



RESEARCH

Smoke Alarms in U.S. Home Fires Supporting Tables

January 2019

Marty Ahrens

Smoke Alarms in U.S. Home Fires: Supporting Tables

The tables in this document are a companion to the report of the same name. Firefighter deaths and injuries are excluded from this analysis. While most show national estimates of reported fires, some show data from other sources.

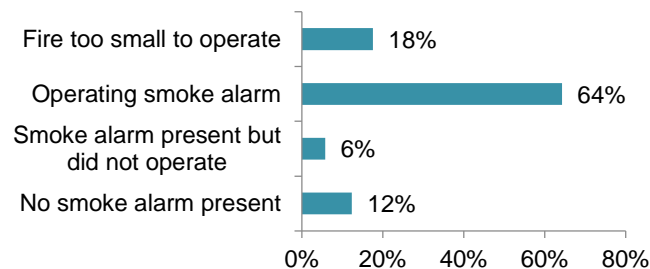
National estimates of fires and losses are presented as 2012-2016 annual averages. Estimates were derived from the U.S. Fire Administration’s National Fire Incident Reporting System (NFIRS) and NFPA’s annual fire department experience survey and include proportional shares of unknown or missing data. Fires are rounded to the nearest 100, deaths and injuries are rounded to the nearest ten, and property loss is rounded to the nearest million dollars. Property loss was not adjusted for inflation. Percentages were calculated on unrounded estimates.

“Confined” fires, that is fires with NFIRS incident type codes 113-118 indicating confined cooking fires, confined chimney or flue fires, confined trash fires, confined fuel burner or boiler fires, confined commercial compactor fires, and confined incinerator fires, were analyzed separately from fires with “non-confined” structure fire incident types (NFIRS incident type codes 110-123, excluding 113-118) and summed. Estimates include proportional shares of fires with unknown data. For more information on how these estimates were calculated, please see the [full report](#) and [How NFPA's National Estimates Are Calculated for Home Structure Fires](#).

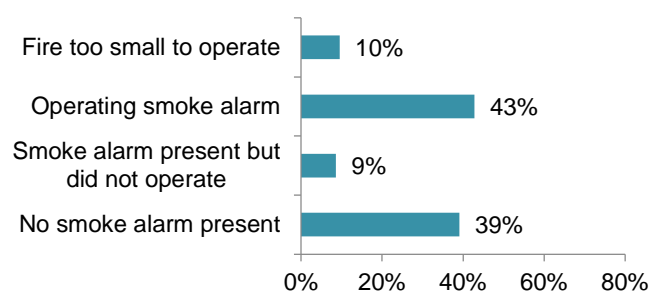
Smoke alarms were more likely to be present and more likely to have operated in confined fires than in non-confined fires. Also, larger percentage of confined fires were too small to operate the smoke alarms. Note that the National Fire Incident Reporting System (NFIRS), the source of detailed data about fire department responses, does not capture information about whether the detection is monitored. Monitored detection may result in more fire department responses to very small fires.

**Confined and Non-Confined Home Structure Fires by Smoke Alarm Performance
2012-2016**

A. Confined fires



B. Non-confined fires



List of Tables

Table	Smoke Alarms in U.S. Home Fires s	Page
Home Structure Fires		
Table 1.	By Smoke Alarm Performance	3
Table 2.	By Type of Detection	4
Table 3.	By Smoke Alarm Power Source	5
Table 4.	Considered Large Enough to Activate Alarm by Operating Alarms and Power Source	6
Table 5.	By Smoke Alarm Power Source when Smoke Alarms Did Not Operate	7
Table 6.	By Power Source and Reason When Smoke Alarm Did Not Operate	8
Table 7.	With Hardwired Smoke Alarms by Extent of Flame Damage	12
Table 8.	With Battery-Powered Smoke Alarms by Extent of Flame Damage	12
Table 9.	By Effectiveness of Operating Smoke Alarms	13
Various Survey Results about Smoke Alarms		
Table 10.	Findings from 2010 Harris Poll® National Quorum	14
Table 11.	Occupied Housing Units with Smoke Alarms: 2011 American Housing Survey	15
Table 12.	Smoke Alarm Key Findings from CPSC's 2004-2005 Residential Fire Survey	16
Fires in One- or Two-Family Homes		
Table 13.	by Smoke Alarm Performance	17
Table 14.	by Type of Detection	18
Table 15.	By Smoke Alarm Power Source	19
Apartment Fires		
Table 16.	by Smoke Alarm Performance	20
Table 17.	by Type of Detection	21
Table 18.	By Smoke Alarm Power Source	22
Smoke Alarm Presence and Operation in Home Structure Fires Resulting in Death		
Table 19.	By Victim's General Location at Time of Fatal Injury	23
Table 20.	By Victim's Location and Involvement at Time of Fire Incident	23
Table 21.	By Extent of Flame Damage	24
Table 22.	By Activity at Time of Fatal Injury	24
Table 23.	By Human Factor Contributing to Injury	25
Table 24.	By Victim's Age	26
Smoke Alarm Presence and Operation in Home Structure Fires Resulting in Injury		
Table 25.	By Victim's Activity at Time of Injury	27

Table 1.
Home Structure Fires by Smoke Alarm Performance
2012-2016 Annual Averages

Detection Performance	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Total	355,400	(100%)	2,560	(100%)	11,670	(100%)	\$6,482	(100%)
Non-confined fire	183,400	(52%)	2,560	(100%)	10,170	(87%)	\$6,445	(87%)
Confined fire	172,000	(48%)	0	(0%)	1,500	(13%)	\$37	(13%)
Smoke Alarm Present	262,400	(74%)	1,540	(60%)	8,300	(71%)	\$4,723	(71%)
Non-confined fire	111,700	(31%)	1,540	(60%)	6,960	(60%)	\$4,691	(60%)
Confined fire	150,700	(42%)	0	(0%)	1,340	(11%)	\$33	(11%)
<i>Fire too small to operate alarm</i>	47,700	(13%)	20	(1%)	530	(5%)	\$143	(5%)
Non-confined fire	17,500	(5%)	20	(1%)	360	(3%)	\$139	(3%)
Confined fire	30,300	(9%)	0	(0%)	170	(1%)	\$4	(1%)
<i>Smoke alarm present and fire large enough to operate alarm</i>	214,700	(60%)	1,520	(59%)	7,770	(67%)	\$4,580	(67%)
Non-confined fire	94,200	(27%)	1,520	(59%)	6,610	(57%)	\$4,551	(57%)
Confined fire	120,500	(34%)	0	(0%)	1,160	(10%)	\$29	(10%)
<i>Smoke alarm operated</i>	189,000	(53%)	1,080	(42%)	6,330	(54%)	\$4,020	(54%)
Non-confined fire	78,500	(22%)	1,080	(42%)	5,290	(45%)	\$3,994	(45%)
Confined fire	110,500	(31%)	0	(0%)	1,040	(9%)	\$26	(9%)
<i>Smoke alarm present but did not operate</i>	25,700	(7%)	440	(17%)	1,440	(12%)	\$560	(12%)
Non-confined fire	15,800	(4%)	440	(17%)	1,310	(11%)	\$557	(11%)
Confined fire	9,900	(3%)	0	(0%)	130	(1%)	\$3	(1%)
No Smoke Alarm	93,000	(26%)	1,020	(40%)	3,370	(29%)	\$1,759	(29%)
Non-confined fire	71,700	(20%)	1,020	(40%)	3,210	(27%)	\$1,755	(27%)
Confined fire	21,300	(6%)	0	(0%)	160	(1%)	\$4	(1%)
Operating alarms as share of those present in fires large enough to activate	189,000	(88%)	1,080	(71%)	6,330	(81%)	\$4,020	(81%)
Fires with no smoke alarms or none that operated in fires large enough to activate	118,700	(33%)	1,450	(57%)	4,810	(41%)	\$2,319	(41%)

Note: Sums may not equal totals due to rounding errors. Confined and non-confined fires were analyzed separately. Smoke alarm presence or absence was reported in 68% of non-confined fires and 7% of confined fires. Fires with unknown or missing data were allocated proportionally among fires with missing data.

Source: NFIRS 5.0 and NFPA survey.

Table 2.
Home Structure Fires with Detection Equipment by Type of Detection
2012-2016 Annual Averages

Type of Detection Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Smoke	232,100	(88%)	1,450	(94%)	7,600	(92%)	\$4,196	(92%)
Non-confined fire	102,200	(39%)	1,450	(94%)	6,430	(92%)	\$4,168	(92%)
Confined fire	129,900	(50%)	0	(0%)	1,170	(87%)	\$27	(87%)
Combination smoke and heat	18,200	(7%)	40	(2%)	330	(4%)	\$324	(4%)
Non-confined fire	5,600	(2%)	40	(2%)	250	(4%)	\$321	(4%)
Confined fire	12,500	(5%)	0	(0%)	70	(6%)	\$2	(6%)
More than one type present	7,000	(3%)	30	(2%)	240	(3%)	\$133	(3%)
Non-confined fire	2,100	(1%)	30	(2%)	180	(3%)	\$132	(3%)
Confined fire	4,900	(2%)	0	(0%)	60	(5%)	\$1	(5%)
Unclassified detection equipment	2,200	(1%)	10	(1%)	40	(0%)	\$33	(0%)
Non-confined fire	600	(1%)	10	(1%)	30	(0%)	\$33	(0%)
Confined fire	1,500	(1%)	0	(0%)	10	(1%)	\$0	(1%)
Sprinkler with water flow detection	1,700	(1%)	0	(0%)	40	(0%)	\$19	(0%)
Non-confined fire	600	(0%)	0	(0%)	30	(0%)	\$17	(0%)
Confined fire	1,100	(0%)	0	(0%)	10	(1%)	\$2	(1%)
Heat	1,300	(0%)	10	(1%)	50	(1%)	\$19	(1%)
Non-confined fire	500	(0%)	10	(1%)	30	(0%)	\$19	(0%)
Confined fire	700	(0%)	0	(0%)	10	(1%)	\$0	(1%)
Total	262,400	(100%)	1,540	(100%)	8,300	(100%)	\$4,723	(100%)
Non-confined fire	111,700	(43%)	1,540	(100%)	6,960	(84%)	\$4,691	(84%)
Confined fire	150,700	(57%)	0	(0%)	1,340	(16%)	\$33	(16%)

Note: Sums may not equal totals due to rounding errors. Unknowns have been allocated proportionally.

Source: NFIRS and NFPA's fire experience survey.

**Table 3.
Home Structure Fires in which Smoke Alarms Were Present by Smoke Alarm Power Source
2012-2016 Annual Averages**

Power Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Battery only	119,900	(46%)	1,000	(65%)	4,440	(54%)	\$2,253	(54%)
Non-confined fire	62,600	(24%)	1,000	(65%)	3,950	(48%)	\$2,240	(48%)
Confined fire	57,300	(22%)	0	(0%)	500	(6%)	\$13	(6%)
Hardwired with battery backup	92,800	(35%)	320	(21%)	2,430	(29%)	\$1,768	(29%)
Non-confined fire	33,900	(13%)	320	(21%)	1,920	(23%)	\$1,755	(23%)
Confined fire	58,900	(22%)	0	(0%)	510	(6%)	\$13	(6%)
Hardwired only	33,300	(13%)	130	(9%)	920	(11%)	\$396	(11%)
Non-confined fire	9,700	(4%)	130	(9%)	720	(9%)	\$391	(9%)
Confined fire	23,600	(9%)	0	(0%)	200	(2%)	\$4	(2%)
Multiple detection devices and power supplies	8,600	(3%)	60	(4%)	310	(4%)	\$166	(4%)
Non-confined fire	2,600	(1%)	60	(4%)	230	(3%)	\$165	(3%)
Confined fire	6,000	(2%)	0	(0%)	80	(1%)	\$1	(1%)
Plug-in with battery backup	4,100	(2%)	20	(1%)	90	(1%)	\$82	(1%)
Non-confined fire	1,700	(1%)	20	(1%)	80	(1%)	\$81	(1%)
Confined fire	2,400	(1%)	0	(0%)	20	(0%)	\$1	(0%)
Unclassified power source	2,500	(1%)	10	(1%)	60	(1%)	\$38	(1%)
Non-confined fire	700	(0%)	10	(1%)	30	(0%)	\$38	(0%)
Confined fire	1,700	(1%)	0	(0%)	30	(0%)	\$0	(0%)
Plug-in	800	(0%)	0	(0%)	20	(0%)	\$14	(0%)
Non-confined fire	300	(0%)	0	(0%)	20	(0%)	\$14	(0%)
Confined fire	500	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Mechanical	400	(0%)	0	(0%)	20	(0%)	\$6	(0%)
Non-confined fire	200	(0%)	0	(0%)	10	(0%)	\$6	(0%)
Confined fire	300	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	262,400	(100%)	1,540	(100%)	8,300	(100%)	\$4,723	(100%)
Non-confined fire	111,700	(43%)	1,540	(100%)	6,960	(84%)	\$4,691	(84%)
Confined fire	150,700	(57%)	0	(0%)	1,340	(16%)	\$33	(16%)

Note: Sums may not equal totals due to rounding errors. Unknowns have been allocated proportionally. Smoke alarm presence, operation, and power source are not required fields in NFIRS 5.0. Smoke alarm presence was completed in 67% of non-confined fires but only 4% of confined fires. Estimates of these elements in non-confined fires are therefore more reliable than estimates for confined fires and totals but non-confined estimates exclude many minor fires.

Source: NFIRS and NFPA's fire experience survey.

Table 4.
Home Structure Fires Considered Large Enough to Activate Alarm
By Operating Alarms and Power Source
2012-2016 Annual Averages

Power Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Battery only	76,300	(81%)	600	(63%)	2,960	(73%)	\$1,733	(82%)
Non-confined fire	40,700	(78%)	600	(63%)	2,630	(72%)	\$1,723	(82%)
Confined fire	35,700	(85%)	0	(NA)	330	(81%)	\$9	(83%)
All hardwired	100,200	(94%)	390	(86%)	2,930	(91%)	\$1,997	(93%)
Non-confined fire	33,700	(91%)	390	(86%)	2,330	(90%)	\$1,983	(93%)
Confined fire	66,500	(96%)	0	(NA)	590	(93%)	\$14	(93%)
Hardwired with battery	72,900	(94%)	290	(90%)	2,130	(91%)	\$1,666	(94%)
Non-confined fire	26,500	(92%)	290	(90%)	1,710	(91%)	\$1,655	(94%)
Confined fire	46,400	(96%)	0	(NA)	420	(92%)	\$11	(96%)
Hardwired only	27,300	(92%)	100	(75%)	790	(90%)	\$331	(87%)
Non-confined fire	7,200	(86%)	100	(75%)	620	(89%)	\$328	(87%)
Confined fire	20,100	(95%)	0	(NA)	170	(94%)	\$3	(83%)
	0		0		0		\$0	
All power sources	189,000	(88%)	1,080	(71%)	6,330	(81%)	\$4,020	(88%)
Non-confined fire	78,500	(83%)	1,080	(71%)	5,290	(80%)	\$3,994	(88%)
Confined fire	110,500	(92%)	0	(NA)	1,040	(89%)	\$26	(89%)

Note: Sums may not equal totals due to rounding errors. Unknowns have been allocated proportionally. Smoke alarm presence, operation, and power source are not required fields in NFIRS 5.0. Smoke alarm presence was completed in 67% of non-confined fires but only 4% of confined fires. Estimates of these elements in non-confined fires are therefore more reliable than estimates for confined fires and totals, but non-confined estimates exclude many minor fires. Operation was calculated based on the number of fires in which smoke alarms were present and operated divided by the number present that operated and failed to operate. Fires that were too small to operate were excluded. Minor power sources are not shown separately but are include in the entry for all power sources.

Source: NFIRS and NFPA's fire experience survey.

Table 5.
Home Structure Fires Considered Large Enough to Activate Alarm
By Smoke Alarm Power Source when Smoke Alarms Did Not Operate
2012-2016 Annual Averages

Power Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Battery only	17,900	(70%)	340	(79%)	1,080	(75%)	\$379	(75%)
Non-confined fire	11,600	(45%)	340	(79%)	1,010	(70%)	\$377	(70%)
Confined fire	6,300	(25%)	0	(0%)	70	(5%)	\$2	(5%)
Hardwired with battery backup	4,400	(17%)	40	(9%)	220	(15%)	\$109	(15%)
Non-confined fire	2,400	(9%)	40	(9%)	190	(13%)	\$108	(13%)
Confined fire	2,000	(8%)	0	(0%)	40	(2%)	\$0	(2%)
Hardwired only	2,300	(9%)	30	(8%)	90	(6%)	\$50	(6%)
Non-confined fire	1,200	(5%)	30	(8%)	80	(5%)	\$50	(5%)
Confined fire	1,100	(4%)	0	(0%)	10	(1%)	\$1	(1%)
Multiple detectors and power supplies	600	(2%)	10	(3%)	30	(2%)	\$13	(2%)
Non-confined fire	300	(1%)	10	(3%)	30	(2%)	\$13	(2%)
Confined fire	300	(1%)	0	(0%)	10	(0%)	\$0	(0%)
Plug-in with or without battery backup	400	(1%)	0	(0%)	10	(1%)	\$6	(1%)
Non-confined fire	200	(1%)	0	(0%)	10	(1%)	\$6	(1%)
Confined fire	200	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Other known power source	100	(1%)	10	(1%)	0	(0%)	\$4	(0%)
Non-confined fire	100	(0%)	10	(1%)	0	(0%)	\$4	(0%)
Confined fire	100	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	25,700	(100%)	440	(100%)	1,440	(100%)	\$560	(100%)
Non-confined fire	15,800	(61%)	440	(100%)	1,310	(91%)	\$557	(91%)
Confined fire	9,900	(39%)	0	(0%)	130	(9%)	\$3	(9%)

Note: Sums may not equal totals due to rounding errors. Unknowns have been allocated proportionally.

Source: NFIRS and NFPA's fire experience survey.

Table 6.
Home Structure Fires Considered Large Enough to Activate Alarm
By Power Source and Reason Smoke Alarm Did Not Operate
2012-2016 Annual Averages

A. All Power Sources Combined

Reason for Failure	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Missing or disconnected battery	11,100	(43%)	300	(68%)	790	(55%)	\$262	(55%)
Non-confined fire	7,200	(28%)	300	(68%)	730	(51%)	\$260	(51%)
Confined fire	3,900	(15%)	0	(0%)	60	(4%)	\$2	(4%)
Dead or discharged battery	6,500	(25%)	60	(13%)	310	(21%)	\$107	(21%)
Non-confined fire	3,900	(15%)	60	(13%)	280	(19%)	\$106	(19%)
Confined fire	2,500	(10%)	0	(0%)	30	(2%)	\$1	(2%)
Unclassified reason for failure	2,400	(9%)	20	(4%)	70	(5%)	\$85	(5%)
Non-confined fire	1,500	(6%)	20	(4%)	70	(5%)	\$85	(5%)
Confined fire	900	(4%)	0	(0%)	10	(0%)	\$0	(0%)
Lack of cleaning	1,800	(7%)	10	(3%)	60	(4%)	\$28	(4%)
Non-confined fire	900	(4%)	10	(3%)	60	(4%)	\$28	(4%)
Confined fire	900	(3%)	0	(0%)	0	(0%)	\$0	(0%)
Hardwired power failure, shut-off or disconnect	1,700	(7%)	40	(8%)	120	(8%)	\$47	(8%)
Non-confined fire	1,000	(4%)	40	(8%)	100	(7%)	\$47	(7%)
Confined fire	700	(3%)	0	(0%)	10	(1%)	\$0	(1%)
Defective unit	1,300	(5%)	0	(1%)	30	(2%)	\$11	(2%)
Non-confined fire	600	(2%)	0	(1%)	30	(2%)	\$11	(2%)
Confined fire	700	(3%)	0	(0%)	0	(0%)	\$0	(0%)
Improper installation or placement	1,000	(4%)	10	(2%)	50	(4%)	\$21	(4%)
Non-confined fire	600	(2%)	10	(2%)	40	(3%)	\$20	(3%)
Confined fire	400	(2%)	0	(0%)	10	(1%)	\$0	(1%)
Total	25,700	(100%)	440	(100%)	1,440	(100%)	\$560	(100%)
Non-confined fire	15,800	(61%)	440	(100%)	1,310	(91%)	\$557	(91%)
Confined fire	9,900	(39%)	0	(0%)	130	(9%)	\$3	(9%)

Note: Sums may not equal totals due to rounding errors. Unknowns have been allocated proportionally.

Source: NFIRS and NFPA's fire experience survey.

Table 6.
Home Structure Fires Considered Large Enough to Activate Alarm
By Power Source and Reason Smoke Alarm Did Not Operate
2012-2016 Annual Averages (continued)

B. Battery Only

Reason for Failure	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Missing or disconnected battery	9,100	(51%)	270	(77%)	680	(63%)	\$223	(63%)
Non-confined fire	6,200	(35%)	270	(77%)	640	(59%)	\$222	(59%)
Confined fire	2,900	(16%)	0	(0%)	40	(4%)	\$1	(4%)
Dead or discharged battery	5,700	(32%)	50	(15%)	270	(25%)	\$97	(25%)
Non-confined fire	3,600	(20%)	50	(15%)	250	(23%)	\$96	(23%)
Confined fire	2,100	(12%)	0	(0%)	20	(2%)	\$1	(2%)
Unclassified reason for failure	1,000	(5%)	10	(2%)	40	(4%)	\$28	(4%)
Non-confined fire	600	(3%)	10	(2%)	30	(3%)	\$28	(3%)
Confined fire	300	(2%)	0	(0%)	10	(1%)	\$0	(1%)
Lack of cleaning	900	(5%)	10	(3%)	40	(3%)	\$13	(3%)
Non-confined fire	500	(3%)	10	(3%)	40	(3%)	\$13	(3%)
Confined fire	400	(2%)	0	(0%)	0	(0%)	\$0	(0%)
Defective unit	700	(4%)	0	(0%)	20	(2%)	\$6	(2%)
Non-confined fire	300	(2%)	0	(0%)	20	(2%)	\$6	(2%)
Confined fire	400	(2%)	0	(0%)	0	(0%)	\$0	(0%)
Improper installation or placement	500	(3%)	10	(2%)	30	(3%)	\$11	(3%)
Non-confined fire	300	(2%)	10	(2%)	20	(2%)	\$11	(2%)
Confined fire	200	(1%)	0	(0%)	10	(1%)	\$0	(1%)
Total	17,900	(100%)	340	(100%)	1,080	(100%)	\$379	(100%)
Non-confined fire	11,600	(65%)	340	(100%)	1,010	(93%)	\$377	(93%)
Confined fire	6,300	(35%)	0	(0%)	70	(7%)	\$2	(7%)

Note: Sums may not equal totals due to rounding errors. Unknowns have been allocated proportionally.

Source: NFIRS and NFPA's fire experience survey.

Table 6.
Home Structure Fires Considered Large Enough to Activate Alarm
By Power Source and Reason Smoke Alarm Did Not Operate
2012-2016 Annual Averages (continued)

C. Hardwired Only

Reason for Failure	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Hardwired power failure, shut-off or disconnect	1,000	(43%)	30	(87%)	50	(59%)	\$28	(59%)
Non-confined fire	600	(25%)	30	(87%)	50	(54%)	\$28	(54%)
Confined fire	400	(18%)	0	(0%)	0	(5%)	\$0	(5%)
Unclassified reason for failure	400	(19%)	0	(7%)	10	(11%)	\$12	(11%)
Non-confined fire	200	(9%)	0	(7%)	10	(11%)	\$12	(11%)
Confined fire	200	(10%)	0	(0%)	0	(0%)	\$0	(0%)
Lack of cleaning	400	(16%)	0	(6%)	10	(11%)	\$6	(11%)
Non-confined fire	200	(8%)	0	(6%)	10	(11%)	\$6	(11%)
Confined fire	200	(8%)	0	(0%)	0	(0%)	\$0	(0%)
Defective unit	300	(14%)	0	(0%)	0	(5%)	\$3	(5%)
Non-confined fire	200	(7%)	0	(0%)	0	(5%)	\$3	(5%)
Confined fire	100	(6%)	0	(0%)	0	(0%)	\$0	(0%)
Improper installation or placement	200	(9%)	0	(0%)	10	(14%)	\$3	(14%)
Non-confined fire	100	(3%)	0	(0%)	0	(5%)	\$3	(5%)
Confined fire	100	(6%)	0	(0%)	10	(9%)	\$0	(9%)
Total	2,300	(100%)	40	(100%)	90	(100%)	\$50	(100%)
Non-confined fire	1,200	(52%)	40	(100%)	80	(86%)	\$50	(86%)
Confined fire	1,100	(48%)	0	(0%)	10	(14%)	\$1	(14%)

Note: Sums may not equal totals due to rounding errors. Unknowns have been allocated proportionally.

Source: NFIRS and NFPA's fire experience survey.

Table 6.
Home Structure Fires Considered Large Enough to Activate Alarm
By Power Source and Reason Smoke Alarm Did Not Operate
2012-2016 Annual Averages (continued)

D. Hardwired with Battery Backup

Reason for Failure	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Missing or disconnected battery	1,300	(28%)	20	(41%)	80	(36%)	\$22	(36%)
Non-confined fire	600	(14%)	20	(41%)	50	(24%)	\$22	(24%)
Confined fire	600	(13%)	0	(0%)	30	(12%)	\$0	(12%)
Unclassified reason for failure	900	(21%)	10	(18%)	20	(11%)	\$38	(11%)
Non-confined fire	600	(12%)	10	(18%)	20	(11%)	\$38	(11%)
Confined fire	400	(9%)	0	(0%)	0	(0%)	\$0	(0%)
Hardwired power failure, shut-off or disconnect	900	(20%)	10	(32%)	80	(34%)	\$28	(34%)
Non-confined fire	600	(13%)	10	(32%)	70	(30%)	\$28	(30%)
Confined fire	300	(8%)	0	(0%)	10	(5%)	\$0	(5%)
Lack of cleaning	500	(11%)	0	(0%)	20	(8%)	\$10	(8%)
Non-confined fire	300	(6%)	0	(0%)	20	(8%)	\$10	(8%)
Confined fire	200	(5%)	0	(0%)	0	(0%)	\$0	(0%)
Defective unit	300	(7%)	0	(0%)	0	(0%)	\$3	(0%)
Non-confined fire	100	(3%)	0	(0%)	0	(0%)	\$3	(0%)
Confined fire	200	(4%)	0	(0%)	0	(0%)	\$0	(0%)
Dead or discharged battery	300	(7%)	0	(4%)	10	(6%)	\$3	(6%)
Non-confined fire	100	(3%)	0	(4%)	10	(6%)	\$3	(6%)
Confined fire	200	(4%)	0	(0%)	0	(0%)	\$0	(0%)
Improper installation or placement	300	(6%)	0	(4%)	10	(6%)	\$6	(6%)
Non-confined fire	100	(3%)	0	(4%)	10	(6%)	\$6	(6%)
Confined fire	100	(2%)	0	(0%)	0	(0%)	\$0	(0%)
Total	4,400	(100%)	40	(100%)	220	(100%)	\$109	(100%)
Non-confined fire	2,400	(54%)	40	(100%)	190	(83%)	\$108	(83%)
Confined fire	2,000	(46%)	0	(0%)	40	(17%)	\$0	(17%)

Note: Sums may not equal totals due to rounding errors. Unknowns have been allocated proportionally.

Source: NFIRS and NFPA's fire experience survey.

Table 7.
Home Structure Fires with Hardwired Smoke Alarms
(Includes Alarms with and without Battery Backup)
by Extent of Flame Damage
2012-2016 Annual Averages

Extent of Flame Damage	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined fire identified by incident type	82,500	(65%)	0	(0%)	710	(21%)	\$17	(21%)
Confined to object of origin	8,100	(6%)	20	(4%)	240	(7%)	\$70	(7%)
Confined to room of origin	22,000	(17%)	160	(36%)	1,490	(45%)	\$427	(45%)
Confined to floor of origin	4,000	(3%)	70	(15%)	300	(9%)	\$233	(9%)
Confined to building of origin	8,700	(7%)	180	(39%)	550	(16%)	\$1,239	(16%)
Extended beyond building of origin	900	(1%)	20	(6%)	70	(2%)	\$177	(2%)
Total	126,100	(100%)	450	(100%)	3,350	(100%)	\$2,164	(100%)

Table 8.
Home Structure Fires with Battery-Powered Smoke Alarms
by Extent of Flame Damage
2012-2016 Annual Averages

Extent of Flame Damage	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Confined fire identified by incident type	57,300	(48%)	0	(0%)	500	(11%)	\$13	(11%)
Confined to object of origin	10,100	(8%)	30	(3%)	290	(7%)	\$73	(7%)
Confined to room of origin	28,600	(24%)	250	(24%)	1,820	(41%)	\$401	(41%)
Confined to floor of origin	6,900	(6%)	170	(17%)	580	(13%)	\$303	(13%)
Confined to building of origin	15,400	(13%)	470	(47%)	1,080	(24%)	\$1,256	(24%)
Extended beyond building of origin	1,700	(1%)	80	(8%)	180	(4%)	\$207	(4%)
Total	119,900	(100%)	1,000	(100%)	4,440	(100%)	\$2,253	(100%)

Note: Sums may not equal totals due to rounding errors. Unknowns have been allocated proportionally.

Source: NFIRS and NFPA's fire experience survey.

Table 9.
Home Structure Fires by Effectiveness of Operating Smoke Alarms
2012-2016 Annual Averages

Effectiveness	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Alerted occupants and occupants responded	153,600	(81%)	710	(66%)	5,430	(86%)	\$2,909	(86%)
Non-confined fire	61,600	(33%)	710	(66%)	4,570	(72%)	\$2,888	(72%)
Confined fire	92,000	(49%)	0	(0%)	860	(14%)	\$21	(14%)
No occupants	21,300	(11%)	0	(0%)	140	(2%)	\$795	(2%)
Non-confined fire	12,000	(6%)	0	(0%)	140	(2%)	\$792	(2%)
Confined fire	9,300	(5%)	0	(0%)	10	(0%)	\$3	(0%)
Alerted occupants but occupants failed to respond	9,700	(5%)	260	(24%)	470	(7%)	\$132	(7%)
Non-confined fire	2,700	(1%)	260	(24%)	370	(6%)	\$131	(6%)
Confined fire	7,000	(4%)	0	(0%)	100	(2%)	\$1	(2%)
Failed to alert occupants	4,400	(2%)	110	(10%)	290	(5%)	\$183	(5%)
Non-confined fire	2,100	(1%)	110	(10%)	220	(3%)	\$182	(3%)
Confined fire	2,200	(1%)	0	(0%)	70	(1%)	\$0	(1%)
Total	189,000	(100%)	1,080	(100%)	6,330	(100%)	\$4,020	(100%)
Non-confined fire	78,500	(42%)	1,080	(100%)	5,290	(84%)	\$3,994	(84%)
Confined fire	110,500	(58%)	0	(0%)	1,040	(16%)	\$26	(16%)

Note: Sums may not equal totals due to rounding errors. Unknowns have been allocated proportionally.

Source: NFIRS and NFPA's fire experience survey.

Table 10.
Findings from 2010 Harris Poll® National Quorum:
National Fire Protection Association – Smoke Alarms

	Percentage of Homes with Smoke Alarms	All Homes
Homes with at least one smoke alarm	(100%)	(96%)
In hallways	(80%)	(77%)
In all bedrooms	(43%)	(41%)
In most bedrooms	(14%)	(14%)
Basement	(29%)	(28%)
Kitchen	(52%)	(50%)
Garage	(15%)	(14%)
Interconnected smoke alarms	(25%)	(24%)
Test their alarms at least once a year	(87%)	(83%)
Alarms tested at least once a month	(21%)	(20%)
Smoke alarms more than 10 years old	(12%)	(12%)
When householder is at least 55	(17%)	(16%)

Source: Harris Poll® National Quorum: National Fire Protection Association – Smoke Alarms. September 2010. Unknown and refused responses were allocated proportionally among known data.

Table 11.
Occupied Housing Units with Smoke Alarms: Findings from 2011 American Housing Survey
Based on Self-Reports

Characteristic	SMOKE ALARM POWERED BY				Batteries Replaced in Last Six Months*
	All Homes	Electricity and Battery	Electricity Only	Battery Only	
Total	95%	32%	7%	61%	76%
Owner-occupied	95%	37%	6%	57%	75%
Renter-occupied	94%	24%	8%	69%	77%
Newer home - four years old or less	98%	63%	8%	30%	72%
Manufactured home	92%	36%	11%	53%	74%
Black householder	94%	24%	6%	69%	77%
Hispanic householder	90%	22%	7%	71%	78%
Householder at least 65 years old	93%	29%	9%	62%	75%
Household below poverty line	91%	23%	7%	70%	78%
Northeast	96%	30%	7%	63%	80%
Midwest	96%	30%	6%	64%	77%
South	93%	35%	7%	58%	75%
West	95%	33%	7%	56%	71%

* Based on smoke alarms powered by batteries or electricity and batteries only.

Note: The survey reported these data as “working smoke alarms.” However, it appears the survey did not ask separate questions about smoke alarm presence and operability and did not verify that the smoke alarms were working. For that reason, the AHS results presented here do not mention whether they are working. Sums of valid reported data were used for calculating percentages. Table entries of “not reported” were excluded from the calculations.

Source: U.S. Census Bureau, Current Housing Reports, Series H150/11, *American Housing Survey for the United States, 2011*, U.S. Government Printing Office, Washington, DC. 20401, 2013. Table S-01-AO.

Table 12.
Smoke Alarm Key Findings from CPSC's 2004-2005 Residential Fire Survey

A. Smoke Alarm Coverage in Fire and Non-Fire Households

Based on weighted responses from 916 fire households and 2,161 non-fire households

Alarm Coverage	Fire Household	Non-Fire Household
Smoke alarm present	93%	97%
On all floors	82%	84%
In all bedrooms	22%	31%
Interconnected	13%	19%
Connected to home security service	8%	14%

Sections B, C and D are based on weighted responses from 270 households having low severity fires within the past 14 days or high severity fires within the past 21 days. In Section B, indentation indicates a sequence – In 86% of the fires, someone was home and at least one alarm was present.

B. Smoke Alarm Performance and Effectiveness

Condition	Percent of All Fires
Fires with someone home	96%
At least one alarm present	86%
<i>Smoke alarm sounded</i>	30%
Alerted people	12%
Provided only alert	10%
<i>Alarm did not sound</i>	55%
Not enough smoke	49%

C. Smoke Alarm Performance and Effectiveness by Extent of Coverage

Alarm Coverage	Sounded	Alerted Occupants	Only Alert
On all floors	37%	15%	12%
Not on all floors	4%	2%	2%
In all bedrooms	36%	16%	13%
Not in all bedrooms	28%	10%	9%
Interconnected	53%	26%	26%
Not interconnected	27%	10%	8%

D. Smoke Alarm Performance and Effectiveness by Cause of Fire

Cause of Fire	Sounded	Alerted Occupants	Only Alert
Stove fires	41%	16%	13%
Other cooking	30%	16%	11%
Cigarette/match	28%	8%	8%
Candle	20%	7%	6%
Lighting/wiring	6%	5%	5%
Heating/cooling	18%	4%	1%

Source: Michael A. Greene and Craig Andres. [2004-2005 National Sample Survey of Unreported Residential Fires](#). U.S. CPSC, July 2009.

Table 13.
One- and Two-Family Home Fires by Smoke Alarm Performance
2012-2016 Annual Averages

Smoke Alarm Status	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Total	246,200	(100%)	2,160	(100%)	7,670	(100%)	\$5,220	(100%)
Non-confined fire	150,600	(61%)	2,160	(100%)	6,940	(90%)	\$5,196	(90%)
Confined fire	95,600	(39%)	0	(0%)	740	(10%)	\$24	(10%)
Smoke Alarm Present	165,000	(67%)	1,180	(55%)	5,070	(66%)	\$3,644	(66%)
Non-confined fire	85,500	(35%)	1,180	(55%)	4,450	(58%)	\$3,624	(58%)
Confined fire	79,600	(32%)	0	(0%)	620	(8%)	\$20	(8%)
<i>Fire too small to operate alarm</i>	35,600	(14%)	20	(1%)	360	(5%)	\$120	(5%)
Non-confined fire	13,700	(6%)	20	(1%)	250	(3%)	\$117	(3%)
Confined fire	21,900	(9%)	0	(0%)	110	(1%)	\$3	(1%)
<i>Smoke alarm present and fire large enough to operate alarm</i>	129,500	(53%)	1,160	(54%)	4,710	(61%)	\$3,524	(61%)
Non-confined fire	71,800	(29%)	1,160	(54%)	4,200	(55%)	\$3,507	(55%)
Confined fire	57,700	(23%)	0	(0%)	510	(7%)	\$17	(7%)
<i>Smoke alarm operated</i>	111,000	(45%)	790	(37%)	3,710	(48%)	\$3,042	(48%)
Non-confined fire	59,100	(24%)	790	(37%)	3,250	(42%)	\$3,027	(42%)
Confined fire	51,900	(21%)	0	(0%)	460	(6%)	\$15	(6%)
<i>Smoke alarm present but did not operate</i>	18,400	(7%)	370	(17%)	1,000	(13%)	\$482	(13%)
Non-confined fire	12,700	(5%)	370	(17%)	950	(12%)	\$480	(12%)
Confined fire	5,800	(2%)	0	(0%)	50	(1%)	\$2	(1%)
No Smoke Alarm	81,200	(33%)	980	(45%)	2,600	(34%)	\$1,576	(34%)
Non-confined fire	65,200	(26%)	980	(45%)	2,490	(32%)	\$1,572	(32%)
Confined fire	16,000	(7%)	0	(0%)	120	(2%)	\$4	(2%)
Operating alarms as share of those present in fires considered large enough to activate	111,000	(86%)	790	(68%)	3,710	(79%)	\$3,042	(79%)
Fires with no smoke alarms or none that operated in fires large enough to activate	99,600	(40%)	1,350	(62%)	3,610	(47%)	\$2,058	(47%)

Note: Sums may not equal totals due to rounding errors. Confined and non-confined fires were analyzed separately. Smoke alarm presence or absence was reported in 64% of non-confined fires and 4% of confined fires. Fires with unknown or missing data were allocated proportionally among fires with missing data.

Source: NFIRS 5.0 and NFPA survey.

Table 14.
One- and Two-Family Home Structure Fires with Detection Equipment Present
by Type of Detection
2012-2016 Annual Averages

Type of Detection Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Smoke	151,600	(92%)	1,130	(96%)	4,800	(95%)	\$3,326	151,600
Non-confined fire	79,600	(48%)	1,130	(96%)	4,220	(83%)	\$3,308	79,600
Confined fire	72,000	(44%)	0	(0%)	580	(11%)	\$18	72,000
Combination smoke and heat	9,600	(6%)	20	(2%)	170	(3%)	\$217	9,600
Non-confined fire	4,200	(3%)	20	(2%)	140	(3%)	\$216	4,200
Confined fire	5,300	(3%)	0	(0%)	30	(1%)	\$1	5,300
More than one type present	1,900	(1%)	10	(1%)	60	(1%)	\$57	1,900
Non-confined fire	900	(1%)	10	(1%)	50	(1%)	\$56	900
Confined fire	1,100	(1%)	0	(0%)	10	(0%)	\$0	1,100
Unclassified detection equipment	1,300	(1%)	10	(1%)	20	(0%)	\$27	1,300
Non-confined fire	500	(0%)	10	(1%)	20	(0%)	\$27	500
Confined fire	800	(0%)	0	(0%)	0	(0%)	\$0	800
Heat	600	(0%)	10	(1%)	20	(0%)	\$13	600
Non-confined fire	300	(0%)	10	(1%)	20	(0%)	\$13	300
Confined fire	300	(0%)	0	(0%)	10	(0%)	\$0	300
Sprinklers with water flow detection	200	(0%)	0	(0%)	0	(0%)	\$4	200
Non-confined fire	100	(0%)	0	(0%)	0	(0%)	\$3	100
Confined fire	100	(0%)	0	(0%)	0	(0%)	\$0	100
Total	165,000	(100%)	1,180	(100%)	5,070	(100%)	\$3,644	165,000
Non-confined fire	85,500	(52%)	1,180	(100%)	4,450	(88%)	\$3,624	85,500
Confined fire	79,600	(48%)	0	(0%)	620	(12%)	\$20	79,600

Note: Sums may not equal totals due to rounding errors. Entries of zero may actually be zero or may have rounded to zero.

Source: NFIRS 5.0 and NFPA survey.

Table 15.
One- and Two-Family Home Structure Fires in which Smoke Alarms Were Present
by Smoke Alarm Power Source
2012-2016 Annual Averages

Power Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Battery only	94,300	(57%)	870	(74%)	3,310	(65%)	\$1,909	(52%)
Non-confined fire	53,200	(32%)	870	(74%)	2,980	(59%)	\$1,898	(52%)
Confined fire	41,000	(25%)	0	(0%)	320	(6%)	\$11	(0%)
Hardwired with battery backup	51,300	(31%)	200	(17%)	1,270	(25%)	\$1,278	(35%)
Non-confined fire	23,800	(14%)	200	(17%)	1,050	(21%)	\$1,271	(35%)
Confined fire	27,500	(17%)	0	(0%)	210	(4%)	\$7	(0%)
Hardwired only	12,000	(7%)	60	(5%)	300	(6%)	\$249	(7%)
Non-confined fire	5,000	(3%)	60	(5%)	250	(5%)	\$248	(7%)
Confined fire	6,900	(4%)	0	(0%)	50	(1%)	\$2	(0%)
Multiple detectors and power supplies	2,800	(2%)	30	(2%)	90	(2%)	\$90	(2%)
Non-confined fire	1,300	(1%)	30	(2%)	80	(1%)	\$90	(2%)
Confined fire	1,500	(1%)	0	(0%)	10	(0%)	\$0	(0%)
Plug in with battery backup	2,600	(2%)	10	(1%)	60	(1%)	\$72	(2%)
Non-confined fire	1,300	(1%)	10	(1%)	50	(1%)	\$71	(2%)
Confined fire	1,300	(1%)	0	(0%)	10	(0%)	\$0	(0%)
Unclassified power source	1,400	(1%)	0	(0%)	30	(1%)	\$30	(1%)
Non-confined fire	500	(0%)	0	(0%)	20	(0%)	\$30	(1%)
Confined fire	900	(1%)	0	(0%)	20	(0%)	\$0	(0%)
Plug in only	500	(0%)	0	(0%)	10	(0%)	\$12	(0%)
Non-confined fire	200	(0%)	0	(0%)	10	(0%)	\$12	(0%)
Confined fire	300	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Mechanical	100	(0%)	0	(0%)	10	(0%)	\$3	(0%)
Non-confined fire	100	(0%)	0	(0%)	10	(0%)	\$3	(0%)
Confined fire	0	(0%)	0	(0%)	0	(0%)	\$0	(0%)
Total	165,000	(100%)	1,180	(100%)	5,070	(100%)	\$3,644	(100%)
Non-confined fire	85,500	(52%)	1,180	(100%)	4,450	(88%)	\$3,624	(99%)
Confined fire	79,600	(48%)	0	(0%)	620	(12%)	\$20	(1%)

Note: Sums may not equal totals due to rounding errors. Entries of zero may actually be zero or may round to zero.

Source: NFIRS 5.0 and NFPA survey.

Table 16.
Apartment Fires by Smoke Alarm Performance
2012-2016 Annual Averages

Smoke Alarm Status	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Total	109,200	(100%)	400	(100%)	3,990	(100%)	\$1,263	(100%)
Non-confined fire	32,700	(30%)	400	(100%)	3,230	(81%)	\$1,249	(81%)
Confined fire	76,500	(70%)	0	(0%)	760	(19%)	\$14	(19%)
Smoke Alarm Present	96,300	(88%)	330	(82%)	3,170	(79%)	\$1,043	(79%)
Non-confined fire	25,100	(23%)	330	(82%)	2,460	(62%)	\$1,031	(62%)
Confined fire	71,200	(65%)	0	(0%)	710	(18%)	\$13	(18%)
Fire too small to operate alarm	12,100	(11%)	10	(1%)	170	(4%)	\$25	(4%)
Non-confined fire	3,700	(3%)	10	(1%)	110	(3%)	\$24	(3%)
Confined fire	8,500	(8%)	0	(0%)	70	(2%)	\$1	(2%)
<i>Smoke alarm present and fire large enough to operate alarm</i>	84,100	(77%)	320	(81%)	3,000	(75%)	\$1,019	(75%)
Non-confined fire	21,400	(20%)	320	(81%)	2,350	(59%)	\$1,007	(59%)
Confined fire	62,700	(57%)	0	(0%)	640	(16%)	\$12	(16%)
Smoke alarm operated	76,900	(70%)	250	(63%)	2,550	(64%)	\$932	(64%)
Non-confined fire	18,300	(17%)	250	(63%)	1,980	(50%)	\$921	(50%)
Confined fire	58,600	(54%)	0	(0%)	570	(14%)	\$11	(14%)
Smoke alarm present but did not operate	7,200	(7%)	70	(18%)	440	(11%)	\$87	(11%)
Non-confined fire	3,100	(3%)	70	(18%)	370	(9%)	\$86	(9%)
Confined fire	4,200	(4%)	0	(0%)	70	(2%)	\$1	(2%)
No Smoke Alarm	12,900	(12%)	70	(18%)	820	(21%)	\$219	(21%)
Non-confined fire	7,700	(7%)	70	(18%)	770	(19%)	\$219	(19%)
Confined fire	5,300	(5%)	0	(0%)	50	(1%)	\$1	(1%)
Operating alarms as share of those present in fires large enough to activate	76,900	(91%)	250	(78%)	2,550	(85%)	\$932	(85%)
Fires with no smoke alarms or none that operated in fires large enough to activate	20,200	(18%)	140	(35%)	1,270	(32%)	\$306	(32%)

Note: Sums may not equal totals due to rounding errors. Confined and non-confined fires were analyzed separately. Smoke alarm presence or absence was reported in 79% of non-confined fires and 4% of confined fires. Fires with unknown or missing data were allocated proportionally among fires with missing data.

Source: NFIRS 5.0 and NFPA survey.

Table 17.
Apartment Fires with Detection Equipment Present
by Type of Detection
2012-2016 Annual Averages

Type of Detection Equipment	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Smoke	79,800	(83%)	290	(90%)	2,780	(87%)	\$861	(87%)
Non-confined fire	21,800	(23%)	290	(90%)	2,190	(89%)	\$851	(89%)
Confined fire	58,000	(60%)	0	(0%)	590	(83%)	\$9	(83%)
Combination smoke and heat	8,500	(9%)	10	(4%)	150	(5%)	\$96	(5%)
Non-confined fire	1,300	(1%)	10	(4%)	110	(4%)	\$95	(4%)
Confined fire	7,200	(7%)	0	(0%)	50	(6%)	\$1	(6%)
More than one type present	4,900	(5%)	20	(5%)	160	(5%)	\$64	(5%)
Non-confined fire	1,100	(1%)	20	(5%)	120	(5%)	\$63	(5%)
Confined fire	3,800	(4%)	0	(0%)	50	(7%)	\$1	(7%)
Sprinklers with water flow detection	1,500	(2%)	0	(0%)	30	(1%)	\$12	(1%)
Non-confined fire	500	(0%)	0	(0%)	20	(1%)	\$11	(1%)
Confined fire	1,000	(1%)	0	(0%)	10	(2%)	\$1	(2%)
Unclassified detection equipment	900	(1%)	0	(0%)	20	(1%)	\$6	(1%)
Non-confined fire	200	(0%)	0	(0%)	20	(1%)	\$6	(1%)
Confined fire	700	(1%)	0	(0%)	10	(1%)	\$0	(1%)
Heat	700	(1%)	0	(1%)	20	(1%)	\$5	(1%)
Non-confined fire	200	(0%)	0	(1%)	10	(1%)	\$5	(1%)
Confined fire	500	(1%)	0	(0%)	10	(1%)	\$0	(1%)
Total	96,300	(100%)	330	(100%)	3,170	(100%)	\$1,043	(100%)
Non-confined fire	25,100	(26%)	330	(100%)	2,460	(78%)	\$1,031	(78%)
Confined fire	71,200	(74%)	0	(0%)	710	(22%)	\$13	(22%)

Note: Sums may not equal totals due to rounding errors. Entries of zero may actually be zero or may have rounded to zero.

Source: NFIRS 5.0 and NFPA survey.

Table 18.
Apartment Structure Fires in which Smoke Alarms Were Present
by Smoke Alarm Power Source
2012-2016 Annual Averages

Power Source	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Hardwired with battery backup	40,600	(42%)	100	(30%)	1,110	(35%)	\$456	40,600
Non-confined fire	9,300	(10%)	100	(30%)	830	(34%)	\$450	9,300
Confined fire	31,300	(32%)	0	(0%)	290	(40%)	\$6	31,300
Battery only	26,500	(27%)	140	(43%)	1,200	(38%)	\$367	26,500
Non-confined fire	9,800	(10%)	140	(43%)	1,020	(41%)	\$364	9,800
Confined fire	16,700	(17%)	0	(0%)	180	(26%)	\$3	16,700
Hardwired only	20,600	(21%)	60	(17%)	570	(18%)	\$130	20,600
Non-confined fire	4,100	(4%)	60	(17%)	430	(17%)	\$128	4,100
Confined fire	16,500	(17%)	0	(0%)	150	(20%)	\$3	16,500
Multiple detectors and power supplies	5,600	(6%)	30	(8%)	210	(7%)	\$65	5,600
Non-confined fire	1,100	(1%)	30	(8%)	140	(6%)	\$65	1,100
Confined fire	4,500	(5%)	0	(0%)	70	(10%)	\$1	4,500
Plug-in with battery backup	1,400	(1%)	0	(1%)	40	(1%)	\$12	1,400
Non-confined fire	400	(0%)	0	(1%)	30	(1%)	\$12	400
Confined fire	1,000	(1%)	0	(0%)	10	(1%)	\$0	1,000
Unclassified power source	1,000	(1%)	0	(1%)	30	(1%)	\$8	1,000
Non-confined fire	200	(0%)	0	(1%)	20	(1%)	\$8	200
Confined fire	800	(1%)	0	(0%)	10	(2%)	\$0	800
Mechanical	300	(0%)	0	(0%)	10	(0%)	\$2	300
Non-confined fire	100	(0%)	0	(0%)	10	(0%)	\$2	100
Confined fire	200	(0%)	0	(0%)	0	(0%)	\$0	200
Plug-in only	300	(0%)	0	(0%)	10	(0%)	\$2	300
Non-confined fire	100	(0%)	0	(0%)	0	(0%)	\$2	100
Confined fire	200	(0%)	0	(0%)	0	(0%)	\$0	200
Total	96,300	(100%)	330	(100%)	3,170	(100%)	\$1,043	96,300
Non-confined fire	25,100	(26%)	330	(100%)	2,460	(78%)	\$1,031	25,100
Confined fire	71,200	(74%)	0	(0%)	710	(22%)	\$13	71,200

Note: Sums may not equal totals due to rounding errors. Entries of zero may actually be zero or may round to zero.

Source: NFIRS 5.0 and NFPA survey.

Table 19.
Smoke Alarm Presence and Operation in Home Structure Fires Resulting in Death
By Victim's General Location at Time of Fatal Injury
2012-2016 Annual Averages

Victim's Location	Present and Operated		Present but Did Not Operate		None Present	
In area of origin	620	(58%)	220	(51%)	530	(52%)
In building, but not in area of origin	450	(42%)	210	(48%)	490	(48%)
Outside of building	10	(1%)	0	(1%)	0	(0%)
Total	1,080	(100%)	440	(100%)	1,020	(100%)

Note: Fire deaths resulting from fires too small to activate the smoke alarm are not included in these tables. Sums may not equal totals due to rounding errors. Entries of zero may actually be zero or may have rounded to zero.

Source: NFIRS 5.0 and NFPA survey.

Table 20.
Smoke Alarm Presence and Operation in Home Structure Fires Resulting in Death
By Victim's Location at Time of Fire Incident and Involvement in Ignition
2012-2016 Annual Averages

Victim's Location and Involvement	Present and Operated		Present but Did Not Operate		None Present	
In area of origin and involved	440	(41%)	140	(33%)	320	(32%)
In area of origin and not involved	160	(15%)	70	(17%)	180	(17%)
<i>Subtotal – In area of origin</i>	600	(55%)	220	(50%)	500	(49%)
Not in area of origin and not involved	300	(28%)	90	(21%)	220	(21%)
Not in area of origin but involved	180	(16%)	130	(30%)	280	(27%)
<i>Subtotal – Not in area of origin</i>	480	(44%)	220	(50%)	500	(49%)
Unclassified	0	(0%)	0	(0%)	20	(2%)
Total	1,080	(100%)	440	(100%)	1,020	(100%)

Note: Fire deaths resulting from fires too small to activate the smoke alarm are not included in these tables. Sums may not equal totals due to rounding errors. Entries of zero may actually be zero or may have rounded to zero.

Source: NFIRS 5.0 and NFPA survey.

Table 21.
Smoke Alarm Presence and Operation in Home Structure Fires Resulting in Death
by Extent of Flame Damage
2009-2013 Annual Averages

Extent of Flame Damage	Present and Operated		Present but Did Not Operate		None Present	
Confined to object of origin	50	(4%)	20	(4%)	40	(4%)
Confined to room of origin	310	(28%)	120	(27%)	150	(14%)
Confined to floor of origin	170	(16%)	60	(15%)	130	(13%)
Confined to building of origin	470	(43%)	210	(49%)	570	(56%)
Extended beyond building of origin	90	(8%)	30	(6%)	130	(12%)
Total	1,080	(100%)	440	(100%)	1,020	(100%)

Table 22.
Smoke Alarm Presence and Operation in Home Structure Fires Resulting in Death
by Victim's Activity at Time of Fatal Injury
2012-2016 Annual Averages

Activity	Present and Operated		Present but Did Not Operate		None Present	
Escaping	370	(34%)	160	(36%)	420	(41%)
Sleeping	320	(29%)	140	(32%)	330	(32%)
Unable to act	130	(12%)	60	(14%)	110	(11%)
Irrational act	70	(7%)	40	(8%)	40	(4%)
Unclassified activity	60	(5%)	10	(3%)	40	(4%)
Fire control	60	(5%)	10	(2%)	10	(1%)
Rescue attempt	40	(4%)	10	(2%)	30	(3%)
Returning to vicinity of fire before control	30	(3%)	10	(2%)	30	(3%)
Returning to vicinity of fire after control	0	(0%)	0	(1%)	10	(1%)
Total	1,080	(100%)	440	(100%)	1,020	(100%)

Note: Fire deaths resulting from fires too small to activate the smoke alarm are not included in these tables. Sums may not equal totals due to rounding errors. Entries of zero may actually be zero or may have rounded to zero.

Source: NFIRS 5.0 and NFPA survey.

Table 23.
Smoke Alarm Presence and Operation in Home Structure Fires Resulting in Death
by Human Factor Contributing to Injury
2012-2016 Annual Averages

Human Factor	Present and Operated		Present but Did Not Operate		None Present	
Asleep	270	(25%)	160	(38%)	270	(27%)
Physically disabled	210	(20%)	60	(14%)	120	(12%)
Possibly impaired by alcohol	130	(12%)	50	(11%)	110	(11%)
Possibly impaired by other drug or chemical	60	(5%)	20	(6%)	40	(4%)
Possibly mentally disabled	60	(5%)	30	(6%)	40	(4%)
Unattended or unsupervised person	50	(5%)	20	(5%)	40	(4%)
Unconscious	40	(4%)	30	(8%)	50	(5%)
Physically restrained	0	(0%)	0	(0%)	0	(0%)
None	420	(39%)	130	(30%)	460	(45%)
Total	1,080	(100%)	440	(100%)	1,020	(100%)
Total factors*	1,250	(115%)	510	(117%)	1,130	(111%)

* Multiple factors are allowed, meaning that the totals will exceed the sums.

Note: Fire deaths resulting from fires too small to activate the smoke alarm are not included in these tables. Sums may not equal totals due to rounding errors. Entries of zero may actually be zero or may have rounded to zero.

Source: NFIRS 5.0 and NFPA survey.

Table 24.
Smoke Alarm Presence and Operation in Home Structure Fires Resulting in Death
by Victim's Age
2012-2016 Annual Averages

Age Group	Present and Operated		Present but Did Not Operate		None Present	
Under 5	60	(5%)	40	(10%)	70	(7%)
5-9	50	(4%)	20	(4%)	40	(4%)
10-14	20	(2%)	10	(3%)	30	(2%)
15-19	30	(2%)	10	(2%)	20	(2%)
20-24	30	(2%)	10	(2%)	30	(3%)
25-34	80	(7%)	30	(6%)	90	(8%)
35-44	80	(7%)	30	(8%)	90	(9%)
45-54	160	(15%)	60	(14%)	150	(15%)
55-64	210	(19%)	90	(21%)	200	(20%)
65-74	170	(16%)	70	(16%)	150	(15%)
75-84	140	(13%)	40	(9%)	100	(10%)
85 and over	60	(6%)	20	(5%)	50	(5%)
Total	1,080	(100%)	440	(100%)	1,020	(100%)
Under 15	130	(12%)	70	(16%)	140	(14%)
55 and over	580	(54%)	220	(51%)	500	(50%)
65 and over	370	(34%)	130	(31%)	300	(30%)
75 and over	200	(18%)	70	(15%)	150	(15%)

Note: Fire deaths resulting from fires too small to activate the smoke alarm are not included in these tables. Sums may not equal totals due to rounding errors. Entries of zero may actually be zero or may have rounded to zero.

Source: NFIRS 5.0 and NFPA survey.

Table 25.
Smoke Alarm Presence and Operation in Home Structure Fires Resulting in Non-Fatal Injury
by Victim's Activity at Time of Injury
2012-2016 Annual Averages

Activity	Present and Operated		Present but Did Not Operate		None Present	
Fire control	2,340	(37%)	450	(31%)	1,030	(30%)
Escaping	1,710	(27%)	380	(26%)	920	(27%)
Sleeping	640	(10%)	230	(16%)	440	(13%)
Returning to vicinity of fire before control	450	(7%)	110	(8%)	230	(7%)
Rescue attempt	430	(7%)	120	(8%)	280	(8%)
Unclassified activity	400	(6%)	80	(5%)	250	(8%)
Unable to act	170	(3%)	30	(2%)	100	(3%)
Irrational act	160	(3%)	40	(3%)	120	(3%)
Returning to vicinity of fire after control	30	(0%)	10	(1%)	10	(0%)
Total	6,330	(100%)	1,440	(100%)	3,370	(100%)

Note: Fire deaths or injuries resulting from fires too small to activate the smoke alarm are not included in these tables. Sums may not equal totals due to rounding errors.

Source: NFIRS 5.0 and NFPA survey.

Acknowledgements

The National Fire Protection Association thanks all the fire departments and state fire authorities who participate in the National Fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

To learn more about research at NFPA visit www.nfpa.org/research.
 E-mail: research@nfpa.org.

NFPA No. USS04ST