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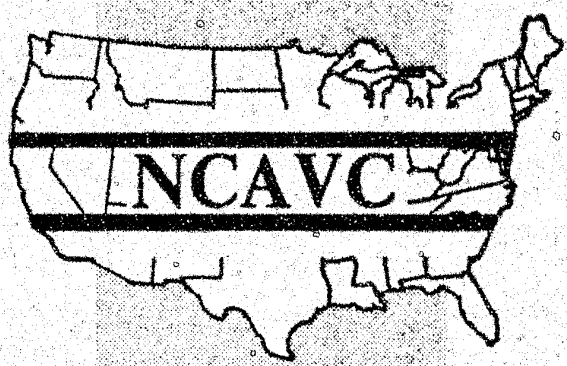
Arson-Homicides: Findings from a National Study



Arson-Homicides: Findings From a National Study

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Introduction

Many of the standard procedures used in investigating cases of homicide are either thwarted or, at least, significantly delayed when the body of the victim has been burned. Generally, the initial decision as to whether a homicide has occurred is based on an examination of the body. The type of wounds or injury to the body, the location of such wounds or trauma, the type of weapon apparently used, and the general appearance of the crime scene are primary to the determination of the likely cause of death and detecting whether or not a murder has taken place.

Murderers will sometimes burn a body in order to prevent or delay the identification of the body upon discovery. The body may also be burned to destroy evidence of the true cause of death or evidence of the crime scene. The most frequently used methods of attempting to prevent identification or to destroy evidence is to set fire to the house, building or vehicle containing the body or to pour some type of inflammable liquid on the victim and ignite the body (Tedeschi, Eckert and Tedeschi, 1977). When confronted with a burned body, the key questions for the investigator include: whether the burns were the cause of death, were they produced before or after death, and are there other injuries to the victim?

As Polson (1965) pointed out, determination of when the burns were received, before or after death, is critically important. If the burns were ante-mortem, before death, then it is important to determine if the burns were the cause of death. On the other hand, if the burns were post-mortem,

it is possible that the victim's death occurred by violence and the fire was an attempt to conceal the crime or destroy evidence.

Determination of cause of death and time of fire injury to the victim must be left to the medical examiner (Kessler and Weston, 1972; Fisher, 1952). In the past, some arson/homicide investigators tended to rely on their own judgment, using simplistic characteristics of burned bodies as guidelines. One of those characteristics was the "pugilistic attitude" of a burned body, caused by the effects of extreme heat on the muscles of the body (Geberth, 1990). A body exposed to sufficient fire will assume the pugilistic attitude irrespective of life or death at the time of exposure to the fire (O'Connor, 1987). The pugilistic attitude is not always present, however, even if the body has been exposed to ample fire to normally result in the attitude. This may occur if the body was in rigor mortis prior to the fire (O'Connor, 1987). In one of the cases included in this study, the murderer returned to the scene approximately 24 hours after the murder and set the fire that destroyed the victim's body and residence. In this case, only a limited pugilistic attitude was noted.

Another common belief is that blisters will only form on the skin if the victim was alive at the time of the fire. This belief is also not correct. As Spitz and Fisher (1973) point out, even microscopic examination may not be able to determine whether burn blisters on the skin occurred shortly before death or whether they occurred after death. Most persons who die in a conflagration are killed by asphyxiant gases before any burning of the body occurs (Dutra, 1949; Fisher, 1952; Geberth, 1990). Carbon monoxide poisoning is the most common poisoning due to asphyxiant gases (Courville, 1964).

When arson is involved in a homicide, regardless of whether the arson caused death or took place after death, the investigation is made much more difficult (Geberth, 1990). Although no two crimes are exactly alike, there are certain similarities and differences that are shared (Ressler, Burgess, and Douglas, 1988). This study was designed to provide arson-homicide investigators with information that may help to differentiate and identify common characteristics and significant differences.

Method of The Study

Purpose of the study: This study was conducted to identify characteristics of arson-homicides and to provide arson and homicide investigators with information on patterns and common characteristics of such crimes. Examination of a large number of cases, widely dispersed geographically, could provide information helpful to investigators of these difficult cases. This study is one of a series of related research projects conducted by the Arson and Bombing Investigative Services Subunit of the National Center for the Analysis of Violent Crime, housed at the FBI Academy, Quantico, Virginia. The subunit has conducted a series of studies on arson and serial arsonists (see Icove and Estepp, 1987; Icove and Gilman, 1989; Icove and Horbert, 1990; Sapp, Gary, Huff and James, 1993; Sapp, Gary, Huff and James, 1994; Sapp, Huff, Gary, Icove, and Horbert, 1994, among others; see also Douglas, Burgess, Burgess and Ressler, 1992).

The Population Studied: Data for 183 cases of arson-homicide were obtained from the Federal Bureau of Investigation's Violent Criminal Apprehension Program (VICAP), located at the FBI Academy in Quantico, Virginia. A data search was conducted for fire-related homicide cases from the synopses of almost 10,000 cases reported to VICAP from throughout

the United States since 1985. The data set is made up of 183 cases from 36 states and the District of Columbia reported to VICAP between 1985 and 1994. Only 31 of the cases have been cleared by arrest. The 183 cases comprise the total population of cases reported to VICAP that involved significant burning of the body, regardless of whether the burning was prior to death (ante-mortem) or after death (post-mortem).

Cases reported to the VICAP are not randomly selected but are based on reporting criteria that is consistent across the nation's law enforcement community. These cases do not represent all arson-homicides that occurred during this period but probably do include most of the unsolved cases. Since the analyses below are based on the total cases in VICAP, the differences noted are real differences and not an artifact of sampling or statistical analysis.

Variables Examined: The study examined variables related to the victim, to the known offenders, and the offense. Since the data were collected from case synopses provided by over 150 different law enforcement agencies from 36 states, data for all of the variables were not always available for analysis. Since some of the cases had more than one victim, the only victim data included in the analyses were those available for the primary, or targeted victim. As an example, in one case, a former boyfriend killed a 26 year old female and subsequently set her house of fire. Her children, aged six and four, died in the fire. Only the 26 year-old female's characteristics were included since she was the targeted victim. This protocol was followed throughout the analyses, thus precluding multiple compounding of data on the offenses and offender.

Results of the Study

Gender and Age of the Victims: The 183 victims in the study consisted of 99 (54.1 percent) females and 84 (45.9 percent) males. Mean age of the victims was 36.3 years. The modal age was 26, with ten victims of that age. The median age was 30. Overall, the victims ranged in age from two years to 91 years. The distribution of the 183 victims by age group and gender is provided in Table 1. As reflected in that table, female victims tended to be somewhat younger than male victims.

Table 1
Distribution of Arson-Homicide Cases By Age Group and Gender of Victim (n=182)

Age Group	Male	Female	Total
17 or below	10	14	24 (13.2 %)
18-29 years	29	39	68 (37.4%)
30-39 years	7	18	25 (13.7%)
40-49 years	9	8	18 (9.9%)
50-59 years	9	7	16 (8.8%)
60 or older	20	11	31 (17.0%)
Total	*84	99	182 (100.0%)

* Age information was not available for one male victim.

Overall, more than one-third (68, 37.4 percent) of the victims in these 183 arson-homicides were between 18-29 years of age. Twenty-four (13.2 percent) were 17 years of age or younger and 25 (13.7 percent) were between 30 and 39 years of age. In the 40-49 year age group there were 18

victims (9.9 percent). Sixteen (8.8 percent) victims were between 50 and 59 years of age. A total of 31 (17.0 percent) of the victims were aged 60 years or older. Information on the age of one male victim was not available.

Cause of Death: Specific cause of death was available for 177 cases. The most frequently occurring specific cause of death was fire and fire related causes that accounted for 49 (27.7 percent) of the 177 victims. As reflected in Table 2, equal numbers of victims (36, 20.3 percent) died as a result of gunshots or stabbing. Blunt force injuries were the cause of 25 (14.1 percent) of the deaths. The remaining victims died of asphyxiant gases (5, 2.8 percent), cutting (3, 1.7 percent), or smothering (2, 1.1 percent). Specific cause of death information was not available for six cases.

Table 2
Distribution of Arson-Homicide Cases
by Specific Cause of Death
(n =177)

Cause of Death	Number of Cases	Percent
Gunshot	36	20.3
Strangulation	21	11.9
Fire, Burns	49	27.7
Blunt Force	25	14.1
Stabbing	36	20.3
Cutting	3	1.7
Asphyxiant Gases	5	2.8
Smothering	2	1.1
Totals	177	100.0

To enhance the analyses, the specific causes of death were collapsed into five general causes as shown in Table 3. Fire-related causes, which included burns and asphyxiant gases, accounted for 53 (29.9 percent) of the 177 deaths. Bladed weapons, including specific causes of death of cutting and stabbing, were responsible for 39 (22.0 percent) of the deaths. Injury from one or more gunshots (36, 20.3 percent) was the third most frequently occurring cause of death. Death by application of blunt force (25, 14.1 percent) and by asphyxia (24, 13.7 percent) were less often identified as the cause of death. Asphyxia included cases where the victim was strangled or smothered. Cause of death information was not available for six victims.

Table 3
Distribution of Arson-Homicide Cases
by General Cause of Death
(n = 177)

Cause of Death	Number	Percent
Fire-related	53	29.9
Bladed weapon	39	22.0
Gunshots	36	20.3
Blunt force	25	14.1
Asphyxia	24	13.7
Totals	177	100.0

Cause of death differed significantly by gender of the victim. Males were more likely than females to die by gunshot or by fire-related deaths. Females were more likely than males to die by asphyxia, blunt force trauma, or bladed weapons. These differences and the distribution of the cases by cause of death and gender of the victim are illustrated in Table 4.

Table 4
Distribution of Arson-Homicide Cases by Gender of Victim and by Cause of Death (n=177)

Cause of Death	Male	Female
Gunshot	28 (33.3%)	8 (8.6%)
Asphyxia	5 (6.0%)	19 (20.4%)
Fire Related	32 (38.1%)	21 (22.6%)
Blunt Force	10 (11.9%)	15 (16.1%)
Bladed Weapon	9 (10.9%)	30 (32.3%)
Totals	84 (100.0%)	93 (100.0%)

The cases were also differentially distributed by age group and cause of death as reflected in Table 5. The youngest victims were most likely to die of fire-related causes (15, 62.5 percent). The second most frequent cause of death for victims aged 17 years or younger was asphyxia (5, 20.8 percent), including smothering and strangulation. Few of the victims aged 17 or younger died from bladed weapons (2, 8.3%), gunshots (1, 4.2 percent) or blunt force (1, 4.2 percent).

The cause of death for victims in the 18-29 year age group was more equally distributed with gunshots (19, 29.7 percent), bladed weapons (15, 23.4 percent), and fire (12, 20.3 percent) being the most frequent causes of death. Asphyxia (9, 14.1 percent) and blunt force (8, 12.5 percent) were less frequently noted as cause of death for the 18-29 age group. In the 30-39 year age group, bladed weapons (10, 43.5 percent) accounted for nearly one-half of the victims. Death by fire was the least common cause of death

(2 cases, 8.7 percent) in the 30-39 age group. Gunshots (3, 13.0%), blunt force trauma (4, 17.4 percent) and asphyxia (4, 17.4 percent) were the other causes of death reported for this age group.

Table 5
Distribution of Arson-Homicide Cases by Cause of Death and by Victim Age Group (n=176)

	Age Group		
Cause of Death	**17 or less**	**18-29**	**30-39**
Gunshot	1 (4.2%)	19 (29.7%)	3 (13.0%)
Asphyxia	5 (20.8%)	9 (14.1%)	4 (17.4%)
Fire Related	15 (62.5%)	13 (20.3%)	2 (8.7%)
Blunt Force	1 (4.2%)	8 (12.5%)	4 (17.4%)
Bladed weapon	2 (8.3%)	15 (23.4%)	10 (43.5%)
Totals	24 (100%)	64 (100%)	23 (100%)

Table 5 (Continued)
Age Group

Cause of Death	**40-49**	**50-59**	**60 or more**
Gunshot	1 (5.6%)	3 (18.8%)	9 (29.0%)
Asphyxia	1 (5.6%)	1 (6.3%)	3 (9.7%)
Fire Related	7 (38.9%)	6 (37.5%)	10 (32.3%)
Blunt Force	3 (16.7%)	4 (25.0%)	5 (16.1%)
Bladed weapon	6 (33.3%)	2 (12.5%)	4 (12.9%)
Totals	18 (100%)	16 (100%)	31 (100%)

In the cases involving victims from 40 to 49 years old, fire related causes were the most commonly reported reason for death (7, 38.9

percent) with death by a bladed weapon (6, 33.3 percent) a close second cause. Only one victim died of gunshots (5.6 percent) and only one of asphyxia (5.6 percent) in the 40-49 age group. In three (16.7 percent) of the cases, blunt force trauma was the cause of death for victims in this group.

Fire was also the leading cause of death in cases with victims aged 50-59 years (6, 37.5 percent). Blunt force trauma (4, 25.0 percent) was the second leading cause of death in this age group. Three victims (18.8 percent) died from gunshots and two (12.5 percent) from bladed weapons. The remaining case (1, 6.3 percent) in this age group involved death by asphyxia.

Fire was the most frequent (10, 32.3 percent) cause of death for victims aged 60 years or older. Death by gunshot (9, 29.0 percent) was the second most common cause of death for the oldest group of victims. Elderly victims, aged 60 years or older, also died by blunt force trauma (16.1 percent), bladed weapons (4, 12.9 percent), and asphyxia (3, 9.7 percent).

Time of Fire Injury to Victims: Information was available on the time of fire injury to the victims, either ante-mortem or post-mortem, for 173 of the cases studied. Of these 173 cases, the victims received injuries from fire prior to their death, ante-mortem, in 52 (30.4 percent) of the cases. The remaining 121 (9.6 percent) involved post-mortem fire injuries. Male victims were statistically more likely to receive fire injuries before death than were female victims. Overall, 40.5 percent (34) of male victims received ante-mortem fire injuries. However, for females, only 20.2 percent (18) had injuries from fire received ante-mortem. See Table

6. Thus, males were twice as likely as females to be alive when the fire injuries were received.

Table 6
Distribution of Arson-Homicide Cases
by Gender of Victim and by
Time of Fire Injuries
(n=183)

Time of Injury	Male	Female
Ante-mortem	34 (40.5%)	18 (20.2%)
Post-mortem	50 (59.4%)	71 (79.8%)
Totals	84 (100%)	99 (100%)

As shown in Table 7, 15 of 24 victims (62.5 percent) aged 17 years or younger received ante-mortem injuries. In contrast, in the 18-29 year age group and the 30-39 age group, only 20.6 percent (13) and 4.5 percent (one case) had ante-mortem injuries. More than one-third of all victims over 40, however, had ante-mortem fire injuries. In the 40-49 age group, seven of 18 victims (38.9 percent) and in the 50-59 age group, 37.5 percent (six victims) received fire injuries before death. In the oldest age group, 60 years or more, 34.5 percent (ten cases) had ante-mortem fire injuries.

Table 7
Distribution of Arson-Homicide Cases
by Age Group and by Time of Fire Injuries
(n=172)

Age Group	Ante-Mortem	Post-mortem
17 years or less	15 (62.5%)	9 (37.5%)
18-29 years	13 (20.6%)	50 (79.4%)
30-39 years	1 (4.5%)	21 (95.5%)
40-49 years	7 (38.9%)	11 (61.1%)
50-59 years	6 (37.5%)	10 (62.5%)
60 years or more	10 (34.5%)	19 (65.5%)
Totals	52 (100%)	120 (100%)

Location of the Arson-Homicide: Specific locations were analyzed for the 183 cases of arson-homicide. As depicted in Table 8, the most common location for an arson-homicide was in a residence (75, 41.0 percent). Open areas (36, 19.7 percent), vehicles (23, 12.6 percent), and wooded areas (19, 10.4 percent) were other common locations for arson-homicides. Sixteen (8.7 percent) other cases involved a building, other than a residence, and six cases (3.3 percent) occurred on or along a roadway. Fires in workplaces (5, 2.7 percent) and in or by a trash dumpster (3 , 1.6 percent) accounted for the remainder of the cases.

Table 8
Distribution of Arson-Homicide Cases by Specific Location of the Crime (n=183)

Specific Location	Number	Percent
Residence	75	41.0
Open Area	36	19.7
Vehicle	23	12.6
Wooded Area	19	10.4
Building (Non-Residence	16	8.7
Roadway	6	3.3
Workplace	5	2.7
Trash Dumpster	3	1.6
Totals	183	100.0

For purposes of the study, the locations were categorized as indoor, outdoor, or vehicle. The indoor category included residences, workplaces, and other buildings. A total of 96 cases (52.5 percent) of the 183 arson-homicides occurred indoors. Outdoor fires were defined as those that were located in open areas, wooded areas, roadways and trash dumpsters. About one-third (64, 35.0 percent) were located in an outdoor site and 23 cases (12.6 percent) in a vehicle. Arsons in vehicles, such as motor homes, or recreational vehicles, that were permanently parked and used as a residence were included in the indoor category rather than the vehicle category.

Similar percentages of female (35.3 percent) and male (34.5 percent) of victims of arson-homicide were in outdoor locations. (See Table 9).

However, the bodies of female victims were more likely (56.6 percent) than those of males (47.6 percent) to be found in indoor arsons. Males, however, were more likely (17.9 percent) than were females (8.1 percent) to be found in vehicles.

Table 9
Distribution of Arson-Homicide Cases by General Location of Fire and by Gender of Victim (n=183)

General Location	Male	Female
Indoor	40 (47.6%)	56 (56.6%)
Outdoor	29 (34.5%)	35 (35.3%)
Vehicle	15 (17.9%)	8 (8.1%)
Totals	84 (100%)	99 (100%)

The cases of arson-homicide in this study were not equally distributed by location of the crime and the time of fire injury to the body. Overall, 69.9 percent of the arson-homicide victims received post-mortem fire injuries. For outdoor location, 79.3 percent had post-mortem fire injuries and vehicle locations had 71.4 percent post-mortem injuries. For all victims found in indoor locations, 63.8 percent were determined to have post-mortem fire injuries. When the cases were analyzed by the specific location of the body, it was found that residences (62.2 percent), other buildings (66.7 percent) and trash dumpsters (66.7 percent) were more likely to involve arsons where the victim was still alive when the fires were set. In contrast, arsons and body locations in or along roadways (83.3

percent) and wooded areas (82.4 percent) were much more likely to have victims with post-mortem fire injuries.

The distribution of cases by general location and by age group of the victim is shown in Table 10. Two-thirds of the youngest age group died in fires set in an indoor location. However, the 18-29 year age group had more than one-half (58.8 percent) of the cases located in an outdoor site. The 50-59 age group was equally likely to be involved in a case with an indoor or an outdoor location. For the other age groups, the most frequently occurring location was an indoor one, with the 30-39 age group with 52.0 percent, the 40-49 group with 83.3 percent, and the oldest group with 90.3 percent of the cases in an indoor location.

Table 10
Distribution of Arson-Homicide Cases by General Location of the Crime and by Victim Age Group (n=182)

Age Group	Indoor	Outdoor	Vehicle
17 or less	16 (66.7%)	6 (25.0%)	2 (8.3%)
18-29 years	15 (22.1%)	40 (58.8%)	13 (19.1%)
30-39 years	13 (52.0%)	7 (28.0%)	5 (20.0%)
40-49 years	15 (83.3%)	2 (11.1%)	1 (5.6%)
50-59 years	8 (50.0%)	8 (50.0%)	0
60 or more	28 (90.3%)	1 (3.2%)	2 (6.5%)
Totals	95	64	23

Victim Known to the Offender: The victim was known to the offender, or was presumed to have been known, in nearly one-third of the arson-homicide cases (59, 32.2 percent). The cases were differentially distributed by general location and whether the victim was known to the offender. This distribution is shown in Table 11. When the victim was known to the offender, 72.9 percent of the cases involved an indoor location, 20.3 percent an outdoor location, and 6.8 percent a vehicle. In those cases where the offender was a stranger, the arson-homicides were almost equally distributed between indoor (42.7 percent) and outdoor (41.9 percent) locations. The remaining 15.4 percent involved vehicles.

Table 11
Distribution of Arson-Homicide Cases
by General Location and by Whether the
Victim Was Known to the Offender
(n=183)

General Location	Known to Offender	Not Known
Indoor	43 (72.9%)	53 (42.7%)
Outdoor	12 (20.3%)	52 (41.9%)
Vehicle	4 (6.8%)	19 (15.4%)
Totals	59 (1005)	124 (100%)

More than One Victim: Included in the 183 cases were 28 (15.3 percent) where there was more than one victim of the arson-homicide. The cases with more than one victim all occurred either in an indoor location (25, 89.3 percent) or in a vehicle (3, 10.7 percent). The distribution of

cases by general location of the crime and by numbers of victims is illustrated in Table 12.

Table 12
Distribution of Arson-Homicide Cases
by General Location of the Crime
and by Number of Victims (n=165)

General Location of the Crime	More than one victim	One victim
Indoor	25 (89.3%)	65 (47.5%)
Outdoor	0	54 (39.4%)
Vehicle	3 (10.7%)	18 (13.1%)
Totals	28 (100%)	137 (100%)

Arson-homicide cases with more than one victim were more likely to involve ante-mortem fire injuries than cases with a single victim. Victims with ante-mortem fire injuries accounted for 59.3 percent of the cases with two or more victims. Only 23.8 percent of the cases with a single victim involved fire injuries ante-mortem. See Table 13 for the distribution of the cases by number of victims and time of fire injury.

Table 13
Distribution of Arson-Homicide Cases
by Time of Fire Injury and
by Number of Victims (n=157)

Time of Fire Injury	More than one Victim	One Victim
Ante-Mortem	16 (59.3%)	31 (23.8%)
Post-Mortem	11 (40.7%)	99 (76.2%)
Totals	27 (100%)	130 (100%)

Arson-homicide cases with more than one victim were more likely to involve young and elderly victims. See Table 14. The youngest age group, 17 years or younger, accounted for 35.7 percent (10) of the cases with more than one victim. The oldest age group, those aged 60 or more years, were involved in 17.9 percent (five cases) of the cases with more than one victim. In the other age groups, from two to four cases involving more than one victim were noted.

Table 14
Distribution of Arson-Homicide Cases
by Number of Victims and by
Victim Age Group
(n=164)

Victim Age Group	More than one victim	One victim
17 or younger	10 (35.7%)	13 (9.6%)
18-29	3 (10.7%)	55 (40.4%)
30-39	4 (14.3%)	19 (14.0%)
40-49	4 (14.3%)	14 (10.3%)
50-59	2 (7.1%)	12 (8.8%)
60 or older	5 (17.9%)	23 (16.9%)
Totals	28 (100%)	136 (100%)

When the cases of arson-homicide were examined by number of victims and by cause of death, the analysis revealed that over one-half (53.6 percent) of the cases with more than one victim were cases where the cause of death was fire-related. (See Table 15).

Table 15
Distribution of Arson-Homicide Cases
by Cause of Death and by
Number of Victims
(n=161)

Cause of Death	More than One Victim	One Victim
Gunshot	4 (14.3%)	28 (21.2%)
Asphyxia	4 (14.3%)	19 (14.3%)
Fire-related	15 (53.6%)	33 (24.8%)
Blunt Force	1 (4.5%)	21 (15.8%)
Bladed Weapon	4 (14.3%)	32 (24.0%)
Totals	28 (100%)	133 (100%)

Other Crimes Associated with the Arson-Homicides: Data were analyzed on other crimes committed with or associated with the arson-homicide cases. In a total of 62 of the cases, some other crime or combination of crimes took place concurrently with the arson-homicide. (See Table 16). Burglary (20 cases, 32.3 percent), sexual assault (17, 27.4 percent), and robbery (12, 19.4 percent) were the crimes most often associated with arson-homicides. Other associated crimes included kidnapping (5, 8.1 percent), auto theft (4, 6.5 percent), and one case each (1.6 percent) of prostitution, hired killing, burglary combined with auto theft, and robbery combined with sexual assault.

Table 16
Other Crimes Associated
with Arson-Homicide
(n=62)

Crime Type	Number	Percent
Burglary	20	32.3
Auto Theft	4	6.4
Prostitution	1	1.6
Robbery	12	19.4
Kidnapping	5	8.1
Sexual Assault	17	27.4
Hired Killing	1	1.6
Burglary and Auto Theft	1	1.6
Robbery and Sexual Assault	1	1.6
Totals	62	100.0

Victim Lifestyles: Data were available on various victim lifestyle traits for 69 of the arson-homicide cases. Table 17 provides a listing of the 86 lifestyle traits associated with the 69 victims. Two or more traits were noted in some of the cases, accounting for the disparity in the numbers of observed traits and the number of cases. Involvement with drugs was the most commonly reported victim lifestyle trait. Prostitution, homosexuality, and alcoholism were also frequently reported traits. Others included bisexuality, criminal history, transient lifestyle, mental handicap, and gambler.

Table 17
Victim Lifestyle Traits
(n=69)

Lifestyle Trait	Number	Percent
Drugs	30	43.4
Prostitution	15	21.7
Homosexuality	14	20.3
Bisexuality	4	5.8
Criminal History	5	7.2
Alcoholism	9	13.0
Transient	5	7.2
Mental Handicap	3	4.3
Gambler	1	1.4
Totals*	86	124.3

* Totals exceed n and 100 percent due to multiple traits associated with individuals.

Victim Risk Factor: The 69 victims for whom lifestyle data were available were assigned to one of three risk categories, based on the lifestyle traits. Risk categories of high, moderate, and low were included. Specific victim lifestyle traits included in the high risk category were drugs, prostitution, homosexuality, and bisexuality. A total of 46 (66.7 percent) of the 69 victims were classified as high risk. The moderate risk classification included cases where lifestyle traits of alcoholism, criminal history, transient, gambler, or mental handicap were present. Twelve of the 69 victims (17.4 percent) were classified as moderate risk. The remaining eleven victims (15.9 percent) were classified as low risk. Low risk victims include those whose lifestyle, occupation, and daily activities are highly unlikely to cause them to be selected as a targeted victim for a crime. When further analyses were performed using victim risk factor as a variable, a number of interesting differences were noted.

There was a notable difference in the distribution of cases by cause of death when victim risk factor was used in the analysis. As shown in Table 18, moderate (33.3 percent) and low risk victims (42.9 percent) were more likely to die as a result of fire related injuries while high risk victims were more likely to die as a result of an assault with a bladed weapon (15, 34.1 percent) or by gunshot (10, 22.7 percent).

Table 18
Distribution of Arson-Homicide Cases
by Victim Risk Factor and by Cause of Death
(n=67)

Cause of Death	High Risk	Moderate Risk	Low Risk
Gunshot	10 (22.7%)	3 (25.0%)	0
Asphyxia	6 (13.6%)	0	1 (9.1%)
Fire-related	8 (18.2%)	4 (33.3%)	9 (81.8%)
Blunt force	5 (11.4%)	3 (25.0%)	1 (9.1%)
Bladed weapon	15 (34.1%)	2 (16.7%)	0
Totals	44 (100%)	12 (100%)	11 (100%)

There was also considerable difference in the distribution of cases of arson-homicide when analyzed by victim risk factor and time of fire injury. As shown in Table 19, low risk victims were far more likely to have ante-mortem fire injuries than were moderate and high risk victims. Of the low risk victims, 81.8 percent had ante-mortem fire injuries while only 33.3 percent of moderate risk victims and 18.2 percent of high risk victims had such injuries.

Table 19
Distribution of Arson-Homicide Cases by Time of Fire Injury and Victim Risk Factor (n=67)

Victim Risk Factor	Ante-mortem Injury	Post-mortem Injury
High	8 (18.2%)	36 (81.8%)
Moderate	4 (33.3%)	8 (66.7%)
Low	9 (81.8%)	2 (18.2%)
Totals	21	46

There were also differences in the distribution of arson-homicide cases by general location of the crime and by victim risk factor. (See Table 20). Low risk victims were much more likely to be killed in an indoor location than were moderate and high risk victims. Moderate risk victims and high risk victims were much more likely to be killed in a vehicle or an outdoor location than were low risk victims.

Table 20
Distribution of Arson-Homicide Cases by General Location of the Crime and by Victim Risk Factor (n=67)

General Location	High Risk Victim	Moderate Risk Victim	Low Risk Victim
Indoor	16 (34.8%)	4 (33.3%)	8 (72.7%)
Outdoor	21 (45.7%)	5 (41.7%)	2 (18.2%)
Vehicle	9 (19.5%)	3 (25.0%)	1 (9.1%)
Totals	46 (100%)	12 (100%)	11 (100%)

Offender Lifestyle Traits: Traits of the 31 identified offender's lifestyle were analyzed. Similar traits to those found among the victims were also noted for the offenders. Drugs (54.8 percent) and criminal history (45.4 percent) were the two most common traits among the offenders. Homosexuality (29.0 percent) and a transient lifestyle (22.6 percent) were also frequently noted. Two of the offenders were involved in prostitution and two were alcoholics. One was reportedly a bisexual. (See Table 21).

Table 21
Traits of Arson-Homicide Offenders
(n=31)

Lifestyle Trait	Number	Percent
Drugs	17	54.8
Prostitution	2	6.5
Homosexuality	9	29.0
Bisexuality	1	3.2
Criminal History	14	45.2
Alcoholism	2	6.5
Transient	7	22.6
*Totals	52	167.8

* Totals exceed n and 100 percent due to multiple traits associated with individuals.

Sufficient data were available to permit the comparison and matching of victim risk and offender lifestyle in 27 of the cases of arson-homicide. In 20 of the 27 cases, both the offender's lifestyle and the lifestyle of the victim were classified as high risk. In one case the victim classification was moderate risk and the offender was high risk. In three cases, moderate risk victims were killed by moderate risk offenders. One low risk victim was killed by a high risk offender and one by a low risk offender. Overall, in

25 of the 27 cases, the offender and victim lifestyles and risk classifications were the same.

Conclusions and Implications for Fire Investigators

A number of general conclusions reached from the results of this study will be discussed only briefly in this section. Generally, the victims of arson-homicides were more likely to be females, somewhat younger than the mean age for all victims, and more likely to be in the 18-29 year age group. As one would expect in a study of arson-homicides, fire and fire-related injuries were the most prevalent causes of death.

Males were more likely than females to die by gunshot or by fire-related deaths. Females were more likely than males to die by asphyxia, blunt force trauma, or bladed weapons. Younger victims (17 and under) were more likely to die from fire related injuries as were all victims aged 40 and above. Gunshots were the most common cause of death for the 18-29 year group while bladed weapons was the most common for 30-39 year old group. Generally, males were more than twice as likely to have ante-mortem fire injuries than were females. Ante-mortem fire injuries were most frequently noted in the victim age group of 17 years or younger and for all victims 40 years and older.

Female victims were more likely to be found in indoor locations while males were more likely to be found in a vehicle. Similar percentages of male and female victims were found in outdoor locations. Two-thirds of the youngest age group died in fires set in an indoor location. However, the 18-29 year age group had more than one-half (58.8 percent) of the cases located in an outdoor site. The 50-59 age group was equally likely to be involved in a case with an indoor or an outdoor location. For the other age groups, the most frequently occurring location was an indoor one, with the

30-39 age group with 52.0 percent, the 40-49 group with 83.3 percent, and the oldest group with 90.3 percent of the cases in an indoor location. This distribution was quite similar to that evidenced in time of fire injury with higher percentages of ante-mortem fire injury noted in groups with more indoor locations.

Arson-homicide cases with more than one victim were more likely to involve ante-mortem fire injuries than cases with a single victim. Victims with ante-mortem fire injuries accounted for 59.3 percent of the cases with two or more victims. Only 23.8 percent of the cases with a single victim involved fire injuries ante-mortem. The analyses of cases with more than one victim suggest that such cases often involve victims other than the targeted victim, with children and elderly persons being the most frequent "innocent" victims who die from the effects of the fire rather than from some trauma inflicted directly by the offender. A similar finding was noted in the case of low risk victims who were far more likely to die in an indoor location and to die of ante-mortem fire injuries than were moderate or high risk individuals.

Implications for Investigators

Investigators should note that time of fire injury to the victim's body may be a source of valuable investigative information:

- In 80 percent of female victims, burning was post-mortem.
- In 60 percent of male victims, the burning was post-mortem.
- In 76 percent of single victim cases, the fire was post-mortem.
- In 60 percent of multiple victim cases , fire was ante-mortem.
- 82 percent of the burns of low risk victims were ante-mortem.
- 82 percent of high risk victims were burned post-mortem.
- Burns were post-mortem in 70 percent of the cases.

- Burns were post-mortem in 79 percent of outdoor locations.
- In vehicles, burns were post-mortem in 71 percent of cases.
- When bodies were indoors, burns were post-mortem in 64 percent of the cases.

These percentages suggest that injuries received after death are most frequent in outdoor and vehicular locations while ante-mortem injuries are far more frequent in indoor locations. This suggests that it is relatively easy to set a fire in a residence or indoor location and leave a still breathing victim to die in that fire. However, to transport a living victim to an outdoor location or to place the victim in a vehicle for purpose of a fire is more difficult and less likely to occur. Location of the fire may also provide investigative data:

- In 72 percent of indoor cases, the victims knew the offender.
- 90 percent of multiple victims were indoors.

Investigators should note that, of the 62 cases where data were available, nearly one-third involved a burglary, over one-fourth a sexual assault, and nearly one-fifth, a robbery as well as the arson-homicide. Thus, 79 percent of the 62 cases involved an associated crime. In many of these cases, the primary purpose of the offender was likely to commit the associated crime with homicide and then arson as secondary events after something went wrong in the primary event. If these 49 arson-homicides are representative, the data would suggest that crime concealment (Douglas, et al, 1992) may be the primary motive noted in such arsons.

When victim risk was examined as part of the study, several significant findings were revealed.

- Low risk and moderate risk victims were more likely to die from fire related injuries than were high risk victims.

- High risk victims were more likely to die from injuries received from a bladed weapon or a gunshot.
- Low risk victims were far more likely to have ante-mortem fire injuries than were moderate and high risk victims.

These findings suggest that low risk victims are probably rarely targeted but become victims through circumstances more than intent on the part of the offender. Low risk victims die from fire related injuries, in indoor locations, and are less likely to know their killer.

Overall, victim risk factor may be an important asset to the arson-homicide investigator. In this study, the findings indicate that victims involved in drugs were killed, for the most part, by offenders who were also involved in drugs. Homosexual offenders killed homosexual victims, transient victims were killed by transient offenders, and alcoholic victims met their demise at the hands of alcoholic offenders. Thus, high risk victims were killed by high risk offenders and moderate risk victims by moderate risk offenders.

Recommendations

While this study has answered some questions about arson-homicide, it is evident that more research is needed. The area of risk categorization of victims and offenders may offer fruitful ground for further investigation. Similarly, study and comparison of cases of arson-homicide involving multiple victims and those involving single victims would also be useful for investigators. Future studies of arson-homicides would benefit from standardized reporting and recording of pertinent offense related data to insure comprehensive records.

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