

INTENTIONAL FIRES AND ARSON

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Abstract

In 2005, an estimated 323,900 intentional fires were reported to U.S. fire departments. These fires were associated with losses of 490 civilian fire deaths, 1,500 civilian fire injuries, 7,600 firefighter on-duty at-scene injuries, and \$1.102 billion in direct property damage. In 2005, 18% of arson offenses were cleared by arrest or exceptional means.

Keywords: Arson, intentional fire, suspicious, firesetting, firesetter, fire statistics.

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Executive Summary

In 2005, an estimated 323,900 intentional fires reported to U.S. fire departments resulted in 490 civilian fire deaths, 3 firefighter on-duty deaths (at the scene of or during response or return to or from an intentional fire), 1,500 civilian fire injuries, 7,600 firefighter on-duty injuries (at the scene of an intentional fire but not including response/return injuries) and \$1.102 billion in direct property damage.

Rates of intentional structure fires or arson offenses, relative to population, are highest in large cities but are also higher in rural communities (less than 2,500 population) than in small towns (say, 2,500 to 9,999 population). The percentage of structure fires that are intentional is largest for the large cities, and for this measure, there is no secondary peak for rural communities.

In the U.S., typically one of every six arson offenses (18% in 2005) is cleared by arrest or “exceptional means.” Juveniles have accounted for roughly half of all U.S. arrestees beginning in 1992 (49% in 2005).

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Intentional Fires and Arson

Fire departments responded to an estimated **323,900** intentional fires in 2005. These fires resulted in:

- 490 civilian fire deaths
- 1,500 civilian fire injuries
- \$1.1 billion in property damage
- 3 on-duty firefighter fatalities
- 7,600 on-duty firefighter injuries

The numbers of intentional fires and associated losses have been on a downward trend since 1980.

An “intentional” fire is a fire that threatens harm or is started in a manner inconsistent with the goal of a controlled fire that avoids harm.

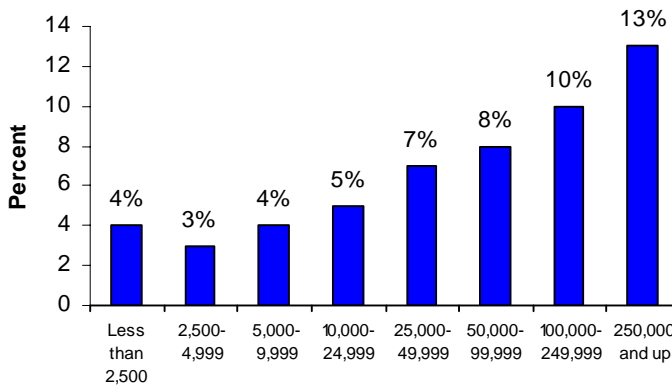
Intentional Fires in 2005

| Incident Type | Fires | Civilian Deaths | Civilian Injuries | Direct Property Damage (in Millions) |
|-----------------|---------------|-----------------|-------------------|--------------------------------------|
| Structures | 55,500 (17%) | 430 (88%) | 1,200 (80%) | \$917 (83%) |
| Vehicles | 26,000 (8%) | 40 (8%) | 80 (5%) | \$173 (16%) |
| Outside & Other | 242,400 (75%) | 20 (4%) | 220 (15%) | \$13 (12%) |

Large cities have a larger percentage of intentional structure fires.



Intentional Fire Percentage of Structure Fires by Community Size



According to FBI statistics:

- 18% of arson offenses were cleared by arrest or exceptional means.
- In 2006, 49% of arrestees were under the age of 18.
- An estimated 5-7% of arsons offenses result in convictions.

Defining Arson and Intentional Fires

What is “arson”?

The Uniform Crime Reporting Program defines arson as “any willing or malicious burning or attempt to burn, with or without intent to defraud, a dwelling house, public building, motor vehicle or aircraft, personal property of another, etc.” Here, “willing” is essentially the same as “intentional,” and the rest of the definition consists of examples of types of harm that are included.

The fire problem we mean when we use the term “arson” is considerably broader and larger than fires that meet the legal definition of arson. There appear to be at least three elements to the definition, and there is controversy attached to each element.

The three elements that define arson, not legally but as popularly used, are:

- Intention to start a hostile fire, which is a fire that threatens harm and has no socially condoned purpose;
- What (or who) is harmed; and
- Strength of proof.

What is an “intentional” fire.

All definitions of relevant fires assume the fire was intentionally or deliberately started. Merriam Webster’s Collegiate Dictionary, 10th edition, defines “incendiary” as an adjective to mean “of, relating to, or involving a deliberate burning of property.” This suggests a focus on monetary harm and would exclude the leading cause of fire-related death in Japan, which they term “incendiary suicide.” “Intentional” appears to be a better word, with no connotation of narrow focus on any particular type of harm. However, NFIRS Version 5.0 does not provide a definition of “intentional.”

What is a hostile fire?

A person who lights a stove burner or lights a wood stove is deliberately starting a fire, but such fires are not arson, because the purpose of the fire is socially condoned, in this case, cooking food or heating a space used for shelter. Even if ignition is conducted in a reckless manner, recklessness does not mean intentional. (Fire incident coding manuals even cite “reckless” and “careless” as examples of “unintentional.”) Someone who sets fire to a pile of rubbish for the purpose of solid waste disposal is deliberately starting a fire but for a socially condoned purpose, while someone who sets fire to that same pile of rubbish without that legitimate purpose is guilty of setting an intentional fire.

An “intentional” fire, therefore, is a fire that threatens harm or is started in a manner inconsistent with the goal of a controlled fire that avoids harm.

What is “intention”?

A child may initiate a fire without intending harm or intending any legitimate purpose for the fire. Even a child in crisis who starts a fire as a cry for help may not intend the fire to cause harm. In law, each state has a minimum age below which a child is presumed to be unable to form the intent to harm as we use it here. A fire started by such a child would be coded as “child playing.” However, this term was problematic in that “playing” seemed to convey not so much an absence of conscious or legally defined intent as the presence of a frivolous intention of reckless

entertainment. Attempts to replace the phrase “child playing” with “juvenile firesetter or firestarter” or “experimentation” solved the problem of inappropriately ascribing a frivolous intention but left intact, or even strengthened, the connotation that the fire was intended. The notion of a person incapable (legally, morally) of intending a fire was not firmly and clearly addressed.

In NFIRS prior to 1999, the data element of Ignition Factor forced a choice between “incendiary,” “suspicious” “child playing,” and many other fire causes. A fire could be “incendiary or suspicious” or “child playing” (or neither) but not both. There was also an Ignition Factor code to use if mental impairment or drug or alcohol impairment led to misuse of the heat of ignition. In NFIRS Version 5.0, “intentional” is identified on a different data element from the one used to identify playing, drug or alcohol impairment, or mental impairment, and that second data element can accept multiple values for one or two of these several possible reasons for not being able to form a legal intention. Also, a fire coded in Version 5.0 can ascribe “playing” as a factor but choose not to ascribe age as a factor (e.g., reckless fireplay by college students) or cite age as a factor for an older child – or even an older adult (e.g., a person with senile dementia whose condition leads to reckless fireplay without intention to harm).

For technical reasons, it would be difficult to exclude certain fires coded as intentional on the grounds that other codes (e.g., age coded as a factor, person who started the fire coded as 3 years old) create a presumption against the firestarter being deemed capable of forming an intention. It has been NFPA practice when dealing with apparently or potentially incompatible data entries for an incident to avoid any presumption that we know or can reliably estimate which data entry was correct. Therefore, our analysis includes all intentional fires.

Who or what is harmed? For example, is it arson if you burn your own house?

In many states, the legal answer is no, although the act may be chargeable as malicious mischief or some other offense. For purposes of analysis, it is more straightforward – and arguably more in keeping with what we mean when we use the term “arson” casually – to ignore nuances of value and ownership and include any fire intentionally started with no socially condoned purpose.

If a pile of rubbish is ignited for solid waste disposal, but poor fire control allows it to spread, then the socially condoned intent controls, and the fire is considered unintentional. If the same pile of rubbish is ignited as a means of burning the adjacent house, no matter who owns it or what the financial consequences might be, that fire is intentional. If the rubbish pile is ignited in order to burn the house, but the fire is stopped before it spreads to valuable property, the intent was still not socially condoned, and that act of attempted arson (or some other attempted crime) is intentional. If the rubbish pile is ignited by a child old enough to form an intent, without a socially condoned purpose, then that fire will be intentional but could also be coded as playing (which also has no formal definition in NFIRS Version 5.0).

For our analysis, fire department statistics on intentional fires bypass the need to address specific legal nuances or state differences in the definition of arson. Those nuances and differences will affect the FBI statistics on arson offenses but are already incorporated into that data.

What is the strength of evidence?

Prior to 1999, NFIRS allowed fires to be coded as “suspicious,” and prior to 2001, the NFPA survey collected statistics on incendiary and suspicious fires, sometimes separately, sometimes only in combination. The coding guidance defines “suspicious” as follows: “circumstances indicate the possibility that the fire may have been deliberately set, multiple ignitions were found, or there were suspicious circumstances and no accidental or natural ignition factor could be found.”

In Version 5.0, effective with the 1999 data, NFIRS eliminated the category “suspicious.” The designation “suspicious” has been long criticized because the uncertainty it acknowledges looks like the product of incomplete investigation. This concern would argue that many “suspicious” fires would prove not to be intentional if they were fully and successfully investigated, and it would argue against the common practice of including all suspicious fires in a combined incendiary-and-suspicious group, deemed to be the best indicator of deliberately set fires.

Cause determination in general is necessarily based on negative evidence (i.e., the physical evidence appears to eliminate alternative causes) as much as or more than positive evidence. The third part of the definition of “suspicious” is arguably as strong a case for declaring a fire intentional as the evidence typically used to conclude that any other cause has been established. Intentional fires, when they were called incendiary fires, have historically been different because of the presumption that any fire declared incendiary should be filed as a criminal offense (arson or some other crime consistent with the nature of what was burned). This means criminal investigation and the possibility of criminal prosecution, at which point the proof required is proof that a crime was committed, a higher standard than the usual standard for determination of probable fire cause. (Some have argued that the proliferation of civil litigation against allegedly defective products has introduced concerns about the higher standard of proof required for a court case into cause determination for every other cause, not just arson.) But if we only seek consistent handling of every cause, a case can be made that most of what had been “suspicious” fires should now be coded as “intentional” fires – that the conversion rules should also be the ongoing rules for recording fire cause.

Intentional Fires and Arson Offenses

In 2005, an estimated 323,900 intentional fires were reported to U.S. fire departments.

The 323,900 intentional fires were associated with losses of 490 civilian fire deaths, 3 firefighter on-duty deaths (at the scene of or during response or return to or from an intentional fire), 1,500 civilian fire injuries, 7,600 firefighter on-duty injuries (at the scene of an intentional fire but not including response/return injuries) and \$1.102 billion in direct property damage. (See Tables 1-4 and Appendix A for statistical methods.)

The trends in intentional fires and associated losses have been downward since 1980.

There was a more pronounced decline in 1999 with the introduction of NFIRS Version 5.0 and the associated removal of “suspicious” as a coding option. See Appendix B for analysis of the different components of the intentional fire problem, analyzed using different approaches. The implication of these analyses is that by 2005, estimated intentional fires were close to where the long-term trend for 1980-1998 for incendiary and suspicious fires was headed. For other losses – civilian deaths, civilian injuries, and direct property damage – the estimates are clearly below the points where the trend lines were headed, but the gap is reduced if the steeper downward trend for incendiary fires alone is applied to the incendiary and suspicious total.

It is reasonable to estimate that some fires that would have been coded as suspicious are now being coded as intentional, and the rest are being coded as unknown. The various trend analyses suggest that most are being coded as intentional and that this practice has a more dramatic and visible effect on loss estimates where the suspicious share of incendiary and suspicious had been growing from 1980 to 1998.

One other source of arson estimates is the NFPA survey, which has provided estimates of incendiary structure fires through 2000 and intentional structure fires afterwards. The NFPA survey estimates include no allocation of unknowns but are usually released at least a year before NFIRS national estimates are available. Another source is the Federal Bureau of Investigation’s Uniform Crime Reports, which does not take account of gaps in reporting in its published numbers of arson crimes but does in estimating arson offense rates relative to population. Table 5 shows the latest statistics from both sources. These two estimates tend to track very closely together, with both running below the NFIRS national estimates, as would be expected because the NFIRS national estimates include an allocation of unknowns. All three estimates show a long-term downward trend in intentional fires and arson offenses.

Lavatories and exterior wall surfaces are among the leading areas of origin for intentional fires in a number of property use groups, but they account for much smaller shares of property damage than of incidents.

Tables 6-9 show the patterns by areas of origin for intentional fires in public assembly properties, schools grade K to 12, stores and offices, and warehouses (including cold storage warehouses). Table 10 shows the intentional share of structures for various structure statuses, such as vacant or under construction.

As compared with unintentional fires, there are larger shares of intentional fires in rooms or areas that are low-traffic and somewhat more likely to give a firesetter time to start a fire unobserved, but

this is only a moderate shift from the patterns for unintentional fires. Rooms and areas with larger shares of damage than of fire incidents tend to have higher concentration of combustibles.

Overall, 10% of non-confined structure fires and 10% of associated direct property damage involve intentional fires. These percentages fall to 7% and 8% for properties that are occupied and operating, but rise to 56% and 62% for properties that are vacant and unsecured.

Rates of intentional structure fires or arson offenses, relative to population, are highest in large cities but are also higher in rural communities (under 2,500 population) than in small towns (say, 2,500 to 9,999 population).

Figure 1 and Table 11 make this point, while also showing that the differences by size of community vary from year to year and from measure to measure. The differences between rural communities and the largest cities are larger (close to 3-to-1 in recent years) for arson offenses than for intentional structure fires (typically 2-to-1 or less in recent years).

The percentage of structure fires that are intentional is largest for the large cities, and for this measure, there is no secondary peak for rural communities.

See Figure 2.

In the United Kingdom and Japan, the trends in intentional fires have been upward, in contrast to the trend in the U.S.

In the U.K., there had been a consistent and substantial upward trend in intentional fires, especially for vehicles, until 1994. A change in definitions in 1994 accounted for much of the increase in intentional building fires in that year, but intentional fires have declined most years since 1994. In Japan, a fairly consistent upward trend is seen for fires and monetary losses adjusted for inflation until 1995, when the downward trend began. In Canada, there has been no consistent trend up or down in set fires, in total or as a share of all fires, or in associated losses. (See Tables 12-15.)

Table 1. Intentional Fires

| Year | Structures | | Vehicles | Other | Total | |
|-------------|-------------------|----------|-----------------|--------------|--------------|-----------|
| 1980 | 201,200 | | 74,800 | 583,800 | 859,800 | |
| 1981 | 190,900 | | 65,500 | 568,200 | 824,600 | |
| 1982 | 159,800 | | 56,000 | 450,900 | 666,700 | |
| 1983 | 138,800 | | 55,300 | 381,100 | 575,200 | |
| 1984 | 136,000 | | 64,500 | 370,500 | 571,100 | |
| 1985 | 143,600 | | 72,900 | 381,000 | 597,500 | |
| 1986 | 140,500 | | 78,600 | 373,500 | 592,600 | |
| 1987 | 129,100 | | 76,500 | 368,900 | 574,500 | |
| 1988 | 125,100 | | 72,500 | 385,800 | 583,400 | |
| 1989 | 117,000 | | 70,000 | 332,600 | 519,600 | |
| 1990 | 111,900 | | 76,200 | 351,400 | 539,500 | |
| 1991 | 113,900 | | 76,800 | 367,400 | 558,100 | |
| 1992 | 116,600 | | 73,500 | 355,100 | 545,200 | |
| 1993 | 104,400 | | 68,200 | 347,200 | 519,800 | |
| 1994 | 107,900 | | 66,600 | 376,500 | 551,000 | |
| 1995 | 99,300 | | 66,300 | 368,300 | 533,900 | |
| 1996 | 98,800 | | 74,400 | 351,500 | 524,800 | |
| 1997 | 85,000 | | 64,500 | 293,300 | 442,800 | |
| 1998 | 86,000 | | 66,300 | 294,900 | 447,200 | |
| 1999 | 62,500 | (44,100) | 29,300 | 251,000 | 342,900 | (324,400) |
| 2000 | 54,800 | (40,000) | 25,900 | 226,700 | 307,500 | (292,600) |
| 2001 | 48,600 | (33,800) | 24,200 | 251,100 | 323,800 | (309,100) |
| 2002 | 52,300 | (33,100) | 28,900 | 242,900 | 324,100 | (304,900) |
| 2003 | 52,800 | (28,400) | 24,800 | 235,400 | 312,900 | (288,500) |
| 2004 | 49,500 | (29,100) | 23,000 | 232,600 | 305,100 | (284,700) |
| 2005 | 55,500 | (29,100) | 26,000 | 242,400 | 323,900 | (297,500) |

Notes: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Prior to 1999, intentional fires include fires coded as incendiary or suspicious. These estimates include a proportional share of unknown cause fires, defined as unknown Ignition Factor in 1998 and earlier years and as unknown Cause before or after investigation in 1999 and later years. From 1999 on, only fires reported in NFIRS Version 5.0 are used in the estimation. Allocation of unknowns is done separately for structure, vehicle, and other fires, and from 1999 on, for confined vs. non-confined structure fires and for outdoor trash fires vs. other outdoor fires. Numbers in parentheses for 1999 and later exclude confined fires. Fires are estimated to the nearest hundred.

Source: Data from NFIRS Version 4.1 (1980-1998) and Version 5.0 (1999-2005) and NFPA survey.

Table 2. Deaths in Intentional Fires

| Year | Civilian Fire Deaths in | | | | Total | Firefighters Fatally Injured At Scene or During Response |
|------|-------------------------|----------|-------|--|-----------|---|
| | Structures | Vehicles | Other | | | |
| 1980 | 930 | 30 | 20 | | 980 | 24 |
| 1981 | 810 | 20 | 20 | | 850 | 21 |
| 1982 | 930 | 30 | 10 | | 970 | 20 |
| 1983 | 860 | 190 | 10 | | 1,070 | 16 |
| 1984 | 660 | 30 | 20 | | 710 | 15 |
| 1985 | 720 | 40 | 30 | | 800 | 29 |
| 1986 | 800 | 40 | 10 | | 850 | 24 |
| 1987 | 730 | 60 | 30 | | 820 | 27 |
| 1988 | 870 | 40 | 10 | | 930 | 25 |
| 1989 | 840 | 50 | 10 | | 910 | 16 |
| 1990 | 810 | 30 | 10 | | 850 | 15 |
| 1991 | 690 | 30 | 10 | | 740 | 17 |
| 1992 | 720 | 30 | 10 | | 760 | 13 |
| 1993 | 840 | 40 | 10 | | 890 | 9 |
| 1994 | 500 | 50 | 10 | | 560 | 14 |
| 1995 | 740 | 70 | 10 | | 820 | 13 |
| 1996 | 680 | 60 | 10 | | 760 | 5 |
| 1997 | 660 | 40 | 10 | | 710 | 6 |
| 1998 | 640 | 40 | 10 | | 680 | 10 |
| 1999 | 390 (390) | 0 | 0 | | 390 (390) | 8 |
| 2000 | 390 (390) | 40 | 0 | | 430 (430) | 9 |
| 2001 | 370 (370) | 10 | 10 | | 390 (390) | 5 |
| 2002 | 330 (330) | 80 | 10 | | 420 (420) | 12 |
| 2003 | 450 (450) | 50 | 30 | | 530 (530) | 5 |
| 2004 | 310 (310) | 30 | 20 | | 350 (350) | 3 |
| 2005 | 430 (430) | 40 | 20 | | 490 (490) | 3 |

Note: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Prior to 1999, intentional fires include fires coded as incendiary or suspicious. These estimates include a proportional share of unknown cause fires, defined as unknown Ignition Factor in 1998 and earlier years and as unknown Cause before or after investigation in 1999 and later years. From 1999 on, only fires reported in NFIRS Version 5.0 are used in the estimation. Allocation of unknowns is done separately for structure, vehicle, and other fires, and from 1999 on, for confined vs. non-confined structure fires and for outdoor trash fires vs. other outdoor fires. Numbers in parentheses for 1999 and later exclude confined fires. Civilian deaths are estimated to the nearest ten and firefighter deaths are estimated to the nearest one.

Source: Data from NFIRS Version 4.1 (1980-1998) and Version 5.0 (1999-2005) and NFPA survey.

Table 3. Injuries in Intentional Fires

| Year | Civilian Fire Injuries in | | | | Firefighters Injured at Scene or During Response or Return | | |
|------|---------------------------|----------|-------|-------|--|---------|-------|
| | Structures | Vehicles | Other | Total | | | |
| 1980 | 3,010 | 180 | 150 | 3,340 | - | - | |
| 1981 | 3,790 | 190 | 170 | 4,150 | - | - | |
| 1982 | 3,420 | 100 | 120 | 3,640 | - | - | |
| 1983 | 3,160 | 130 | 120 | 3,410 | - | - | |
| 1984 | 2,640 | 120 | 170 | 2,930 | - | - | |
| 1985 | 2,840 | 140 | 140 | 3,120 | 11,300 | | |
| 1986 | 2,930 | 170 | 110 | 3,200 | 10,600 | | |
| 1987 | 2,700 | 180 | 130 | 3,010 | 8,300 | | |
| 1988 | 3,140 | 140 | 140 | 3,420 | 9,900 | | |
| 1989 | 2,990 | 150 | 110 | 3,250 | 9,600 | | |
| 1990 | 3,190 | 170 | 110 | 3,480 | 10,500 | | |
| 1991 | 3,390 | 130 | 170 | 3,700 | 10,800 | | |
| 1992 | 3,170 | 160 | 170 | 3,500 | 10,200 | | |
| 1993 | 3,330 | 100 | 150 | 3,580 | 8,900 | | |
| 1994 | 3,070 | 160 | 220 | 3,450 | 9,300 | | |
| 1995 | 2,550 | 130 | 180 | 2,860 | 7,900 | | |
| 1996 | 2,650 | 110 | 160 | 2,920 | 6,500 | | |
| 1997 | 2,090 | 120 | 120 | 2,330 | 6,100 | | |
| 1998 | 2,320 | 160 | 220 | 2,700 | 5,600 | | |
| 1999 | 2,030 | (2,030) | 110 | 230 | 2,340 | (2,340) | 8,700 |
| 2000 | 1,280 | (1,200) | 40 | 200 | 1,520 | (1,430) | 6,600 |
| 2001 | 1,630 | (1,630) | 110 | 190 | 1,920 | (1,920) | 4,500 |
| 2002 | 1,390 | (1,320) | 50 | 170 | 1,610 | (1,540) | 5,200 |
| 2003 | 1,190 | (1,110) | 80 | 230 | 1,490 | (1,410) | 5,300 |
| 2004 | 1,090 | (1,060) | 70 | 260 | 1,420 | (1,380) | 6,300 |
| 2005 | 1,200 | (1,140) | 80 | 220 | 1,500 | (1,450) | 7,600 |

Notes: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Prior to 1999, intentional fires include fires coded as incendiary or suspicious. These estimates include a proportional share of unknown cause fires, defined as unknown Ignition Factor in 1998 and earlier years and as unknown Cause before or after investigation in 1999 and later years. From 1999 on, only fires reported in NFIRS Version 5.0 are used in the estimation. Allocation of unknowns is done separately for structure, vehicle, and other fires, and from 1999 on, for confined vs. non-confined structure fires and for outdoor trash fires vs. other outdoor fires. Numbers in parentheses for 1999 and later exclude confined fires. Civilian injuries are estimated to the nearest ten and firefighter injuries to the nearest hundred.

Source: Data from NFIRS Version 4.1 (1980-1998) and Version 5.0 (1999-2005) and NFPA survey.

Table 4. Direct Property Damage (in Millions) in Intentional Fires

| Year | Structures | Vehicles | Other | Total | Total in 2005 Dollars | |
|-------|------------|-----------|-------|---------|--------------------------|---------|
| 1980 | \$1,776 | \$143 | \$19 | \$1,938 | \$4,600 | |
| 1981 | \$1,994 | \$108 | \$32 | \$2,135 | \$4,578 | |
| 1982 | \$1,918 | \$115 | \$21 | \$2,054 | \$4,152 | |
| 1983 | \$1,675 | \$166 | \$14 | \$1,854 | \$3,633 | |
| 1984 | \$1,549 | \$176 | \$13 | \$1,738 | \$3,261 | |
| 1985 | \$1,920 | \$142 | \$22 | \$2,084 | \$3,778 | |
| 1986 | \$1,786 | \$179 | \$17 | \$1,983 | \$3,536 | |
| 1987 | \$1,803 | \$185 | \$14 | \$2,002 | \$3,441 | |
| 1988 | \$1,878 | \$215 | \$21 | \$2,114 | \$3,493 | |
| 1989 | \$1,584 | \$222 | \$32 | \$1,838 | \$2,897 | |
| 1990 | \$1,763 | \$244 | \$37 | \$2,044 | \$3,058 | |
| 1991* | \$2,167 | \$268 | \$9 | \$2,444 | \$3,504 | |
| 1992* | \$2,133 | \$235 | \$63 | \$2,431 | \$3,385 | |
| 1993* | \$1,667 | \$207 | \$13 | \$1,886 | \$2,550 | |
| 1994 | \$1,756 | \$238 | \$33 | \$2,027 | \$2,673 | |
| 1995 | \$2,145 | \$267 | \$26 | \$2,438 | \$3,124 | |
| 1996 | \$1,802 | \$263 | \$29 | \$2,094 | \$2,609 | |
| 1997 | \$1,405 | \$293 | \$16 | \$1,758 | \$2,140 | |
| 1998 | \$1,467 | \$324 | \$86 | \$1,877 | \$2,248 | |
| 1999* | \$981 | (\$981) | \$170 | \$14 | \$1,165 (\$1,164) | \$1,365 |
| 2000 | \$1,140 | (\$1,138) | \$124 | \$170 | \$1,434 (\$1,432) | \$1,627 |
| 2001* | \$840 | (\$836) | \$91 | \$13 | \$944 (\$939) | \$1,041 |
| 2002 | \$914 | (\$912) | \$161 | \$6 | \$1,080 (\$1,078) | \$1,173 |
| 2003 | \$861 | (\$858) | \$142 | \$27 | \$1,030 (\$1,027) | \$1,095 |
| 2004 | \$816 | (\$815) | \$128 | \$40 | \$984 (\$983) | \$1,019 |
| 2005 | \$917 | (\$913) | \$173 | \$13 | \$1,102 (\$1,098) | \$1,102 |

*Figures for 1991 are distorted by the Oakland wildfire, which by itself accounted for \$1.5 billion in home structure fire damage. This fire was a rekindle of a suspicious fire. The national estimates approach has difficulty handling this fire, and the 1991 figures reflect only a fraction of this fire's loss. Similarly, figures for 1992 are overstated due to problems in handling the 1992 Los Angeles civil disturbance fires. Figures for 1993 are understated because they do not fully reflect losses in the three largest-loss incendiary and suspicious fires of 1993. Figures for 1999 are overstated by roughly half a billion dollars because of a household goods store fire coded as a \$250 million loss where there was no such incident, a probable miscoding of the loss amount. Figures exclude the events of September 11, 2001.

Notes: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Prior to 1999, intentional fires include fires coded as incendiary or suspicious. These estimates include a proportional share of unknown cause fires, defined as unknown Ignition Factor in 1998 and earlier years and as unknown Cause before or after investigation in 1999 and later years. From 1999 on, only fires reported in NFIRS Version 5.0 are used in the estimation. Allocation of unknowns is done separately for structure, vehicle, and other fires, and from 1999 on, for confined vs. non-confined structure fires and for outdoor trash fires vs. other outdoor fires. Numbers in parentheses for 1999 and later exclude confined fires. Damages are estimated to the nearest million dollars, and inflation adjustment is made using the consumer price index for purchasing power of the dollar, as shown in the *Statistical Abstract of the United States*.

Source: Data from NFIRS Version 4.1 (1980-1998) and Version 5.0 (1999-2005) and NFPA survey.

Table 5. Size of the U.S. Intentional Fire and Arson Problems

A. 2006 Fires Reported to U.S. Fire Departments (NFPA Survey)

| Intentional Fires | 2006 Intentionally Set Fires | Percent of Fires of All Causes* | Comparison with 2005 |
|------------------------------------|-------------------------------------|--|-----------------------------|
| Structure fires | 31,000 | 6 | -2% |
| Property damage in structure fires | \$755 Million | 8 | +14% |
| Civilian deaths in structure fires | 305 | 11 | -3% |
| Vehicle fires | 20,500 | 7 | -2% |
| Property damage in vehicle fires | \$134 Million | 10 | +19% |

B. 2005 Crimes Reported to U.S. Law Enforcement Agencies (FBI Uniform Crime Reports)

| Reported Arson Offenses* | 2005 Arson Offenses | Percent of Reported Arsons | Change Since 2004 |
|--|----------------------------|-----------------------------------|--------------------------|
| Arson offense rate per 100,000 population - structures | 11.7 | 44 | -7% |
| Arson offense rate per 100,000 population - mobile property | 7.8 | 29 | -8% |
| Arson offense rate per 100,000 population - outdoor property | 7.4 | 27 | +4% |
| Arson offense rate per 100,000 population - all properties | 26.9 | 100 | -5% |

*Arson offense rates do not appear in this form in the FBI reports. Rates by property type were calculated by the NFPA as products of the FBI overall arson rate per 100,000 population (based on about three-fourths of reporting agencies) times the percentage of all arson offenses by property type (shown in the second column and based on nearly all reporting agencies).

Sources: NFPA survey, FBI's *Crime in the U.S.*

**Table 6. Intentional Fires in Public Assembly Properties, by Area of Origin
Annual Average of 2002-2005 Non-Confined Structure Fires**

| Area of Origin | Fires | | Direct Property Damage (in Millions) | |
|---|-------|--------|---|--------|
| Bathroom, locker room, or check room | 260 | (23%) | \$1 | (1%) |
| Exterior wall surface | 70 | (6%) | \$4 | (9%) |
| Unclassified outside area | 60 | (6%) | \$1 | (2%) |
| Assembly area for fewer than 100 persons | 50 | (5%) | \$2 | (3%) |
| Kitchen | 40 | (4%) | \$1 | (3%) |
| Multiple areas of origin | 40 | (4%) | \$7 | (14%) |
| Lobby or entrance way | 40 | (3%) | \$3 | (7%) |
| Unclassified area of origin | 40 | (3%) | \$0 | (0%) |
| Unclassified structural area | 30 | (3%) | \$0 | (1%) |
| Unclassified means of egress | 30 | (3%) | \$1 | (2%) |
| Unclassified storage area | 30 | (2%) | \$3 | (6%) |
| Office | 30 | (2%) | \$9 | (19%) |
| Storage room, area, tank, or bin | 30 | (2%) | \$1 | (1%) |
| Exterior stairway, ramp, or fire escape | 20 | (2%) | \$1 | (2%) |
| Wall assembly or concealed space | 20 | (2%) | \$0 | (0%) |
| Common room or lounge | 20 | (2%) | \$1 | (1%) |
| Bar, cafeteria, or dining room | 20 | (2%) | \$2 | (4%) |
| Unclassified assembly or sales area | 20 | (2%) | \$2 | (3%) |
| Exterior roof surface | 20 | (2%) | \$1 | (2%) |
| Large open room without fixed seats | 20 | (2%) | \$2 | (4%) |
| Supply or tool storage area | 20 | (2%) | \$0 | (1%) |
| Lawn, field or other open area outside building | 20 | (2%) | \$0 | (0%) |
| Other known area of origin | 190 | (17%) | \$7 | (15%) |
| Total | 1,120 | (100%) | \$49 | (100%) |

Note: These are national estimates of fires reported to U.S. municipal departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten and direct property damage to the nearest million dollars. Damage has not been adjusted for inflation. Figures reflect a proportional share of fires with Cause of Ignition unreported, blank, or unknown before or after investigation. There is no adjustment for the absence of a suspicious fires coding option. Intentional fires with unknown area of origin are also proportionally allocated.

Source: Data from NFIRS Version 5.0 and NFPA survey.

**Table 7. Intentional Fires in Schools Grades K to 12, by Area of Origin
Annual Average of 2002-2005 Non-Confined Structure Fires**

| Area of Origin | Fires | | Direct Property Damage (in Millions) | |
|---|--------------|---------------|---|---------------|
| | Count | Percentage | Amount | Percentage |
| Bathroom, locker room, or check room | 490 | (44%) | \$1 | (2%) |
| Corridor or hallway | 80 | (7%) | \$0 | (1%) |
| Assembly area for fewer than 100 persons | 70 | (7%) | \$4 | (14%) |
| Unclassified means of egress | 30 | (3%) | \$0 | (1%) |
| Unclassified outside area | 30 | (3%) | \$0 | (1%) |
| Unclassified function area | 30 | (3%) | \$1 | (2%) |
| Unclassified storage area | 30 | (3%) | \$0 | (1%) |
| Unclassified area of origin | 30 | (2%) | \$2 | (7%) |
| Exterior wall surface | 20 | (2%) | \$0 | (0%) |
| Office | 20 | (2%) | \$7 | (24%) |
| Multiple areas of origin | 20 | (2%) | \$1 | (4%) |
| Interior stairway or ramp | 20 | (2%) | \$0 | (0%) |
| Closet | 20 | (2%) | \$1 | (3%) |
| Lobby or entrance way | 20 | (1%) | \$0 | (0%) |
| Exterior stairway, ramp, or fire escape | 20 | (1%) | \$0 | (0%) |
| Storage room, area, tank, or bin | 10 | (1%) | \$0 | (1%) |
| Wall assembly or concealed space | 10 | (1%) | \$0 | (0%) |
| Supply or tool storage area | 10 | (1%) | \$0 | (0%) |
| Large open room without fixed seats | 10 | (1%) | \$6 | (20%) |
| Unclassified assembly area | 10 | (1%) | \$1 | (3%) |
| Large assembly area with fixed seats | 10 | (1%) | \$1 | (4%) |
| Kitchen | 10 | (1%) | \$0 | (0%) |
| Vacant structural area | 10 | (1%) | \$0 | (1%) |
| Exterior surface of vehicle | 10 | (1%) | \$0 | (0%) |
| Lawn, field or other open area outside building | 10 | (1%) | \$0 | (0%) |
| Crawl space or substructure space | 10 | (1%) | \$0 | (0%) |
| Trash chute, area or container | 10 | (1%) | \$0 | (1%) |
| Common room or lounge | 10 | (1%) | \$0 | (0%) |
| Courtyard, terrace or patio | 10 | (1%) | \$0 | (0%) |
| Other known area of origin | 50 | (4%) | \$2 | (8%) |
| Total | 1,100 | (100%) | \$31 | (100%) |

Note: These are national estimates of fires reported to U.S. municipal departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten and direct property damage to the nearest million dollars. Damage has not been adjusted for inflation. Figures reflect a proportional share of fires with Cause of Ignition unreported, blank, or unknown before or after investigation. There is no adjustment for the absence of a suspicious fires coding option. Intentional fires with unknown area of origin are also proportionally allocated.

Source: Data from NFIRS Version 5.0 and NFPA survey.

**Table 8. Intentional Fires in Stores and Offices, by Area of Origin
Annual Average of 2002-2005 Non-Confined Structure Fires**

| Area of Origin | Fires | | Direct Property Damage (in Millions) | |
|---|-------|--------|---|--------|
| Sales or showroom area | 150 | (10%) | \$11 | (11%) |
| Exterior wall surface | 110 | (8%) | \$5 | (5%) |
| Office | 110 | (8%) | \$13 | (14%) |
| Bathroom, locker room or check room | 100 | (7%) | \$1 | (1%) |
| Lobby or entrance way | 80 | (6%) | \$5 | (5%) |
| Unclassified storage area | 60 | (4%) | \$15 | (16%) |
| Unclassified means of egress | 50 | (4%) | \$4 | (4%) |
| Storage room, area, tank, or bin | 50 | (4%) | \$3 | (3%) |
| Unclassified outside area | 50 | (3%) | \$3 | (3%) |
| Unclassified assembly or sales area | 40 | (3%) | \$2 | (2%) |
| Multiple areas of origin | 40 | (3%) | \$4 | (4%) |
| Laundry room or area | 30 | (2%) | \$1 | (1%) |
| Shipping, receiving or loading area | 30 | (2%) | \$5 | (5%) |
| Unclassified function area | 30 | (2%) | \$2 | (2%) |
| Unclassified area of origin | 30 | (2%) | \$0 | (0%) |
| Exterior roof surface | 30 | (2%) | \$0 | (0%) |
| Unclassified structural area | 20 | (2%) | \$1 | (1%) |
| Exterior stairway, ramp, or fire escape | 20 | (2%) | \$1 | (1%) |
| Supply or tool storage area | 20 | (2%) | \$1 | (1%) |
| Maintenance or paint shop or area | 20 | (2%) | \$2 | (3%) |
| Wall assembly or concealed space | 20 | (2%) | \$0 | (0%) |
| Vacant structural area | 20 | (1%) | \$0 | (0%) |
| Garage or vehicle storage area | 20 | (1%) | \$2 | (2%) |
| Hallway, corridor or mall | 20 | (1%) | \$1 | (1%) |
| Other known area of origin | 250 | (18%) | \$11 | (12%) |
| Total | 1,410 | (100%) | \$94 | (100%) |

Note: These are national estimates of fires reported to U.S. municipal departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten and direct property damage to the nearest million dollars. Damage has not been adjusted for inflation. Figures reflect a proportional share of fires with Cause of Ignition unreported, blank, or unknown before or after investigation. There is no adjustment for the absence of a suspicious fires coding option. Intentional fires with unknown area of origin are also proportionally allocated.

Source: Data from NFIRS Version 5.0 and NFPA survey.

**Table 9. Intentional Fires in Warehouses (Including Cold Storage Warehouses), by Area of Origin
Annual Average of 2002-2005 Non-Confined Structure Fires**

| Area of Origin | Fires | | Direct Property Damage (in Millions) | |
|-------------------------------------|-------|--------|---|--------|
| Unclassified storage area | 30 | (20%) | \$3 | (10%) |
| Storage room, area, tank or bin | 20 | (13%) | \$4 | (16%) |
| Shipping, receiving or loading area | 10 | (9%) | \$9 | (34%) |
| Office | 10 | (5%) | \$1 | (6%) |
| Multiple areas of origin | 10 | (4%) | \$1 | (2%) |
| Unclassified outside area | 10 | (4%) | \$6 | (25%) |
| Exterior wall surface | 10 | (4%) | \$0 | (0%) |
| Supply or tool storage area | 10 | (4%) | \$0 | (1%) |
| Vacant structural area | 10 | (4%) | \$0 | (1%) |
| Other known area of origin | 50 | (31%) | \$1 | (4%) |
| Total | 160 | (100%) | \$26 | (100%) |

Note: These are national estimates of fires reported to U.S. municipal departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are rounded to the nearest ten and direct property damage to the nearest million dollars. Damage has not been adjusted for inflation. Figures reflect a proportional share of fires with Cause of Ignition unreported, blank, or unknown before or after investigation. There is no adjustment for the absence of a suspicious fires coding option. Intentional fires with unknown area of origin are also proportionally allocated.

Source: Data from NFIRS Version 5.0 and NFPA survey.

**Table 10. Intentional fires as Share of
2002-2005 Non-Confined Structure Fires, by Structure Status**

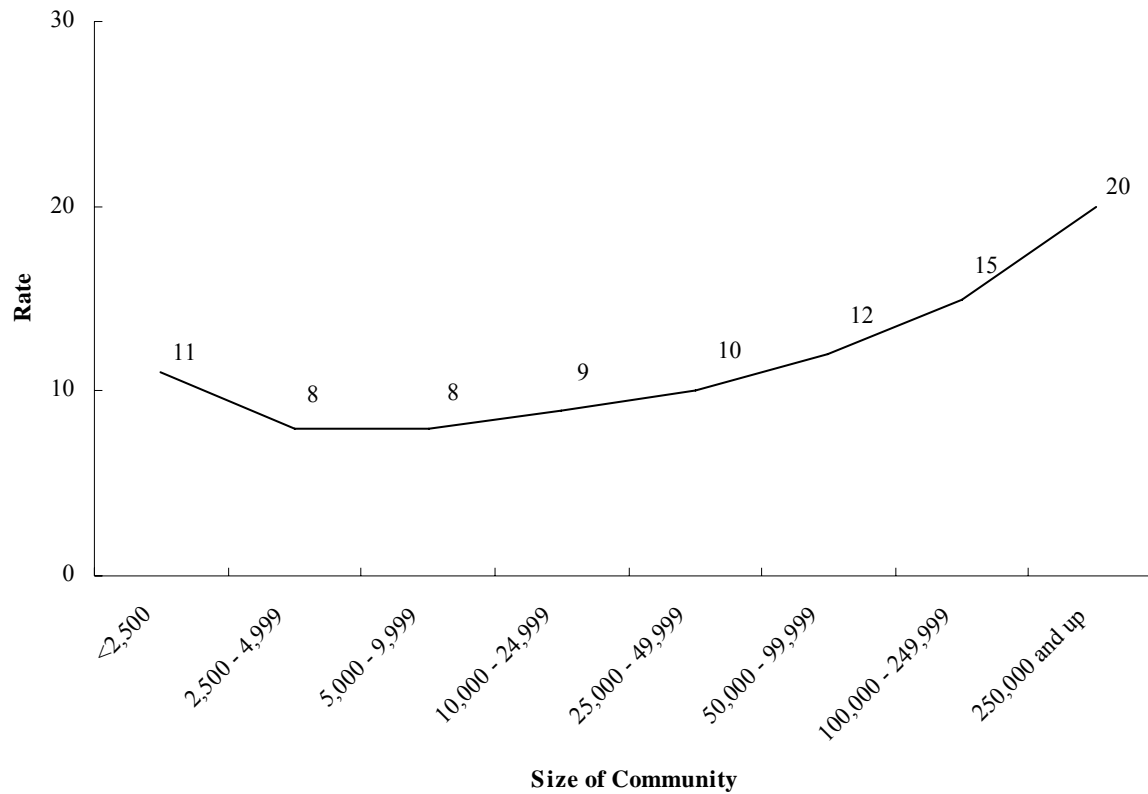
| Structure Status | Percentage of All Structure Fires That Are Intentional | Percentage of All Structure Fire Direct Property Damage in Intentional Fires |
|---------------------------|---|---|
| Vacant and unsecured | 56% | 62% |
| Being demolished | 44% | 16% |
| Vacant and secured | 32% | 30% |
| Idle (not routinely used) | 22% | 21% |
| Under construction | 16% | 36% |
| Under major renovation | 13% | 17% |
| Occupied and operating | 7% | 8% |
| All structure statuses* | 10% | 10% |

*Includes fires with unknown or unclassified structure status, not shown above.

Note: these are national estimates of fires reported to U.S. municipal departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire.

Source: Data from NFIRS Version 5.0 and NFPA survey.

Figure 1.
U.S. Intentional Structure Fire Rate
per 100,000 Population by Size of Community



Source: 2002-2006 NFPA survey.

**Table 11. U.S. Intentional Structure Fire and Arson Offense Rates
by Size of Community**

A. Intentional Structure Fires per 100,000 Population

| Size of Community | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 250,000 or more | 36 | 32 | 34 | 30 | 31 | 26 | 26 | 26 | 28 | 27 | 21 | 21 | 16 | 15 |
| 100,000 to 249,999 | 27 | 29 | 31 | 29 | 25 | 24 | 16 | 19 | 20 | 20 | 15 | 15 | 11 | 15 |
| 50,000 to 99,999 | 20 | 20 | 17 | 16 | 15 | 18 | 12 | 15 | 14 | 15 | 13 | 11 | 11 | 9 |
| 25,000 to 49,999 | 15 | 14 | 14 | 14 | 12 | 11 | 8 | 10 | 11 | 12 | 9 | 9 | 10 | 9 |
| 10,000 to 24,999 | 11 | 13 | 12 | 11 | 14 | 11 | 10 | 9 | 10 | 13 | 8 | 8 | 7 | 7 |
| 5,000 to 9,999 | 11 | 12 | 15 | 13 | 11 | 10 | 14 | 10 | 8 | 11 | 8 | 7 | 7 | 7 |
| 2,500 to 4,999 | 16 | 14 | 19 | 12 | 16 | 15 | 13 | 17 | 7 | 8 | 9 | 8 | 6 | 7 |
| Under 2,500 | 18 | 16 | 24 | 23 | 18 | 15 | 20 | 18 | 15 | 10 | 14 | 11 | 11 | 7 |

Note: FBI rates include non-structure fires (i.e., vehicles, outdoor fires). The FBI uses cities and other communities; the NFPA uses population coverage areas of fire departments. The FBI figures for cities under 10,000 population and rural counties may not correspond exactly to rates for communities of 2,500 to 9,999 and under 2,500 population, the definitions used in the NFPA survey. The FBI also reports rates for suburban counties and areas. As of 2003, FBI statistics replaced rural counties with non-metropolitan counties. NFPA statistics are for incendiary fires through 2000 and for intentional fires from 2001 on.

Source for Part A: NFPA survey and U.S. Census Bureau resident population statistics.

**Table 11. U.S. Intentional Structure Fire and Arson Offense Rates
by Size of Community (Continued)**

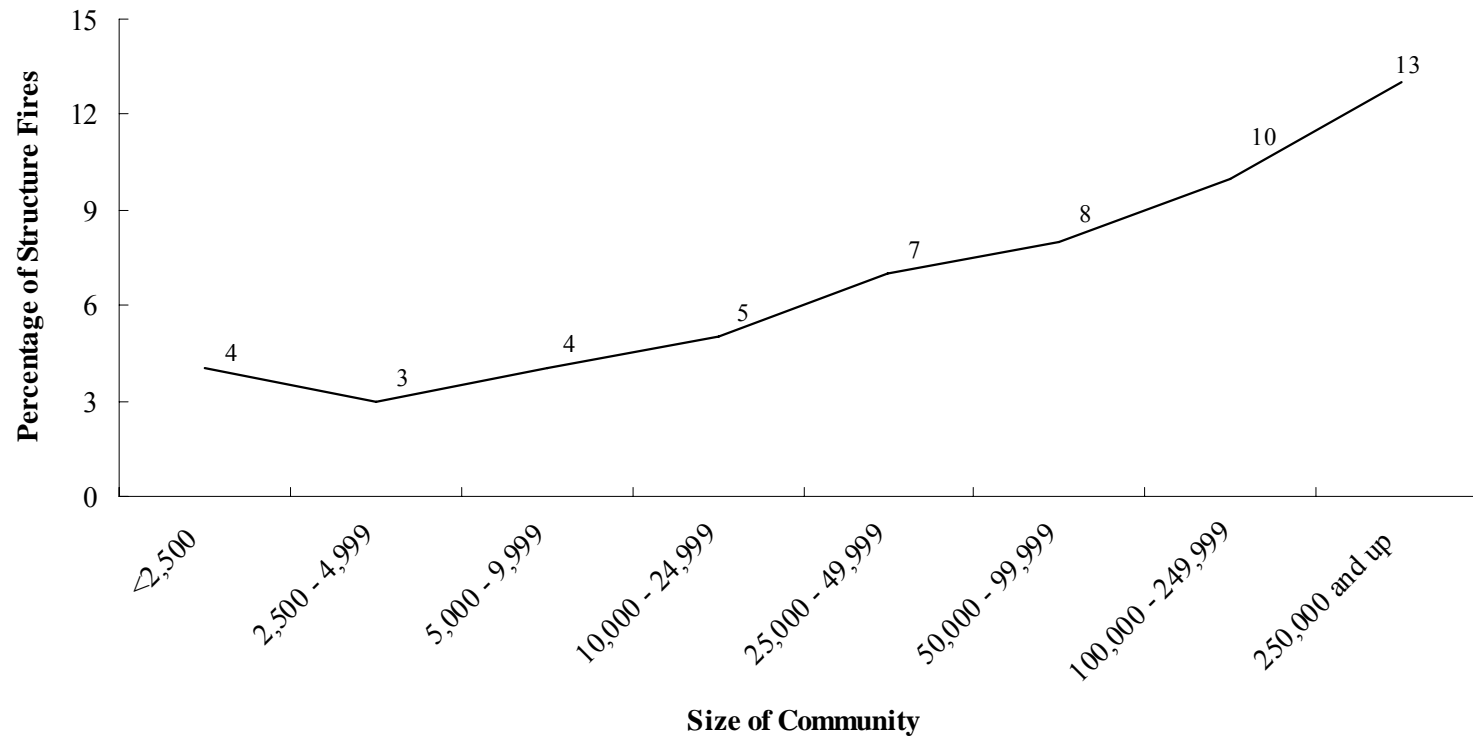
B. Arson Offenses in All Properties per 100,000 Population

| Size of Community | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 250,000 or more | 86 | 84 | 83 | 84 | 78 | 75 | 71 | 67 | 62 | 59 | 53 | 49 | 46 |
| 100,000 to 249,999 | 63 | 66 | 60 | 50 | 52 | 43 | 43 | 40 | 38 | 39 | 35 | 30 | 30 |
| 50,000 to 99,999 | 41 | 43 | 42 | 41 | 36 | 34 | 33 | 31 | 32 | 29 | 28 | 26 | 24 |
| 25,000 to 49,999 | 34 | 37 | 36 | 36 | 31 | 28 | 27 | 26 | 25 | 24 | 23 | 23 | 23 |
| 10,000 to 24,999 | 26 | 28 | 29 | 27 | 24 | 22 | 21 | 19 | 21 | 20 | 20 | 19 | 18 |
| Cities under 10,000 | 28 | 31 | 35 | 30 | 28 | 28 | 26 | 24 | 27 | 25 | 22 | 22 | 21 |
| Rural counties | 19 | 19 | 21 | 19 | 18 | 18 | 18 | 18 | 19 | 17 | 18 | 17 | 17 |

Note: FBI rates include non-structure fires (i.e., vehicles, outdoor fires). The FBI uses cities and other communities; the NFPA uses population coverage areas of fire departments. The FBI figures for cities under 10,000 population and rural counties may not correspond exactly to rates for communities of 2,500 to 9,999 and under 2,500 population, the definitions used in the NFPA survey. The FBI also reports rates for suburban counties and suburban areas. As of 2003, FBI statistics replaced rural counties with non-metropolitan counties. NFPA statistics are for incendiary fires through 2000 and for intentional fires from 2001 on.

Source for Part B: FBI and U.S. Census Bureau resident population statistics.

Figure 2.
U.S. Intentional Fire Percentage of
Structure Fires, by Size of Community



Source: 2002-2006 NFPA survey.

Table 12. Intentional Fires in Other Countries

| Year | <u>United Kingdom</u> | | <u>Japan structures</u> | | | <u>Canada</u> | |
|------|-----------------------|--------|-------------------------|-----------------|-------|---------------|----------------------|
| | Buildings | Cars | Arson | Suspected arson | Total | Set fires | Percent of all fires |
| 1990 | 23,600 | 19,800 | 2,600 | 2,000 | 4,700 | 10,400 | 15% |
| 1991 | 24,900 | 33,100 | 2,700 | 2,100 | 4,800 | 11,000 | 16% |
| 1992 | 26,300 | 41,000 | 2,700 | 2,300 | 5,000 | 12,100 | 18% |
| 1993 | 27,700 | 39,800 | 3,300 | 2,300 | 5,600 | 11,400 | 17% |
| 1994 | 36,100 | 34,300 | 3,100 | 2,400 | 5,400 | 10,900 | 16% |
| 1995 | 35,700 | 35,400 | 3,100 | 2,400 | 5,500 | 11,900 | 19% |
| 1996 | 35,600 | 38,300 | 3,300 | 2,500 | 5,800 | 12,000 | 20% |
| 1997 | 32,700 | 36,400 | 3,600 | 2,500 | 6,000 | 9,600 | 17% |
| 1998 | 30,500 | 42,700 | 3,600 | 2,400 | 6,000 | 10,600 | 18% |
| 1999 | 31,800 | 56,200 | 3,700 | 2,300 | 6,000 | 10,200 | 18% |
| 2000 | 32,200 | 63,000 | 3,800 | 2,500 | 6,300 | 8,200 | 15% |
| 2001 | 34,600 | 70,200 | 3,800 | 2,500 | 6,300 | 10,900 | 20% |
| 2002 | 31,300 | 68,700 | 3,900 | 2,600 | 6,500 | 10,000 | 19% |
| 2003 | 32,100 | 62,600 | 4,000 | 2,500 | 6,500 | NA | NA |
| 2004 | 28,000 | 46,900 | 3,800 | 2,400 | 6,200 | NA | NA |
| 2005 | 24,500 | 39,600 | NA | NA | NA | NA | NA |

NA – Not available at press time.

Note: In 1994, the U.K. began including some late calls and some heat and smoke damage incidents not previously included. All U.K. figures include suspected set fires. The U.K. refers to intentional fires as “malicious” cause fires but includes other “deliberate” ignitions as well. Fires are estimated to the nearest hundred. Totals may not equal sums because of rounding.

Source: *Fire Statistics – United Kingdom* series; *White Book on Fire Service in Japan* series and additional statistics from Dr. Ai Sekizawa, National Research Institute for Fire and Disaster; *Annual Report – Fire Losses in Canada* series of the Canadian Fire Commissioners.

Table 13. Civilian Deaths in Intentional Fires in Other Countries

| Year | <u>United Kingdom</u> | | <u>Japan structure fires</u> | | <u>Canada</u> |
|------|-----------------------|------|------------------------------|-------|---------------|
| | Building | Cars | Suspected Arson | Arson | |
| 1990 | 70 | 20 | 280 | 60 | 50 |
| 1991 | 70 | 20 | 290 | 50 | 40 |
| 1992 | 80 | 20 | 240 | 50 | 50 |
| 1993 | 70 | 20 | 250 | 70 | 40 |
| 1994 | 70 | 20 | 240 | 80 | 50 |
| 1995 | 90 | 20 | 200 | 50 | 50 |
| 1996 | 90 | 20 | 220 | 60 | 30 |
| 1997 | 70 | 20 | 260 | 70 | 60 |
| 1998 | 70 | 20 | 290 | 80 | 80 |
| 1999 | 70 | 20 | 290 | 70 | 80 |
| 2000 | 70 | 20 | 240 | 90 | 30 |
| 2001 | 60 | 10 | 250 | 120 | 70 |
| 2002 | 80 | 10 | 240 | 80 | 50 |
| 2003 | 60 | 20 | 260 | 90 | NA |
| 2004 | 60 | 10 | NA | NA | NA |
| 2005 | 80 | 20 | NA | NA | NA |

NA – Not available at press time or no longer available at source.

Note: In 1994, the U.K. began including some late calls and some heat and smoke damage incidents not previously included. All U.K. figures include suspected set fires. The U.K. refers to intentional fires as “malicious” cause fires but includes other “deliberate” ignitions as well. Deaths are shown to the nearest ten. Totals may not equal sums because of rounding.

Source: *Annual Fire Statistics – United Kingdom series White Book on Fire Service in Japan series* and additional statistics from Dr. Ai Sekizawa, National Research Institute, for Fire and Disaster; *Annual Report – Fire Losses in Canada series* of the Canadian Fire Commissioners.

Table 14. Civilian Injuries in Intentional Fires in Other Countries

| Year | <u>United Kingdom</u> | | <u>Canada</u> |
|------|-----------------------|------|---------------|
| | Building | Cars | |
| 1990 | 1,970 | 30 | 220 |
| 1991 | 2,020 | 70 | 180 |
| 1992 | 2,300 | 110 | 260 |
| 1993 | 2,290 | 60 | 210 |
| 1994 | 2,760 | 70 | 190 |
| 1995 | 2,690 | 70 | 190 |
| 1996 | 2,850 | 100 | 220 |
| 1997 | 2,650 | 70 | 170 |
| 1998 | 2,720 | 100 | 180 |
| 1999 | 2,720 | 80 | 140 |
| 2000 | 2,980 | 110 | 170 |
| 2001 | 3,080 | 90 | 160 |
| 2002 | 2,850 | 100 | 200 |
| 2003 | 2,730 | 110 | NA |
| 2004 | 2,530 | 70 | NA |
| 2005 | 2,430 | 90 | NA |

Note: In 1994, the U.K. began including some late calls and some heat and smoke damage incidents not previously included. All U.K. figures include suspected set fires. The U.K. refers to intentional fires as “malicious” cause fires but includes other “deliberate” ignitions as well. Injuries are estimated to the nearest ten. Totals may not equal sums because of rounding.

Source: *Fire Statistics – United Kingdom* series; and *Annual Report – Fire Losses in Canada* series of the Canadian Fire Commissioners.

Table 15. Direct Property Damage in Intentional Fires in Other Countries

| Year | Japan structures | | | | | Canada | | |
|------|--------------------|-----------------|-----------------------------|--------|-----------------|---------------------------------|-----------------------------|-----------------|
| | in Billions of Yen | | in Millions of U.S. Dollars | | | In Millions of Canadian Dollars | In Millions of U.S. Dollars | |
| | Arson | Suspected Arson | Total | Total | In 2005 Dollars | | Total | In 2005 Dollars |
| 1990 | 8.8 | 7.6 | 16.4 | \$113 | \$169 | \$244 | \$209 | \$313 |
| 1991 | 8.3 | 7.9 | 16.2 | \$120 | \$172 | \$236 | \$206 | \$295 |
| 1992 | 7.5 | 9.1 | 16.5 | \$131 | \$182 | \$250 | \$207 | \$288 |
| 1993 | 11.6 | 8.7 | 20.4 | \$183 | \$247 | \$232 | \$180 | \$243 |
| 1994 | 9.9 | 10.6 | 20.5 | \$201 | \$265 | \$192 | \$140 | \$185 |
| 1995 | 12.1 | 10.5 | 22.6 | \$240 | \$308 | \$199 | \$145 | \$185 |
| 1996 | 10.2 | 8.4 | 18.5 | \$170 | \$212 | \$246 | \$180 | \$225 |
| 1997 | 12.0 | 11.2 | 23.2 | \$192 | \$233 | \$182 | \$131 | \$160 |
| 1998 | 8.6 | 7.7 | 16.4 | \$125 | \$150 | \$258 | \$174 | \$209 |
| 1999 | 12.9 | 8.9 | 21.8 | \$191 | \$224 | \$222 | \$149 | \$175 |
| 2000 | 11.6 | 9.5 | 21.0 | \$195 | \$222 | \$110 | \$74 | \$84 |
| 2001 | 10.1 | 9.7 | 19.7 | \$162 | \$179 | \$252 | \$163 | \$179 |
| 2002 | 9.4 | 8.9 | 18.3 | \$14.6 | \$159 | \$242 | \$154 | \$168 |
| 2003 | 7.3 | 10.7 | 18.0 | \$155 | \$165 | NA | NA | NA |
| 2004 | 8.3 | 8.2 | 16.5 | \$153 | \$158 | NA | NA | NA |

Note: Direct property damage is estimated to the nearest million dollars, Canadian or U.S., or the nearest hundred million Japanese yen. Totals may not equal sums because of rounding. “Billion” means a thousand million.

Source: *White Book on Fire Service in Japan* series and additional statistics from Dr. Ai Sekizawa, National Research Institute for Fire and Disaster; and *Annual Report – Fire Losses in Canada* series of the Canadian Fire Commissioners. Exchange rates taken from OECD website in August 2007, and adjustments to U.S. inflation based on consumer price index from *Statistical Abstract of the United States*.

Firesetters and Criminal Justice

In the U.S., typically one of every six arson offenses (18% in 2005) are cleared by arrest or “exceptional means.”

“Clearance” means the law enforcement officials are satisfied that they have identified the perpetrator, even if no arrest has been made for that particular offense. (It is not unusual for an individual who is suspected of many offenses to be charged with only a few of them for which the evidence is the strongest. The officials will regard all the offenses as cleared.) A single clearance can mean several arrests if a fire was set by several persons. A single arrest can mean several clearances if one suspect is reliably associated with several arson offenses.

Clearance by “exceptional means” involves the following criteria: (1) identification of offender, (2) sufficient evidence to support an arrest, make a charge, and turn over the offender for prosecution, (3) identification of the offender’s exact location so that an arrest can be made, and (4) circumstances outside the control of law enforcement that prohibit arrest, such as death of the offender, denial of extradition because of simultaneous prosecution for another offense elsewhere, or refusal of victim to cooperate with prosecution after identifying the offender.

Table 16 indicates that the regional clearance percentages have also been fairly stable, except for a sustained improvement in the Northeast, which had the highest clearance rate in 2001 to 2005. The South had had the highest clearance rate in every year prior to 2001 and now ranks second, behind the Northeast. Clearance rates are higher for arsons in structures, where the loss is typically much greater, and lower in large cities (with at least 250,000 population), which also have the highest rates of arson offenses.

Juveniles have accounted for roughly half of all arrestees beginning in 1992.

Table 17 shows the 2005 age breakdown of arrestees, when 49% of arrestees were under age 18. Table 17 also shows three-fifths (58%) of arrestees are under age 21. Table 18 shows the same breakdown by age from 1980 through 2005.

In 2005, 83% of arson arrestees were male.

The percentage of arson arrestees under age 10 (3% in 2005) is much higher than for any other crime the FBI tracks.

Table 18 shows that the 2005 percentage is by far the lowest since at least 1980. Interestingly, the percentage under age 10 was higher in the 1980s, when the total percentage of arrestees under age 18 was lower than it has been in recent years. There are no other offenses where the 2005 percentage of arrestees under age 10 was at least 1%.

There appears to be some diversity of opinion as to how to describe different types of youthful firesetters.

As our understanding has grown regarding the many different circumstances that can lead to firestarting by children, there has also been a growing discomfort with the rigidity of the two traditional choices – “intentional” (formerly incendiary), with its close association with arson or other acts intended to cause harm to people or property, and “playing,” with its implications of both innocence and recklessness.

With the changes in NFIRS 5.0, it is now possible to code a fire as intentional or playing (not limited to children) or both, to indicate age of the firestarter was a factor or not, and to indicate the age of the firestarter if age was cited as a factor. This could permit the reckless fireplay of older youths to be distinguished from traditional curiosity firestarting by young children. The former could be coded as intentional and playing, the latter could be coded as unintentional and playing, and both could be coded with age as a factor.

However, it is not clear what should be done about so-called “crisis” firesetters – children whose firesetting behavior is a cry for help but may or may not represent a deliberate, intentional choice, and it does not fit well with either intentional or playing. Juvenile firesetters have diverse motives, including curiosity fireplay, anger and cries for help, fire as a form of juvenile delinquency, and severe emotional disturbance.

The author analyzed 2002-2005 non-confined structure fires coded directly in Version 5.0, with age as a factor and either intentional or playing coded. Of these, 48% were coded as playing but not intentional, 31% were coded as playing and intentional, and 21% were coded as intentional but not playing. For those coded as playing but not intentional, 76% involved firesetters under age 10. For those coded as playing and intentional, 71% involved firesetters under age 10. For those coded as intentional but not playing, 50% involved firesetters under age 10.

These last two percentages, especially the last one, seem rather high. They may indicate that fire departments are under-coding age as a factor for firesetters between 10 and 18 years of age.

An estimated 5-7% of arson offenses result in convictions.

Of all arson offenses, 80-85% are never solved or cleared by an arrest. This means 15-20% result in an arrest.

A study of 178 cases in Federal court during 1980-1989 in which arson was the most serious offense listed for the suspect found prosecutors decided to prosecute 43% of the cases in district court, referred 7% to U.S. magistrates, and declined to prosecute 50% of the cases.* A study of 160 arson cases in which prosecution took place in U.S. district court in the same period (presumably partially overlapping the cases referred for prosecution from the 178 cases above) found 66% led to convictions, 23% led to dismissal of charges, and the other 11% were not characterized.** Therefore, one-half of arrests lead to prosecution, and two-thirds of prosecutions lead to conviction. Combining this with the earlier estimates, the percentage of set fires leading to conviction is estimated as 1/2 of 2/3 of 15-20%, or 5-7%.

This narrow leverage on the arson problem is not unusual for serious crimes, because some combination of unreported crimes (the counterpart of unconfirmed or unreported intentional fires) and low clearance rates is a problem for nearly all serious crimes. Note that the biggest opportunities to change this picture come in the earliest stages, that is, in scene preservation and investigating fires to confirm incendiarity and investigating arson offenses to identify and arrest alleged perpetrators. By the time the district attorneys and courts enter the picture, most set fires have been lost from the system.

**Federal Criminal Case Processing*, 1980-89, NCJ-130526, October 1991.

***Federal Criminal Case Processing*, 1980-87, NCJ-120069, Washington: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics, May 1989.

Two-thirds of convicted arsonists are sentenced to prison, where half of them serve only 1-1/2 to 3 years.

Of those convicted in the 1989 study cited above, 67% were sentenced to prison.*

The average sentence that was served by an arsonist who is being released from state prison is 26 months if it was a first release from prison, 19 months otherwise. Half of all arsonists released from prison served 18 months or less if it was a first release, 10 months otherwise.**

The average length of sentence imposed on arsonists sentenced to Federal prison was 48 months, with half sentenced to 36 months or less. Half of the arsonists released from Federal prison had served at least 33 months or more, which is nearly twice the 18 months served by half of those released from state prisons.*** Note that the sentence *served* is typically much less than the sentence *imposed*.

After release, one-third of convicted arsonists will be back in prison for some new offense within 3 years.

Of those released with arson as their most serious offense, 55.3% were rearrested for some new crime within three years, 38.5% were reconvicted within three years, and 32.3% were reincarcerated within three years. All these percentages were considerably lower than the overall recidivism rates and even farther below the recidivism rate for other property crimes.****

Based on the slight evidence available, it appears that less than 10% of intentional fires involve incendiary devices and less than 10% are committed in connection with illegal-drug distribution or related gangs.

A 1993 six-month study of five U.S. cities found roughly 22% of the arson fires studied were drug-related, with a high degree of consistency across cities (e.g., four of five cities fell in the range of 19-24%).***** Molotov cocktails accounted for less than 8% of these drug-related incidents.

These results need to be viewed with caution. A full year of data is needed to eliminate seasonal effects, and the five cities may not be representative of other cities, let alone of the entire country. It also is likely that the patterns found would not apply to the same degree to the estimated two-thirds share of intentional fires that do not lead to reported arson offences. The total arson problem

**Federal Criminal Case Processing*, 1980-87, NCJ-120069, Washington: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics, May 1989.

**Craig Perkins, *National Corrections Reporting Program, 1992*, Washington: Bureau of Justice Statistics, U.S. Department of Justice, October 1994.

***Craig Perkins, *National Corrections Reporting Program, 1990*, Washington: Bureau of Justice Statistics, U.S. Department of Justice, May 1993.

****Allen J. Beck and Bernard E. Shipley, *Recidivism of Prisoners Released in 1983*, Washington: Bureau of Justice Statistics, U.S. Department of Justice, April 1989. Survey examined 1983 releases for the next three years.

*****Donna B. Towberman and Thomas J. Towberman, *Drug Related Fires in the United States – A Preliminary Report of Research on the Relationship Between Drug Activity and Arson in Selected U.S. Cities*, Project report sponsored by the Bureau of Alcohol, Tobacco and Firearms, Virginia Commonwealth University, Department of Justice and Risk Administration, 1993. While this report is labeled preliminary, no later report has been found.

that is not coded as incendiary in the field but is left as suspicious or unknown-cause, because part of the use of arson as a weapon is intimidation, which requires awareness by a victim that he is the target of a hostile act. Drug activity may be linked to some suspicious fires, but this may be offset by a reduced link between drug activity and arson in communities smaller than the cities studied. Therefore, the overall percentage of set fires linked to illegal drug activity would be estimated as one-third of 20-25%, or 7-8% of the estimated incendiary or suspicious fires in those cities. That is still a small fraction of the total arson problem, but it is a large enough number of incidents, particularly in some cities, to deserve attention.

From 1980 to 1998, the share of intentional (incendiary) structure fires started by incendiary devices fell in the range of 7-10% and showed a slight upward trend. The percentage fell to the 6-7% range in 2002-2005, which may be related to the changes in reporting and analysis associated with the advent of NFIRS Version 5.0. The slight upward trend appears to have resumed, but from a lower base. See Table 19.

**Table 16. U.S. Arson Clearances
Percentage of Reported Crimes Cleared by Arrest or Exceptional Means**

| Year | Nation | Northeast | Midwest | South | West | Structures* | Percent of Clearances With Only Juvenile Offenders Involved | In Cities of At Least 250,000 Population |
|-------------|---------------|------------------|----------------|--------------|-------------|--------------------|--|---|
| 1984 | 17 | 15 | 13 | 22 | 16 | 23 | 35 | 11 |
| 1985 | 17 | 13 | 16 | 22 | 15 | 23 | 36 | 11 |
| 1986 | 15 | 12 | 13 | 20 | 15 | 22 | 35 | 11 |
| 1987 | 16 | 13 | 13 | 20 | 15 | 22 | 36 | 11 |
| 1988 | 15 | 12 | 12 | 21 | 14 | 22 | 39 | 10 |
| 1989 | 15 | 11 | 14 | 20 | 14 | 21 | 39 | 10 |
| 1990 | 15 | 11 | 11 | 21 | 15 | 22 | 38 | 9 |
| 1991 | 16 | 12 | 13 | 21 | 16 | 22 | 40 | 10 |
| 1992 | 15 | 13 | 11 | 21 | 13 | 21 | 42 | 9 |
| 1993 | 15 | 13 | 12 | 20 | 15 | 22 | 44 | 10 |
| 1994 | 15 | 10 | 14 | 21 | 15 | 23 | 48 | 11 |
| 1995 | 16 | 11 | 16 | 20 | 15 | 23 | 47 | 12 |
| 1996 | 16 | 14 | 16 | 20 | 15 | 22 | 45 | 12 |
| 1997 | 18 | 16 | 16 | 22 | 15 | 24 | 46 | 12 |
| 1998 | 16 | 17 | 15 | 20 | 13 | 24 | 45 | 12 |
| 1999 | 17 | 17 | 18 | 19 | 14 | 23 | 48 | 12 |
| 2000 | 16 | 17 | 15 | 18 | 14 | 22 | 45 | 11 |
| 2001 | 16 | 20 | 15 | 18 | 14 | 22 | 45 | 11 |
| 2002 | 17 | 20 | 15 | 19 | 14 | 22 | 42 | 11 |
| 2003 | 17 | 21 | 16 | 19 | 14 | 22 | 41 | 11 |
| 2004 | 17 | 22 | 15 | 19 | 15 | 22 | 43 | 10 |
| 2005 | 18 | 22 | 17 | 19 | 16 | 22 | 42 | 13 |

Source: FBI *Crime in the United States* series.

Table 17. Age Profile of Persons Under Age 21 Arrested for Arson, U.S., 2005

| Age of Arrestee | Percentage of All Arrests | Cumulative Percentage of All Arrests |
|------------------------|----------------------------------|---|
| Under 10 | 3 | 3 |
| 10-12 | 9 | 12 |
| 13-14 | 17 | 29 |
| 15 | 8 | 37 |
| 16 | 6 | 43 |
| 17 | 5 | 49 |
| 18 | 4 | 53 |
| 19 | 3 | 56 |
| 20 | 2 | 58 |

Source: FBI *Crime in the United States* series.

Table 18. Trends in Age Profiles of Juveniles Arrested for Arson, U.S.

| Age of Arrestee | Percentage of All Arrests | | | | | | | | | |
|-----------------|---------------------------|------|------|------|------|------|------|------|------|--|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | |
| Under 10 | 7 | 7 | 6 | 7 | 8 | 7 | 7 | 7 | 8 | |
| 10-12 | 7 | 8 | 7 | 7 | 8 | 7 | 7 | 8 | 9 | |
| 13-14 | 11 | 11 | 9 | 10 | 12 | 12 | 11 | 11 | 12 | |
| 15 | 7 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | |
| 16 | 6 | 5 | 5 | 4 | 5 | 5 | 5 | 5 | 4 | |
| 17 | 6 | 6 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | |
| All under 18 | 44 | 42 | 37 | 37 | 43 | 41 | 40 | 41 | 43 | |
| | | | | | | | | | | |
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | |
| Under 10 | 8 | 7 | 7 | 6 | 6 | 7 | 6 | 7 | 6 | |
| 10-12 | 9 | 10 | 11 | 11 | 10 | 12 | 12 | 12 | 11 | |
| 13-14 | 13 | 12 | 14 | 15 | 16 | 18 | 17 | 17 | 16 | |
| 15 | 5 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | |
| 16 | 4 | 5 | 5 | 5 | 5 | 6 | 5 | 6 | 6 | |
| 17 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | |
| All under 18 | 43 | 44 | 47 | 49 | 49 | 55 | 52 | 53 | 50 | |
| | | | | | | | | | | |
| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | | |
| Under 10 | 6 | 7 | 6 | 5 | 5 | 3 | 3 | 3 | | |
| 10-12 | 12 | 12 | 13 | 11 | 11 | 10 | 10 | 9 | | |
| 13-14 | 17 | 17 | 16 | 15 | 15 | 18 | 17 | 17 | | |
| 15 | 7 | 8 | 7 | 7 | 7 | 9 | 8 | 8 | | |
| 16 | 6 | 5 | 6 | 6 | 6 | 6 | 7 | 6 | | |
| 17 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | | |
| All under 18 | 52 | 54 | 53 | 49 | 49 | 51 | 50 | 49 | | |

Source: FBI *Crime in the United States* series.

**Table 19. U.S. Intentional Structure Fires Involving the
Use of Incendiary Devices
(Limited to Non-Confined Fires From 1999 On)**

| Year | Fires | | Direct Property Damage (in Millions) | |
|-------------|--------------|-------|---|-------|
| 1980 | 8,600 | (7%) | \$106 | (9%) |
| 1981 | 8,400 | (8%) | \$89 | (7%) |
| 1982 | 6,100 | (7%) | \$74 | (6%) |
| 1983 | 5,000 | (7%) | \$57 | (6%) |
| 1984 | 5,000 | (7%) | \$68 | (7%) |
| 1985 | 5,800 | (7%) | \$92 | (9%) |
| 1986 | 5,800 | (8%) | \$61 | (6%) |
| 1987 | 5,600 | (8%) | \$86 | (9%) |
| 1988 | 5,200 | (8%) | \$85 | (8%) |
| 1989 | 5,100 | (8%) | \$56 | (7%) |
| 1990 | 5,200 | (9%) | \$85 | (9%) |
| 1991 | 5,600 | (9%) | \$148 | (12%) |
| 1992 | 6,000 | (9%) | \$115 | (6%) |
| 1993 | 4,900 | (9%) | \$62 | (7%) |
| 1994 | 4,800 | (9%) | \$97 | (10%) |
| 1995 | 4,500 | (9%) | \$90 | (10%) |
| 1996 | 4,500 | (9%) | \$135 | (14%) |
| 1997 | 3,800 | (8%) | \$70 | (9%) |
| 1998 | 4,200 | (10%) | \$75 | (10%) |
| 1999 | 1,600 | (4%) | \$37 | (4%) |
| 2000 | 1,800 | (5%) | \$86 | (8%) |
| 2001 | 1,700 | (5%) | \$79 | (10%) |
| 2002 | 2,100 | (6%) | \$41 | (4%) |
| 2003 | 1,600 | (6%) | \$35 | (4%) |
| 2004 | 1,700 | (6%) | \$48 | (6%) |
| 2005 | 2,000 | (7%) | \$66 | (7%) |

Note: These are national estimates of fires reported to U.S. municipal departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. Fires are estimated to the nearest hundred and direct property damage to the nearest million dollars. Property damage has not been adjusted for inflation. Percentages shown are the percentages of total intentional (incendiary) structure fires. Statistics include a proportional share of structure fires with unknown Ignition Factor (1980-1998) or unknown Cause (1999 and after) and also intentional fires with heat source unknown.

Source: Data from NFIRS Version 4.1 (1980-1998) and Version 5.0 (1999-present) and NFPA survey.

The Myths of Arson

Myth #1: Arson is the fastest growing crime in America.

As the earlier statistics showed, arson (or intentional fires) is not growing at all in the U.S. or Canada – the long-term trends are all down – so it can hardly be the fastest growing crime.

The perception that arson is growing in the U.S. may involve one or more of the following bases:

- Opinions formed in another time or another place. As noted, some parts of the world are experiencing growth in arson. Also, prior to 1980, there is some evidence that arson was growing for a considerable part of the 1970s. Unfortunately, the evidence available from that period is not as statistically sound as the evidence since 1977, so we cannot confirm that this perception was at least valid for its time.
- Opinions formed on the basis of a part of the problem. Trends can be different in particular communities or for certain types of properties. With an overall trend that has often been level for long periods, with many ups and downs, it would not be surprising for some communities to experience a substantial upward or downward trend. Also, a community or an agency that has substantially improved its investigative activity will find that it has a substantial increase in confirmed arson cases or confirmed intentional fires, and this may be mistaken for an increase in the problem rather than a better, clearer view of the same problem.
- Confusing under-reporting with a concealed upward trend. Many individuals believe the incidence of arson or intentional fires is under-reported. They may be concerned at the large number of set fires that are never officially determined as intentional, and they may be unaware of the statistical methods used to compensate for such cases, for intentional fires and every other cause. They may be concerned about the ability of professional or other highly skilled firesetters to conceal their crimes, and they may be unaware of the large fraction of fires, regardless of cause, that are controlled while still small enough to be easily and conclusively investigated. In other words, they may be concerned about a problem that, even under the worst scenario, cannot be common enough to dramatically alter the statistics.

But even if the incidence of arson or of intentional fire is under-reported – as all crimes and all types of fires are – that would not be sufficient to change a downward trend to an upward trend. Most likely, it would mean the same downward trend applies, but with higher rates in any particular year. In order for the direction of the trend to change, the degree of under-reporting would have to be growing – and growing substantially – over time. There is no evidence for this, and if anything, the many initiatives to address arson over the past two decades would be expected to reduce under-reporting and create the illusion of an increasing trend where the true trend was decreasing. That has not happened.

Myth #2: Arson is hard to solve because it destroys all the evidence.

Arson is hard to solve. The fraction of all offenses cleared (solved) by arrest ranges between 15% and 20%. However, this same solution rate applies to all other major property crimes — crimes where there usually are no witnesses.

Intentional fires typically do not destroy all the evidence. More than half of all intentional structure fires (56% in 2002-2005) have no flame damage outside the room of origin. Intentional fires are more likely to spread beyond the room of origin than most other fires, but the differences in likelihood are small. One-third of intentional structure fires (32% in 2002-2005) had no flame damage beyond the object of origin. If there was useful evidence available in these fires, the fire will often have left some of it untouched. Training in scene preservation can often improve this situation.

Unfortunately, the real problem, while less unique to arson, is no less difficult to solve. Readily trackable evidence is rare in any unwitnessed property crime, so there usually is no need for fire to obliterate it. Conversely, whatever methods work to increase crime-solving rates for crimes like burglary or motor vehicle theft may be effective with arson as well.

Myth #3: Arson rises in bad economic times.

One additional issue that keeps recurring is the question of whether there is a link between arson and trends in the economy, particularly recessions. In hard times, it is not unusual for local fire officials and insurance adjusters in some communities to report apparent jumps in some types of arson. The national statistics, however, do not show evidence of a significant link.

During the 26-year period covered by available statistics, there have been three recessions - one centered on 1982, one in 1991-1992, and one in 2001-2002. Intentional fires actually fell dramatically in 1982 in most categories and by most measures, despite the recession. The 1991-1992 recession occurred during a leveling off in the trend, but that leveling off was not notably different from the trend for the rest of the decade. And in 2001-2002, excluding the unique events of September 11, 2001, the trend in arson losses was level or down.

It is known from our statistical studies that overall fire incident or fire death rates tend to be correlated with poverty, but that need not mean that fire experience responds rapidly or dramatically to year-to-year shifts in economic conditions. The relationship appears to be more complex than that. Also, as noted, for arson in particular, most studies have shown (or at least estimated) that arson for profit ranks second as a motive for the less than half the arson problem involving adult offenders. Therefore, even if there were a statistically significant jump in arson for profit, the overall arson figure might not show the jump in measureable form and might even decline, under the influence of other factors affecting other, larger parts of the arson problem, such as juvenile firesetting.

Another variation of this myth is that there is a tendency of businesses to commit arsons at the end of the month in order to fix up an otherwise dismal balance sheet. An analysis was done to see whether stores and offices had more incendiary and suspicious fires in the last three days of the month than at other times. Data from 1988-92 were used, and at first the answer seemed affirmative: Those days accounted for 10% of the days and 15% of the incendiary fires. On closer examination, this proved to be entirely an artifact of the Los Angeles civil disturbance, which went into the records as nearly 2,000 separate incidents at the end of April 1991. If those days are removed, the other days account for roughly 10% of the days and the fires, showing no distinctive pattern.

Appendix A.

How National Estimates Statistics Are Calculated

The statistics in this analysis are estimates derived from the U.S. Fire Administration's (USFA's) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA's) annual survey of U.S. fire departments. NFIRS is a voluntary system by which participating fire departments report detailed factors about the fires to which they respond. Roughly two-thirds of U.S. fire departments participate, although not all of these departments provide data every year.

NFIRS provides the most detailed incident information of any national database not limited to large fires. NFIRS is the only database capable of addressing national patterns for fires of all sizes by specific property use and specific fire cause. NFIRS also captures information on the extent of flame spread, and automatic detection and suppression equipment. For more information about NFIRS visit <http://www.nfirs.fema.gov/>. Copies of the paper forms may be downloaded from <http://www.nfirs.fema.gov/download/nfirpaperforms2007.pdf>.

Each year, NFPA conducts an annual survey of fire departments which enables us to capture a summary of fire department experience on a larger scale. Surveys are sent to all municipal departments protecting populations of 50,000 or more and a random sample, stratified by **community size**, of the smaller departments. Typically, a total of roughly 3,000 surveys are returned, representing about one of every ten U.S. municipal fire departments and about one third of the U.S. population.

The survey is stratified by size of population protected to reduce the uncertainty of the final estimate. Small rural communities have fewer people protected per department and are less likely to respond to the survey. A larger number must be surveyed to obtain an adequate sample of those departments. (NFPA also makes follow-up calls to a sample of the smaller fire departments that do not respond, to confirm that those that did respond are truly representative of fire departments their size.) On the other hand, large city departments are so few in number and protect such a large proportion of the total U.S. population that it makes sense to survey all of them. Most respond, resulting in excellent precision for their part of the final estimate.

The survey includes the following information: (1) the total number of fire incidents, civilian deaths, and civilian injuries, and the total estimated property damage (in dollars), for each of the major property use classes defined in NFIRS; (2) the number of on-duty firefighter injuries, by type of duty and nature of illness; and (3) information on the type of community protected (e.g., county versus township versus city) and the size of the population protected, which is used in the statistical formula for projecting national totals from sample results. The results of the survey are published in the annual report *Fire Loss in the United States*. To download a free copy of the report, visit <http://www.nfpa.org/assets/files/PDF/OS.fireloss.pdf>.

Projecting NFIRS to National Estimates

As noted, NFIRS is a voluntary system. Different states and jurisdictions have different reporting requirements and practices. Participation rates in NFIRS are not necessarily

uniform across regions and community sizes, both factors correlated with frequency and severity of fires. This means NFIRS may be susceptible to systematic biases. No one at present can quantify the size of these deviations from the ideal, representative sample, so no one can say with confidence that they are or are not serious problems. But there is enough reason for concern so that a second database - the NFPA survey - is needed to project NFIRS to national estimates and to project different parts of NFIRS separately. This multiple calibration approach makes use of the annual NFPA survey where its statistical design advantages are strongest.

Scaling ratios are obtained by comparing NFPA's projected totals of residential structure fires, non-residential structure fires, vehicle fires, and outside and other fires, and associated civilian deaths, civilian injuries, and direct property damage with comparable totals in NFIRS. Estimates of specific fire problems and circumstances are obtained by multiplying the NFIRS data by the scaling ratios.

Analysts at the NFPA, the USFA and the Consumer Product Safety Commission have developed the specific analytical rules used for this procedure. "The National Estimates Approach to U.S. Fire Statistics," by John R. Hall, Jr. and Beatrice Harwood, provides a more detailed explanation of national estimates. A copy of the article is available online at <http://www.nfpa.org/osds> or through NFPA's One-Stop Data Shop.

Version 5.0 of NFIRS, first introduced in 1999, used a different coding structure for many data elements, added some property use codes, and dropped others.

Figure 1.

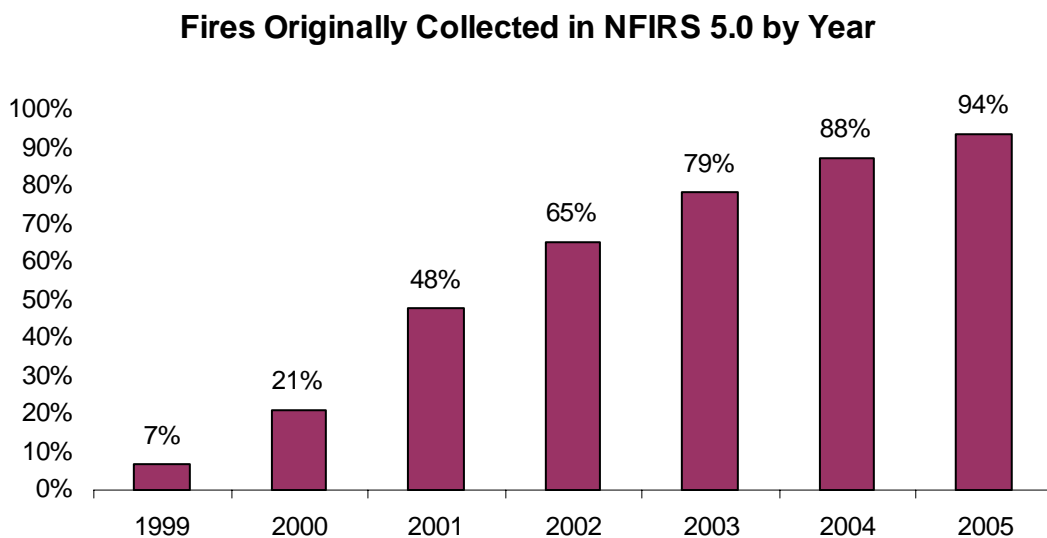


Figure 1 shows the percentage of fires originally collected in the NFIRS 5.0 system. Each year's release version of NFIRS data also includes data collected in older versions of NFIRS that were converted to NFIRS 5.0 codes.

For 2002 data on, analyses are based on scaling ratios using only data originally collected in NFIRS 5.0:

NFPA survey projections
NFIRS totals (Version 5.0)

For 1999 to 2001, the same rules may be applied, but estimates for these years in this form will be less reliable due to the smaller amount of data originally collected in NFIRS 5.0; they should be viewed with extreme caution.

A second option is to omit year estimates for 1999-2001 from year tables.

NFIRS 5.0 has six categories of confined structure fires, including:

- cooking fires confined to the cooking vessel,
- confined chimney or flue fires,
- confined incinerator fire,
- confined fuel burner or boiler fire or delayed ignition,
- confined commercial compactor fire, and
- trash or rubbish fires in a structure with no flame damage to the structure or its contents.

Although causal and other detailed information is typically not required for these incidents, it is provided in some cases. In order for that limited detail to be used to characterize the confined fires, they must be analyzed separately from non-confined fires. Otherwise, the patterns in a factor for the more numerous non-confined fires with factor known will dominate the allocation of the unknown factor fires for both non-confined and confined fires. If the pattern is different for confined fires, which is often the case, that fact will be lost unless analysis is done separately.

For most fields other than Property Use, NFPA allocates unknown data proportionally among known data. This approach assumes that if the missing data were known, it would be distributed in the same manner as the known data. NFPA makes additional adjustments to several fields.

For Factor Contributing to Ignition, the code “none” is treated as an unknown and allocated proportionally. For Human Factor Contributing to Ignition, NFPA enters a code for “not reported” when no factors are recorded. “Not reported” is treated as an unknown, but the code “none” is treated as a known code and not allocated. Multiple entries are allowed in both of these fields. Percentages are calculated on the total number of fires, not entries, resulting in sums greater than 100%. Groupings for this field show all category headings and specific factors if they account for a rounded value of at least 1%.

Type of Material First Ignited (TMI). This field is required only if the Item First Ignited falls within the code range of 00-69. NFPA has created a new code “not required” for this field that is applied when Item First Ignited is in code 70-99 (organic materials, including cooking materials and vegetation, and general materials, such as electrical wire, cable insulation, transformers, tires, books, newspaper, dust, rubbish, etc..) and TMI is blank. The ratio for allocation of unknown data is:

(All fires – TMI Not required)
(All fires – TMI Not Required – Undetermined – Blank)

Heat Source. In NFIRS 5.0, one grouping of codes encompasses various types of open flames and smoking materials. In the past, these had been two separate groupings. A new code was added to NFIRS 5.0, which is code 60: “Heat from open flame or smoking material, other.” NFPA treats this code as a partial unknown and allocates it proportionally across the codes in the 61-69 range, shown below.

- 61. Cigarette,
- 62. Pipe or cigar,
- 63. Heat from undetermined smoking material,
- 64. Match,
- 65. Lighter: cigarette lighter, cigar lighter,
- 66. Candle,
- 67 Warning or road flare, fusee,
- 68. Backfire from internal combustion engine. Excludes flames and sparks from an exhaust system, (11)
- 69. Flame/torch used for lighting. Includes gas light and gas-/liquid-fueled lantern.

In addition to the conventional allocation of missing and undetermined fires, NFPA multiplies fires with codes in the 61-69 range by

$$\frac{\text{All fires in range 60-69}}{\text{All fires in range 61-69}}$$

The downside of this approach is that heat sources that are truly a different type of open flame or smoking material are erroneously assigned to other categories. The grouping “smoking materials” includes codes 61-63 (cigarettes, pipes or cigars, and heat from undetermined smoking material, with a proportional share of the code 60s and true unknown data.

Equipment Involved in Ignition (EII). NFIRS 5.0 originally defined EII as the piece of equipment that provided the principal heat source to cause ignition if the equipment malfunctioned or was used improperly. In 2006, the definition was modified to “the piece of equipment that provided the principal heat source to cause ignition.” However, the 2006 data is not yet available and a large portion of the fires coded as no equipment involved (NNN) have heat sources in the operating equipment category. To compensate, NFPA treats fires in which EII = NNN and heat source is not in the range of 40-99 as an additional unknown.

To allocate unknown data for EII, the known data is multiplied by

$$\frac{\text{All fires}}{\text{(All fires – blank – undetermined – [fires in which EII = NNN and heat source } \langle \rangle 40-99])}$$

Additional allocations may be used in specific analyses. For example, NFPA's report about home heating fires treats Equipment Involved in Ignition Code 120, fireplace, chimney, other" as a partial unknown (like Heat Source 60) and allocates it over its related decade of 121-127, which includes codes for fireplaces (121-122) and chimneys (126-127) but also includes codes for fireplace insert or stove, heating stove, and chimney or vent connector. More general analyses of specific occupancies may not perform as many allocations of partial allocations. Notes at the end of each table describe what was allocated.

Rounding and percentages. The data shown are estimates and generally rounded. An entry of zero may be a true zero or it may mean that the value rounds to zero. Percentages are calculated from unrounded values. It is quite possible to have a percentage entry of up to 100%, even if the rounded number entry is zero. Values that appear identical may be associated with different percentages, and identical percentages may be associated with slightly different values.

Appendix B. Trend Analysis and the Disappearance of “Suspicious” as a Cause

Tables B-1 to B-4 show 1980-1998 statistics for structure, vehicle, and other properties for three groups related to intentional fires – incendiary fires estimated as if suspicious fires were really unknown fires to be allocated over all known-cause fires, incendiary fires estimated as if suspicious fires are not unknown-cause fires, and estimated suspicious fires.

In Table 1 and Table B-1, the 2005 estimate of intentional fires is roughly consistent with the 1980-1998 trend of estimated incendiary and suspicious fires, extrapolated another seven years. Tables 2 to 4 and B-2 to B-4 show the 2005 estimates of deaths, injuries, and direct property damage (adjusted for inflation) are clearly lower than would be expected by extrapolating the 1980-1998 trends. However, unlike fires, the other losses show a much sharper downward trend for incendiary fires alone than for incendiary and suspicious fires combined. If this difference is taken into account, the differences between 2005 estimates and extrapolated trends are reduced.

Table B-1. Trends in Intentional Fires in All Properties

| Year | Incendiary Fires if Suspicious is Treated as Unknown | Incendiary Fires if Suspicious Is Not Treated as Unknown | Suspicious Fires |
|-------------|---|---|-----------------------------|
| 1980 | 506,900 | 412,900 | 444,800 |
| 1981 | 442,800 | 357,800 | 465,100 |
| 1982 | 347,200 | 282,800 | 382,500 |
| 1983 | 300,500 | 248,200 | 325,900 |
| 1984 | 296,500 | 248,000 | 321,700 |
| 1985 | 308,600 | 257,000 | 339,000 |
| 1986 | 310,200 | 257,500 | 332,900 |
| 1987 | 307,700 | 260,900 | 312,300 |
| 1988 | 309,500 | 264,100 | 318,000 |
| 1989 | 285,700 | 243,600 | 274,900 |
| 1990 | 300,200 | 251,200 | 287,300 |
| 1991 | 314,900 | 262,400 | 294,900 |
| 1992 | 315,100 | 262,900 | 281,200 |
| 1993 | 297,900 | 249,000 | 269,700 |
| 1994 | 309,100 | 258,100 | 288,300 |
| 1995 | 310,800 | 260,800 | 272,100 |
| 1996 | 306,400 | 259,900 | 263,600 |
| 1997 | 262,000 | 225,100 | 217,000 |
| 1998 | 252,200 | 214,500 | 231,900 |

Notes: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. These estimates include a proportional share of unknown cause fires, defined as suspicious and unknown Ignition Factor in the first column and as unknown Ignition Factor in the last two columns. Allocation of unknowns is done separately for structure, vehicle, and other fires. Fires are estimated to the nearest hundred.

Source: Data from NFIRS Version 4.1 (1980-1998) and Version 5.0 (1999-2005) and NFPA survey.

Table B-2. Trends in Civilian Deaths in Intentional Fires in All Properties

| Year | Incendiary Fires if Suspicious is Treated as Unknown | Incendiary Fires if Suspicious Is Not Treated as Unknown | Suspicious Fires |
|-------------|---|---|-----------------------------|
| 1980 | 680 | 650 | 330 |
| 1981 | 570 | 540 | 310 |
| 1982 | 540 | 500 | 470 |
| 1983 | 550 | 500 | 570 |
| 1984 | 450 | 430 | 280 |
| 1985 | 490 | 460 | 330 |
| 1986 | 500 | 470 | 390 |
| 1987 | 500 | 470 | 350 |
| 1988 | 530 | 490 | 440 |
| 1989 | 550 | 510 | 400 |
| 1990 | 490 | 450 | 410 |
| 1991 | 530 | 490 | 250 |
| 1992 | 450 | 420 | 340 |
| 1993 | 540 | 490 | 400 |
| 1994 | 290 | 270 | 290 |
| 1995 | 450 | 410 | 410 |
| 1996 | 410 | 380 | 370 |
| 1997 | 410 | 370 | 340 |
| 1998 | 330 | 300 | 380 |

Notes: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. These estimates include a proportional share of unknown cause fires, defined as suspicious and unknown Ignition Factor in the first column and as unknown Ignition Factor in the last two columns. Allocation of unknowns is done separately for structure, vehicle, and other fires. Deaths are estimated to the nearest ten.

Source: Data from NFIRS Version 4.1 (1980-1998) and Version 5.0 (1999-2005) and NFPA survey.

Table B-3. Trends in Civilian Injuries in Intentional Fires in All Properties

| Year | Incendiary Fires if Suspicious is Treated as Unknown | Incendiary Fires if Suspicious Is Not Treated as Unknown | Suspicious Fires |
|-------------|---|---|-----------------------------|
| 1980 | 1,990 | 1,890 | 1,470 |
| 1981 | 2,550 | 2,400 | 1,750 |
| 1982 | 2,250 | 2,130 | 1,510 |
| 1983 | 2,040 | 1,940 | 1,490 |
| 1984 | 1,770 | 1,690 | 1,230 |
| 1985 | 1,840 | 1,750 | 1,370 |
| 1986 | 1,950 | 1,850 | 1,350 |
| 1987 | 1,750 | 1,670 | 1,340 |
| 1988 | 1,990 | 1,880 | 1,530 |
| 1989 | 1,750 | 1,650 | 1,610 |
| 1990 | 1,790 | 1,680 | 1,780 |
| 1991 | 2,190 | 2,070 | 1,640 |
| 1992 | 1,860 | 1,750 | 1,740 |
| 1993 | 2,050 | 1,940 | 1,650 |
| 1994 | 2,030 | 1,910 | 1,530 |
| 1995 | 1,590 | 1,500 | 1,360 |
| 1996 | 1,630 | 1,530 | 1,380 |
| 1997 | 1,380 | 1,320 | 1,020 |
| 1998 | 1,400 | 1,320 | 1,390 |

Notes: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. These estimates include a proportional share of unknown cause fires, defined as suspicious and unknown Ignition Factor in the first column and as unknown Ignition Factor in the last two columns. Allocation of unknowns is done separately for structure, vehicle, and other fires. Injuries are estimated to the nearest ten.

Source: Data from NFIRS Version 4.1 (1980-1998) and Version 5.0 (1999-2005) and NFPA survey.

Table B-4. Trends in Direct Property Damage (in Millions) in Intentional Fires in All Properties

| Year | Incendiary Fires if Suspicious is Treated as Unknown | | Incendiary Fires if Suspicious Is Not Treated as Unknown | | Suspicious Fires | |
|------|--|-----------------|--|-----------------|---------------------|-----------------|
| | As Reported | in 2005 Dollars | As Reported | in 2005 Dollars | As Reported | In 2005 Dollars |
| 1980 | \$1,268 | \$3,010 | \$1,099 | \$2,609 | \$812 | \$1,926 |
| 1981 | \$1,314 | \$2,818 | \$1,119 | \$2,400 | \$963 | \$2,065 |
| 1982 | \$1,338 | \$2,705 | \$1,154 | \$2,332 | \$866 | \$1,752 |
| 1983 | \$1,008 | \$1,974 | \$856 | \$1,677 | \$980 | \$1,919 |
| 1984 | \$1,039 | \$1,951 | \$911 | \$1,711 | \$819 | \$1,537 |
| 1985 | \$1,141 | \$2,069 | \$967 | \$1,752 | \$1,080 | \$1,958 |
| 1986 | \$1,135 | \$2,023 | \$953 | \$1,700 | \$1,103 | \$1,967 |
| 1987 | \$1,105 | \$1,899 | \$946 | \$1,626 | \$1,015 | \$1,744 |
| 1988 | \$1,167 | \$1,929 | \$1,015 | \$1,676 | \$1,065 | \$1,760 |
| 1989 | \$968 | \$1,526 | \$859 | \$1,353 | \$967 | \$1,525 |
| 1990 | \$1,078 | \$1,613 | \$927 | \$1,386 | \$1,090 | \$1,631 |
| 1991 | \$1,344 | \$1,927 | \$1,162 | \$1,666 | \$1,272 | \$1,824 |
| 1992 | \$2,210 | \$3,077 | \$1,957 | \$2,725 | \$922 | \$1,284 |
| 1993 | \$1,070 | \$1,446 | \$953 | \$1,288 | \$924 | \$1,248 |
| 1994 | \$1,123 | \$1,481 | \$979 | \$1,291 | \$1,024 | \$1,349 |
| 1995 | \$1,085 | \$1,391 | \$920 | \$1,179 | \$1,338 | \$1,714 |
| 1996 | \$1,130 | \$1,409 | \$1,001 | \$1,247 | \$1,053 | \$1,313 |
| 1997 | \$931 | \$1,132 | \$828 | \$1,008 | \$920 | \$1,120 |
| 1998 | \$900 | \$1,079 | \$787 | \$944 | \$1,008 | \$1,208 |

Notes: These are fires reported to U.S. municipal fire departments and so exclude fires reported only to Federal or state agencies or industrial fire brigades. National estimates are projections. Casualty and loss projections can be heavily influenced by the inclusion or exclusion of one unusually serious fire. These estimates include a proportional share of unknown cause fires, defined as suspicious and unknown Ignition Factor in the first column and as unknown Ignition Factor in the last two columns. Allocation of unknowns is done separately for structure, vehicle, and other fires. Fires are estimated to the nearest hundred.

Source: Data from NFIRS Version 4.1 (1980-1998) and Version 5.0 (1999-2005) and NFPA survey.