

# THE MASSACHUSETTS FIRE PROBLEM

Massachusetts Fire Incident Reporting System • 2019 Annual Report



Charles D. Baker, Governor

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Department of Fire Services

Division of Fire Safety • Fire Data and Public Education Unit

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## ABOUT THE COVERS

The drawings on the front and back covers of this report are the first- and second-place winners of the 38<sup>th</sup> annual statewide **Arson Watch Reward Program Poster Contest**, held in 2020. The contest is sponsored by the Massachusetts Property Insurance Underwriting Association (MPIUA) on behalf of all property and casualty insurance companies of Massachusetts. The poster theme was **Fire Prevention – Everyone/Everyday**.

A county-wide poster contest was held for all students in grade 6-8. Eight out of 14 counties participated and 429 posters were submitted. Posters were judged by an impartial panel. First- and second-place county winners were chosen at MPIUA. All first-place county winners were entered into the Massachusetts statewide contest.

The front cover drawing is by Emily Quinn, a student at the Plymouth South Middle School in Plymouth, Massachusetts. Emily's poster was the first-place winner in the Plymouth County poster contest, and was automatically entered into the statewide contest, along with seven other county winners, where it was chosen as the first-place state winner.

The back cover drawing is by Katie Martini, a student at the Beckwith Middle School in Rehoboth, Massachusetts. Katie's poster was the first-place winner in the Bristol County poster contest and was also automatically entered into the statewide contest where it was chosen as the second-place state winner.

MPIUA generously sponsored the printing of the *2019 Annual Report of the Massachusetts Fire Incident Reporting System (MFIRS)* and provided the cover posters. MPIUA has provided this sponsorship of the report and the poster contest for 38 years.

## DEPARTMENT OF FIRE SERVICES MISSION

The mission of the Department of Fire Services is, through coordinated training, education, prevention, investigation, and emergency response, to provide the citizens of Massachusetts with the ability to create safer communities; to assist and support the fire service community in the protection of life and property; to promote and enhance firefighter safety; and to provide a fire service leadership presence in the Executive Office of Public Safety and Security in order to direct policy and legislation on all fire related matters.

## EXECUTIVE SUMMARY

This is the *2019 Annual Report of the Massachusetts Fire Incident Reporting System* (MFIRS), which summarizes the Massachusetts fire experience for 2019. It is based on the 25,176 individual fire reports submitted by members of 366 fire departments and districts in compliance with the National Fire Incident Reporting System. It is this effort that makes it possible to look at the total fire experience, to identify our fire problems, and to develop strategies to address these issues. One of the goals of the Division of Fire Safety is to provide the fire service and the public with accurate and complete information about the fire experience in Massachusetts.

## FIRES BY INCIDENT TYPE

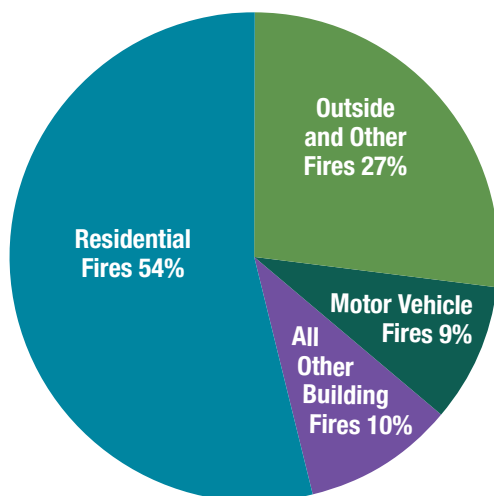
### 16,148 Structure Fires, 2,355 Vehicle Fires, 6,673 Outside and Other Fires in 2019

There were 25,176 fire and explosion incidents reported by fire departments to the Massachusetts Fire Incident Reporting System (MFIRS) in 2019. The 16,148 structure fires, 2,355 motor vehicle fires, and 6,673 outside and other fires caused 42 civilian deaths, two fire service deaths, 248 civilian injuries, 506 fire service injuries, and an estimated loss of \$248.8 million in property damages. See Figure 1.

Civilian deaths decreased by three, or 5%, from the 45 fire deaths in 2018.

Figure 1

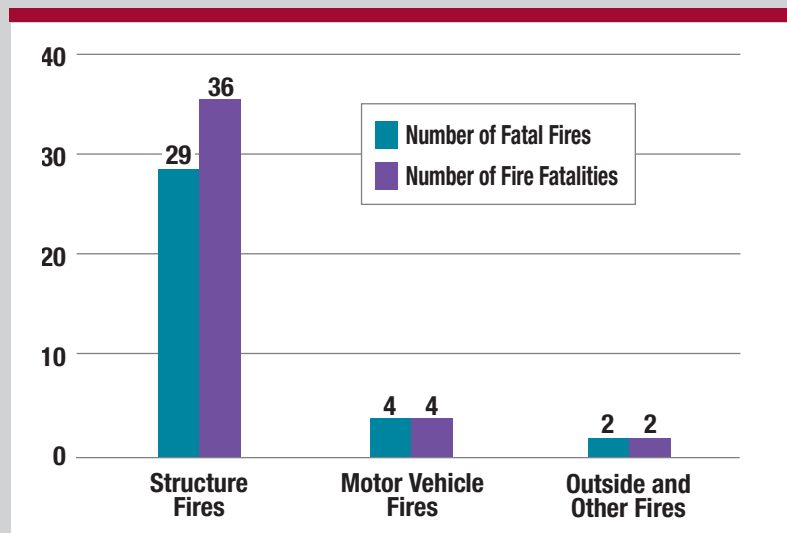
### FIRES BY INCIDENT TYPE



Twenty-one fire victims (50%) died between 10 p.m. and 7 a.m. in the place people feel safest – their own homes.

Figure 2

## FATAL FIRES AND FIRE DEATHS



## CIVILIAN FIRE DEATHS

### 42 Civilians Died in 35 Massachusetts Fires

Forty-two civilians died in 35 Massachusetts fires and one civilian died in one explosion in 2019. Thirty-six of these deaths happened in residential structures. Eighty-one percent of these fire deaths happened where people feel safest, in their homes. Four deaths occurred in four motor vehicle fires, and two people were killed in two outside fires. See Figure 2.

### Half of People Died in Fires at Night

Fifty percent of civilians died at night, at home, between 10 p.m. and 7 a.m. Many of these fire victims did not have working smoke alarms or residential sprinklers. See Figure 3.

Figure 3

## CIVILIAN FIRE DEATHS BY HOUR

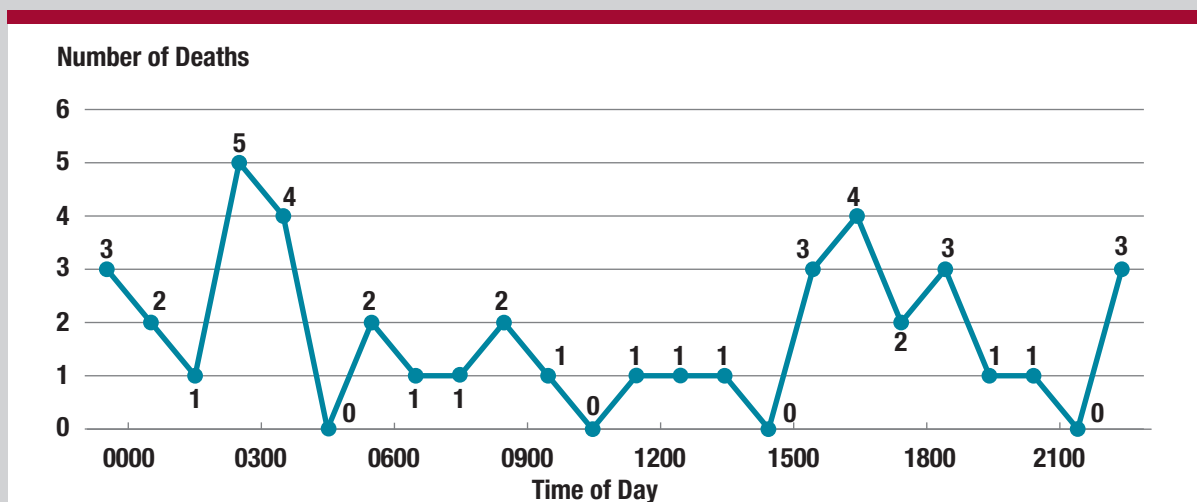
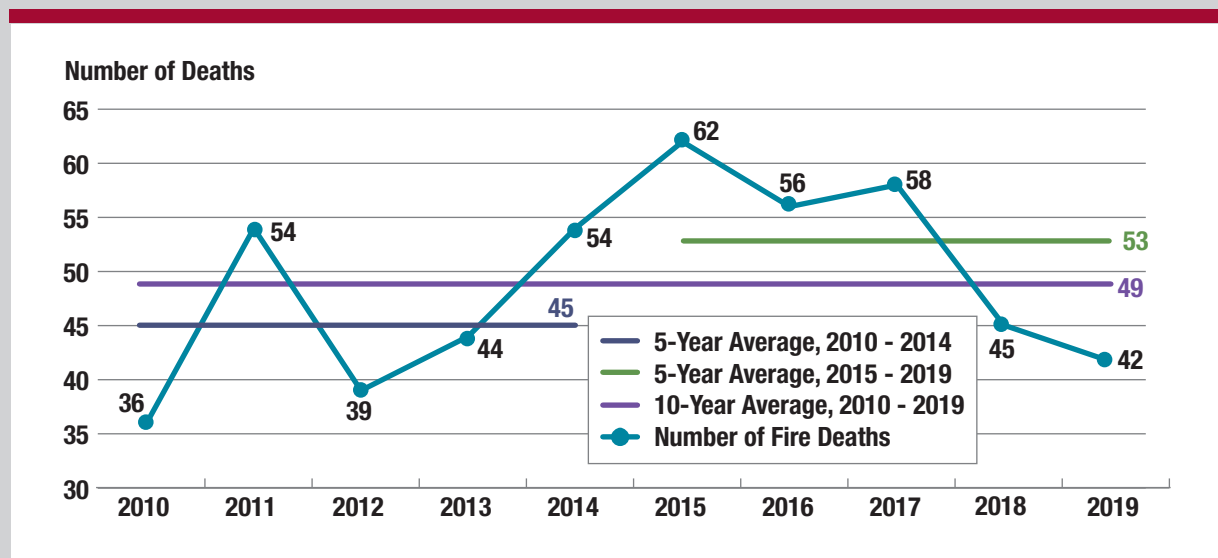


Figure 4

## CIVILIAN FIRE DEATHS BY YEAR



### 2019 is Below the 5- and 10-Year Averages

The 42 fire deaths in 2019 are 20% below the five-year average and 13% below the 10-year average number of fire deaths. See Figure 4.

### 28 Men, 12 Women and 2 Children under 18 Died from Fires in 2019

Of the 42 fire deaths in 2019, 28 (67%) were men, 12 (28%) were women and two (5%) were children under 18. See Figure 5.

### 48% of Fire Deaths in 2019 Were People over the Age of 65

Twenty civilian fire victims (48%) were over 65 years of age. This included 10 elderly men and 10 elderly women. Two (5%) of the victims were under 18 years old. Twenty (48%) were adults between 18 and 65 years of age. See Figure 6.

Figure 5

## CIVILIAN FIRE DEATHS BY GENDER

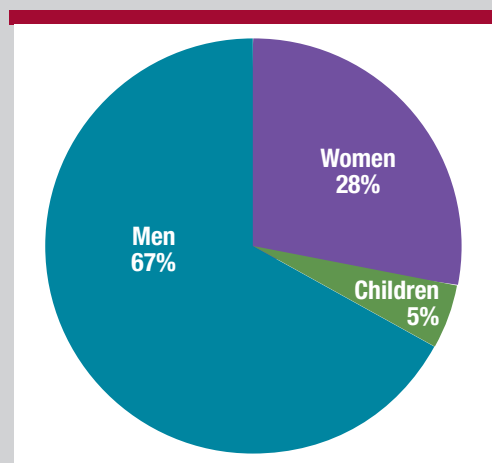


Figure 6

## CIVILIAN FIRE DEATHS BY AGE

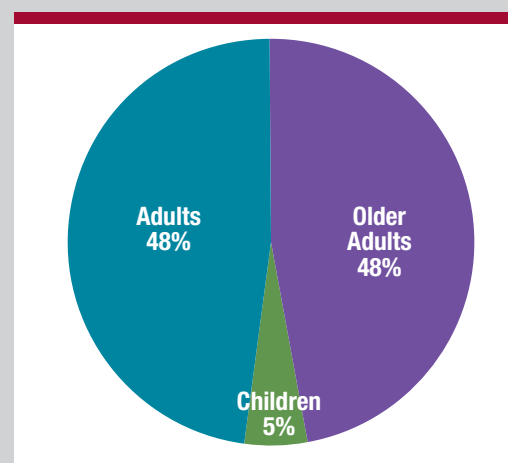


Figure 7

## FIRE DEATHS BY AGE COMPARED TO PERCENT OF POPULATION

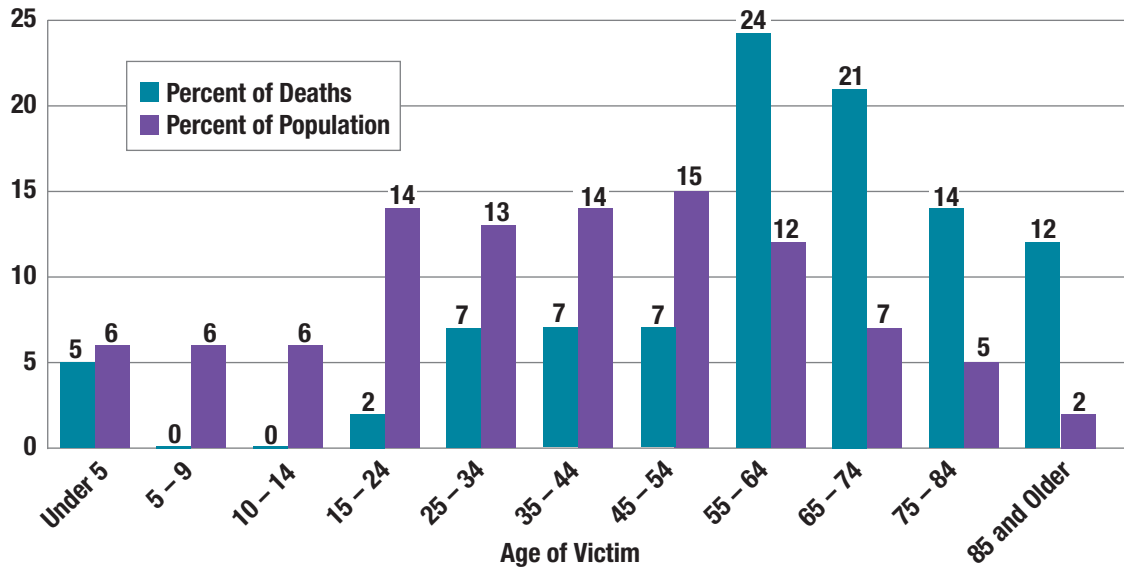


Figure 8

## CHILD FIRE DEATHS BY YEAR

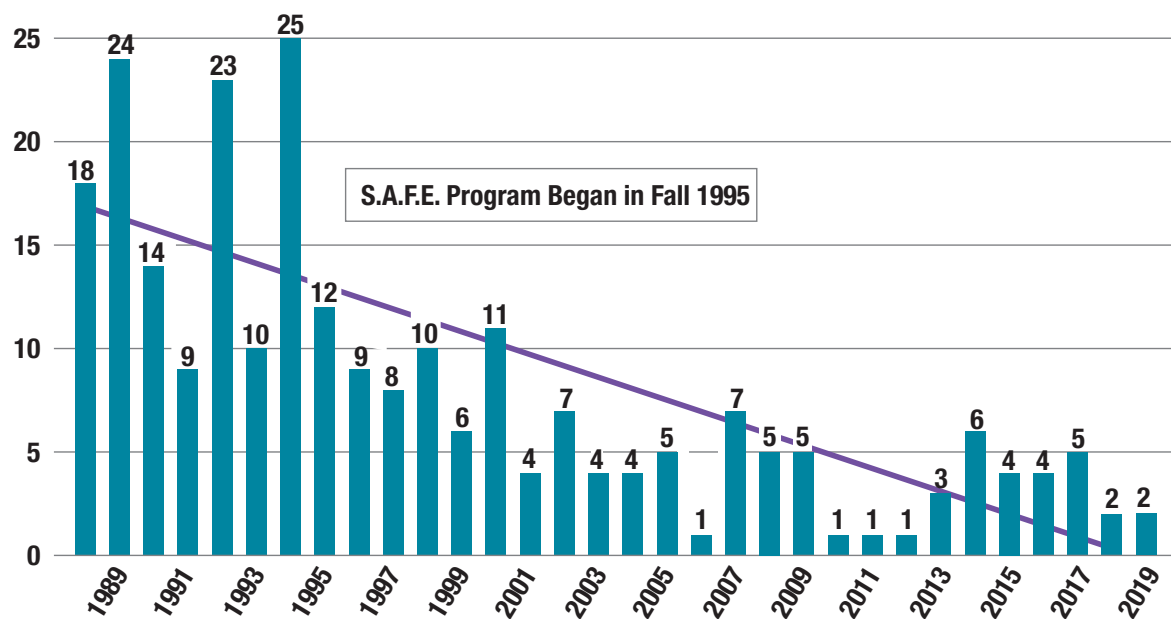
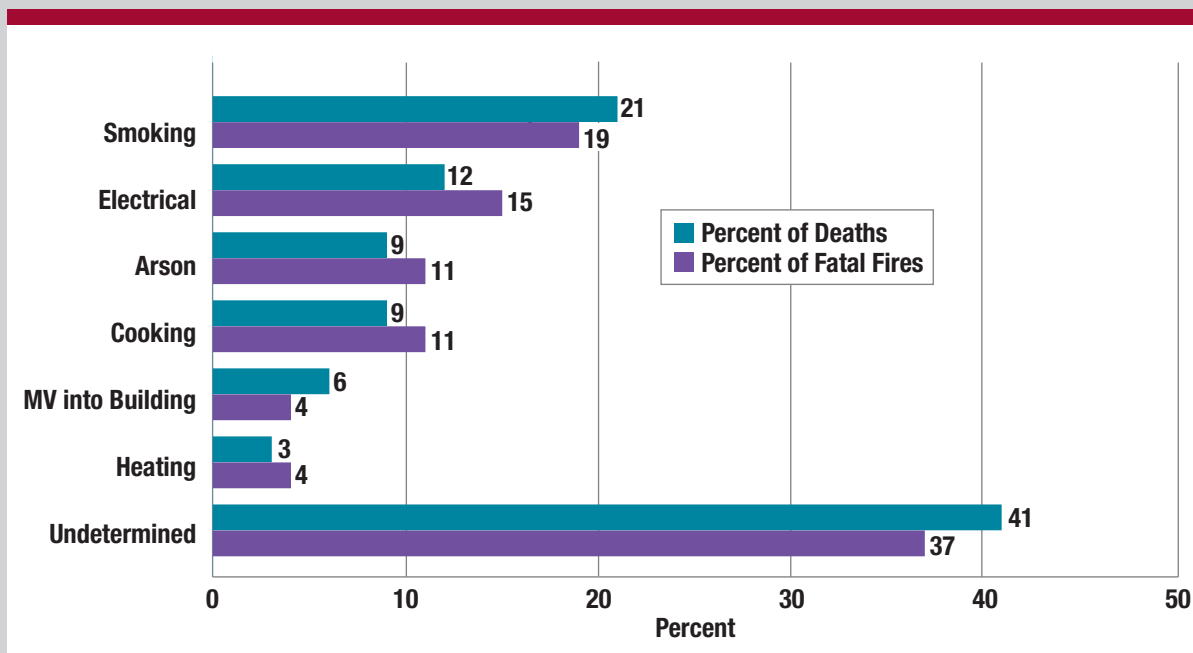


Figure 9

## CAUSES OF RESIDENTIAL FATAL FIRES AND FIRE DEATHS



### Older Adults at Great Risk for Fire Death

Older adults, especially those over the age of 85, had the greatest risk of dying in a fire. Adults over age 85 account for 2% of the population but 12% of the fire deaths. The risk of fire death for these adults is 6 times higher. Figure 7 shows the percentage of fire deaths versus population percentage by age group in 2019.

### Average Annual Child Fire Deaths Down 77% Since the Start of S.A.F.E.

In the 24 full years since the S.A.F.E. Program began (1996 to 2019), the average number of child fire deaths per year was 4.8. In the 24 years prior to the S.A.F.E. Program (1972 to 1994), the average number of child fire deaths per year was 21.8. This 77% drop in the average number of child fire deaths is significant when compared to the 50% drop in the number of all fire deaths during the same years. See Figure 8.

### Smoking Fires are Leading Cause of Fire Deaths

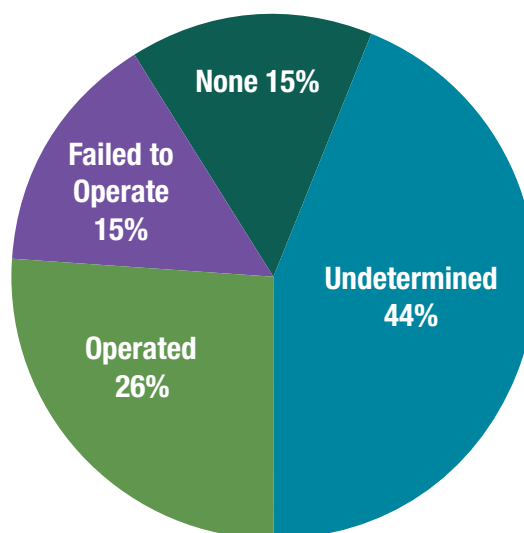
In 2019, improper disposal of smoking materials was the leading cause of residential fire deaths and fatal residential fires. These fires accounted for seven, or 21%, of the year's residential fire deaths. Electrical problems were the second leading cause of fire deaths, accounting for four, or 12%, of the year's residential fire deaths. See Figure 9.

Consistent, comprehensive, statewide, school-based fire safety education has improved fire safety for children in Massachusetts. All other age groups need comprehensive education to improve their fire safety, too.

Smoke alarms notify occupants of danger whether they are asleep or awake, but smoke alarms don't guarantee escape. A practiced home escape plan, combined with working smoke alarms increases chances of survival.

Figure 10

### SMOKE ALARM OPERATION IN RESIDENTIAL FIRE DEATHS



## SMOKE ALARMS

In 2019, 34 people died in residential building fires. Smoke alarm performance was reported for 19 of the victims. In eight fires that killed 10 people (30% of deaths), victims were not alerted by smoke alarms. In four fires that killed five people (15% of deaths), no alarms were present. In another four fires and five deaths (15% of deaths), alarms were present but they failed to operate.

### One- and Two-Family Homes had Lowest Percentage of Operating Alarms

In 2019, people were more likely to die in a fire in a one- or two-family home without a working smoke alarm than in any other residence. There were 62% more fire deaths in one- and two-family homes than in all other residences combined. Twenty-one people died in 17 one- and two-family dwelling fires in 2019. Seven, or 33%, of the fire deaths in one- and two-family homes occurred in fires with no alarms or with alarms that failed to operate. Of these deaths, three occurred in homes where smoke alarms failed to work. Four deaths were in homes where no smoke alarms were present. One death was in a home where a smoke alarm operated. See Figure 10.

## FIRE SERVICE INJURIES

### 506 Firefighters Injured in 2019

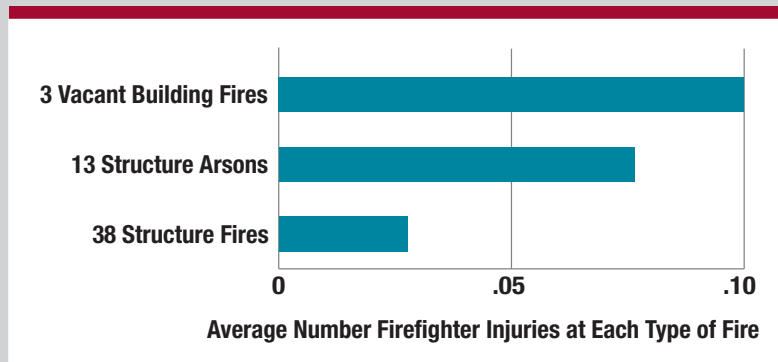
In 2019, 506 firefighters were injured while fighting the 25,176 reported fires in Massachusetts. On average, one firefighter was injured at one of every 50 fires in 2019.

### Firefighters Injured at 1 of Every 3 Vacant Structure Arsons

Vacant building fires were one of the most dangerous types of fire for firefighters in 2019. These fires accounted for 75, or 15%, of all firefighter injuries. An average of one firefighter was injured for every 13 structure arsons. There was one firefighter injury for every 11 vacant building fires and one firefighter injury for every 36 structure fires. See Figure 11.

Figure 11

### ONE FIREFIGHTER IS INJURED AT EVERY:



In 2019, 29% of all firefighter injuries were from overexertion or strains and 26% were from exposure to hazards.

### 29% of Injuries from Overexertion or Strain

Twenty-nine percent of all firefighter injuries in 2019 were from overexertion or strain. See Figure 12.

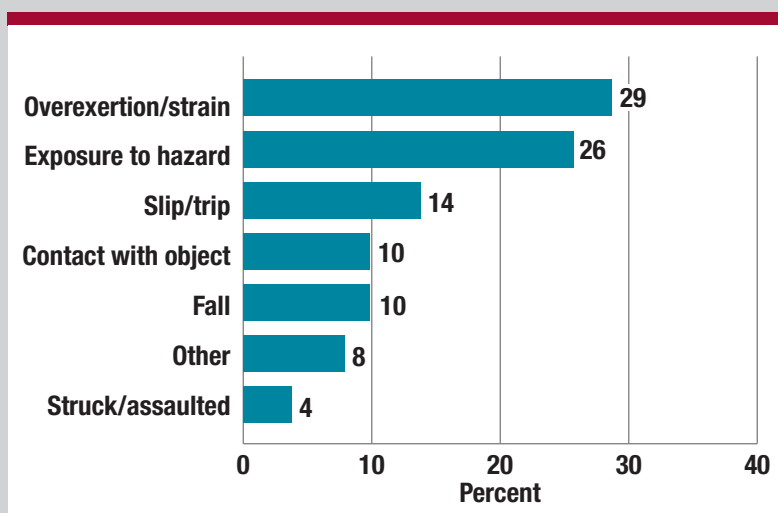
## CIVILIAN INJURIES

### 248 Civilians Injured in Fires in 2019 – Mostly at Home

Massachusetts' fires injured 248 civilians in 2019. One hundred and ninety-two, or 77%, of these injuries occurred in structure fires. One hundred and sixty-four injuries occurred in residential building fires, accounting for 66% of all injuries and 85% of all structure fire injuries. Thirty-four, or 14%, occurred in motor vehicle fires. Twenty-two, or 9%, of the year's civilian injuries occurred in outside and other fires. Special outside fires accounted for five, or 2%, of all civilian injuries, and brush fires accounted for two, or 1%, of civilian fire injuries. Outside rubbish fires accounted for one civilian fire injury, or less than 1% of all civilian fire injuries. Fourteen, or 6%, of the year's civilian injuries were caused by unclassified fires.

Figure 12

### CAUSES OF FIREFIGHTER INJURIES



Heating fires continue to decline in Massachusetts. There were 1,381 heating fires in 2019, down 8% from the 1,507 heating fires in 2018.

### Adults 45 to 54 at High Risk for Fire Injury

Adults between the ages of 45 and 54 represent 14% of the population and yet they accounted for 20% of the injuries in 2019. Of these injuries, 50% happened when people tried to control a fire and 11% occurred when the victim was trying to escape. People in this age group are most at risk of being injured in a fire because they are more likely to try to control the fire. See Figure 13.

## RESIDENTIAL BUILDING FIRES

### 84% of Building Fires Happened in Residential Occupancies

Massachusetts fire departments reported that 13,514, or 84%, of the 16,086 building fires occurred in residential occupancies. These fires caused 34 civilian deaths, two fire service deaths, 164 civilian injuries, 356 fire service injuries and an estimated loss of \$158 million.

### Almost Half of Residential Fires Happened in Multi-Family Buildings

Almost half (49%), of residential building fires happened in multi-family apartment buildings in 2019. About one-third (33%) of these fires happened in one- and two-family homes. Dormitories and rooming houses each accounted for 4% of the fires. Residential board and care facilities accounted for 2% of the residential fires and hotels accounted for 1%. See Figure 14.

### Cooking & Heating Were the Leading Causes of Fires in all Homes

Cooking caused 73% of fires in residential properties in 2019. Heating equipment caused 9% of these fires, electrical problems caused 4%. The unsafe use and improper disposal of smoking materials caused 3% of the fires and indoor rubbish fires caused 2%. Arson and candles accounted for 1% of residential fires. Clothes dryer fires, juvenile firesetting, and fireworks caused less than 1% of the fires in residential properties in 2019. See Figure 15.

Figure 13

### CIVILIAN INJURIES BY AGE COMPARED TO PERCENT OF POPULATION

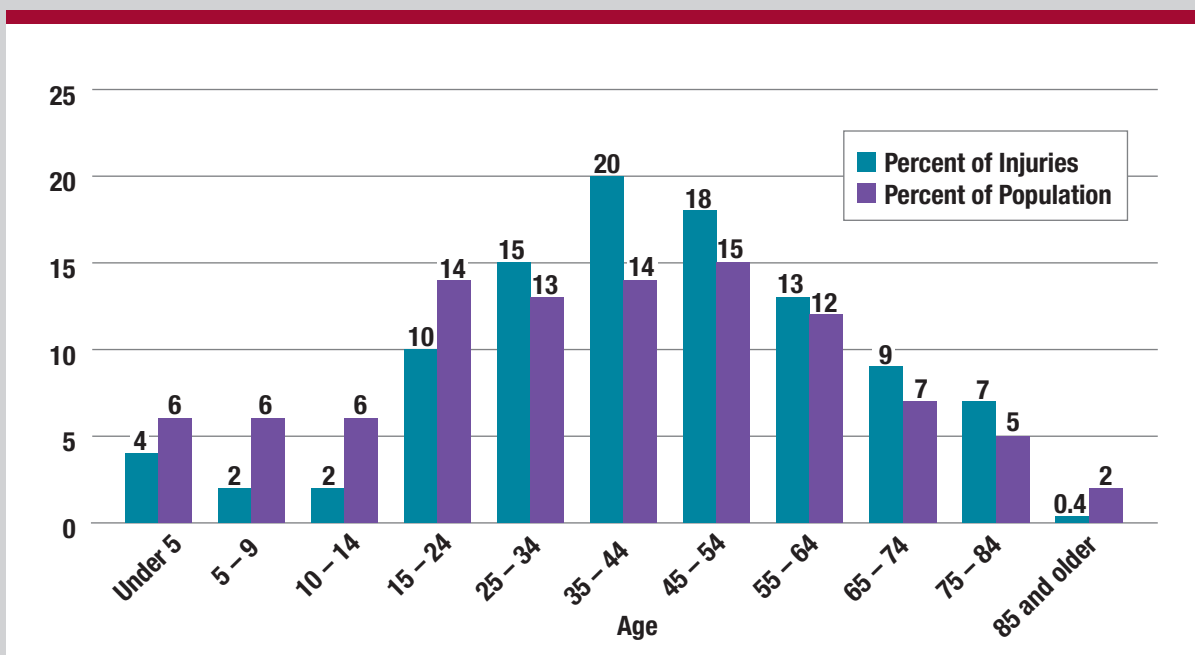
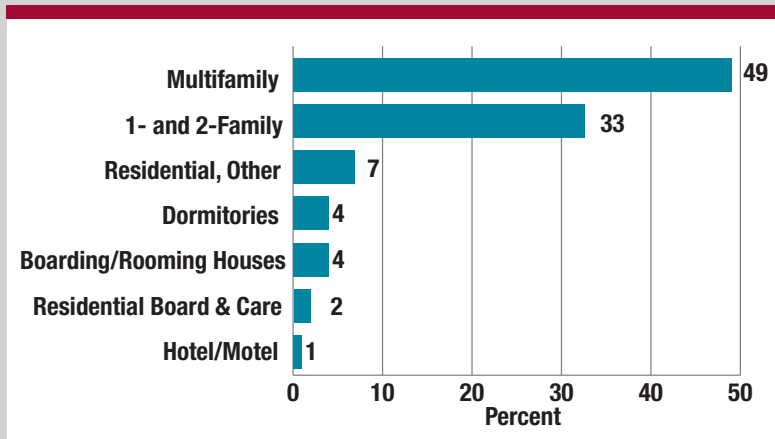


Figure 14

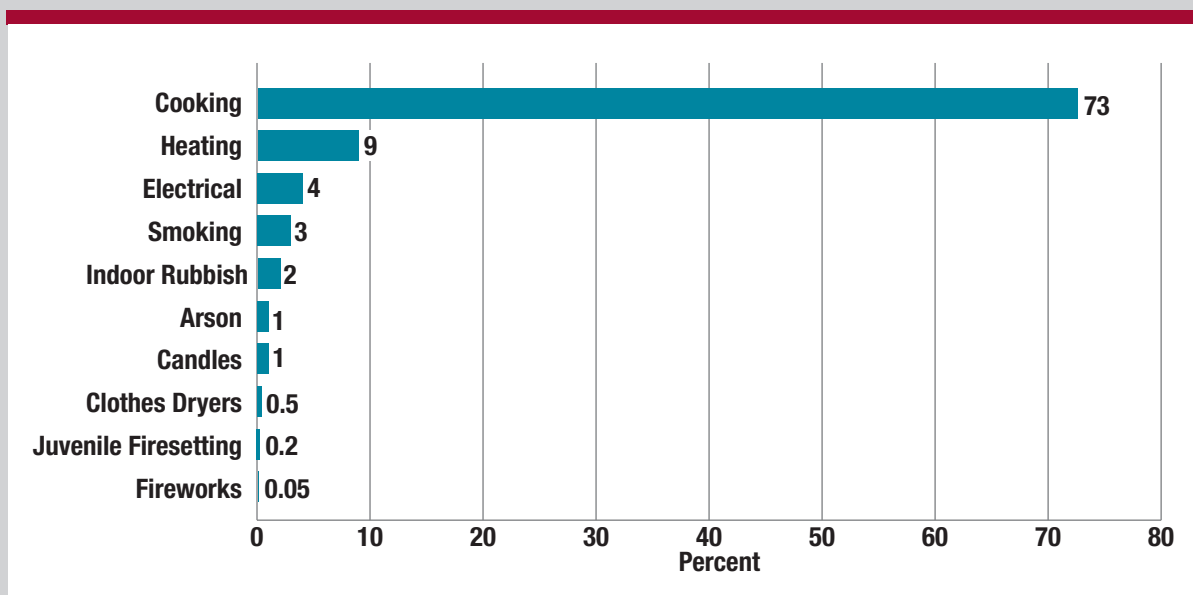
## RESIDENTIAL FIRES BY OCCUPANCY TYPE



Cooking caused 73% of fires in residential properties in 2019. Forty-nine percent of these fires happened in multi-family homes.

Figure 15

## CAUSES OF RESIDENTIAL FIRES



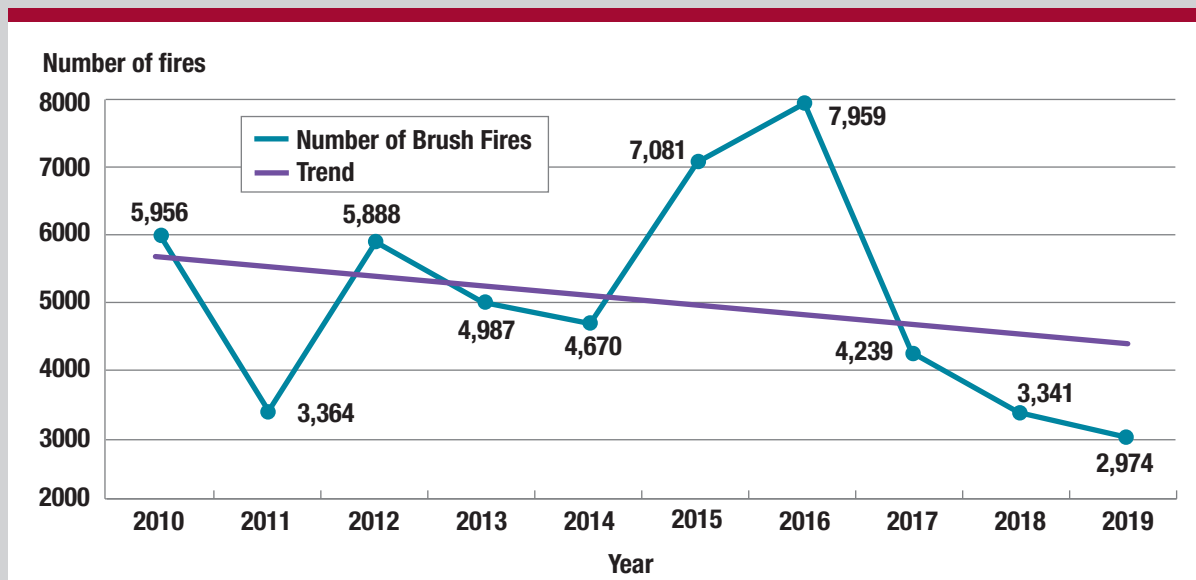
## MOTOR VEHICLE FIRES

### 2,356 Motor Vehicle Fires Account for 9% of all Reported Fires

The 2,356 motor vehicle fires in 2019 caused four (10%) civilian fire deaths, 34 civilian injuries, 35 fire service injuries, and \$24.4 million in property damage. The 2,356 motor vehicle fires in 2019 were a decrease of 155 (6%) from the 2,511 motor vehicle fires reported in 2018, and reflected 9% of total reported fire incidents in 2019.

Figure 16

## BRUSH FIRES BY YEAR



Shortly after midnight on October 19, 2019, fires were intentionally set at three locations in the basement of Athol's Our Lady Immaculate Church. If a passerby hadn't seen the smoke and called 911, the fire could have destroyed the building. After a joint investigation by the Athol Fire and Police Departments, and State Police assigned to the State Fire Marshal's office, a suspect was charged and convicted.

## OUTSIDE AND OTHER FIRES AND EXPLOSIONS

### 6,673 Brush, Trash, and Other Outside Fires

In 2019, 6,673 outside and other fires and explosions caused two civilian deaths, 22 civilian injuries, 25 fire service injuries, and an estimated loss of \$3.7 million. The 2,974 tree, grass and brush fires, 2,219 outside trash fires, 757 special outside fires, 31 cultivated vegetation or crop fires, and 692 other fires accounted for 27% of the total fire incidents in 2019. These fires decreased by 5% from the 7,004 incidents reported in 2018.

### Brush Fires

Brush fires are the most variable category of fires from year to year. Large increases and decreases are not uncommon and are often dependent on the weather. If it is a dry spring or summer, the number of brush fires usually increases. In 2019, the reported number of brush fires decreased by 367, or 11%, from the 3,341 reported in 2018. 2019 had the second lowest number of reported brush fires since 1986. See Figure 16.

## ARSON FIRES

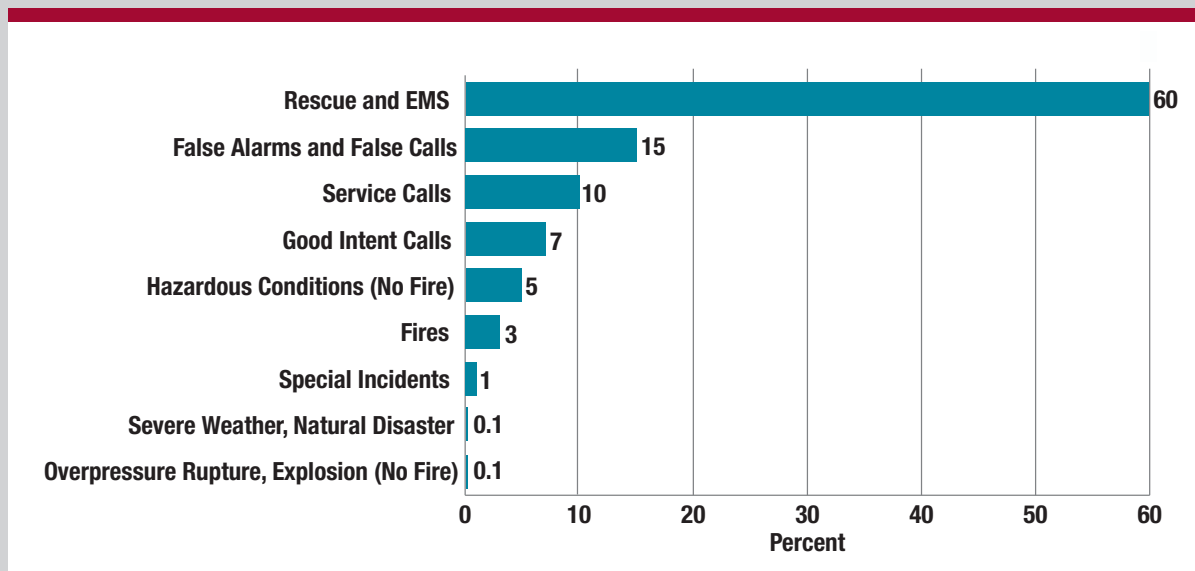
### 571 Arsons - 144 Structures, 64 Vehicles, and 363 Other Arsons

Five hundred and seventy-one, or 2%, of the 25,176 fire incidents reported to the Massachusetts Fire Incident Reporting System were considered to be intentionally-set, or arson.<sup>1</sup> The 144 structure arsons, 64 motor vehicle arsons, and 363 outside and other arsons caused five civilian fire deaths (12% of the year's total), as well as 11 civilian injuries and 12 fire service injuries. The estimated loss from arson was \$6.5 million. The average loss per arson fire was \$11,349. Total arson was up by 2% from the 571 in 2018.

<sup>1</sup> In MFIRS (v5) a fire is considered an arson if the Cause of Ignition = 1 (Intentional) and the Age of Person (Fire Module) is greater than 17 or if the field is blank; or if the Wildland Module is used, the Wildland Fire Cause = 7 (Incendiary) and the Age of the Person (Wildland Module) is greater than 17 or if the field is left blank.

Figure 17

## RESPONSES BY INCIDENT TYPE



## NON-FIRE INCIDENTS

### 60% of all Massachusetts Calls were EMS Incidents

In 2019, 345 fire departments in Massachusetts reported 972,465 responses to MFIRS. 945,649 of these were non-fire calls. Rescue and EMS calls comprised 60% of all calls, and were the leading type of call, with 584,336 responses. See Figure 17.

## CONCLUSIONS

### Working Smoke Alarms Save Lives

Most people die in fires at night in the so-called safety of their own home. While the overall trend in the number of deaths continues to decline, smoking was the leading cause of all fatal fires in 2019. Yet cooking, something we do everyday, is still the leading cause of fires in the home and the leading cause of civilian fire injuries. We must all work to address this problem.

The lack of working smoke alarms or sprinkler systems are contributing factors to these tragedies. We have less than three minutes to get out of a building if there is a fire. It is important to remember that properly maintained alarms provide early warning of a fire, and residential sprinklers increase the opportunity to escape safely. Having a practiced home escape plan in addition to working smoke alarms and sprinklers allows us to get out of our houses quickly. Time is of the essence in a fire.

Improper disposal of smoking materials remains the leading cause of fatal home fires. The lack of working smoke alarms or sprinkler systems are contributing factors in these tragedies.

## 2019 FIRES BY COUNTY

County	Total Fires	Structure Fires	Vehicle Fires	Other Fires	Civilian Deaths	Civilian Injuries	Fire Service Deaths	Fire Service Injuries	Dollar Loss
Barnstable	723	324	82	317	3	11	0	15	\$6,468,578
Berkshire	359	191	34	134	6	12	0	9	5,887,385
Bristol	1,509	727	243	539	8	23	0	19	20,771,760
Dukes	50	23	4	23	0	0	0	0	825,600
Essex	2,068	1,157	238	673	0	8	0	64	28,760,098
Franklin	224	103	28	93	0	2	0	6	2,538,887
Hampden	1,584	885	250	449	4	28	0	54	12,517,448
Hampshire	400	194	53	153	1	9	0	6	4,135,051
Middlesex	5,410	3,778	386	1,246	9	44	0	189	41,464,515
Nantucket	31	16	2	13	0	1	0	0	2,256,104
Norfolk	2,554	1,704	210	640	0	13	0	59	23,412,582
Plymouth	1,565	808	198	559	4	46	1	23	13,407,136
Suffolk	4,986	3,843	239	904	4	4	0	24	58,679,984
Worcester	3,713	2,395	388	930	3	47	1	38	27,688,236
<b>Total</b>	<b>25,176</b>	<b>16,148</b>	<b>2,355</b>	<b>6,673</b>	<b>42</b>	<b>252</b>	<b>2</b>	<b>506</b>	<b>248,813,274</b>

## 2019 ARSONS BY COUNTY

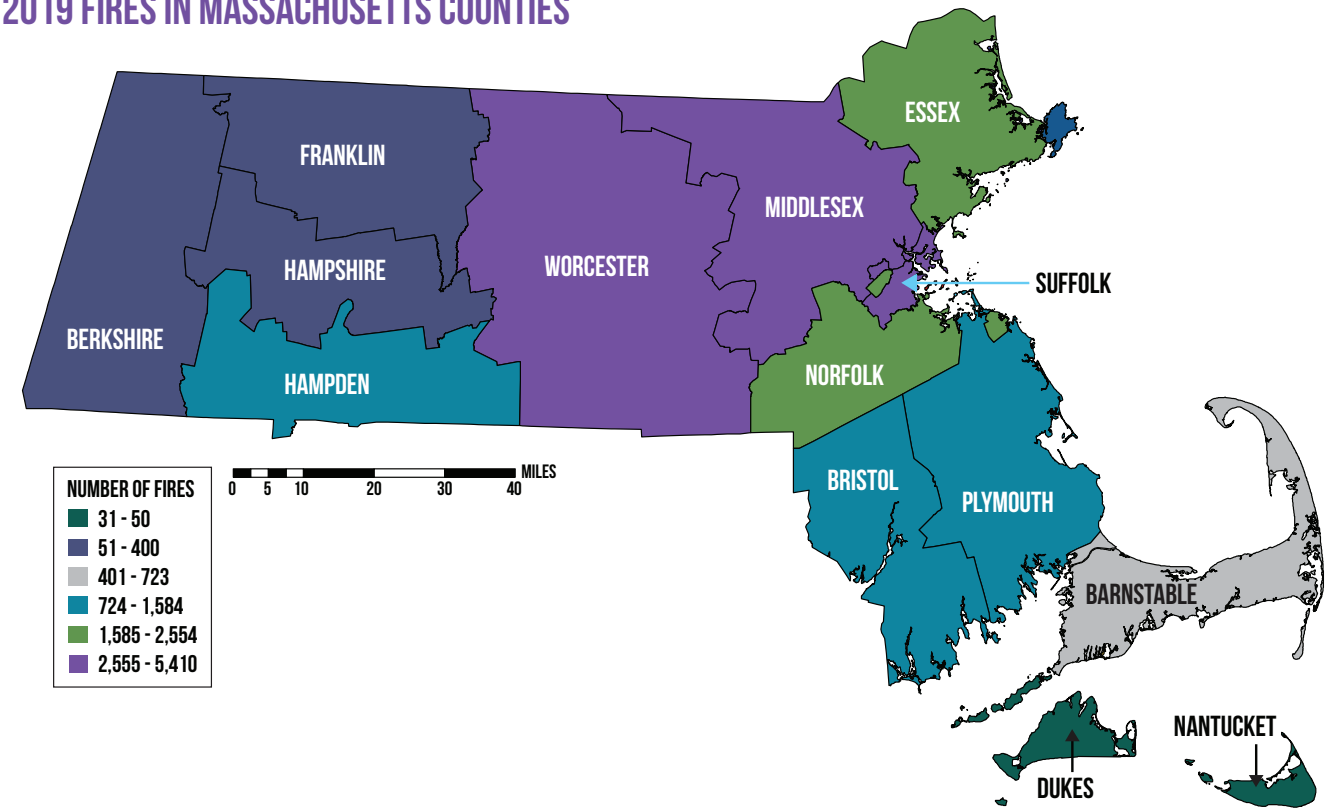
County	Total Arsons	Structure Arsons	Vehicle Arsons	Other Arsons	Civilian Deaths	Civilian Injuries	Fire Service Deaths	Fire Service Injuries	Dollar Loss
Barnstable	25	4	3	18	0	0	0	0	\$584,000
Berkshire	28	11	1	16	1	0	0	1	433,567
Bristol	40	9	7	24	0	2	0	0	312,791
Dukes	4	0	0	4	0	0	0	0	0
Essex	60	12	1	47	0	0	0	1	471,761
Franklin	13	1	1	11	0	0	0	1	3,000
Hampden	72	23	21	28	1	1	0	1	393,250
Hampshire	18	4	2	12	0	0	0	0	4,500
Middlesex	69	15	8	46	2	2	0	2	156,027
Nantucket	0	0	0	0	0	0	0	0	0
Norfolk	42	6	1	35	0	0	0	0	6,000
Plymouth	33	14	5	14	0	1	0	1	668,205
Suffolk	74	21	5	48	0	0	0	0	253,040
Worcester	93	24	9	60	1	5	0	5	3,194,369
<b>Total</b>	<b>571</b>	<b>144</b>	<b>64</b>	<b>363</b>	<b>5</b>	<b>11</b>	<b>0</b>	<b>2</b>	<b>\$6,480,500</b>

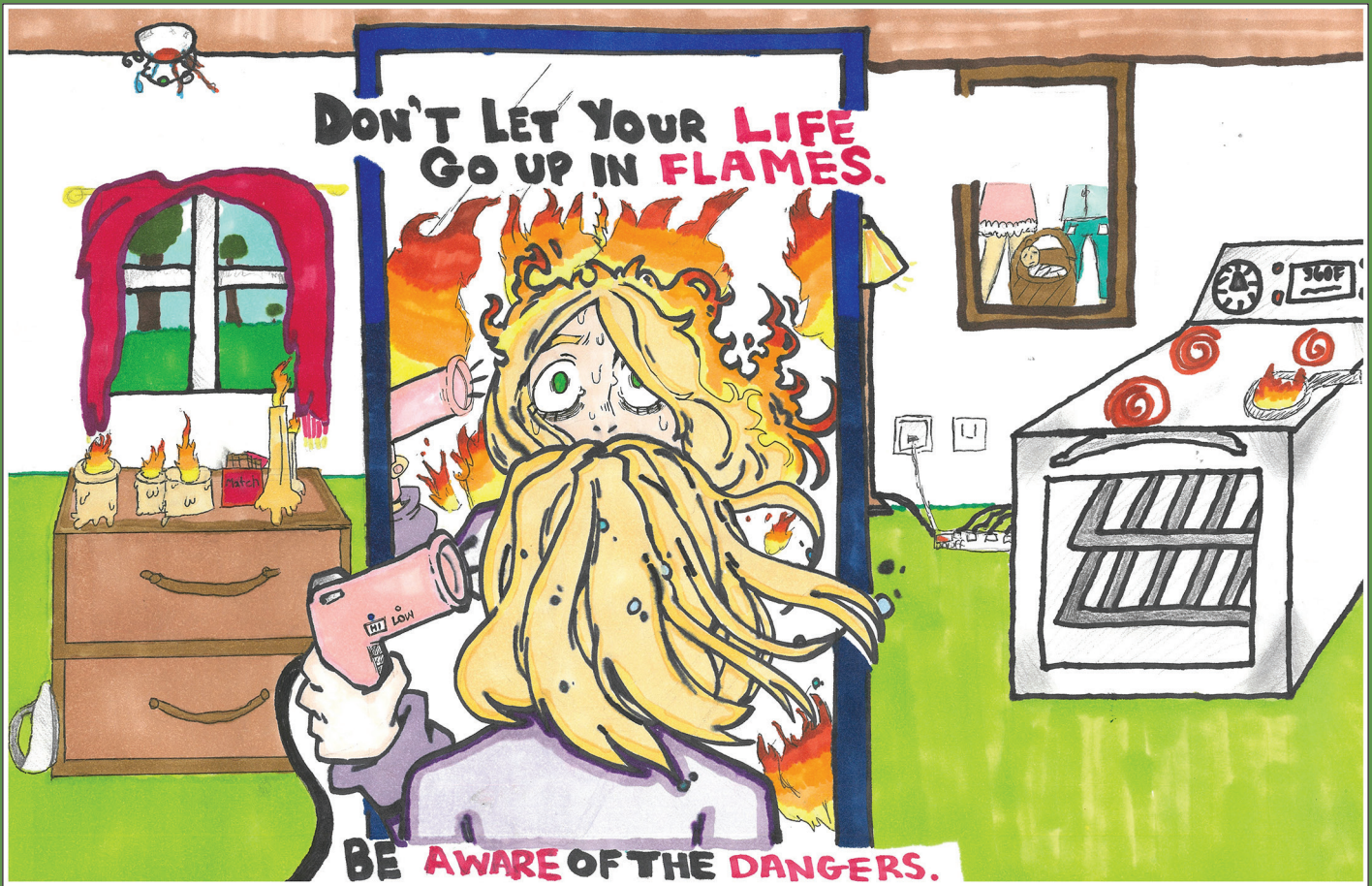
# 2019 NON-FIRE RESPONSES BY COUNTY AND BY INCIDENT TYPE

County	Total Non-Fire Responses	Over-pressure Rupture, Explosion (No-fire)	Rescue, EMS Incidents	Hazardous Conditions (No-fire)	Service Calls	Good Intent Calls	False Alarm Calls	Severe Weather, Natural Disaster	Special Incidents
Barnstable	65,244	57	46,773	2,950	4,508	2,919	7,661	108	268
Berkshire	12,554	12	6,862	791	1,658	715	2,395	38	83
Bristol	62,594	54	41,974	2,454	3,861	3,545	10,114	49	543
Dukes	1,933	6	123	137	105	424	1,116	3	19
Essex	107,271	108	60,785	5,979	13,737	7,698	18,406	204	354
Franklin	8,571	15	4,999	734	837	571	1,028	73	314
Hampden	53,056	78	33,785	2,065	4,064	4,455	8,379	77	153
Hampshire	18,909	28	12,851	896	896	1,093	3,005	91	49
Middlesex	207,925	137	124,251	10,330	22,360	12,506	32,843	173	5,325
Nantucket	2,412	3	1,202	80	31	51	1,037	0	8
Norfolk	105,744	132	67,501	5,137	10,177	6,888	14,906	124	879
Plymouth	89,573	67	61,625	4,394	7,959	5,142	9,865	228	293
Suffolk	104,031	64	51,143	4,097	16,865	10,178	20,762	30	892
Worcester	105,636	169	70,424	4,134	9,615	7,201	13,730	142	221
Total	945,453	930	584,298	44,178	96,673	63,386	145,247	1,340	9,401

The numbers in this table may be higher than those reported in the text of this document because they are the most recent figures available.

# 2019 FIRES IN MASSACHUSETTS COUNTIES





**MFIRS**  
Massachusetts Fire Incident Reporting System

Department of Fire Services  
[www.mass.gov/dfs](http://www.mass.gov/dfs)  
(978) 567-3380