J Forensic Sci, September 2006, Vol. 51, No. 5
doi:10.1111/j.1556-4029.2006.00206.x
Available online at: www.blackwell-synergy.com

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Extent, Trends, and Perpetrators of Prostitution-Related Homicide in the United States

ABSTRACT: Prostitute women have the highest homicide victimization rate of any set of women ever studied. We analyzed nine diverse homicide data sets to examine the extent, trends, and perpetrators of prostitution-related homicide in the United States. Most data sources substantially underascertained prostitute homicides. As estimated from a conservative capture–recapture analysis, 2.7% of female homicide victims in the United States between 1982 and 2000 were prostitutes. Frequencies of recorded prostitute and client homicides increased substantially in the late 1980s and early 1990s; nearly all of the few observed pimp homicides occurred before the late 1980s. These trends may be linked to the rise of crack cocaine use. Prostitutes were killed primarily by clients, clients were killed mainly by prostitutes, and pimps were killed predominantly by pimps. Another conservative estimate suggests that serial killers accounted for 35% of prostitute homicides. Proactive surveillance of, and evidence collection from, clients and prostitutes might enhance the investigation of prostitution-related homicide.

KEYWORDS: forensic science, homicide, prostitution

Violence is prominent in prostitution, and the trade is often linked to other criminal behavior, illicit drug use, and illicit drug markets (1–5). In surveys, many prostitute women report physical and sexual violence from clients and pimps (1,6–16). Moreover, active and passive surveillance of prostitute women in Canada, Kenya, the United Kingdom, and the United States indicate that homicide is the leading cause of death in this population (10,17,18).

In a prospective study, prostitute women who worked in Colorado Springs, Colorado, between 1967 and 1999 had a higher homicide victimization rate (229 per 100,000 person-years; standardized mortality ratio = 18) than any set of women ever studied (17). Nearly all homicides observed in this study occurred while the victims were working. This observed homicide rate and an empirical estimate of the prevalence of prostitute women (19) together imply, by extrapolation, that 2.5% of all female homicide victims in the United States in recent decades were prostitute women (17). Clients and pimps might also be expected to be homicide victims, given the violent milieu of prostitution, but we have been unable to find any systematic studies of their victimization.

Focused and efficient homicide investigations require reliable information on probable perpetrators. Homicide investigators often assume that drug dealers and pimps are the primary perpetrators of prostitute homicide (20). However, in recent years, clients committed 62–64% of prostitute homicides in Canada and the United Kingdom (21,22). To our knowledge, there has been no prior research on the perpetrators of prostitute homicide in the United States.

In this paper, we report on the extent, trends, and perpetrators of prostitution-related homicide based on analyses of homicide data from a wide variety of sources. Through these analyses, we also assess the prior extrapolated estimate of the extent of prostitute homicide and the consistency of patterns in prostitution-related homicide across time, space, and data sources. In the discussion, we interpret our results and highlight implications for law enforcement investigation of prostitution-related homicide.

Methods

We analyzed data from nine different samples of homicides. Four of these include homicides routinely recorded by criminal justice and/or vital statistics agencies. The other five include prostitute homicides ascertained through a variety of other approaches. The diversity of samples allows determination of the reliability of observed patterns and potential shortcomings in particular samples. We defined a homicide as prostitution related if it occurred in the context of prostitution or if the perpetrator's motive was prostitution-oriented (e.g., targeting an individual because of his/her role in prostitution or because of a dispute originating from prostitution activity). We focused exclusively on heterosexual prostitution because in investigations it can be difficult to differentiate between commercial and noncommercial homosexual encounters and determine objectively a male client's awareness of and intent in picking up a transvestite prostitute. Therefore, in our study, all prostitutes were female and all clients and pimps were male.

General Samples of Homicides

Supplemental Homicide Reports (SHR), 1976–2002—Since 1968, local law enforcement agencies across the United States that participate in the Uniform Crime Reporting program have reported incident-level information on homicides to the Federal

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An earlier version of this paper was presented at the 2004 Annual Meeting of the Homicide Research Working Group, Ann Arbor, MI, June.

Received 4 Dec. 2005; and in revised form 4 Mar. 2006; accepted 26 Mar. 2006; published 7 Aug. 2006.

Bureau of Investigation (FBI). One variable in the SHR data set (23) indicates whether the homicide circumstance involved prostitution. We considered female victims who were killed in circumstances involving prostitution to be prostitutes. Our analyses include reports from 1976 to 2002 because the earlier SHR data do not include a code for prostitution as a possible circumstance of homicide.

Thirty-Three Urban Counties, 1988—The Bureau of Justice Statistics (24) gathered data on murder cases filed in prosecuting attorneys' offices in 33 urban counties. The included cases were adjudicated in 1988 and involved an arrested perpetrator. All such cases were included for counties with 200 or fewer cases; a random sample of 200 cases was drawn for each county with more than 200 cases. We considered all female victims who were killed under circumstances of heterosexual prostitution or sex for drugs to be prostitutes in addition to those female victims explicitly identified as prostitutes. All recorded prostitute murders occurred between 1986 and 1988. Heterosexual prostitution-related client and pimp murders cannot be unambiguously and consistently inventoried in these data. Therefore, for this data set we analyzed prostitute murders only. To estimate the proportion of female murder victims who were prostitutes, we multiplied the observed number of prostitute murders and female murders overall in a county by a case sampling weight (the inverse of the proportion of cases sampled in that county) and then summed the weighted number of prostitute murders and female murders, respectively.

Chicago, 1965–1995—Carolyn and Richard Block (25) coded all homicides in Chicago police reports for the period between 1965 and 1995 on many variables, including the relationship each perpetrator had with his/her victim(s) and vice versa. Prostitute, client of prostitute, and pimp are some of the role relationships coded in these variables.

St. Louis, 1978–1995—The St. Louis Homicide Project, directed by Richard Rosenfeld and Scott H. Decker of the University of Missouri, St. Louis, involved collecting quantitative and police narrative data on homicides recorded by the police in St. Louis between 1978 and 1995. We reviewed the narratives and systematically coded prostitution role relationships (prostitute, client, or pimp) that perpetrators and victims had with each other and whether the homicide was prostitution related. In some cases, the narratives indicate that a victim and/or perpetrator was involved in prostitution, but do not specify that the homicide was prostitution related.

Washington State, 1981–1986—The publicly available version of the Homicide Investigation Tracking System (HITS) database (26) includes information on murder cases voluntarily reported by local and state agencies to the Washington State Attorney General's Office. Two of the many variables in the database indicate whether a victim had an occupation of "prostitute" or "streetwalker" and whether a perpetrator used deception in the form of patronizing a prostitute to contact the victim. We considered a female victim to be a prostitute if the case had either of these attributes. This version of the data set does not include any of the "Green River" prostitute homicides (20).

North Carolina, 1991–1993—Decker et al. (27) identified all nondomestic female homicides in North Carolina between 1991 and 1993 through retrospective review of medical examiner records and telephone interviews with homicide investigators. These data indicated whether a homicide was prostitution related. We obtained the number of all female homicides in North Carolina in this period from WISQARS (http://www.cdc.gov/ncipc/wisqars).

Samples of Prostitute Homicides

Colorado Springs, 1967–1999—We followed prospectively an open cohort of 1969 prostitute women in Colorado Springs identified from public health and police surveillance (17). We ascertained women who were killed while still active prostitutes from searches of the Social Security Death Index (SSDI), National Death Index, local media reports, local police records, and records of selected other police agencies across the United States.

National Center for the Analysis of Violent Crime (NCAVC), 1982–2000—The second author collected and coded data on 123 cleared female prostitute homicides committed by lone male perpetrators in the United States between 1982 and the first half of 2000 (28) from the FBI's NCAVC. These cases were cleared by arrest, warrant for arrest, or exceptional means (e.g., death of suspected perpetrator). Cases were submitted to the NCAVC by local, state, and federal agencies requesting investigative support. The 123 cases represent a haphazard sample of 253 such prostitution homicide cases recorded by the NCAVC at the time as well as a handful of other cases that were provided by the investigating agencies. The second author sought comprehensive reports on these cases from the local, state, and federal agencies that reported these cases. These extensive data include variables indicating whether the perpetrator solicited sex from the prostitute victim, whether the perpetrator was known to frequent street prostitutes, and whether the perpetrator was the victim's pimp.

National Media Sample, 1965–2005—In early 2004, we searched two online national newspaper databases (Newsbank Retrospective/NewsFile Collections, 1970–2004, covering over 500 North American newspapers; Ethnic NewsWatch, 1960–2004, covering 275 publications of the ethnic, minority, and native press) and databases for four major metropolitan newspapers (The Indianapolis Star, 1999–2004; The Oregonian [Portland], 1990–1998; The Seattle Times, 1990–2004; St. Louis Post-Dispatch, 1988–2004) with the keywords "prostitu*" and "murder*." The * in the keywords represent wildcards that include all words beginning with the listed stem. We conducted a parallel search of the ProQuest (http://www.proquest.umi.com) newspaper and publication database in May 2005. We also searched relevant documents posted on the World Wide Web with the Google search engine (http://www.google.com), using the keyword string "prostitute murder arraign OR arrest OR charge OR convict OR accuse OR prosecute." Google automatically searches for variants of words. We inspected the web pages identified by the Google search and also followed relevant links on these pages to additional documents on prostitute homicides. We examined more than 11,500 articles/documents identified in the newspaper and Web searches. In addition, we reviewed a catalog of serial homicide cases (29) and scores of academic and "true crime" publications on homicide cases for information on prostitute homicides. Moreover, we added media reports of prostitute homicides to our database that colleagues informed us about or we discovered incidentally.

We included in our analysis prostitution-related homicides of biologically female prostitutes in the United States that had been cleared by law enforcement officials. For our purposes, clearance was indicated by: (1) charges against an accused perpetrator (and no later dropping of charges except when key witnesses were unable to testify); (2) law enforcement officials' belief that they had sufficient evidence to charge a perpetrator for the victim's homicide, but postponed doing so as a prosecutorial strategy (to save the case as a backup); or (3) an offer of a plea bargain to the accused perpetrator. We excluded cases in which a conviction was

later overturned and had been based on a forced confession without any other supporting evidence (or had contrary physical evidence). We retained cases in which the charges were dismissed or the accused perpetrator was acquitted (without contrary physical evidence) but police still considered the case cleared by the arrest.

When information on the relationship between victim and perpetrator was lacking, we searched for more information on the case (by perpetrator and/or victim name) in several media sources: a listing of published books sold by the bookseller Amazon.com (http://www.amazon.com), the World Wide Web via Google, electronically archived national newspapers via ProQuest, and online archives of the newspapers in the local/regional area where the homicide occurred. The archives of particular newspapers include short articles and news briefs typically not included in the national newspaper archives. We also sought to augment information on cases in selected jurisdictions (Connecticut, Texas, Virginia, Washington state, Kansas City, MO, and Minneapolis, MN) by requesting incident reports from the local law enforcement agencies that had investigated these cases.

Furthermore, we searched the Social Security Death Index (SSDI) (via http://www.familytreelegends.com) for victims whose death dates were not known precisely from media sources. A large proportion of such women had no records in the SSDI, as we found in our prior research on prostitute mortality (17). If the victim's identifying information (name, birthdate/birth year, place of death, and/or place of birth) was consistent between the media reports and SSDI, we used the death date listed in the SSDI. When a victim's date of death was not known precisely from either the media reports or SSDI, we estimated the date as the midpoint of the known interval of death (if available; interval length was 2 years or less for 73 of 80 victims for whom the date was estimated).

Results

Extent of Prostitution-Related Homicide

Table 1 shows the number of female prostitute homicide victims and the percentage of female victims they represent in each of the general samples of homicides. The percentage of female homicide victims who were prostitutes ranges from 0.3% to 7.2% across samples. Some of this variation might be explained by different definitions of prostitute victims. The prostitute victims in the SHR, 33 urban counties, Chicago, and North Carolina data sets include just those females killed in prostitution-related circumstances. The St. Louis and Washington state data, however, include female victims who were identified as prostitutes even if their deaths were not necessarily prostitution related. At least 20 (57%) of the 35 St. Louis prostitute victims (3.6% of all female victims) died under circumstances involving (or suggesting, in the case of four victims) prostitution. The 15 St. Louis prostitute homicides not classified as prostitution related were committed by drug dealers (3), other types of perpetrators (2), or unknown perpetrators under unknown circumstances (10). Of the six Washington state prostitute murders, at least four were prostitution related (1.3% of all female victims).

TABLE 1—*Percentage of female homicide victims who were prostitutes.*

Sample	% of Female Victims Who Were Prostitutes
Chicago	0.9 (39/4,384)*
St. Louis, 1978–1995	6.3 (35/560)
Washington state, 1981–1986	2.0 (6/306)
North Carolina, 1991–1993	4.7 (29/611)
Supplemental Homicide Reports, 1976–2002	0.3 (304/118,577)†
33 urban counties, 1988	2.9 (40/1,356)
Capture-recapture estimate for United States, 1982–2000 (NCAVC vs. media)	2.7 (2,542/94,012)
Estimate for United States, 1980s, extrapolated from Colorado Springs cohort	2.5

Fractions in parentheses indicate the number of prostitute victims divided by the number of all female victims.

*If based on only those female victims whose relationship with the perpetrator is known ($n = 3553$), this percentage is 1.1%.

†If based on only those female victims whose death circumstances are known ($n = 91,231$), this percentage remains 0.3%.

Table 1 also shows the estimated percentage of female homicide victims in the United States during the 1980s who were prostitutes (17). We calculated this extrapolated estimate by multiplying the homicide victimization rate in the Colorado Springs cohort of prostitute women and a capture–recapture estimate of prostitute prevalence in the Colorado Springs area (El Paso County) (19). (This area is demographically similar to the United States as a whole, including the proportion of the population that is rural.) We then divided the product by the mean annual number of female homicides in the United States, based on figures from CDC Wonder for 1980 (http://wonder.cdc.gov) and WISQARS for 1981–1990 (http://www.cdc.gov/ncipc/wisqars). The extrapolated estimate from Colorado Springs and the median estimate from the six contemporary data sets is the same (2.5%).

The Chicago and St. Louis data also contain information about client and pimp homicides. In the Chicago data, there are 38 client and seven pimp homicides that were prostitution related, with each victim type representing less than 0.2% of all 19,433 male victims. In the St. Louis data, there are 13 client and eight pimp homicides that were prostitution related, with each victim type representing less than 0.4% of all 3543 male victims.

Ascertainment—Prostitute homicides were grossly underascertained in most samples, contributing to the variation in estimates in Table 1. Table 2 shows the overlap in prostitute homicides ascertained by pairs of contemporary samples. The numerator in each cell indicates the number of prostitute homicides that appear in both samples, and the denominator indicates the number of prostitute homicides identified in the row sample that corresponds to the jurisdiction and time period of the column sample. The criteria for determining matching prostitute homicides between data sets were: exact match on year of homicide; within one month on month of homicide; exact match on state and local jurisdiction (the latter if available in both sources); exact match on victim sex and race; within 1 year on victim age; and exact match on offender race and sex, and within 1 year on offender age (if offender demographics available in both sources). In defining matches, we allowed victim age or race to be missing, but not both. Furthermore, we allowed slightly more missing or discordant data on these variables if cases were linked by a common offender and the available evidence in both samples reflected this. Table 2 indicates that the observed overlap ranged from 0% to 44%, even though, in principle, the overlap between most pairs of samples would be 100% if ascertainment were complete in one sample or the other.

The underascertainment in the SHR seems to be due in part to the monthly reporting schedule for participating agencies. Monthly reporting apparently requires agencies to report homicides in the month that they are discovered even if that is not the month in which they actually occurred or if the social context of the homicide is not yet known. Prostitute homicides often go undetected as such for weeks, months, or years, so the SHR procedures have a built-in bias toward underascertainment of many prostitute hom-

TABLE 2—*Overlap in prostitute homicides identified by different contemporary data sources.*

	SHR	33 Counties*	Chicago	St. Louis	Washington State	Colo. Springs Cohort†	NCAVC	Media
SHR	—	—†	8/18	0/0	0/0	—	10/235	33/304
33 counties‡	3/17	—	1/1	0/0	—	—	0/17	2/17
Chicago	8/31	1/4	—	—	—	—	4/20	1/39
St. Louis	0/20	0/0	—	—	—	—	0/20	0/20
Washington state	0/6	—	—	—	—	—	0/6	1/6
Colo. Springs cohort	0/14	0/1	—	0/0	0/1	—	1/17	1/16
NCAVC§	10/123	—†	4/14	0/0	0/1	—	—	46/123
Media§	33/537	2/18	1/28	0/0	1/46	—	46/463	—

In each cell, the numerator indicates the number of homicides identified in both samples of a pair, and the denominator indicates the number ascertained by the row sample in a comparable time period and jurisdiction to that in the column sample. Dashes indicate that comparisons were not possible by definition.

*Denominators in this column refer to homicides occurring in 1986–1988. Lack of overlap could be due to lack of prosecution in the same time period.

†No values computed for column or cell because no sensible denominator is calculable or comparable with column sample's jurisdiction.

‡Denominators in this row refer to murders adjudicated in 1988.

§Denominators in this row refer to cleared homicides.

NCAVC, National Center for the Analysis of Violent Crime; SHR, Supplemental Homicide Reports.

icides. Similarly, the SHR likely often misrepresents the date of such homicides (we encountered a few instances of this in examining overlap). Underascertainment of prostitute homicides is also implied by the high proportions of female homicides with missing data on the circumstances and victim–offender relationship in the SHR and Chicago data sets (SHR = 23%, Chicago = 19%).

Other evidence points to low rates of detected prostitution-related homicides in the data sets that we analyzed. Only five total prostitute homicides in North Carolina between 1991 and 1993 were identified in the SHR, NCAVC, and media samples combined. It is unknown whether any of these five were included in the 29 prostitute homicides Decker et al. (27) found in North Carolina during the same period. At best, the detection rate of the combined SHR, NCAVC, and media samples is 17% for prostitute homicides in North Carolina during this period. The data sets similarly underascertained client and pimp homicides. Only one of the 36 Chicago client homicides was among the 35 client homicides (including just one in Chicago) in the media sample. None of the 13 St. Louis client homicides appeared in the media sample, and none of the pimp homicides in Chicago ($n = 7$) or St. Louis ($n = 8$) were among the five pimp homicides in the media sample. Despite marginal overlap between some pairs of data sets, our analyses of each data set include all homicides identified in that data set.

Capture–recapture analysis, however, permits more complete estimation of the number of prostitute homicides. The features of the NCAVC and media samples allow direct comparison of the specific prostitute homicides detected in each. Other pairs of samples are not suitable for capture–recapture analysis because they exhibit very little or no overlap or have obvious biases that lead to undermatching by our criteria (e.g., the SHR).

We began by estimating the total number of lone male perpetrators in cleared prostitute homicide cases in the U.S. between 1982 and 2000 (the period for which data are available for both the NCAVC and media samples) with a simple two-sample capture–recapture method ([number of perpetrators in NCAVC sample × number in media sample]/number appearing in both samples) (30). The factors leading to submission of a case to the NCAVC are not necessarily the same as those that might draw media attention about a case, and vice versa. Therefore, it seems reasonable to view these as independent samples for the purpose of analysis. However, inclusion in either sample was probably more likely for serial perpetrators, introducing a common bias. Therefore, we estimated the number of lone male perpetrators involved in cleared cases of prostitute homicide separately for those with single victims and those with multiple victims. From these calculations, we estimate 1650 single perpetrators ([49 in NCAVC × 101 in media]/3 overlapping) and 142 serial perpetrators ([26 in NCAVC × 71 in media]/13 overlapping) in this period. Serial perpetrators in the media sample in this period had a mean of 6.3 (446/71) victims, which would suggest approximately 892 prostitute homicide victims of serial perpetrators. The sum of the estimated number victims in cleared prostitute homicides involving lone perpetrators is thus 2542 (1650+892) and represents 2.7% of all female homicides in the United States during the 1982–2000 period (Table 1). This estimate is very conservative because a large, but unknown, proportion of prostitute homicide cases are never cleared and because team perpetrators are excluded (given the NCAVC data set's inclusion criteria).

Trends of Prostitution-Related Homicide

Figure 1 displays the frequencies of prostitution-related prostitute homicides over time for the three national samples. The graphs are based on data grouped biennially (e.g., 1965–1966, 1967–1968, etc.); data are shown for a particular time point only if the data set covered both years in a biennial group. The different data sets tend to reveal somewhat similar patterns over time. The media sample indicates few recorded prostitute homicides in the 1960s. In the 1970s, the number of prostitute homicides increased steadily. The three samples show a large increase in the early and mid-1980s. The 1983–1984 jump in the national media sample is due entirely to dozens committed by one serial perpetrator (Gary

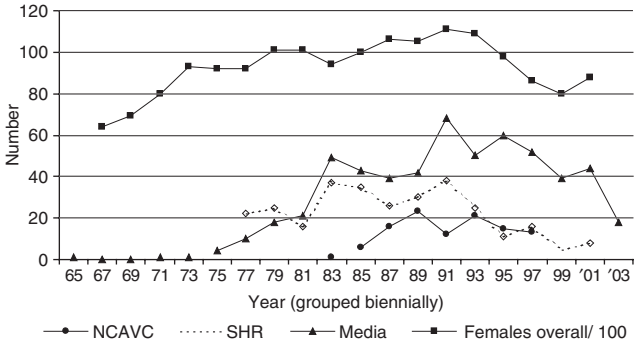

FIG. 1—*Prostitute homicides and female homicides overall in the United States over time.*

Ridgway in Washington state). If these homicides are excluded, the national media sample shows a dip in 1981–1982, and in 1983–1984 returns approximately to the 1979–1980 level. None of the Ridgway homicides is included in the SHR or NCAVC data sets. All samples exhibit moderate to large increases in prostitute homicide in the late 1980s and early 1990s. Thereafter, the NCAVC and national media samples indicate relatively high and stable frequencies, whereas the SHR suggests a fairly dramatic decline. In the final years of the NCAVC and media series, there are noticeable decreases, but these appear to be an artifact of the considerable time lag in solving prostitute homicides. Although the time series data for the other contemporary samples are sparse, the biennial periods with the highest frequency of prostitute homicides in each of these samples occurred after 1986 (Chicago: 1993–1994; Colorado Springs: 1987–1988; St. Louis: 1991–1992).

The lag between the dates of a prostitute homicide and the perpetrator's arrest tends to be long. In the media sample, lags were calculable for 508 of the 580 cleared prostitute homicide cases. Forty-one percent had lags longer than 1 year, and 17% had lags longer than 5 years. Seven percent (1/15) and 50% (2/4) of the cleared prostitute homicides in the 33 urban counties and Washington state samples, respectively, had lags of more than 1 year.

The trends in prostitute homicide are roughly parallel to those for female homicide overall in the United States, with a median Pearson correlation of 0.59 (range = 0.47–0.66) between frequencies of prostitute homicide in the national data sets and female homicide overall in the biennially grouped data. (The frequencies of female homicide overall are national statistics from the Centers for Disease Control and Prevention (Vital Statistics of the United States for 1967–1978 [http://www.cdc.gov/nchs/products/pubs/pubd/vsus/vsus.html]); CDC Wonder for 1979–1980; WISQARS for 1981–2002.) The overall series, with frequencies divided by 100 for convenient display, does not exhibit the shifts as sharply as the prostitute homicide series, but this may be substantially due to variability in prostitute homicides appearing larger as a consequence of smaller frequencies (Fig. 1). The correlation between two untransformed time-series is not a good estimate of their underlying association, but it is a convenient way to assess the overall similarity of the two trends.

The general increase over time in frequency of prostitute homicides in the media sample is not a consequence of increased media interest or law enforcement attention to serial murder. The Pearson correlation between frequency of prostitute homicides committed by single perpetrators and the frequency of those committed by serial perpetrators (years grouped biennially) is 0.80, and the shapes of the two time series are similar (data not shown).

The distribution of prostitution-related client homicides through time generally corresponds to that for prostitute homicides (for biennially grouped data: Chicago, $r = 0.49$; St. Louis, $r = 0.21$; media = $r = 0.73$). The few prostitution-related pimp homicides in Chicago ($n = 7$) and St. Louis ($n = 8$) occurred from the late 1970s to the mid/late 1980s, and were not observed before or after this period. Three of the five pimp homicides in the media sample occurred between 1968 and 1991, and the other two (resulting from conflict between competing immigrant pimps/prostitution rings) occurred in 2004.

Perpetrators of Prostitution-Related Homicide

Lone perpetrators accounted for most prostitute homicides, including 91% in Chicago, 85% in St. Louis, 82% in the 33 urban counties, and 96% in the media sample. Client homicides were somewhat less likely to be carried out by lone perpetrators, although they still predominated, accounting for 78% in Chicago, 62% in St. Louis, and 66% in the media sample.

TABLE 3—*Relationships between perpetrators and victims in prostitution-related homicide, Chicago, 1965–1995.*

Victim / Perpetrator	Prostitute	Client	Pimp	Total
Prostitute	3 (8) (10)	28 (78) (90)	0 (0) (0)	31 (38) (100)
Client	30 (77) (94)	0 (0) (0)	2 (29) (6)	32 (39) (100)
Pimp	4 (10) (31)	5 (14) (38)	4 (57) (31)	13 (16) (100)
Prostitute/pimp pair	0 (0) (0)	3 (8) (100)	0 (0) (0)	3 (4) (100)
Unknown	2 (5) (67)	0 (0) (0)	1 (14) (33)	3 (4) (100)
Total	39 (100) (48)	36 (100) (44)	7 (100) (9)	82 (100) (100)

Cells display frequencies, with column percentages in the top parentheses and row percentages in the bottom parentheses.

Tables 3–5 show the perpetrator by victim ("killer to killed") matrices of prostitution-related homicides in the Chicago, St. Louis, and media samples, respectively. Homicides in the tables refer to unique victims. When multiple perpetrators were involved with the same homicide and had the same prostitution relationship with the victim, we classified them as one perpetrator with that relationship. All other homicides involving multiple perpetrators had one perpetrator with a prostitution relationship with the victim and one or more other perpetrators with a nonprostitution relationship with the victim; we classified the perpetrators in these homicides as a single perpetrator by the perpetrator with a prostitution relationship with the victim. For the media sample, when a serial perpetrator's relationship with one of his prostitute victims was not explicitly reported, his relationship with his other prostitute victims was imputed to those lacking explicit indications.

In these data sets, clients were perpetrators of 60–77% of prostitute homicides (75–96% of homicides in which the perpetrator's prostitution relationship with the victim is known). Prostitutes, acting alone or with a pimp, were perpetrators of 77–91% of client homicides (86–94% of homicides in which the perpetrator's pros-

TABLE 4—*Relationships between perpetrators and victims in prostitution-related homicide, St. Louis, 1978–1995.*

Victim / Perpetrator	Prostitute	Client	Pimp	Total
Prostitute	0 (0) (0)	6 (46) (86)	1 (13) (14)	7 (17) (100)
Client	12 (60) (92)	0 (0) (0)	1 (13) (8)	13 (32) (100)
Pimp	2 (10) (29)	1 (8) (14)	4 (50) (57)	7 (17) (100)
Prostitute/pimp pair	0 (0) (0)	4 (31) (100)	0 (0) (0)	4 (10) (100)
Other	2 (10) (100)	0 (0) (0)	0 (0) (0)	2 (5) (100)
Unknown	4 (20) (50)	2 (15) (25)	2 (25) (25)	8 (20) (100)
Total	20 (100) (48)	13 (100) (32)	8 (100) (20)	41 (100) (100)

Cells display frequencies, with column percentages in the top parentheses and row percentages in the bottom parentheses.

TABLE 5—*Relationships between perpetrators and victims in prostitution-related homicide, national media sample, 1965–2005.*

Victim	Prostitute	Client	Pimp	Total
Perpetrator				
Prostitute	2 (0.3)	21 (60)	1 (20)	24 (4)
	(8)	(88)	(4)	(100)
Client	449 (77)	0 (0)	1 (20)	450 (73)
	(99.8)	(0)	(0.2)	(100)
Pimp*	10 (2)	2 (6)	2 (40)	14 (2)
	(71)	(14)	(14)	(100)
Prostitute/pimp team†	0 (0)	11 (31)	0 (0)	11 (2)
	(0)	(100)	(0)	(100)
Other	5 (1)	0 (0)	1 (20)	6 (1)
	(83)	(0)	(17)	(100)
Unknown	114 (20)	1 (3)	0 (0)	115 (19)
	(99)	(1)	(0)	(100)
Total	580 (100)	35 (100)	5 (100)	620 (100)
	(94)	(6)	(1)	(100)

Cells display frequencies, with column percentages in the top parentheses and row percentages in the bottom parentheses. Some percentages do not sum to 100 because of rounding error.

*Includes prostitute's boyfriend.

†Includes prostitute working with her boyfriend and/or other accomplices.

titution relationship with the victim is known). Pimps were perpetrators of 40–57% of pimp homicides (40–67% of homicides in which the perpetrator's prostitution relationship with the victim is known). Overall, as perpetrators of prostitution-related homicide, prostitutes' primary victims were clients, clients' main victims were prostitutes, and pimps' typical victims were other pimps.

Tables 3–5 indicate that in terms of raw frequencies of prostitution-related homicide, prostitutes were the most victimized, followed by clients and then pimps. However, perpetrators of prostitution-related homicides were most often clients, followed by prostitutes and then pimps. Prostitute-perpetrated (alone or with a pimp) client homicides represent 1.1–3.3% of all homicides committed by females in the Chicago and St. Louis data sets.

Several of the other data sets also illuminate the perpetrators of prostitute homicides. Table 6 shows that, across the five samples, clients committed 57% to nearly 100% of the prostitution-related prostitute homicides in which the perpetrator's prostitution relationship with the victim is known. Pimps were perpetrators in 2% (two of 90 for whom data were available) of the NCAVC prostitute homicides. In addition, 84% of perpetrators (26 of 31 for whom data were available) in this sample were known to have patronized street prostitutes in well-known stroll (street prostitution) areas (28).

TABLE 6—*Percentage of prostitution-related prostitute homicides committed by clients in other samples.*

Sample	% Perpetrated by Clients
33 urban counties, 1988	88 (15/17)*
Colorado Springs cohort, 1967–1999	57 (4/7)†
Washington state, 1981–1986	100 (4/4)‡
NCAVC, 1982–2000	84 (86/103)§

Fractions in parentheses indicate the number of prostitute homicides perpetrated by clients divided by the number of all prostitution-related prostitute homicides in which the perpetrator's prostitution relationship with the victim is known.

*Calculations based on unweighted data.

†Perpetrator–victim prostitution relationship unknown for 10 victims.

‡Perpetrator–victim prostitution relationship unknown for two victims.

§Perpetrator–victim prostitution relationship unknown for 20 victims.

NCAVC, National Center for the Analysis of Violent Crime.

Serial perpetrators account for a large share of prostitute homicides. The large majority of prostitute victims in the NCAVC (60%, 74/123) and national media (77%; 447/580) samples were killed by serial perpetrators of prostitute homicide. Twenty-six of the 75 (35%) perpetrators in the NCAVC data had killed multiple prostitutes, as had 97 of the 230 (42%) perpetrators (with team perpetrators counted as one perpetrator only) in the media sample. In the media sample, the percentage of serial perpetrators increases to 55% if single perpetrators are reclassified as serial perpetrators because they were perpetrators of additional cleared prostitute homicides for which we lacked specific information ($n = 5$), committed nonfatal assaults against prostitute women ($n = 18$), or were suspects in other prostitute homicides ($n = 5$) or assaults ($n = 2$). Furthermore, nearly all serial perpetrators of prostitute homicide were clients (92% [22/24] in the NCAVC and 99% [74/75] in the national media samples).

Despite the large percentage of perpetrators in the NCAVC and media samples who were serial perpetrators, the actual percentage is likely substantially less. The capture–recapture analysis involving cleared prostitute homicides in the NCAVC and media samples suggests that 35% (892/2542) of prostitute homicide victims in the United States between 1982 and 2000 were killed by serial perpetrators of prostitute homicide. The same analysis yields an estimate that 8% (142/1792) of all perpetrators in cleared prostitute homicide cases had multiple victims. Both of these estimates are conservative, though, in that serial perpetrators were underidentified due to the factors mentioned in the previous paragraph.

Serial perpetrators may be as common in client homicide as in prostitute homicide. Thirty-seven percent (13/35) of client victims in the media sample were killed by serial perpetrators, and 15% (4/26) of perpetrators of client homicide had multiple victims.

Prostitute and client homicides in the media sample differ somewhat in the sector of prostitution in which they occurred. Three percent (16/580) of prostitute victims were known to be working off-street at the time of death. However, 20% (7/35) of client victims were patronizing an escort/call-girl prostitute at the time of death.

Prostitute homicides committed by clients are not easily characterized by motives. Often, any attributed motive is based solely on the self-report of the perpetrator. The varied motives cited in the NCAVC, media, Chicago, and St. Louis data include arguments over the sex for money/drugs exchange, responses to the victim's (attempted) robbery of the client, verbal insults from the victim, demands or requests by the victim, the client's misogyny, the client's hatred of prostitutes, the client's sadism, the client's psychopathology (e.g., sexual deviance, psychopathy, and psychosis), other motives, some combination of these reasons, or, commonly, no apparent precipitating factor.

Client homicides committed by prostitutes were predominantly associated with robbery/theft (39% in Chicago, 80% in St. Louis, 61% in the media sample) or altercations over the sex for money/drugs exchange (53% in Chicago, 10% in St. Louis, 16% in the media sample). The characteristics of client victims in the Chicago, St. Louis, and media samples suggest that client victims were vulnerable and attractive targets for robbery: their median ages ranged between 40 and 51 (22–31% were older than age 60), and 73% were professionals or business owners (media sample only). In St. Louis, all pimp homicides committed by other pimps were retaliatory killings related to prostitution "business" disputes between perpetrator and victim (e.g., over prostitution "turf," "stealing" one another's prostitute, and robbery of another pimp's prostitute); the Chicago data do not provide sufficient detail for such classification.

Discussion

By our conservative estimate, 2.7% of all female homicide victims in the United States during the 1980s and 1990s were prostitutes, with prostitutes accounting for much higher proportions in some areas of the United States. These results approximate the 2.5% national estimate extrapolated from a prospective study of mortality in prostitutes (17). Prostitution-related homicides were underascertained considerably in the nine homicide data sets that we examined, and a key limiting factor for several data sets was the long time often required to solve such crimes. Frequencies of recorded prostitution-related prostitute and client homicides generally increased over the last four decades and spiked prominently during the late 1980s and early 1990s. Nearly all of the few observed pimp homicides occurred between the late 1970s and mid-1980s. Lone perpetrators accounted for the overwhelming majority of prostitute and client homicides. In these data sets, clients committed 57–100% of prostitute homicides, prostitutes committed 86–94% of client homicides, and pimps committed 40–67% of pimp homicides. Serial perpetrators of prostitute homicide killed more than one-third of prostitute victims, and nearly all such serial perpetrators were clients. With few exceptions, prostitute homicide victims worked on the street, although 20% of client victims were patronizing off-street prostitutes when killed. Interestingly, the extent and perpetrators of prostitute homicide during the 19th century (31) are similar to those we observed for recent decades.

The frequency of prostitute homicide in urban areas is likely underestimated in the urban data sets. Perpetrators often dump bodies of their prostitute victims outside of the central cities in which they met, making the resulting homicide cases outside many of the jurisdictions covered in the samples we analyzed (as evidenced by numerous cases in the media sample; e.g., (32–36)). Furthermore, while others have noted underascertainment bias in the SHR for other types of homicide (37,38), our results indicate that underascertainment of prostitution-related homicide is also a problem for the SHR and other homicide data sources we examined. An unknown fraction of prostitute homicides may not have been recorded in the nine data sets we examined—beyond that already discussed—because identified victims were not recognized as prostitutes, or because the bodies of some prostitute victims were never found or identified due to decomposition of remains. Given the challenges to detecting prostitute homicides, the true extent of prostitute homicide may be much larger than that which we estimated.

The increase in recorded prostitute and client homicides beginning in the late 1980s and early 1990s could reflect a genuine increase in homicidal violence or improved detection and recognition of such homicides. The similarity of the time series based on different data sources suggests that the trends are real. Indeed, Lowman (22) observed a similar increase in British Columbia, Canada, beginning in the mid-1980s. If the increase we observed were genuine, one possible cause is the temporally concomitant upsurge in crack cocaine use by prostitutes and others in the United States. Crack use by prostitutes may increase their vulnerability to violence (e.g., by soliciting while high and the rapid cycle of short-term effect, followed by intense withdrawal symptoms, including irritability) and propensity for violence (through increased desperation for money or drugs) (cf. (9,39)). Cocaine pharmacologically enhances aggression (40), which might also promote violence between clients and prostitutes to the extent either party uses crack. Indeed, most victims and perhaps most perpetrators of prostitute homicide during the crack era were under the influence of cocaine at the time of the homicide (Table 7). Moreover, anecdotal reports (41,42) suggest that cocaine use can inhibit male sexual function, which could lead to a cocaine-using client's misplaced frustration with the prostitute and/or the prostitute ending sexual activities before the client thinks appropriate. The risk of client violence would seem to increase in either situation.

TABLE 7—*Percentage of perpetrators and victims in prostitution-related prostitute homicide who were under the influence of cocaine at the time of the homicide.*

Sample	Perpetrators	Victims
Washington state, 1981–1986*	0 (0/6)	—
33 urban counties, 1988†	67 (12/18)	82 (14/17)
NCAVC, 1982–2000‡	79 (22/28)	74 (51/69)

*Sample covers a period before crack commonly used in the state.
†Sample covers period when crack commonly used; based on unweighted data.
‡Most of sample covers period when crack commonly used.
NCAVC, National Center for the Analysis of Violent Crime.

The increase of crack cocaine use in prostitute women may also account for the disappearance of pimp homicides. The prevalence of pimps may have declined and their central role in prostitution may have faded in response to crack-using prostitutes, whose crack addictions undermine pimps' control and earning power (42) and who may tend to engage in prostitution without pimps. (Given the likely small population of pimps, though, their homicide victimization rate is likely quite high despite the few homicides among them.) However, 40% of a sample of incarcerated prostitute women in a large northeastern U.S. city in 1998–1999 reported having a pimp, and pimped women's crack use was almost the same as that for women without pimps (43). Further research may better elucidate the prevalence of pimps, violence between them, and the relationship between pimping and prostitutes' crack cocaine use.

We found an unexpectedly large number of client homicides in Chicago and St. Louis. In our media search of prostitution-related homicides, we encountered comparatively fewer reports of client homicides. This suggests that client homicides are much less newsworthy than prostitute homicides or are reported in the media but in terms that do not convey the connection to prostitution. Nonetheless, clients' homicide victimization rate is likely to be much smaller than prostitutes' victimization rate because there are far more clients than prostitutes. Still, violence against clients in prostitution may be generally underrecognized. Fifty-six percent of prostitute women participating in a case management project reported ever assaulting a client not in self-defense (44). In addition, violence perpetration against clients was modestly negatively associated with violence victimization by clients in this sample, suggesting that prostitute victims and perpetrators tend to be somewhat distinct subsets of prostitute women.

Our results have practical implications for the prevention and investigation of prostitute and client homicide. Although prostitute homicides are among the most difficult to solve (10,27,28), victims come from a small pool of women who are relatively easily identified when working. As our results indicate, perpetrators also are a definable set of men who can be observed in public when patronizing prostitutes. These facts suggest that ongoing proactive surveillance of diverse prostitution strolls (areas of street prostitution) and collection of DNA (45–48) and other samples (e.g., vehicle carpet fibers, tire tread patterns, dental imprints) from both clients and prostitutes arrested for prostitution or interrogated in the field could help deter and solve prostitute and client homicides.

Acknowledgments

We thank Richard Rosenfeld and Charis Kubrin for sharing and orienting us to the St. Louis homicide data, and records staff at numerous local law enforcement agencies for providing details on particular homicide cases. We also appreciate helpful comments on the manuscript from Michele Decker. This research was supported in part by grants from the National Institute of Justice (nos. 2003-IJ-CX-1036 and 2001-IJ-CX-0001) and the National Institute of Drug Abuse (no. DA09928). Points of view are those of the authors and do not necessarily represent those of the U.S. Departments of Justice or Health and Human Services.

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