

Fire-Related Injuries

In an average month, there are more than 2,000 fires in Ontario resulting in eight deaths and 35 hospitalizations.

Results

In Ontario, there were 415 fire-related injury hospitalizations during the 2002/03 fiscal year. Males accounted for about 69% of these hospitalizations. Among males, the highest number of hospitalizations was seen among the 15-39 year age group. Among females, the highest number of hospitalizations was seen among those 40-64 years of age (Figure 1).

The most frequent type of fire-related hospitalization was exposure to an uncontrolled fire in a building or structure (Figure 2). Other common causes were ignition of a highly flammable material (e.g., gasoline), exposure to a controlled fire not in a building or structure (e.g., campfire), ignition or melting of clothing or other apparel, and exposure to a controlled fire in a building or structure (e.g., fireplace, stove).

A burn was the diagnosis most responsible for hospitalization in 67% of cases. Second degree burns to the head or neck, third degree burns to the trunk, and second degree burns to upper limb were most common.

The 415 cases accounted for more than 4,200 days in an acute care hospital, with an average length of stay of 10.2 days. Some of the longest lengths of hospital stay were observed for cases with third degree burns (average of 19.5 days). About 79% of cases were discharged home, 10% were transferred to another inpatient facility (e.g., rehabilitation centre), and 5% died during their hospital stay.

In Ontario, the age-standardized hospitalization rate for fire-related injuries was 3.5 per 100,000 population (Table 1). By region, the highest number and rate were seen in the North and the lowest in the East.

In 2004, there were 24,391 fires reported to the Office of the Fire Marshal in Ontario, a 34% decline from 1995. There were 14,237 fires that resulted in a loss (e.g., structural, vehicular, or property), with costs estimated at more than \$395 million in 2004.

In 2004, there were 761 fire-related injuries and 97 deaths. Preventable residential fires accounted for 77% of deaths. Over 10 years, the leading ignition sources for these fatal fires were lit smokers materials, cooking equipment, and matches or lighters (Figure 3). In many deaths, the fire destruction prevented the Fire Marshal from determining a cause. A drug or alcohol impairment was present in 29% of deaths and in 14% of cases the person was asleep with no known impairment. The

FIGURE 1. Fire-related injury hospitalizations by age and sex (Ontario, 2002/2003)

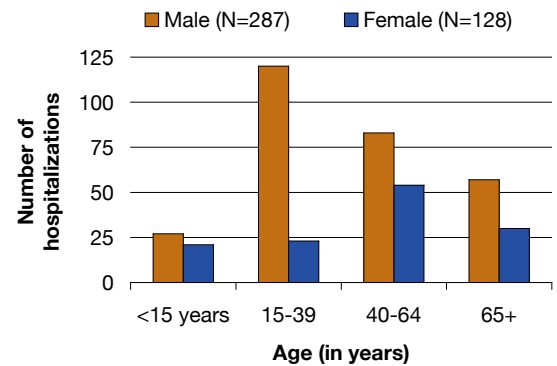


FIGURE 2. Type of fire-related injury hospitalization (Ontario, 2002/03)

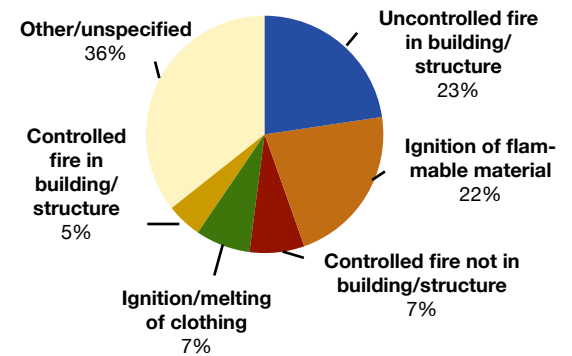


FIGURE 3. Ignition source in fatal preventable residential fires in Ontario (Office of Fire Marshal, 1995-2004)

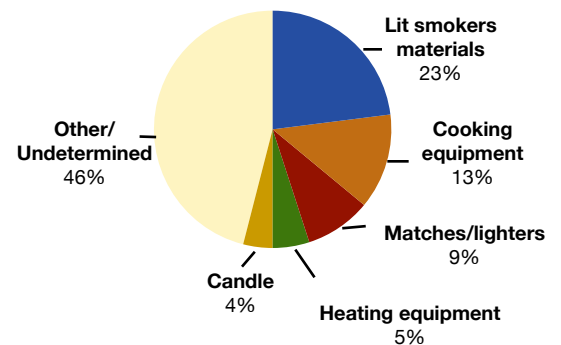


TABLE 1. Regional comparison of fire-related hospitalizations (Ontario, 2002/03)

	South West	Central South	Central West	Central East	Toronto	East	North	Ontario
Number	72	65	49	45	60	33	80	415
Rate per 100,000 ^a	4.7	5.5	2.4	2.4	2.2	2.1	8.8	3.5
Average age (in years)	39	38	41	45	53	42	43	43
% male	64	71	84	73	53	64	71	69

a. Age-standardized rate per 100,000 population. Note: Region of residence unknown/outside of Ontario for 11 hospitalizations.

Ontario Injury Compass

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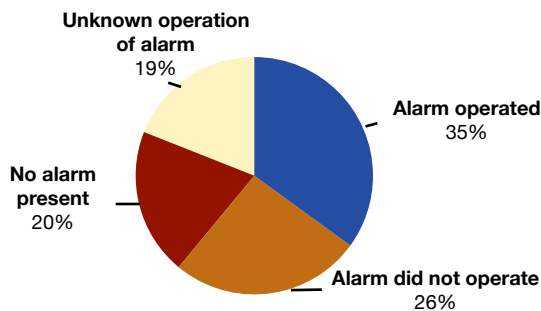
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FIGURE 4. Smoke alarm operation in fatal residential fires in Ontario where alarm presence/absence was determined (Office of Fire Marshal, 1995-2004)



leading cause of death, in more than two-thirds of cases, was asphyxia.

The presence or absence of a smoke alarm was determined in 84% of fatal residential fires. Of those cases, the alarm operated in 35% of them, the alarm did not operate in 26% of them, and no alarm was present in 20% of them (Figure 4). In the remaining 19% of those cases, a smoke alarm was present but the operation was unknown. A common reason for operation failure was that the alarm did not have power (either no battery (60%) or a dead battery (7%)).

Discussion

This Compass highlights patterns of fire-related injuries in Ontario. More than 400 people are hospitalized each year in Ontario with a fire-related injury. Hospitalizations represent only one aspect of fire-related incidents. In 2004, more than 24,000 fires were reported to the Office of the Fire Marshal in Ontario, including 761 injuries and 97 deaths. This Compass illustrates the use of complementary data sources to describe an injury pattern. However, it is important to note that there is some overlap between the data sources.

There are many risk factors related to fires. For example, smoking, alcohol use, mobility or cognitive impairment, and absence of safety features have been associated with fire-related injury or death.^{1,2}

Compliance with a passive means of fire prevention, like a smoke alarm, is a concern.³ In many cases, the smoke alarm did not function because the battery was dead or had been removed. The alarm was considered to be too sensitive and a nuisance, or regular maintenance was not performed.^{3,4}

In certain cases, legislation has been implemented as a way of preventing fires. For example, under the Cigarette Ignition Propensity Regulations intended to reduce fire risks, all cigarettes manufactured or sold in Canada are to burn their full length no more than 25% of the time when tested on 10 layers of filter paper.⁵

References

1. Warda L, Tenenbein M, Moffatt MEK. House fire injury prevention update. Part I. A review of risk factors for fatal and non-fatal house fire injury. *Inj Prev* 1999;5:145-50.
2. Marshall SW, Runyan CW, Bangdiwala SI, et al. Fatal residential fires: who dies and who survives? *JAMA* 1998;279:1633-7.
3. Pless IB. Smoke detectors and house fires. *BMJ* 2002;325:979-80.
4. Roberts H, Curtis K, Liabo K, et al. Putting public health evidence into practice: increasing the prevalence of working smoke alarms in disadvantaged inner city housing. *J Epidemiol Community Health* 2004;58:280-5.
5. Canada Gazette. *Cigarette Ignition Propensity Regulations*. Part II. June 29, 2005;139(13).

Managing the risk

Knowing what to do in the event of a fire is important, but fire prevention is key to reducing the number of injuries and deaths. Some tips for the public include:

- ❖ Develop a home fire escape plan and practice it regularly. Make sure everyone knows two ways out of every room.
- ❖ Install a smoke alarm on each level of your house and outside sleeping areas. Test smoke alarms regularly and change the batteries at least once a year.
- ❖ Attend to cooking. Turn off the stove if you need to leave the kitchen while cooking. Avoid cooking when drowsy or intoxicated.
- ❖ Always pay attention while smoking. Avoid smoking in bed, or when otherwise sleepy. Always properly extinguish and dispose of cigarettes, lighters, and matches.
- ❖ Evacuate in the event of a fire. Leave as soon as possible after you hear an alarm or discover a fire. The earlier you leave the better your chances of getting out safely.
- ❖ Many children are fascinated by fire and fire-making. Teach them proper respect for fire. Hiding lighters isn't enough. Assume they know all of your hiding places.

Some community approaches for preventing or minimizing fire-related incidents include:

- ❖ Education – public and school-based programs
- ❖ Counselling – at home, school, or during health surveillance visits
- ❖ Regulations and legislation – child-resistant lighters and cigarette regulations
- ❖ Media campaigns – public and community communication programs

Further evaluation work is needed for many of these interventions as their effectiveness for preventing injuries and deaths has not been conclusively proven.

For Further Information

Office of the Ontario Fire Marshal

www.ofm.gov.on.ca

The Fire Marshal's Public Fire Safety Council

www.firesafetycouncil.com

SMARTRISK Catalogue of Best Practices

www.smartrisk.ca/ListingSections.aspx?dd=4&sd=207

Published Studies

Arai L, Roen K, Roberts H, Popay J. It might work in Oklahoma but will it work in Oakhampton? Context and implementation in the effectiveness literature on domestic smoke detectors. *Inj Prev* 2005;11:148-51.

DiGiuseppi C, Higgins JP. Interventions for promoting smoke alarm ownership and function. *Cochrane Database Syst Rev* 2001;(2):CD002246.

Warda L, Tenenbein M, Moffatt MEK. House fire prevention update. Part II. A review of effectiveness of preventive interventions. *Inj Prev* 1999;5:217-25.

Methods

Hospitalization data included acute care hospitalizations for fire-related injuries in Ontario from the 2002/03 fiscal year. Data were obtained from the Discharge Abstract Database at the Canadian Institute for Health Information. Fire-related injuries were classified according to the International Classification of Diseases, 10th revision (ICD-10) using codes X00-X09. Regions were defined according to place or residence using the Ontario Ministry of Health Region Codes.

Data for fires (including deaths and injuries) were obtained from the Office of the Fire Marshal in Ontario. These data included all fires reported to the Fire Marshal's office in Ontario.