juries involving motor vehicles.[10] Therefore, targeting prevention by educating children before they reach adolescence may be more efficacious but would not be sufficient to reduce mortality from motor vehicle and recreational injuries in the group currently at greatest risk. Both age groups should be targeted, and educational interventions need to be rigorously evaluated to determine optimal prevention strategies. □

Acknowledgments

This research was funded in part by the Centers for Disease Control (grant R49-CCR703640).

We wish to thank Lisa O'Neill and the staff of the Traumatic Injury Prevention Strategy program for collecting data and for their contribution to the study.

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The Choice of Weapons in Firearm Suicides in Iowa

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ABSTRACT

This study reports the types of firearms used in firearm suicides in Iowa and tests the hypothesis that the use of handguns, rifles, and shotguns in such suicides reflects the availability of these weapons. The percentage of firearm suicides involving handguns increased from 36.6% in 1980 through 1984 to 43.3% during 1990 and 1991. In both time periods, the use of handguns was more likely than would be expected from their household prevalence. Our data suggest that handguns are disproportionately represented among firearm suicides and that this overrepresentation has increased during the last decade. (*Am J Public Health.* 1993;83:1630–1632)

Introduction

In 1988, 18 181 firearm suicides accounted for 53% of the firearm deaths in the United States,[1] outnumbering firearm homicides by almost 5000. Firearms accounted for 60% of all suicides.[1] However, relatively little is known about the types of firearms used in suicides. Nationwide, the specific type of weapon used is not recorded on death certificates in two thirds of firearm suicides.[1] The three studies that have examined the choice of weapons in firearm suicides focused on urban counties.[2–4]

We report on the types of firearms used in firearm suicides in a rural state, Iowa, from 1980 through 1991. In addition, we test the hypothesis that the observed frequency of use of handguns, rifles, and shotguns in firearm suicides reflects the availability of each of these weapons.

Methods

For 1980 through 1984, data on suicides were drawn from the Iowa Master Mortality File maintained by the State Health Registry.[5] For 1990 and 1991, data were drawn from the computerized records of the Iowa state medical examiner.

Data on the prevalence of handguns, rifles, and shotguns in households were derived from the general social survey database of the National Opinion Research Center, a national probability sample of adults living in households in the United States.[6] The Northwest Central census division, which includes the states of Iowa, Minnesota, Missouri, North Dakota, South Dakota, Nebraska, and Kansas, was used in estimating Iowa data. Surveys conducted in 1980, 1982, and 1984 yielded estimates based on interviews of 500 households. Combining the surveys from 1990 and 1991 yielded estimates based on 256 households.

Respondents were asked, "Do you happen to have in your home any guns or revolvers?" Those answering "yes" were asked a follow-up question: "Is it a pistol, shotgun, rifle, or what?" Answers were

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This paper was accepted March 25, 1993.

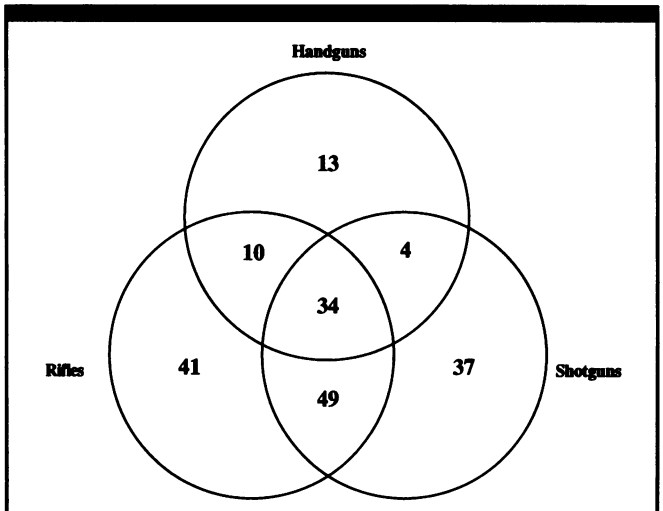

FIGURE 1—Venn diagram showing the distribution (absolute numbers) of guns in the 188 households owning guns in the Iowa Northwest Central census division, 1980 through 1984.

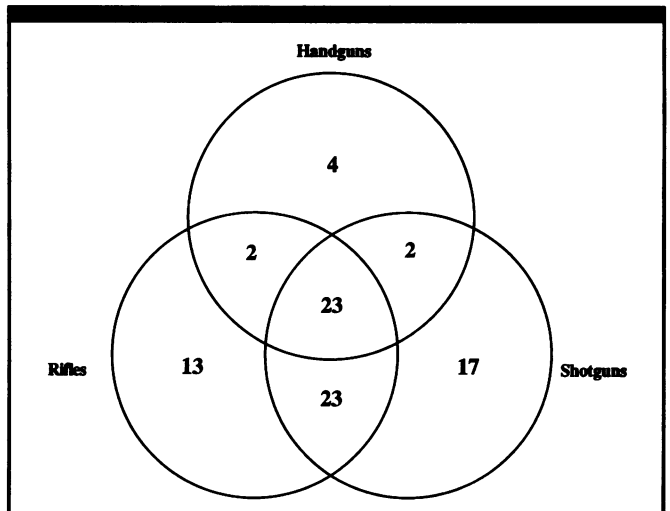

FIGURE 2—Venn diagram showing the distribution (absolute numbers) of guns in the 84 households owning guns in the Iowa Northwest Central census division, 1990 through 1991.

coded yes or no separately for pistols, shotguns, and rifles.[7]

For 1980 through 1984 and 1990 to 1991, 37.6% and 32.8% of respondents, respectively, reported having guns at home. The distribution of type of weapons is shown in Figures 1 and 2. To test the hypothesis that the choice of firearm type in suicides reflected the number of households with that type of weapon, we assumed that in households possessing more than one type of weapon, each was equally likely to be used.[3] We used these proportions to compute expected values for use in firearm suicides. We calculated ratios by dividing the percentage of suicides involving a specific weapon by the expected percentage based on the prevalence of that weapon in the regional population using the National Opinion Research Center data (suicides/weapon prevalence). We calculated 95% confidence intervals using the logarithmic method.[8]

Results

Death certificate records revealed that 877 firearm suicides were committed in Iowa during 1980 through 1984. For 92.5% of them, the type of firearm used was recorded. Handguns were used in 297 suicides (36.6%); shotguns, in 335 (41.3%); and rifles, in 179 (22.1%). The choice of weapons in firearm suicides differed by sex (Table 1). We found the following ratios of suicides/weapon prevalence: 2.20 (95% CI = 1.57, 3.05) for handguns, 1.04 (95% CI = 0.85, 1.25) for shotguns, and 0.51 (95% CI = 0.41, 0.60) for rifles.

Medical examiner's records revealed 292 firearm suicides in 1990 and 1991. For 96.9% of them, the type of firearm used was recorded. Handguns were used in 124 suicides (43.8%); shotguns, in 113 (39.9%); and rifles, in 46 (16.3%). Again, the choice of weapons differed by sex (Table 1). We found the following ratios of suicides/weapon prevalence: 2.69 (95% CI = 1.63, 4.45) for handguns, 0.90 (95% CI = 0.68, 1.19) for shotguns, and 0.41 (95% CI = 0.28, 0.60) for rifles.

A comparison of the years 1990 and 1991 and the years 1980 through 1984 revealed that the proportion of firearm suicides involving handguns increased from 36.6% to 43.8% ($P = .03$ using the normal approximation to a binomial distribution), even though there was no change in the prevalence of handguns in the region (16.7% in 1980 through 1984 and 16.3% in 1990 and 1991).

Discussion

Federal Bureau of Investigation data show that handguns account for a disproportionate share of firearm homicides (75% in 1988).[1] However, the equivalent national data have not been available to assess the contribution of handguns to firearm suicides. In fact, the largest study of the role of handguns in firearm suicides was limited to one urban county (Sacramento County, California). In that study, Wintemute et al.[3] found that, relative to their prevalence in Pacific census region households, handguns were twice as likely to be involved in firearm suicides.

Our study provides the first statewide data to address this issue. We found that handguns accounted for 2.20 to 2.69 times

TABLE 1—Firearm Suicides by Type of Weapon, State of Iowa, 1980 through 1984 vs 1990 through 1991

	Handgun		Shotgun		Rifle		Total	
	No.	%	No.	%	No.	%	No.	%
1980–1984 ($\chi^2 = 28.1$, $df = 2$, $P < .001$)								
Male	248	33.7	318	43.3	169	23.0	735	100
Female	49	64.5	17	22.4	10	13.2	76	100
Total	297	36.6	335	41.3	179	22.1	811	100
1990–1991 ($\chi^2 = 14.8$, $df = 2$, $P < .001$)								
Male	107	40.7	111	42.2	45	17.1	263	100
Female	17	85.0	2	10.0	1	5.0	20	100
Total	124	43.8	113	39.9	46	16.3	283	100

as many suicides as would be predicted by their estimated prevalence in households in our census region. This confirms the results of Wintemute et al.[3] and extends them to a rural region where handguns are much less prevalent (17% in the Northwest Central census region vs 35% in the Pacific census region). It also suggests that the role of handguns in firearm suicides may be increasing.

The use of National Opinion Research Center general social survey data to estimate the prevalence of types of firearms in households has potential weaknesses. First, we assumed that in households with multiple types of guns, any type was equally likely to be used in a suicide. We agree with Wintemute et al.[3] that this is the most reasonable assumption, but other assumptions could decrease the apparent role of handguns. One study of adolescent suicide victims[9] who had both handguns and long guns at home showed that they were slightly, but not statistically significantly, more likely to use a handgun. Second, some[10] have argued that gun owners underreport ownership in surveys. However, survey respondents rarely refuse[11] to answer questions about gun ownership, and a recent validation study[12] suggests that 97% of registered owners report ownership.

Our data suggest that handguns are disproportionally represented among firearm suicide weapons and that the overrepresentation has increased in the last decade. The availability and ease of use of handguns may make them particularly attractive in impulsive suicides. Thus, restrictions on the availability of handguns might decrease suicide rates, particularly among young people, who are most likely to act impulsively. Recent studies support this argument. Loftin et al.[13] found a 23% drop in gun-related suicides in the District of Columbia after the introduction of restrictive handgun licensing, and two recent case–control studies[9,14] showed an association between suicide and the presence of a gun in the home. Taken together, these results suggest that handgun restrictions might well lead to a reduction in suicide rates. □

Acknowledgments

This work was supported by the Centers for Disease Control (grant R49/CCR703640-03). We would like to thank Carla Van Hoesen, Kay Holst, and Thomas Bennett, MD, for help in obtaining the data on which this study is based; Nancy Sprince, MD, for editorial assistance; and Lia Hsu-Pieper, Joan Radloff, and Ros Bingham for help in the production of the manuscript.

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