Comparing Death Certificate Data with FBI Crime Reporting Statistics on U.S. Homicides

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Mr. Rokaw, the primary author, died on July 9, 1989, before this paper was completed. This paper is dedicated to his memory and his contributions to the field of violence epidemiology. He had been with the Division of Reproductive Health, Center for Health Promotion and Education, Centers for Disease Control (CDC), Public Health Service, Atlanta, GA. Dr. Mercy is with the Epidemiology Branch, Division of Injury Control, Center for Environmental Health and Injury Control, CDC. Mr. Smith is with the Division of Reproductive Health at CDC.

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Synopsis

Both the National Center for Health Statistics (NCHS) Mortality System and the Federal Bureau of Investigation (FBI) Uniform Crime Reporting System measure the numbers and characteristics of homicide in the United States. There are important differences, however, in both the substance and the quality of the information that the two systems collect. The NCHS mortality system reported an average of 9 percent more homicides nationally than did the FBI crime reporting system during the 1976-82 period. Variations did occur in the average ratios of the frequencies of homicides reported by the two systems across age, race, and sex subgroups and geographic areas.

The major source of the ascertainment difference between the NCHS and the FBI systems is thought to be incomplete voluntary reporting to the FBI by participating law enforcement agencies and lack of reporting by nonparticipating agencies. The proportions of homicides among corresponding demographic categories in the two systems is remarkably similar despite the difference in ascertainment. This congruence of the distributions of reported homicides supports the idea that inferences drawn from analysis of variables in one of these systems will be valid for the population reported on by the other system.

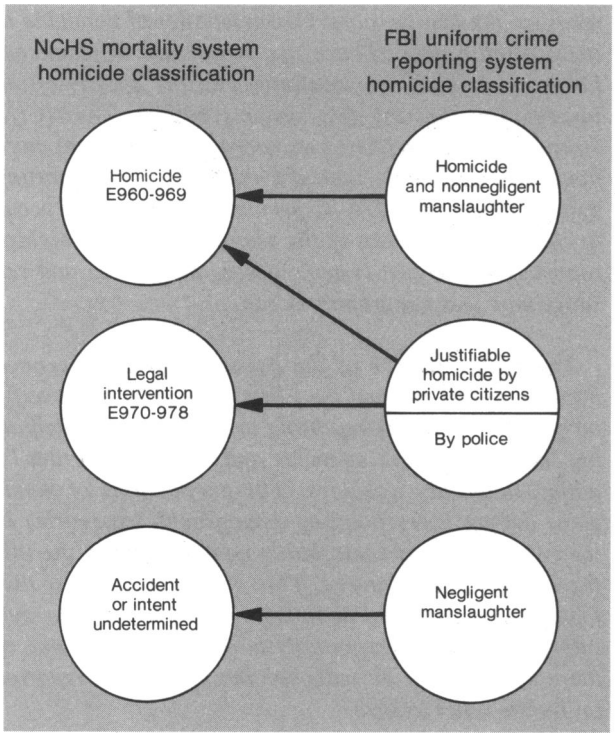
HOMICIDE IS NOW RECOGNIZED as a major public health problem in the United States. Each year more than 20,000 people die by another's hand, with the greatest toll among young, minority males. Homicide is the third leading cause of death among all 15- to 24-year-olds and the leading cause of death for 15- to 34-year-old blacks (*1*). These statistics have led many to call for the development of public health programs to prevent homicide. A fundamental component of any homicide prevention program must be a surveillance system that researchers and policymakers can use to

1. assess the magnitude and impact of homicide,
2. determine the type and quantity of resources needed to respond to the problem, and
3. develop baseline information for evaluating the effectiveness of public policies for preventing homicide.

Such surveillance data are essential to the planning, implementation, and evaluation of public health programs. An ideal surveillance base should allow characterization of homicides in a complete and timely manner, identification of population subgroups at high risk of homicide, and description of temporal patterns and trends in the occurrence of homicide.

In the United States, two independent systems provide national data on homicides that are useful for surveillance. The vital statistics system coordinated by the National Center for Health Statistics (NCHS) of the Public Health Service compiles national mortality data, including homicide data, from death certificates filed with State health departments. The other system, the Federal Bureau of Investigation's (FBI) Uniform Crime Reporting (UCR) Program, bases its information about homicide deaths on summary reports filed by local law enforcement authorities. To determine the usefulness of these data collection systems for public health surveillance and research, we compared the number and distribution of homicides in the United States identified by the two systems by age, race, sex, and State of occurrence for the years 1976–82.

Figure 1. Correspondence of NCHS International Classification of Diseases and FBI uniform crime reports categories for fatalities caused by other persons



Background and Definitions

Mortality system. Death statistics have been collected by the Federal Government since 1850, but it was not until 1933 that a death registration system existed which covered the entire United States (*2a*). The fundamental document that feeds the NCHS system of mortality data is the death certificate that each State requires for every death. It is believed that more than 99 percent of deaths occurring in the United States are registered through this system (*2b*). Each State has a centralized office of vital statistics that cooperates in a national vital statistics program coordinated by NCHS. Thus, NCHS receives death certificate data for national compilation directly from the States. The format for the death certificate varies from State to State but in general closely follows a model of style and content that NCHS and State offices of vital statistics have agreed upon. State vital statistics authorities collect uniform information on deaths from all causes, including homicide. This information includes the age, race, and sex of the victim and the date, location, and underlying and contributing causes of death. The death certificate does not include any information on the suspected perpetrator of a homicide, the relationship of a victim and a perpetrator, or the circumstances of the event leading to death.

Hospital or medical personnel, funeral directors, or others often complete demographic items on the death certificate, but the physician attending the death or a coroner or medical examiner investigating the death must certify the cause and manner of death.

In all States, certain deaths are required to be brought to the attention of the coroner or medical examiner. These usually include deaths without a physician in attendance, sudden or unexpected deaths, and deaths that may have been self-inflicted or caused by another person. Following investigation of the death, the coroner or medical examiner is responsible for certifying the cause (gunshot wound to the head, for example) and manner (natural, accidental, homicide, suicide, or undetermined) of death .

FBI uniform crime reporting system. The FBI has collected data on crimes known to police through the UCR Program since 1933. This program is intended to generate reliable criminal statistics for use in law enforcement administration, operations, and management. Homicide is one of the seven major categories of crimes reported through this system. Three estimates of the number of homicides in the United States can be derived from the information collected through the UCR program. The first estimate can be derived from the Return A forms which are monthly tallies of homicides occurring in a jurisdiction. The second estimate is the Return A estimate adjusted for nonreporting agencies. The third estimate comes from the Supplemental Homicide Reports (SHR) which are used by jurisdictions to provide details of the individual homicides tallied on the Return A forms on a monthly basis. The SHR data are the only UCR source that includes demographic and circumstantial information about the homicides and, therefore, are the most useful for public health surveillance and research. Participation in the UCR system is not required by law but depends on voluntary reporting by local law enforcement agencies. As of 1984, 41 States had established centralized reporting units that send crime report data to the FBI. In the remaining States, crime report forms are sent to the FBI directly from the local law enforcement agency (*3*).

Each SHR form contains information on a particular homicide event, some of which may include more than one death. Information is included on the demographic characteristics of the person(s) suspected of committing the homicide as well as of the victims, the relationship of victim and perpetrator, and the circumstances of the event. When a local law enforcement agency becomes aware of a homicide, personnel of the agency record these items of information on a SHR form based on the findings of the investigation.

In most cases, the officials responsible for complet-

ing the death certificate and those responsible for the criminal investigation work together to determine if a death results from homicide. Thus, within the NCHS and FBI systems, medical-legal and law enforcement officials usually investigate the same death at the point of origin for collecting data, but report their findings through separate channels to the two different national homicide data systems.

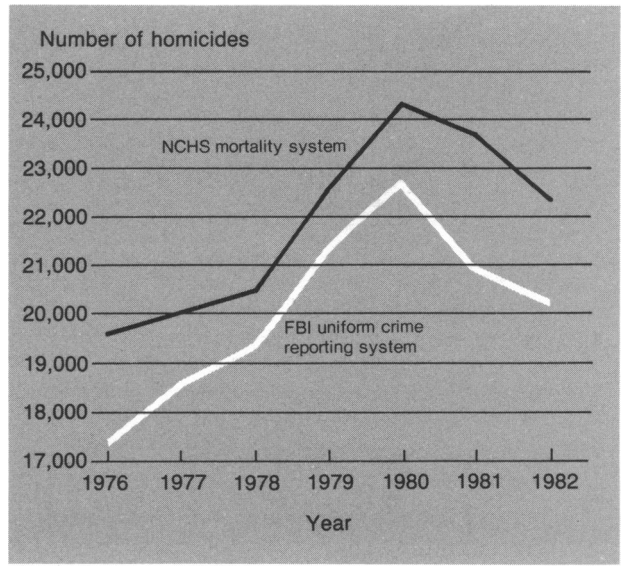
Mortality system homicide definition. Homicides reported through the vital statistics system are classified according to the International Classification of Diseases (ICD) into two general categories, homicide and legal intervention (*4*). Homicide is broadly defined as "injuries inflicted by another person with intent to injure or kill by any means" (ICD Codes E960–E969) (*4a*). Legal intervention (ICD Codes E970–E978) is more specifically defined as "injuries inflicted by the police or other law enforcing agents, including military on duty, in the course of arresting or attempting to arrest law breakers, suppressing disturbances, maintaining order, and other legal action" or "legal execution" (*4b*). The mortality system definition employs no judgment of criminal involvement in a homicide death.

Crime reporting system homicide definition. The FBI definition classifies deaths due to human action into three categories based on legal criteria. The first category, called homicide and nonnegligent manslaughter, is defined as "the willful (nonnegligent) killing of one human being by another" (*3a*). The second category, called justifiable homicide, is defined as "the killing of a felon by a police officer in the line of duty, or the killing (during the commission of a felony) of a felon by a private person" (*3a*). The third category, called negligent manslaughter, is defined as "the killing of another person by gross negligence" (*3b*).

Comparability of definitions. The two categories of homicide from the mortality system definition (ICD codes E960–E969 and E970-E978) and the first two categories of homicide from the FBI definition (homicide, or nonnegligent manslaughter, and justifiable homicide) are roughly comparable, although the terminology is not identical. The key elements of both definitions are (*a*) fatal injury, (*b*) caused by another human being, (*c*) with intent.

The FBI category of negligent manslaughter (death due to gross negligence), in general, would be classified probably as accidental death in the ICD classification scheme used by the NCHS system. The unintentional killing of one person by another, such as in the accidental discharge of a firearm, would generally fit the crime reporting system coding criteria for negligent manslaughter (*2c*). Figure 1 shows how these categories correspond to one another.

Figure 2. Comparison of reported homicide frequencies NCHS mortality and FBI uniform crime reporting systems United States, 1976–82



Methods

We obtained SHR data files from the FBI for the period 1976–82. These data records were organized by homicide events rather than by individual deaths as are data records at NCHS. We therefore reorganized the FBI data to produce files in which each homicide death is represented by a single record. Cases from the homicide-nonnegligent manslaughter and justifiable homicide categories were included. Negligent manslaughter cases were omitted because they corresponded most closely to the ICD category of accidents rather than homicides. Because the FBI categorizes cases by place of injury occurrence rather than by residence of the victims, we included all cases that occurred in the 50 States and the District of Columbia.

Mortality detail tapes for the period 1976–82 were also obtained from the NCHS and all homicide and legal intervention death records (ICD E960–E978 codes) were selected for analysis. Although these data sets include the residence of the decedent and the place where the death occurred, we included all cases occurring in the 50 States and the District of Columbia to match the FBI's geographic coverage. This selection criterion results in the inclusion of a modest number of foreign residents who were killed while visiting the United States (about 70 per year). They would be excluded from mortality system homicide statistics computed on the basis of residence.

Figure 3. NCHS mortality/FBI uniform crime reporting systems mean homicide frequency ratios by age and sex group, United States, 1976–82

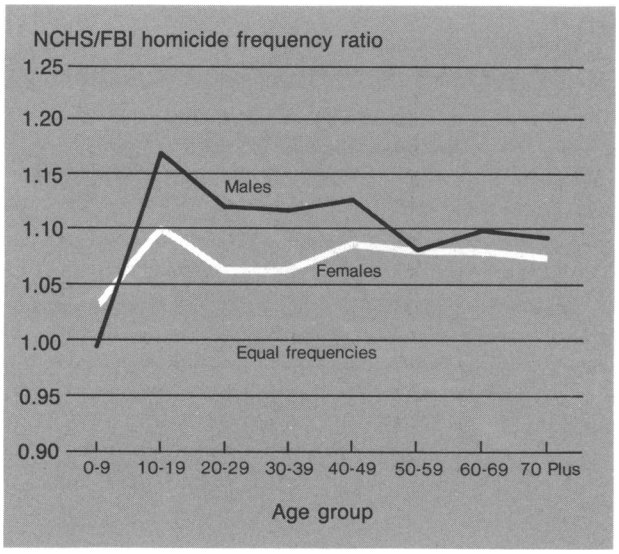
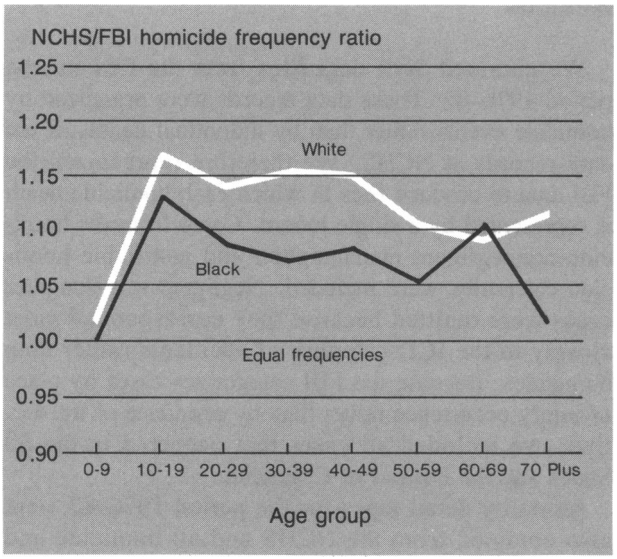


Figure 4. NCHS mortality/FBI uniform crime reporting systems mean homicide frequency ratios by age and race group, United States, 1976–82



For each data set we then tabulated the homicide frequencies by all possible cross-categories of sex, age, race, State of occurrence, and year. Age was classified into 10-year categories. We separated sex into male, female, and unknown, and we divided race into white, black, other, and unknown. Some incompatibility between the categories in the two systems arises from the fact that the mortality system uses a statistical imputation algorithm to assign race and sex to cases when they are unknown, thus eliminating the need for an unknown category (*2d*).

The statistical computer files of both data systems lack information identifying individuals. Therefore, data cannot be linked on a case-by-case basis. In order to assess the comparability of homicide reporting to these two systems, we generated homicide frequency counts for each system, matched for each age-sex-race-State-year category. We then computed the ratio of the mortality system frequency to crime reporting system frequency. A ratio in excess of one indicates that more homicides were reported by the mortality system; a ratio of less than one indicates that more were reported by the UCR system. The difference between the ratio and 1.00 gives the proportion by which the mortality system frequency exceeded that of the crime reporting system. For example, a ratio of 1.09 means that the mortality system reported 9 percent more cases than the crime reporting system. A ratio of 0.90 means that the NCHS mortality system reported about 10 percent fewer cases. It should be noted that ratios based on smaller frequencies are more unstable. A change of the same number of deaths in either frequency will have a much greater relative impact on the ratio when two small frequencies are being compared than it would for the ratio of two larger frequencies. The results are expressed primarily in terms of mean frequency ratios. The mean ratio is the mean of all of the single-year ratios for the years 1976–82. Univariate statistics for these frequency ratios for the 7-year period were calculated for each possible age-sex-race-State category.

Results

Overall frequency ratios. For the 7-year period we examined, the mortality system consistently had a greater number of homicides than the UCR (fig. 2) with a mean difference of 1,791 homicide deaths per year. The mean ratio of mortality system to crime reporting system frequencies for the 7 years was 1.09; thus the mortality system reported a mean of 9 percent more cases than did the crime reporting system. This figure was relatively stable, having a standard deviation of 0.03. During the period, ratios of the total frequencies reported by the mortality system and the crime reporting system did not vary in a systematic way, and there was no clear trend in them. Examining the proportional distributions of homicides by month of occurrence report indicated that the seasonal patterns of homicide were very close.

Frequency ratios in demographic subgroups. Some variation in the mortality system-crime reporting system ratio was evident by sex, with male victims having a

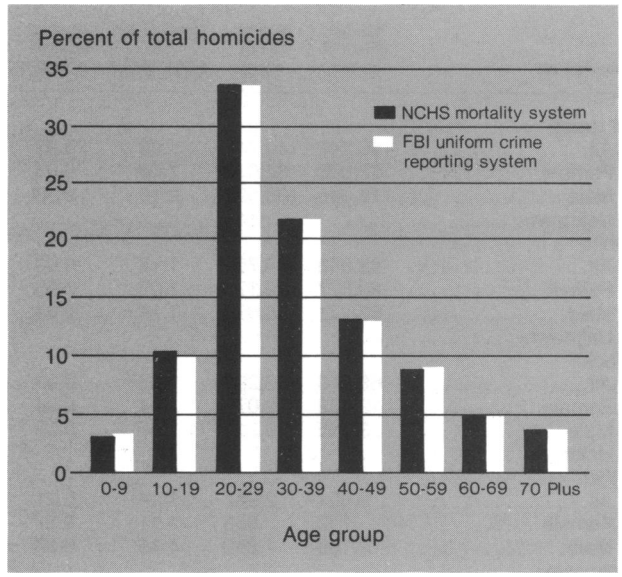
mean ratio of 1.10 compared with 1.06 for female victims (table 1). This pattern of higher frequency ratios in male victims also held true for each race group and in all age groups except children under 10. Male ratios were higher in all age groups among whites, in all age groups among blacks except infants to 9 years and 50 to 70 years, and in most ages for the other race category. No meaningful ratio could be computed for the unknown sex category because of the mortality system's imputation procedure for unknown sex. The proportional distribution of homicides between the sexes for the two systems was very close; the mortality system reported 77.9 percent of homicide victims were men compared with the crime reporting system, which reported 77.1 percent.

Blacks had the lowest mean ratio, 1.07, among the three race groups (table 1). Whites had a mean ratio of 1.12, and persons classified as other races had a ratio of 1.14. The mean ratios for whites and blacks were very stable with standard deviations of 0.03; the ratios for other races, however, were quite variable with a standard deviation of 0.21, due in part to the relatively low frequencies being compared by the ratio. The pattern of other races having larger ratios than whites and whites having larger ratios than blacks was evident in both sexes and in most age categories. A total of 1,072 homicide victims was reported in the crime reporting system data as being of unknown race during the 1976–82 period, 0.76 percent of the total. The proportional distribution of the races between the two systems was almost identical.

Variation in the mean frequency ratios also occurred by age group. The ratios closest to 1.00 were seen in children younger than 10 years (1.01), particularly in those younger than 5 years. The number of homicides for the period that the two systems reported for children younger than 5 is nearly identical, with the mortality system reporting 3,653 and the the crime reporting system 3,649. The ratios are at their maximum in people ages 10 to 19 (1.15) and vary within a narrower range (1.07 to 1.14) in older age categories. This pattern prevailed for both sexes (figure 3) and for blacks and whites overall (figure 4). Except in the other races category, which had relatively low frequencies and more unstable ratios, the same pattern of ratios across the age range was found among race-sex subgroups as well. The ratios for persons of unknown age were uniformly below 0.30 because the FBI system reported considerably more persons of unknown age. The proportional distribution of homicides by age in the two data systems for the period was nearly identical (figure 5).

Frequency ratios by State of occurrence. The greatest variation in terms of mean frequency ratios was

Figure 5. Proportional distribution of homicide cases in NCHS mortality and FBI UCR systems by age group, United States, 1976–82



observed for the State of occurrence of the homicide (table 2). Eleven States had mean ratios in excess of 1.20, indicating that from these States the mortality system was receiving in excess of 20 percent more reports of individual homicides than the crime reporting system. Four States had mean ratios less than 1.0. Some States had extreme variability in their annual ratios. Annual ratios for New Mexico varied from 1.13 to 42.00, with a standard deviation of 15.32. Although the frequencies in many States were small for both systems, clearly the UCR system receives substantially fewer homicide reports from many States than does the mortality system.

Discussion

Sources of differential ascertainment. There are four potential sources for the differences we observed in the number of deaths classified and reported as homicide to the mortality and the crime reporting data systems.

1. differences in the coverage of the U.S. population,
2. differences in the practices or rules governing the reporting of homicide deaths to NCHS and the FBI,
3. differences in the criteria used in defining a case as a homicide, and
4. differences in the categories used and the rules employed to classify people among demographic subgroups.

Differences in coverage. Coverage refers to the area or proportion of the U.S. population that is reached by the

Table 1. Comparison of FBI crime reporting and NCHS mortality data systems homicide frequencies and frequency ratios, by sex and race, United States, 1976–82

Race and sex	Number of NCHS cases	Number of FBI cases	Mean annual ratio NCHS to FBI	Standard deviation of ratio
All races:				
All	153,247	140,711	1.09	0.03
Female	33,902	32,073	1.06	0.03
Male	119,345	108,522	1.10	0.03
Unknown	...	116	...	...
White:				
All	83,848	74,796	1.12	0.03
Female	20,577	19,179	1.07	0.03
Male	63,271	55,606	1.14	0.04
Unknown	...	11	...	...
Black:				
All	66,548	62,296	1.07	0.03
Female	12,583	12,070	1.04	0.04
Male	53,965	50,221	1.07	0.03
Unknown	...	5	...	...
Other:				
All	2,851	2,547	1.14	0.21
Female	742	685	1.11	0.27
Male	2,109	1,862	1.15	0.20
Unknown:				
All	...	1,072	...	...
Female	...	139	...	...
Male	...	833	...	...
Unknown	...	100	...	...

respective data systems. The National Death Registration Area used by the NCHS in its vital statistics system is considered to cover all of the U.S. population (*2*). The FBI UCR system, on the other hand, was estimated to cover approximately 98 percent of the U.S. population as of 1984, implying that some jurisdictions did not report homicides to the FBI (*5*). In addition, in most cases, homicides occurring in Federal jurisdictions such as prisons, military bases, and Indian reservations are not reported to the FBI system but are included within the National Death Registration Area used by NCHS, according to a June 26, 1990, personal communication from J. Vagh of the FBI. Thus incomplete coverage by the crime reporting system is one significant reason that fewer homicides are reported to the FBI than to the NCHS mortality data system.

Differences in reporting practices and rules. There are several differences in the rules and procedures governing local agency reporting to the two data systems that could potentially account for some observed discrepancies in the frequencies of reported homicides.

First, the legal requirements for reporting homicide deaths to the two data systems differ. Within the vital statistics system, State and local laws require that physicians, coroners, funeral directors, and registrars cooperate to complete a death certificate for every death and submit it to a central vital statistics office. In the crime reporting system, however, participation is not universally required by law, but often depends on voluntary reporting by local law enforcement agencies. Furthermore, in States where police agencies may be legally required to participate in the crime reporting system, the State reporting agency may not vigorously enforce this requirement, particularly since reporting may be regarded as a bookkeeping activity, incidental to the central mission of law enforcement. Consequently, there appears to be less compliance with reporting procedures within the crime reporting system than the mortality system.

Differences in the way cases are reported over time and attributed to specific intervals could also account for some discrepancies in homicide frequencies. The NCHS accrues death certificates for a considerable period after the calendar year of interest has ended. It then assigns deaths to years by date of death. Each month the FBI receives reports of the deaths occurring during the previous month. If, for example, delays in processing and submitting records occurred in the FBI system, a proportion of December's homicides might be shifted to January and be counted in the next year. If the number of homicides is fairly constant from year to year, this difference in procedures should have a minimal effect. The distribution of homicides by month of report or death in the two data systems is very similar, suggesting that the difference resulting from time lags in reporting is a minor problem.

The third difference in reporting procedures involves the way cases are reclassified if a change occurs in their designation as homicide cases. The mortality system classifies cases that are in question as pending and reclassifies them into an appropriate cause of death category when a final determination is made. If a final determination is not reached, then cases can be classified into an undetermined cause of death category. In the crime reporting system, an initial SHR record reporting the homicide is submitted and, if a change occurs, an amendment is submitted later to correct the original classification. Whenever amendments are not submitted, the crime reporting system will continue to identify the case as a homicide, whereas the mortality system may have ultimately classified it in some other category. Apparently amendments are not submitted to the FBI with great reliability, according to a October 25, 1985, personal communication from K. Candell, of the FBI.

Assessing the impact of these procedural differences on the differential in the frequency of homicides reported to these two data systems is difficult. Given the nature of these differences, however, one might expect a greater number of false positives—deaths classified as homicides which were in fact not due to homi-

cide—to be present in the UCR system than the mortality system. Alternatively, because of its stricter classification procedure, one might expect the mortality system to be more likely than the crime reporting system to misclassify some deaths as nonhomicides, especially those ultimately classified as undetermined. The net effect of these two differences, however, would be to decrease the frequency ratios.

Differences in homicide definitions. The definitions of homicide used in the NCHS and FBI data systems are quite similar. The degree of adherence to the official definitions could vary significantly, however, leading to unpredictable patterns of differences between the systems. The key element of both definitions is a fatal injury caused intentionally by another human being. Although both systems include legal intervention by police, the definition of legal intervention in the mortality system extends beyond police agencies to other public agencies responsible for maintaining order such as military police, prison guards, and the like. Non-police legal interventions and legal executions constitute a relatively small proportion of deaths. Such deaths, however, generally are not reported to the FBI system and, therefore, could be a source of differences in the number of homicides reported to the two data systems according to Mr. Vagh's communication. Changes in definitions may occur within each system over time and also could alter the relationship between the two systems. Such an alteration might have occurred as a result of the change in the ICD cause of death classification from ICD–8 to ICD–9. The NCHS found, however, that no significant change appeared in its homicide figures, and there is no discontinuity in the annual frequency ratios during the interval when the change occurred. Collaboration by local police and medical examiners or coroners in the investigation of homicides probably enhances uniformity in classifying cases among definitional categories.

Differences among demographic subpopulations. Differences in the frequency of homicides allocated to demographic subpopulations, defined by age, race, and sex, could conceivably be attributable to differences in the rules used to assign decedents to the subpopulations or differences in the subcategories used for particular demographic variables. As previously mentioned, the mortality system imputes sex and race when these values are unknown (*2d*). This procedure contrasts with the FBI system, which maintains unknown race and sex categories. Thus, the unknowns in the FBI system are not counted in the substantive race and sex categories, resulting in the mortality system having higher relative frequencies for these categories. However, the proportion of homicides in the crime reporting system with unknown sex (0.08 percent) and race (0.76 percent) is so small that this procedural difference has little poten-

Table 2. Comparison of FBI crime reporting and NCHS mortality data systems homicide frequencies and frequency ratios by States, 1976–82

State	Number of NCHS cases	Number of FBI cases	Mean annual ratio NCHS to FBI	Standard deviation of ratio
Alabama	3,756	3,346	1.13	0.08
Alaska	354	360	1.00	0.17
Arizona	1,832	1,607	1.15	0.07
Arkansas	1,553	1,337	1.16	0.06
California	20,162	20,015	1.01	0.06
Colorado	1,374	1,295	1.06	0.07
Connecticut	963	913	1.07	0.08
Delaware	274	256	1.07	0.15
District of Columbia	1,441	1,388	1.04	0.06
Florida	8,908	8,333	1.08	0.04
Georgia	5,612	3,751	1.51	0.15
Hawaii	404	403	1.01	0.10
Idaho	290	285	1.02	0.10
Illinois	9,109	8,419	1.08	0.04
Indiana	2,643	2,429	1.10	0.10
Iowa	499	448	1.12	0.09
Kansas	1,015	961	1.06	0.07
Kentucky	2,285	2,316	1.00	0.12
Louisiana	4,800	4,280	1.12	0.09
Maine	204	211	0.96	0.10
Maryland	2,692	2,790	0.97	0.04
Massachusetts	1,469	1,393	1.06	0.07
Michigan	6,655	6,446	1.03	0.01
Minnesota	719	681	1.06	0.07
Mississippi	2,411	1,496	1.61	0.12
Missouri	3,707	3,314	1.12	0.04
Montana[1]	290	171	6.18	12.27
Nebraska	380	333	1.14	0.10
Nevada	848	809	1.06	0.08
New Hampshire	130	143	0.92	0.14
New Jersey	3,049	3,273	0.93	0.03
New Mexico[2]	1,133	669	7.26	15.32
New York	14,459	13,201	1.14	0.28
North Carolina	4,567	4,074	1.12	0.04
North Dakota	93	57	1.69	0.27
Ohio	5,397	5,313	1.02	0.07
Oklahoma	2,133	1,938	1.11	0.07
Oregon	871	812	1.07	0.04
Pennsylvania	5,179	5,189	1.00	0.02
Rhode Island	289	239	1.22	0.16
South Carolina	2,522	2,435	1.04	0.04
South Dakota	178	69	2.73	0.61
Tennessee	3,554	2,851	1.26	0.16
Texas	15,465	13,824	1.12	0.14
Utah	448	332	1.36	0.12
Vermont	103	49	2.46	1.35
Virginia	3,397	3,220	1.06	0.03
Washington	1,417	236	1.16	0.10
West Virginia	977	810	1.21	0.09
Wisconsin	1,033	999	1.04	0.06
Wyoming	204	192	1.10	0.19

[1] In 1982, Montana had an annual NCHS to FBI ratio of 34.0 due to a deficit in reporting of cases to the FBI. For the remaining 6 years the mean annual NCHS to FBI ratio for Montana was 1.50.

[2] In 1981, New Mexico had an annual NCHS to FBI ratio of 47.75 due to a deficit in reporting of cases to the FBI. For the remaining 6 years the mean annual NCHS to FBI ratio for New Mexico was 1.46.

tial impact on the overall difference in the relative frequencies for specific demographic categories.

Overview of sources of differential ascertainment. Our most notable and consistent finding was that the mortality system reports more homicide deaths than the crime reporting system for corresponding categories of homicide victims. This pattern was true for nearly all race, age, and sex categories. The best explanations for this pattern are that participating law enforcement agencies sometimes fail to submit SHRs and that nonparticipating agencies do not submit reports. This pattern of incomplete reporting and nonreporting would result in ratios in excess of one across nearly all age, sex, and race categories.

The best evidence for the importance of incomplete reporting and nonreporting is the size and extreme variability of the mortality system-crime reporting system frequency ratios among States. In general, the magnitude of the ratios is far greater among States than among age-sex-race categories, and the variation between States is greater. In some years in specific States very few homicides were reported to the FBI, while the mortality system recorded a substantially greater number.

The FBI is aware of both episodic and systematic deficiencies in reporting in a number of States, according to the October 1985 communication from Mr. Candell previously referred to. A notable episode occurred in 1976 when New York City was unable to report cases for the last half of the year. This failure to report homicides to the FBI resulted in a frequency ratio for New York State in 1976 of 1.74, considerably higher than any other year in the period of study.

Systematic nonreporting also seems to have a discernible effect. Three of the four States with the largest ratios are States with large populations on Indian reservations. Deaths on Indian reservations are usually investigated by tribal police or Federal authorities who do not report to the FBI system. In these States a great proportion of the differential between the homicides reported to the two systems occurs among people identified as Indians.

Representativeness of systems for homicide victim population. The proportion of homicide victims among corresponding demographic categories in the mortality and crime reporting systems is remarkably similar despite differences in ascertainment. This congruence supports the idea that inferences drawn from the analysis of variables in one of these systems will be valid for the population reported on by the other system. Such inferences will probably be accurate so long as the variable of interest is not strongly correlated with the tendency toward nonreporting. Inferences concerning subpopulations, particularly geographic areas, must be made more cautiously.

Our finding of a similar distribution in the demographic characteristics of homicide victims across these two systems is particularly important because the systems differ in the specific items of information they report concerning the characteristics of the victim and the event. For example, only the FBI system reports information on Hispanic ethnicity, attributes of the perpetrators, and the circumstances of the homicide such as victim-offender relationship. The NCHS system reports the residence of the victim, the date of the event, and the detailed cause of death. Thus the mortality system would appear to be advantageous for conducting public health surveillance of homicide victimization, given its greater level of ascertainment, while the crime reporting system of the FBI offers unique opportunities for homicide research that takes advantage of information on homicide circumstances and offender characteristics.

Future directions. Although we have demonstrated the differential in ascertainment between the NCHS mortality and the FBI UCR systems in reporting homicides and offered a number of likely explanations, we cannot in this study evaluate the relative importance of these sources of differential ascertainment to the difference in the frequency of homicides reported to the two systems. To determine precisely the causes of the differential between these two systems requires tracking the progress of the same cases from their origin to their presence in the final national data sets. This approach would determine the degree to which the members of the two data sets are truly concordant and would also permit cross-comparison of coding used in the two data systems to determine the level of agreement for specific variables.

There are at least two steps that can be taken to improve the quality of homicide data in the mortality and crime reporting systems. First, investigation of deaths by expert review committees at the State and local level should be encouraged as a mechanism for improving the classification of cause of death. (This was a recommendation from the NCHS Workshop on Improving Cause of Death Statistics, October 15–17, 1989, in Virginia Beach, VA.) Such review committees should include appropriate criminal justice representatives. This mechanism would help reinforce the cooperation of criminal justice agencies and medical examiners or coroners in determining the cause of death in suspected homicides. Second, easier methods and procedures should be developed for amending or updating information on death certificates and homicide

reports to the FBI. Current procedures for both the mortality and crime reporting systems discourage rather than encourage the updating of incorrect or incomplete information.

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Patterns of Rates of Mortality from Narcotics and Cocaine Overdose in Texas, 1976–87

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Synopsis

Drug overdose mortality data for narcotics and cocaine for Texas for 1976–87 reveal a cyclic pattern of narcotics mortality falling from 0.92 per 100,000 population in 1976 to a low of 0.13 in 1979, and rising to 0.62 in 1986. The data also show a sharp increase in cocaine mortality from 0.07 per 100,000 in 1983 to 0.38 in 1987. The data indicate that men consistently are at higher risk than women for overdose from both categories of drugs.

Hispanics in the El Paso and San Antonio areas were found to have much higher risk of mortality from narcotics than expected, while blacks in the Houston and Dallas areas were at higher risk of cocaine mortality. The evidence suggests that narcotics and cocaine mortality is highest among the blue collar categories of the work force.

The cyclical pattern of drug overdose mortality suggests the need for more examination of the historical interplay of public policies and social factors against the magnitude of the drug problems. The differences in mortality patterns by sex, ethnicity, and location indicate the need to develop policies and programs that address the unique characteristics of different at-risk populations.

EFFECTIVE RESPONSES TO DRUG PROBLEMS, including identifying drug use risk factors and high risk groups, require understanding epidemiologic patterns of these problems.

Variations in the nature of drug problems are seen in different localities and differ between men and women, among ethnic groups, and in the types of drugs abused (*1–5*). Several researchers have suggested that there is a cyclical pattern to the problems of drug abuse (*6, 7*). The differences manifested in drug problems indicate the complexity of the overall problems and the need for continuing examination of their patterns and the populations at risk.

Population surveys are useful for examining patterns in drug problems, but they have their shortcomings. First, the cost of surveys of sufficient size to be useful preclude conducting them locally at intervals frequent enough to characterize and monitor drug problems on a local or regional basis. Such surveys are most practical on a large scale, such as nationally. Secondly, survey samples may not be large enough to permit differences in drug problems to be examined among geographic and demographic subsets that are important to developing responses to drug problems. Lastly, the types of people involved in abuse of narcotics and cocaine are not easily reached through either face-to-face or telephone interviews, and their responses may be of limited reliability.