The economic impact and potential years of life lost from fire deaths in residential homes

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Introduction

Fire is a leading cause of injury and death in Canada.[1] Loss of life due to fire-related injuries results in both societal and economic consequences. The magnitude of the economic burden of premature mortality due to burn injuries in Canada was estimated to be $290 million annually.[1]

Fires in residential homes are preventable and assessments of the impact of premature mortality may not be completely determined by mortality statistics alone. Measures such as potential years of life lost (PYLL) can provide a better estimate of the impact because it takes into account the effect on young and middle-aged adults.

Objective

The aim of this study was to quantify the impact of fatal injuries resulting from residential fires to develop priorities for prevention.

Methods

Study setting and population

Cohort analysis of adults that died due to a residential fire in Ontario, Canada between January 1, 1998 and March 31, 2012.

Inclusion criteria: adults (age ≥ 16) and death due to a fire in a residential home.

Exclusion criteria: mechanism of injury due to scald or chemical burns, or location of injury in motor vehicles, outdoors, or inside a location other than a residence.

Patient demographic and injury characteristics were recorded from coroner investigation statements and autopsy reports from the Office of the Chief Coroner. In Ontario, coroners investigate all unnatural deaths to determine the cause and manner of death.[2]

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Economic impact analysis

The Canadian policy analysis recommended value of 6.5 million was used to estimate a value of statistical life.[3]

Potential years of life lost

To estimate PYLL, the age at death was subtracted from the reference age 75.[4] The upper age limit of 75 was used to represent premature mortality that could have been potentially avoided.[4]

Using data from Statistics Canada, the rate of fire-related mortality was standardized to the population size each year.[5]

Results

Participants

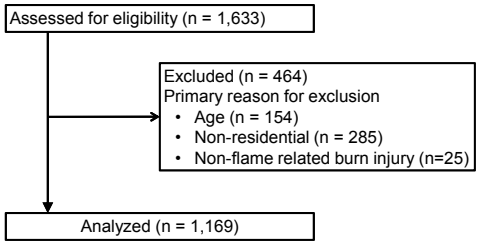

Figure 1. Flow diagram

Table 1. Demographic characteristics, residential fire deaths

Characteristic	
N	1,169
Male, No. (%)	684 (59%)
Age, mean (SD), years	56 (20)
Age ≥ 65, No. (%)	447 (38%)
Primary cause of death, smoke inhalation, No. (%)	839 (72%)

Economic impact and potential years of life lost

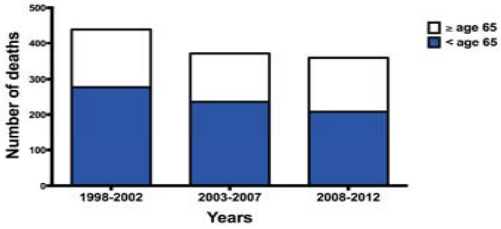

Figure 2. Mortality of adults (≥ age 16) due to residential house fires in Ontario from 1998 to 2012.

Table 2. Economic impact and potential years of life lost

N	1,169
Value of statistical life, dollars, CAN$	7,598,500,000
Number of potential years of life lost	23,782
Admitted to at least one healthcare institution, No. (%)	532 (45%)
Survived longer than 3 days, No. (%)	140 (12%)

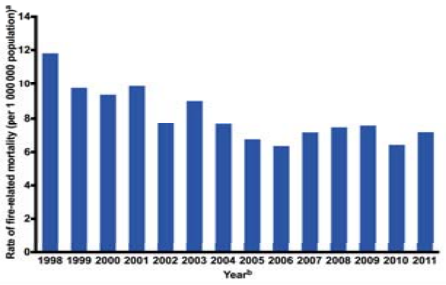

Figure 3. Annual rate of mortality (per 1,000,000 population) due to residential house fires in Ontario from 1998 to 2011.
[a]Rates per 1,000,000 population of adults aged ≥ 16.
[b]Limited to 2011 because study ended March 31, 2012.

Conclusions

Mortality due to residential fires has a substantial economic impact and resulted in 23,782 PYLL. Even with mandated smoke alarms, the primary medical cause of death from 1998 to 2012 was smoke inhalation in 839 (72%) cases. In that same time period, the percentage of fatal residential fire victims over 65 years of age dying due to inhalation injury increased from 30% to 39%. The overwhelming majority of deaths after a fire occurred either on scene or within one day. In addition to loss of life, these deaths create considerable costs incurred from medical transport, hospitalization,[6] and the coroner investigation process.

Continued increases in fire prevention combined with advances in burn injury treatment have led to fewer deaths over time. However, this study showed that there is still an urgent need to identify effective fire prevention strategies, such as implementation of automatic fire sprinklers, to prevent fatal residential fires.

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