



Oregon Office of State Fire Marshal

Oregon Fire Injury Review

2007-2011

Addendum to the
Oregon Fire Fatality Review 2004-2008

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

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Overview

Following the publication of the *Oregon Fire Fatality Review 2004-2008* (April 2010), the fire service expressed a great deal of interest in a similar analysis of Oregon fire injury data. The number of civilians injured in residential fires outnumbers fatalities by more than nine times, representing a large problem deserving focus. Consequently, the Oregon Fire Fatality Review Committee embarked on an analysis of Oregon's fire injury data to determine what factors and demographics are characteristic of fires with civilian injuries. The committee has since formally expanded its mission to include civilian fire injury review and changed its name to *Oregon Fire Casualty Review Committee (OFCRC)*.

The OFCRC reviewed data from 1,018 injuries, occurring in 769 residential property fires from 2007 through 2011 in Oregon. This 'Addendum' presents the committee's findings.

Methodology

The OFCRC reviewed injury data from 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. All residential fires were included regardless of intent. The incident data was obtained from the Oregon Fire Bridge™ database.

Analysis of the fire incidents and victims involves several variables:

- Demographic – age, gender, race, ethnicity
- Geographic – property type
- Human factors – asleep, physical disability, medical conditions, mental impairment, alcohol or drug use (alcohol and drug use data for injuries is less accurate than for fatalities).
- Non-human factors – presence and operation of smoke alarm and sprinklers, exiting issues
- Fire specifics – area of origin, ignition factor, equipment involved

Key Data Findings

From 2007 through 2011 there were 1,018 injuries occurring in 769 incidents in Oregon residential fires. Key data findings are summarized below. For data details see the Appendix.

Nearly 4 out of 5 civilians were injured in residential fires with preventable ignition factors:

- Fires started by a misuse of heat or material (cigarette, candle, and combustibles too close to heating equipment) account for **34%** of the injuries.
- Fires started by other human-related, and thus preventable, causes account for approximately **36%** of the injuries.

Fire cause:

- Cooking fires were the top cause of injuries (24%), but were a less significant cause of fatalities (9%).
- Cooking fires:
 - Of cooking fires with reported equipment involved, most involved a range or stove. (63%)
 - More females than males were injured in cooking fires. (25% to 19%; 56% gender not reported)
 - Most cooking fire injury victims were in the 20-49 year age group. (53%)
 - Most cooking fire injuries were of minor severity. (68%)
 - 17% of cooking fire injury victims were injured while trying to control the fire – significantly higher than the same group injured in non-cooking fires (10%).
 - Of the cooking fire injuries, 48% occurred in confined fires and 52% occurred in non-confined fires.
- Non-cooking fires:
 - More females than males were injured (22% to 19%; 59% gender not reported).
 - Largest number of victims was injured trying to control the fire (10%) or escaping (7%).

Victim age:

- Most injuries (54%) were in the 18-49 years age group, whereas most fatalities (67%) were in the 50+ years age group.
- The oldest age group was typically injured while escaping the fire, but adults age 20-59 received more injuries in fire control attempt:
 - Approximately 13% of victims age 20-59 were injured while attempting to control the fire.
 - Approximately 18% of victims age 20-59 were injured while attempting to control the fire, attempting rescue, or returning to vicinity of the fire.

Other factors:

- 17% (170 of 1,018) of injury victims had 'other factors' contributing to their injury. Among these 170 victims the most common of these other factors were: the victim reentered the building (19%), improper use of cooking equipment (18%), or the exits were blocked by flame or smoke (13%).

Smoke alarm:

- 51% of injury victims had an operating alarm, as compared to 22% of the fatalities, suggesting an operating alarm prevented fatalities by providing the civilian more time to escape.
- 12% of those with an operating alarm were injured during an attempt to control the fire.
- When there is no operating alarm, injury severity tends to be higher. 'Moderate' injuries are 9% higher in fires with no operating alarm.

Sprinkler presence:

- Only 4% of injury victims had a sprinkler system present.

Recommendations

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

- What recommendations were created for the 2008-2010 Oregon Fire Fatality report to avoid duplication?
- How can the OSFM's existing programs and tactics be improved to address the key data findings?
- Are there new issues revealed in the data analysis that is 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 the committee's development of one additional recommendation to drive the reduction of Oregon residential fire injuries:

Recommendation 1:

Recommendation 1: Increase the awareness of the dangers of attempting to control a fire.

This recommendation is presented in detail on the following page.

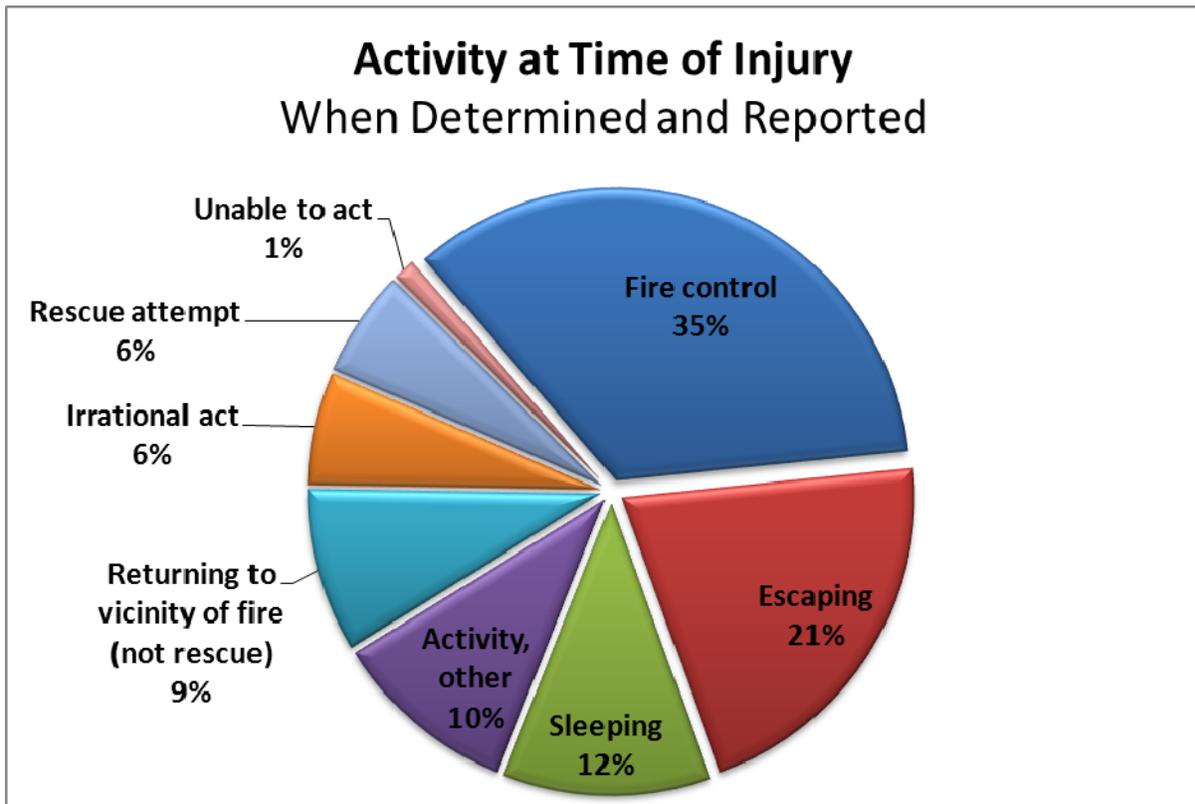
Recommendation 1: Increase the awareness of the dangers of attempting to control a fire.

The OFCRC recommends improving the messaging associated with fire control attempts. Efforts are recommended to increase targeted messages to ensure the safe escape of Oregon’s residents and to leave the firefighting to professionals unless the fire is small in nature and can be easily extinguished.

Discussion:

Where determined and reported, the activity at time of injury in relation to all fires demonstrates that in 35% of the incidents, injuries occur as the result of fire control attempts by the victim. This increases to 47% when incidents are isolated to cooking fires. Out of the 1,018 reported injuries, there were 696 instances (68%) in which the victim’s activity was either not determined or not reported.

The chart below exhibits the 322 instances in which the activity at the time of injury in residential property fires from 2007-2011 were both determined and reported; 35% of injuries occurred as a result of attempting to control the fire, 21% occurred from escaping, 12% were asleep, 10% resulted from “other” activities, 9% returned to the vicinity of the fire, 6% were an irrational action, another 6% occurred during a rescue attempt, and only 1% were unable to act.



The data demonstrates that victims are attempting to engage in fighting the fires which results in injury. The data demonstrates there is an educational opportunity on when to fight the fire and when to leave the firefighting to professionals.

Appendix: Oregon Residential Fires with Civilian Injuries 2007-2011

Section 1: Comparison of injury and fatality data, injury counts, fire cause, property type, room of origin, and demographic data.

Casualty and Incident Counts

	Civilians Injured	Civilian Fatalities	Fires with Civilians Injured	Fires with Civilian Fatalities
2007	191	25	159	21
2008	214	33	176	28
2009	190	15	148	13
2010	224	10	140	10
2011	199	29	146	26
Five-Year Total:	1,018	112	769	98

Injured civilians outnumber fatalities more than nine to one.

Causes of Fires with Civilian Casualties

Top Fire Causes	Civilians Injured	Civilian Fatalities
Cooking-related	24%	9%
Cigarette	9%	13%
Electrical	6%	11%
Home heating equipment	4%	12%
Candle	7%	1%
Match or lighter	9%	4%
Other	21%	3%
Undetermined	18%	40%
Not reported	2%	7%

Six fire causes account for 59% of the civilian injuries and 50% of the fatalities. Cooking is the leading cause of injuries.

Ignition Factors

Misuse of material or product	34%
Operational deficiency (human-caused)	10%
Electrical or mechanical failure	11%
Incendiary / suspicious	8%
Design / construct / install deficiency	1%
Natural condition	0%
Other	36%

Cigarette, candle, heating equipment (combustibles too close).

Human-caused (preventable) – 35%

Nearly 4 out of 5 civilians were injured in residential fires with preventable ignition factors.

Where Fires Occurred

	Civilians Injured	Civilian Fatalities
Residential Property Type		
Houses	63%	59%
Apartments / multi-family housing	27%	16%
Mobile homes and trailers used as fixed residence	5%	20%
Other (motels, assisted living facilities, other)	5%	5%
Room of Origin		
Kitchen	30%	8%
Bedroom	22%	31%
Living or family room	11%	32%
Garage or carport	5%	1%
Other	27%	15%
Undetermined	5%	13%

Demographics

	<u>Civilians Injured</u>	<u>Civilian Fatalities</u>
Age		
18-49 years of age	54%	23%
50+ years of age	32%	67%
Under 18 years of age	11%	11%
Not reported	2%	0%

Most injuries were in the 18-49 age group, whereas most fatalities were in the 50+ age group.

Gender		
Male	23%	18%
Female	19%	17%
Not reported	58%	65%

	<u>Civilians Injured</u>	<u>Civilian Fatalities</u>
Race / Ethnicity		
Caucasian	23%	22%
Black	3%	1%
Hispanic	3%	0%
Asian	<1%	0%
American Indian or Alaska native	<1%	0%
Other	1%	2%
Undetermined	3%	2%
Not reported	69%	73%

Note: Percentages in each category are based on the total injured civilians with known / reported data for that category. Percentages in the 'Race/Ethnicity' category may total more than 100% due to the possibility of an individual being included in more than one category.

Section 2: Comparison of cooking fires to fires of other causes, demographics, nature of injury, and activity at time of injury.

	All Fire Injuries	Cooking	Other Cause
Civilians injured	1,018	244 (24%)	774 (76%)

Demographics

Gender of Casualty

Female	23%	25%	22%
Male	19%	19%	19%
Not reported	58%	56%	59%

Age of Casualty

0-9 years	5%	2%	5%
10-19 years	9%	10%	8%
20-29 years	17%	23%	16%
30-39 years	17%	14%	17%
40-49 years	18%	16%	19%
50-59 years	15%	13%	16%
60-69 years	11%	11%	12%
70-79 years	3%	2%	3%
80-89 years	3%	5%	2%
90+ years	<1%	<1%	1%
Not reported	2%	4%	2%

66% of fire injury victims are under age 50. (33% of fire fatalities are under age 50)

Nature of Injury

Severity

Minor	63%	68%	62%
Moderate	22%	23%	22%
Severe	7%	4%	8%
Life threatening	4%	1%	4%
Undetermined	4%	4%	4%

Nature of Injury

Burn: Thermal	12%	11%	12%
Asphyxiation	8%	12%	8%
Shortness of breath	4%	7%	4%
Burns and asphyxiation	5%	3%	5%
Burn: scald	1%	2%	1%
Laceration, cut	1%	3%	1%
Cardiac symptoms	1%	0%	1%
Other	3%	3%	3%
Undetermined	1%	0%	1%
Not reported	64%	60%	64%

Activity at Time of Injury

Activity

Fire control attempt	11%	17%	10%
Escaping	7%	7%	7%
Asleep	4%	3%	4%
Rescue attempt	2%	2%	2%
Return to vicinity of fire (not rescue)	3%	2%	3%
Irrational action	2%	1%	2%
Unable to act	<1%	<1%	<1%
Activity, other	3%	4%	3%
Undetermined	3%	3%	4%
Not reported	64%	61%	65%

17% of injury victims in cooking fires were injured trying to control the fire.

Note: Percentages in each category are based on the total injured civilians with known / reported data for that category.

Section 3: Victim age correlated to activity at time of injury; other contributing factors.

Victim Age Correlated to Known Activity at Time of Injury

	Injured victim's age:								
	All Ages	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70+
Number of Injury Victims with Known Activity:	322	13	25	49	44	71	52	43	25
% of Victims Injured while doing:									
Fire control attempt	35%	38%	32%	35%	30%	45%	44%	21%	20%
Escaping	21%	15%	20%	18%	25%	14%	13%	33%	40%
Asleep	11%	15%	32%	12%	7%	1%	13%	21%	4%
Rescue attempt	6%	8%	4%	10%	7%	4%	10%	2%	0%
Return to vicinity of fire (not rescue)	9%	8%	0%	6%	9%	17%	6%	7%	12%
Irrational action	6%	8%	0%	12%	5%	3%	10%	5%	8%
Unable to act	1%	0%	0%	2%	0%	3%	0%	2%	0%
Activity, other	10%	8%	12%	4%	18%	13%	4%	9%	16%
Total of injury victims who tried to control fire, attempted rescue, or returned to vicinity of fire	50%	54%	36%	51%	45%	66%	60%	30%	32%

39% of victims age 20-59 received their injuries while attempting to control the fire.

Other Factors Contributing to the Injury

17% of injury victims (170/1,018) had 'other factors' reported that contributed to their injury.

Percent of these 170 victims injured due to these other factors:

Escape Factors	25%
Reentered building/structure	19%
Other escape factors, not classed above	3%
Chose inappropriate escape route	1%
Clothing burned while escaping	1%
Excessive travel distance to nearest exit	1%
Equipment-Related Factors	22%
Improper use of cooking equipment	18%
Improper use of heating equipment	2%
Equipment-related factors, other	2%
Fire Pattern Factors	18%
Exits blocked by flame	7%
Exits blocked by smoke	6%
Other fire pattern factors	2%
Vision impaired by smoke	3%
Clothing Burned or Overexertion	6%
Clothing burned, not while escaping	4%
Overexertion	2%
Egress Problem	6%
Egress problem, not classed above	5%
Window type impeded egress	1%
Factor Contributing to Injury, other	22%

Note: Percentages in each category are based on the total injured civilians with known / reported data for that category.

Section 4: Smoke alarm and sprinkler system data.

Smoke Alarm Presence and Performance

Alarm Presence

Victims with an alarm present:	60%
Victims with no alarm:	15%
Undetermined	16%
Not reported	9%

Alarm performance percentages are based on the 767 injury fires where alarm presence was neither undetermined nor unreported.

Alarm Performance

Alarm present and operated:	51%
Alarm not present:	20%
Alarm present and did not operate:	10%
Alarm present and unknown if operated:	18%

51% of injury victims had an operating alarm (compared to 22% of the fatalities).

30% of injury victims did not have an operating alarm (compared to 49% of the fatalities).

Severity and activity, breakdown by alarm performance (percentages based on the 767 injury fires where alarm performance data was reported):

No Alarm or Alarm did not Operate (231 injury fires)

Severity of Injury

Minor	59%
Moderate	28%
Severe	5%
Life threatening	3%
Undetermined	6%

Higher injury severity when no operating alarm (Moderate injuries are 9% higher in fires with no operating alarm).

Activity at Time of Injury

Fire control attempt	5%
Escaping	9%
Asleep	0%
Rescue attempt	<1%
Return to vicinity of fire (not rescue)	1%
Irrational action	1%
Unable to act	<1%
Activity, other	5%
Undetermined	1%
Not reported	77%

Alarm Present and Operated (396 injury fires)

Severity of Injury

Minor	68%
Moderate	19%
Severe	7%
Life threatening	4%
Undetermined	2%

Activity at Time of Injury

Fire control attempt	12%
Escaping	7%
Asleep	6%
Rescue attempt	2%
Return to vicinity of fire (not rescue)	5%
Irrational action	2%
Unable to act	1%
Activity, other	2%
Undetermined	3%
Not reported	61%

Victims alerted to the fire by an operating alarm were nearly twice as likely to have been injured in a fire control attempt instead of escaping.

Alarm Operation Undetermined (140 injury fires)

Severity of Injury

Minor	61%
Moderate	22%
Severe	6%
Life threatening	4%
Undetermined	7%

Activity at Time of Injury

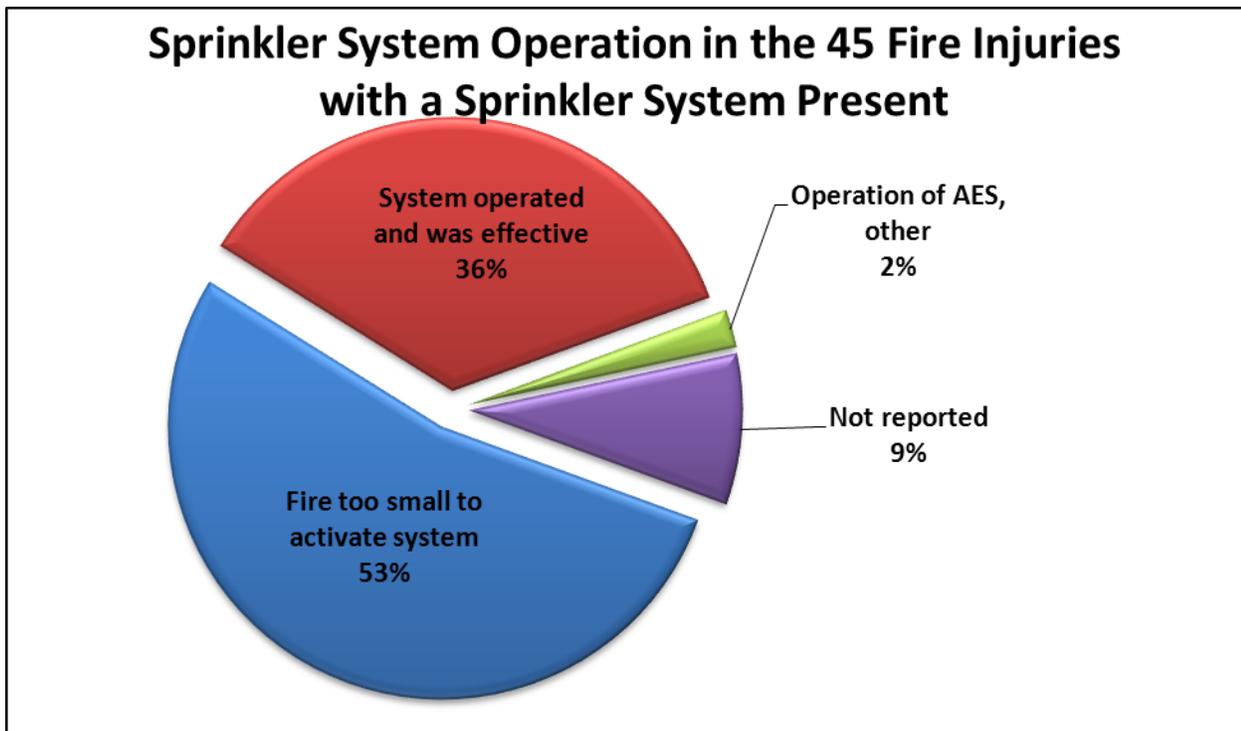
Not reported	100%
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Sprinkler Presence and Performance

Sprinkler Presence

Victims with a sprinkler system present	4%
Undetermined	4%
Not reported	92%

Note: Percentages in each category are based on the total injured civilians with known / reported data for that category.



Section 5: Injuries in cooking fires; demographics, equipment involved, nature of injury, and activity at time of injury.

Breakdown by type of fire:

	<u>All Cooking Fire Injuries</u>	<u>Confined</u>	<u>Not Confined</u>
Civilians Injured in Cooking Fires	244	117	127
	100%	48%	52%

Demographics

Gender of Casualty

Female	25%	21%	28%
Male	19%	18%	20%
Not reported	56%	61%	52%

Age of Casualty

0-9 years	2%	2%	2%
10-19 years	10%	13%	8%
20-29 years	23%	26%	20%
30-39 years	14%	11%	17%
40-49 years	16%	15%	17%
50-59 years	13%	9%	16%
60-69 years	11%	11%	10%
70-79 years	2%	4%	1%
80-89 years	5%	4%	6%
90+ years	<1%	0%	1%
Not reported	4%	4%	3%

Equipment Involved in Injury

Equipment

Range or stove	63%	56%	69%
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Nature of Injury

Severity of Injury

Minor	68%	77%	61%
Moderate	23%	19%	26%
Severe	4%	4%	4%
Life threatening	1%	0%	2%
Undetermined	4%	0%	7%

Activity at Time of Injury

Activity at Time of Injury and Nature of Injury

Fire control attempt	17%	19%	15%
Escaping	7%	3%	10%
Asleep	3%	3%	3%
Rescue attempt	2%	1%	3%
Return to vicinity of fire (not rescue)	2%	3%	0%
Irrational action	1%	2%	1%
Unable to act	1%	2%	0%
Activity, other	4%	0%	7%
Undetermined	3%	1%	6%
Not reported	61%	67%	55%

Notes

'Confined' cooking fires are structure fires coded as incident type 113 ('cooking fire, confined to container').

'Not confined' cooking fires are structure fires reported to involve cooking equipment, and are not incident type 113.

Percentages in each category are based on the total injured civilians with known / reported data for that category.