Oregon Office of State Fire Marshal

Oregon Fire Fatality Review 2004-2008

Prepared by the Oregon Fire Fatality Review Committee,
advisory group to the Office of State Fire Marshal

April 2010

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Overview

The Oregon Fire Fatality Review Committee (OFFRC) is an advisory group to the Oregon Office of State Fire Marshal (OSFM). Membership represents a wide cross-section of Oregon fire industry professionals from fire service agencies, private agencies, and the OSFM. The purpose of the OFFRC is to collectively review the fire fatality data and make recommendations to reduce residential fire fatalities in Oregon.

The OFFRC met during 2009 to review the previous five years of Oregon residential fire fatalities. The OFFRC reviewed 138 fatalities, occurring in 120 residential property fires from 2004 through 2008. This report presents the committee's findings and recommendations.

Membership

Member	Representing
Tim Birr	Oregon Fire Safety Coalition
Troy Buzalsky	Oregon Fire Chiefs Association
Jeff Cranford	McMinnville Fire Department
Kristina Deschaine	Oregon Office of State Fire Marshal, Fire and Life Safety
Earl Diment	Pioneering Technology, Inc. and National Fire Protection Association
Bryan Emmons	Oregon Office of State Fire Marshal, Community Education/Data Services
Tari Glocar[1]	Oregon Office of State Fire Marshal, Community Education
Jay Hardwick[2]	Oregon Office of State Fire Marshal, License and Permits Services
Debbie McDermott	McMinnville Fire Department and Oregon Fire Marshals Association
Claire McGrew	Oregon Office of State Fire Marshal, Data Services
Patricia Mieszala[3]	National Fire Protection Association, Public Education Network
Lena Mohajerin	Oregon Office of State Fire Marshal, Data Services
Anita Phillips	Oregon Office of State Fire Marshal, License and Permits Services
Steven Schneiderman	Oregon Volunteer Firefighters Association
Stephanie Stafford[4]	Oregon Office of State Fire Marshal, Community Education
Jim Walker	Oregon Office of State Fire Marshal, Administration

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[1] Committee chair retired during 2009.
[2] Participated on the OFFRC committee during 2009.
[3] Replaced by Monica Colby in 2010.
[4] Interim chair

Methodology

The OFFRC reviewed only fatalities from *unintentional residential property fires*. Residential property fires include houses, multi-family housing, mobile homes or travel trailers used as a fixed residence, nursing homes, assisted living facilities, and hotels/motels. Excluded from this report are fatalities in intentional residential fires (i.e. suicides or homicides), non-residential property fires, vehicle fires, aircraft fires, and outdoor property fires.

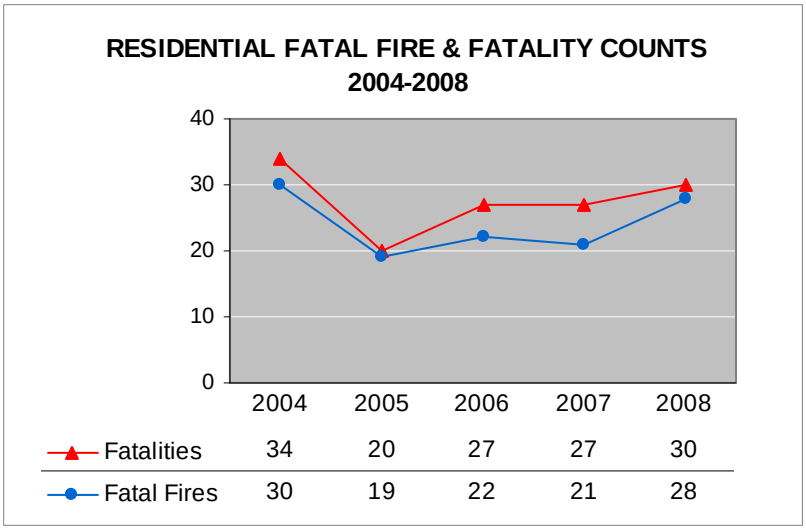
The fire fatality incident data was obtained from the 2004-2008 Fire Incident and Civilian Casualty databases in the Oregon All-Incident Reporting System (OAIRS), investigation reports, and medical examiner reports. The OAIRS database includes incident data reported to the OSFM by Oregon fire departments and districts.

Analysis of the fire fatality incidents and victims involves several variables:

- Demographic – age, gender, income level, race, ethnicity, household type
- Geographic – where the fires occurred (rural vs. urban, neighborhood characteristics), property type
- Socioeconomic status – a combination of income, education level, and occupation
- Human factors – asleep, physical disability, medical conditions, mental impairment, alcohol or drug use
- Non-human factors – presence and operation of smoke alarm and sprinklers, exiting issues
- Fire specifics – area of origin, ignition factor, equipment involved

Income, education, and occupation information was not available for fatalities in the 2004-2008 dataset. Income analysis in this report is based on the median household income for the zip code in which the fatality occurred.

A thorough review of the known variables identified commonalities and trends in the fatality data, which the OFFRC focused on to develop the recommendations presented in this report.



Key Data Findings

From 2004 through 2008, there were 138 fatalities, occurring in 120 incidents, in Oregon residential fires. Unless otherwise noted, percentages cited in this report are based on the 138 fatalities. Key data findings are summarized below. Additional analysis is included in the "Recommendations" section of this report.

Top Causes of Fatal Fires

- These four causes account for 79% of the fatalities[5]:
  - **46% cigarette, cigar, or pipe** (includes 8% smoking while on oxygen)
  - 13% candle
  - 11% electrical
  - 9% combustibles too close to heat source

Where Fatal Fires Occurred

- Residential property type included:
  - **50% in houses**
  - **31% in mobile homes and trailers used as fixed residences**
  - 17% in apartments and other multi-family housing
  - 2% in other (nursing home, hotels)
- These three rooms where the fire started account for 80% of the fatalities:
  - **41% in the living room or family room**
  - **30% in the bedroom**
  - 10% in the kitchen
- Property locations were an equal mix of rural (48%) and urban (52%).

Demographics of the Fatalities

- **68% were 50+ years of age**, 23% were 18-49 years of age, and 9% were under 18 years of age
- 55% were men and 45% were women
- 93% were Caucasian, 4% were Hispanic, 2% were Black, and 1% were Native American/Alaskan
- Analysis by zip code suggests **68% had household incomes under $50,000**[6].

Human Factors

- **22% of victims were asleep when the fire started**
- **24% of victims were impaired by alcohol and/or drugs**[7] (17% alcohol only, 5% drug only, and 2% combined alcohol & drugs). Majority of the victims impaired by drugs/alcohol were age 60 and under.
- **10% of victims had impaired mobility**. This includes physical limitations such as being bed-bound or requiring a wheelchair, cane, or walker for mobility.

Smoke Alarm Presence[8]

- **32% Alarm Not Present**
- **17% Alarm Present & Did Not Operate**
- 25% Alarm Present & Operated
- 26% Alarm Present & Unknown If Operated

Sprinkler Presence[9]

- **96% No Sprinkler Protection**

[5] Based on 96 fatalities with known fire causes. In addition, there were 42 fatalities with undetermined fire causes. See Appendix.
[6] Based on median household income in the zip codes where the fatalities occurred. 2007 data as reported by www.city-data.com.
[7] Based on medical examiner reports. Drugs include both legal and illegal substances. Alcohol included only if over .08 BAC. Not all victims had blood tests conducted.
[8] Based on 104 fatalities with reported smoke alarm data.
[9] Based on 112 fatalities with reported sprinkler data.

Recommendations

The OFFRC discussed the key data findings with attention to these types of questions:

- What is already being done by the OSFM that supports the data findings?
- How can the OSFM's existing programs and tactics be improved to address the data findings?
- Are there new issues revealed in the data analysis not currently addressed by any OSFM program?
- What strategies and tactics can Oregon's fire service pursue to address the new issues?

Answers to these questions led to the committee's development of eight recommendations to help reduce Oregon residential fire fatalities:

Recommendation 1: Expand Older Adult Fire Prevention Program

Recommendation 2: Improve Smoke Alarm Program

Recommendation 3: Increase Home Fire Escape Planning Effort

Recommendation 4: Promote Installation of Home Fire Sprinklers

Recommendation 5: Target Fire Prevention and Life Safety Education to At-Risk Population

Recommendation 6: Increase Cigarette-Caused Fire Education

Recommendation 7: Monitor Legislative and Regulatory Processes

Recommendation 8: Improve Data Collection and Review

These recommendations are presented in detail on the following pages.

Recommendation 1: Expand Older Adult Fire Prevention Program

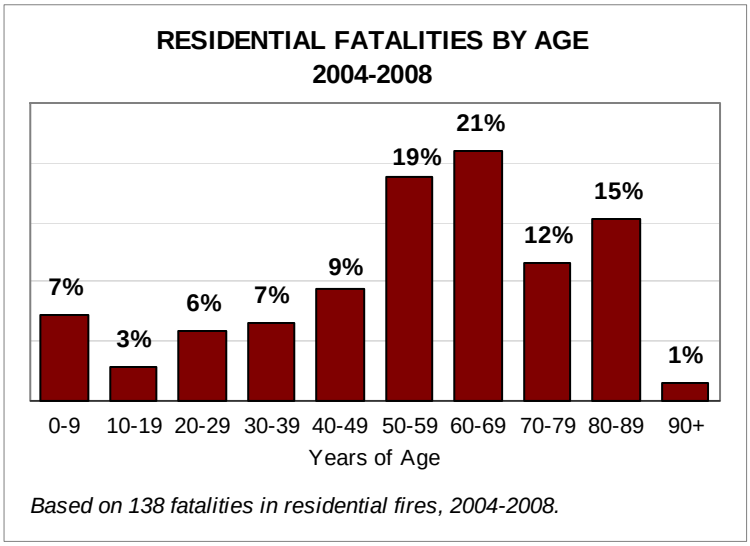
The OFFRC recommends continuing to expand the older adult fire prevention program. The program should include adults age 50 and above. The OSFM and fire departments should partner with agencies serving older adults to reach the target audience.

Discussion:

Older adults account for the majority of fire fatalities. As shown in the chart at right, 68% (94 victims) were age 50 or older.

Limited socioeconomic data was available on the older adult fire fatalities. Based on property-type data and statements in some fire investigation reports, a hypothesis is that these victims were generally a low-income group.

Property types where fatal fires involving older adults occurred included: 50% in a single-family home, 34% in a mobile home or trailer, 15% in an apartment, and 1% in a nursing home.



Based on 138 fatalities in residential fires, 2004-2008.

Only 37% of older adult fatal fires occurred during the day (between 6:00 a.m. and 6:00 p.m.). 29% occurred between 6:00 p.m. and midnight, and 35% occurred between midnight and 6:00 a.m.

Careless cigarette smoking, electrical overload, and candle-burning are the top three causes of fatal fires involving older adults. Together they account for 70% of the known causes of fatal fires with victims age 50 and older.

- 46% (24 victims) died in a cigarette-caused fire. Of these, 11% (8 victims) were smoking while on oxygen.
- 14% (10 victims) died in an electrical-caused fire.
- 10% (7 victims) died in a candle-caused fire.

Alcohol and/or drug impairment was a factor in older adult fatalities. 16% (15 victims) were impaired by alcohol, 3% (3 victims) by drugs, and 2% (2 victims) by a combination of alcohol and drugs. (Drugs include both legal and illegal substances.)

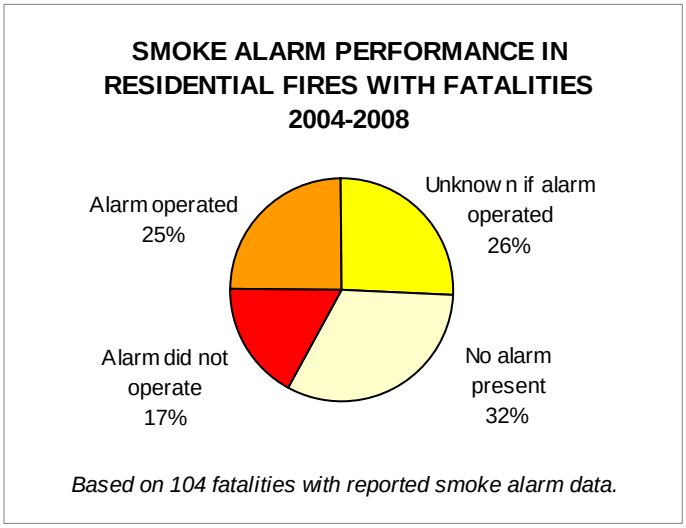
Twelve percent (11 victims) had impaired mobility which could have been a contributing factor in their ability to escape the fire.

Recommendation 2: Improve Smoke Alarm Program

Revise Oregon's smoke alarm law (ORS 479.250 – Smoke Detection) to clarify requirements. Increase smoke alarm program for public awareness and education to Oregonians. Include additional fire prevention materials for fire agencies to distribute during door-to-door smoke alarm campaigns.

Discussion:

Smoke alarm data is complicated to gather. Structural fire damage makes it difficult for investigators to determine if alarms were present. Often the only way to determine if a smoke alarm sounded is to interview building occupants, bystanders, or responding firefighters. For the years 2004 through 2008, smoke alarm data was available for 75% (104) of the fatalities. The available data strongly indicates that smoke alarms are essential to a person's survival of fire.



The chart at left exhibits the smoke alarm presence and performance data in fatal fires. The data shows there is plenty of opportunity for further education about smoke alarms. About one-third (32%) of the fatalities had no smoke alarm in their home. An additional 17% had an alarm, but it did not operate.

In 61% of the cases where the smoke alarm did not operate, the battery was missing or disconnected. Other issues prohibiting smoke alarm operation included: improper position of the battery, a hardwired smoke alarm that was unplugged and not in place, and a smoke alarm was taken down to clean and not reinstalled.

The majority of the fatal residential fires started in the living room or family room (41%), bedroom (30%), or kitchen (10%).

In addition, the data shows that 22% of the victims were asleep when the fire started. If they had an operating smoke alarm to wake them up, they would have had the opportunity to exit the fire.

In cases where the smoke alarm operated, the following were factors in the victim's death:

- Victims went back into the burning property to find other occupants or pets
- Victims were impaired (alcohol, drugs, mobility), which kept them from being able to exit
- Victims were trapped (exits blocked)

Recommendation 3: Increase Home Fire Escape Planning Effort

Recommend fire agencies provide education on home fire escape planning in combination with door-to-door smoke alarm campaigns. Expand public education on home fire escape planning.

Discussion:

Egress problems were reported in 15% of the fatal fires. These problems included mechanical obstacles to the exit, locked exits or other problem with exit, and inappropriate exit route chosen. The opportunity exists to add home fire escape planning to the door-to-door smoke alarm campaign. Twenty-five percent of fatalities occurred in spite of the fact that the smoke alarm activated. Some of these fatalities may have been avoided with escape pre-planning.

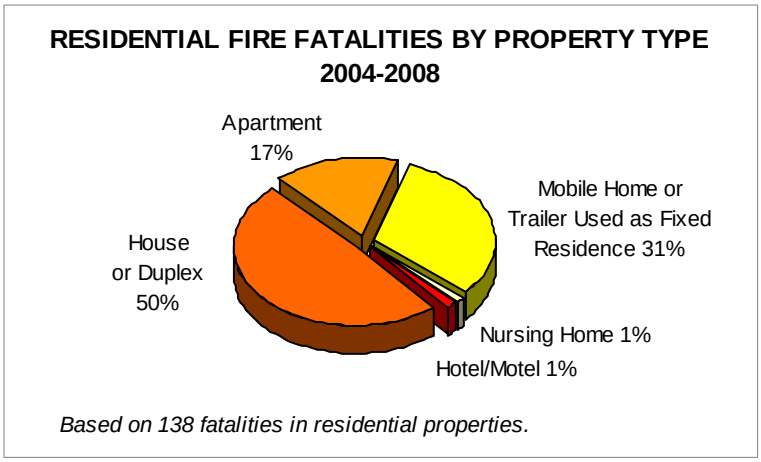
Recommendation 4: Promote Installation of Home Fire Sprinklers

Reestablish the Oregon Home Fire Sprinkler Coalition in the Office of State Fire Marshal to help promote the installation of home fire sprinklers and educate on the value of home fire sprinkler systems.

Discussion:

Based on 117 fatalities with reported sprinkler data, 112 (96%) had no sprinkler protection. The majority of fires are occurring in homes where sprinklers are not required.

The graph at right shows, of the residential fire fatalities during 2004-2008, 50% occurred in houses, 31% in mobile homes and trailers used as fixed residences, 17% in apartments and other multi-family housing, 1% in nursing homes, and 1% in hotels.



Five single-fatality incidents were in properties which had sprinkler protection:

- In two of these incidents, the sprinkler system operated. Both of these were cigarette-caused fires in apartment buildings. In the first incident, the victim was reportedly applying hairspray while smoking. In the second incident, the victim was smoking in bed and was physically challenged due to recent surgery.
- In two incidents, the fire was too small to activate the sprinkler system. In both cases, the victim was directly involved in the ignition and the area of origin. One fire was caused by smoking while on oxygen, and the other was a cooking fire in which the victim's clothing was lit by the stove.
- One incident occurred in a travel trailer which had an open head system with manual control that was not activated.

Recommendation 5: Target Fire Prevention and Life Safety Education to At-Risk Population

Study at-risk populations to better understand where to reach them and how to effectively communicate fire prevention messages. Make fire safety presentations to at-risk audiences, including older adults and low-income populations. Provide consistent educational messages statewide. Provide more training for public educators in understanding older adults and low-income populations. Document real-life stories for educational outreach. Encourage fire agencies to take advantage of teachable moments.

Discussion:

Older adults (discussed in Recommendation #1) and low-income households are the primary at-risk populations identified by the data findings. OFFRC acknowledged that, currently, most fire safety presentations are not given to the at-risk audiences, and more effort needs to be made to reach these audiences. The OFFRC proposed marketing to agencies serving low-income households and older adults.

The data sources used in this report offered limited socioeconomic data on the fire fatalities. However, based on property-type data, statements in some fire investigation reports, national reports, and experience of the OFFRC committee members, the hypothesis was formed that a significant number of fire fatalities are within a low-income group. Although individual income data was not available, an analysis was performed of the median household incomes in the zip codes where the fatalities occurred. This data suggests that 68% of the fatalities had household income under $50,000.

The data findings of human factor variables (cigarette smoking, alcohol use, mobility impairments) will help in forming the educational approaches to the at-risk audiences. In addition, more research needs to be done to understand behaviors and household characteristics of the at-risk populations.

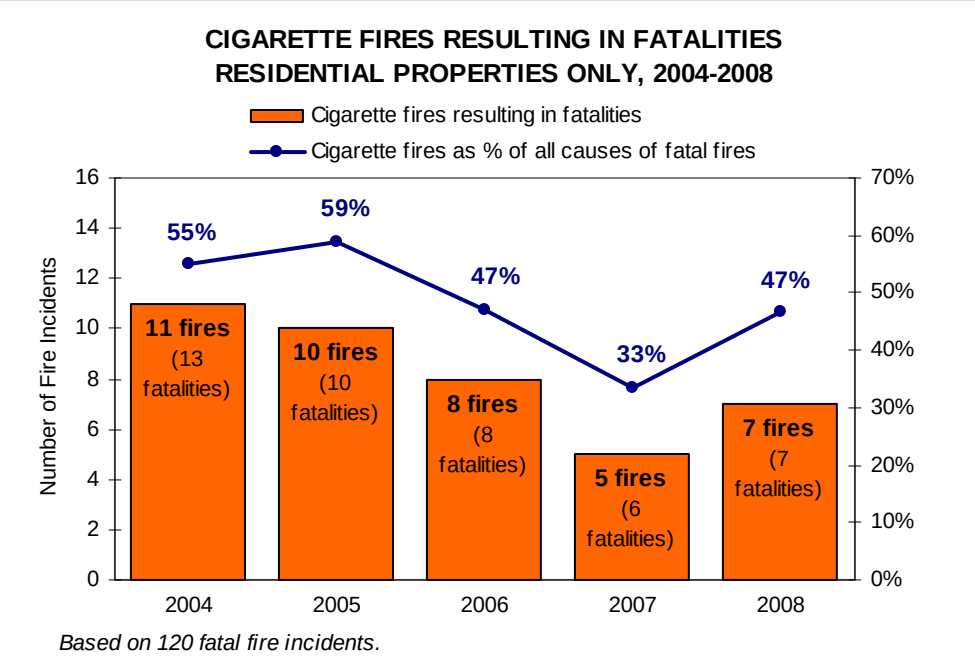
Recommendation 6: Increase Cigarette-Caused Fire Education

Increase education about cigarette, cigar, and pipe smoking as it relates to starting residential fires. Educational messaging should include cigarette and oxygen misuse. Messaging campaigns should be broadened beyond cigarette rack cards or brochures.

Discussion:

Cigarettes continue to be the top cause of fire fatalities, accounting for 46% of the deaths (47% of the fatal fires) from 2004 through 2008. Of the 41 fatal fires started by cigarettes, cigars, or pipes, eight involved smoking while using medical oxygen.

The graph below shows that fatal cigarette-caused fires declined during the 2004-2008 period. Since 2004, there was a 36% decline in the number of fatal cigarette fires in 2008, and cigarette fires as a percentage of all causes of fatal fires declined by 8% in 2008.



Beginning January 2008, Oregon law requires only Fire Standard Compliant Cigarettes to be sold in Oregon. It is expected that this law will reduce the number of cigarette-caused fires in years to come. However, the fire service should target fire education to smokers in an effort to further reduce the number of cigarette-caused fires. This law will not prevent fatal fires involving smoking while using medical oxygen, due to the behavioral and medical issues involved.

More than half of all fatal cigarette fires occurred in either an apartment or mobile home. Based on 44 fatalities caused by cigarette fires during 2004-2008, 39% started in a house, 32% in a mobile home or trailer, 27% in an apartment, and 2% in a nursing home. In addition, a higher percentage of cigarette fire fatalities are age 50 and above (75% are age 50 and older, and 55% age 60 and older). This property and age data will help in refining the approach to fire education of smokers.

Recommendation 7: Monitor Legislative and Regulatory Processes

Continue to monitor legislative, code amendment, and other processes and, where appropriate and permissible, provide advocacy for those proposals that enhance community fire and life safety.

Discussion:

In recent years, significant enhancements to Oregon fire safety (cigarette fire safety regulation and a ban on novelty lighters) have come about through the legislative process. Other advances have been made through administrative rule and other processes.

While public agencies are limited by rule from engaging in outright political activity, under certain conditions they may provide advocacy and support for measures that would improve public safety. Further, the various fire service trade associations can be expected to provide this same level of support in a less-restricted manner.

Given that further legislative initiatives affecting fire and life safety can be expected, it is important that the OSFM continue to monitor these efforts and, where appropriate and permissible, provide advocacy and support in conjunction with other elements of the state's fire service.

Recommendation 8: Improve Data Collection and Review

Include an Oregon Burn Center representative in the OFFRC to ensure burn victims who later die as a result of fire fatalities are accounted for in fire fatality statistics. Arrange for the medical examiner's office to automatically send to the OSFM fire-related medical examiner reports. Increase reporting of fire cause data by fire departments and investigators. Obtain socioeconomic data about the fire victims. Improve data review by continuing the OFFRC with quarterly meetings and thorough review and analysis of data.

Discussion:

The process of analyzing the 2004-2008 data revealed that there are areas for improvement in data collection for fatality review:

- Ensure all fire fatalities are reported to the OSFM. Notification to the OSFM of a fire fatality currently comes only from fire departments. Sometimes fire departments are not aware that civilians who were severely burned in a fire later die of their injuries. Furthermore, these deaths may be erroneously classified as "hospital death due to burns" rather than a fire fatality. Follow-up procedures, involving fire departments and OSFM's Data Unit, are needed in fire incidents where there were victims with "severe" or "life-threatening" classed injuries. The OSFM should obtain fire death information from additional sources to ensure accuracy of the fire fatality count. Having the medical examiner's office automatically send the OSFM their reports whenever there is a fire-related death will aid in this.

- Increase reporting of fire cause data. Of the 138 fatalities, fire causes were known for only 96 of the fatalities (70%). There were 42 fatalities (30%) with undetermined fire causes (see Appendix). Because of the amount of damage caused by some fires, there will always be cases where the fire cause cannot be determined. However, there is potential to increase the reporting of fire causes. Several of the fatalities in the years 2004-2008 had "possible causes" listed[10]. Adding possible causes to the key findings could influence the formation of recommendations. If the investigator leaves the cause as "undetermined," but notes specific possible causes that were narrowed down by the investigation, this would improve the dataset.

- Socioeconomic data (income and education level) about the fire victims is not collected in the current incident reporting system. Having such data adds a dimension to understanding common characteristics of victims, to better design and target fire prevention efforts.

[10] Seven fatalities were possible cigarette-caused, six are possible combustibles too close to heat source, and six are possible juvenile fire-play caused fatalities.

Appendix

RESIDENTIAL FIRE CAUSES BY FATALITY COUNT					
Fire Cause	**2004**	**2005**	**2006**	**2007**	**2008**
electrical - overloaded equipment/wiring	1	1	1	4	1
electrical - other or not specified	0	0	2	1	
mechanical failure/malfunction of electrical eqt. (fluorescent ballast, extension cord, scooter, heater, RV)	2	1		1	2
mechanical failure/malfunction of propane heater (propane leak)					2
cooking equipment involved			2	2	
cigarette, cigar, or pipe	12	9	7	4	4
cigarette or pipe with oxygen	1	1	1	2	3
combustibles too close to heat source, or v-v (electric heater, wood stove, propane heater)	3	1		3	2
candle	1	4	3	3	1
adult playing with matches					
child playing with fireworks				1	
improper use of heating eqt. (propane heater, woodstove)	2		1		1
improper use of accelerant on burn barrel			1		
embers from the woodstove			1		
build-up of lint in dryer vent		1			
Total fatalities with known fire causes:	**22**	**18**	**19**	**21**	**16**
undetermined - cigarette?	1				1
undetermined - cigarette or candle?					1
undetermined - cigarette or combustibles too close to heat source?		1		1	
undetermined - cigarette or faulty wiring?				1	
undetermined - cigarette or baseboard heater?			1		
undetermined - heat from propane heater a factor					1
undetermined - electrical?					1
undetermined - electrical or combustibles to close to heat source?					1
undetermined - electrical or juvenile playing with lighter?					
undetermined - juvenile playing with candle?			2		1
undetermined - juveniles playing with lighter or combustible too close to heat source?			3		
undetermined	11	1	2	4	8
Total fatalities with undetermined fire causes:	**12**	**2**	**8**	**6**	**14**
Total Fatalities:	**34**	**20**	**27**	**27**	**30**

Includes only fatalities from unintentional residential property fires. Residential property fires include houses, multi-family housing, mobile homes or travel trailers used as fixed residence, nursing homes, assisted living facilities, and hotels/motels. See “Methodology” section of this report for more information.