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# The Epidemiology of Firearm Suicide in the United States

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**ABSTRACT**

Context. *Little attention has been given to the role of firearms in suicide. In 1998, firearms were the leading method of committing suicide for both men and women, responsible for three times the number of suicides compared to the next leading method. Understanding the epidemiology of firearm suicide will increase awareness of firearm suicide as a major public health problem.*

Results. *Rates of firearm suicide have changed little over the past two decades and have consistently exceeded rates of firearm homicide. The firearm suicide rate among men is approximately six times that of women. While firearm suicide rates are highest among the elderly, the majority (66%) of firearm suicides are among persons under 55 years of age. Firearm suicide rates among women of all ages have dropped modestly, while rates among elderly men have risen considerably. Whites have roughly twice the rate of firearm suicide as do blacks and other race/ethnicity groups. Individual-level empirical studies have consistently indicated that keeping firearms in the home is associated with an increased risk of suicide.*

Conclusions. *For suicide prevention to be effective, the availability and use of firearms in suicides must be addressed.*

**KEYWORDS** *Firearms, Guns, Suicide.*

## INTRODUCTION

In 1999, *The Surgeon General's Call to Action to Prevent Suicide* provided a blueprint for addressing suicide prevention in the United States.[1] In a letter accompanying the report, Surgeon General David Satcher wrote: "The nation must address suicide as a significant public health problem and put into place national strategies to prevent the loss of life and the suffering suicide causes." The report proposed that awareness, intervention, and methodology (AIM) be used as a framework for suicide prevention. The goal for awareness is to broaden the public's understanding of suicide and reduce the stigma associated with mental illness, suicidal behavior, and seeking help for such problems. The goal for intervention is to enhance services and programs for suicide prevention; the goal for methodology is to advance the science of suicide prevention. This article focuses on the awareness component as regards the most commonly used method of committing suicide: firearms.

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Little attention has been given to the role of firearms in suicide. A better understanding of firearm suicide will aid both persons interested in preventing suicide and persons interested in the impact of firearms on society. This article presents the epidemiology of firearm suicide in the United States from 1980 to 1998. It describes the size of the firearm suicide problem, highlights the populations at risk for committing suicide with firearms, and summarizes the risk of suicide associated with firearm availability.

## METHODS

All data were obtained from the National Center for Health Statistics Mortality Files using CDC WONDER.[2] International Classification of Diseases, 9th revision (ICD-9), codes were used to identify firearm suicides (E955.0–E955.4), all suicides (E950.0–E959), and firearm homicides (E965.0–E965.4). All rates were unadjusted and expressed as deaths per 100,000 population per year. The year 1998 was the most recent for which data were available.

## RESULTS

In 1998, 30,575 people committed suicide in the United States, a rate of 11.3 per 100,000 population. Suicide rates remained at approximately 12 per 100,000 throughout the 1980s and 1990s. Suicide was the nation's eighth leading cause of death in 1998, and it was third among persons 15–24 years of age. Among all suicides in 1998, 57% (17,424) were committed with a firearm, making firearms the leading method of committing suicide, responsible for three times the number of suicides as the next leading method (Fig. 1).

In contrast to firearm suicides, in 1998 there were 11,798 firearm homicides in the United States, 32% fewer deaths than firearm suicides. Rates of firearm suicide and firearm homicide have differed markedly over the past two decades (Fig. 2). During 1980–1998, the annual rate of firearm suicide in the United States remained relatively constant, declining from its peak in 1990 at 7.6 per 100,000 to 6.4 per 100,000 in 1998, a difference of 1,461 deaths. The pattern was quite different for firearm homicides, which since 1980 have not outnumbered firearm suicides. Only during the peak of the homicide epidemic did firearm homicide rates approach those for firearm suicide.

Rates of firearm suicide varied widely among individual states in 1998, with high rates of firearm suicide in the West and parts of the Middle South and relatively low rates for states in the Northeast and California (Fig. 3). There were exceptionally low rates in Massachusetts, Rhode Island, Connecticut, New Jersey, and Hawaii, all of which were under 3 per 100,000, as well as exceptionally high rates in Alaska and Nevada, nearly 14 per 100,000.

Men committed the majority of firearm suicides (87%) and had a rate over 6.5 times that of women (11.4 and 1.7 per 100,000, respectively) in 1998. Rates for men and women changed little during the 1980s and 1990s, peaking for women in 1981 (2.3 per 100,000) and for men in 1990 (13.4 per 100,000) (Fig. 4). Similarly, the percentage of suicides involving firearms has changed little for men (~60%) and women (<40%), consistently making firearms the leading method of committing suicide regardless of gender.

The rate of firearm suicide in 1998 increased with age, beginning at 6.7 per 100,000 among 15–24 year olds and reaching 14.6 per 100,000 among persons

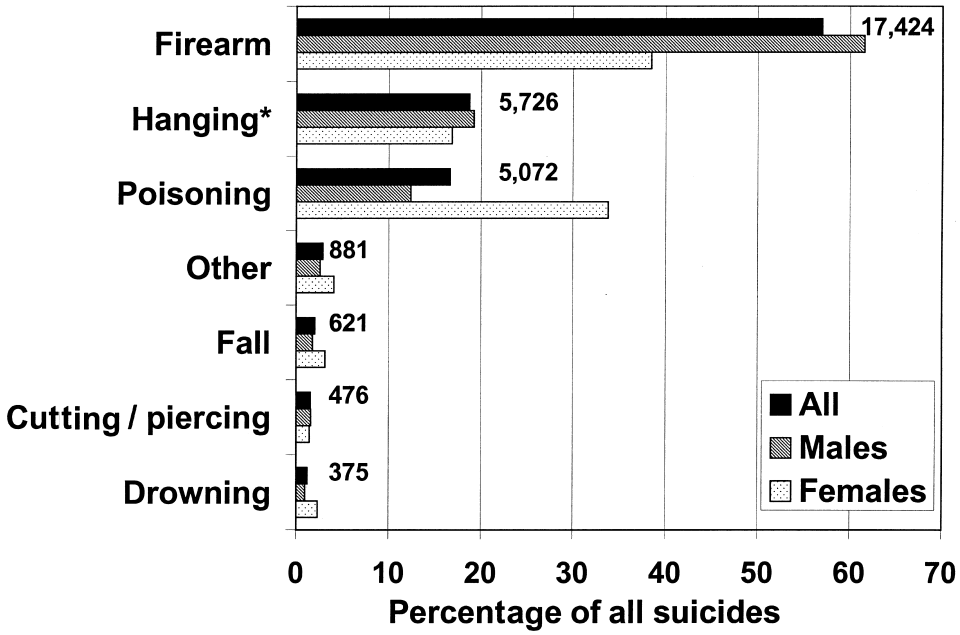


**FIGURE 1.** Methods of suicide in the United States by gender, 1998. *"Hanging" includes other methods of suffocation.

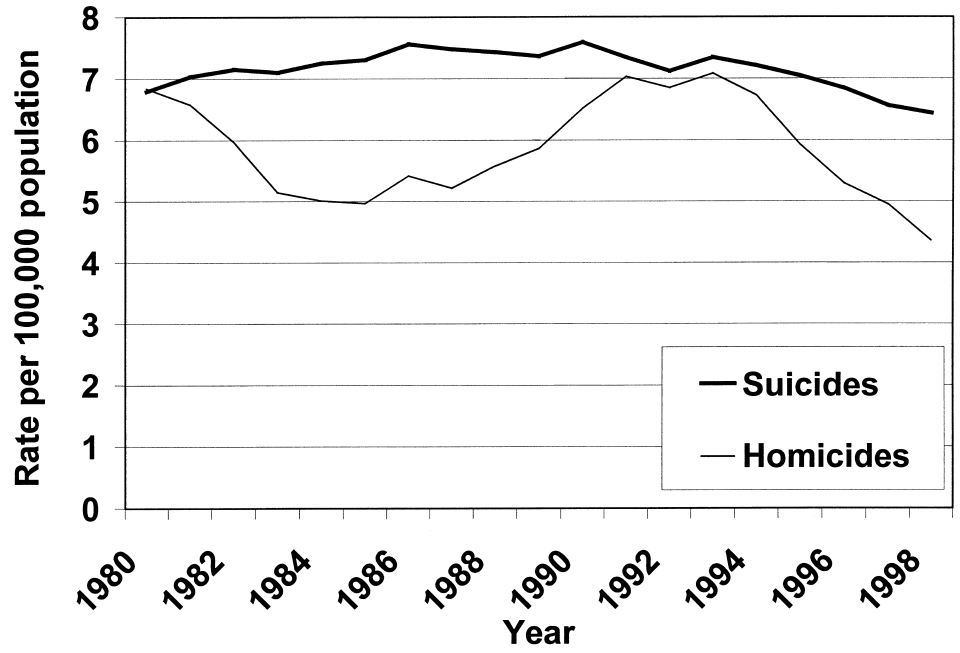


**FIGURE 2.** Firearm suicide and homicide rates in the United States, 1980–1998.

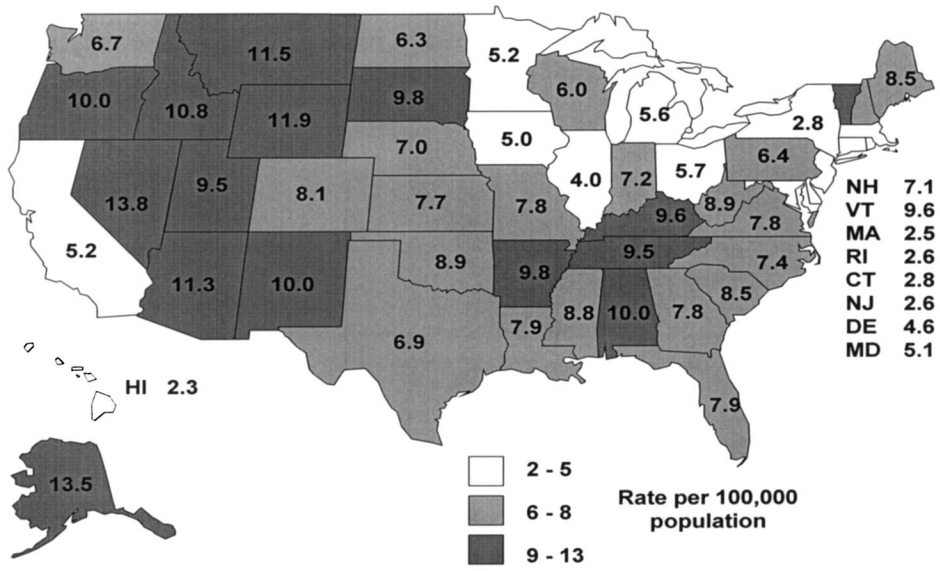


**FIGURE 3.** Firearm suicide rates in the United States by state, 1998.

75–84 years of age (Fig. 5). Two thirds of all firearm suicides, however, were among persons under 55 years of age.

Age-specific trends in firearm suicide have been considerably different between men and women throughout the 1980s and 1990s. Firearm suicide rates have generally gone down for women between the ages of 15 and 74 years (Fig. 6). The

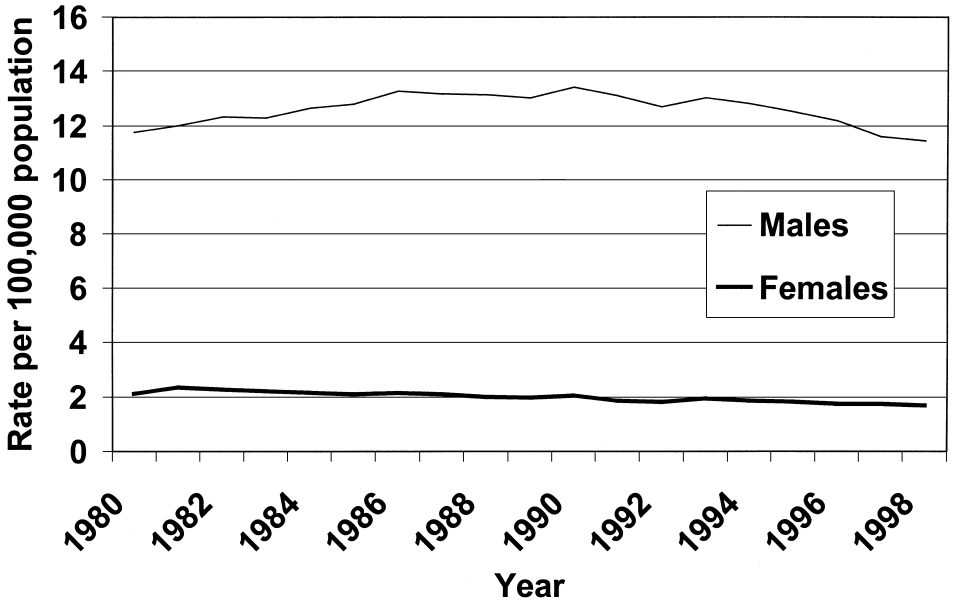


**FIGURE 4.** Firearm suicide rates in the United States by gender, 1980–1998.

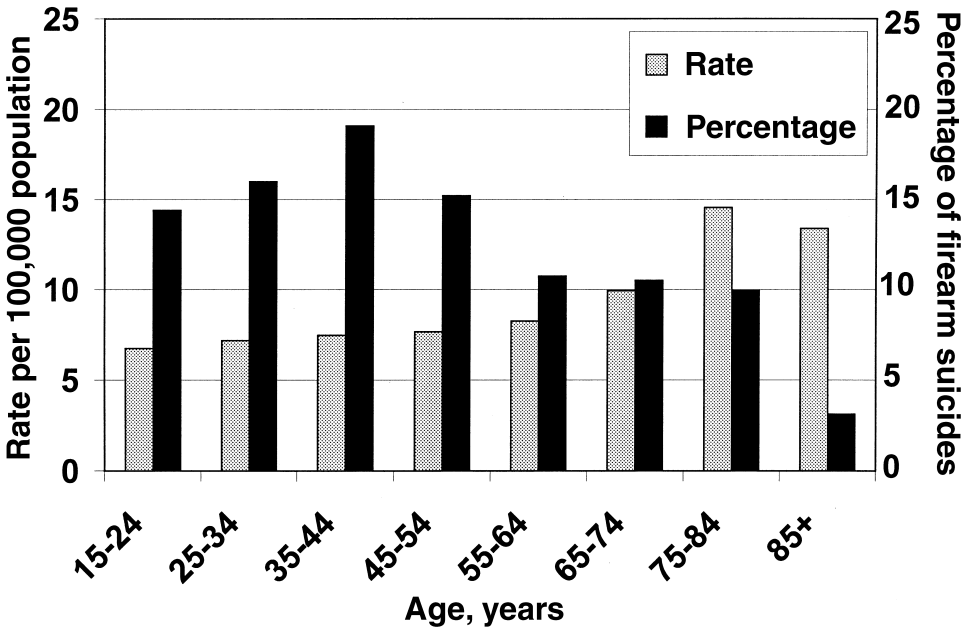


**FIGURE 5.** Rates and percentages of firearm suicide in the United States by age, 1998.

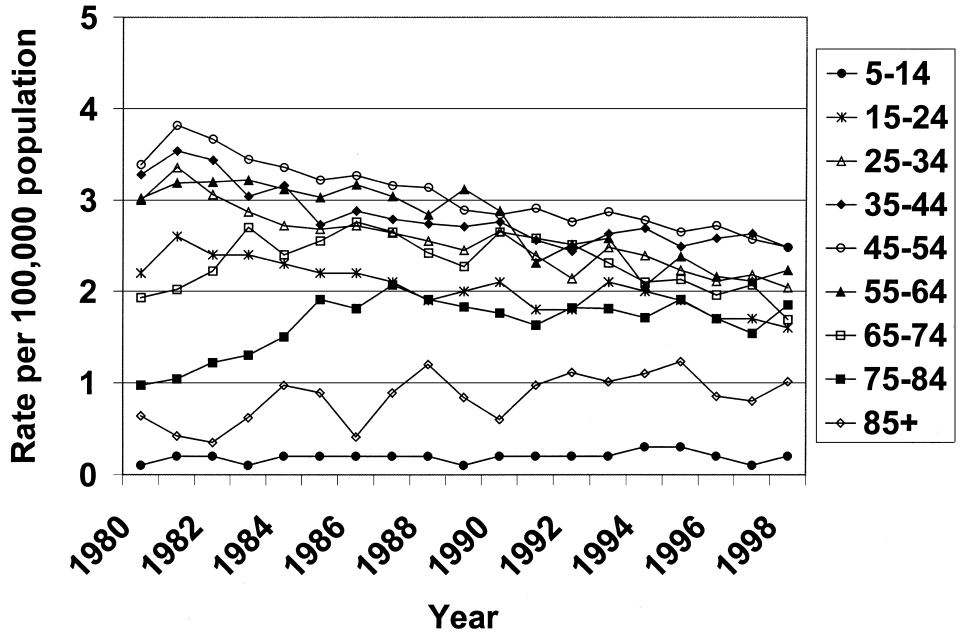


**FIGURE 6.** Firearm suicide rates in the United States among females by age, 1980–1998.

highest rate of firearm suicide among any women's age group was 3.8 per 100,000 among 45–54 year olds in 1981. By 1998, their firearm suicide rate declined to 2.5 per 100,000. While firearm suicide rates among men under 65 remained relatively stable, rates were highest and most varied among men over 65 (Fig. 7). Firearm suicide rates peaked among men 65–74 years old in 1986 (27.4 per 100,000) and declined steadily thereafter. Rates peaked later for men aged 75–84 years (43.8 per 100,000 in 1990) and returned to early 1980s levels by 1998. Rates of firearm suicide have been highest among men aged 85 years and older since 1989.

Whites made up 92% of firearm suicides in 1998, with a rate of 7.2 per 100,000, over two times that of blacks (3.2 per 100,000) and other race/ethnicity groups (2.7 per 100,000) (Fig. 8). These rates remained generally stable over the past two decades, but there were important exceptions within certain age groups. Among males 15–24 years old, whites consistently had the highest firearm suicide rates (Fig. 9). In contrast, black males aged 15–24 years had about half the firearm suicide rate of whites in 1980, followed by a rapid increase to nearly the same levels as whites from 1993 onward.

Risk for suicide is strongly associated with firearm availability. In 1999, Miller and Hemenway[3] wrote a thorough review of the literature on the relationship between firearms and suicide. The Table summarizes individual-level empirical studies reviewed by them, as well as two studies completed since their review.[4–11] Miller and Hemenway concluded that: "All case-control studies indicate that a gun in the home is significantly associated with a higher risk of suicide, especially among youth." Wintemute et al.[10] examined suicide risk for gun purchasers themselves and found that the purchase of a handgun was associated with an increase in the risk of suicide by firearm or by any method. This increase was apparent within the first week after purchase, when the firearm suicide rate was 57 times higher than ex-

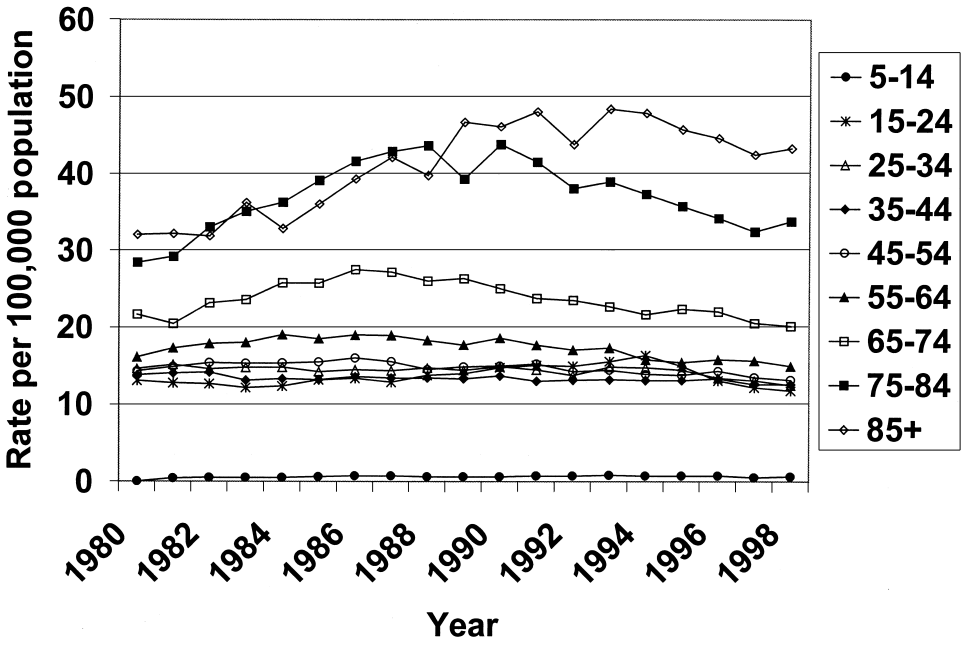


**FIGURE 7.** Firearm suicide rates in the United States among males by age, 1980–1998.

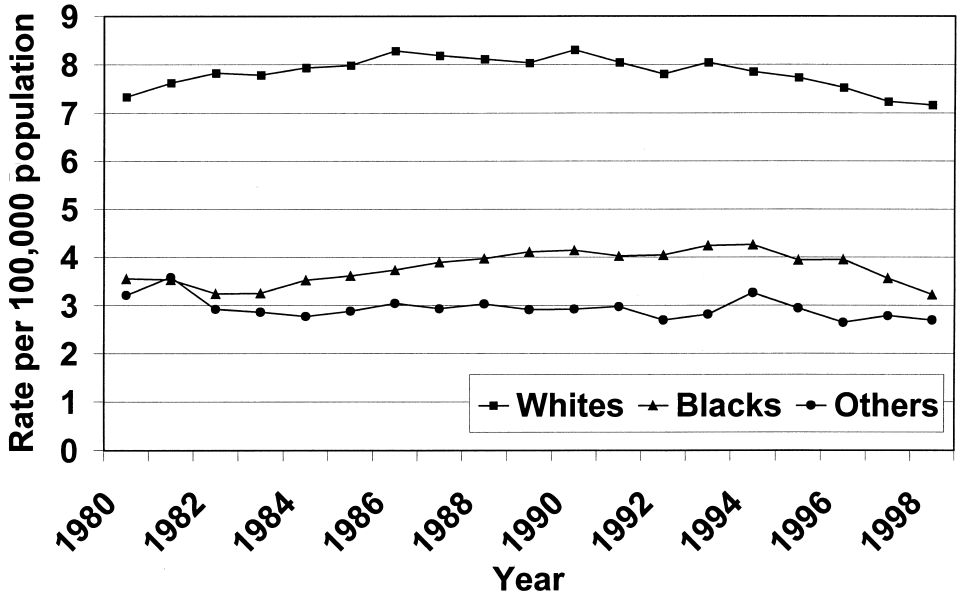


**FIGURE 8.** Firearm suicide rates in the United States by race, 1980–1998.

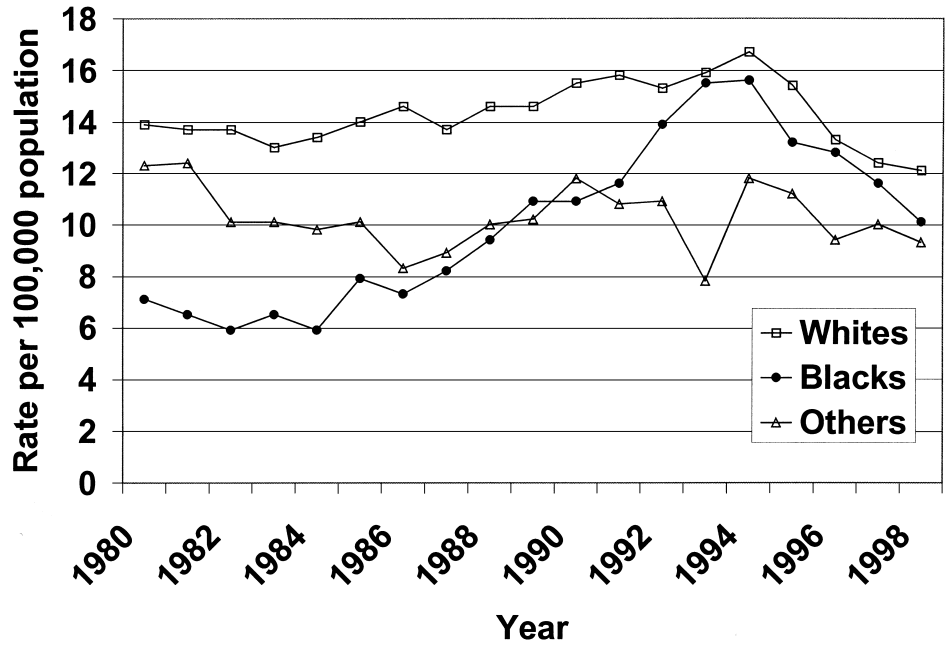


**FIGURE 9.** Firearm suicide rates in the United States among males aged 15–24 years by race, 1980–1998.

**TABLE. Risk for suicide associated with firearm availability**

| Authors | Location | Subjects | Results |
|---|---|---|---|
| Brent et al.[4] | Western Pennsylvania | Cases: 27 adolescent suicide completers<br>Controls: 56 adolescent suicidal psychiatric inpatients (38 attempted suicide) | Firearms more common in homes of completers than attempters (OR = 2.7, 95% CI = 1.1–6.4). |
| Brent et al.[5] | Western Pennsylvania | Cases: 47 adolescent suicide completers<br>Matched controls: 47 adolescent suicide attempters and 47 never-suicidal adolescents (all psychiatric inpatients) | Firearms twice as common in homes of suicide completers than attempters (OR = 2.1, 95% CI = 1.2–3.7) or never-suicidal controls (OR = 2.2, 95% CI = 1.4–3.5). |
| Brent et al.[6] | Western Pennsylvania | Cases: 67 adolescent suicide completers<br>Matched controls: 67 community adolescents | Positive association between suicide and any gun (OR = 4.4, 95% CI = 1.1–17.5) or handgun (OR = 9.4, 95% CI = 1.7–53.9) in the home. |
| Brent et al.[7] | Western Pennsylvania | Cases: 63 adolescent suicide completers with affective illness<br>Matched controls: 23 adolescents with affective illness | Handguns more common in homes of completers than controls (41% vs. 0%, $P = .0001$). |
| Kellermann et al.[8] | Shelby County, TN, and King County, WA | Cases: 438 suicide completers in the home<br>Matched controls: 438 neighborhood controls | Firearm in the home associated with increased risk of suicide (OR = 4.8, 95% CI = 2.7–8.5). |
| Cummings et al.[9] | Seattle, WA | Members of a large HMO<br>Cases: 353 suicide completers<br>Matched controls: 1756 | Suicide completers more likely than controls to have family history of handgun purchase (OR = 1.9, 95% CI = 1.4–2.5). |
| Wintemute et al.[10] | California | Cohorts: 238,292 handgun purchasers in California in 1991, general adult population in California | In first year after handgun purchase, suicide leading cause of death among purchasers (24.5% of all deaths; 51.9% among women 21–44 years old). In first week, firearm suicide rate 57 times higher than the adjusted statewide rate. |

**TABLE.** *Continued*

| Authors | Location | Subjects | Results |
|---|---|---|---|
| Grassel et al.[11] | California | Deaths in California in 1998<br>Cases: All 1546 firearm suicides<br>Controls: All 208,738 noninjury deaths | Purchase of a handgun within 3 years of death more likely for persons who died from firearm suicide than persons who died from noninjury causes (OR = 14.5, 95% CI = 12.1–17.3). |

CI, confidence interval; OR, odds ratio.

pected, and persisted—although at a lower level—over time. In a subsequent population-based case-control study of Californians who died in 1998, persons who died from firearm suicide were more likely to have purchased a handgun during 1996–1998 than were persons who died from noninjury causes (odds ratio [OR] = 14.5, 95% confidence interval [CI] = 12.1–17.3).[11]

## DISCUSSION

Firearm suicide has been a major public health problem for many years. In the past two decades, the big picture has hardly changed. For suicide prevention to be effective, the availability and use of firearms in suicides must be addressed. The Surgeon General's report acknowledged "easy access to lethal methods, especially guns" as a risk factor for suicide and listed "restricted access to highly lethal methods of suicide" as a protective measure against suicide. The report's recommended strategies to restrict access to firearms, however, were limited to "new prevention technologies, including firearm safety measures." Trigger locks, lock boxes, and personalized firearm designs, if used properly and consistently, may prevent affected firearms from being used to commit suicide by persons who are not intended to have access to them. However, firearm safety measures may not sufficiently deter persons who are resolved to commit suicide. In addition, these measures will not prevent suicides among the firearms' owners.

While firearm safety measures do not render firearms completely inaccessible, few alternatives currently offer more promise. Firearm purchase waiting periods exist in only 13 states and range from 1 to 14 days.[12] These waiting periods may be effective for the impulsive suicide attempter and still be too short to provide a sufficient "cooling off" period for persons planning to commit suicide. Federal laws and the laws of 32 states prohibit persons adjudicated mentally defective or committed to mental institutions from purchasing firearms, but there is no registry of persons who are prohibited from purchasing firearms for these reasons. Little is known whether efforts to encourage voluntary removal of household firearms have any impact on preventing suicide. For a certain percentage of suicide attempters, the inaccessibility of firearms will not prevent a completed suicide. But for others, the absence of firearms will likely provide a second chance, as alternative means of suicide are less likely to be fatal.

Preventing access to firearms is only one facet of suicide prevention. But, firearm suicides are too numerous to ignore, however complicated their solution may

be, and suicide prevention strategies do not need to be all-inclusive to be worthwhile. Multifaceted and coordinated strategies to reduce access to firearms are warranted.

## ACKNOWLEDGEMENT

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