

# FALL-RELATED INJURIES

## Deaths, Hospital Discharges, Observation Stays, and Emergency Department Visits

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

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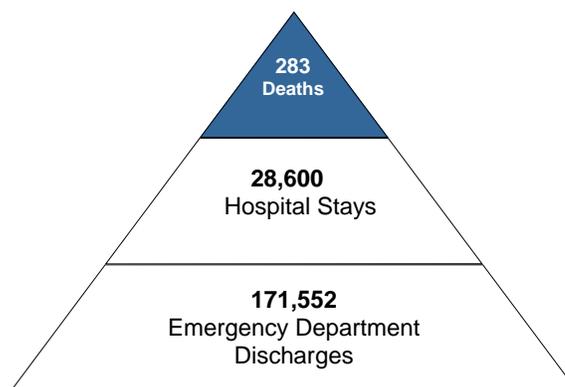
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## OVERVIEW AND TRENDS

Fall-related injury deaths and nonfatal injuries are a serious health problem across the United States and in Massachusetts. Falls were the fourth leading cause of injury death among Massachusetts residents in 2005, and were the leading cause of injury-related hospital stays and emergency department (ED) discharges.\* Figure 1 illustrates the magnitude of fall-related injuries in 2005 to Massachusetts residents, resulting in death or treatment at an acute care hospital. An estimated 500 MA residents are admitted to an acute care hospital or discharged from an ED for injuries resulting from a fall every day. Many more injuries are treated at home, in a physician's office, or a health care center.

This bulletin provides an overview of fall-related deaths and injuries to Massachusetts residents and highlights areas of particular concern such as populations with higher rates. Fall-related injuries are classified according to specific codes in the International Classification of Disease (ICD) manual. These codes provide information on the "nature and anatomic location" of the injury (e.g., fracture to the hip) and "cause" of injury (e.g., fall on or from steps and stairs).

Figure 1. Annual Magnitude of Fatal and Nonfatal Fall-related Injuries to MA Residents



Selected findings are summarized below:

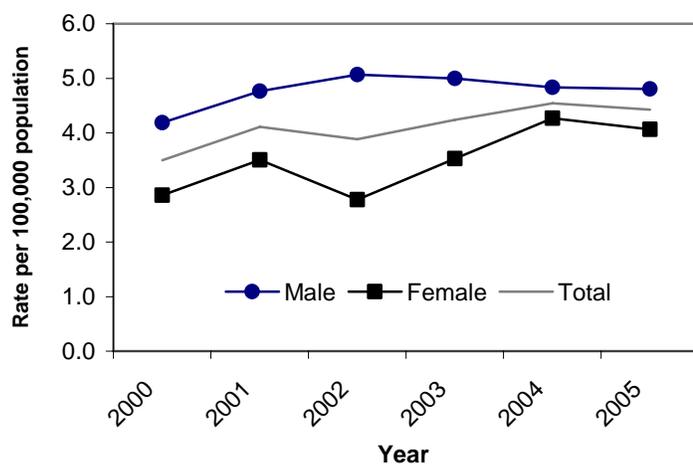
- In 2005, there were 283 fall-related injury deaths (4.4 per 100,000) and over 200,000 nonfatal injuries (3,128 per 100,000) to Massachusetts residents.
- Falls are the leading cause of nonfatal injuries, outnumbering motor vehicle related injuries by a factor of 2 to 1.
- Fall-related injury death rates increased 25.7% from 2000 to 2005.
- Males (N=149) were more likely than females (N=134) to die from a fall (4.8 and 4.1 per 100,000 respectively).
- Females had rates of fall-related injury hospital stays 1.6 times that of males.
- Older adults (ages 75 and over) had the highest rates for both fatal (38.9 per 100,000) and nonfatal fall-related injuries (8,820.2 per 100,000).
- Falls are the leading cause of traumatic brain injury-related deaths and hospital discharges.
- Falls are the leading cause of work-related injury death.

\* Death data are based on a calendar year and nonfatal injury databases are based on a fiscal year (October 1 – September 30, 2005). Fiscal year data sets contain 12 full months of data and are relatively comparable with calendar year data.

All rates presented here are considered stable (i.e., rates were calculated on counts greater than twenty). For the purposes of interpretation we make a distinction between larger increases/decreases – those over 25%, and “slight” increases and decreases (10-25%).

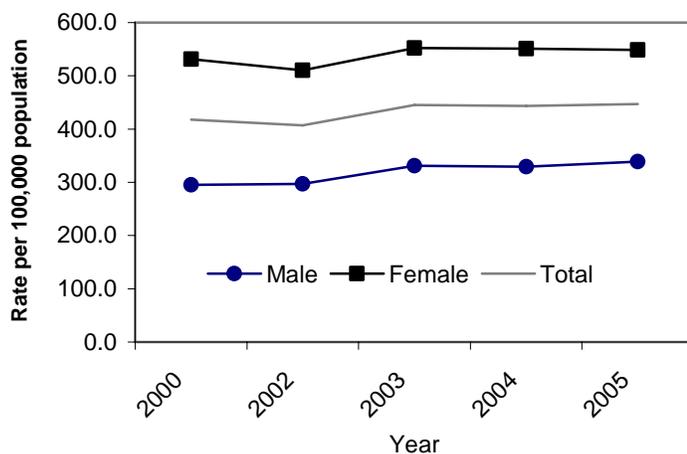
Fall-related injury death rates increased 25.7% from 2000 through 2005 (Figure 2). Nonfatal hospital stays (Figure 3) and emergency department visits (data not shown) remained relatively stable.

**Figure 2.** Trend in Fall Death Rates, MA Residents, 2000-2005, (N=1,580)



Source: Registry of Vital Records and Statistics, MDPH.

**Figure 3.** Trend in Nonfatal Fall-related Injury Hospital Stay Rates, MA Residents, FY2000-2005, (N=704,228)



Source: Registry of Vital Records and Statistics, MDPH.

Among fall-related deaths from 2000 through 2005:

- The rate of fall-related injury deaths increased 25.7% from 3.5 to 4.4 per 100,000 residents. (N=222 and 283 respectively).
- Rates among males increased slightly, from 4.2 to 4.8 per 100,000 while rates for females increased 41.4% from 2.9 to 4.1 per 100,000.
- Males consistently had higher fall-related mortality rates than females. In 2005, however, the gap was considerably narrowed to 4.8 per 100,000 for males and 4.1 per 100,000 for females.

Among hospital stays from 2000 through 2005:

- Females consistently had higher rates of fall-related hospital stays than males. In 2005, females had 1.6 times the rate of hospital stays for fall-related injuries than males (548.8 and 338.6 per 100,000, respectively).
- Rates for females and males remained relatively stable from 2003 through 2005.

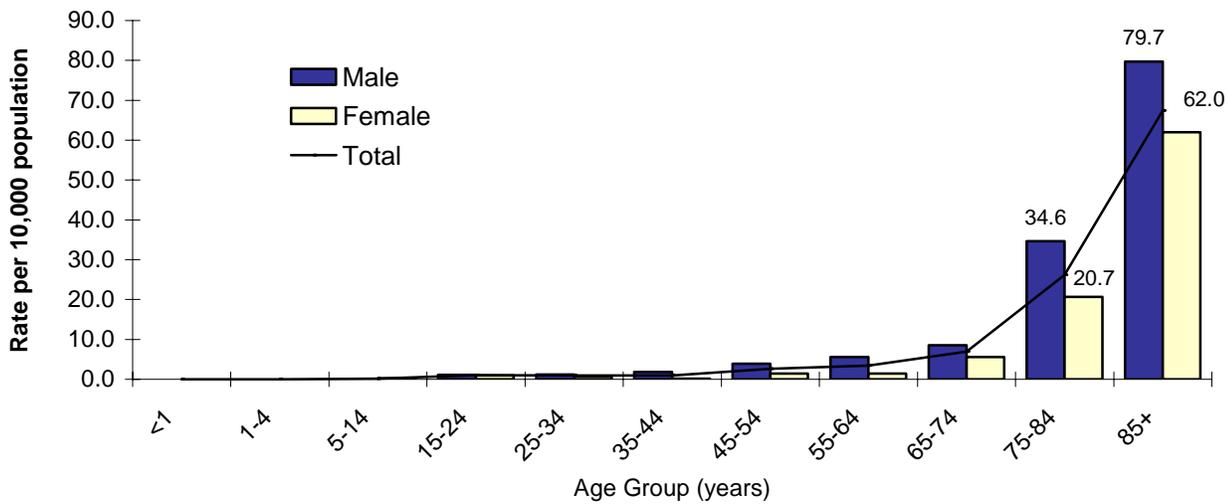
Among emergency department visits (data not shown), females consistently had higher rates of fall-related injuries than males. In 2005, fall-related ED visit rates were 2,759.2 and 2,597.6 per 100,000 females and males, respectively.

Fall-related death and nonfatal injuries differ by sex and age group (Figures 4, 5, and 6).

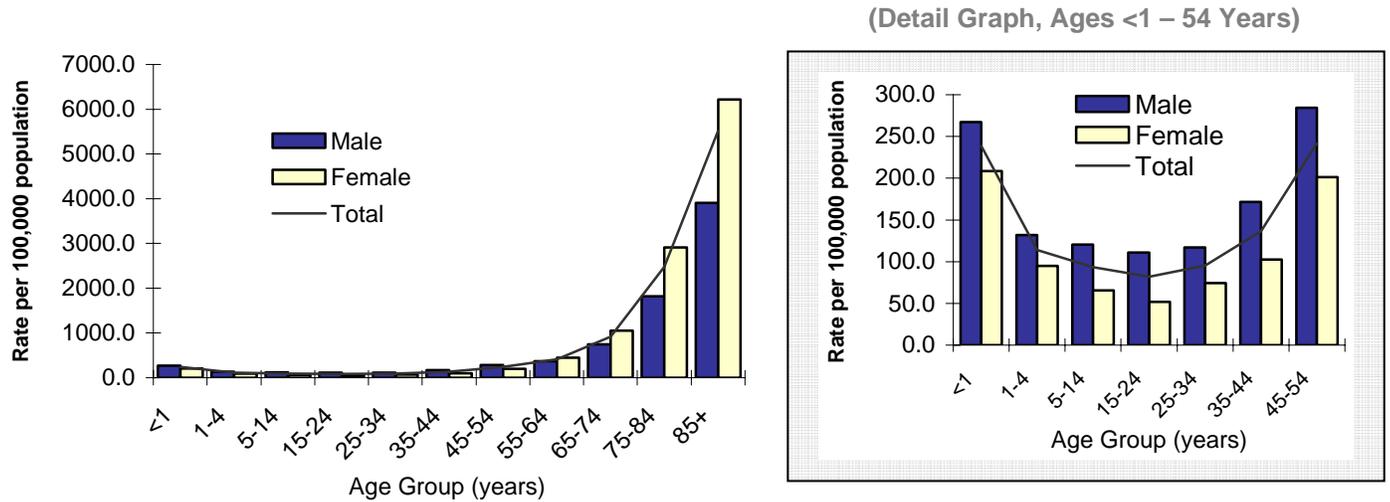
In 2005:

- The overall rate of fall-related injury death was 4.4 per 100,000 residents.
- Males had higher rates of death due to falls for all age groups.
- 73% of fatal falls (n=207) occurred in those 65 years of age and older.
- Rates were greatest among older age groups for both males and females:
  - Males ages 75-84 years old had a rate of 34.6 per 100,000; females a rate of 20.7 per 100,000.
  - Among persons ages 85 and older, males had a rate of 79.7 per 100,000; females a rate of 62.0 per 100,000.

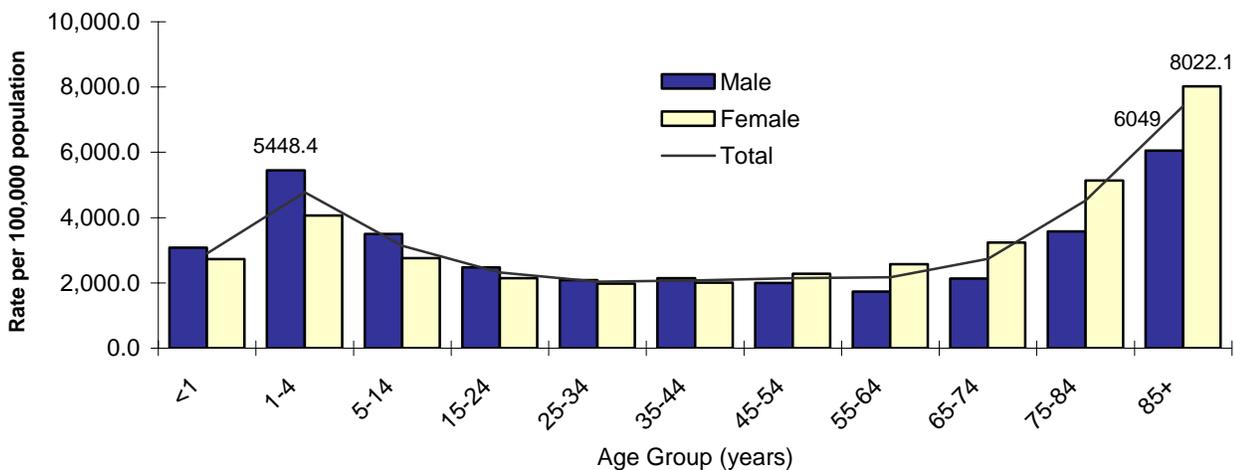
**Figure 4.** Fall-related Injury Death Rates by Sex and Age Group, MA Residents, 2005 (N=283)



**Figure 5.** Rates for Nonfatal Fall-related Injury Hospital Stays by Sex and Age Group, MA Residents, FY2005 (N=28,600)



**Figure 6.** Rates for Nonfatal Fall-related Injury ED Visits by Sex and Age Group, MA Residents, FY2005 (N=171,552)



Among fall-related injury hospital stays:

- Males had higher rates than females in younger age groups (through age 54). In older age groups (55 and older) females had higher rates of fall-related injury hospital stays.
- The highest rates occurred among persons ages 85 and older for both females and males (6,220.0 and 3,902.5 per 100,000 respectively).
- Among ages 54 and younger, infants less than 1 year and persons aged 45-54 had the highest rates (238.6 and 241.7 per 100,000 respectively).

Among emergency department visits:

- Rates of fall-related injury discharges were higher in males than females among children ages 14 and under.
- Among persons between the ages of 15 and 54, males and females had similar rates.
- Among adults and older persons (ages 55 and older), females had higher rates than males.
- The highest rates among males were to those ages 85+ (6,049 per 100,000) and those ages 1-4 (5,448.4 per 100,000).
- For females, the age groups with the highest rates were to those ages 85+, 75-84, and 1-4 (8,022.1, 5,140.3, and 4,063.0 per 100,000 respectively).

Fall-related mortality rates differ by race and ethnicity. For this analysis, we age-adjusted rates to minimize the effect that different age distributions have within different race and ethnicities and tested for significance. While, Non-Hispanic Whites had the highest rates overall, the pattern shifts when examining work-

related fall injuries where Hispanic and Black, Non-Hispanic residents had higher rates (pages 5 and 6).

- Non-Hispanic Whites and Asians had the highest average annual age-adjusted rates of fall-related injury deaths, while Hispanic and Non-Hispanic Blacks had the lowest age-adjusted rates.
- Average annual age-adjusted rates among Black, Non-Hispanics were significantly lower than White, Non-Hispanic residents. Other age-adjusted rates for race and ethnicity showed no significance.

The nature of injuries from falls and the leading anatomic sites also differ by age group. Not surprisingly, the most common type (or nature) of injury associated with a fall was a fracture (Table 2).

In FY2005:

- Infants were most likely to suffer a traumatic brain injury, while fractures to the arm and leg were the most common type and anatomic sites for children between the ages of 1 and 14 years.
- Traumatic brain injury was among the top type/anatomic sites for youth ages 15-19.
- Nearly one-third of MA residents aged 65 years and older who suffered a fall-related injury sustained a hip fracture.

**Table 1. Fatal Fall-related Injuries by Race and Ethnicity, MA Residents, 2001-2005**

Race and Ethnicity	Total Number 2001-2005	Average Annual Age-adjusted Rate*	95% Confidence Interval for Age-Adjusted rates
White, Non-Hispanic	1,263	3.8	3.6 - 4.1
Black, Non-Hispanic	31	2.4	1.5 - 3.3
Asian, Non-Hispanic	25	3.4	1.9 - 4.8
Hispanic	35	2.7	1.6 - 3.7
<b>TOTAL</b>	<b>1,358</b>	<b>3.7</b>	<b>3.5 - 3.9</b>

Source: Registry of Vital Records and Statistics, MDPH

\*Age-adjusted rates are used for race and ethnicity to minimize age differences among different groups.

**Table 2.** Leading Anatomic Site and Nature of Injuries Sustained in Nonfatal Fall-related Hospital Discharges by Age Group, MA Residents, FY2005

Age Group	Total Fall Injuries	Leading Types of Injuries and Anatomic Sites	Injury Type Count	Injury Type Percent
under 1 year	137	Traumatic Brain Injury	81	59.1
		Fracture of upper leg and thigh	13	9.5
1-4 years	259	Fracture of shoulder or upper arm	87	33.6
		Fracture of upper leg or thigh	60	23.2
5-9 years	304	Fracture of shoulder or upper arm	152	50.0
		Fracture of forearm or elbow	71	23.4
10-14 years	253	Fracture of lower leg or ankle	58	22.9
		Fracture of forearm or elbow	54	21.3
15-19 years	250	Fracture of lower leg or ankle	70	28.0
		Traumatic Brain Injury	42	16.8
20-64 years	6420	Fracture of lower leg or ankle	1860	29.0
		Fracture of hip	518	8.1
65-74 years	3274	Fracture of hip	738	22.5
		Fracture of lower leg or ankle	370	11.3
75-84 years	7484	Fracture of hip	2298	30.7
		Fracture of shoulder or upper arm	664	8.9
85+ years	7419	Fracture of hip	2597	35.0
		Fracture of shoulder or upper arm	569	7.7

Source: MA Outpatient Hospital Discharge Database, Division of Health Care Finance and Policy.

Fall-related injuries occur primarily in the home.

- Among fall-related injury deaths, 55% percent occurred at home, 10% occurred in a residential institution, and 6% occurred on a street or highway.
- Among hospital stays where place of injury was noted, 61% occurred at home and 14% occurred at a residential facility.
- Among emergency department visits where place of injury was noted, 40% occurred at home, 8% occurred at a place for recreation and sport, and 7.5% occurred at an industrial place and premises.

### WORK-RELATED FALL INJURIES\*

Falls are the leading cause of work-related injury death (Tables 3 and 4).

- From 2000 through 2005, there were 83 fatal falls among workers, accounting for approximately 21% of all work-related fatal injuries in Massachusetts.

- In FY 2005, there were 11,182 emergency department (ED) discharges associated with nonfatal falls that occurred at work, accounting for almost 17% of all work-related injury discharges and 7% of all ED-treated injuries from falls.
- Male workers had higher rates of fall-related injury fatalities than female workers (0.8 and 0.03 per 100,000 respectively). In the ED, the rate of fall-related visits was 409.6 per 100,000 for males and 285.4 per 100,000 for females.
- Young workers (20–24 years) and Black, Non-Hispanic workers experienced the highest overall rates of ED-treated fall injuries. The rate of ED-treated nonfatal fall injuries was also high among Hispanic workers (444.2 per 100,000 workers).
- Workers aged 66–74 and Hispanic workers had the highest rates of fatal falls. The rate of fatal falls is more than three times higher among older workers aged 66–74 compared with the combined rate of workers in the younger

age groups. Although these high fatality rates are calculated using small numbers, they are

consistent with previous findings for Massachusetts.<sup>1</sup>

**Table 3. Highest Rates of Work-related Fall Injuries, Massachusetts**

	FATAL			NONFATAL		
		Occupational Fatalities <sup>1</sup> 2000 - 2005		Emergency Department Visits <sup>2,3</sup> FY 2005		
Work-related Fall Injuries:		Count	Rate <sup>4</sup>		Count	Rate <sup>4</sup>
Total		83	0.4		11,182	349.5
Sex	Male	80	0.8	Male	6,766	409.6
Race/Ethnicity	Hispanic	8	0.7	Black Non-Hispanic	722	456.4
Age Group	66 - 74 yrs	6	1.4	20 - 24 yrs.	1,128	419.5
Industry Group	Construction	50	6.1	--	--	--

<sup>1</sup> Annually, Massachusetts collects information on all fatal work-related injuries that occur in the state through the Census of Fatal Occupational Injuries Program, in conjunction with U.S. Dept. of Labor, Bureau of Labor Statistics.

<sup>2</sup> Division of Health Care Finance and Policy ED database is based on a fiscal year (October 1, 2004 – Sept. 30, 2005); only nonfatal fall cases are included.

<sup>3</sup> Work-related injuries have an expected payer of Worker's Compensation.

<sup>4</sup> Rates are annual averages, expressed per 100,000 workers and are calculated using MA workforce estimates from the Current Population Survey. Crude rates are presented. Rates based on counts less than 20 may be unstable and caution should be used in interpretation.

**Table 4. Circumstances of Work-related Fall Injuries, Massachusetts**

	FATAL		NONFATAL			
		Occupational Fatalities <sup>1</sup> 2000 - 2005 N=83		Emergency Department Visits <sup>2,3</sup> FY 2005 N=11,182		
Leading Circumstances:	Count	Percent			Count	Percent
Fall from ladder, scaffold, or girder	28	33.7%		Fall on same level from slipping, tripping, or stumbling	4,925	44.0%
Fall from roof or other structure	13	15.7%		Other and unspecified fall	3,291	29.4%
Fall through roof/floor opening or other surface	12	14.5%		Fall from 1 level to another (except from ladder, stair, building, scaffold)	1,033	9.2%
Other fall to lower level	9	10.8%		Fall on or from steps/stairs	903	8.1%
Fall from stationary vehicle	8	9.6%		Fall on or from ladder or scaffold	801	7.2%

<sup>1</sup> Annually, Massachusetts collects information on all fatal work-related injuries that occur in the state through the Census of Fatal Occupational Injuries Program, in conjunction with U.S. Dept. of Labor, Bureau of Labor Statistics.

<sup>2</sup> Division of Health Care Finance and Policy ED database is based on a fiscal year (October 1, 2004 – Sept. 30, 2005); only non-fatal fall cases are included.

- Construction workers experienced the highest number and rate of fatal falls, compared with workers in other industry sectors such as janitorial services (4.2 per 100,000), manufacturing (0.4 per 100,000), government (0.2 per 100,000), and retail/wholesale trade (0.2 per 100,000).
- From 2000 through 2005, approximately one-third (33.7%) of fatal, work-related falls were from a ladder, scaffold, or girder.
- Among fall-related injury ED visits for which a specific cause was provided, 44% resulted from slipping, tripping, or stumbling on the same level. Among older workers (66–74 years), over half (53%) of all nonfatal falls seen in the emergency department involved slipping, tripping, or stumbling on the same level.
- The circumstances resulting in the most work-related falls differ between fatal and nonfatal cases. A fall on the same level caused 44% of nonfatal cases seen in the emergency department but only about 10% of fatal cases.

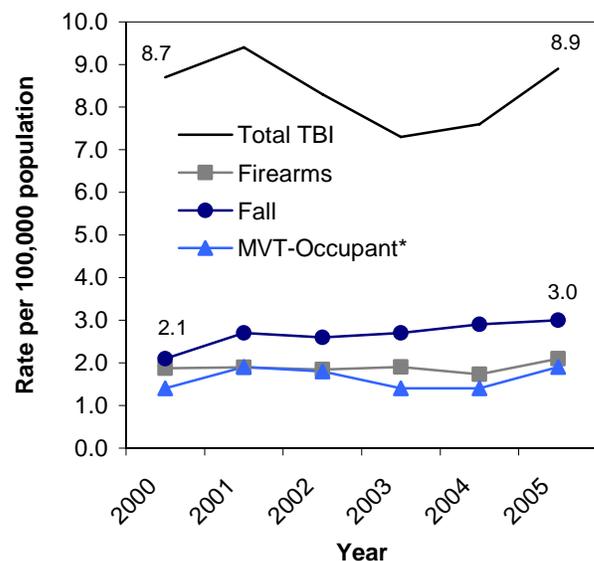
*\*For this bulletin, we included a snapshot of the most serious work-related fall injuries resulting in death and less serious nonfatal fall injuries presenting to emergency departments. The Department's Occupational Health Surveillance Program is planning a more in-depth analysis of falls in the construction industry using all available data (death, hospital discharge, observation stays, emergency departments, etc.).*

## THE LINK BETWEEN FALLS AND TRAUMATIC BRAIN INJURY (TBI)

Traumatic brain injury (TBI) is considered one of the most severe injuries due to its impact on cognitive functioning and long-term medical consequences. TBI is defined as an injury to the head arising from blunt or penetrating trauma or from acceleration-deceleration forces that is associated with any of these symptoms or signs attributable to the injury: decreased level of consciousness, amnesia, other neurologic or neuropsychologic abnormalities, skull fracture, diagnosed intracranial lesions, or death.<sup>2</sup>

Falls are the leading cause of TBI deaths and hospital discharges to MA residents. Each year in Massachusetts, about 46,000 residents sustain a traumatic brain injury. In 2005, there were 571 TBI-related deaths (33.3% of these were fall-related). And in FY2005, there were 6,442 hospital stays and 39,640 emergency department (ED) discharges associated with a nonfatal TBI among MA

**Figure 7.** Trend in Fall-related TBI Deaths, MA Residents, 2000-2005, (N=5,921)



Source: Registry of Vital Records and Statistics, MDPH.

residents. While TBI death rates have varied over the last few years, others such as fall-related TBI deaths have increased.

Among TBI deaths from 2000 through 2005:

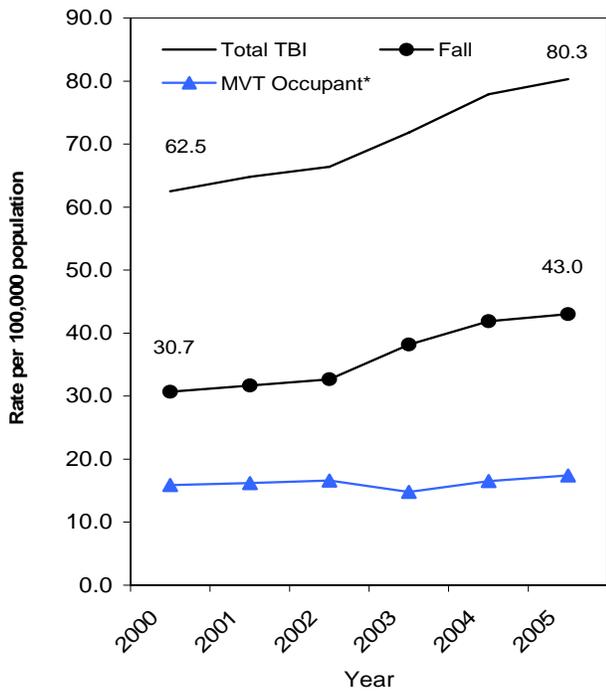
- The rate of TBI deaths varied from year to year. Rates were highest in 2001 (9.4 per 100,000) and lowest in 2003 (7.3 per 100,000).
- The rate of fall-related TBI deaths increased 42.9%, from 2.1 to 3.0 per 100,000.
- No obvious pattern emerged among rates for firearm-related TBI deaths or motor vehicle traffic-related (MVT) occupant\* TBI deaths.

*\*occupant includes passengers and drivers of a motor vehicle including motorcycles.*

<sup>1</sup> *Fatal Occupational Injuries in Massachusetts 1991-1999 (2002), Occupational Health Surveillance Program, Bureau of Health Information, Statistics, Research and Evaluation, Massachusetts Department of Public Health, Pages 28-29.*

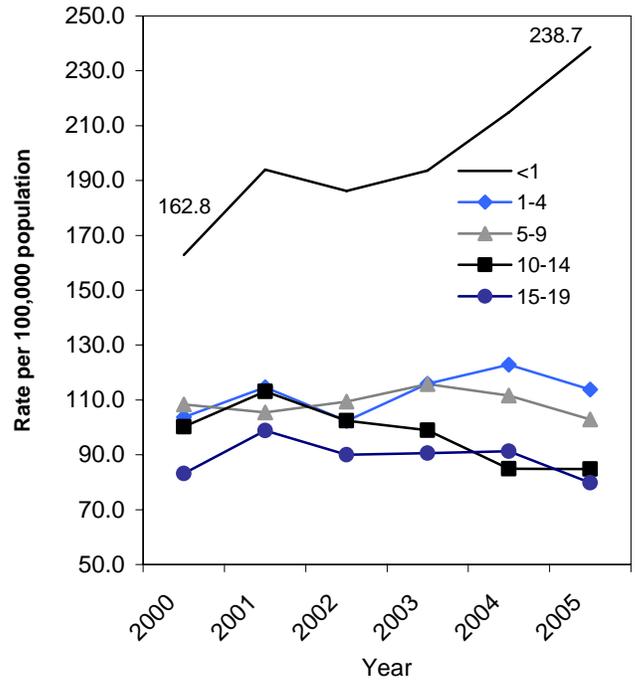
<sup>2</sup> *State and Territorial Injury Prevention Directors Association (STIPDA). Council of State and Territorial Epidemiologists Injury Indicators for Surveillance; 1999. ([www.stipda.org/resol/99nphss-tbi.htm](http://www.stipda.org/resol/99nphss-tbi.htm)).*

**Figure 8. Trend in Rates for Nonfatal Fall-related TBI Hospital Discharges, MA Residents, FY2000-2005, (N=21,860)**



Source: MA Inpatient Hospital Discharge Database, Division of Health Care Finance and Policy.

**Figure 9. Trend in Rates\* for Nonfatal Fall-related Hospital Stays in MA Children and Youth Ages 0-19, FY2000-2005 (N=10,424)**



Source: MA Inpatient Hospital Discharge Database, MA Outpatient Observation Stay Database, Division of Health Care Finance and Policy. \*Scale starts at 50.0 to show differences in rates among all age groups.

Among hospital stays from 2000 through 2005:

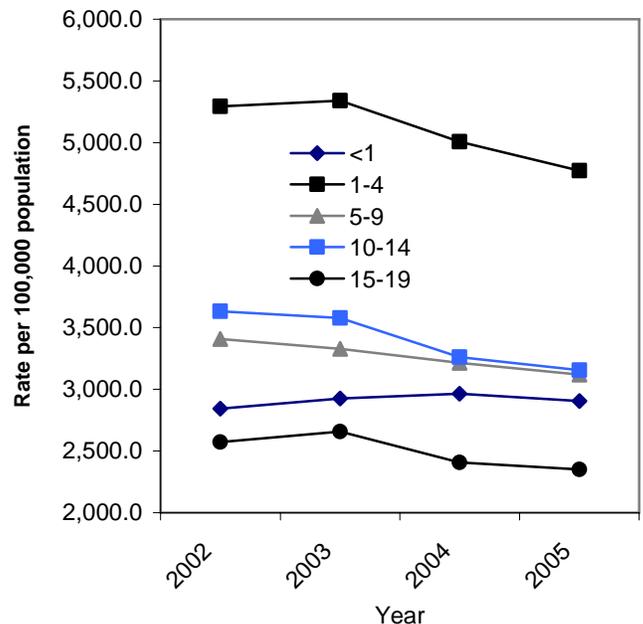
- The rate of hospital discharges from TBI increased 28.5% from 62.5 to 80.3 per 100,000.
- The rate of hospital discharges from fall-related TBI increased 40.1% from 30.7 to 43.0 per 100,000.
- The rate of hospital discharges from MVT occupant-related TBI injuries remained relatively stable.
- Unlike deaths, firearm-related TBI injuries account for very few hospital discharges.

\*occupant includes passengers and drivers of a motor vehicle including motorcycles.

## FALL-RELATED INJURIES TO CHILDREN AND YOUTH

Children and youth have high rates of fall-related emergency department visits and infants less than 1 year have a high rate of fall-related hospital stays when compared to other children between the ages of 1 and 14 (Figures 9 and 10).

**Figure 10. Trend in Rates for Nonfatal Fall-related ED Discharges in MA Children and Youth Ages 0-19, FY2002-2005,\* (N=225,064)**



Source: MA Emergency Department Discharge Database, Division of Health Care Finance and Policy. \*Scale starts at 2000.0 to show differences in rates among all age groups; emergency department data was not collected prior to 2002.

Among hospital stays from 2000 through 2005:

- Rates of fall-related injury hospital stays in infants (<1) increased 46.6% from 162.8 to 238.7 per 100,000. No clear pattern has emerged to explain the increase but the number of falls from one level to another such as from a chair or other furniture, increased 34% during the time period, and traumatic brain injuries increased 60% (from 95 in 2000 to 152 in 2005).
- Rates in 10-14 year olds decreased slightly; 15.3% from 100.2 to 84.9 per 100,000. This decline is due in part to a drop in fall-related injuries associated with roller skates/inline skates, skateboards, and snowboards.

Among ED visits from 2002 through 2005:

- Rates of fall-related ED visits in children ages 1 to 4 years were the highest for this age group; 4,772.0 per 100,000 in 2005.

- Rates of fall-related injury ED visits among infants <1 year remained relatively stable.
- Rates in 10-14 year olds decreased slightly; 13.2% from 3,633.8 to 3,155.6 per 100,000.

Circumstances differ by age group among children ages 0-14 years (Table 5).

- Among younger age groups (ages 9 and under) the leading circumstance for nonfatal fall-related injuries was a fall from one level to another, for example from a bed or playground equipment.
- Among children ages 10-14 years most injuries resulted from a fall on the same level from slipping, tripping, or stumbling, or from a collision, pushing, or shoving while engaged in a sports activity.

**Table 5. Unintentional Nonfatal\* Fall-related Injuries to MA Children and Youth Ages 0-19, FY2005, (N=54,218)**

Circumstance	<1 year old	1-4 years	5-9 years	10-14 years	15-19 years
Fall on or from stairs or steps	328	1,679	647	877	1,175
Fall on or from ladders or scaffolding	0	49	52	28	109
Fall from or out of building or other structure	0	47	19	31	58
Fall into hole or other opening in surface	0	16	40	83	84
Fall from one level to another:	1,410	4,462	3,521	1,500	786
<i>from playground equipment</i>	11	708	1,742	420	66
<i>from chair</i>	141	951	220	77	58
<i>from bed</i>	580	1,210	477	124	71
<i>from other furniture</i>	205	545	154	37	17
<i>other fall from one level to another</i>	473	1,048	928	842	574
Fall on same level from slipping, tripping, or stumbling:	197	2,764	3,425	5,358	3,742
<i>from roller skates</i>	1	13	213	429	99
<i>from skateboard</i>	0	11	109	685	456
<i>from skis</i>	1	7	77	204	126
<i>from snowboard</i>	1	8	56	513	459
<i>other fall on same level from slipping, etc.</i>	194	2,725	2,970	3,527	2,602
Fall on same level from collision, pushing, or shoving, by or with other person:	1	44	221	1,045	890
<i>in sports</i>	0	5	166	1,001	856
<i>other and unspecified from collision, etc.</i>	1	39	55	44	34
Other and unspecified fall	567	6,433	4,466	4,577	3,487
<b>TOTAL FALLS</b>	<b>2,503</b>	<b>15,494</b>	<b>12,391</b>	<b>13,499</b>	<b>10,331</b>

Source: MA Inpatient Hospital Discharge Database, MA Outpatient Observation Stay Database, MA Emergency Department Discharge Database, Division of Health Care Finance and Policy. \*includes hospital stays and emergency department visits

- Most nonfatal fall-related injuries among youth ages 15-19 resulted from a fall on the same level from slipping, tripping, or stumbling.
- Table 5 illustrates well one of the difficulties of data collection; 36% of all nonfatal fall-related injuries did not include specific circumstance codes. Such limited data can result in the development of less effective prevention strategies.

## FALL-RELATED INJURIES TO OLDER ADULTS

Older adults (ages 65 and older) are disproportionately affected by fall-related death and injury. In 2005, older adults accounted for 73% of fall-related deaths and 67% of nonfatal hospital stays for fall-related injuries.

The Massachusetts Department of Public Health has produced a strategic plan, *Maximizing Our Efforts: The Massachusetts State Injury Prevention Plan*, to address injury priorities in the Commonwealth. Reducing fall-related injury and death among persons aged 65 and older is one of the priorities outlined in the plan.

Among fall-related injury deaths from 2000 through 2005:

- Rates in 65-74 year olds remained relatively stable.
- Rates in 75-84 year olds varied from year to year with the lowest rate for the time period occurring in 2000 (19.3 per 100,000) and the highest rate occurring in 2005 (26.2 per 100,000).
- Rates in those 85+ increased 17.6% from 57.4 to 67.5 per 100,000.

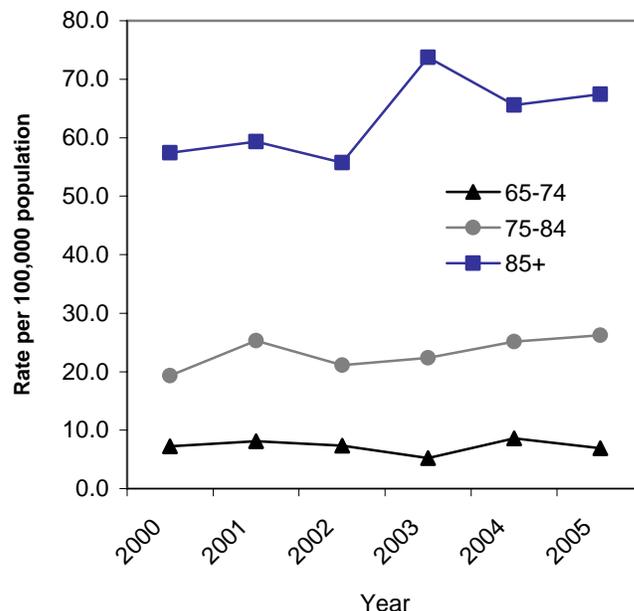
Among hospital stays from 2000 through 2005:

- Rates among 65-74 and 75-84 year olds increased, while rates among persons ages 85 and older decreased.
- Among persons ages 65-74, there was a slight increase of 14.4% (800.8 to 916.2 per 100,000).
- Rates were highest among persons aged 85+. In 2005, the fall-related hospital stay rate was 5,505.3 per 100,000.

Place of injury and Circumstances:

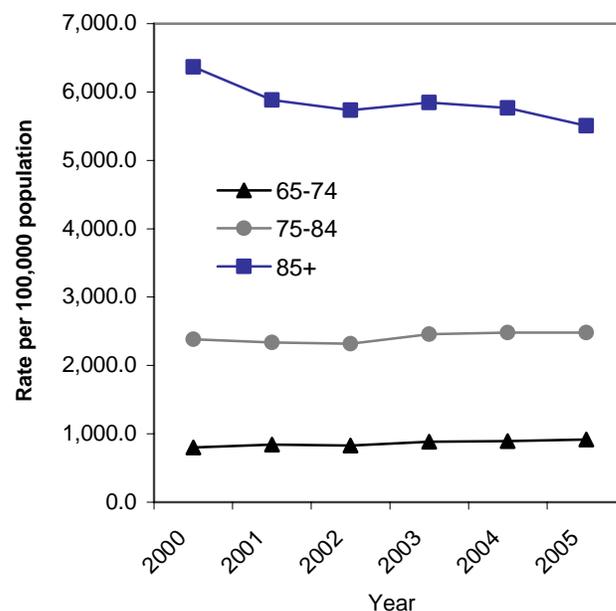
- Most fatal fall injuries to those 65 years and older (59%) occurred at home. Thirteen

Figure 11. Trend in Fatal Fall-related Injuries, MA Residents Ages 65+, 2000-2005, (N=1,115)



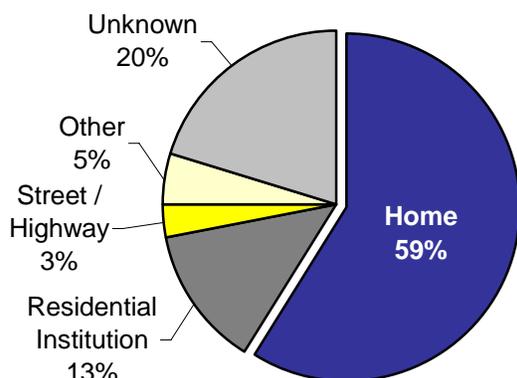
Source: Registry of Vital Records and Statistics, MDPH.

Figure 12. Trend in Rates for Nonfatal Fall-related Injury Hospital Stays, MA Residents Ages 65+, FY2000-2005, (N=112,432)



Source: MA Inpatient Hospital Discharge Database, MA Outpatient Observation Stay Database, Division of Health Care Finance and Policy.

**Figure 13.** Place of Injury for Fall-related Deaths to MA Residents Ages 65+, 2005, (N=207)



Source: Registry of Vital Records and Statistics, MDPH.

percent occurred in a residential institution and 3% occurred on a street or highway.

- Among cases for which a specific cause was provided, the majority of nonfatal fall-related injuries among older adults were the result of a fall on the same level from slipping, tripping, or stumbling.

## CONCLUSION

Fall-related injury deaths and nonfatal injuries are a serious health problem in Massachusetts. In 2005, 283 residents died from injuries sustained as a result of a fall, and more than 500 residents suffer a fall-related injury every day that require admission to or treatment at an acute care hospital. Most fall-related injuries are preventable. Preventive health screening such as vision exams, lifestyle changes, and environmental modifications such as increased street lighting and the installation of handrails, are a few strategies to help reduce the incidence of fall-related injuries. The Massachusetts Department of Public Health has produced a strategic plan, *Maximizing Our Efforts: The Massachusetts State Injury Prevention Plan*, to address injury priorities in the Commonwealth. Preventing fall-related injuries is one priority outlined in the plan. To learn more about how to prevent injuries, or to obtain a copy of the plan, contact the Department's Injury Prevention and Control Program (resources information on page 13).

**Table 6.** Unintentional Nonfatal\* Fall-related Injuries to MA Residents Ages 65+, FY2005 (N=55,082)

Circumstance	65-74 years	75-84 years	85+ years
Fall on or from stairs or steps	1,492	1,866	860
Fall on or from ladders or scaffolding	289	166	45
Fall from or out of building or other structure	20	15	0
Fall into hole or other opening in surface	18	20	4
Other fall from one level to another	1,083	1,984	2,119
<i>fall from chair</i>	216	393	377
<i>fall from wheelchair</i>	188	357	494
<i>fall from bed</i>	367	866	948
<i>fall from other furniture</i>	43	57	33
<i>fall from commode</i>	38	104	140
<i>other fall from one level to another</i>	231	207	127
Fall on same level from slipping, tripping, or stumbling	6,085	9,193	6,831
Fall on same level from collision, pushing, or shoving, by or with other person	25	21	12
Other and unspecified fall	5,250	9,167	8,517
<b>TOTAL FALLS</b>	<b>14,262</b>	<b>22,432</b>	<b>18,388</b>

Source: MA Inpatient Hospital Discharge Database, MA Outpatient Observation Stay Database, MA Emergency Department Discharge Database, Division of Health Care Finance and Policy. \*Includes hospital stays and emergency department visits.

## DATA SOURCES AND METHOD NOTES

### Data Sources:

*Statewide Deaths:* MA Registry of Vital Records and Statistics, MA Department of Public Health; data reported are for calendar years January 1, 2000 – December 31, 2005.

For the purposes of this report, we combined hospital discharges and hospital observation stays into one category referred to as “Hospital Stays”:

*Statewide Acute-care Inpatient Hospitalizations:* MA Inpatient Hospital Discharge Database, MA Division of Health Care Finance and Policy; data reported are for fiscal years 2000-2005 (October 1, 1999 – September 30, 2005). Deaths occurring during the hospital stay and transfers to another acute care facility were excluded except when calculating charges. All hospitalizations and charges discussed refer to acute care hospitals.

*Statewide Outpatient Observation Stays:* MA Outpatient Observation Stay Database, MA Division of Health Care Finance and Policy; data reported are for fiscal years 2000-2005 (October 1, 1999 – September 30, 2005). Deaths occurring during the visit were excluded except when calculating charges.

*Statewide Emergency Department Visits at Acute-care Hospitals:* MA Emergency Department Discharge Database, MA Division of Health Care Finance and Policy; data reported are for fiscal years 2003-2005 (October 1, 2002 – September 30, 2005). Deaths occurring during the visit were excluded except when calculating charges.

Due to data quality issues, the external cause of injury codes (E-Codes) for one hospital, were excluded from all ED analysis. Total injury counts presented in this report include the primary diagnostic codes for this hospital, but associated diagnostic codes were excluded. Additionally, in 2002 two hospitals assigned departure codes incorrectly using “Died during ED visit” rather than “Routine discharge”. We included these two hospitals in the ED 2002 analysis because: 1) according to subsequent years less than 0.2% of injuries for these hospitals “died during an ED visit”, and 2) to exclude them would result in a loss of over 10,000 fall-related injury cases.

*Occupational Fatalities:* Information about fatal injuries that occur at work is collected annually by the Occupational Health Surveillance Program (OHSP), Massachusetts Department of Public Health, in conjunction with the Federal Bureau of Labor Statistics, U.S. Department of Labor. Between 2000 and 2005, there were a total of 320 work-related fatalities recorded in Massachusetts.

*Population Data:* Population numbers used to calculate rates include estimates provided by the 2000 Census file, and estimates provided by the U.S. Census Bureau (2001-2005 data).

### Method Notes:

Fall-related cases were ascertained according to case definitions recommended by the Centers for Disease Control and Prevention (CDC) and are based upon International Classification of Disease Version 9 Clinical Modification (ICD-9-CM) codes for morbidity and International Classification of Disease Version 10 (ICD-10, 2000-2005) codes for mortality.

Work-related Injury for the Emergency Department Discharge Database was defined as the designation of Worker’s Compensation Insurance as the primary expected payer, as well as, certain diagnostic codes (E Codes or V Codes) which are used as probable indicators of an injury’s work-relatedness.

Rates: All rates are per 100,000 residents. Rates for age groups are age-specific rates and rates for racial and ethnic groups include crude and age-adjusted. All other rates are crude rates.

## RESOURCES:

### **Injury Surveillance Program (ISP)**

Massachusetts Department of Public Health  
Bureau of Health Information, Statistics, Research, and Evaluation  
250 Washington Street, 6<sup>th</sup> Floor  
Boston, MA 02108  
(617) 624-5648  
[www.mass.gov/dph/bhsre/isp/isp.htm](http://www.mass.gov/dph/bhsre/isp/isp.htm)

### **Injury Prevention and Control Program (IPCP)**

Massachusetts Department of Public Health  
Bureau of Family and Community Health  
250 Washington Street, 4<sup>th</sup> Floor  
Boston, MA 02108  
(617) 624-5413  
[www.mass.gov/dph/fch/injury/index.htm](http://www.mass.gov/dph/fch/injury/index.htm)

### **Occupational Health Surveillance Program (OSHP)**

Massachusetts Department of Public Health  
Bureau of Health Information, Statistics, Research, and Evaluation  
250 Washington Street, 6<sup>th</sup> Floor  
Boston, MA 02108  
(617) 624-5632  
[www.mass.gov/dph/ohsp](http://www.mass.gov/dph/ohsp)

### **Centers for Disease Control and Prevention**

National Center for Injury Prevention and Control (NCIPC)  
4770 Buford Hwy, NE  
MS K-65  
Atlanta, GA 30341-3717  
1 (800) CDC-INFO (232-4636)  
**TTY:** 1 (888) 232-6348  
**FAX:** (770) 488-4760  
[www.cdc.gov/ncipc/duip/preventadultfalls.htm](http://www.cdc.gov/ncipc/duip/preventadultfalls.htm)

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