

Homicide as a Cause of Pediatric Mortality in the United States

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ABSTRACT. Homicide is a major cause of pediatric mortality. National law enforcement data were analyzed to characterize and differentiate neonaticide, infanticide, filicide, and overall child homicide. Results include the following: Neonaticides often involved parents or unidentified perpetrators and occurred proportionately more in rural areas than did other types of child homicide. Infanticide appeared to be one end of the spectrum of child homicide and not a distinct entity. Filicide rates were higher for sons than daughters and the crime was committed by more fathers than mothers. Overall child homicide predominately involved young male offenders who were acquaintances of the victim. At remarkably early ages, homicide characteristics began to resemble those of adult homicide. Further research in this area should attempt to gain detailed information concerning the child, his family, and their social network. Pediatricians should be actively involved in determining risk factors for child homicide and in screening children for risk when these factors are determined. *Pediatrics* 1983;72:191-197; *child abuse, infanticide, child murder, neonaticide, filicide.*

Homicide is one of the five leading causes of death for pediatric population aged 1 to 18 years in the United States.¹ Furthermore, homicides of infants are probably underrecorded by current health statistics.^{2,3} As public and medical awareness of the problem of violence toward children has grown, officials have begun to suggest that a reduction of the morbidity and mortality associated with this problem be a goal of public health agencies and of persons involved in health care.⁴

Although awareness of violence toward children has increased, the historic literature attests to the

fact that child homicide is not a new problem.⁵⁻⁹ However, incidence data are unavailable and we cannot evaluate whether child homicide is, in fact, increasing. Homicides of children by their parents have been discussed in medical,¹⁰⁻¹³ psychiatric,¹⁴⁻²³ and child abuse²⁴ literature under the broad categories of neonaticide,^{18,22,25,26} infanticide^{5,6,8,16,21,27} filicide,^{12,19,28} and, less precisely, as fatal child abuse.^{13,22,29} This has not been done, however, in a rate-specific or population-specific manner. Furthermore, cases of nonparentally perpetrated child homicide have rarely been examined or integrated with parentally perpetrated child homicide to show the broad spectrum of the problem.^{10-12,20,23} We analyzed homicide data from the Federal Bureau of Investigations-Uniform Crime Reporting System (FBI-UCR) for 1976 through 1979 to characterize epidemiologically child homicide cases in the United States and to present the available data on neonaticide, infanticide, filicide, and overall child homicide.

MATERIALS AND METHODS

Computerized data concerning murder and non-negligent manslaughter were obtained from the FBI-UCR for the years 1976 to 1979. Details of this reporting system are described elsewhere.³⁰ Briefly, law enforcement agencies across the United States voluntarily contribute crime statistics on a monthly basis to the FBI-UCR for eight Crime Index offenses. Murder and nonnegligent manslaughter together constitute one of these eight reportable offenses. More than 96% of these homicide reports are accompanied by supplementary data concerning details about the victim, offender, and event. It is assumed that these supplementary data are representative of all offenses.

Child homicide will be defined using legal age limits, ie, as the homicide of a person less than 18

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years old. Neonaticide is herein defined as the homicide of a person aged 1 week or less (Neonaticide is defined in the literature as the homicide of a child within the first 24 hours of life. However, the FBI-UCR data set does not specify hours or days of life.); infanticide, as the homicide of a person greater than 1 week to less than 1 year of age; and filicide, as the homicide of a person (less than 18 years old) by his or her parent or stepparent. The term "homicide" in this report refers only to those offenses reported to the FBI-UCR as "murder and nonnegligent manslaughter." This category is outlined by the FBI-UCR³⁰ as follows:

The willful (nonnegligent) killing of one human being by another. The classification of this offense, as in all other Crime Index offenses, is based solely on police investigation as opposed to the determination of a court, medical examiner, coroner, jury, or other judicial body. Not included in the count for this offense classification are deaths caused by negligence, suicide, or accident; justifiable homicides, which are the killings of felons by law enforcement officers in the line of duty or by private citizens; and attempts to murder or assaults to murder, which are scored as aggravated assaults.

FBI-UCR collects data on each homicide incident or occurrence. For incidents involving more than one victim and/or offender, the analyses of the weapon used and relationship between offender and victim are based on incidents in which the first-specified victim was a child. The first-specified individual represents 91% of all identifiable child homicide victims. In an incident involving more than one victim or offender, these are not specified in any predetermined order (K. Candell, FBI-UCR, personal communication, 1982). Racial comparisons will be made for only the two predominant categories, ie, whites and blacks. These races together account for 98% of known offenders and 99% of all victims involved in child homicides.

Rates using all victims less than 18 years old in each homicide incident as the numerator will be referred to as "victim-specific." Rates using all specified offenders for each homicide incident involving a child victim as the numerator will be referred to as "offender-specific." Numerators for national rates presented here were calculated as follows: (Number of all child homicide victims or offenders with the described characteristics) \times 1.04. (This factor is based on the FBI-UCR estimate that 96% of all homicides are represented by supplementary data.) Rates for Standard Metropolitan Statistical Areas (SMSA), non-SMSAs, and regions are calculated using factors based on data listed by the FBI-UCR³⁰ (tables 1 and 3). Population estimates were obtained from the US Bureau of the Census³¹⁻³³ and Current Population Survey tapes. Statistical analysis was performed using goodness-of-fit χ^2 techniques³⁴ or a test for the difference of

means of two large samples from a normal population.³⁵ Differences were considered significant when $P < .05$.

RESULTS

Neonaticide

In the period 1976 to 1979, 3% of child homicide victims were less than 1 week old, giving an average yearly neonaticide rate of 1.3/100,000 live births. The characteristics of the newborn, the offender, and the incident are outlined in Table 1. Male victims predominated slightly, and 64% of the offenders were known to have been female. The parent of the victim was the identified offender in the majority of cases and usually used weapons other than guns or knives—most often the application of bodily force, strangulation, or unknown means. The regional distribution differed from that for infanticide or overall child homicide, with relatively higher rates in the Northeast and South (Table 2). Of reported neonaticide, 31% came from non-SMSAs. Of neonaticide incidents with an ascertained offender, 93% involved only one victim and offender; 5% involved more than one victim and only one offender; 2% involved more than one of each; and 1% involved only one victim and more than one offender.

Infanticide

In 1976 through 1979, 9% of child homicide victims were more than 1 week old but less than 1 year old, giving an average yearly infanticide rate of 4.3/100,000 infants. The characteristics of the infant, the offender, and the incident are outlined in Table 1. As in neonaticide, male victims predominated slightly, but unlike neonaticide, the majority of offenders were known to be male. Only 7% of offenders were undetermined and 74% were parents or stepparents of the victim. More than 90% of offenders used weapons other than guns or knives—most often the application of bodily force was used. The regional rate distribution differed from that for neonaticide or overall child homicide, with the highest in the North Central Region (Table 2). Unlike neonaticide, only 15% of reported infanticide came from non-SMSAs and only 82% of infanticide incidents with an ascertained offender involved only one victim and offender. Eleven percent of the cases involved only one victim and more than one offender, and 7% involved more than one victim and one offender.

Filicide

Of child homicides, 29% were perpetrated by the victim's parent or stepparent. This includes 26% of

TABLE 1. Characteristics of Victims, Offenders, and Incidents of Neonaticide, Infanticide, and Overall Child Homicide, United States, 1976 to 1979

| | Neonaticide | Infanticide | Child Homicide |
|---------------------------------|-------------|-------------|----------------|
| Victim: sex (%) | | | |
| Male | 54 | 55 | 62 |
| Female | 43 | 45 | 38 |
| Unknown | 3 | 0 | 0 |
| Victim: race (%) | | | |
| White | 55 | 58 | 57 |
| Black | 40 | 41 | 41 |
| Other | 1 | 1 | 2 |
| Unknown | 4 | 0 | 0 |
| Offender: sex (%)* | | | |
| Male | 8 | 52 | 64 |
| Female | 64 | 40 | 17 |
| Unknown | 28 | 8 | 19 |
| Offender: race (%)* | | | |
| White | 41 | 53 | 44 |
| Black | 29 | 37 | 35 |
| Other | 2 | 2 | 2 |
| Unknown | 29 | 8 | 19 |
| Relationship (%)*† | | | |
| Parent | 66 | 72 | 23 |
| Stepparent | 1 | 2 | 3 |
| Other family member | 2 | 4 | 6 |
| Acquaintance | 2 | 12 | 35 |
| Stranger | 2 | 2 | 10 |
| Undetermined | 29 | 7 | 23 |
| Weapon used (%)*† | | | |
| Gun | 3 | 5 | 40 |
| Knife | 6 | 4 | 15 |
| Force | 22 | 54 | 20 |
| Drowning | 7 | 4 | 2 |
| Strangulation | 17 | 7 | 6 |
| Other or unknown | 45 | 26 | 17 |
| No. of victims or 1st-offenders | 178 | 547 | 6,301 |
| No. of victims or incidents | 178 | 547 | 5,740 |

* Based on first-specified offender for each child homicide victim.

† For overall child homicide, based on incidents in which the first-specified victim was a child.

cases in which the parent is the first specified offender and 3% of cases in which they were the second specified offender. Sons were victims 1.3 times more than daughters ($P < .02$); this was true for both black and white children and when either parent was the perpetrator. For all cases of child homicide, 76% of female offenders were mothers or stepmothers of the victim, whereas only 19% of male offenders were fathers or stepfathers of the victim. In total, 52% of parent or stepparent offenders were female. This was the only relationship category in which female offenders predominated. However, when rates were determined for 1976 to 1979, using relevant household figures, rates of homicides by white fathers or stepfathers were 10% greater than those by white mothers or stepmothers (difference not significant) and rates by black fathers or stepfathers were 50% greater than those by

TABLE 2. Average Yearly Regional Rates for Neonaticide, Infanticide, and Overall Child Homicide, United States, 1976 to 1979

| | Neonaticide (/100,000 Live Births) | Infanticide (/100,000 Infants <1 yr) | Child Homicide (/100,000 Children <18 yr) |
|----------------|------------------------------------|--------------------------------------|---|
| Northeast | 2.1 | 4.8 | 2.4 |
| North Central | 0.7 | 5.0 | 2.3 |
| South | 1.9 | 3.5 | 2.5 |
| West | 0.7 | 4.9 | 3.1 |
| Total | 1.3 | 4.3 | 2.5 |
| No. of victims | 178 | 547 | 6,301 |

* Numerators are calculated as follows: recorded number of victims times regional reporting factor (findings of FBI-UCR³⁰) divided by 4.

black mothers or stepmothers ($P < .001$). Rates were determined as follows: rate of homicide by mothers and stepmothers is the number of homicides by mothers or stepmothers divided by the number of US households headed by a male and female or by a female alone; rate of homicide by fathers and stepfathers is the number of homicides by fathers or stepfathers divided by the number of US households headed by a male and female or by a male alone.

Of homicides perpetrated by a mother or stepmother, 10% involved more than one victim, compared with 17% of homicides by a father or stepfather. Both parents were involved in 11% of parent-perpetrated homicides.

Gangfights and Sexual Assault

Two of the defined circumstances associated with child homicide were "gangfights" and "sexual assault." In 1976, 2.1% of child homicides occurred during gangfights. By 1979, this percentage rose to 4.0%. These were proportionately more common among white than among black children, but the incidence was comparable for both races. Gangfights were almost exclusively a male victim/offender phenomenon, whereas sexual assault was associated with child homicide in 10% of female and 2% of male homicide victims. The perpetrator was known to be a male in 69% of these sexual assaults and the perpetrator was undetermined in 30% of these assaults. Sexual assault was most common when the perpetrator and the victim were strangers; it accounts for 12% of homicides involving strangers.

Overall Child Homicide

Victims. In 1976 to 1979, 9% of homicide victims were less than 18 years old. The average yearly child homicide rate for 1976 through 1979 was 2.5/

100,000 persons less than 18 years of age. Regional victim-specific child homicide rates for 1979, the most recent year analyzed, are given in the Figure and average yearly regional rates are given in Table 2. Race-adjusted rates were similar for these areas: Northeast, North Central, and South; rates for the West lead those for all other regions ($P < .001$ for difference between West and all other regions). The West had the highest proportion of familial child homicides and the lowest proportion of homicides involving strangers (when the relationship between victim and offender was known). The West also had the highest proportion of child homicides for which the relationship could not be determined. Much as with infanticide, 84% of all child homicides occurred in SMSAs. In 1979, victim-specific rates for SMSAs were 3.3/100,000 and for non-SMSAs the rates were 1.4/100,000. The relative rate for SMSAs compared with non-SMSAs was 1.8 for whites (95% confidence interval: 1.6 to 2.1) and was 3.1 for blacks (95% confidence interval: 2.4 to 4.0).

Offenders. The proportion of offenders that were male grew with the increasing age of the victim, from 44% for homicides of persons less than 1 year old to 93% for homicides of persons 17 years old. Of all child homicide offenders, .5% were less than 10 years old, 24% were less than 18 years old, and 42% were less than 21 years old. Nearly one quarter of parent offenders were less than 21 years old at the time of the incident (Table 3). The highest proportion of young offenders was seen among non-

parental members of the victim's family. The mean age of all offenders was 24.1 years; the median age was 22 years. The peak offender-specific homicide rate for 1979 was 2.2/100,000 for persons 15 to 19 years of age. The mean age for white offenders was slightly greater than for black offenders (24.3 and 23.5 years, respectively; $P < .01$). The mean ages for male and female offenders did not differ significantly from one another. For both male and female victims, the difference between the offender's age and the victim's age decreased as the victim's age

TABLE 3. Proportion of Offenders by Age and by Relationship of Offender to Child in Child Homicide, United States, 1976 to 1979*

| | % of Offenders† | |
|---------------------|-----------------|------------|
| | <18 yr old | <21 yr old |
| Parent | 6 | 23 |
| Stepparent | 1 | 15 |
| Other family member | 40 | 76 |
| Acquaintance | 35 | 56 |
| Stranger | 21 | 38 |
| All offenders | 24 | 42 |

* Based on the relationship between first-specified offender and first-specified victim in incidents in which the first-specified victim was a child. In incidents involving multiple victims or offenders, these are not specified in any predetermined order (K. Candell, personal communication, 1982).

† Excludes 1,517 incidents in which the relationship between victim and offender could not be determined and/or in which the age of the first-specified offender was unknown.

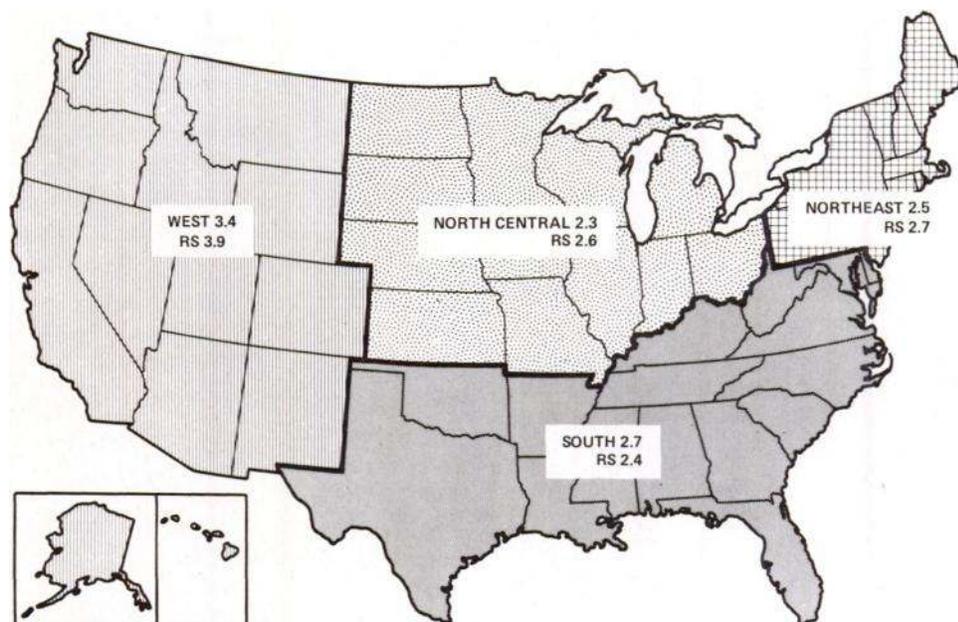


Figure. Child homicide in United States in 1979 (N = 1,620). Victim-specific rates by region. Rate is calculated as follows: (recorded number of victims times regional reporting factor based on reference 30) divided by (regional population <18 years old). It is expressed as rate/100,000 persons. Adjustment is made by direct method, using racial composition of United States as standard. Abbreviation used is: RS, race standardized.

increased. Offenders involved in familial homicide had a mean age of 26.2 years, and their mean age increased with the increasing victims' age. (Mean age was calculated on the basis of the relationship between the first-specified victim and the first-specified offender in all homicide incidents in which the first-specified victim was a child. In incidents involving multiple victims or offenders, these were not specified in any predetermined order [K. Candell, personal communication, 1982].) This pattern was largely due to the parent offenders. Offenders who were strangers to the victim had a higher mean age (26.8 years) than those who were acquaintances of the victims (22.2 years, $P < .001$). The mean age of this last group did not increase with the increasing age of the victim.

Relationships Between Victims and Offenders. The relationships between victims and offenders are summarized in Table 1. As the age of the victim increased, relationships shifted from being intra-familial to extrafamilial in nature. When the age of the victims reached three years, the majority of homicides were not committed by close relatives of the victim.

Numbers of Victims and Offenders. The number of victims and offenders involved in a homicide varied with the relationship between the victim and offender. Multiple homicides were most common in incidents involving family members; 11% of family homicide incidents involved more than one victim. Multiple offenders were most common when victim and offender were strangers; 20% of these homicide incidents involved multiple offenders. One-to-one victim/offender ratios were most common when the victim and offender were acquaintances; 82% of all homicide incidents involving acquaintances had one victim and one offender.

Weapons Used. The types of weapons used are shown in Table 1. The type of weapon used varied with the sex of both victim and offender (Table 4) but not with their race. When stratified by victim-age, weapon usage by female offenders did not differ for male and female victims and consisted of a higher proportion of strangulation and drowning and a lower proportion of guns and knives compared with weapon usage by male offenders ($P < .001$). When the victim's age was greater than 7 years, male offenders used guns proportionately less often on female victims than on male victims. At all victim-ages, male offenders used knives less often and strangulation more often on female than on male victims ($P < .001$). Male offenders used force proportionately more often on male victims than on female victims until victim-age 14 years, when the pattern reversed.

Strangers, siblings, and acquaintances of the vic-

TABLE 4. Distribution of Weapon Usage by Sex of Victim and Offender in Child Homicide, United States, 1976 to 1979*

| | Female Offender | | Male Offender | |
|------------------|-------------------|-----------------|-------------------|-----------------|
| | Female Victim (%) | Male Victim (%) | Female Victim (%) | Male Victim (%) |
| Guns | 15 | 18 | 34 | 53 |
| Knives | 11 | 11 | 13 | 18 |
| Force | 36 | 35 | 35 | 21 |
| Strangulation | 10 | 10 | 7 | 2 |
| Poisoning | 1 | 1 | 1 | ... |
| Drowning/falling | 7 | 6 | 1 | 1 |
| Arson | 4 | 4 | 3 | 2 |
| Unspecified | 15 | 15 | 6 | 3 |
| No. of victims | 425 | 546 | 1,231 | 2,453 |

* Excludes 1,085 incidents in which the sex of first-specified victim or offender was undetermined. Only the first-specified victim and first-specified offender were used in this analysis. In incidents involving multiple victims or offenders, these are not specified in any predetermined order (K. Candell, personal communication, 1982).

tim had a similar pattern of weapon usage. This pattern differed from that seen when the offender was a parent of the victim. Although the overall proportion of firearm usage by parents was less than that for other offenders, the ages of the parents' victims also tended to be younger. When weapon usage was stratified by the age of the victim (using 2-year intervals), parents actually used a higher proportion of firearms than did other offenders. Mothers used guns and force proportionately less often, and strangulation and drowning more often, than did fathers.

DISCUSSION

Homicide is a major cause of pediatric mortality in this country. As such, it is of concern to pediatricians and to child health clinicians. Prevention of child homicide must be based upon its nature and causes. Realizing that child homicide was probably not a homogeneous entity, several authors attempted to classify these deaths on the basis of the victims' age, the offenders' inferred or recorded motivations, or a combination of both.^{13,19-21} These and other authors specifically concentrated on neonaticide,^{18,22,25,26} infanticide,^{5,6,8,16,21,27} filicide,^{12,19,28} and fatal child abuse.^{13,22,29} We have suggested³⁶ that these homicide types represent a minority of child homicide deaths and must be integrated into the broader spectrum of child homicide. We have used national homicide data to examine the currently defined categories of child homicide in a rate-specific manner, to compare them with one another, and to present a more complete picture of child homicide.

One defined category of child homicide is neonaticide. Authors^{18,25} have suggested that neonaticide represents the killing of an unwanted newborn by his or her parent. Our data support this relationship between perpetrator and child. Furthermore, the high proportion of one victim/one offender incidents suggests that the aggression was usually specifically directed at the newborn. Resnick¹⁸ has suggested that the most effective means of preventing neonaticide is the availability of abortion. Interestingly, neonaticide was the only type of child homicide with a high proportion of rural incidents. These rural cases may be in areas in which abortion is socially censured or not readily available. However, regional rates of neonaticide show no clear relationship to regional abortion rates: the highest neonaticide rates are in the South and Northeast, which have respectively, the lowest and highest abortion rates (derived from 1979 data³⁶). Thus we can only suggest that the relation between abortion availability and the prevention of infanticide needs further investigation.

A second defined type of child homicide is infanticide. Infanticide does not appear to be clearly differentiable from overall child homicide. The latter might best be viewed as a spectrum or continuum, with relationships between victims and offenders shifting from parent to acquaintance, the weapons used shifting from bodily contact or force to guns or knives, and the proportion of male victims and offenders increasing as victim-age increases.³⁶ Consistent with this view, infanticides in the United States were largely filicidal, rarely involved guns or knives, and had only a slight male predominance for both victims and offenders.

Our conclusions concerning filicide differ from those of previous reports in that we found homicide by a father as likely as homicide by a mother.^{11-13,19} This difference can be largely attributed to our use of rates, rather than proportions, and emphasizes the importance of ascertaining the population at risk. We also found that the rate of homicide of male children by either parent exceeded the rate of homicide of female children. Weapon usage by parents was similar to that noted in the literature.^{17,20} However, weapon usage appeared to be primarily related to these offenders' sex and the age of the child and not to their parental relationship to that child.

Filicide and fatal child abuse appear to be definitionally overlapping entities. Some¹³ treat them as synonymous. Others²² consider fatal child abuse as a subset of filicide. Still others²⁹ use all child homicide of young children as an indicator of fatal child abuse. We suggest that virtually all victims of child homicide represent cases of child abuse or

neglect on the part of the parent and/or society. Infanticide and filicide are instances of purposeful, direct violence toward children by their caretakers. Research and literature on physical child abuse have the most direct bearing upon this subset of child homicide. Risk factors for severe physical child abuse are likely to prove relevant to these cases and include caretaker parenthood at an early age, the period of infancy, and low socioeconomic status.³⁸

Nonfilicidal child homicide also represents instances of child abuse, although these are not discussed in the child abuse literature. By victim-age 3 years, the majority of child homicides are nonfamilial. With increasing victim-age, child homicide becomes increasingly similar to adult primary homicide.³⁷ The youthfulness of these victims is mirrored by that of the offenders. Nearly one quarter of the child homicide offenders were less than 18 years old, and 42% were less than 21 years old. Child homicide appears to be a problem of the young killing the young, but we can only conjecture how these children became involved in homicides. These cases may represent children drifting into an adult life-style and environment for which they are not developmentally or emotionally prepared and in which they do not receive adequate parental and societal supervision. Prevention of these cases would involve increasing the responsibility that parents and neighborhood networks express toward children in our society.

Several suggestions are made concerning future work in this area. First, researchers should avoid some of the deficiencies of past studies, ie, the use of proportions without associated rates and of small or nonrandom samples. Second, the extent to which racial patterns represent socioeconomic differences needs to be examined. This data set lacks information on the latter and thus cannot separate the effects of race from the effects of poverty. Third, and most important, further data are needed concerning events and interactions precipitating child homicide. This information is markedly lacking for cases of intrafamilial homicide and is only broadly defined for cases of extrafamilial child homicide. The extent to which the latter represents instances of parental neglect of their supervisory role is unknown, as is the extent to which these cases represent extrafamilial replication of intrafamilial patterns of violence.

IMPLICATIONS

Physicians have only gradually become aware that child abuse and neglect are pediatric problems. Child homicide may represent the most severe form

of child abuse and neglect. Pediatricians have a major responsibility for preserving the health and well-being of children. Therefore, they are the most appropriate and knowledgeable specialists to investigate the precursors of child homicide. Medical and school records would be a valuable source of information for this type of research, especially if "well-child" history and physical examinations were conducted with this problem in mind.

Parental information of interest would include age; socioeconomic status, occupation, and marital status; and the presence or absence of a history of drug or alcohol abuse, criminality, or violence. Family information would include a description of living quarters, the family constellation, birth spacing, the presence or absence of household crowding, and the extrafamilial social network. Information on the child would include primary caretaker; birth order; school attendance; grades; television and recreational habits; sexual habits; support network; the status of the child's general care; and the presence or absence of a history of behavior problems, hyperactivity, physical or sexual abuse, neglect, and drug or alcohol abuse.

We reiterate that homicide is a major cause of death in the pediatric age group; it must be seen as a matter of pediatric concern. Pediatricians are in a position to determine risk factors, to screen for those at increased risk, and to initiate preventive measures.

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Janine Jason, Jeanne C. Gilliland and Carl W. Tyler, Jr

Pediatrics 1983;72:191

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