FIRE INJURIES
CURRENT STATUS IN MASSACHUSETTS
Deaths, Hospital Discharges, Emergency Department Visits, & Prevention Strategies

Prepared by: The Massachusetts Department of Public Health, Center for Community Health and Center for Health Information, Statistics, Research & Evaluation, and the Massachusetts Department of Fire Services, Office of the State Fire Marshal

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Key Findings

- Fires are a public health concern in Massachusetts and across the nation. In the two-year period 2002 and 2003, there were 147 deaths due to fires and an additional 415 hospitalizations and 3,638 emergency department visits for nonfatal fire injuries among MA residents. Of these fire-related injuries, 8.4% of the hospitalizations and 19.3% of emergency department visits were work related.
- Most fire deaths in MA are due to fires in residential structures. In 2003, residential fires accounted for 77% of the fire deaths reported to the Office of the State Fire Marshal. The leading cause of the fires in these fire deaths was smoking (36%).
- In 2003, three groups in MA experienced the highest rates of fire-related injuries: 1) males (compared with females), 2) residents ages 65 years and older (compared with other age groups), and 3) Blacks (compared with other race/ethnic groups).
- The total combined charges for acute care hospital stays and emergency department visits associated with fire injuries exceeded $20 million in fiscal year 2003.

BACKGROUND

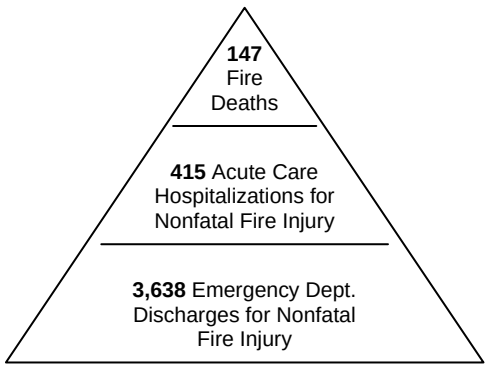
Fire injuries are a public health concern in Massachusetts and across the nation. These injuries are preventable through proven technologies and environmental changes. The Centers for Disease Control and Prevention have a stated goal of eliminating residential fire deaths by the year 2020, through a coordinated effort with the U.S. Fire Administration, the U.S. Consumer Product Safety Commission and other non-governmental organizations. Nationally, in 2003, more than $726 million of the $1.6 billion of the hospital charges for treatment of burn victims was billed to Medicare and Medicaid.[1] This bulletin examines the magnitude of fire injuries in MA, the groups at highest risk, the major causes of these injuries, and the current evidence-based prevention strategies.

MAGNITUDE OF FIRE INJURIES

IN THE TWO YEAR PERIOD 2002-2003:

- Fires caused 147 deaths among MA residents, an average annual crude rate of 1.1 per 100,000 residents. These deaths represent the severest outcome of a much larger problem.
- There were 415 acute care hospitalizations and 3,638 emergency department discharges for nonfatal fire-related injuries among MA residents (average annual crude rate of 3.2 and 28.3 per 100,000 residents, respectively).

Figure 1. Total Fire Injuries
MA Residents, 2002-2003 (N=4,200)



Sources: Registry of Vital Records and Statistics, MDPH. MA Inpatient Hospital Discharge and Emergency Department Databases, MA Division of Heath Care Finance and Policy.

- The total combined charges for acute care hospital stays and emergency department discharges for fire-related injuries exceeded $20 million in fiscal year 2003.

RISK FACTORS FOR FIRE INJURIES

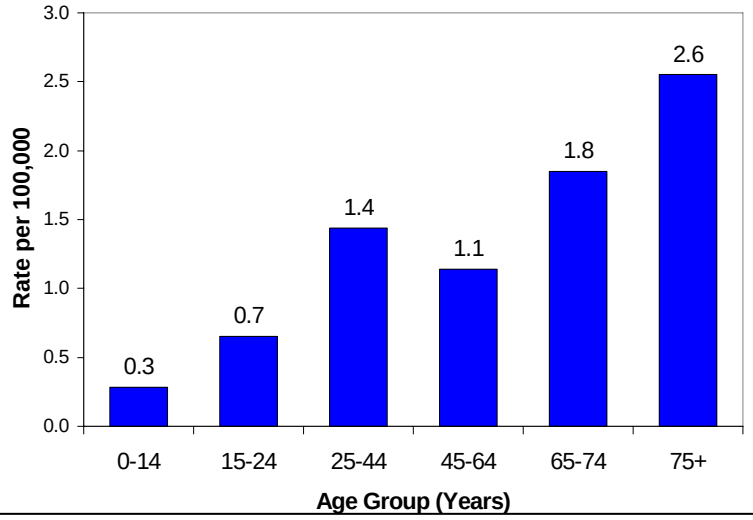
AGE GROUPS

- For the 2 year period 2002-2003, the average annual fire fatality rate was highest among MA residents aged 75 years and older (2.6 per 100,000) and lowest among children 0-14 years (0.3 per 100,000). (Figure 2)

- The average annual rate of hospitalization for nonfatal fire injuries was highest among residents 85 years and older (5.8 per 100,000) and among individuals 45-64 years (4.9 per 100,000), during 2002-2003. Children 0-14 years experienced the lowest hospitalization rate (0.6 per 100.000). (Data not shown.)

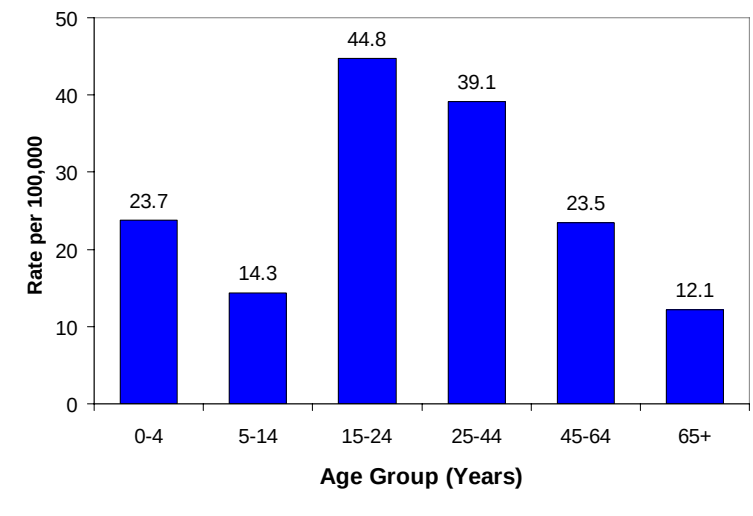
- The average annual Emergency Department discharge rate for nonfatal fire injuries was highest among individuals 15-24 years old (44.8 per 100,000), and lowest among individuals 65 and over (12.1 per 100,000), from 2002-2003. (Figure 3) This age distribution differs from the age distribution of death and hospitalization rates. An infant or toddler's limited recognition of the dangers of fire and flame from candles and other household sources may be associated with the greater number of minor (ED treated) fire injuries seen among children 0-4 years. Greater exposure to occupational hazards may influence the fire injuries occurring in adolescents and young adults.

Figure 2. Average Annual Fire Fatality Rates by Age Group, MA Residents, 2002-2003 (N=147)



Source: Registry of Vital Records and Statistics, MDPH.

Figure 3. Average Annual Emergency Department Discharge Rates for Nonfatal Fire-related Injuries by Age Group, MA Residents, 2002-2003 (N=3,638)



Source: Emergency Department Discharge Database, MA Division of Health Care Finance and Policy.

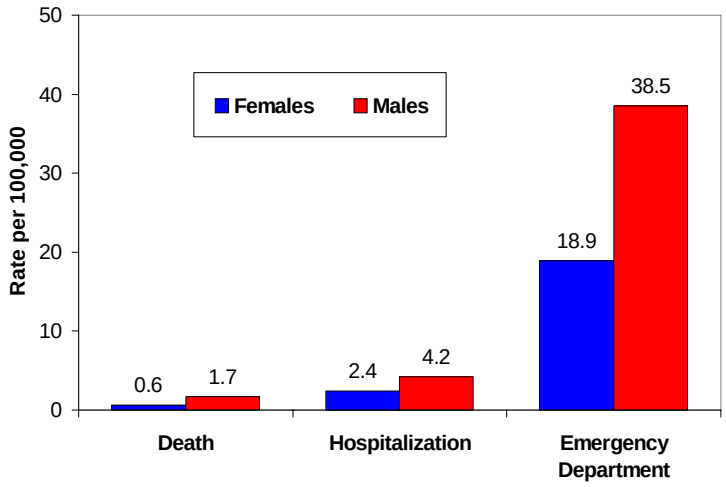
Note: Age groupings presented in Figure 3 differ slightly from Figure 2 in order to present relevant findings.

RISK FACTORS FOR FIRE INJURIES *(continued)*

SEX

- For the period 2002 to 2003, the average annual death rate due to fire was 2.8 times higher for males than for females. Similarly, hospitalization and emergency department discharge rates for nonfatal fire injury were 1.8 and 2.0 times higher for males than for females, respectively. (Figure 4)

Figure 4. Average Annual Fire Fatality, Hospitalization and Emergency Department Discharge Rates by Sex, MA Residents, 2002-2003 (N=4,200)

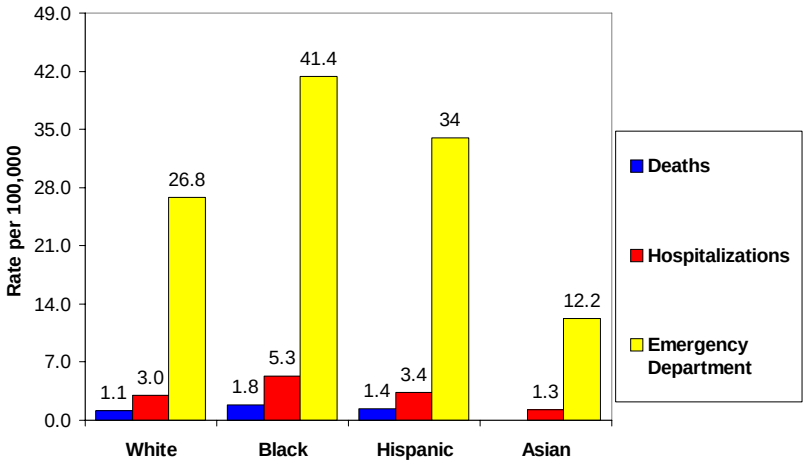


Sources: Registry of Vital Records and Statistics, MDPH. MA Inpatient Hospital Discharge and Emergency Department Databases. MA Division of Heath Care

RACE AND ETHNICITY

- Disparities exist by race and ethnicity for rates of fire injuries.
- Blacks had the highest average annual rates of fire deaths, hospitalizations and emergency department visits (1.8, 5.3, 41.4 per 100,000, respectively), during the 2 year period 2002-2003. Hispanics had the second highest rates for these events (1.4, 3.4, and 34.0per 100,000 respectively). (Figure 5) Asians had the lowest rates (Average annual death rate among Asians not reported as n=2).

Figure 5. Average Annual Fire Fatality, Hospitalization and Emergency Department Discharge Rates by Race and Ethnicity MA Residents. 2002-2003 (N=4,200)



Sources: Registry of Vital Records and Statistics, MDPH. MA Inpatient and Emergency Department Discharge Databases. MA Division of Health Care Finance and Policy.

- The disparities seen are not entirely explained by differences in the age distribution of each race/ethnic group; average annual age adjusted rates of fire death, hospitalization and emergency department visits for 2002 and 2003 among Blacks were 2.2, 6.0 and 40.4 per 100,000, respectively, compared with 1.1, 2.8, and 27.3 per 100,000 among Whites (data not shown).

WORK-RELATED FIRE INJURIES

In 2002 and 2003 there were two deaths, 35 non-fatal hospitalizations and 695 non-fatal emergency room visits for injuries associated with work-related fires. These may include injuries to fire service personnel and civilians in other occupations.

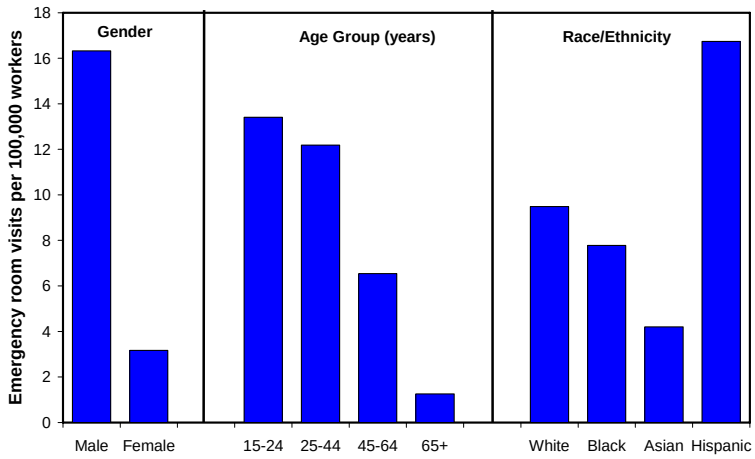
HOSPITALIZATION FOR NON-FATAL WORK-RELATED FIRE INJURIES

- Hospitalization rates for work-related injuries due to fires were higher in males than in females (data not shown).
- Hospitalization rates for work-related injuries due to fires were highest in workers 45 years old and older (data not shown).

EMERGENCY DEPARTMENT (ED) VISITS FOR NON-FATAL WORK-RELATED FIRE INJURIES

- ED visit rates for work-related injuries due to fire were about 5 times higher in males than in females
- ED visits for work-related injuries due to fires were more than two times higher in workers 15 to 44 years old than in older age groups.
- Hispanics had the highest ED visit rate for work-related injuries due to fire, about two to four times higher than other racial/ethnic groups.

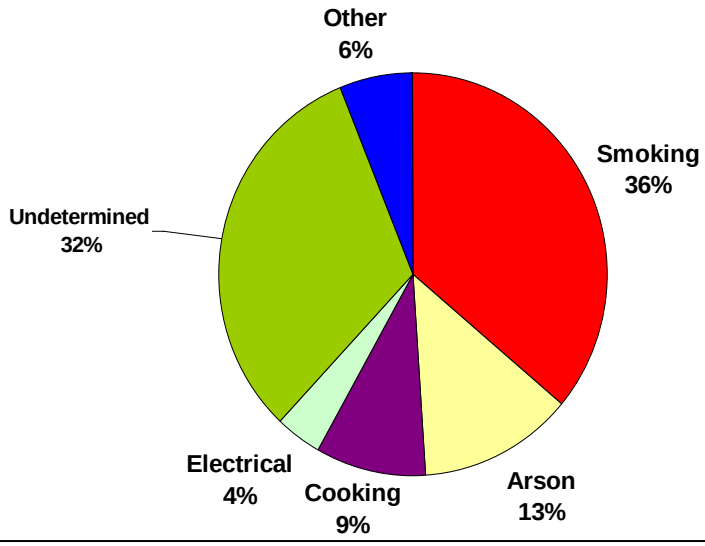
Figure 6. Emergency Department Visit Rates for Work-related Fire Injuries by Gender, Age Group, and Race/Ethnicity
MA Residents, 2002-2003, (N= 695)



Source: MA Emergency Department Discharge Database, MA Division of Health Care Finance and Policy.

CIRCUMSTANCES OF FIRE DEATHS, MA, 2003: DATA FROM THE OFFICE OF THE STATE FIRE MARSHAL

Figure 7. Causes of Residential Fire Deaths, MA, 2003 (N=47)



Source: Massachusetts Fire Incident Reporting System, Office of the State Fire Marshal

- According to the MA Fire Incident Reporting System (MFIRS), in 2003, 77% of the fire deaths occurring in MA were a consequence of fires in residential structures.

- In 2003, the leading causes of the fires leading to residential fire deaths were smoking (36%), arson (13%) and cooking (9%). Whenever the cause of a fire cannot be proven, the proper classification is "undetermined." Undetermined is also acceptable and used when there are multiple fire causes or ignition factors cannot be eliminated, leaving the investigator with only the most probable causes.

- Smoke alarms failed to operate or were not present in 28% of the fatal residential fire incidents in 2003, and smoke alarm presence was not determined in another 32% of the fires.

PREVENTION

Fire-related injuries are preventable! Through environmental and behavioral modifications, and compliance with fire prevention laws and regulations, parents, caregivers, employers, community groups, medical providers, employers and public and private agencies can take action to prevent fire-related injuries in the Commonwealth.

Because most of the fire deaths in MA result from fires in residential structures:

- ***Install and maintain smoke alarms in all residences as required by law.*** Massachusetts was one of the first states to require smoke alarms in the 1970's when the technology became affordable. Alarms are required in all residences (M.G.L. Chapter 148, section 26E). Consult your local fire department for information on smoke alarm placement.

- ***All individuals and families should develop and practice fire escape plans.*** Home escape plans should identify two ways out of every room and establish a meeting place outside. Remember to get out and stay out. NEVER re-enter a burning building. Everyone will feel more confident in a fire emergency if they have practiced the escape plan, so hold a fire drill

at home. Consult your local fire department or the Office of the State Fire Marshal for more information on fire escape planning.

- ***Practice safe cooking.***
  - Wear tight fitting clothing while cooking.
  - Never leave cooking unattended.
  - Do not allow children to play near the stove or barbecue grill.

- ***If you smoke, dispose of smoking materials safely.***
  - Use large deep ashtrays. Wet cigarette butts before emptying ashtrays.
  - Do not smoke in bed
  - Extinguish your cigarette if you get drowsy watching television or reading
  - NEVER SMOKE where oxygen is being used

- ***Teach young children that matches and lighters are tools for grownups, they are not toys.***

Support and promote fire safety education in schools, senior centers and community centers.

Promote Fire Safety in the Workplace.

- All workplaces should develop and practice emergency evacuation plans for fires and other emergencies.
- When possible, substitute less flammable materials (products with a flash point greater than 100 degrees Fahrenheit) for highly flammable materials such as wood floor finishing products and solvents.
- Promote fire and carbon monoxide safety in the workplace through compliance with Occupational Safety and Health Administration and electrical safety requirements. This is especially important in jobs that include work with propane gas, flammable liquids and welding.
- Promote on-going public education on fire and burn prevention, with a focus on employers and workers in high-risk industries.

Other related prevention measures:

- ***Install carbon monoxide alarms as required by law.***
  Carbon monoxide is an odorless, colorless, gas which can cause fatal poisoning. Carbon monoxide alarms are required in all MA residences per MGL Chapter 148, section 26F1/2, "Nicole's Law".

Other burn and fire safety tips are available at the following web pages:

www.mass.gov/dph/fch/injury www.mass.gov/dfs
www.nfpa.org www.homesafetycouncil.org
www.mass.gov/dph/ohsp

METHOD NOTES

Data Sources/Notes:

Death Data (with the exception of Figure 7): Registry of Vital Records and Statistics, MA Department of Public Health. Data reported are for calendar year. Please note that the data reported include deaths to MA residents occurring out of MA (including events such as the Station Night Club fire in Rhode Island) and may differ from those reported by the Office of the State Fire Marshal, which includes deaths occurring in MA, irrespective of legal residence.

Death Data (Figure 7 only): Massachusetts Fire Incident Reporting System, MA Department of Fire Services, Office of the State Fire Marshal.

Statewide Acute-care Hospitalizations: Massachusetts Inpatient Hospital Discharge Database, MA Division of Health Care Finance and Policy. Data reported are for fiscal years (October 1, -September 30). Deaths occurring during the hospital stay and transfers to another acute care facility were excluded from the counts presented. Work-related injuries were defined as those with Workers' Compensation Insurance as the expected payer or with diagnostic codes (E-codes or V-codes) indicating the injury occurred at work.

Statewide Emergency Department Discharges at Acute Care Hospitals: Massachusetts Emergency Department Discharge Database, MA Division of Health Care Finance and Policy. Data reported are for fiscal years (October 1, -September 30). Deaths occurring during treatment or transport to the Emergency Department were excluded from the counts presented. Work-related injuries were defined as those with Workers' Compensation Insurance as the expected payer or with diagnostic codes (E-codes or V-codes) indicating the injury occurred at work.

Population Data: Population Estimates Program, U.S. Census Bureau. Release Date August 11, 2005.

Labor Force estimates were obtained from the Current Population Survey for 2002 and 2003 as the number participating in the workforce.

All fire-related injuries (with the exception of Figure 7) were ascertained using guidelines recommended by the Centers for Disease Control and Prevention and are based upon the International Classification of Disease codes for morbidity (Ninth revision) and mortality (Tenth revision). All available diagnosis fields were analyzed to ascertain an injury. Fire-associated injuries were identified utilizing the first listed external cause of injury.

All rates reported in this bulletin, unless otherwise noted, are crude rates.

Footnote:
[1] HCUPnet, Healthcare Cost and Utilization Project. Agency for Healthcare Research and Quality, Rockville, MD. http://www.ahrq.gov/HCUPnet/

RESOURCES

Massachusetts Department of Public Health
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www.mass.gov/dph/fch/injury

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Office of the State Fire Marshal
Fire Data and Public Education Unit
P.O. Box 1025
State Road
Stow, MA 01775
Tel 978-567-3380
Fax 978-567-3199
www.mass.gov/dfs/osfm

Massachusetts Department of Public Health
Center for Health Information, Statistics
Research & Evaluation
Occupational Health Surveillance Program
250 Washington Street, 6th Floor
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www.mass.gov/dph/isp

FOR INFORMATION ON FIRE SAFETY AND COMMUNITY SMOKE ALARM INSTALLATION:

Contact the Department's
Center for Community Health

Christine Farrell-O'Reilly, Project Coordinator

MA Residential Fire Injury Prevention Program

Phone: 617-624-6076

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