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## The Choice of Weapons in Firearm Suicides

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**Abstract:** We report on the firearms used in 235 suicides in Sacramento County, California, during 1983-85. Handguns were used in 69 per cent of firearm suicides—65 per cent for males, 88 per cent for females—and in all such deaths among women ages 35 and older. We tested the hypothesis that the choice of firearms by persons committing suicide at home would passively reflect the reported prevalence of firearms by type in households in the region. Handguns were used more frequently (rate ratio 2.00; 95% CI = 1.68, 2.39), and rifles and shotguns less frequently than expected. (*Am J Public Health* 1988; 78:824-826.)

### Introduction

Suicides accounted for 55 per cent of the 31,091 firearm deaths in the United States in 1984.\* Firearm suicides outnumbered firearm homicides in 40 of the 50 years between 1933 and 1982.<sup>1</sup>

Conversely, firearms accounted for 58 per cent of the 29,453 suicides in 1984;\* this percentage has been growing at least since 1900.<sup>2,3</sup> Firearms have supplanted poisonings in the US as the most common method of suicide among women.<sup>3</sup> Among adolescents and young adults, firearm suicide rates have increased substantially since 1970, while rates by other methods either have shown only small increases, remained stable, or declined.<sup>4,5</sup> In 1982, firearms were used in 64 per cent of male suicides, and 57 per cent of female suicides, among persons ages 15-24.<sup>6</sup>

Yet little is known about the characteristics of the firearms used in suicides. Death certificates describe suicide firearms in only 20 per cent of cases. Two special studies have yielded conflicting results: handguns were used in 83 per cent of firearm suicides committed in a four-month period in one Ohio county in the early 1970s,<sup>7</sup> but long guns (rifles or shotguns) were used in 64 per cent of firearm suicides of persons ages 12-24 in two Minnesota counties during 1980-81.<sup>8</sup> Each study assessed fewer than 40 firearm suicides, however.

\*Unpublished data, National Center for Health Statistics.

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We report on the characteristics of firearms used in 235 firearm suicides occurring in Sacramento County, California, during 1983-85. We also test the hypothesis that the observed frequency of use of handguns, rifles, and shotguns in firearm suicides committed at home passively reflects the measured prevalence of each of these firearms in a representative sample of households in the region. If so, then weapon choice may simply reflect weapon availability.

### Methods

Cases were identified using a log of autopsy and cause-of-death determinations maintained by the county coroner. There were 237 firearm suicides in 1983-85; two records could not be located. All but seven records specified the manufacturer, firearm type (handgun, rifle, or shotgun), caliber (for rifles and handguns) or gauge (for shotguns), and handgun type (revolver—carrying ammunition in a cylinder which rotates as the gun is fired; or pistol—carrying ammunition in the gun's handgrip).

Data on the prevalence of handguns, rifles, and shotguns in households in the Pacific census division (California, Oregon, Washington, Alaska, Hawaii) were provided by the National Opinion Research Center, University of Chicago (NORC) from their General Social Surveys database. Surveys conducted in 1983, 1984, and 1987 were combined; results are based on data from 545 households. Respondents were asked, "Do you happen to have in your home (IF HOUSE; or garage) any guns or revolvers?" Those answering "yes" were then asked, "Is it a pistol, shotgun, rifle, or what?"<sup>9</sup> Altogether, 324 guns were reported: 35 per cent were handguns, 40 per cent rifles, and 26 per cent shotguns.

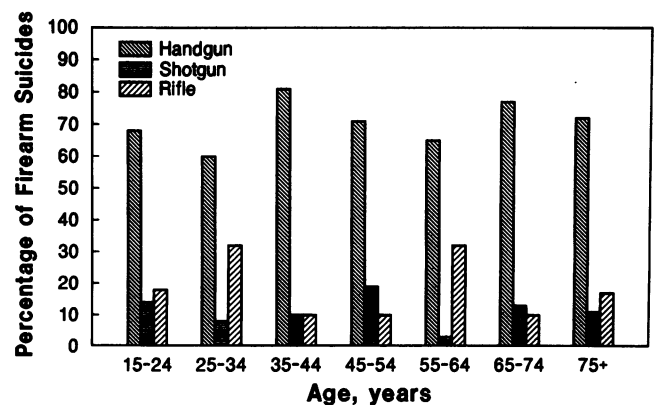


FIGURE 1—Firearms Used in 232 Suicides in Which the Firearm Was Identified, by Age of Victim, Sacramento County 1983-85

TABLE 1—Characteristics of 161 Handguns Used in Firearm Suicides, Sacramento County, 1983–85: Number of Guns by Firearm Type and Caliber

Manufacturer	Revolver				Pistol				Total
	.22	.357	.38	Other/ Unspecified	.22	.25	Other/ Unspecified	Other/ Unspecified	
Smith & Wesson	1	6	28	2	—	—	3	—	40
Colt	2	3	7	2	3	—	6	1	24
Ruger	5	8	—	2	5	—	1	—	21
Harrington & Richardson	7	—	—	2	—	—	—	—	9
Other	10	1	11	1	11	10	9	5	58
Unspecified	—	—	4	—	—	—	2	3	9
TOTAL	25	18	50	9	19	10	21	9	161

These proportions were taken as expected values for use in firearm suicides. Rate ratios were used to compare observed and expected results; 95 per cent confidence intervals were calculated by the logarithmic method.<sup>10</sup>

### Results

The 235 firearm suicides constituted 57 per cent of all suicides in Sacramento County during 1983–1985. Handguns were used in 161 (69 per cent) of these 235 deaths, 65 per cent of 201 firearm suicides among males, and 88 per cent of 34 firearm suicides among females. Rifles and shotguns were used in 20 per cent and 11 per cent of all firearm suicides, respectively—23 per cent and 11 per cent, respectively, of those among males, and 6 per cent each of those among females.

Handguns were the weapon of choice at all ages in both genders (Figure 1). Handguns were used by 10 of 14 women ages 15–34, and all 20 women ages 35 and above. There was one handgun death of a 14-year-old, and two older males used unspecified firearms.

Sixty-three percent of the handguns were revolvers, 31 per cent pistols, and 6 per cent other types or unspecified (Table 1). A .38 caliber revolver was most frequently used and was associated with 31 per cent of handgun suicides. A .22 caliber weapon was used in 27 per cent of handgun deaths. Weapons produced by one of four manufacturers were involved in 62 per cent of handgun deaths in which the manufacturer was identified.

There were 186 suicides committed with a firearm of known type in the victim's own home. Of these, 70 per cent involved handguns, 20 per cent involved rifles, and 10 per cent were committed with shotguns. Rate ratios by firearm type were: for handguns, 2.00 (95% CI = 1.68, 2.39); for rifles, 0.50 (95% CI = 0.36, 0.69); for shotguns, 0.38 (95% CI = 0.24, 0.60).

### Discussion

Handguns were the weapon of choice for firearm suicide in our study population, irrespective of gender or age. Among firearm suicides committed at home, handguns were used much more frequently than was predicted by their estimated prevalence in households in the study area.

Three assumptions underlie our use of the NORC survey data to generate expected frequencies of use for each type of firearm. They are: 1) that the prevalence of firearms by type in Sacramento County households whose occupants committed suicide by firearm at home was similar to the prevalence of firearms by type in the survey households; 2) that the firearms used in these shootings were kept in the home; and 3) that the survey responses were truthful.

Sacramento County has a largely urban population, and handguns may make up a larger percentage of home firearms in our study area than in the Pacific states as a whole. No local data are available. The second assumption can be empirically justified in part. In only three of the home suicides did the coroner's record specify that the firearm used was not kept at home, and two of these were rifles. Handguns were used in 71 per cent of the 112 cases in which the record stated explicitly, or the circumstances made it highly likely, that the firearm was kept at home. Similarly, handguns were used in 68 per cent of deaths in which the record was unclear. We discussed these cases with the Coroner's investigative staff, who felt that these handguns were in fact kept at home. Evidence to the contrary would have been sought and recorded; such evidence could have affected the classification of the death as a suicide.

What might account for a seeming preference for handguns as a means of committing suicide? Handguns may be more immediately available than other home firearms. Handguns are most often kept for protection,<sup>11</sup> and are therefore particularly prone to be stored loaded and within easy reach. As survivors of firearm suicide attempts often report acting on impulse,<sup>12</sup> such easy access is likely to be a major contributing factor. The handgun's short barrel length may also be important; it is difficult to aim a rifle or shotgun at oneself and pull the trigger. Finally, persons living at a household where a handgun is kept may for other reasons be at increased risk of suicide.

Geographic variation in the types of firearms kept at home may account for the Minnesota finding that long guns predominated in firearm suicides of young people.<sup>8</sup> The NORC database we used shows that in the census division which includes Minnesota, only 19 per cent of firearms kept at home are handguns; 81 per cent are rifles or shotguns.

Handguns have long been recognized as contributing disproportionately to firearm homicide.<sup>13,14</sup> Our data suggest they play a similar role in firearm suicide. If so, preventive strategies focused on the handgun itself may be effective in both areas simultaneously. Criminologists, mental health researchers, and others might profitably explore this possibility together.

The predominance of a small number of handgun models and manufacturers deserves further investigation. It may reflect the market share held by these products and corporations, but the necessary data are unavailable.

These conclusions are based on results from a restricted population, as with the earlier studies.<sup>7,8</sup> Pending adequate recording on death certificates, confirmation from states with centralized medical examiner systems would be helpful.

## ACKNOWLEDGMENTS

The authors thank C. R. Simmons, Sacramento County Coroner, and his staff, for their investigative work, Dr. Tom Smith and his staff at NORC for supplying data on home firearms, and Barbara Claire for help in assembling the data.

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## Suicides and Pesticides in Sri Lanka

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**Abstract:** Sri Lanka has one of the highest rates of suicide in the world (29 per 100,000 population in 1980). Suicides are especially frequent among young adults, both male and female. Compared to the US, the suicide rate for males ages 15 to 24 years in Sri Lanka is nearly four times greater; the female rate nearly 13 times greater. The most common mode of suicide is ingestion of liquid pesticides. (*Am J Public Health* 1988; 78:826-828.)

## Introduction

Malnutrition and infectious diseases continue to be major causes of death and morbidity in less industrialized countries (LICs). However, injuries and poisoning are increasingly important.<sup>1-3</sup> In Sri Lanka, injuries and poisoning are the leading cause of death from age 10 to 39. Suicides in 1981 accounted for 47 per cent and 41 per cent of such deaths among females and males, respectively. The importance of liquid pesticides as a vehicle for suicide in Sri Lanka emerged when a variety of data sources were analyzed.

Sri Lanka, formerly Ceylon, is an island republic south of the Indian subcontinent. It has a population of 15.3 million (1983 estimate) and covers 25,332 square miles. Rice is the main domestic crop. Major exports are tea, coconuts, rubber, textiles, petroleum products, and gems.<sup>4</sup> The country's official language is Sinhala; Tamil and English are also spoken. The 1983 per capita gross national product (GNP) was \$301. According to the 1981 Population Census, the literacy rate was 91 per cent for males and 82 per cent for females.<sup>5</sup>

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## Methods

Mortality data for Sri Lanka, as reported to the World Health Organization, have been published for 1980, 1977, and 1968.<sup>6</sup> The most recent computerized vital statistics data (unpublished) are from 1981. Information on causes of injury is recorded by ICDA E-codes ("E" standing for "external causes of injury"). According to the Judicial Medical Officer (JMO) of Sri Lanka's Department of Health (personal communication), death certificates are completed for an estimated 95 per cent of deaths. Some infant deaths in isolated areas of the country are the primary source of unreported deaths.

Hospital discharge data are collected by the Office of the Medical Statistician, Department of Census and Statistics, Ministry of Home Affairs. Only government hospitals (which account for approximately 30 per cent of hospital admissions) report this information; private and military hospitals do not. Only the nature of injury (fracture, burn, contusion, etc.) is listed. E-coding is not performed. The most recent data on hospital discharge diagnoses (also unpublished) is from 1984. The Judicial Medical Officer (JMO) in Sri Lanka's capital, Colombo, made available unpublished data on autopsies performed by his office.

## Results

Suicide rates for males and females in Sri Lanka (1980) appear in Table 1. The 4,401 suicides in 1981 represent 4 per cent of all deaths in Sri Lanka. However, for both males and females, suicides account for nearly 40 per cent of deaths in the age group 15-24 years. The 1980 suicide rate for males in this age group in Sri Lanka is 3.5 times the 1980 US rate of 20.2 per 100,000 population; for females, it is nearly 13 times greater than the US rate of 4.3.<sup>7</sup>

Pesticides were implicated in 53 per cent of autopsied suicide victims in the city of Colombo (JMO, 1985, unpublished data); the proportion would be higher in agricultural areas where pesticides are even more widely available.<sup>8</sup> The