

## Original Contributions

## School-Associated Violent Deaths in the United States, 1992 to 1994

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**Objectives.**—To conduct the first nationwide investigation of violent deaths associated with schools in the United States, to quantify the risk of school-associated violent death, and to identify epidemiologic features of these deaths.

**Design.**—Descriptive case series.

**Setting.**—United States, July 1, 1992, through June 30, 1994.

**Methods.**—School-associated violent deaths were identified by study collaborators and through 2 online news databases. Police reports, medical examiners' records, and interviews with police and school officials provided detailed information about each case.

**Results.**—In a 2-year period, 105 school-associated violent deaths were identified. The estimated incidence of school-associated violent death was 0.09 per 100 000 student-years. Students in secondary schools, students of minority racial and ethnic backgrounds, and students in urban school districts had higher levels of risk. The deaths occurred in communities of all sizes in 25 different states. Homicide was the predominant cause of death ( $n=85$  [80.9%]), and firearms were responsible for a majority ( $n=81$  [77.1%]) of the deaths. Most victims were students ( $n=76$  [72.4%]). Both victims and offenders tended to be young (median ages, 16 and 17 years, respectively) and male (82.9% and 95.6%, respectively). Approximately equal numbers of deaths occurred inside school buildings ( $n=31$  [29.5%]), outdoors but on school property ( $n=37$  [35.2%]), and at off-campus locations while the victim was in transit to or from school ( $n=37$  [35.2%]). Equal numbers of deaths occurred during classes or other school activities ( $n=46$  [43.8%]) and before or after official school activities ( $n=46$  [43.8%]).

**Conclusions.**—School-associated violent deaths were more common than previously estimated. The epidemiologic features of these deaths were similar to those of homicides and suicides that occur elsewhere. A comprehensive approach that addresses violent injury and death among young people at school and elsewhere in the community is suggested.

(JAMA. 1996;275:1729-1733)

OVER THE PAST 15 years, violence has gained recognition as an important public health and social problem. Violent injury and death disproportionately affect children, adolescents, and young adults.<sup>1,2</sup> During the past decade, the number of homicides and suicides among school-aged children more than doubled, even as the rates of childhood deaths from

other causes declined.<sup>3,4</sup> Whenever a violent death occurs in the school setting, it becomes a matter of intense interest and concern. School-associated deaths are rare events, but their actual incidence is not known. They are not routinely reported to state or federal education agencies, nor is it possible to identify school-associated deaths from the usual sources of public health or criminal justice statistics. This descriptive case series investigation was initiated at the request of the US Department of Education in March 1994. Its purposes were (1) to complete the first systematic review of school-associated homicides and suicides across the country, (2) to estimate the level of risk for violent death associated with schools, and (3) to identify common features that characterize these deaths.

Partly because of its high visibility, school-associated violence is widely re-

garded as a common and growing problem. Several well-publicized recent studies confirmed this general impression by reporting that violence in and around schools has become more common and more serious.<sup>5-7</sup> Unfortunately, these reports were drawn from nonrepresentative samples and studies that measured individuals' impressions and attitudes rather than actual events. In a few more methodologically sound investigations, the proportion of students who reported having been victims of violent activity while at school ranged from 9% to 23%.<sup>8,9</sup> Some students have reported carrying a weapon onto school property (12% in a 30-day period) or missing school because they felt unsafe on campus (4% in a 30-day period).<sup>10</sup> There have been even fewer systematic efforts to document fatal violence associated with schools,<sup>11</sup> and there has been no comprehensive study of school-associated violent deaths on a national basis.

School-associated deaths are tragic events that affect not only the individuals immediately involved but also the entire populations of the schools and communities where they occur. Even deaths that involve individuals who have no formal affiliation with a school affect students, teachers, staff, and the entire learning environment when they occur on or near campus. Each school-associated death becomes the focus of intense public attention, accompanied routinely by various suggestions to improve school safety. From a public health perspective, school-associated violent deaths may be considered sentinel health events. A sentinel health event is a preventable disease, disability, or untimely death in which the occurrence of even a single case demands investigation and signals the need to re-examine preventive practices.<sup>12,13</sup>

## METHODS

### Case Definition

A school-associated violent death was any homicide or suicide in which the fatal injury occurred on the campus of a functioning elementary or secondary school in the United States, while the victim was on the way to or from regular ses-

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sions at such a school, or while the victim was attending or traveling to or from an official school-sponsored event. Cases included the deaths of nonstudents as well as students and staff members. We limited the investigation to 2 consecutive academic years, July 1, 1992, through June 30, 1994.

### Case Finding and Confirmation

Cases of school-associated violent death were identified using 2 case-finding strategies. The first strategy was to include deaths identified by study collaborators at the US Department of Education and the National School Safety Center, where officials had been tracking school-associated fatalities since 1992 through a newspaper clipping service and informal voluntary reports from state and local education officers. This method identified 78 possible cases. The second strategy involved a systematic search of 2 computerized newspaper and broadcast media databases. The searches generated more than 8000 citations and yielded 160 possible cases. After obvious duplicate cases were identified and eliminated, the 2 case-finding methods revealed 186 probable cases.

We confirmed probable cases by contacting at least 1 local press, law enforcement, or school official who was familiar with each case and conducted a brief interview to determine if the death met the case definition. Fifty-six cases were excluded based on the location of the fatal event. Another 25 probable cases failed to meet the case definition for other reasons, including 4 cases revealed to be duplicates after additional information was collected (Figure 1). A total of 105 cases were confirmed.

### Data Collection

Once cases were identified, we sought to obtain detailed information about the victims and alleged offenders, the school(s) associated with each death, and the circumstances and nature of fatal injuries. Previous reviews of school-associated deaths had been based entirely on unofficial published news reports (*People*, June 14, 1993:44).<sup>11</sup> For this study, we obtained data directly from official sources. These included the initial police report and medical examiner's report and structured telephone interviews with a police officer who investigated the case and the school principal or another school spokesperson. Before collecting these data we obtained approval from the Institutional Review Board of the Centers for Disease Control and Prevention, Atlanta, Ga. In some cases we also applied for and received approval from local institutional review boards. Participants were free to decline any question or refuse to participate. Data

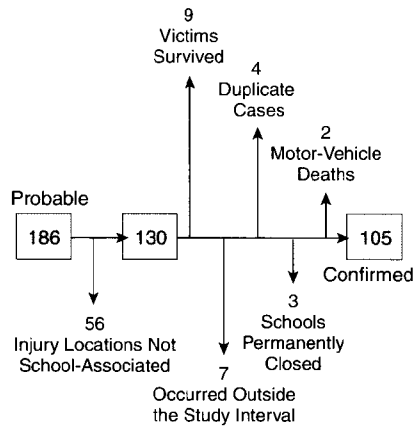


Figure 1.—Case confirmation of school-associated violent deaths.

collection took place from August 1, 1994, through March 30, 1995.

### Data Analysis

The risk of school-associated violent death was estimated by calculating person-time-based rate estimates and a proportional mortality ratio. Denominators for the rate estimates were obtained from the National Center for Education Statistics.<sup>14</sup> These data included national enrollment figures for the 1992-1993 academic year (the most recent year for which national data were available), broken down by race/ethnicity, grade level, and type of community. The proportional mortality ratio for children aged 5 to 19 years was based on 1992 mortality data (the most recent year for which national data were available) compiled by the National Center for Health Statistics.<sup>15</sup>

Data collected from interviews and abstracted from official records were coded and entered into a database using Epi Info, Version 6.0.<sup>16</sup> This software package was used to complete simple univariate and bivariate analyses as well as a matched-pairs analysis comparing a subset of victims with their corresponding alleged offenders. Bivariate statistical comparisons were based on the Yates corrected  $\chi^2$  test. The Fisher exact test was used when expected values were less than 5, and the McNemar  $\chi^2$  test was used in the matched-pairs analysis. Statistical differences were assessed at the .05 level of significance.

### RESULTS

Response rates for the 4 data sources ranged from 72% to 90%. Data from at least 2 official sources were obtained in all 105 cases (100%). Police reports were reviewed for 75 cases (71%). We interviewed a school official in 85 cases (81%) and a police officer in 89 cases (85%). An autopsy was required in all 105 cases, and

Table 1.—Estimates of the Rate of School-Associated Violent Death (Students Only)

Variable	No. of Deaths	Rate*
All students	76	0.09
School grade†		
Preschool-grade 8	10	0.02
Grade 9-12	63	0.27
Race/ethnicity		
White non-Hispanic	17	0.03
Black non-Hispanic	38	0.28
Hispanic	19	0.16
Asian/Pacific Islander	2	0.07
School district		
Rural	6	0.02
Suburban	23	0.09
Urban	47	0.18

\*Per 100 000 student-years.

†Unknown for 3 students.

we reviewed medical examiners' reports for 93 cases (89%).

### Completeness of Case Finding

Fewer than half ( $n=51$  [48.6%]) of the 105 confirmed cases were identified by both case-finding strategies; some appeared on the collaborators' list but not in the on-line databases ( $n=13$  [12.4%]), while others were found in the database searches but not by the collaborators ( $n=41$  [39.0%]). Based on the overlap between these 2 case-finding techniques, we conducted a capture-recapture analysis to determine how many cases might have been missed.<sup>17</sup> From these calculations, an estimated total of 115 school-associated violent deaths may have occurred across the country during the study interval. The 95% confidence interval (CI) around this estimate suggests that as many as 19 additional cases or as few as 1 case may have been overlooked. As case ascertainment tools, the collaborators' list was estimated to be 55.6% complete, and the computer-aided database searches 80.0% complete.

### Risk Estimates

Of the 105 deaths identified, 76 occurred to students. Using 1992-1993 enrollment figures, we estimated the annualized rate of school-associated violent death at 0.09 per 100 000 student-years (Table 1). Students in secondary school (grades 9-12) had an estimated rate of school-associated violent death 13 times greater than that of students in elementary school (prekindergarten through grade 8). Among racial and ethnic groups, white non-Hispanic students had the lowest estimated rate of school-associated violent death, and black non-Hispanic students had the highest estimated rate. Although violent deaths occurred in all types of communities, the estimated rate for students in urban school districts was 9 times greater than the estimated rate for their peers in rural school districts.

Another way to assess the risk of school-associated violent death is to calculate a proportional mortality ratio. In 1992, there

Table 2.—Characteristics of School-Associated Violent Deaths, 1992-1994 (N=105)

	No. (%)
Type of fatality	
Interpersonal (homicide)	85 (81.0)
Self-inflicted (suicide)	20 (19.0)
Time of fatal injury	
During school activities	46 (43.8)
Classes	23 (21.9)
Break period	11 (10.5)
After-school activities	12 (11.4)
Before or after official activities	46 (43.8)
Day with no classes or activities	8 (7.6)
Unknown or other	5 (4.8)
Location of fatal injury	
Elementary school	31 (29.5)
Secondary school	74 (70.5)
On campus	68 (64.8)
Classroom	10 (9.5)
Hallway	9 (8.6)
Other indoor location	12 (11.4)
Parking area	11 (10.5)
Other outdoor location	26 (24.8)
Off campus	37 (35.2)
Street/sidewalk	20 (19.0)
In vehicle	13 (12.4)
Private property	4 (3.8)
Type of community	
Urban	63 (60.0)
Suburban	32 (30.5)
Rural	10 (9.5)
Method of injury	
Firearm	81 (77.1)
Knife or other blade	18 (17.1)
Rope	5 (4.8)
No weapon	1 (1.0)
Motive (more than 1 may apply)	
Interpersonal dispute	35 (33.3)
Gang-related activities	33 (31.4)
Random victim event	19 (18.1)
Suicide	19 (18.1)
Dispute over romantic relationship	12 (11.4)
Robbery or attempted robbery	10 (9.5)
Dispute over money or property	7 (6.7)
Drug-related activities	6 (5.7)
Unintentional	5 (4.8)

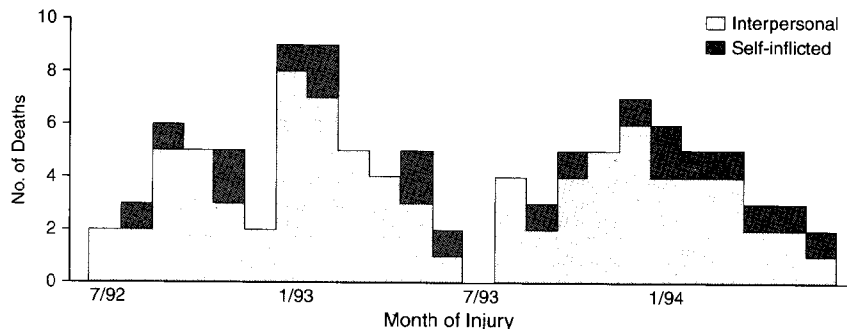


Figure 2.—Number of school-associated violent deaths in the United States in the 1992-1993 and 1993-1994 school years (N=105) by month of occurrence and type.

Table 3.—Characteristics of Victims in School-Associated Violent Deaths\*

Variable	Total (N=105)	Homicide (n=85)	Suicide (n=20)	Odds Ratio† (95% Confidence Interval)
Median age (range), y	16 (4-62)	16 (4-51)	17 (10-62)	...
Age <20 y, No. (%)	81 (77.1)	68 (80.0)	13 (65.0)	0.46 (0.14-1.54)
Male, No. (%)				
Race/ethnicity, No. (%)	87 (82.9)	69 (81.2)	18 (90.0)	2.09 (0.39-14.66)
White non-Hispanic	34 (32.4)	21 (24.7)	13 (65.0)	5.55‡ (1.78-18.55)
Black non-Hispanic	48 (45.7)	43 (51.2)	5 (25.0)	0.32 (0.09-1.06)
Hispanic	21 (20.0)	19 (23.2)	2 (10.0)	0.39 (0.06-2.04)
History of criminal charges, No. (%)	20 (21.5)	15 (20.3)	5 (26.3)	1.40 (0.37-5.17)
Gang member, No. (%)	15 (15.0)	15 (18.7)	0 (0.0)	Undefined§
Weekly alcohol or drug use, No. (%)	19 (25.0)	11 (19.0)	8 (44.4)	3.42 (0.94-12.57)
Carrying a weapon, No. (%)	21 (21.4)	4 (5.1)	17 (85.0)	104.83§ (17.65-782.25)
Student at time of death, No. (%)	76 (72.4)	63 (74.1)	13 (65.0)	0.65 (0.20-2.10)

\*Some data were unknown for some subjects.

†For suicide vs homicide.

‡P<.05 by Fisher exact test.

§P<.05 by Yates corrected  $\chi^2$  test.

were 6050 homicides and suicides reported among children aged 5 to 19 years in the United States.<sup>15</sup> The 105 school-associated violent deaths in this study included 12 suicides and 63 homicides in this age group. Based on this 2-year total of 75 deaths, we estimate that only 0.62% of homicides and suicides among school-aged children were school-associated.

### Features of School-Associated Violent Deaths

The 105 confirmed cases included 85 deaths resulting from interpersonal violence (initially reported as homicides) and 20 self-inflicted deaths (suicides). Data describing the circumstances of all 105 school-associated violent fatalities are presented in Table 2. In this study, 46 (43.8%) of the deaths occurred during some school-sponsored activity, usually regular class sessions (n=23 [21.9%]). An equal number, 46 cases (43.8%), happened before or after official school activities. Only a small number of violent deaths (n=8 [7.6%]) occurred on days when there were no school-sponsored events taking place. The frequency of school-associated violent deaths was lowest during the summer months (Figure 2).

The 105 fatalities occurred at 101 dif-

ferent schools in 25 states. There were double-victim events at 2 schools, and 2 additional schools experienced more than 1 episode of fatal violence during the study period. Fatal school-associated violence affected communities of all sizes and types. A majority of the deaths occurred in urban communities (n=63 [60.0%]) or were associated with secondary schools (n=74 [70.5%]). Roughly equal numbers of fatalities occurred inside school buildings (n=31 [29.5%]), outdoors but on school property (n=37 [35.2%]), and at off-campus locations (n=37 [35.2%]). On campus, classrooms (n=10 [9.5%]) and hallways (n=9 [8.6%]) were the most common indoor locations, while parking areas (n=11 [10.5%]) were the most common outdoor location. The most common off-campus locations were streets and sidewalks (n=20 [19.0%]) and vehicles (n=13 [12.4%]).

Firearms were employed in a sizable majority of school-associated fatalities (n=81 [77.1%]). Knives were used in 18 cases (17.1%), and a rope was used in a hanging or strangulation death in 5 cases (4.8%). For most firearm-related deaths, some details were available about the type of weapon involved. Most (62/70 [89%]) of

the firearms that could be identified were handguns. Whether the firearm was an automatic weapon was determined in 59 fatalities. Roughly half of these guns (30/59 [51%]) were identified as automatic or semiautomatic weapons. The most commonly cited motives for the deaths in this study were interpersonal disputes unrelated to a romantic relationship or personal property (n=35 [33.3%]), gang-related activities (n=33 [31.4%]), random victim events in which the person killed was not a party to the initial altercation (n=19 [18.1%]), suicides (n=19 [18.1%]), and disputes over romantic relationships (n=12 [11.4%]). Five cases (4 homicides and 1 suicide) were later ruled unintentional during the adjudication process; these were retained in the study.

The victims ranged in age from 4 to 62 years, with a median age of 16 years (Table 3). Most victims (n=81 [77.1%]) were less than 20 years old at the time of death. Victims were predominantly male (n=87 [82.9%]). White non-Hispanic persons accounted for 34 deaths (32.4%), black non-Hispanic persons for 48 deaths (45.7%), and persons of Hispanic ethnicity, regardless of race, for 21 deaths (20.0%). There

Table 4.—Matched Pairs Analysis—Victims and Primary Offenders in School-Associated Violent Deaths

Variable	Victims (n=79), No.	Primary Offenders (n=79), No.	Ratio of Discordant Pairs*	Matched Odds Ratio† (95% Confidence Interval)
Age <20 y	64	64	7/6	1.17 (0.38-3.70)
Male	64	77	2/15	0.13‡ (0.01-0.57)
Race/ethnicity				
White non-Hispanic	20	14	6/0	Undefined§
Black non-Hispanic	38	40	2/5	0.40 (0.05-2.03)
Hispanic	19	18	5/5	1.00 (0.27-3.72)
History of criminal charges	13	40	2/30	0.07‡ (0.01-0.24)
Gang member	12	35	0/24	Undefined§
Weekly alcohol or drug use	9	24	1/15	0.07‡ (0.00-0.37)
Carrying a weapon	4	72	0/63	Undefined§
Student at time of death	59	50	17/7	2.43‡ (1.03-6.28)

\*No. of victims only/No. of primary offenders only.

†For victims vs primary offenders.

‡ $P < .05$  by maximum likelihood estimate of the odds ratio.§ $P < .05$  by McNemar  $\chi^2$  test.

were 2 deaths (1.9%) among Asian/Pacific Islanders. A majority (n=76 [72.4%]) of the victims were students, with a median grade level of 10. Twenty (n=93 [21.5%]) of the victims had a history of previous criminal charges. Similar proportions of victims were reported by police or school officials to have been members of organized gangs (15/100 [15.0%]), to have used alcohol or other drugs weekly or more frequently (19/76 [25.0%]), or to have been armed with a weapon at the time of death (21/98 [21.4%]).

Although they share many features, homicide and suicide can have very different social meanings. An analysis of the victims of these 2 types of violent deaths revealed some significant differences. Compared with homicide victims, suicide victims were slightly older and more likely to have been male. However, these differences were not statistically significant. Individuals who died by suicide were more likely to have been white non-Hispanic (odds ratio [OR], 5.55; 95% CI, 1.78-18.55), less likely to have been recognized as a gang member (OR undefined), and far more likely to have been armed with a weapon at the time of death (OR, 104.83; 95% CI, 17.65-782.25). Suicide victims were also more likely to have used alcohol or other drugs on a weekly basis, and this difference approached statistical significance (OR, 3.42; 95% CI, 0.94-12.57).

To compare victims and offenders, we selected a subset consisting of all homicide deaths for which we had collected information on a primary offender (n=79). The primary offender was the individual identified by police, school officials, or both as principally responsible for the death. We conducted a matched-pairs analysis (Table 4) to compare the traits of victims with those of their primary offenders. The matched-pairs analysis allows direct comparison of the victim and offender involved in the same event. The matched-pairs analysis is based on cases in which the

victim and offender differ from one another (discordant pairs) on a given trait.

In this subset, victims and their offenders were equally likely to have been less than 20 years old or Hispanic. Victims were less likely than primary offenders to have been male (OR, 0.13; 95% CI, 0.01-0.57), to have had a history of prior criminal charges (OR, 0.07; 95% CI, 0.01-0.24), to have been affiliated with a recognized gang (OR undefined), to have used alcohol or other drugs weekly (OR, 0.07; 95% CI, 0.00-0.37), or to have been armed with a weapon at the time of the fatal injury (OR undefined). Victims were more likely than their primary offenders to have been white non-Hispanic (OR undefined) or to have been a student at the time of the event (OR, 2.43; 95% CI, 1.03-6.28).

## COMMENT

### Conclusions

School-associated violent deaths account for less than 1% of the homicides and suicides among school-aged children in the United States. Although rare, these fatalities were more common than expected; the number of events identified in this study exceeded the number of school-associated deaths reported elsewhere (*People*. June 14, 1993:44).<sup>11</sup> As a sentinel health event, even a single school-associated violent death demands investigation and reassessment of preventive practices. Moreover, creating school environments that are free of violence and drugs is one of the National Education Objectives for the year 2000.<sup>18</sup> While many educators and public health officials have suggested strategies to prevent or reduce violence in the school setting,<sup>6,18-22</sup> choosing among the recommended interventions is difficult because none has been objectively demonstrated to reduce violent injury or death. A rational approach to selecting the most promising preventive interven-

tion strategies may be suggested by considering the epidemiologic features of the deaths identified in this report.

For example, the characteristics of victims and offenders identified in this study might suggest that efforts to prevent future school-associated fatalities should be targeted at males, at minority racial and ethnic groups, and at students in secondary school grades and in urban school districts. However, interventions must not be limited to these groups, since fatal violence involves all sorts of individuals and affects schools and communities of all types and sizes. Although epidemiologic data may be useful for identifying the environments and populations most at risk, education officials recommend that every school develop a safe school plan for a systematic and broad-based approach to preventing school violence through a combination of educational, environmental, and supervision strategies.<sup>19</sup>

It was also reported that several of the victims and offenders in this study had criminal histories, had been gang members, or had used alcohol or other drugs on a regular basis. No population-level data were available to characterize these activities as risk factors for school-associated violent deaths in this study. However, criminal activity, gang membership, and alcohol or other drug use are widely regarded as precursors of violent injury among young people.<sup>22,23</sup> Interventions that reduce these risk factors may have some role in reducing violent injury and death. Perhaps more important is that interpersonal disputes constituted the most frequently identified motive for school-associated violent death in this study. This suggests that improving the ability of young people to identify and peacefully resolve interpersonal conflict might be a reasonable approach to reducing the risk of fatal violence in the school setting.

Another striking epidemiologic feature of the deaths identified in this study is that most resulted from firearm-related injuries. This was true for both self-inflicted and interpersonal violent deaths. While suicide and homicide can have very different social meanings and causal pathways, the predominant role of the firearm in both types of violent death suggests a common approach to prevention. Strategies designed to reduce the availability of firearms may be particularly applicable to the school environment. These approaches include environmental changes such as installing metal detectors at school entrances, as well as regulatory initiatives such as adopting strict "zero-tolerance" policies toward disciplining students who bring firearms onto campus.

All of these findings indicate that violent deaths associated with schools are

epidemiologically similar to violent deaths among young people in general, suggesting, as others have observed,<sup>5</sup> that when high levels of violent behavior exist among young people in a community, some of that violence will be played out in and around the schools. Therefore, a rational response to the problem must consider school-associated violence in its larger community context.<sup>24</sup> In such an effort, schools can serve as a focal point for broader action. Many common approaches to reducing school-associated violence—such as security cameras, metal detectors, and random locker searches—would have little effect beyond the immediate environment of the school building. In this study, fewer than one third of school-associated violent deaths occurred inside school buildings, and nearly as many students died on the way to or from school as died during class. These findings support the recommendation that school officials work closely with other agencies in their communities to develop a comprehensive approach to preventing violence among young people.

### Study Limitations

In this review, school-associated violent deaths were defined broadly and included the deaths of individuals who might have had little to do with the school except that they were fatally injured on school property. Also included were deaths that arose from disputes in the community but that happened to occur while the victim was at school or on the way to or from the campus. In addition, the study included at least 5 deaths in which the intention was ambiguous. Four of these deaths were initially reported as homicides and 1 as a suicide, but all were ruled unintentional by the courts. It is not possible to know how many of the remaining cases would also be ruled unintentional, as most had not been completely adjudicated at the time of the investigation. On the other hand, the case definition excluded deaths that may have resulted directly from disputes initiated at school if the fatal injury did not occur on campus or while the victim was clearly in transit to or from school.

Furthermore, cases that were never reported in the press may have been overlooked altogether because both case-finding strategies relied heavily on news reports. However, since most of the recognized cases received extensive, often nationwide, coverage, it is not likely that many cases of school-associated homicide or suicide went entirely unreported. If any such cases did occur, they may differ from the cases that were deemed more newsworthy and are characterized in this report. Since neither of the case-finding strategies was complete,

the capture-recapture analysis is a useful method of estimating the number of cases that might have been missed. As noted, this analysis suggested that our case-finding efforts missed only a small number ( $n=10$  [ $<10\%$ ]) of school-associated violent deaths. However, these 2 case-finding strategies may have been positively dependent, in which case the capture-recapture correction would still underestimate the true total.<sup>25</sup>

Another important consideration is that deaths represent only a small fraction of the problem of school-associated violence. The distribution and characteristics of fatal events described in this report may not adequately reflect the distribution and characteristics of nonfatal violent behavior. However, homicide and suicide are clearly the most extreme and visible manifestations of the problem. Any successful effort to reduce school-associated violence must address the level of injury and death.

Because the data in this report are based on a small number of deaths, the risk estimates presented here may be unstable. Furthermore, denominator data were not available for the entire study period. Enrollment data from the start of the 1992-1993 academic year were the most current national education statistics available and were used to compute rate estimates. Similarly, the proportional mortality ratio was calculated on the basis of 1992 mortality data. Therefore, the risk estimates presented here should be interpreted not as actual rates but as the best possible estimates based on available data. Finally, the 2-year cross-sectional study design did not allow us to evaluate changes in risk over time.

Despite these limitations, important conclusions can be drawn from this first nationwide review of school-associated violent deaths in the United States. School-associated homicides and suicides are rare events and are epidemiologically similar to violent deaths among young people elsewhere in the community. Multiple targeted interventions to prevent violent injury and death have been proposed, but more research is needed to establish the effectiveness of the various strategies. Until then, the most rational response to preventing these tragedies is a coordinated cooperative approach that addresses youth violence in the community as well as the school environment.

The authors are grateful to the many local officials who participated in the study. We especially acknowledge the assistance of Sandra Jennings, Christopher Behrens, MD, Amy Blumenthal, and Sandra Boyland, MD, in completing the interviews and Jan Stansell, MLS, for her part in identifying cases.

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