



MASSACHUSETTS

Special Emphasis Report: Traumatic Brain Injury – 2012

February 2015

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 2012, there were 836 deaths of MA residents that involved a traumatic brain injury (11.3 per 100,000). In addition, there were 5,182 hospitalizations (70.4 per 100,000), and 64,528 emergency department (ED) visits (987.5 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 2012. 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.²

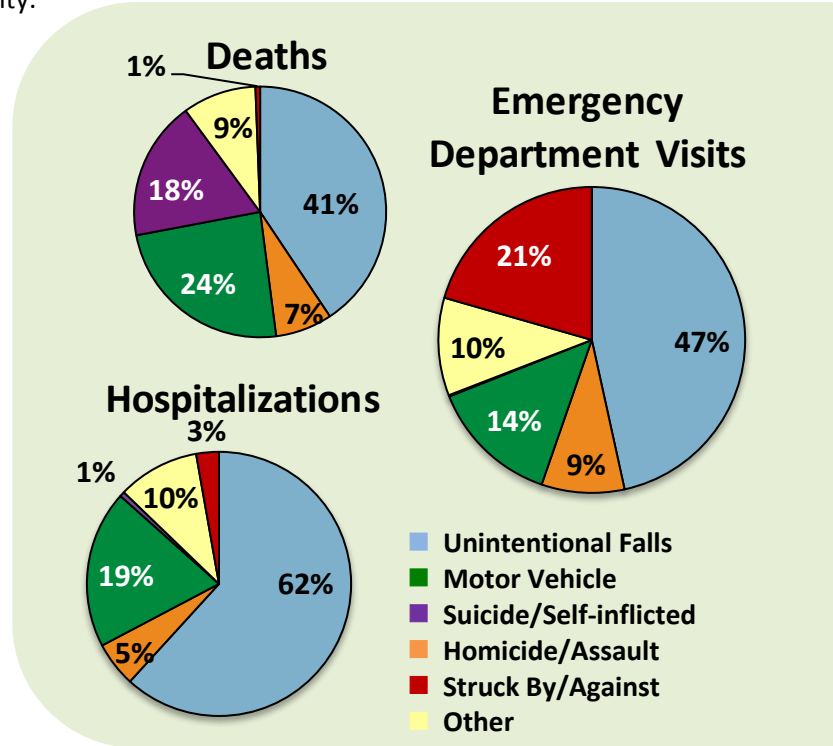


Figure 1: Percentage of Annual TBI-Related Deaths, Hospitalizations, and Emergency Department Visits, by External Cause, MA Residents, 2012³

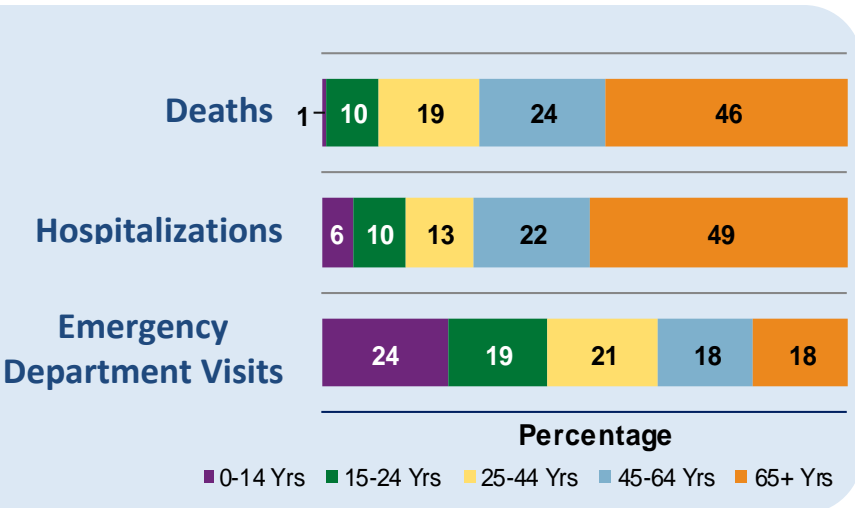


Figure 2. Percentage of Annual TBI-Related Deaths, Hospitalizations and Emergency Department Visits, by Age, MA Residents, 2012

TBI by Age

MA residents aged 65 years and older had the highest number and rate of TBI-related deaths and hospitalizations, accounting for 46% of TBI-related deaths and 49% of TBI-related hospitalizations. MA children ages 0 to 14 years had the highest number and rate of TBI-related emergency department visits, accounting for 24% of such visits.



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-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.

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 20% 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 was nearly three times higher among men than women (17.5 vs. 6.1 per 100,000). TBI-related hospitalization rates were 87% higher among men than women (93.3 vs. 49.9 per 100,000), and rates of TBI-related emergency department (ED) visits were 26% higher among men than women (1,098.0 vs. 872.7 per 100,000).⁴

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



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.⁵

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).

5. 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.

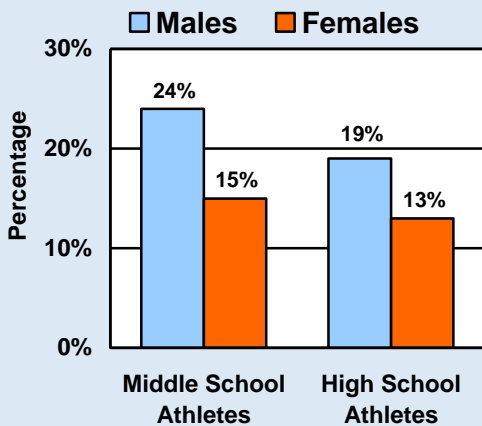


Figure 3. Percentage of Middle and High School Athletes Reporting Sports-related TBI Symptoms in the Past Year, by Sex, MA Residents, 2013

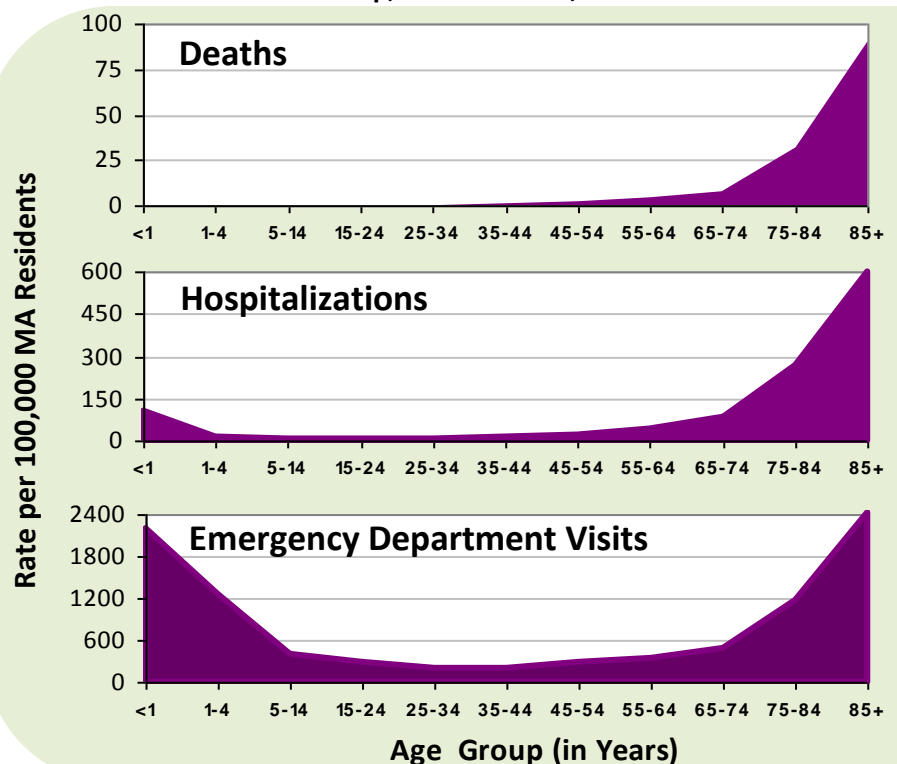
Unintentional Falls & TBI

In 2012, unintentional falls were the leading cause of fatal and nonfatal TBI among MA residents, accounting for 41% of TBI-related deaths, 62% of TBI-related hospitalizations, and 47% of TBI-related ED visits.

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 (90.1 per 100,000 for deaths, 601.5 per 100,000 for hospitalizations, and 2,423.0 per 100,000 for ED visits).

ED visit rates for fall-related TBIs were also very high among MA infants under age one (2,203.5 per 100,000) and children ages 1-4 (1,265.9 per 100,000).

Figure 4. Rates of Deaths, Hospitalizations, and Emergency Department Visits for Unintentional Fall-related TBIs, by Age Group, MA Residents, 2012





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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
- **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 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. 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.

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 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, and conducting numerous trainings throughout the Commonwealth for a range of stakeholders. MDPH is also collecting sports concussion data from schools and evaluating school policies on sports concussion.

Data Sources - Deaths: MA Registry of Vital Records and Statistics, MDPH, 2012.

Nonfatal injuries: MA Inpatient Hospital Discharge and Emergency Department Discharge Databases, MA Center for Health Information and Analysis, 2012.

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.



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Resources and Related Publications

This report and other MA injury data reports are available online at no cost at: www.mass.gov/dph/isp.

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

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
www.mass.gov/dph/isp

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

Brain Injury Association of Massachusetts

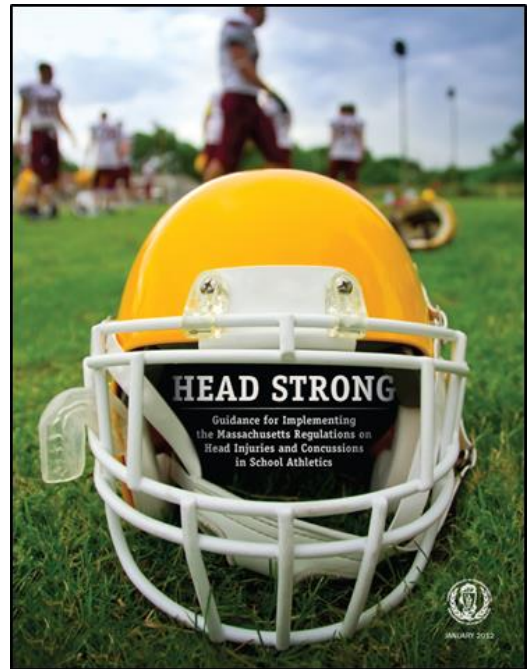
30 Lyman Street, Suite 10
Westborough, MA 01581
Phone : (508) 475-0032 ; Email : biana@biana.org
www.biana.org

Traumatic Brain Injury

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

Heads Up Tool Kit for Youth Sports

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



Head Strong provides guidance to schools on implementing MA youth sports concussion regulations and is available at: www.mass.gov/dph/sportsconcussion

Fall-Related Injuries and Deaths Among Older MA Adults: 2002-2010

Injury Surveillance Program, Bureau of Health Information, Statistics, Research, and Evaluation
Massachusetts Department of Public Health August 2013

Overview

Falls are a leading cause of injury and death across the United States and in Massachusetts and account for a significant portion of health care dollars spent on injury-related care.¹

This bulletin focuses on unintentional falls among older Massachusetts adults ages 65 and over, as they have much higher rates of fall-related injury and death than those under age 65. Annually older adults account for 84% of all fall-related deaths and 68% of all hospital stays for fall-related injuries.²

Unintentional falls are the leading cause of injury-related death and nonfatal injuries among MA residents ages 65+. Fall-related death rates have increased significantly for this age group over the past several years.

Unintentional falls led to the deaths of 434 MA older adults and 61,466 injuries treated in MA acute care hospitals (2010). Not included in these counts are those who received treatment only at home or in a physician office. (Fig. 1)

Research has found that there are many effective ways to prevent falls among older adults including improving balance and vision, and reducing hazards in the home. Massachusetts has made preventing falls among older adults a top priority. Data such as those included in this report are essential to guide the development and evaluation of efforts to prevent falls among older MA residents.

Fig. 1. Annual Magnitude of Fall-related Deaths and Treated Injuries, MA Residents Ages 65+

Key Findings

Among MA residents ages 65 and over:

- Men had higher fall death rates, while women had higher rates of hospital care for nonfatal fall-related injuries (2010).
- Fall-related injury and death rates increased significantly with age (2010).
- Fall-related death rates in MA increased 143% between 2002 and 2010, from 17.7 to 43.0 per 100,000.
- Of nonfatal falls treated in MA acute care hospitals, 1 in 5 was associated with a traumatic brain injury and 1 in 10 involved a hip or other femur fracture (2010).
- Acute care hospital charges associated with fall-related injuries in 2010 totaled over \$630 million.

¹ In this bulletin, the term "injury" refers to nonfatal injuries unless otherwise specified.
² The most recent data available are for 2010. Due to how data are reported, mortality data are based on calendar year and nonfatal injury data are based on fiscal year.

Fall-Related Injuries and Deaths Among Older Massachusetts Adults: 2002-2010 page 1

Fall-Related Injuries and Deaths among Older MA Adults includes data on fall injuries involving a TBI and is available at: www.mass.gov/dph/isp