

CHILDREN AND FIRE IN THE UNITED STATES: 1994-1997

**Federal Emergency Management Agency
United States Fire Administration**

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Introduction

The purpose of this report is to analyze and discuss the incidence of fires involving children. According to National Center on Health Statistics data, there has been a consistent decline in child mortality from fire over the past decade. However, hundreds of child deaths from fire continue to occur each year. Children playing fires account for a large portion of child fire deaths and the majority of fire-related deaths among children are the result of residential fires. This report devotes sections to each of these factors.

Methodology

Data Sources

This report uses two primary data sources as the basis of analysis. The National Center on Health Statistics (NCHS) data from 1994-1996 on child mortality from accidents due to fire and flames (ICD code 890-899) and general population data are used to identify:

- number of annual deaths reported for each of three age groups (infant, 1-4, and 5-9)
- deaths/million population
- risk factor based on age and ethnicity of victims (white and African-American)

Portions of the National Fire Incident Reporting System (NFIRS) data from 1994-1997 are used to describe fires associated with child injuries and deaths. All states, and fire departments within them, have been invited to participate in NFIRS on a voluntary basis. Participating fire departments collect a common core of information on fire and casualty reports using a common set of definitions. In 1995, thirty nine states and the District of Columbia were reporting to NFIRS with 39% of the more than 33,000 fire departments providing data to the system.¹ NFIRS data provide information on fires of all types and are used in studies conducted by many agencies including the Consumer Product Safety Commission, Department of Transportation and the Department of Housing and Urban Development.

In addition to the primary data sources, findings from the Consumer Product Safety Commission (CPSC) are used to support some of the findings of the primary analysis.

CPSC data analysis uses NFIRS data and the National Fire Protection Association's (NFPA) annual survey of fire departments.

Definitions

Child - For the purpose of this report, a child is defined by the ages of birth through nine years. This age range was chosen for two reasons. Using this age range corresponds to the current age categories used by NCHS of: under one year, one to less than five years, and five through nine years. Using this definition also enables comparison of findings of the 1993 Children and Fire Report as well as other studies.

Adjusted Percentages – Where data sets contained unknowns, percentages were adjusted by weighting the unknown incidents based on occurrence of known incidents. The adjusted percentage was computed using only those incidents for which the cause was provided. This, in effect, distributes the fires for which the cause is unknown in the same proportion as the fires for which the cause is known. This method was used to account for unknown data since the distribution of the unknowns is assumed to follow the distribution of the knowns. It is the best method available without additional knowledge of the nature of the unknown and is suggested and described in detail by both Hall and Harwood² and in the tenth edition of *Fire in the United States*.¹

Population Numbers – Population numbers obtained from NCHS represent resident population only and are estimates for the years utilized in this report.

Limitations

Although NFIRS is not a random sample, it is believed that the distribution of participating fire departments is a reasonable representation of all fire departments in the U.S. In 1995, over 835,400 fire incidents were collected by NFIRS; about 42% of the estimated total attended by fire departments.¹ The actual numbers available in NFIRS are cited in this report as the sample size ($n =$) notation found in the tables and charts.

A second limitation is that the data sets used for this report collect information using different methods. Therefore, sample size numbers may vary among these data sets.

Demographic Profile

Child Fire Death Rates

Table 1 presents a general overview of the relationship of child mortality to overall population fire deaths reported for the years 1994-1996. Although the actual number of reported fire deaths for children has decreased over three years, the percentage of child fire deaths in relationship to population for the age groups shows only a minimal decrease. Table 1 shows the comparison of child fire deaths to that of the total population. The population of children from birth to 10 years of age has decreased from 16% in 1994 to 14% in 1996. This has been accompanied by a decrease from 23% to 18% of the total fire deaths. Table 2 shows the comparison of child fire deaths by age group. While the percentage of fire deaths in relationship to population has decreased somewhat over those years, it still remains higher for children than for the general population. This table also demonstrates the vulnerability of the 1 through 4 age group. Although decreasing from 65% on 1994, this age group still accounts for 60% of all the reported fire deaths for children.

Table 1. Percent of Fire Deaths by Population

Age	Year	Population	% of Population	Fire Deaths	Total % of Fire Deaths
Birth –9 years	1994	38,585,750	16	940	23
	1995	38,811,104	15	734	20
	1996	38,727,149	14	660	18
Over 10	1994	221,755,239	84	3046	77
	1995	224,144,166	85	3027	80
	1996	226,556,634	86	3081	82

Source: NCHS

Table 2. Percent of Child Fire Deaths by Age Group

Age	Year	Population	% of Population	Fire Deaths	Total % of Fire Deaths
Under 1					
	1994	3,870,185	3	93	2
	1995	3,848,106	1	64	2
	1996	3,769,485	1	56	2
1-4					
	1994	15,856,964	6	601	15
	1995	15,743,042	6	446	12
	1996	15,516,482	6	408	11
5-9					
	1994	18,858,601	7	246	6
	1995	19,219,956	8	224	6
	1996	19,441,182	7	196	5

Source: NCHS

Variation in Risk

The relative risk for fire death is determined by first determining the deaths per capita of the overall population (number of deaths reported for each year divided by the total population for the year). Then the deaths per capita for each age group is calculated and divided by the per capita death rate of the overall population. For example, if the deaths per capita for the general population for a given year was 19.32 and the deaths per capita for those under the age of four were 41.99, those under the age of four have a 2.17 relative risk for fire death – over twice that of the general population.

Table 3 presents a breakdown of the overall risk for children dying in a fire for the years 1994-1996. Overall, the relative risk of dying in a fire has decreased slightly over three years. However, the 1-4 age group is still 1 ½ times more likely to die in a fire than the general population (relative risk = 1.49).

The relative risk for children dying in a fire also varies considerably depending on gender and ethnicity. Table 4 presents the breakdown of risk according to gender and ethnicity for each age group. Ethnicity data is limited, since only white and African-American data are collected separately by NCHS. Data presented in Table 4 are for the year 1996

only. Girls have a higher risk of fire death under the age of one. In the other two age categories, boys have a higher risk.

Of particular concern is the variation in fire death risk based on ethnicity. African American children are at considerably higher risk of fire death relative to white children in all age categories. In 1991, African American males in the 1-4 age group were 6 times (relative risk = 5.95) more likely to die in a fire than white males.³ Although down slightly from 1991, African American males in the 1-4 age group are still 5 times more likely to die in a fire than their white counterparts and remain at the highest relative risk (5.17) for fire death.

Table 3. Relative Risk of Fire Death for Children

Age	Year	Fire Death Rate/million	Relative Risk*
Under 1	1994	15.3	1.56
	1995	14.3	1.17
	1996	14.1	1.07
1-4	1994	15.3	2.08
	1995	14.3	1.62
	1996	14.1	1.49
5-9	1994	15.3	0.85
	1995	14.3	0.82
	1996	14.1	0.72

Source: NCHS

*Relative risk of general population is 1.00 based on the fire death rate for each year per million population for the U.S. as a whole.

Table 4. Relative Risk of Fire Death for Children Based on Gender and Ethnicity Compared to General Population

Age	Gender/ Ethnicity	1996 Fire Deaths	Deaths/ Million	Relative Risk*
Under 1				
	White/Male	16	10.66	0.76
	White/Female	16	10.88	0.77
	African/ American/Male	9	32.14	2.28
	African/ American/Female	12	44.61	3.16
1-4				
	White/Male	141	22.42	1.59
	White/Female	84	14.04	1.00
	African/ American/Male	89	72.95	5.17
	African/ American/Female	75	63.56	4.51
5-9				
	White/Male	68	8.63	0.61
	White/Female	46	6.15	0.44
	African/ American/Male	40	25.48	1.81
	African/ American/Female	35	23.03	1.63

Source: NCHS

* Relative risk of the general population is 1.00 based on a fire death rate of 14.1 per million population for the U.S. as a whole.

Patterns of Child Fire Deaths

Seasonal Patterns

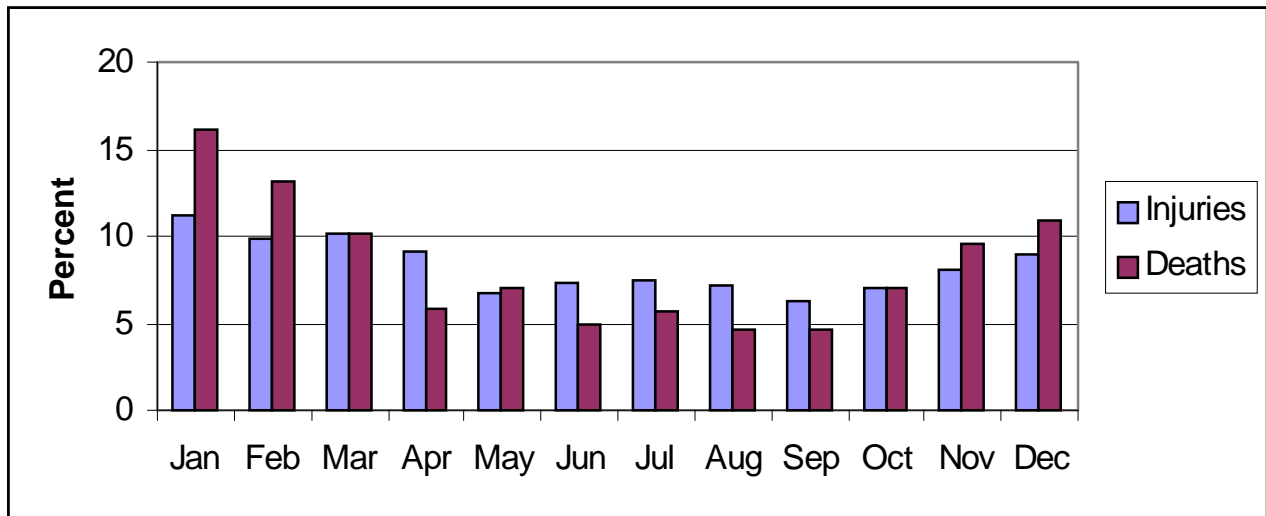
Table 5 presents the break down by month for child injuries and deaths due to fire for the years 1994-1997. Figures 1 and 2 display the annual average by month for child fire injuries and deaths for the years 1994-1997. Injuries and deaths appear to follow the same trends. The greatest percentage of child fire injuries and deaths has consistently occurred during the winter months. This can be attributed to a degree to the fact that people generally spend more time indoors during the coldest months and use heating sources including furnace, fireplace and space heaters.

Table 5. Percent of Reported Child Fire Injuries and Deaths by Month

	1994		1995		1996		1997	
	Injuries (n=1195)	Deaths (n=468)	Injuries (n=794)	Deaths (n=312)	Injuries (n=866)	Deaths (n=293)	Injuries (n=789)	Deaths (n=253)
Jan	12.5	18.8	9.9	12.5	9.5	18.6	13.0	14.6
Feb	11.5	9.9	8.8	21.2	10.9	11.7	8.5	10.1
Mar	9.7	12.8	10.6	9.7	8.4	9.3	12.1	8.9
Apr	9.5	7.9	8.9	6.0	10.7	4.9	7.4	4.4
May	6.4	6.9	7.1	6.4	6.3	6.3	7.1	8.4
Jun	7.5	4.6	7.1	3.2	7.7	6.3	7.1	5.6
Jul	7.1	4.6	7.7	6.4	7.1	5.8	8.1	5.6
Aug	7.2	4.6	7.1	4.6	7.6	5.3	6.9	3.9
Sep	6.8	6.6	6.4	1.8	4.7	3.9	7.3	6.1
Oct	6.2	4.2	7.8	8.7	7.9	5.8	6.0	9.5
Nov	6.0	8.9	10.1	7.4	8.4	9.3	7.4	12.3
Dec	9.0	9.9	7.9	11.5	10.3	12.2	8.5	10.1

Source: NFIRS

Figure 1. Average Percent of Child Fire Injuries and Deaths by Month



Source: NFIRS

Weekday

Table 6 presents the breakdown of child injuries and deaths due to fire by weekday.

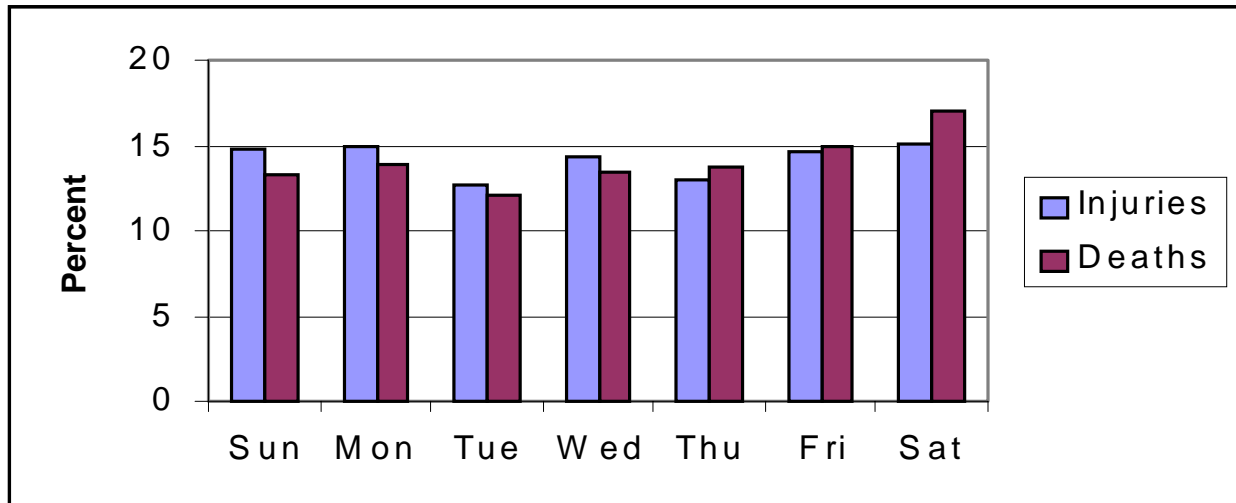
Figure 2 present the annual average of injuries and deaths for 1994-1997. Both injuries and deaths are distributed relatively evenly throughout the week.

Table 6. Percent of Reported Child Fire Injuries and Deaths by Weekday

	1994		1995		1996		1997	
	Injuries (n=1195)	Deaths (n=468)	Injuries (n=794)	Deaths (n=312)	Injuries (n=866)	Deaths (n=293)	Injuries (n=789)	Deaths (n=253)
Sun	11.6	12.5	14.3	14.8	16.8	14.7	16.5	11.2
Mon	14.3	14.8	14.1	13.4	14.6	10.7	16.5	16.8
Tues	13.4	11.5	13.9	10.1	12.2	14.7	11.4	12.3
Weds	15.5	13.8	12.3	10.6	15.5	13.7	14.0	15.7
Thurs	14.0	11.8	14.1	15.5	13.1	13.2	10.9	14.6
Fri	13.8	15.5	17.0	15.7	13.4	16.6	14.4	11.7
Sat	17.1	19.1	13.7	18.0	14.1	15.1	15.4	15.7
Unk		0.6		0.4		0.9		1.6

Source: NFIRS

Figure 2. Average Percent of Child Injuries and Deaths by Weekday



Source: NFIRS

Time of Day

Table 7 presents the breakdown of child injuries and deaths due to fire by time of day. Figure 3 present the annual average of injuries and deaths for 1994-1997. With the exception of 1996, the greatest number of injuries occurred from 0800-1159. With the exception of 1994, the greatest number of deaths occurred between midnight and 0400. The least number of both injuries and deaths occurred from 0400-0759.

Both injuries and deaths are more frequent during nighttime hours (8:00 PM to 8:00 AM). Most household members are likely to be asleep during these hours. That, coupled

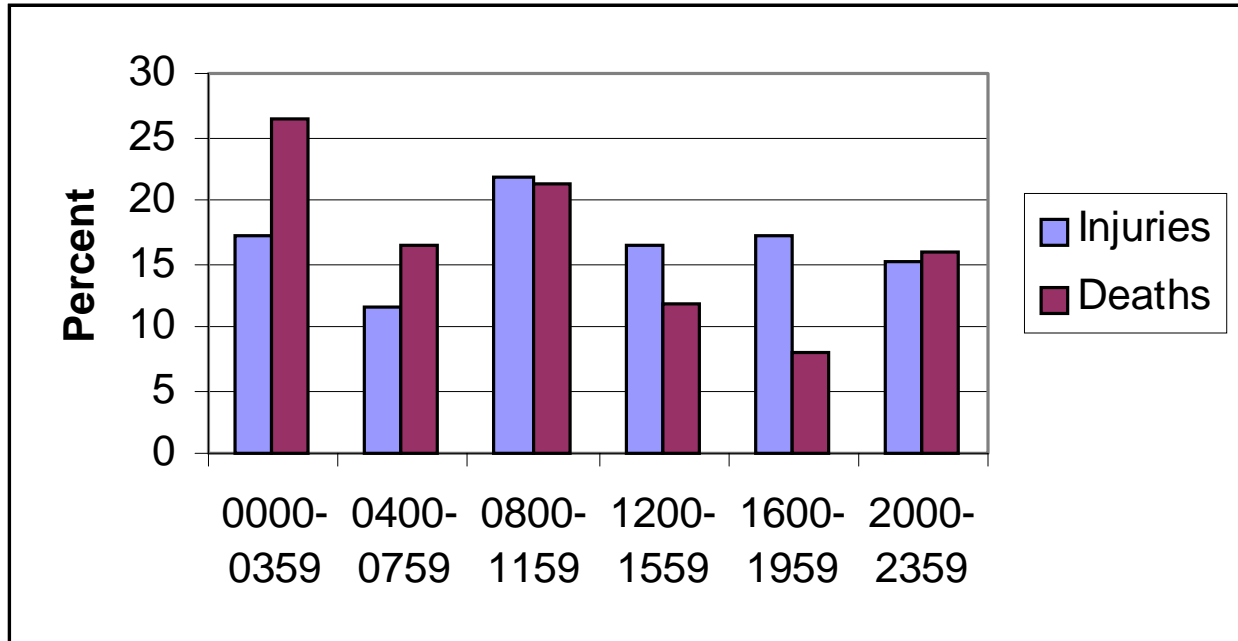
with the smoke detector data presented later in this report, may allow fires to extend farther before they are detected, thus decreasing the chance of escape.

Table 7. Percent of Reported Child Fire Injuries and Deaths by Time of Day

	1994		1995		1996		1997	
	Injuries (n=1195)	Deaths (n=468)	Injuries (n=794)	Deaths (n=312)	Injuries (n=866)	Deaths (n=293)	Injuries (n=789)	Deaths (n=253)
0000-0359	16.6	21.5	17.3	27.6	17.7	25.0	17.1	32.0
0400-0759	11.7	17.7	11.0	18.3	11.6	16.0	11.8	13.9
0800-1159	24.8	24.0	25.3	23.0	18.2	19.8	19.5	18.5
1200-1559	16.6	13.5	14.7	9.6	16.3	11.3	18.3	12.4
1600-1959	14.9	7.5	16.5	7.6	20.1	9.2	17.3	7.6
2000-2359	15.3	15.8	14.6	13.8	15.8	18.4	15.0	15.3

Source: NFIRS

Figure 3. Average Percent of Child Injuries and Deaths by Time of Day



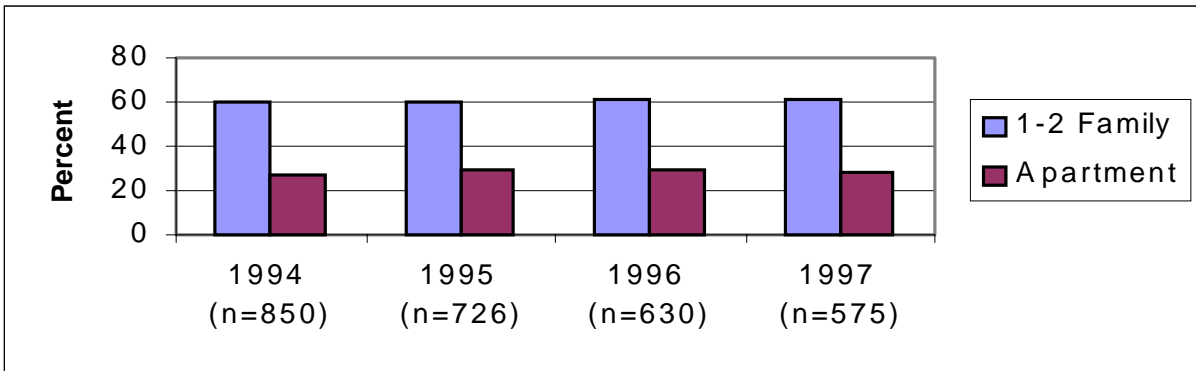
Source: NFIRS

Residential Fires

Where Fires Occur

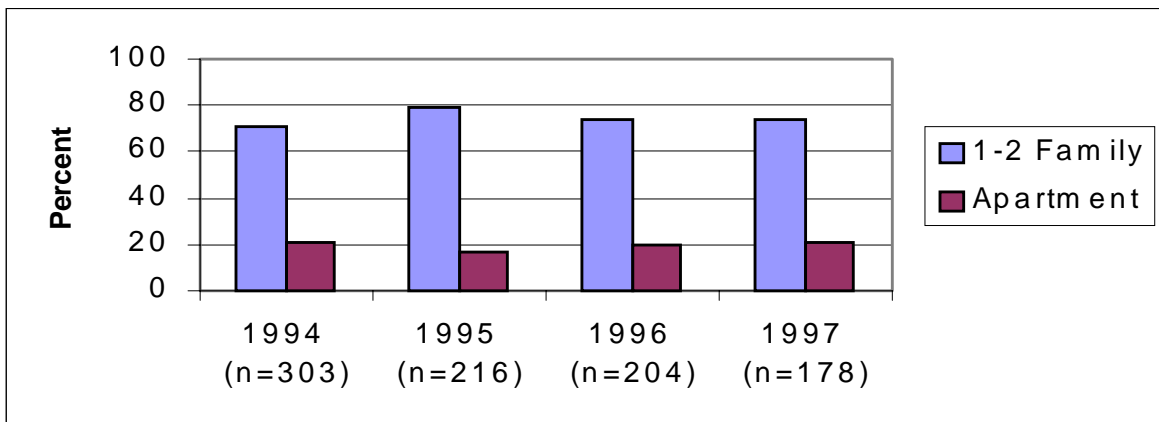
Figures 4 and 5 present the type of residential fires that resulted in child injuries and deaths for the years 1994-1997. The *n* noted is for number of reported incidents. Of the fires that resulted in child injuries, an annual average of 90% were residential. Of the fires that resulted in child deaths, an annual average of 94% were residential. The majority of residential fires continue to occur in one and two family dwellings and apartments. The percentage of fatalities attributable to residential fires in one and two family dwellings is somewhat higher (74%) than for injuries (61%) in one and two family dwellings. In contrast, the percentage of fatalities attributable to residential fires in apartments is somewhat lower (20%) than for injuries (29%).

Figure 4. Types of Residential Fires Resulting in Child Injuries by Year



Source: NFIRS

Figure 5. Types of Residential Fires Resulting in Child Deaths by Year



Source: NFIRS

Area of Fire Origin

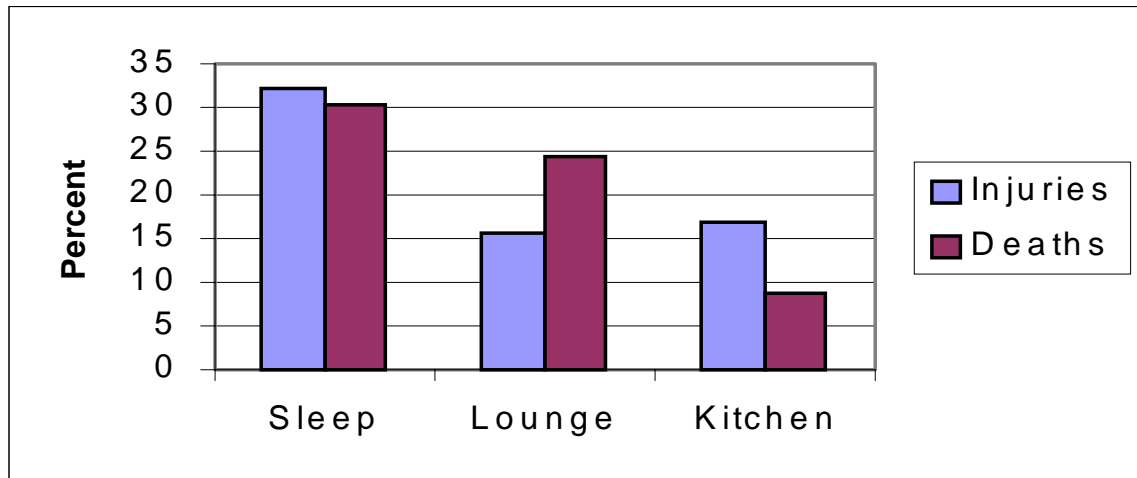
The top-ranking areas of fire origin for reported child fire injuries and deaths remain the same as those identified in the 1993 report: sleeping area, lounge area, and kitchen/cooking area. Although the total percentage reported related to these areas has decreased from the 71% in the 1993 report, they still account for over 60% of all child fire injuries and deaths. Table 8 presents the breakdown for each of these areas by year. Figure 6 compares the annual average for the years 1994-1997 for both injuries and deaths. The percentage originating in the sleep area resulting in deaths remained consistent with the findings (31%) of the 1993 report with the exception of 1996. The 25% noted for 1996 should be viewed as an isolated finding and not indicative of a decreasing trend. The percentage originating in the lounge area resulting in deaths has shown a slight decrease from the 31% noted in the 1993 report. The percentage of fires originating in the kitchen/cooking area that resulted in deaths showed a consistent decrease over the years of 1993 through 1996 (9% in 1993 to 6.8% in 1996). However, the percentage doubled to 12.3% in 1997. At this point, this should also be considered an isolated finding and further years should be studied.

Table 8. Percent of Reported Child Fire Injuries and Deaths by Area of Origin Adjusted to Include Apportioned Unknown Responses, 1994-1997

Injuries				
	1994 (n=850)	1995 (n=726)	1996 (n=630)	1997 (n=575)
Sleep	33.0	35.5	30.4	29.3
Lounge	16.1	17.0	15.8	13.7
Kitchen	13.4	12.9	21.1	20.5
Unknown*	5.0	4.0	5.1	5.5
Deaths				
	1994 (n=303)	1995 (n=216)	1996 (n=204)	1997 (n=178)
Sleep	32.6	33.3	25.0	30.3
Lounge	25.7	22.6	28.9	20.7
Kitchen	8.2	6.9	6.8	12.3
Unknown*	9.2	9.6	10.2	8.4

Source: NFIRS; *Unknowns included for reference.

Figure 6. Average Percent of Child Fire Injuries and Deaths by Area of Origin



Source: NFIRS; Adjusted Percentages

Causes of Fires

This section analyzes causes of reported fires involving child injuries and deaths for the years 1994-1997 from two aspects. The first aspect looks at equipment involved in ignition. The second aspect looks at the ignition factor.

Equipment Involved in Ignition

Approximately one-third of reported fires resulting in child injuries and deaths over the four years reviewed involved some type of equipment in ignition. Table 9 presents the breakdown of the four top-ranking equipment related causes for injuries and deaths. Cooking equipment was the leading cause of injuries with over two-thirds of the injuries the result of stoves. Heating systems were the leading cause of deaths.

Table 9. Percent of Reported Child Fire Injuries and Deaths by Equipment Involved Adjusted to Include Apportioned Unknown Responses, 1994-1997

Injuries				
	1994 (n=850)	1995 (n=726)	1996 (n=630)	1997 (n=575)
Heating	9.5	9.6	8.0	7.1
Cooking	10.0	9.4	15.9	17.7
(Fixed Surface)	(6.9)	(7.4)	(12.0)	(11.8)
Electrical	6.6	8.3	7.0	7.6
Appliances	4.2	4.2	3.0	3.7
Unknown*	15.2	15.3	15.3	14.1
Deaths				
	1994 (n=468)	1995 (n=312)	1996 (n=293)	1997 (n=253)
Heating	15.0	11.5	16.4	13.0
Cooking	3.2	5.1	3.1	5.1
(Fixed Surface)	(1.9)	(4.5)	(2.4)	(5.1)
Electrical	7.9	10.6	5.5	9.1
Appliances	1.7	2.9	1.7	3.2
Unknown*	27.3	26.3	23.9	29.6

Source: NFIRS; * Unknowns included for reference

Ignition Factors

Data were reviewed for major forms of ignition and types and forms of material ignited. Over one-third of all fires involving child injuries and deaths were the result of open flame. Matches as the form of ignition remained relatively constant over the four years. There was a consistent yearly decrease in injuries (from 27% in 1994 to 18.4% in 1997) and in deaths (from 22.2% in 1994 to 12.6% in 1997) related to lighters over the four year period. However, matches and lighters still accounted for over two thirds of the reported open flame fires resulting in child injuries and deaths. Table 10 presents the percent of child injuries and deaths for 1994-1997 resulting from reported open flame fires as the form of ignition. It includes the breakdown of the percent of open flame fires attributed to matches and lighters.

Table 10. Percent of Child Injuries and Deaths in Open Flame Fires Adjusted to Include Apportioned Unknown Responses, 1994-1997

Injuries				
	1994 (n=1195)	1995 (n=794)	1996 (n=866)	1997 (n=789)
Open Flame	48.9	48.9	44.1	42.7
Matches	12.4	16.4	13.3	12.8
Lighter	27.0	21.5	20.1	18.4
Unknown* Ignition Form	21.6	19.3	17.9	21.7
Deaths				
	1994 (n=468)	1995 (n=312)	1996 (n=293)	1997 (n=253)
Open Flame	40.8	38.1	34.5	34.4
Matches	13.9	13.8	10.9	11.1
Lighter	22.2	19.2	13.7	12.6
Unknown* Ignition Form	35.5	43.9	34.2	43.2

Source: NFIRS; * Unknown included for reference

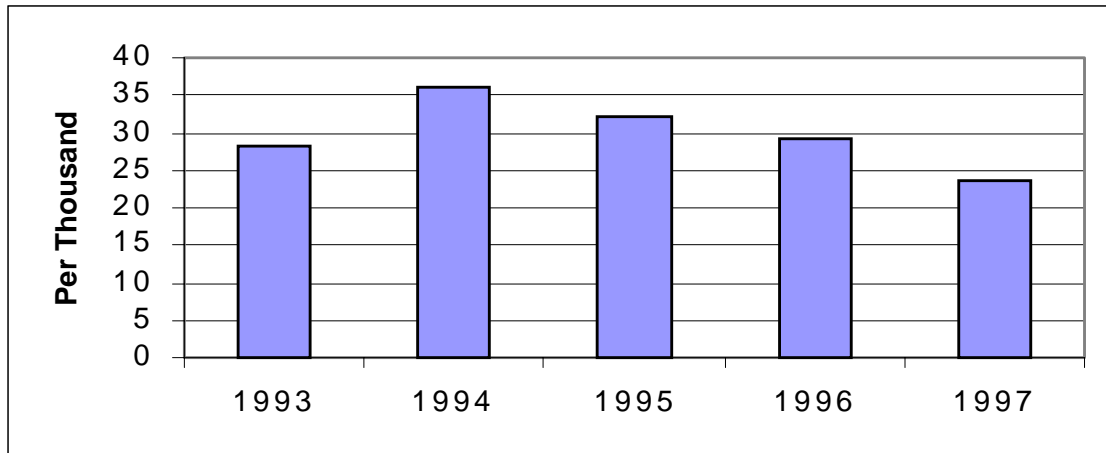
Based on adjusted percentages, NFIRS data from 1994-1997 also revealed that an annual average of 57% of all reported child fire injuries and 50% of all child deaths include either misuse of heat ignition or misuse of material involved in ignition. Over half (58%) of the child fire injuries and 62% of the child fatalities involving misuse of heat ignition or misuse of material involved in ignition were attributed to children playing.

Children Playing Fires

Children playing fires account for a large proportion of reported child fire injuries and deaths. Although, not a total data set of all fires and related deaths and injuries, NFIRS provides a reasonable overall picture of the scope of the problem. Figure 7 presents the number of reported children playing fires for 1994-1997. The 1993 report estimated 25,400 children playing fires occurred in 1993³ (p.22). Thus, 28.1 per thousand of all fires reported to NFIRS in 1993 were children playing fires. In 1997, 23.6 per thousand of all fires reported to NFIRS were children playing fires, a slight decrease from 1993. A review of the intervening years reveals an increase in 1994 to 36.2 per thousand of total fires reported. From 1995 through 1997, a small, but consistent, decrease is seen.

Figure 7 illustrates the number of children playing fires per thousand total fires reported from 1993 through 1997.

Figure 7. Children Playing Fires per Thousand of Total Reported Fires, 1993-1997



Source: NFIRS

Form of Heat Ignition

Lighters and matches remain the first and second most common forms of heat ignition in reported children playing fires. The easy availability of matches and lighters and their relative ease in use likely accounts for this high proportion of cases. These data highlight the importance of keeping these materials out of the hands of children.

Down from the 1993 report showing matches as the form of heat ignition in 58% of children playing fires, they are still the most common form. The decrease from the percent noted in the 1993 report has remained relatively consistent at an annual average of 42.2%. Lighters as a form of heat ignition has remained consistent at an annual average of 20.5%, down slightly from the 22% in the 1993 report.

Although matches are the leading form of ignition in children playing fires, lighters account for more injuries and deaths. However, the discrepancy appears to be narrowing. The fact that most lighters sold today are “child proof” as the result of the CPSC lighter regulation may account for some of the decrease in injuries and deaths attributed to lighters and for some of the decrease in the overall number of children playing fires.

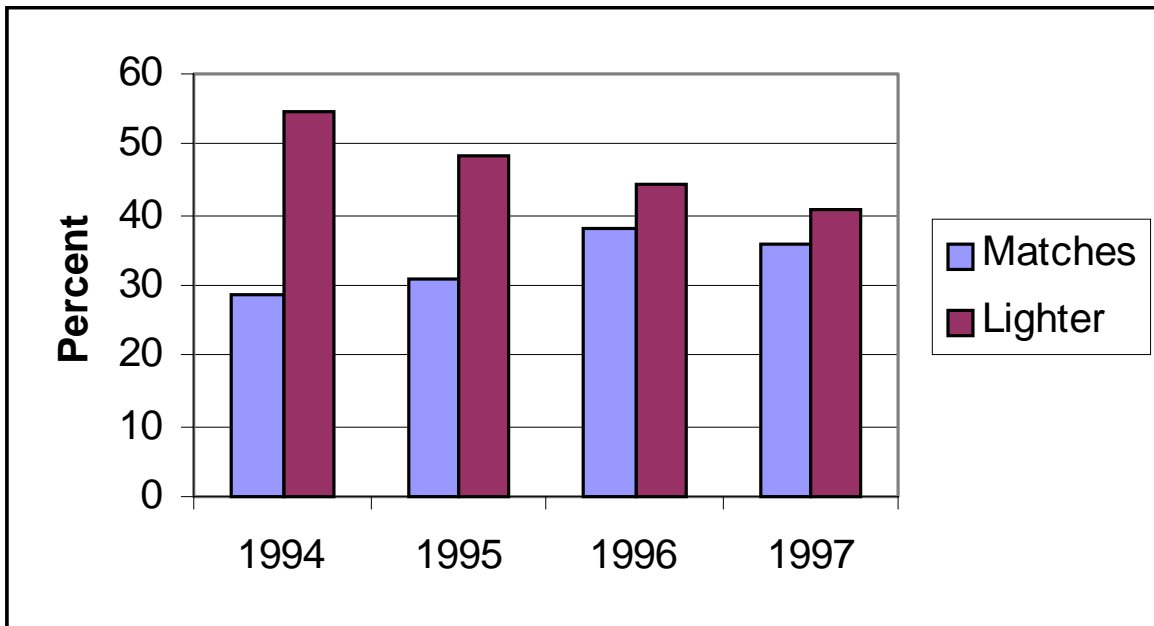
Table 11 shows the breakdown of injuries and fatalities from matches and lighters in children playing fires by year. Figures 8 and 9 show these data graphically.

Table 11. Percent of Reported Injuries and Deaths from Matches and Lighters in Children Playing Fires Adjusted to Include Apportioned Unknown Responses 1994-1997

Injuries				
	1994 (n=1336)	1995 (n=1131)	1996 (n=1098)	1997 (n=800)
Matches	28.7	30.9	38.0	35.8
Lighter	54.6	48.5	44.4	40.8
Deaths				
	1994 (n=149)	1995 (n=85)	1996 (n=71)	1997 (n=65)
Matches	30.9	34.1	32.4	26.2
Lighter	51.7	56.5	46.5	43.1
Unknown* Ignition Form	17.8	15.6	14.4	10.4

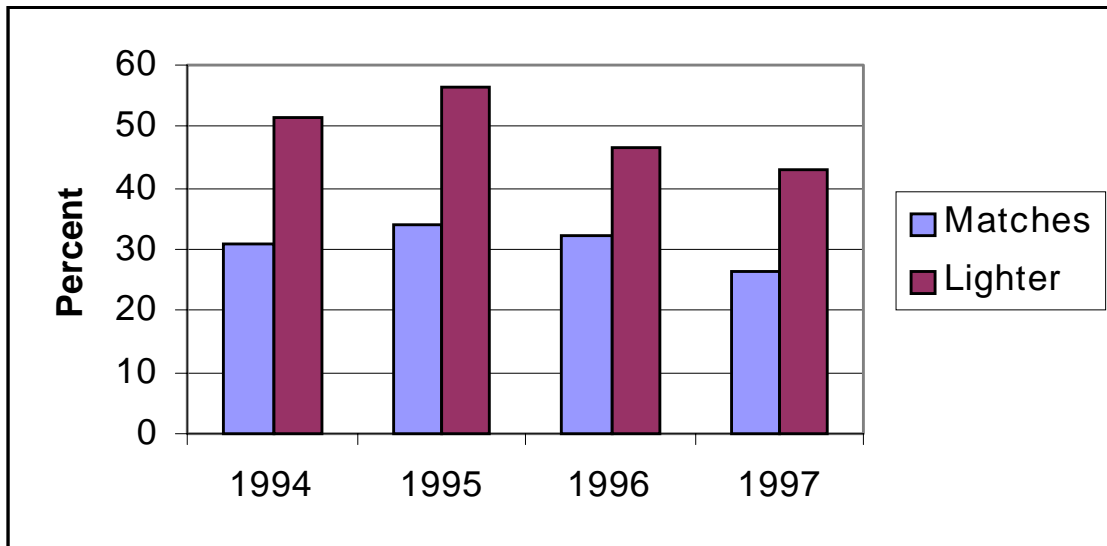
Source: NFIRS; * Unknown included for reference

Figure 8. Percent of Injuries from Matches and Lighters in Children Playing Fires



Source: NFIRS ; Adjusted percentages

Figure 9. Percent of Deaths from Matches and Lighters in Children Playing Fires



Source: NFIRS; Adjusted percentages

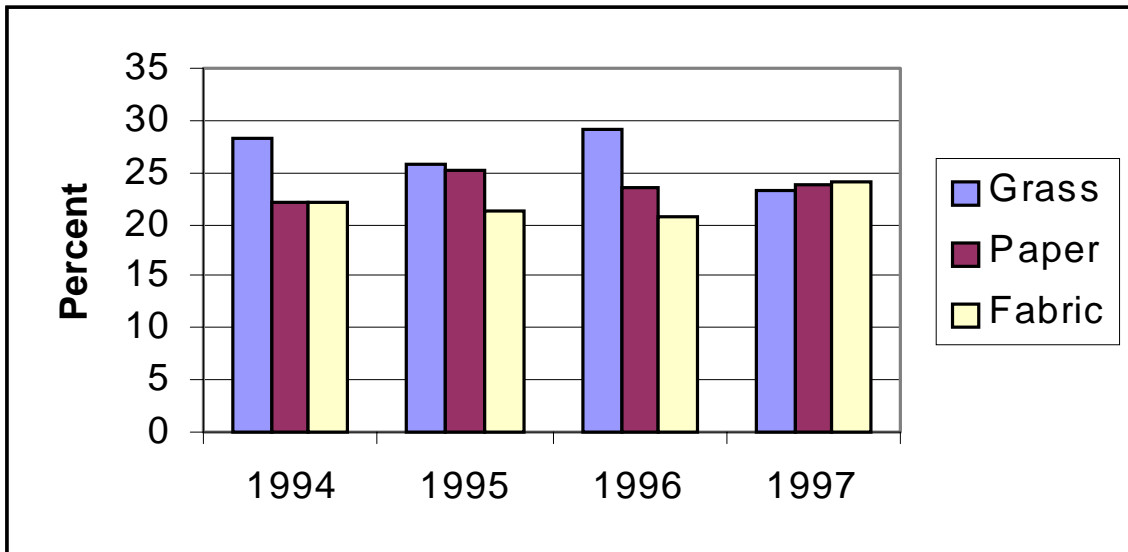
Material Ignited

Of the nine NFIRS categories for material ignited, two-thirds of all children playing fires reported for 1994-1997 are relatively evenly distributed between three categories: grass/leaves, wood/paper, and fabric. Grass/leaves account for approximately 25% of all reported children playing fires. The fact that so many fires are set by children outdoors raises an interesting issue. “Children playing” fires involve three categories of child fire setters. These are children too young to understand the dangerous implications of playing with fire, children having reached the “age of reason” (usually defined as eight and older), and children who set fires intentionally. This last category raises special concerns. According to the United States Fire Administration’s report “Arson and Juveniles: Responding to the Violence”, two-thirds of all arson fires in 1994 occurred outdoors.⁴ Intervention may be needed to prevent these “children playing” fire setters from becoming juvenile fire setters and, perhaps, juvenile or adult arsonists.

Although NFIRS data do not allow identification of the age of a child who starts a fire, one hypothesis is that younger children set more indoor fires, especially those involving the ignition of fabrics, and older children are more involved with igniting materials found outdoors. Figure 10 depicts the breakdown of material ignited in the reported children

playing fires for the years 1994-1997. “Paper/cardboard” is a subcategory of Wood/Paper and “cotton” is a subcategory of Fabrics. These subcategories account for half of the material ignited in each of their respective categories.

Figure 10. Material Ignited in Children Playing Fires Adjusted to Include Apportioned Unknown Responses

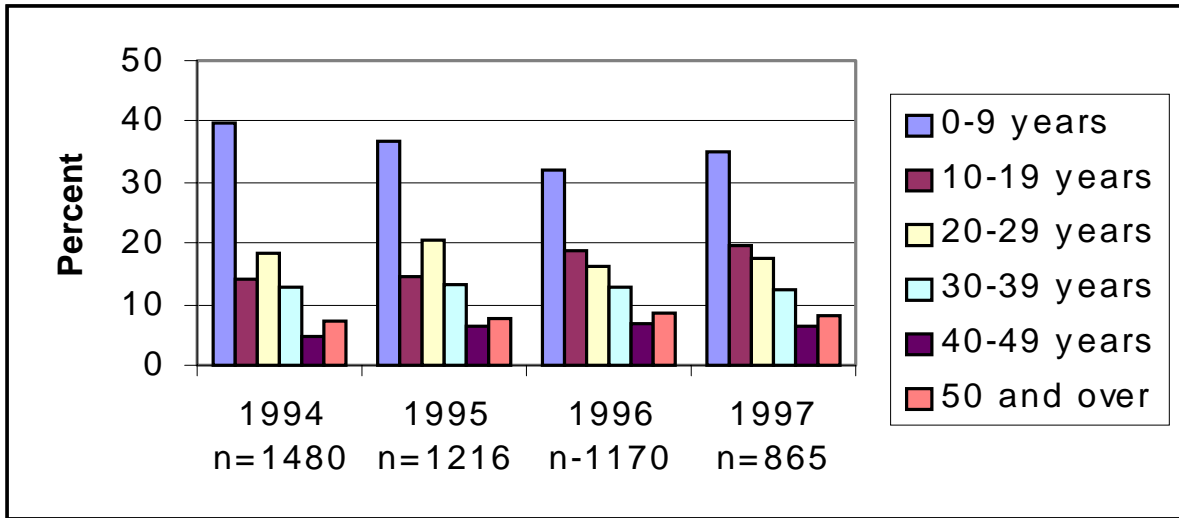


Source: NFIRS; Adjusted Percentages

Victims of Children Playing Fires

Victims of children playing fires occur in all age groups, but children themselves account for the greatest number of victims. Combining age groups to include those from birth through nine years, children account for over one-third of the reported casualties resulting from children playing fires. Figure 11 displays the breakdown by age group of all reported fire casualties associated with children playing fires for the years 1994-1997. This varies from the 1993 report that analyzed deaths due to children playing fires by age group for only residential fires.

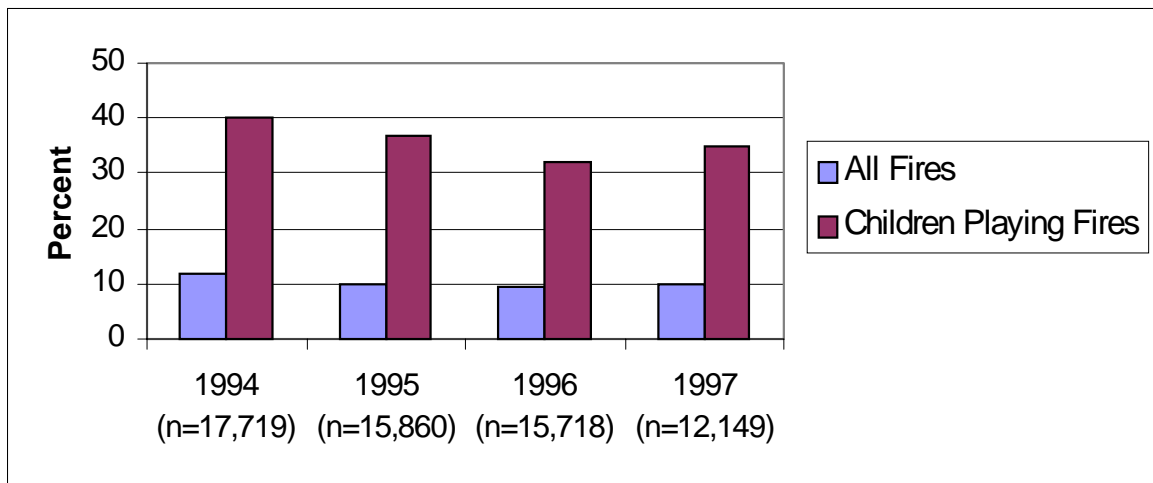
Figure 11. Percent of Casualties by Age Due to Children Playing Fires



Source: NFIRS; Adjusted Percentages

An additional comparison of child casualties between the total casualty data and the children playing fires data was also conducted. Comparing these data further supports the fact that the majority of child fire casualties occur in relationship to children playing fires. This should further the concern for the need to remove materials that can ignite fires from the reach of children. Figure 12 presents the reported total child fire casualties compared to child casualties related to children playing fires.

Figure 12. Percent of Child Casualties in All Fires Compared to Children Playing Fires



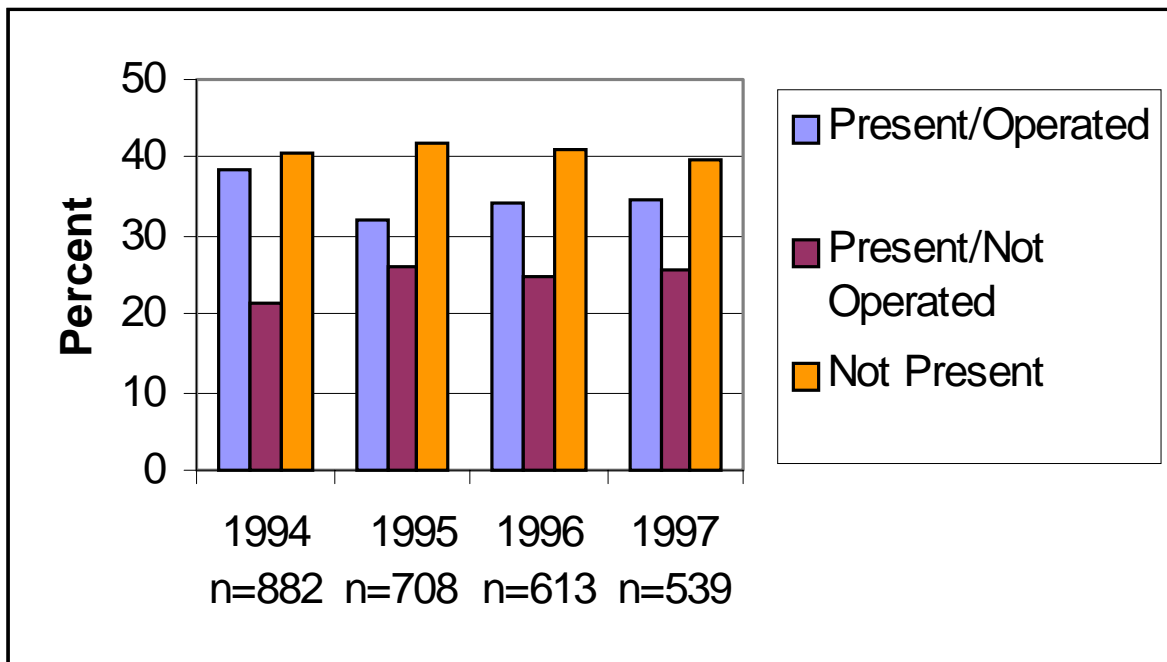
Source: NFIRS; Adjusted Percentages

Impact of Smoke Detectors

The importance of smoke detectors in preventing fire injuries and deaths among children cannot be overstated. Figures 13 and 14 show smoke detector status in fires involving child injuries and deaths for the years 1994-1997. Data used in these figures are only for cases where detector presence and operability were known.

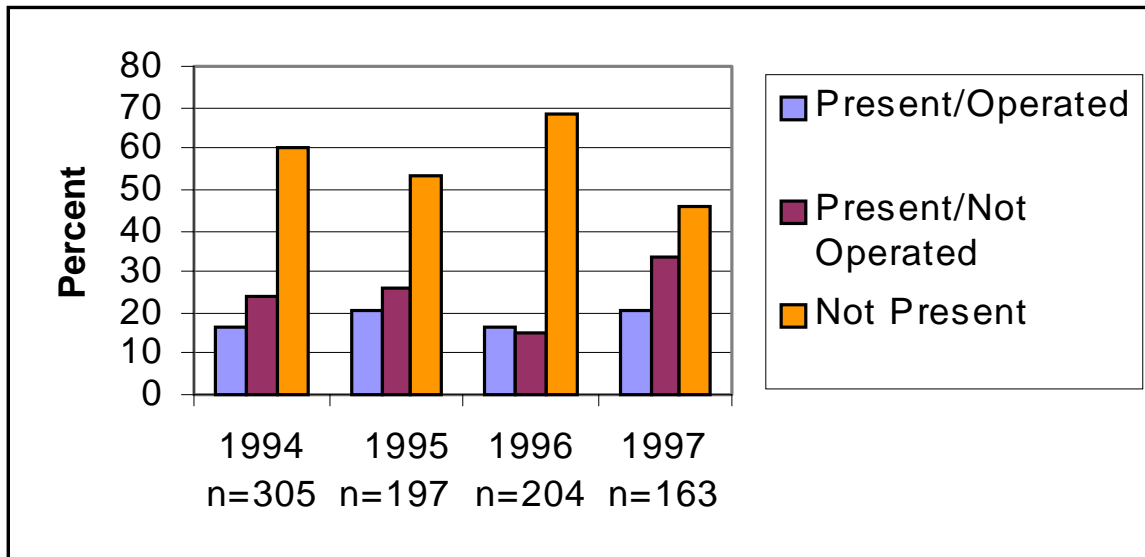
Based on reported data, the impact of detectors is compelling. Two-thirds of the annual reported child fire injuries and over three-fourths of child fire deaths occurred where there was no operable smoke detector. This raises a concern of a potential false sense of security with a detector present. It also reinforces the importance of educating the public to changing batteries on a regular basis to maintain existing detectors and placing detectors in sleeping areas where approximately one-third of fires involving child injuries and deaths originate.

Figure 13. Percent Comparison of Reported Smoke Detector Status in Fires Resulting in Child Injuries



Source: NFIRS

Figure 14. Percent Comparison of Reported Smoke Detector Status in Fires Resulting in Child Deaths



Source: NFIRS

Conclusions

This report has highlighted a number of facts about the fire experiences of children in the U.S. that should help mold public education efforts aimed at this target group. Among the key findings are:

- All children do not experience the same risk. Younger children (birth through 4 years) are at a significantly higher risk than older children (5 through 9 years). Among all children under age ten, African American children face inordinate fire risks relative to white children. This finding must be taken in context of other studies that show a strong correlation between socioeconomic factors such as poverty and education. A larger percentage of African Americans fall into the poverty and lower education categories than other cultures. The reader is referred to the United States Fire Administration, *Socioeconomic Factors and the Incidence of Fire* report for further information. However, the findings of this report should help public educators target their efforts to affected groups to make them aware of the gravity of the situation.

- Data demonstrate that the majority of child fire deaths occur during the colder months. This is substantiated in the data that show heating equipment as the top-ranking cause in fires with equipment involved in ignition.
- Although occurrence of injuries and deaths is relatively consistent for day of the week, the time of day analysis shows the greatest number of injuries occurred from 0800-1159 and the greatest number of deaths occurred between midnight and 0400.
- The majority of fires resulting in child fire injuries and deaths originate in the sleeping area, with the most common form of material ignited indoors being fabric.
- Children playing fires are a major factor in fire injuries and deaths in general and child fire injuries and deaths in specific. Comparison of NFIRS data reveals that the majority of all child injuries and deaths are related to children playing fires. These fires are usually started with matches or a lighter. These findings highlight the critical importance of adequate supervision of children.
- A disproportionate number of child fire injuries and deaths occur in homes without operating smoke detectors. Universal installation in high incidence areas of fire origin and maintenance of smoke detectors is of the utmost importance for the prevention of future child fire deaths.

References

- ¹ United States Fire Administration. (1995). *Fire in the United States* (10th ed.); 11-16.
- ² Hall, J. & Harwood, B. (1989). The national estimates approach to U.S. fire statistics. *Fire Technology*, 25(2); 99-113.
- ³ United States Fire Administration (1991). *Children and fire*. p. 6.
- ⁴ United States Fire Administration (1994). *Arson and juveniles: responding to the violence*. p. 3.