Catastrophic Multiple-Death Fires and Explosions in the United States in 2021

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2021 Experience

In the United States in 2021, 14 catastrophic multiple-death fires and explosions occurred. Catastrophic multiple-death fires are defined as home fires that kill five or more people, or fires in non-home structures or non-structural properties (including vehicle and wildland-urban interface fires) that kill three or more people. These 14 fires killed 65 people, including 17 children under the age of six. Ten of these fires occurred in homes and accounted for 53 deaths, including all 17 children under the age of six. Two fires occurred in non-home structures and accounted for six of the deaths. Additionally, two fires occurred in non-structure settings. These two fires accounted for six of the deaths.

Compared to 2020, when there were 16 fires and 90 deaths, including eight victims under age six, in 2021, there were two fewer fires (for a reduction of 13 percent) and 25 fewer fatalities (a 28 percent reduction), but nine more deaths of children under the age of six, doubling last year’s number.

2021 recorded the second lowest number of catastrophic multiple-death fires in the past 10 years, with the nine fires in 2015 being the lowest. The average number of such fires over the previous 10 years (2012 to 2021) was 19. The 65 fire deaths in 2021 was also the second lowest total and falls 52 below the 10-year average of 117 deaths per year. The number of deaths of children under six was 17, the fourth highest toll in 10 years, with a 10-year average of 17.

Catastrophic multiple-death fires are an important part of the nation’s overall fire picture. In 2021, firefighters in the US responded to an estimated 1,353,500 fires. An estimated 361,000 of those fires occurred in residential structures; 125,500 occurred in non-residential structures; 658,500 occurred outside of structures; and 208,500 occurred in vehicles. These fires accounted for an estimated 3,800 deaths; 2,880 of the deaths occurred in residential structures, 130 in non-residential structures, 110 in fires outside of structures, and 680 in vehicle fires. The 14 catastrophic multiple-death incidents in this report accounted for 0.001 percent of the total estimated fires in 2021, while the 65 deaths accounted for 1.7 percent of the total fire deaths in the US last year.

Catastrophic Home Structure Fires

There were ten catastrophic multiple-death home fires in 2021. Six of these occurred in single-family dwellings (one being a manufactured home) and four occurred in apartment buildings, (two with four units each and two with an unknown number of units). These fires killed 53 people (81.5 percent of the total catastrophic multiple deaths). Seventeen of the victims were children under the age of six. No one fire was the largest in 2021, as three of the fires killed six people and seven fires killed five.

Six of the ten homes fire incidents had information reported on the presence of smoke alarms. Two of the homes reportedly did not have any detectors present. Four homes did have detectors and two of them operated, but no information was reported on the other two. Information was reported on suppression equipment in six of the home properties; all six had no suppression systems. No information on suppression systems was reported for the other four fires.

The area of origin was known in six of the ten home fires; there were two in bedrooms, two in wall assemblies, and one each in a crawl space and a porch. Two of the home fires had a cause reported—one involved smoking materials in bed and one was an electrical part failure that caused a short circuit.

Eight of the home fires broke out between the hours of 11 p.m. and 7 a.m., killing 43 people (81 percent of the victims of catastrophic multiple-death fires), including 14 of the children under the age of six.
Catastrophic Non-Home Structure Fires

Two of the 14 catastrophic multiple-death fires and explosions in 2021 occurred in non-home structures, resulting in six deaths. One occurred in a vacant single-family home and one occurred in a barn/workshop. Each of these fires/explosions killed three people. No children under the age of six died in these fires.

One property was known to have no smoke alarms present and no information was reported on the second. No information was reported on the presence of automatic suppression systems.

The area of ignition was known in one incident; the fire began in a storage area. Neither fire nor explosion had an ignition factor reported. One of these properties was in full operation, while the other was vacant but used as a shelter by homeless people.

One of the two non-home fires, the fire in the vacant home, broke out between 11 p.m. and 7 a.m., killing three.

Catastrophic Non-Structure Fires

In 2021, there were two catastrophic non-structure fires, including a boat fire and an explosion at a fishing site on a riverbank. These two fires accounted for six deaths.

The area of ignition was known for both incidents; the fires began in a cabin area of a boat and an open camping area alongside a river. The cause was undetermined or not reported in both incidents

One of the two non-structure fires, the boat fire, broke out between the hours of 11 p.m. and 7 a.m. and resulted in three deaths.

Smoke detectors were present and operated at the boat fire. No information was reported on automatic suppression equipment at either fire.

The Benefits of Smoke Detection Equipment and Fire Sprinklers

Information on smoke detection equipment was reported in eight of the catastrophic multiple-death incidents that occurred in structures or vehicles in 2021. Detectors were present in five of the incidents and no detectors in three cases. These systems operated in three fires. The occupants in these structure fires were trapped above the fire or had the exits blocked by heat and smoke. Information on automatic suppression equipment was reported on seven of the structure fires, all of which had no suppression systems.

Smoke alarms have been proven effective in reducing the risk of death in home fires. The most effective arrangement is interconnected, multiple-station smoke alarms supplied by hardwired AC power with a battery backup. These should be located outside each sleeping area, on each level, and in each bedroom. Homeowners should routinely test smoke alarms according to manufacturers’ recommendations. NFPA recommends testing home smoke alarms at least monthly.

It is unfortunate that more information about detection and suppression equipment is not available, as sprinklers have been proven to save lives across many kinds of properties, including homes. According to NFPA’s Fire Sprinkler Initiative (firesprinklerinitiative.org), the civilian death rate associated with home fires is 81 percent lower in homes with fire sprinklers than in homes without them. Additionally, sprinklers reduce the average property loss in home fires by 71 percent per fire, and the average firefighter injury rate is nearly 80 percent lower when fire sprinklers are present during fires. When home sprinklers are present, fires are confined to the room of origin 97 percent of the time.

When fire sprinklers and hardwired smoke alarms are both present, the home fire death rate drops by 90 percent. In comparison, when battery-powered smoke alarms are present but automatic extinguishing systems are not, the home fire death rate drops by 18 percent.
Batteries for smoke alarms should be replaced according to manufacturer recommendations, and conventional batteries should be replaced at least yearly. If an alarm chirps indicating that the battery is low, the battery should be replaced right away. All smoke alarms, including hardwired alarms and alarms that use 10-year batteries, should be replaced when they are 10 years old or sooner if they do not respond properly when tested.

Smoke alarms are only effective if occupants leave the building when the alarms sound. Children should be familiar with the sound of a properly operating smoke alarm and follow a practiced escape plan that emphasizes two exits from any location, as well as a designated meeting place once they have left the structure. Exit drills in the home are part of many schools’ curricula. Practicing the plan can help families determine whether children and others readily wake up to the sound of a smoke alarm if it sounds during the night; that knowledge, along with assistance for family members who require it, can be factored into the escape plan. Practicing escape plans, as well as basic fire prevention principles, might have prevented many of the fires and deaths included in this report.

Where We Get Our Data

NFPA obtains its data by first reviewing national and local news media, including fire service publications. A news clipping service reads all the daily US newspapers and notifies NFPA of fatal fires. Once an incident has been identified, we request information from the local fire department, or the authority having jurisdiction and follow up as necessary. NFPA’s annual survey of US fire experience and mailings to state fire marshals are additional data sources, although not the principal ones. We also contact federal agencies that have participated in the investigation of such fires.

The diversity and redundancy of these sources enable us to collect the most complete data available on catastrophic multiple-death fires throughout the US. We understand that, in many cases, a fire department cannot release information due to ongoing litigation. In other cases, fire departments have been unable to determine the information we requested.

Catastrophic Multiple-Death Fires and Explosions by Type

Home Fires

State: Oklahoma
Date and Time: March, 1:17 a.m.
Number of Deaths: Six (one was under the age of 6)

Number of Stories, Occupancy Type, Construction Types:
This was a one-story, single-family home (manufactured home) of unprotected wood-frame construction. The floor area was not reported.

Detection Systems and Suppression Systems:
It was undetermined if there were detectors present. There was no automatic suppression equipment.

Fire Origin and Path:
The cause was not reported but it is believed to have begun on a front porch.

Contributing Factors and Victim Locations:
The home was fully involved upon the arrival of firefighters. A team of firefighters entered the structure through a window but were withdrawn soon after due to deteriorating fire conditions with heavy smoke and heat. Once the fire was knocked down, a full primary search was performed. The location of the victims was not reported.

State: Virginia
Date and Time: April, 12:11 a.m.
Number of Deaths: Six (two were under the age of 6)

Number of Stories, Occupancy Type, Construction Type:
This was a two-story, 2,380 ft² (221.1 m²) single-family home of unprotected wood-frame construction.
Detection Systems and Suppression Systems:
There was a detection system present and it operated, but the type and coverage were not reported. There was no automatic suppression equipment present.

Fire Origin and Path:
The fire started when smoking materials ignited bedding material or clothing in a bedroom while oxygen was in use.

Contributing Factors and Victim Locations:
Arriving firefighters found heavy fire showing from the front windows. The front door was forced open by firefighters but many household items were blocking the doorway. A rear door was missing a doorknob, but firefighters forced the door open into the kitchen and a resident exited, while another was located on the kitchen floor. During the search, five victims were located on the second floor (three in one bedroom and one in another) and removed. The sixth victim was in a bedroom on the first floor.

State: Georgia
Date and Time: December, 12:20 a.m.
Number of Deaths: Six (one was under the age of six)

Number of Stories, Occupancy Type, Construction Type:
This was a split-level, 600 ft² (55.7 m²) single-family home of unprotected wood-frame construction. The home was occupied by 10 people at the time.

Detection Systems and Suppression Systems:
There were no smoke alarms or automatic suppression equipment present.

Fire Origin and Path:
The fire broke out in a bedroom, but the cause was not determined.

Contributing Factors and Victim Locations:
Arriving firefighters found heavy fire and smoke showing, as well as a car on fire under a carport. Bystanders reported that the residents were unaccounted for. An attack on the fire and a primary search were begun and victims were found in second-floor bedrooms.

State: Georgia
Date and Time: January, 12:40 a.m.
Number of Deaths: Five (three were under the age of 6)

Number of Stories, Occupancy Type, Construction Type:
This was a one-story 1,528 ft² (142 m²) single-family home of unprotected wood-frame construction.

Detection Systems and Suppression Systems:
There was a partial coverage of smoke detectors present, but it was undetermined if they operated. There was no automatic suppression system present.

Fire Origin and Path:
The fire started within a wall between the kitchen and living room, but the cause was undetermined.

Contributing Factors and Victim Locations:
Arriving firefighters found heavy fire showing from the front of the home and bystanders reported that five residents were not accounted for. During a primary search, the five victims were located, four of whom were in a bedroom.

State: Illinois
Date and Time: January, 10:11 a.m.
Number of Deaths: Five (three were under the age of 6)

Number of Stories, Occupancy Type, Construction Type:
This was a two-story, 625 ft² (58.1 m²) apartment in a four-unit apartment building (originally built as a single-family home) of unprotected wood-frame construction. No additional information was reported.
Detection Systems and Suppression Systems:
There were smoke alarms present but their coverage and effectiveness were not reported. There was no information reported on any suppression equipment.

Fire Origin and Path:
The cause and origin of this fire were undetermined.

Contributing Factors and Victim Locations:
Arriving firefighters found smoke showing from the second-story windows. Firefighters attacked the visible fire from the outside. When the fire was knocked down, an interior attack and search were performed. All the victims were in one room in a second-story apartment. One firefighter was injured fighting the fire.

State: Arkansas
Date and Time: March, 5:10 a.m.
Number of Deaths: Five (one was under the age of 6)
Number of Stories, Occupancy Type, Construction Type:
This was a two-story apartment building of unprotected ordinary construction. The floor area and number of units were not reported.
Detection Systems and Suppression Systems:
No information was reported on detection or suppression equipment.
Fire Origin and Path:
The cause and origin are listed as under investigation.
Contributing Factors and Victim Locations:
On arrival, firefighters found heavy fire in two second-floor apartment units with fire extending into the attic. The victims were all located in one of the second-floor apartments. One civilian was also injured.

State: Illinois
Date and Time: August, 3:00 a.m.
Number of Deaths: Five (two were under the age of six)
Number of Stories, Occupancy Type, Construction Type:
This was a two-story apartment building of unprotected ordinary construction. The number of units and floor size were not reported.
Detection Systems and Suppression Systems:
No information was reported.
Fire Origin and Path:
No information was reported.
Contributing Factors and Victim Locations:
No information was reported.

State: Ohio
Date and Time: September, 12:49 a.m.
Number of Deaths: Five (one was under the age of six)
Number of Stories, Occupancy Type, Construction Type:
This was a three-story, 1,356 ft² (125.1 m²) home of unprotected wood-frame construction.
Detection Systems and Suppression Systems:
No information was reported on detection systems. There was no automatic suppression system present.
Fire Origin and Path:
The fire broke out on a first-floor exterior wall, but the cause was not determined.
Contributing Factors and Victim Locations:
The victims were all trapped above the fire. Four residents and a person who attempted a rescue were also injured, as was one firefighter.
State: California  
Date and Time: September, 4:38 a.m.  
Number of Deaths: Five (two were under the age of six)

_NUMBER OF STORIES, OCCUPANCY TYPE, CONSTRUCTION TYPE:_
This was a one-story, 1,000 ft² (93 m²) single-family home of unprotected wood-frame construction. The home was occupied by 10 residents at the time of the fire.

_DETECTION SYSTEMS AND SUPPRESSION SYSTEMS:_
There were no smoke alarms or automatic suppression systems present.

_FIRE ORIGIN AND PATH:_
This fire broke out in a crawl space when an arc from a short-circuit ignited wood structural members and extend up to the living area and attic.

CONTRIBUTING FACTORS AND VICTIM LOCATIONS:_
Arriving firefighters found smoke coming from the home. Neighbors had attempted to rescue the residents prior to the arrival of firefighters. No information on victim locations was reported. Two residents were also injured.

State: New York  
Date and Time: November, 10:38 p.m.  
Number of Deaths: Five

_NUMBER OF STORIES, OCCUPANCY TYPE, CONSTRUCTION TYPE:_
This was a three-story, 2,000 ft² (185.8 m²) three-unit apartment building of unprotected wood-frame construction.

_DETECTION SYSTEMS AND SUPPRESSION SYSTEMS:_
No information was reported on detection or suppression equipment.

_FIRE ORIGIN AND PATH:_
No information was reported.

CONTRIBUTING FACTORS AND VICTIM LOCATIONS:_
When firefighters arrived, the building was fully involved. Officials reported in media that the victims were trapped above the fire in a third-floor bedroom. One firefighter was also injured.

NON-HOME FIRES

State: Texas  
Date and Time: November, 7:20 p.m.  
Number of Deaths: Three

_NUMBER OF STORIES, OCCUPANCY TYPE, CONSTRUCTION TYPE, OPERATING STATUS:_
This was a one-story barn/workshop of unprotected, noncombustible construction. No additional information was reported.

_DETECTION SYSTEMS AND SUPPRESSION SYSTEMS:_
No information was reported on detection or suppression equipment.

_FIRE ORIGIN AND PATH:_
No information was reported on the cause or origin.

CONTRIBUTING FACTORS AND VICTIM LOCATIONS:_
Officials in media reported that there was an explosion and fire in this structure. No additional information was reported.

State: Maine  
Date and Time: December, 4:46 a.m.  
Number of Deaths: Three

_NUMBER OF STORIES, OCCUPANCY TYPE, CONSTRUCTION TYPE, OPERATING STATUS:_
This was a three-story, 960 ft² (89.2 m²) vacant single-family home of unprotected wood-frame construction.

_DETECTION SYSTEMS AND SUPPRESSION SYSTEMS:_
There were no detection or automatic suppression systems present.
**Non-Structural Fires**

**Outside Property**

State: Illinois  
Date and Time: May, 7:00 p.m.  
Number of Deaths: Three

**Setting:**  
This incident occurred at a small campsite used while fishing in the area on a riverbank.

**Fire Origin and Path:**  
According to officials in media reports, three men found copper pipe while fishing and used it to cook fish over a campfire. Unknown to them, it was an explosive device with black powder, and it exploded.

**Contributing Factors and Victim Locations:**  
No information was released due to ongoing litigation.

**Factors Hindering Occupant Escape:**  
Under litigation and a lawsuit has been filed.

**Vehicle**

State: Michigan  
Date and Time: July, 6:05 a.m.  
Number of Deaths: Three

**Number of Stories, Occupancy Type, Construction Type, Operating Status:**  
This fire was contained to a 38 ft (11.6 m) boat docked at a marina.  
Three people were on the boat overnight.

**Detection Systems and Suppression Systems:**  
There were smoke detectors present and operated in the cabin. No information on automatic suppression equipment was reported.

**Fire Origin and Path:**  
No information was reported.

**Contributing Factors and Victim Locations:**  
Upon arrival, firefighters found a smoldering fire. The fire was contained to the cabin of the boat.

**Acknowledgments**

In 2021, when much of the data gathering for this study occurred, the US, along with the rest of the world, was dealing with the COVID-19 pandemic. Understanding that fire departments had their hands full with emergencies, we did not make additional follow-up requests and phone calls to fire departments and, as a result, less detailed information was available for the 2021 study, as in the previous two years.

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