

Adolescent health brief

Gun Suicide by Young People in California: Descriptive Epidemiology and Gun Ownership

Mona A. Wright, M.P.H.*, Garen J. Wintemute, M.D., M.P.H., and Barbara E. Claire

Violence Prevention Research Program, University of California–Davis, Davis, California

Manuscript received January 16, 2008; manuscript accepted April 22, 2008

Abstract

We studied the 336 firearm suicides occurring in California in 1997–1999 to persons under age 21. The gun used was most often owned by the victim or a family member living in the victim's household. Prevention efforts should focus on gun ownership and accessibility. © 2008 Society for Adolescent Medicine. All rights reserved.

Keywords:

Suicide; Firearm; Ownership; Adolescence

In the United States, suicide is the third leading cause of death among those aged 20 years or less. In 2005 there were 2,364 suicides in this age group, nearly half committed with firearms [1].

Youth-focused firearm laws and reduced firearm accessibility are recommended to prevent firearm suicides [2,3]. Guns used in firearm suicides are most commonly located in the victim's home or in that of a friend or relative [4].

We examined firearm suicides in California committed by persons aged 20 years or less to determine the actual ownership of the guns used. With few exceptions, purchasers of firearms must be at least 21 years of age for handguns and 18 years of age for rifles or shotguns [5]. We hypothesized that the firearm used in a young person's suicide is most likely owned by someone within the victim's household.

Methods

We searched the State of California Death Statmaster for the years 1997, 1998 (ICD9 E-code 955), and 1999 (group no. 335 ICD10 No.X72-X74) to identify all suicides by firearm among individuals aged 20 years or less. Of 58 counties within the state, 41 were represented; 17 counties had no cases.

*Address correspondence to: Mona A. Wright, M.P.H., Violence Prevention Research Program, UC Davis Medical Center, 2315 Stockton Blvd., Sacramento, CA 95817.

E-mail address: mawright@ucdavis.edu

We contacted the coroner/medical examiner (ME) and the local police/sheriff's agency to obtain a copy of their investigative reports. Data on the victim, the incident, the firearm, and the reported owner or possessor of the firearm were abstracted from these agency reports.

Guns were classified as owned by the victim, by someone else in the victim's household, or by another (this included guns owned by a family member or friend with whom the victim did not reside or an outside source). We defined ownership as that reported in the agency reports.

To verify reported ownership, we searched the California Dealer's Record of Sale (DROS) file for 1985 to 1999 (data for 1992 were not available) for all study handguns. A match on manufacturer and serial number between agency reports and DROS data was followed-up with a manual comparison of model and caliber. The DROS dataset identifies the most recent legal sale of handguns in California. These data are not available for long guns.

We also utilized the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) file of traced firearms from 1996–2003, comparing manufacturer and serial number. A successful trace identifies the initial gun purchaser regardless of when the trace was initiated.

Owner information (name and address) was compared between both DROS or ATF data and that given in the agency report. If the gun did not have a reported owner, the new data were used; however if the data differed, the reported information was not changed.

Table 1
Victim demographics, suicide incident information, and calculated annual rates

Characteristic	n	% ^a	Annual rate (per 100,000 persons)
Victim	n = 336		
Gender			
Female	50	15	3.47
Male	286	85	.65
Age, years			
12–14	25	7	.34
15–17	119	35	2.83
18–20	192	57	4.38
Race/ethnicity			
White, non-Hispanic	167	50	2.96
Hispanic	108	32	1.71
Black	30	9	2.45
Asian/Other	31	9	.58
Suicide incident			
Location ^b			
Residence of subject	220	65	
Residence of family or friend	34	10	
Other ^c	74	22	
Firearm used ^d			
Handgun	212	63	
Long gun	104	31	
Unspecified ^e	22	7	
Ownership of firearm			
Victim	31	9	
Household of victim	106	31	
Other than victim's household	50	15	
Unspecified	151	45	

^a Because of rounding, percents may not add to 100.

^b Location of suicide was missing in eight cases.

^c Locations included vehicle, street, park, school, motel, indoor shooting range, parking lot, military barrack, creek bed, store.

^d There were 338 firearms; one victim used three guns per the autopsy report.

^e There was not enough information to classify firearm type.

We used double data abstraction and entry. Differences were reviewed and reconciled by a third abstractor. We performed Fisher's exact tests to compute *p* values [6].

Results

We identified 336 firearm suicides (Table 1). We obtained both coroner/ME and police/sheriff reports for 76% (*n* = 254) of cases, 19% (*n* = 63) coroner/ME only, 4% (*n* = 12) police/sheriff only, and 2% (*n* = 7) death certificate alone. For those cases with coroner/ME and police/sheriff reports, the reported information was in agreement between the two sources.

Most victims were male, and more than half were aged 18–20 years. One-half were listed as white and nearly one-third as Hispanic.

Three-quarters of the suicides occurred at a residence. Nearly two-thirds of the firearms used were handguns, of

which nearly equal numbers were semi-automatic pistols (49%, *n* = 103) and revolvers (50%, *n* = 105). Among long guns, rifles (61%, *n* = 63) outnumbered shotguns (39%, *n* = 41).

Gun ownership was determined from agency reports for just over half the guns (*n* = 187). Twenty of these guns were also listed in DROS and 11 in ATF data. Two DROS cases provided more specific owner information and 15 (10, DROS; five, ATF) verified the agency reports. The information for 14 guns (eight, DROS; six ATF) had no connection to the reported owner; no change was made to the owner listed in the agency report.

Of the victims, 31 (9%) owned the firearm they used: 19 (61%) a rifle or shotgun, 10 (32%) a handgun, and two (6%) an unspecified gun type. One 20-year-old purchased a shotgun and killed himself that same day.

Nearly one-third of the firearms were owned by another individual in the victim's household (*n* = 106), who was a family member in 95% of these cases (*n* = 101) and a roommate or friend in 5% (*n* = 5). A total of 50 guns were owned by someone not residing with the victim. Ownership of these guns was almost evenly divided between family members (46%, *n* = 23) and other individuals (48%, *n* = 24); three guns (6%) came from nonindividual sources (i.e., shooting range and military armory).

Figure 1 displays gun ownership by victim demographics, suicide location, and gun type. Males were more likely than females to own the guns that they used to commit suicide (Figure 1A). Victims aged 18–20 years were nearly as likely to own the gun themselves as to use a gun owned by someone else (Figure 1B).

For suicides committed at the victim's residence, the firearm was most commonly owned by another member of the household (Figure 1D). When the suicide occurred at a residence other than that of the victim, the gun was most likely to be owned by someone not in the victim's household.

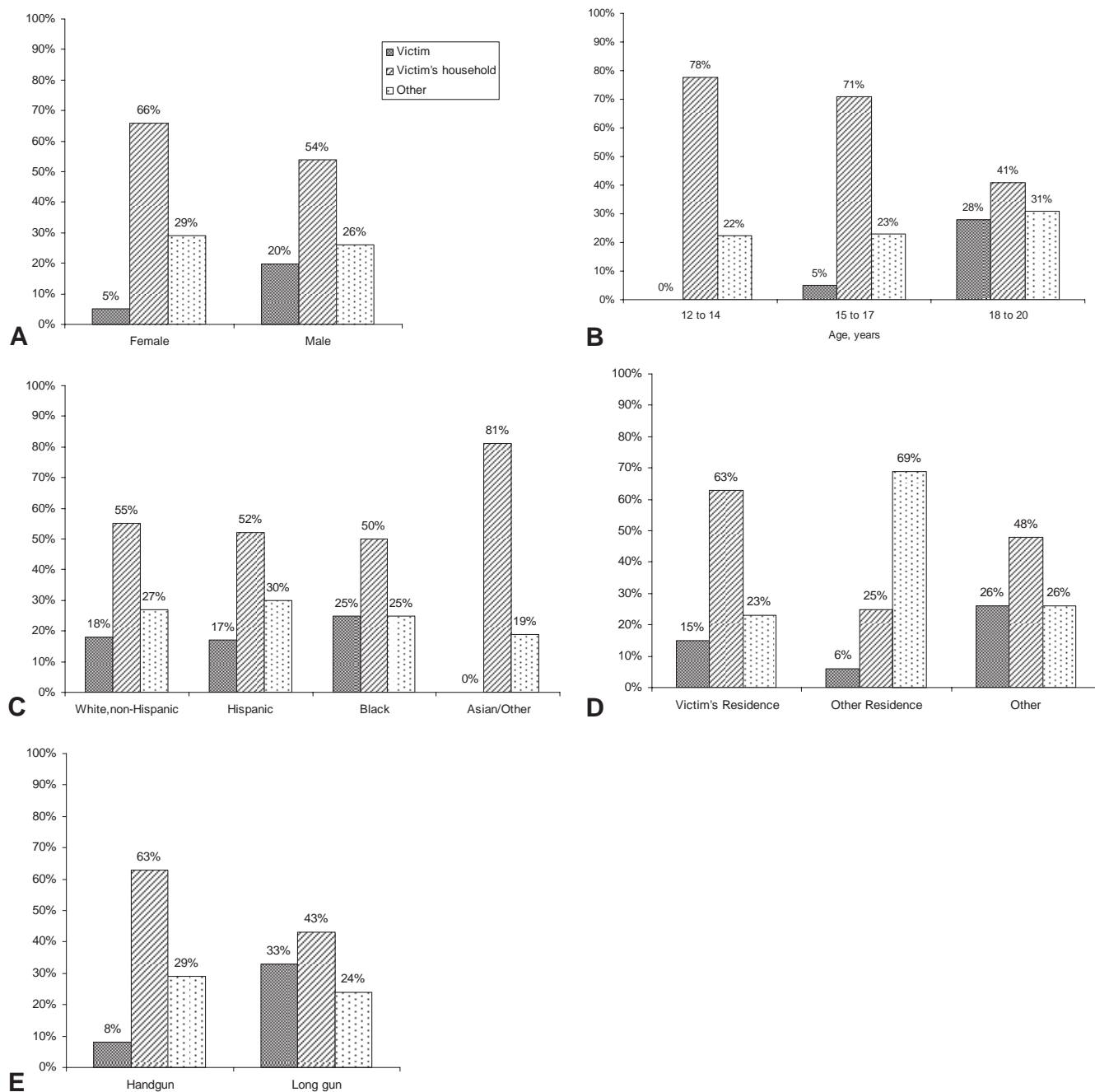
Nearly two-thirds of suicide handguns were owned by members of the victim's household (Figure 1E). Ownership of long guns was almost equally divided between the victim, others at the victim's residence, and other sources.

Discussion

In this study we found that although suicide guns were most often owned by someone in the victim's residence—primarily a family member—personal ownership was important among older youth and particularly among older males.

Guns owned by suicide victims were most commonly shotguns or rifles. However 10 victims were the reported owners of the handgun used in the suicide. Details regarding where or how victims acquired these firearms were unavailable.

Ownership patterns in relation to suicide locations were as expected. Suicides occurring in the victim's residence



Note: Percents for each category may not add to 100% due to rounding.

Fisher's exact test *p* values: gender, *p* = .0955; age, *p* = 2.108E-05; race/ethnicity, *p* = .4028; location of shooting, *p* = .0024; gun type, *p* = 2.303E-04

Figure 1. Ownership of firearm by victim demographics and suicide incident information (A, Gender; B, Age; C, Race/Ethnicity; D, Location of shooting; E, Type of firearm used in suicide) for 187 cases for which gun ownership was available.

most commonly involved a gun owned by someone at that residence. When the incident occurred at a residence other than the victim's, the gun was owned by someone beyond the victim's residence. We were not able to determine

whether those owners lived at the residences where the suicides occurred. With that caveat, our results are consistent with findings of an increased risk for suicide in homes with firearms [3,7].

When firearm ownership information was available, it came from coroner/ME and police/sheriff reports. The gun sales and tracing datasets allowed us to reinforce the validity of the reported information.

Our study was limited by incomplete information contained in agency reports regarding the gun. For example, information on ownership of the firearm was missing for 45% of the guns. Information on storage of the firearm was available in only one-third of the cases. Systematic data collection such as the National Violent Death Reporting System could aid in focusing preventive measures. This system gathers information on the gun owner (including trace information), relationship of victim to owner, and storage of the weapon [8].

Rates have dropped since 1977–1999 for this age group overall (from 2.24 per 100,000 persons to 1.27 per 100,000 persons for the years 2003–2005) and for most of the demographic subsets described in the study [1]. However suicide by firearm remains a leading cause of death for this age group.

Our results re-emphasize that firearm-related suicide preventive measures should focus on gun accessibility and ownership. Increasing the minimum age for long-gun ownership to 21 years could serve as a deterrent [9]. Personalized guns, which are operable only by their intended users, might be attractive to adult owners who want to retain rapid access to guns in their homes [10].

Acknowledgments

This work was supported by grants from The Eli & Edythe L. Broad Foundation (#06-002679), The Joyce

Foundation (#24716), The David and Lucile Packard Foundation (#2001-17381), Richard & Rhoda Goldman Fund, and The California Wellness Foundation (#200000130). The authors thank Vanessa McHenry, Michael Romero, and Donna Valadez for their expert technical assistance.

References

- [1] Centers for Disease Control and Prevention. Web-based Injury Statistics Query and Reporting System [Online]. Available at: <http://www.cdc.gov/ncipc/wisqars>. Accessed June 5, 2008.
- [2] Miller M, Azrael D, Hepburn L, et al. The association between changes in household firearm ownership and rates of suicide in the United States, 1981–2002. *Inj Prev* 2006;12:178–82.
- [3] Brent DA, Perper J, Allman C, et al. The presence and accessibility of firearms in the homes of adolescent suicides: A case-control study. *JAMA* 1991;266:2989–95.
- [4] Grossman DC, Reay DT, Baker SA. Self-inflicted and unintentional firearm injuries among children and adolescents. *Arch Pediatr Adolesc Med* 1999;153:875–8.
- [5] Bureau of Justice Statistics. Survey of state procedures related to firearm sales, 2005. St. Louis, MO: Regional Justice Information Service, November 2006. Report No. NCJ 214645.
- [6] SAS Institute. SAS System for Windows, Version 9.1. Cary, NC: SAS Institute; 2003.
- [7] Miller M, Azrael D, Hemenway D. Household firearm ownership and suicide rates in the United States. *Epidemiology* 2002;13:517–24.
- [8] Centers for Disease Control and Prevention. National Violent Death Reporting System Coding Manual, Version 2 [Online]. Available at: <http://www.cdc.gov/ncipc/pub-res/nvdrs-coding/VS2/default.htm>. Accessed April 10, 2008.
- [9] Loftin C, McDowall D, Wiersema B, et al. Effects of restrictive licensing of handguns on homicide and suicide in the District of Columbia. *N Engl J Med* 1991;325:1615–20.
- [10] Vernick JS, O'Brien M, Hepburn LM, et al. Unintentional and undetermined firearm related deaths: A preventable death analysis for three safety devices. *Inj Prev* 2003;9:307–11.