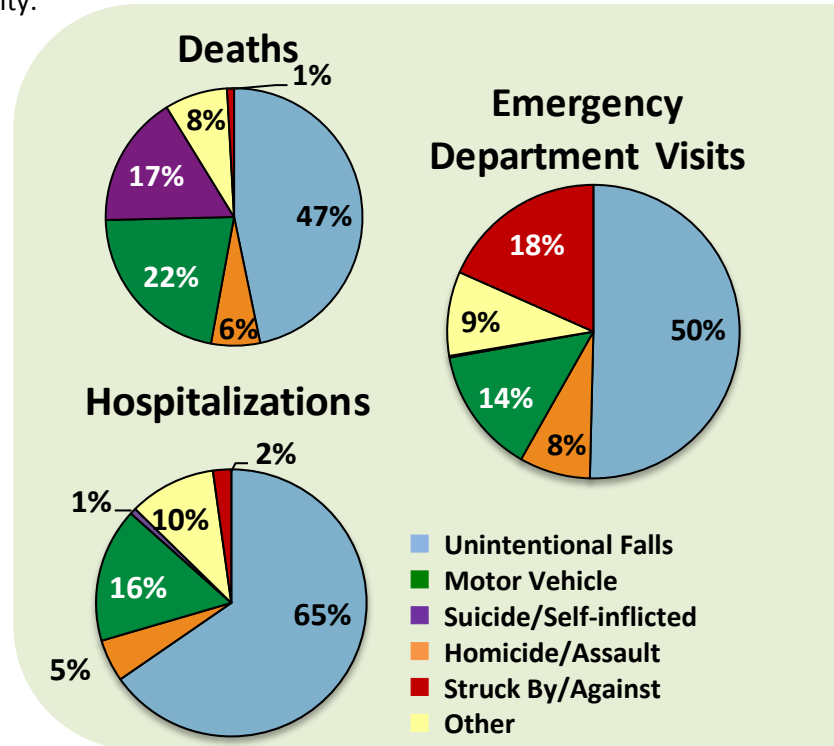


Figure 1: Percentage of Annual TBI-Related Deaths, Hospitalizations, and Emergency Department Visits, by External Cause, MA Residents, 2014²

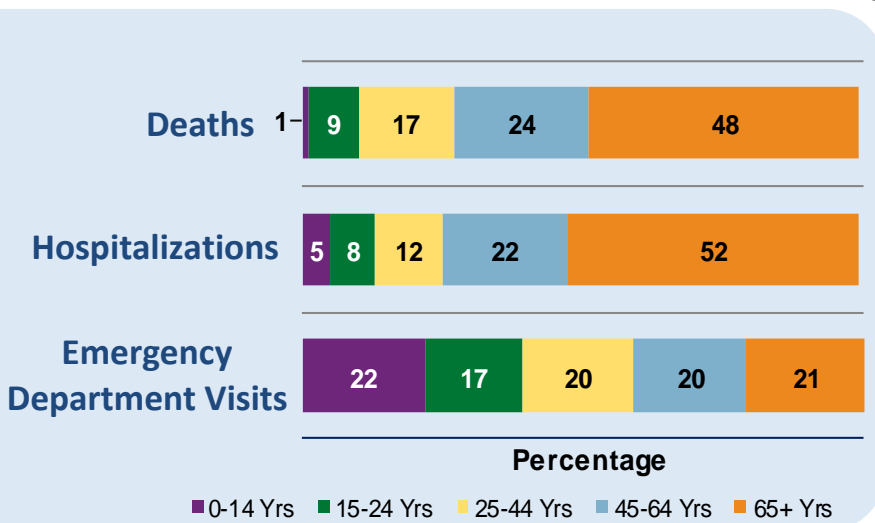


Figure 2. Percentage of Annual TBI-Related Deaths, Hospitalizations and Emergency Department Visits, by Age, MA Residents, 2014¹

TBI by Age

MA residents aged 65 years and older had the highest number and rate of TBI-related deaths and hospitalizations, accounting for 48% of TBI-related deaths and 52% of TBI-related hospitalizations. ED visits for TBIs were distributed more evenly across age groups, with the highest rates in infants under age one and adults ages 85 and over (data not shown).



1. Data sources are listed at the bottom of page 3. 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-based, therefore 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. Percentages may not add to 100% due to rounding.

2. Percentages of firearm injuries are not shown in Figure 1 as they fall into multiple intents (e.g., homicide/assault, suicide). Firearms were involved in 19% of TBI deaths, 1% of TBI hospitalizations and <1% of TBI emergency department visits.

This document was produced in conjunction with CDC's Core Violence and Injury Prevention Program under Cooperative Agreement 11-1101.



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TBI by Gender

Males were more likely to sustain a traumatic brain injury than females. The magnitude of this difference was greatest for TBI-related deaths. In Massachusetts, the rate of TBI deaths was 168% higher among males than females (15.8 vs. 5.9 per 100,000). Compared to females, TBI-related hospitalization rates were 83% higher among males (84.8 vs. 46.4 per 100,000) and rates of TBI-related emergency department (ED) visits were 16% higher among males (1,071.1 vs. 920.3 per 100,000).³

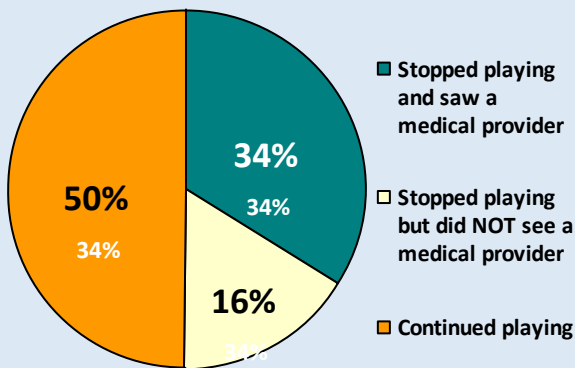


Figure 3. Actions Reported after Experiencing Sports-related TBI Symptoms, MA Middle & High School Athletes, 2015

Sports-related TBI

In 2015, 19% of middle school and 14% of high school students in MA who participated in sports reported experiencing symptoms of a sports-related TBI in the past year.⁴ Between 2011 and 2015 the percentage of students reporting such symptoms decreased significantly among high school but not middle school athletes.

Only one in three students (34%) reporting sports-related TBI symptoms reported they stopped playing sports that day and got checked by a doctor or health care provider. Half (50%) reported they continued playing sports that day and 16% reported they stopped playing sports that day but did NOT get checked by a doctor or health care provider.

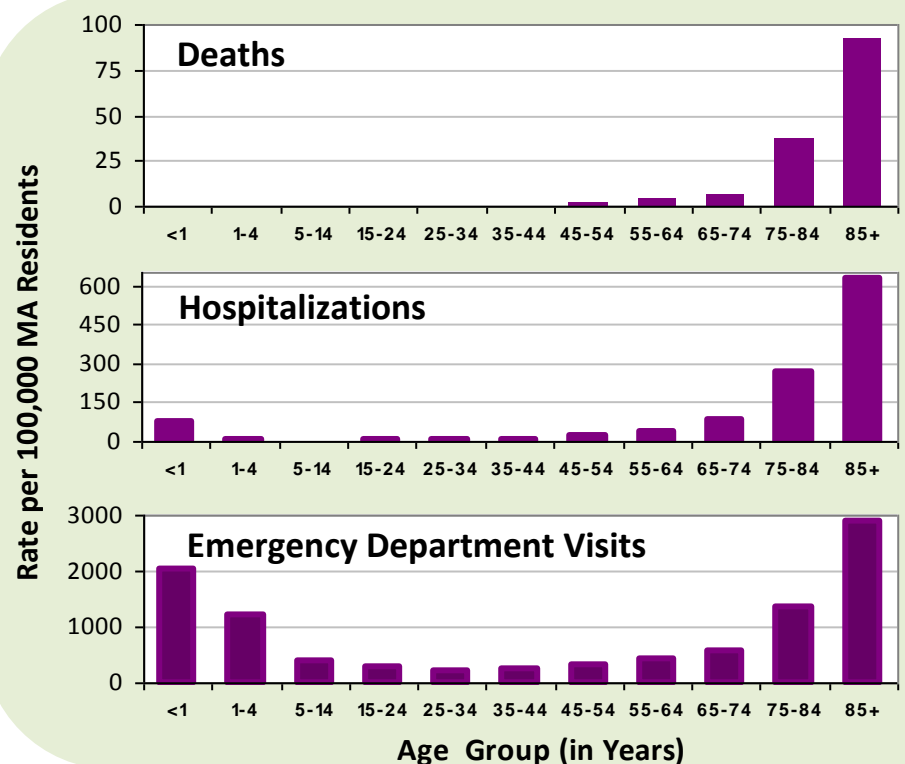
Unintentional Falls & TBI

In 2014, 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 50% of TBI-related ED visits.

Fall-related TBI death and injury rates were highest among MA residents ages 85 and older. Fall-related TBI rates in this age group were 92.7 per 100,000 for deaths, 629.7 per 100,000 for hospitalizations, and 2,887.7 per 100,000 for ED visits.

Emergency department visit rates for fall-related TBIs were also very high among MA infants under age one (2,019.2 per 100,000) and children ages 1-4 (1,228.2 per 100,000).

Figure 4. Rates of Death, Hospitalizations, and Emergency Department Visits for Unintentional Fall-related TBIs, by Age Group, MA Residents, 2014



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

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”. Results do not include students who reported that they did not play on a sports team in the past year.



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MASSACHUSETTS TBI Prevention 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. In 2015, MDPH also administered The Prevention and Wellness Trust Fund, which aimed 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.

Partnerships - Preventing TBI depends upon the work and collaboration of many partners. MDPH works closely with MassPINN, the MA Traffic Safety Coalition, and representatives from the Brain Injury Association of MA, the MA Falls Prevention Coalition, the MA Medical Society, Blue Cross/Blue Shield of MA, AAA Southern New England, the MA Department of Transportation, the Executive Office of Public Safety and Security Highway Safety Division, 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 best strategies to reduce older adult falls and associated injuries. Massachusetts also has an active voluntary Falls Prevention Coalition of 130+ members committed to raising awareness of the preventability of falls and promoting prevention strategies.
- MA passed a series of junior operator laws between 2004 and 2010. Since passage of these laws, there has been a significant decrease in the number of crash-related deaths and injuries of junior operators in the Commonwealth.
- Massachusetts has been a leader in the implementation of “Return to Play” (sports concussion) legislation, by developing regulations and providing model policies, concussion history forms, medical clearance forms and technical assistance to middle and high schools. We have also conducted numerous trainings throughout the state for a range of stakeholders and are collecting sports concussion data from schools and evaluating school policies on sports concussion.

CDC 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/steady
- **HEADS UP** - The HEADS UP initiative provides 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. The CDC’s primary prevention focuses on child passenger safety, seat belt use, reducing drowsy driving, distracted driving and alcohol and drug-impaired driving. www.thecommunityguide.org/mvoi; www.cdc.gov/motorvehiclesafety

Data Sources - Deaths: MA Registry of Vital Records and Statistics, MDPH, 2014.

Nonfatal injuries: MA Inpatient Hospital Discharge and Emergency Department Discharge Databases, MA Center for Health Information and Analysis, fiscal year 2014.

Sports-related head injuries: MA Youth Health Survey, MDPH, 2015.

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.



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Resources and Related Publications

MA injury data reports are available online at no cost at: www.mass.gov/injury-surveillance-program.

Custom data analysis may also be requested by contacting the Injury Surveillance Program directly.

Injury Surveillance Program

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
www.mass.gov/injury-surveillance-program

Injury Prevention and Control Program

Massachusetts Department of Public Health
Bureau of Community Health and Prevention
250 Washington Street, 4th Floor
Boston, MA 02108
www.mass.gov/dph/injury

DPH Sports Concussion Program

www.mass.gov/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/orgs/massachusetts-rehabilitation-commission

Brain Injury Association of Massachusetts

30 Lyman Street, Suite 10
Westborough, MA 01581
Phone: (508) 475-0032; Email: biama@biama.org
www.biama.org

Centers for Disease Control and Prevention:

Traumatic Brain Injury

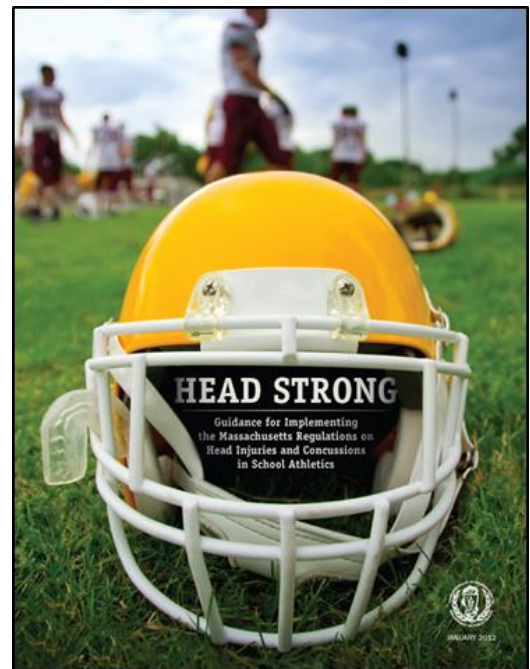
www.cdc.gov/traumaticbraininjury

HEADS UP Tool Kit for Youth Sports

www.cdc.gov/headsup

STEADI Tool Kit for Health Care Providers

www.cdc.gov/steadi



Head Strong provides guidance to schools on implementing MA youth sports concussion regulations and is available at:

www.mass.gov/dph/sportsconcussion

DATA BRIEF: Sports-Related Concussions among Massachusetts Youth

Health Survey Program, Office of Data Management and Outcomes Assessment
Massachusetts Department of Public Health | www.mass.gov/dph | Summer 2015

Introduction
Concussions are serious, particularly for young developing brains. For some students, symptoms can last weeks or months. A concussion is a type of traumatic brain injury caused by a bump, blow, or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth. This can damage brain cells and create chemical changes in the brain. Although concussions are usually not life-threatening, the effects of a concussion can cause long-term memory, learning, motor control, and/or speech problems.¹ Youth concussion safety laws have now been passed by all 50 states.

The Massachusetts Department of Public Health (MDPH)'s Youth Health Survey asks middle and high school students if they have experienced symptoms² of a concussion in the last year, and if so, what actions were taken. This fact sheet describes data on youth sports concussions and policies in Massachusetts to both prevent concussions among youth and ensure that appropriate management is followed.

Figure 1. Percent of MA student athletes who reported symptoms³ of a concussion while playing sports in past 12 months
© 2009 ■ 2011 ■ 2013 ■ 2015

School Level	2009	2011	2013	2015
Middle school	19.2	20.8	19.9	19.3
High school	18.3	21.3	15.7	14.0

¹Symptoms include being "knocked out", memory problems, dizziness or blurry vision, headaches, "pressure" in the head, nausea or vomiting.
²Significantly lower than in 2009 and 2011.

Massachusetts Sports Concussion Regulation (105 CMR 201.000)
Passed in 2011, the *Head Injuries and Concussions in Extracurricular Activities* regulations apply to all public middle and high schools with grades 6-12 that provide extracurricular sports activities. They also apply to other schools subject to rules of the Massachusetts Interscholastic Athletic Association. The regulations **mandate**:

- Schools and school districts must have policies governing the prevention and management of concussions;
- School staff, students, and parents must take an annual training on sports-related concussions;
- Student athletes prior to every sports season must submit the Pre-participation Form;
- Any student showing signs and symptoms of a concussion must be removed from play immediately, may not return to practice that day, and must be medically evaluated before returning to play;
- Every student who is diagnosed with a concussion must have a graduated "Return to Play" plan and must not return to practice until he/she is medically cleared;
- Specifically identified clinicians who have verified MDPH-approved training on post-traumatic head injury management are authorized to provide medical clearance.

For more information, go to: www.mass.gov/sportsconcussion

Sports-Related Concussions among Massachusetts Youth provides data from the MA Youth Health Survey and other resources. It is available at:

www.mass.gov/injury-surveillance-program