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Civilian Residential Fire Fatality Rates: Six High-Rate States Versus Six Low-Rate States

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
National Engineering Laboratory
Center for Fire Research
Washington, DC 20234

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U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, *Secretary*

NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director*

TABLE OF CONTENTS

LIST OF TABLES

TABLE OF CONTENTS (cont'd.)

CIVILIAN RESIDENTIAL FIRE FATALITY RATES: SIX HIGH-RATE STATES VERSUS SIX LOW-RATE STATES

John R. Hall, Jr. and Susan G. Helzer[1]

Abstract

The report presents results of an analysis of 1,600 fire fatalities occurring in six states with high fire-death rates and six states with low fire-death rates. Reasons for the differences in rates are explored, with special attention to victim age, sex, race, and condition at time of ignition. Fire cause patterns are touched on only lightly but are addressed more extensively in the companion piece to this report, "Rural and Non-Rural Civilian Residential Fire Fatalities in Twelve States", NBSIR 82-2519, by A. Gomberg and L. Clark, which also examines the rural/non-rural split.

Key Words: Fire data; fire deaths; fire statistics; residential fires.

1. INTRODUCTION

Over the past three years, the National Bureau of Standards (NBS), Center for Fire Research (CFR) has conducted a project to help determine why the southern and southeastern states of the United States have fire-death rates higher than the other states and why rural areas have fire-death rates higher than non-rural areas. These two patterns had first been identified in the December 1978 report "Fire in the United States" [1][2], which was published by the U.S. Fire Administration (USFA) and described fire experience through 1976. The pattern was reconfirmed in "Highlights of Fire in the United States, Second Edition" [2], which described fire experience in 1977-1978. This led NBS/CFR to design a project for the USFA in which a more intensive examination of fire fatalities would be used to identify reasons for these patterns. The first report from this project, "Rural and Non-Rural Civilian Residential Fire Fatalities in Twelve States" [3], concentrated on differences between rural and non-rural populations and on the fire cause patterns which proved to be the most likely factors in the overall differences. This second report, based on

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[1]Presently located at the Federal Aviation Administration.

[2]Numbers in brackets indicates literature references at the end of this paper.

analysis of the same fire fatality cases, concentrates on the role of age, race, sex, and victim condition when the fire began, and it concentrates on the differences between the states of the South and Southeast and the other states.

2. REVIEW OF PROJECT METHODOLOGY AND OVERALL PATTERNS

In order to set the context for these results, it is useful to recapitulate the first report's description of the project methodology and the overall fire-death rates for the high death rate and low death rate states. The following description is taken from the first report, with the emphasis shifted as appropriate to state versus state differences and away from rural versus non-rural differences.

Data on 1,797 fire fatalities from twelve states were collected, including 1,606 civilian, residential fatalities. (Six victims could not be assigned to rural versus non-rural locations and are not included in any of the analyses in this report.) Based on data from earlier years six of these states were grouped as high death rate states: Mississippi, Alabama, Arkansas, Tennessee, Georgia, and Oklahoma; six of these states were grouped as low death rate states: Connecticut, Utah, Wisconsin, California, Florida, and Delaware. Each state contains both rural and non-rural populations.

In each of the participating states the data were collected through the state fire marshal's office or a comparable office responsible for data collection. In each of the twelve states, a full one year collection period was agreed upon[3]. Then a report was obtained for _every_ fatality which could be identified as being the result of a fire which occurred in that state over the one year period. Any person who died as the direct result of a fire, accidental or otherwise, was defined as a fire fatality in this study, except for those persons who died as a result of a fire associated with a motor vehicle accident. This category was excluded for three reasons: (1) these data were considerably more difficult to obtain; (2) it would be difficult to determine if the cause of death was the accident or the fire; (3) it was not felt that the inclusion of these fatalities would provide significant insight into the problems this study is addressing.

The fire fatalities were identified primarily through death certificates. In addition fire incident reports, fire casualty reports, state investigation reports, telephone inquiries, and personal contacts were used to identify additional fatalities, to identify non-fire fatalities which were incorrectly identified as fire fatalities on the death certificates, and to obtain the necessary information on the circumstances of each fatality. In each state the data collection effort was provided by or through the responsible state office with coordination and assistance from CFR as required.

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[3]Two different one-year periods were used, due to differences in reporting procedures among the states.

2

For each state in the study the number of civilian residential fatalities identified and the time period used are shown in table 1. In this report we will use the following terminology:

HIGH (LOW) refers to the set of data collected from the group of high (low) death rate states in this study.

ALL refers to the set of data collected from all of the states included in this study.

RURAL refers to the set of data collected from areas of < 2500 population.

NON-RURAL refers to the set of data collected from areas of > 2500 population.

Areas include municipalities, cities, towns and unincorporated areas.

Table 1. Civilian residential fire-death totals and fire-death rates for HIGH and LOW states

STATE	NUMBER OF DEATHS	POPULATION (MILLION)	FIRE DEATHS PER MILLION	REPORTING PERIOD
AL	163	3.742	43.6	July 1978 – June 1979
AR	78	2.186	35.7	July 1978 – June 1979
GA	227	5.084	44.6	Jan. 1978 – Dec. 1978
MS	111	2.404	46.2	July 1978 – June 1979
OK	89	2.880	30.9	Jan. 1978 – Dec. 1978
TN	168	4.357	38.6	Jan. 1978 – Dec. 1978
HIGH TOTAL	836	20.652	40.5	
CA	355	22.294	15.9	July 1978 – June 1979
CT	56	3.099	18.1	Jan. 1978 – Dec. 1978
DE	27	0.583	46.3	July 1978 – June 1979
FL	192	8.594	22.3	Jan. 1978 – Dec. 1978
UT	23	1.307	17.6	July 1978 – June 1979
WI	117	4.688	25.0	Jan. 1978 – Dec. 1978
LOW TOTAL	770	40.565	19.0	
ALL	1606	61.217	26.2	

Table 1 indicates that, state by state the death rate for the reporting period of this study in the HIGH states is considerably higher than the death rate in the LOW states, with the exception of Delaware. The choice of Delaware as a LOW state for this study was based on the USFA data available at the beginning of the study [1], and Delaware's fatality rate had been low for several years. However, two fires resulting in thirteen fatalities during the study year increased Delaware's civilian residential fire-death rate to 46.3 per million. This type of result is

not surprising for a state with both a small population and a generally low fire-death rate, and even with a high death rate for the period examined, Delaware's small population assured that it had little impact on the overall patterns for the LOW group.

Almost half of the LOW state fire fatalities occurred in California. It is possible, therefore, for trends that appear only in California to appear to be true for the entire group of LOW states. In order to guard against this possibility, various frequencies and data tabulations were compared for California versus the group of other LOW states. In most instances the California data were similar to the data in the other states. There is considerable confidence, therefore, that the LOW state results are not unduly influenced by California.

The overall civilian residential fire-death rate for the HIGH states is 40.5 deaths per million, more than double the overall 19.0 deaths per million in the LOW states.

All of the fire fatality data used in this study were obtained by the participating states and recorded on a worksheet. The data included information about the individual fatality, such as age, sex, race, and place of residence. However, most of the data elements provide information about the fire. Most of these are based on the National Fire Protection Association (NFPA) 901, Uniform Coding for Fire Protection [4]. These data elements are familiar to the fire service community and provide a uniform way to consider fire "causes". A brief narrative of the fire was also included. Autopsy information was also requested when available. Finally, the sources for the data are indicated. The coding format used in this study is given in appendix A.

A worksheet was completed for every fire fatality identified. Thus if three persons died in a fire then three worksheets were completed. Once the fatalities were identified, an attempt was made to identify and contact the responding fire department. The contact was made by telephone, by mail, or by a personal visit. The completed worksheets were sent to CFR where they were reviewed, edited and coded for input to a computerized data base. The computer file was then edited, reviewed, and analyzed.

The reader is cautioned that the data are not necessarily representative of all the fifty states. Also, since the methods used to identify the fatalities varied somewhat from state to state, the fire death rates for each state are approximate and individual states may not be directly comparable. In addition, uncertainties may be introduced by the method of calculating populations and by possible errors in the interpretation and coding of the worksheet information.

A section of the fire fatality worksheet asked the respondent to check off the appropriate population interval corresponding to the location (e.g., city, town, unincorporated area) where the fatal fire took place. While this provided a good first indication of populations, several problems were noted with these estimates. In some cases, populations were not known. In others, different respondents checked different population intervals for the same location. A more significant problem was the coding of the population interval corresponding to the location of the responding fire department rather than the location of the fatal fire. This sometimes resulted in rural areas being coded with the population interval corresponding to the population of an entire county when a county fire department responded. It also resulted in a rural or farm location, outside the city limits of a municipality, being coded with the population interval of that municipality.

To better define the actual populations of the fire location several steps were taken. Coded population intervals were compared with the populations given in the Rand McNally Commercial Atlas [5], and corrected where found to be incorrect. In some cases where the fire location was not adequately identified by place name, use of the zip code enabled identification of the place name.

Finally, where death certificates defined the location of the fire as outside the city limits of small towns, or where addresses were obviously outside the limits of a populated area (such as "off Route 1", "7 miles outside town," "off Highway 355" etc.) and where other factors such as run time, fire department identification, or descriptions given in the narrative indicated a rural location, the population interval was checked and corrected as necessary.

Tables 2 and 3 present, respectively, the estimated rural, non-rural and total populations for each state, with HIGH and LOW states separated, and the fire death rates for each state, similarly separated. Note that the LOW-state rate (and all other rates including LOW states) differ from those shown in table 1. This is because six LOW-state fatalities had population interval unknown and are omitted from all calculations from this point on.

Table 2. Estimated populations by state

State	Rural	Non-Rural	Total	Percent Rural
Alabama	1,387,942	2,353,964	3,741,906	37
Arkansas	920,616	1,265,357	2,185,973	42
Georgia	1,897,405	3,186,467	5,083,872	37
Mississippi	1,120,901	1,283,001	2,403,902	47
Oklahoma	767,243	2,112,569	2,879,812	27
Tennessee	1,550,831	2,805,962	4,356,793	36
ALL HIGH	7,644,938	13,007,320	20,652,258	37
California	1,072,294	21,221,811	22,294,105	5
Connecticut	68,073	3,030,855	3,098,928	2
Delaware	122,768	460,265	583,033	21
Florida	1,441,662	7,152,175	8,593,837	17
Utah	196,086	1,110,857	1,306,943	15
Wisconsin	1,340,987	3,347,251	4,688,238	29
ALL LOW	4,241,870	36,323,214	40,565,084	10
ALL States	11,886,808	49,330,534	61,217,342	19

Table 3. Overall fire-death rates per million population

Population Interval	HIGH Rate States	LOW Rate States	ALL States
Rural	55.1	42.7	50.6
Non-Rural	31.9	16.1	20.2
Total	40.5	18.8	26.1

NOTE: These rates are based on the following number of fire fatality cases:
HIGH Rural - 421, LOW Rural - 181, HIGH Non-Rural - 415, LOW Non-Rural - 583.
The population interval was not known for six LOW-state fatalities. Hence,
the LOW-state rate used from this point on is based on a smaller number of
fatalities and differs from the rate shown in table 1.

3. FIRE-DEATH RATE PATTERNS FOR HIGH- VERSUS LOW-RATE STATES

This section presents the differences in fire-death rates for high-rate
versus low-rate states for victim age, victim sex, victim race, fire cause, and
victim condition before ignition. In calculating the fire-death rates, all "unknown"
entries have been allocated proportionately over all "known" categories. For
example, victims whose races were unknown have been assigned to the known race
groupings in proportion to the number of victims known to be of each race. As

another example, fires of unknown cause have been allocated proportionately to the
known fire-cause groupings. This is necessary because "unknown" entries occur at
significantly different frequencies in HIGH versus LOW states and in rural versus
non-rural areas. Failure to include these "unknown" cases would give states and
areas with large numbers of unknowns unreasonably low fire-death rates in all known
categories. This allocation procedure is the best possible in the absence of better
information, but it should be noted that some fire causes (e.g., arson) may be more
likely to occur in fires large enough to destroy all evidence of fire cause, hence
more likely to be coded as unknown cause. This should be kept in mind when examin-
ing these patterns.

3.1 Fire-Death Rate Patterns by Age of Victim

Tables 4 and 5 show, respectively, the percentage of the population, by age
group, and the differences between fire-death rates for HIGH versus LOW rate states,
by age of victim. Age distributions for these states, used to compute the rates,
were taken from 1979 Census figures [6]. There were 12 cases with unknown victim
age - two in HIGH states and 10 in LOW states - that were distributed over the known
age groups.

Table 4. Age distributions of populations in HIGH versus LOW states

Population Age	HIGH Rate States	LOW Rate States
Under 5 years	7.7%	7.0%
5-13 years	14.6%	13.1%
14-17 years	7.5%	7.1%
18-24 years	12.9%	13.2%
25-44 years	27.0%	27.3%
45-64 years	19.0%	20.2%
Over 64 years	11.3%	12.1%

The particular LOW rate states selected made a difference in these distributions,
because the selection of Florida raised the proportion of the population in the most
vulnerable age group - over 64. Without Florida, the percentage of the population
over 64 in the LOW states would have been 10.4% rather than 12.1%, or lower rather
than higher than the corresponding percentage in the HIGH rate states.

Table 5. Fire-death rates per million population by
victim age, HIGH versus LOW states

Victim Age	HIGH Rate States	LOW Rate States	Ratio of HIGH to LOW
Under 5 years	84.1	33.4	2.5
5-13 years	17.3	10.8	1.6
14-17 years	11.0	6.3	1.7
18-24 years	20.6	9.8	2.1
25-44 years	26.2	13.7	1.9
45-64 years	50.6	22.3	2.3
Over 64 years	100.3	42.0	2.4
All ages	40.5	18.8	2.2

The differences in fire-death rates between HIGH and LOW rate states are not dramatically different for different age groups, but the difference is slightly larger in the age ranges that suffer that highest rates to begin with - the under 5 and over 44 age groups. A later section compares fire-death rates with respect to victim age, sex and race combined.

3.2 Fire-Death Rate Patterns by Race and Sex of Victim

Table 6 shows the differences between fire-death rates for HIGH versus LOW rate states, by race and sex of victim, considered individually and in combination. The population distribution of sexes was calculated by age and race but not separately for LOW vs HIGH rate states. It was assumed that the sex distributions of LOW and HIGH states are the same, once you control for age and race. In other words, any differences in the overall sex distributions of LOW and HIGH states are due to differences in the population mix of ages and races in LOW and HIGH states.

The percentage of the population that is black was estimated at 8.7% for LOW states and 21.9% for HIGH states [6]. Victims who were coded as some known race other than white or black were counted as white in this analysis; there were 17 such victims - 11 males and 6 females - among the 1,600 fire death cases. Another 75 victims had either race or sex - usually race - unknown; they were allocated proportionately over the known cases. Race and sex distributions for the states, used to compute the rates, were taken from the 1979 Statistical Abstract of the United States [6].

8

Table 6. Fire-death rates per million population by victim
race and sex, HIGH versus LOW states

Victim Race and Sex	HIGH Rate States	LOW Rate States	Ratio of HIGH to LOW
White male	38.5	19.5	2.0
White female	22.6	13.2	1.7
Black male	97.1	59.7	1.6
Black female	58.0	33.4	1.7
All whites	30.4	16.2	1.9
All blacks	76.6	45.9	1.7
All males	51.1	23.3	2.2
All females	30.5	14.6	2.1
All victims	40.5	18.8	2.2

The differences between HIGH and LOW rate states overall are more pronounced than for any of the individual race-sex groups or for either of the race groupings but are about the same as those for the two sex groupings. What this means is that HIGH rate states have higher fire-death rates both because they have a larger high-risk population (i.e., more blacks proportionately than the LOW rate states do) and because they pose a larger risk to people of any race or sex. If the mix of blacks and whites were the same in HIGH and LOW states, the ratio between their fatality rates would be 1.8, or about 18 percent less than the 2.2 ratio that actually applies. The other 82 percent of the difference is due to other differences between HIGH and LOW states (such as the difference in proportion of population in rural areas).

3.3 Fire-Death Rate Patterns by Age, Race and Sex of Victim

Table 7 provides estimated percentages of the population by age, race and sex for HIGH and LOW states. These percentages are based on products of three values: (1) the percentage of each race, given LOW or HIGH, (2) the percentage of each age group, given race and given LOW or HIGH, and (3) the percentage of each sex, given age and race (all from [6]). These percentages are shown in truncated form; in calculating fire-death rates they were calculated more precisely.

Table 7. Population distributions by age, race and sex,
HIGH versus LOW states

Victim Age	HIGH Rate States				LOW Rate States			
	White Male	White Female	Black Male	Black Female	White Male	White Female	Black Male	Black Female
Under 5	2.8%	2.7%	1.1%	1.1%	3.2%	3.0%	0.4%	0.4%
5-24	13.0%	12.6%	4.7%	4.7%	15.1%	14.6%	1.9%	1.9%
25-44	11.2%	11.3%	2.1%	2.5%	12.5%	12.6%	1.0%	1.2%
45-64	7.4%	7.9%	1.7%	2.0%	9.1%	9.8%	0.6%	0.7%
Over 64	3.7%	5.5%	0.9%	1.2%	4.7%	6.9%	0.2%	0.3%
All ages	38.1%	40.0%	10.4%	11.5%	44.5%	46.8%	4.1%	4.6%

To help in assessing the significance of differences in the rates shown in the tables to follow, table 8 indicates the estimated number of fire fatality cases used in calculating fire-death rates, by race, sex, and age, for HIGH and LOW rate states. Note that these figures include the allocations of unknowns described at the beginning of section 3.2. All rates from this point on are based on at least five fire-fatality cases, except where noted.

Table 8. Estimated number of fire-fatality cases examined
by age, race and sex, HIGH versus LOW states

Victim Age	HIGH Rate States				LOW Rate States			
	White Male	White Female	Black Male	Black Female	White Male	White Female	Black Male	Black Female
Under 5	41	22	35	35	30	31	21	12
5-24	50	35	20	18	62	42	13	13
25-44	63	29	42	13	75	35	29	14
45-64	87	42	52	17	96	54	21	11
Over 64	61	58	62	54	90	89	15	11

Table 9 provides the corresponding fire-death rates by age, sex and race for HIGH and LOW rate states. Table 10 provides the ratios of HIGH to LOW rates for corresponding age/sex/race groups.

10

Table 9. Fire-death rates per million population by victim age,
race, and sex, HIGH versus LOW states

Victim Age	HIGH Rate States				LOW Rate States			
	White Male	White Female	Black Male	Black Female	White Male	White Female	Black Male	Black Female
Under 5	71.4	40.3	153.9	153.4	23.0	25.4	123.5	77.0
5-24	18.8	13.6	20.9	18.6	10.1	7.1	16.3	15.9
25-44	27.1	12.5	97.0	25.9	14.8	6.8	71.9	28.5
45-64	57.1	25.9	147.8	41.6	26.0	13.6	85.1	37.2
Over 64	80.0	50.8	332.4	216.4	47.2	31.9	168.3	86.4
All ages	38.5	22.6	97.1	58.0	19.5	13.2	59.7	33.4

The wide range of risk is clear here. The highest-risk group - elderly black
men living in HIGH rate states - die in fires at nearly 50 times the rate of the
lowest-risk group - young adult white women living in LOW rate states.

Table 10. Ratio of fire-death rates in HIGH states to those in
LOW states, by victim age, race and sex

Victim Age	White Male	White Female	Black Male	Black Female
Under 5 years	3.1	1.6	1.2	2.0
5-24 years	1.9	1.9	1.3	1.2
25-44 years	1.8	1.8	1.3	0.9
45-64 years	2.2	1.9	1.7	1.1
Over 64 years	1.7	1.6	2.0	2.5
All ages	2.0	1.7	1.6	1.7

Table 10 shows that black women - excluding the very young and the elderly -
have essentially the same fire-death rates in HIGH and LOW states, while black males
under the age of 45 are only slightly worse off in HIGH than in LOW states. Whites
of both sexes and all ages, on the other hand, have significantly higher fire-death
rates in HIGH states than they do in LOW states. To summarize the results to date,
there are three somewhat distinct patterns of race and age underlying the higher
fire-death rates in HIGH states: (1) Whites in HIGH states, regardless of age, are
more likely to die in fires than whites in LOW states. (2) Elderly people (over 64)
in HIGH states, regardless of race, are more likely to die in fires than elderly
people in LOW states. (3) Blacks, excluding elderly, are about equally likely to

11

die in fires in HIGH states or LOW states. But because blacks are more likely to
die in fires than whites in either HIGH or LOW states, and because blacks make up a
much larger proportion of the population in HIGH states, the fire-death rate for
blacks is also part of the reason for the higher overall fire-death rate in HIGH
states.

3.4 Fire-Death Rates by Cause

The previous section alluded to the importance of factors other than age, race
and sex, and the previous report showed that prominent among those factors were the
differences in fire-death rates by cause for rural versus non-rural areas. Heating-
related fires and smoking-related fires account for the largest share of fire
fatalities and table 11 shows how fire-death rates, by cause, compare for HIGH rate
and LOW rate states.

Table 11. Fire-death rates per million population by major
fire cause, HIGH versus LOW states

Fire Cause	HIGH Rate States	LOW Rate States	Ratio of HIGH to LOW
Heating	13.9	3.7	3.8
Smoking	11.5	6.7	1.7
Other	15.2	8.5	1.8
Total	40.5	18.8	2.2

As noted earlier, all cases in which age, race, sex or fire cause were unknown
have been proportionally allocated over the appropriate known ages, races, sexes and
causes. Column totals may not equal rates for all causes combined because of
rounding errors in making these numerous allocations. This point applies to all
analyses in this section.

Table 11 shows that the HIGH states suffer more fire deaths per million
population across the board but are particularly affected by heating-related fire
deaths. As noted in the previous report, this pattern is linked to the HIGH states'
higher ratio of rural to non-rural population, although there is also a significant
excess of heating-related fire deaths in HIGH states over LOW states within rural
and non-rural areas. Smoking, the other major cause of fire deaths, is more like
the other causes as far as the comparison of HIGH states to LOW states is concerned.

Tables 12 and 13 show how these patterns are influenced by the factors of
victim race and sex.

Table 12. Fire-death rates per million population, by victim race or
sex and by major fire causes, HIGH versus LOW states

| Fire Cause | HIGH States | | | | LOW States | | | |
	Whites	Blacks	Males	Females	Whites	Blacks	Males	Females
Heating	7.9	35.1	16.2	11.7	2.6	15.1	5.0	2.5
Smoking	11.2	12.2	16.5	6.7	6.3	10.4	8.6	4.9
Other	11.2	29.3	18.5	12.0	7.3	20.5	9.7	7.3
Total	30.4	76.6	51.1	30.5	16.2	45.9	23.3	14.6

Table 13. Ratios of fire-death rates for major fire causes,
by race, by sex and for HIGH versus LOW states

| Fire Cause | HIGH States Divided by LOW States | | | | Black Rate Divided by White Rate | | Male Rate Divided by Female Rate | |
| | | | | | HIGH States | LOW States | HIGH States | LOW States |
	Whites	Blacks	Males	Females				
Heating	3.0	2.3	3.2	4.7	4.4	5.8	1.4	2.0
Smoking	1.8	1.2	1.9	1.4	1.1	1.7	2.5	1.8
Other	1.5	1.4	1.9	1.6	2.6	2.8	1.5	1.3
Total	1.9	1.7	2.2	2.1	2.5	2.8	1.7	1.6

Males have consistently higher death rates than females, particularly for smoking-
related fires. Blacks have consistently higher death rates than whites, but the
pattern is least pronounced for smoking. It is interesting to compare this latter
finding with the Toledo neighborhood analysis by Paul Gunther [7], which showed that
people-caused fires (of which smoking is an example) showed far more variation from
poor neighborhoods to affluent neighborhoods than did equipment-related fires (such
as heating). This study seems to suggest the opposite finding - that racial dif-
ferences (which tend to be highly correlated with income differences) are more
pronounced for equipment-related fire deaths. There are a number of differences
between the two studies - one examined fires, the other fire deaths; one examined
whole neighborhoods within one city, the other racial groups within twelve states;
one examined income, the other did not; one examined all people-caused fires with
arson and children-playing dominating, the other examined only smoking. There are
too many plausible theories to explain both the patterns found and the apparent
differences between the findings of the two studies to support any conclusions.

Tables 14 and 15 take the analysis another step by examining the factors of
race and sex in combination.

Table 14. Fire-death rates per million population, by victim race and sex and by major fire cause, HIGH versus LOW states

| Fire Cause | HIGH Rate States | | | | LOW Rate States | | | |
| | White | | Black | | White | | Black | |
	Male	Female	Male	Female	Male	Female	Male	Female
Heating	9.8	6.2	39.5	31.0	3.3	1.9	23.2	7.7
Smoking	15.5	7.2	20.1	5.1	8.2	4.5	12.4	8.6
Other	13.3	9.2	37.5	21.8	8.3	6.4	25.0	16.4
Total	38.5	22.6	97.1	58.0	19.5	13.2	59.7	33.4

Table 15. Ratio of fire-death rates in HIGH states to those in LOW states, by victim race, sex and major fire cause

Fire Cause	White Male	White Female	Black Male	Black Female
Heating	3.0	3.3	1.7	4.0
Smoking	1.9	1.6	1.6	0.6
Other	1.6	1.4	1.5	1.3
Total	2.0	1.7	1.6	1.7

For the most part, there are no further surprises here. The patterns are essentially consistent with what might be expected, given the patterns shown in tables 12 and 13. Tables 16-21, then, introduce victim age as a factor. Care should be taken in interpreting these tables, however, in view of the small numbers of fires represented by each rate. Nevertheless, it is interesting to note that while heating-fire death rates and other-known-cause fire-death rates follow the overall pattern of peaks for the very young and the very old, smoking fire death rates tend to grow steadily with age. This suggests that most of the people dying in smoking-related fires are the smokers whose cigarettes ignited the fires, and so the young-child peak is eliminated by the fact that young children do not smoke.

Table 16. Fire-death rates per million population - heating fires - by victim age and race or sex, HIGH versus LOW states

| Victim Age | HIGH Rate States | | | | LOW Rate States | | | |
	Whites	Blacks	Males	Females	Whites	Blacks	Males	Females
Under 5	22.0	67.9	36.8	33.4	8.7	42.3	15.1	10.3
5-24	4.3	4.0	5.6	2.8	1.8	2.6*	2.4	1.4
25-44	3.9	19.5	9.4	5.2	2.1	9.3	5.4	1.4
45-64	5.8	35.4	18.1	5.5	1.5	21.4	5.3	0.6*
Over 64	23.1	163.4	55.1	45.3	4.1	63.5	8.4	5.9
All ages	7.9	35.1	16.2	11.7	2.6	15.1	5.0	2.5

*Rate based on fewer than five fire fatality cases.

Table 17. Fire-death rates per million population - smoking fires -
by victim age and race or sex, HIGH versus LOW states

Victim Age	HIGH Rate States				LOW Rate States			
	Whites	Blacks	Males	Females	Whites	Blacks	Males	Females
Under 5	1.2*	2.7*	1.5*	1.8*	2.0	27.9	5.3	4.9
5-24	5.9	0.0*	5.8	2.8	2.5	5.5	3.3	2.4
25-44	9.3	14.3	16.9	3.6	4.1	9.3	6.7	2.6
45-64	24.0	31.6	36.3	15.6	11.7	8.0*	13.6	9.5
Over 64	15.6	38.7	30.1	12.9	14.5	21.6*	24.6	8.2
All ages	11.2	12.2	16.5	6.7	6.3	10.3	8.6	4.9

Table 18. Fire-death rates per million population - fires other than
heating and smoking - by victim age and race or sex, HIGH
versus LOW states

Victim Age	HIGH Rate States				LOW Rate States			
	Whites	Blacks	Males	Females	Whites	Blacks	Males	Females
Under 5	32.8	82.7	56.2	37.5	12.9	30.2	16.9	13.1
5-24	6.1	15.7	8.0	9.3	4.2	8.8	5.5	3.9
25-44	6.6	20.4	11.8	6.1	4.7	27.7	8.6	4.4
45-64	11.2	23.8	20.1	21.1	6.6	28.0	10.7	5.6
Over 64	24.1	62.8	43.3	73.6	19.4	38.4	20.5	20.2
All ages	11.2	29.3	18.5	12.0	7.3	20.5	9.7	7.3

*Rate based on fewer than five fire fatality cases.

Table 19. Fire-death rates per million population - heating fires -
by victim age, race and sex, HIGH versus LOW states

Victim Age	HIGH Rate States				LOW Rate States			
	White Male	White Female	Black Male	Black Female	White Male	White Female	Black Male	Black Female
Under 5	31.1	12.5	51.1	85.1	9.2	8.2	58.5	25.6**
5-24	4.8	3.8	8.0	0.0**	2.3	1.4	4.0**	1.3**
25-44	4.3	3.5	36.9	12.8	3.5	0.8**	11.8**	7.2**
45-64	10.9	1.0**	49.0	23.6	2.4	0.7**	46.3	0.0**
Over 64	25.5	21.5	180.6	151.1	3.9	4.2	95.7	40.6
All ages	9.8	6.2	39.5	31.0	3.3	1.9	23.2	7.7

**Rate estimated from fewer than five fire fatalities in the study.

15

Table 20. Fire-death rates per million population - smoking fires -
by victim age, race and sex, HIGH versus LOW states

| Victim Age | HIGH Rate States | | | | LOW Rate States | | | |
	White Male	White Female	Black Male	Black Female	White Male	White Female	Black Male	Black Female
Under 5	0.0**	2.5**	5.2**	0.0**	1.5**	2.5**	33.0	22.7**
5-24	7.9	3.8	0.0**	0.0**	3.1	1.9	5.0**	6.0**
25-44	15.7	2.9	23.5	6.5**	6.0	2.3	15.6	6.6**
45-64	30.4	18.0	61.5	5.8**	14.1	9.4	5.9**	9.8**
Over 64	23.7	10.1	57.6	25.2	24.0	8.1	37.4**	10.3**
All ages	15.5	7.2	20.1	5.1	8.2	4.5	12.4	8.6

Table 21. Fire-death rates per million population - fires other than
heating and smoking - by victim age, race and sex, HIGH
versus LOW states

| Victim Age | HIGH Rate States | | | | LOW Rate States | | | |
	White Male	White Female	Black Male	Black Female	White Male	White Female	Black Male	Black Female
Under 5	39.9	25.3	97.4	67.6	14.0	11.8	38.1	22.1**
5-24	6.3	5.9	12.8	18.5	5.0	3.3	9.1	8.4
25-44	7.1	6.0	36.9	6.5**	5.8	3.5	43.6	14.4
45-64	16.0	6.8	37.7	11.9**	9.4	4.0	29.4	26.7
Over 64	31.1	19.3	98.1	40.1	19.7	19.3	37.4**	39.2**
All ages	13.3	9.2	37.5	21.8	8.3	6.4	25.0	16.4

**Rate estimated from fewer than five fire fatalities in the study.

3.5 Fire-Death Rate Patterns by Condition Before Ignition

This section examines fire-death patterns by victim condition before ignition, victim age, and victim sex, for HIGH versus LOW rate states. Victim race is omitted because section 3.4 showed that race is not a major factor in fire-death rate differences for smoking-related fires, which tend to be highly correlated with victim intoxication, one of the key categories of victim condition. Therefore, this section concentrates on sex, which is a strong factor in smoking fire deaths, and age, which is directly related to several victim conditions, such as being a child too young to understand fire or the need to escape or being unable to escape because of general infirmities associated with advanced age (abbreviated below as "too old").

Table 22 gives fire-death rates by victim condition for HIGH vs LOW states. Table 23 gives those rates further subdivided by victim sex. Tables 24 and 25 give the rates from table 21 subdivided by victim age. Tables 26-31 give the rates by

victim condition, sex and age. Note that the condition of bedridden, senile,
physically or mentally handicapped, or other is strongly dominated by victims age 65
or over. The condition of awake and unimpaired also shows a strong age bias toward
elderly victims. Most adult victims below the age of 65 are either asleep or
impaired. Tables 32-33 show what percentage of the victims, by age and sex, were in
each of the conditions. These tables show that drug and alcohol impairment is much
more a problem with men than women.

Table 22. Fire-death rates per million population, by
victim condition, HIGH versus LOW states

Victim Condition	HIGH-Rate States	LOW-Rate States
Asleep	13.2	7.7
Awake and unimpaired	2.5	2.0
Too young	6.8	2.6
Too old	4.2	1.5
Impaired by drugs or alcohol	9.7	3.7
Bedridden, senile, physically or mentally handicapped, other	4.2	1.4
All conditions	40.5	18.8

Table 23. Fire-death rates per million population, by victim
condition and sex, HIGH versus LOW states

Victim Condition	HIGH States		LOW States	
	Male	Female	Male	Female
Asleep	15.2	11.3	9.7	5.9
Awake and unimpaired	2.2	2.8	2.7	1.3
Too young	7.9	5.7	3.2	2.0
Too old	3.9	4.4	1.0	2.0
Impaired by drugs or alcohol	16.3	3.4	5.2	2.2
Bedridden, senile, physically or mentally handicapped, other	5.6	2.8	1.5	1.3
All conditions	51.1	30.5	23.3	14.6

17

Table 24. Fire-death rates per million population, by victim
condition and age, HIGH states only

Victim Condition	Under 5	Victim Age 5-24	Victim Age 25-44	Victim Age 45-64	Over 64
Asleep	3.2	11.4	10.6	17.2	25.2
Awake and unimpaired	0.7*	0.7	2.0	4.0	9.0
Too young	79.4	1.7	0.0*	0.0*	0.0*
Too old	0.0*	0.0*	0.0*	0.3*	36.7
Impaired by drugs or alcohol	0.0*	2.8	11.6	23.7	10.7
Bedridden, senile, physically or mentally handicapped, other	0.0*	0.5*	2.0	5.6	22.4

Table 25. Fire-death rates per million population, by victim
condition and age, LOW states only

Victim Condition	Under 5	Victim Age 5-24	Victim Age 25-44	Victim Age 45-64	Over 64
Asleep	0.4*	5.5	6.5	11.4	15.5
Awake and unimpaired	0.0*	1.7	1.9	2.2	3.4
Too young	31.8	1.0	0.0*	0.0*	0.0*
Too old	0.0*	0.0*	0.0*	0.1*	12.0
Impaired by drugs or alcohol	0.0*	0.7	4.7	6.6	7.0
Bedridden, senile, physically or mentally handicapped, other	0.0*	0.4	0.6	2.1	5.8

*Based on fewer than five fire fatality cases.

Table 26. Fire-death rates per million
population - asleep - by victim
age and sex, HIGH vs. LOW states

| Victim | HIGH States | | LOW States | |
Age	Male	Female	Male	Female
Under 5	3.8*	2.7*	0.0*	0.7*
5-24	10.7	12.1	6.0	5.1
25-44	15.1	6.3	9.7	3.5
45-64	23.6	11.2	13.3	9.7
Over 64	26.3	24.2	22.3	9.1
All ages	15.2	11.3	9.7	5.9

Table 27. Fire-death rates per million
population - awake and unimpaired -
by victim age and sex, HIGH vs. LOW
states

| Victim | HIGH States | | LOW States | |
Age	Male	Female	Male	Female
Under 5	0.0*	1.3*	0.0*	0.0*
5-24	1.0*	0.4*	2.1	1.4
25-44	0.0*	3.8	2.7	1.2
45-64	4.7	3.3	3.7	0.7*
Over 64	10.6	7.5	4.4	2.4
All ages	2.2	2.8	2.7	1.3

Table 28. Fire-death rates per million
population - too young - by victim
age and sex, HIGH vs. LOW states

| Victim | HIGH States | | LOW States | |
Age	Male	Female	Male	Female
Under 5	91.2	68.2	36.6	27.3
5-24	1.3*	2.0	1.5	0.6*
25-44	0.0*	0.0*	0.0*	0.0*
45-64	0.0*	0.0*	0.0*	0.0*
Over 64	0.0*	0.0*	0.0*	0.0*
All ages	7.9	5.7	3.2	2.0

Table 29. Fire-death rates per million
population - too old - by victim
age and sex, HIGH vs. LOW states

| Victim | HIGH States | | LOW States | |
Age	Male	Female	Male	Female
Under 5	0.0*	0.0*	0.0*	0.0*
5-24	0.0*	0.0*	0.0*	0.0*
25-44	0.0*	0.0*	0.0*	0.0*
45-64	0.7*	0.0*	0.3*	0.0*
Over 64	39.6	33.9	9.9	14.0
All ages	3.9	4.4	1.0	2.0

Table 30. Fire-death rates per million
population - impaired by drugs or
alcohol - by victim age and sex,
HIGH vs. LOW states

| Victim | HIGH States | | LOW States | |
Age	Male	Female	Male	Female
Under 5	0.0*	0.0*	0.0*	0.0*
5-24	5.7	0.0*	1.3	0.2*
25-44	19.8	3.8	6.7	2.9
45-64	36.4	11.8	9.3	4.1
Over 64	21.2	0.8*	10.5	3.6
All ages	16.3	3.4	5.2	2.2

Table 31. Fire-death rates per million
population - bedridden, senile,
physically or mentally handicapped,
other - by victim age and sex, HIGH
vs. LOW states

| Victim | HIGH States | | LOW States | |
Age	Male	Female	Male	Female
Under 5	0.0*	0.0*	0.0*	0.0*
5-24	0.7*	0.4*	0.4*	0.4*
25-44	3.1	1.0*	0.3*	0.9
45-64	8.8	2.6	3.1	1.1*
Over 64	30.4	14.9	6.4	5.2
All ages	5.6	2.8	1.5	1.3

*Rate based on fewer than five fire fatality cases.

Table 32. Percentage of fire deaths by victim condition,
             HIGH states only

Victim Age and Sex	Asleep	Awake and Unimpaired	Too Young	Too Old	Impaired by Drugs or Alcohol	Bedridden, Senile, Physically or Mentally Handicapped, Other
Male						
Under 5	4%	0%	96%	0%	0%	0%
5-24	55%	5%	7%	0%	29%	4%
25-44	40%	0%	0%	0%	52%	8%
45-64	32%	6%	0%	1%	49%	12%
Over 64	20%	8%	0%	31%	17%	24%
Female						
Under 5	4%	2%	94%	0%	0%	0%
5-24	81%	3%	13%	0%	0%	3%
25-44	42%	26%	0%	0%	25%	7%
45-64	39%	11%	0%	0%	41%	9%
Over 64	30%	9%	0%	42%	1%	18%
All						
Under 5	4%	1%	95%	0%	0%	0%
5-24	67%	4%	10%	0%	16%	3%
25-44	40%	8%	0%	0%	44%	8%
45-64	34%	8%	0%	1%	47%	11%
Over 64	24%	9%	0%	35%	10%	22%
All males	30%	4%	15%	8%	32%	11%
All females	37%	9%	19%	14%	11%	9%
All victims	33%	6%	17%	10%	24%	10%

Table 33. Percentage of fire deaths by victim condition,
LOW states only

Victim Age and Sex	Asleep	Awake and Unimpaired	Too Young	Too Old	Impaired by Drugs or Alcohol	Bedridden, Senile, Physically or Mentally Handicapped, Other
Male						
Under 5	0%	0%	100%	0%	0%	0%
5-24	53%	19%	13%	0%	12%	3%
25-44	50%	14%	0%	0%	35%	1%
45-64	45%	12%	0%	1%	31%	10%
Over 64	42%	8%	0%	18%	20%	12%
Female						
Under 5	2%	0%	98%	0%	0%	0%
5-24	66%	18%	8%	0%	3%	5%
25-44	41%	14%	0%	0%	34%	11%
45-64	62%	4%	0%	0%	26%	7%
Over 64	27%	7%	0%	41%	10%	15%
All						
Under 5	1%	0%	99%	0%	0%	0%
5-24	59%	18%	11%	0%	8%	4%
25-44	47%	14%	0%	0%	34%	4%
45-64	51%	10%	0%	0%	29%	9%
Over 64	35%	8%	0%	27%	16%	13%
All males	42%	12%	14%	4%	22%	6%
All females	40%	9%	14%	14%	15%	9%
All victims	41%	11%	14%	8%	19%	7%

4. CONCLUSIONS

This report seeks to build on the results of the 1982 report by Gomberg and
Clark [3], which identified differences in the frequencies of several causal cate-
gories of fires - primarily related to heating equipment - as the principal explana-
tion of differences in overall fire death rates between rural and non-rural areas.
Because rural areas account for a much larger proportion of total population in
those states having the highest fire death rates, the Gomberg and Clark report also
implicitly showed the role of heating-related fires in explaining why the high-rate
states had higher fire death rates. In this report, analyses were performed to
determine what role race, sex and age play in explaining the differences between
high-rate and low-rate states. Because the results produced few conclusions going
beyond what was already known, the data are of interest primarily for archival
purposes and as bases for future analysis.

21

It was recognized at the outset that males have much higher fire death rates than females, and it has been widely conjectured that a major reason for the difference is a greater propensity for males to combine careless smoking and excessive drinking. Tables 32 and 33 support the contention that a higher percentage of male fire deaths involve drug or alcohol impairment - particularly in high-rate states. Table 23 shows that without fire deaths involving such impairment, the gap between male and female fire death rates would shrink by nearly one-third in low-rate states and nearly two-thirds in high-rate states. However, tables 22 and 23 shows that drug/alcohol impairment does not stand out uniquely as a factor in the differences between high-rate and low-rate states, either with both sexes considered together or with the two sexes considered separately. Similarly table 11 shows that smoking-related fires contribute no more than other non-heating causes to the differences between high-rate and low-rate states.

The results on race also generally follow already-established patterns. Blacks constitute two-and-a-half times as large a proportion of the total population in high-rate states as in low-rate states. Therefore, because fire-death-rates are much higher for blacks than for whites, their greater numbers help to explain the higher death rates in high-rate states. (A similar analysis would probably show a similar patttern for poverty versus non-poverty populations. High-rate states have higher proportions of their populations in poverty, and that has been shown to correlate with higher fire rates.) But for each racial group considered separately, the differences between death rates in high-rate and low-rate states are almost the same, as table 6 shows. And although table 10 shows the high-low differences to be more age-dependent for blacks than for whites, it is not clear what significance this pattern has for fire prevention planners.

Finally, the results on age also showed little beyond the familiar pattern that young children and the elderly have much higher fire death rates than the rest of the population. Elderly blacks were the principal age-defined group for which death rates in high-rate states were much higher (more than double) the corresponding rates in low-rate states (see table 10).

5. REFERENCES

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[5]   The 1980 Commercial Atlas and Marketing Guide, 110th Edition, Rand McNally and
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      Washington, D.C., 1979.

[7]   Socioeconomic Characteristics and Fire Patterns: A Case Study of Toledo, Fire
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APPENDIX A
CODING STRUCTURES

CODING FOR FIRE FATALITY WORKSHEETS

ID NUMBER (5 digits)
- first two digits used for NCHS state code (attached)

MULTIPLE FATALITY FIRE NUMBER (2 digits)
- number each multiple fatality fire under ID number
00 for single fatality fire

BLOCK A
DATE OF DEATH (6 digits)[1]
Month   (2 digits)
Day   (2 digits)
Year   (2 digits)

AGE (2 digits)[1]
Actual age except
01 for ages 00 and 01
99 for 99 and above
00 for unknown

SEX (1 digit)[1]
1 male
2 female

RACE (1 digit)[1]
1 white
2 black
3 American Indian
4 Asian (Japanese, Chinese, Philipino, Korean, Asian Indian,
        Vietnamese, Hawaiian, Pacific Islanders)
5 Spanish (Mexican, Puerto Rican, Cuban)
9 Race, Not Classified Above

BLOCK B
PLACE OF DEATH (10 digits)[1]
City/Town (5 digit census code)
County   (3 digit census code)
State   (2 digit NCHS code attached)

PLACE OF RESIDENCE (10 digits)[1]
Same as "PLACE OF DEATH"

BLOCK C
DATE OF FIRE (6 digits)[1]
Same as "DATE OF DEATH"

TIME OF FIRE (MILITARY) (4 digits)[1]
0000 = Unknown

---
[1]If code is unknown or not reported fill data element with appropriate number of zeros.

DAY (1 digit)[1]
    1 Sunday
    2 Monday
    3 Tuesday
    4 Wednesday
    5 Thursday
    6 Friday
    7 Saturday
    0 Unknown

AFFILIATION OF VICTIM (1 digit)[1]
    1 Fire Service
    2 Other Emergency Personnel
    3 Civilian

BLOCK D
    CAUSE OF DEATH (1 digit)
        1 Smoke inhalation, carbon monoxide, etc.
        2 Burns
        3 Smoke Inhalation and burns
        4 Cremation
        9 Other
        0 Not reported

    E-CODE (5 digits)[1]
        NCHS External cause of death code
        1978 Code has form 00XXX or 0XXXX
        1979 Code has form XXX.X

    MULTIPLE FATALITY FIRE (2 digits)[1]
        Number of fatalities (2 digits)
        00 Not Multiple Fatality Fire

BLOCK E
    ADDRESS (13 digits)[1]
        Street Address - Omit
        City/Town (5 digit census code)
        Zip Code (5 digits)
        County   (3 digit census code)

BLOCK F
    WAS FIRE DEPARTMENT CALLED? IF YES, TYPE OF FIRE DEPARTMENT (1 digit)
        0 Not called
        1 Yes, all paid
        2 Yes, part paid
        3 Yes, all volunteer
        8 Response unknown
        9 Yes, type unknown

    RUN TIME (In minutes - 2 digits)[1]
        00 Unknown

BLOCK G
        POPULATION OF PLACE (2 digits)
                01 Under 2,500
                02 2,500-5,000
                03 5,000-10,000
                04 10,000-25,000
                05 25,000-50,000
                06 50,000-100,000
                07 100,000-250,000
                08 250,000-500,000
                09 500,000-1,000,000
                10 Over 1,000,000
                00 Not reported

BLOCK H
        PROPERTY TYPE (2 digits)
                41 One/two family
                42 Apartment
                47 Mobile home
                44 Hotel
                04 Other residential
                01 Public assembly
                02 Educational
                03 Institutional
                05 Store, office
                06 Industry, utility, defense
                08 Storage
                07 Manufacturing
                00 Unknown
                "Other" is coded with appropriate 2 digit NFIRS code[2] except
                09 Vehicle fire
                45 Travel trailer

BLOCK I
        ORIGIN OF FIRE (2 digits)
                14 Living room/family room
                21 Bedroom
                23 Dining room
                24 Kitchen
                25 Bathroom
                42 Closet
                47 Garage/carport
                62 Heating equipment room/water heater area
                75 Concealed wall space
                00 Undetermined/not reported
                "Not Classified Above" is coded with appropriate NFIRS[2] code

BLOCK J
        EQUIPMENT INVOLVED (2 digits)
                11 Central heating unit
                13 Stationary local heating unit
                14 Fireplace
                15 Portable local heating unit
                01 Chimney
                02 Cooking equipment
                03 Fixed wiring
                04 Switch, receptacle, outlet
                05 Cord, plug
                06 Television, radio, phonograph
                08 No equipment involved
                00 Undetermined/not reported
                "Not Classified Above" coded with appropriate NFIRS code[2]

_____

[2]Use 99 if no NFIRS code applies.

26

BLOCK K

FORM OF HEAT IGNITION (2 digits)
01 Gas fueled equipment
02 Liquid fueled equipment
03 Solid fueled equipment
04 Short circuit
31 Cigarette
44 Candle
45 Match
46 Lighter
05 Properly operating electrical equipment
06 Improperly operating electrical equipment
00 Undetermined/not reported
"Not Classified Above" coded with appropriate NFIRS code[2]

BLOCK L

TYPE OF MATERIAL IGNITED (2 digits)
01 Natural gas
02 LP gas
03 Gasoline
04 Cooking oil, grease
05 Other food
06 Sawn wood, framing
07 Hardwood, plywood, fiberboard
08 Paper
09 Fabric
00 Undetermined/not reported
"Not Classified Above" coded with appropriate NFIRS code[2]

BLOCK M

FORM OF MATERIAL IGNITED (2 digits)
01 Interior wall covering, surface
02 Thermal, acoustical insulation
21 Upholstered furniture
03 Mattress/bedding
34 Wearing apparel not on a person
35 Wearing apparel on a person
44 Magazine, newspaper
04 Rubbish, trash waste
05 Cooking materials
00 Undetermined/not reported
"Not Classified Above" coded with appropriate NFIRS code[2]

BLOCK N

IGNITION FACTOR (2 digits)
01 Incendiary/suspicious
31 Abandoned, discarded material (cigarette)
33 Falling asleep
36 Children playing
41 Fuel spilled, released accidentally
46 Combustible too close to heat
51 Part failure, leak, break
54 Short circuit, ground fault
56 Lack of mainenance, worn out
63 Installed too close to combustibles
73 Unattended
00 Undetermined/not reported
"Not Classified Above" coded with appropriate NFIRS code except[2]
08 Murder
09 Suicide

BLOCK O
LOCATION AT TIME OF IGNITION (1 digit)
1 Intimately involved with ignition
2 In the room or space of fire origin
4 In same building as origin of fire
5 Outside of building of fire origin
0 Undetermined/not reported
9 Not classified above

BLOCK P
CONDITION BEFORE INJURY (1 digit)
1 Asleep
2 Bedridden or physically handicapped
3 Impaired by drugs, alcohol
4 Under restraint
5 Too young to act
6 Too old to act
7 Mentally handicapped, senile
8 Awake, Unimpaired
9 Not classified above
0 Undetermined/not reported

BLOCK Q
WAS THERE A SMOKE DETECTOR PRESENT? IF SO, DID IT OPERATE? (1 digit)
0 Undetermined/not reported
1 Present and operated
2 Present and did not operate
7 Present and operation not reported
8 Not present

BLOCK R
BLOCK R WILL BE CODED WITH
1-14 letters (left justified blank filled) indicating block of
this form for which additional information is provided in
NARRATIVE

BLOCK S
WAS AN AUTOPSY PERFORMED? (1 digit)
1 Yes
0 No

WAS A BLOOD SAMPLE TAKEN? (1 digit)
1 Yes
0 No

DRUGS PRESENT? (1 digit)
1 Yes
0 No
9 Not reported

BLOOD ALCOHOL CONTENT (4 digits)
Percentage of Form X.XX
9999 - Unknown

CARBOXY HEMOGLOBIN (4 digits)
Percentage of Form XX.X
9999 - Unknown

28

<u>BLOCK T</u>
    DATA SOURCES (2 digits)
            For convenience, we use the abbreviation
                    DC for Death Certificate
                    FIR for Fire Incident Report
                    TPC for Telephone/Personal Contact
                    NR for Newspaper Report
                    O for Other

    01 DC only   31 DC + O
    02 FIR only   32 FIR + O
    03 TPC only   33 TPC + O
    04 NR only   34 NR + O
    05 O only

    11 DC + FIR   41 DC + FIR + O
    12 DC + TPC   42 DC + TPC + O
    13 DC + NR   43 DC + NR + O
    14 FIR + TPC   44 FIR + TPC + O
    15 FIR + NR   45 FIR + NR + O
    16 TPC + NR   46 TPC + NR + O

    21 DC + FIR + TPC   51 DC + FIR + TPC + O
    22 DC + FIR + NR   52 DC + FIR + NR + O
    23 DC + TPC + NR   53 DC + TPC + NR + O
    24 FIR + TPC + NR   54 FIR + TPC + NR + O

    29 DC + FIR + TPC + NR   59 DC + FIR + TPC + NR + O

    00 NOT REPORTED

DEFINITION OF FIRE "CAUSES"

Cause	EQP	NFPA 901 Codes FHI	IGF
Incendiary, Suspicious	–	–	11, 12, 21, 22
Children Playing	–	–	36, 48
Smoking	–	30 – 39	–
Heating	10 – 19	–	–
Cooking	20 – 29	–	–
Electrical Distribution	40 – 49 –	– 28, 54	– –
Appliances	30 – 39 50 – 54 56 – 59	–	–
Open Flame	87	41 – 43 44 – 47 53, 55	32, 35
Unknown		00, 97, 99 Non-Numeric	
Other		ALL OTHER	

EQP: Equipment Involved in Ignition
FHI: Form of Heat of Ignition
IGF: Ignition Factor

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4. TITLE AND SUBTITLE

CIVILIAN RESIDENTIAL FIRE FATALITY RATES: SIX HIGH-RATE
STATES VERSUS SIX LOW-RATE STATES

5. AUTHOR(S)

John R. Hall, Jr. and Susan G. Helzer

6. PERFORMING ORGANIZATION (If joint or other than NBS, see instructions) **NATIONAL BUREAU OF STANDARDS** **DEPARTMENT OF COMMERCE** **WASHINGTON, D.C. 20234**	**7.** Contract/Grant No.
	8. Type of Report & Period Covered

10. SUPPLEMENTARY NOTES

☐ Document describes a computer program; SF-185, FIPS Software Summary, is attached.

11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)

The report presents results of an analysis of 1,600 fire fatalities occurring
in six states with high fire-death rates and six states with low fire-death rates.
Reasons for the differences in rates are explored, with special attention to victim
age, sex, race, and condition at time of ignition. Fire cause patterns are touched on
only lightly but are addressed more extensively in the companion piece to this report,
"Rural and Non-Rural Civilian Residential Fire Fatalities in Twelve States", NBSIR
82-2519, by A. Gomberg and L. Clark, which also examines the rural/non-rural split.

12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)

Fire data; fire deaths; fire statistics; residential fires.

13. AVAILABILITY ☒ Unlimited ☐ For Official Distribution. Do Not Release to NTIS ☐ Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. ☒ Order From National Technical Information Service (NTIS), Springfield, VA. 22161	**14. NO. OF PRINTED PAGES** 35
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