US Suicide Rates by Age Group, 1970–2002: An Examination of Recent Trends

Robert E. McKeown, PhD, Steven P. Cuffe, MD, and Richard M. Schulz, PhD

US suicide rates have declined in recent years, reversing earlier trends. We examined suicide rates among 4 age groups from 1970 to 2002 and the factors that may have contributed to the decline. We paid particular attention to newer antidepressants because of recent concerns and controversy about a possible association with suicidal behaviors. These trends warrant more extensive analysis of suicide rates among specific subgroups, including consideration of additional variables that may influence rates differentially.

The relative contributions of depression diagnosis and treatment, postsuicide attempt care, and other contextual factors (e.g., overall economic conditions) also deserve attention. If the decline is associated with contextual factors, clarifying these associations will better inform public policy decisions and contribute to more effective interventions for preventing suicide. (*Am J Public Health.* 2006; 96:1744–1751. doi:10.2105/AJPH.2005.066951)

Suicide was among the 10 leading causes of death until 1998, when it was number 8 overall. Since that time, it has been surpassed by deaths due to Alzheimer disease and septicemia. Preliminary data for 2003 placed suicide at number 11 overall, with a provisional age-adjusted rate of 10.5 per 100 000, a 3.7% decline from the 2002 age-adjusted rate.[1] However, it remains one of the 10 leading causes of death among individuals aged 10 to 64 years, and it ranks between second and fourth among those aged 10 to 45 years.[2]

Rates varied by region in the United States, with the highest rates being in the West (14.7 suicides per 100 000 people), which was followed closely by the South (13.1 per 100 000) the Midwest (10.9 per 100 000) and the Northeast (8.6 per 100 000).[3] This regional variation remained after control for age, race/ethnicity, and gender. The proportion of suicides by firearms also varied regionally, with the South having the highest proportion (68.9%), followed by the West (58.3%), the Midwest (57.8%), and the Northeast (44.9%).[3] The presence of firearms in the home has been associated with a higher risk for suicide.[4,5] Other risk factors for suicide include previous diagnosis of major depression, bipolar disorder, substance abuse, conduct disorder, and previous suicide attempts, suicidal ideation, and homicidal ideation.[6–8] Previous suicidality, including previous attempts, is a major risk factor for completed suicide[6,7,9–12]; therefore, it is reasonable to expect that factors influencing attempts have similar effects on completions.

Considerable attention has been given to past increases in suicide rates, especially among adolescents and the elderly. During the early 1990s, a number of articles and editorials called attention to increasing rates of suicide among adolescents and older adults.[13–16] The perception has persisted that suicide rates continue to increase overall, specifically among these 2 groups.[17] With a few exceptions,[18–22] there has been less recognition of recent declines in suicide rates among these age groups, and there has been little investigation of factors that may have contributed to these declines.

Several recent studies have investigated the association between suicide rates and the increase in use of selective serotonin reuptake inhibitor (SSRI) antidepressants.[20,23–36] This research is particularly important because of the recent controversy about whether SSRIs increase suicide-related behavior among children and adolescents. The US Food and Drug Administration (FDA) has recently issued a black-box warning for all antidepressant use among children and adolescents, because data from clinical trials of antidepressants showed a 1.5- to 2-fold increase in suicide-related behavior among children who were given SSRIs compared with children who were given a placebo.[37] Understanding whether these treatments for depression contribute to increased risk or to the observed decline in rates—or to both in some complex way—is important.

We examined recent trends in US suicide death rates among 4 age groups from 1970 to 2002, paying close attention to the recent controversy about possible increased risk for suicidal behaviors associated with certain antidepressants. Recent trends call into question frequently held assumptions about increasing rates of suicide. Although the risk factor profiles differ somewhat for nonfatal attempts and completed suicides, it is obvious that every completed suicide is a successful attempt. Our intent is to stimulate further discussion and research into the seeming paradox of a significant decline in completed suicides that is coinciding with the introduction of new antidepressants and the recent warnings that these same medications increase suicidality. We also want to stimulate a broader discussion about these trends and encourage a more extensive investigation of larger social, contextual, and policy issues and the evidence associated with antidepressants that may be contributing to the decline in one of the major causes of preventable death.

METHODS

We used data on US suicide deaths as classified by the *International Classification of Diseases, Eighth, Ninth, and Tenth Revisions.*[38–40] The numbers of suicide deaths were abstracted from annual *Vital Statistics of the United States* reports for years 1970 to 1990 and from National Center for Health Statistics' annual mortality reports for years 1991 to 2002. Population denominators were taken from US Census Bureau enumerations of the resident population on April 1 for

census years 1970, 1980, 1990, and 2000.[40–43] Intercensal estimates of the US population on July 1 of each year were determined on the basis of US Census Bureau estimates reported in *Vital Statistics of the United States* or in relevant reports from the National Center for Health Statistics.

Because of very small numbers and the low, unstable rates for younger children, suicide rates are not reported for children and adolescents aged 14 years and younger. We combined all other ages into 4 age groups: 15 to 24 years, 25 to 44 years, 45 to 64 years, and 65 years and older. Rates for the 85-year-and-older age group also were examined separately for years 1989 to 2002 (data not shown). We used simple Poisson regression models to test data from 1990 to 2002 for the oldest and youngest age groups to determine whether observed trends were statistically significant in these groups.

Rates of suicide per 100 000 population are shown in Table 1 and are depicted graphically in Figure 1. Smoothing techniques were not used so that yearly fluctuations are evident.

TABLE 1—Annual Suicide Rates (per 100 000 People) by Age Group: United States, 1970–2002

	Age Group, y			
Year	15–24	25–44	45–64	≥65
1970	8.8	15.4	20.6	20.8
1971	9.4	15.3	20.1	21.3
1972	10.2	15.7	20.1	21.0
1973	10.6	15.6	19.9	20.3
1974	10.9	16.2	19.6	19.3
1975	11.8	16.8	20.1	19.1
1976	11.7	16.1	19.6	19.8
1977	13.6	17.3	19.1	20.3
1978	12.4	16.3	17.6	19.9
1979	12.7	16.2	16.8	19.1
1980	12.3	15.7	15.9	17.8
1981	12.3	16.2	16.2	17.1
1982	12.1	15.8	16.7	18.3
1983	11.9	15.3	16.4	19.2
1984	12.5	15.3	16.7	19.7
1985	12.9	14.9	16.2	20.3
1986	13.1	15.5	16.7	21.5
1987	12.9	15.2	16.2	21.7
1988	13.2	15.1	15.1	21.0
1989	13.3	14.8	15.0	20.1
1990	13.2	15.2	15.3	20.5
1991	13.1	14.9	15.5	19.7
1992	13.0	14.8	14.7	19.1
1993	13.5	15.1	14.6	18.9
1994	13.8	15.3	14.0	18.1
1995	13.3	15.3	14.1	18.1
1996	12.0	15.0	14.4	17.3
1997	11.4	14.8	14.2	16.8
1998	11.1	14.6	14.1	16.9
1999	10.1	14.0	13.5	15.9
2000	10.2	13.8	13.7	15.3
2001	9.9	13.8	14.4	15.3
2002	9.9	14.0	14.9	15.6

Secular Trends

The adolescent and young adult age group (aged 15–24 years) showed a continuously increasing trend in rates until 1994, at which point rates began declining steadily to levels not seen since the early 1970s. It is too soon to tell if the slight increase from 1999 to 2000 represents a statistical fluctuation, a stabilization of rates, or a reversal in the declining trend, although data for 2001 show the suicide rate for this age group declined again (to 9.9 per 100 000),[44] and final data for 2002 show that it remained at 9.9 per 100 000.[45] Rates among the oldest group (those aged 65 years and older), fluctuated somewhat during the 1970s, reached a low point in 1981, increased rather sharply until 1987, declined steadily through 2001, and then increased in 2002. Rates among the 45-to-64-year age group declined rather sharply during the late 1970s and more gradually thereafter, but rates increased each year from 1999 through 2002. Rates among the 25-to-44-year age group, by contrast, showed a slight bump during the late 1970s, somewhat stable rates through the 1980s and early 1990s, and a slight decrease after 1995 to fairly stable rates for 1999 to 2002.

In the oldest and youngest groups from 1990 to 2002, Poisson regression models, with standard errors adjusted to account for overdispersion, showed that the trend for decreasing rates was statistically significant for both age groups ($P<.0001$). The beginning of this period was intermediate between the years of trend reversal for both groups. Rate ratios per year were virtually identical among the 2 groups (0.974; 95% confidence interval [CI]=0.966, 0.981 for the youngest group; and 0.975; 95% CI=0.972, 0.978 for the oldest group). This can be interpreted as an approximate 2.5% reduction in suicide rates on average for each year. The later initiation of the trend in declining rates among the youngest group and the slight increase in the 2002 rates among the oldest group somewhat attenuate the overall estimate of the rate of decline in this model.

Age Effect

Although the data were a series of cross-sectional points, there was an evident age effect, with suicide rates increasing as age increased. However, suicide rates in the 45-to-64-year age group began declining earlier compared with the age groups immediately before and after: at the beginning of the period, rates among the 45-to-64-year age group were closer to the rates among those aged 65 years and older, but by 1980, rates among the 45-to-64-year age group were closely tracking rates among the 25-to-44-year age group. The latter pattern corresponds with an age-related increase in rates up to adulthood, followed by a fairly level period of rates until about age 65 years, and then another age-related increase in occurrence. The data for those aged 85 years and older suggest that, after age 65 years, increases in rates may continue (data not shown).

Cohort Effect

The data did not lend themselves to a precise analysis of cohort effects owing to the broad age categories and the relatively short time span. However, the decline in rates among the 45-to-64-year age group during the late 1970s that preceded the decline in rates among those aged 65 years and older that began during the late 1980s could be explained by a cohort effect, because the group that was aged 45 to 64 years during the 1970s aged into the 65-year-and-older age group during the 1980s. Similarly, the more recent decline in rates among the 15-to-24-year age group could reflect the impact of a new cohort of younger people who are at lower risk for suicide.

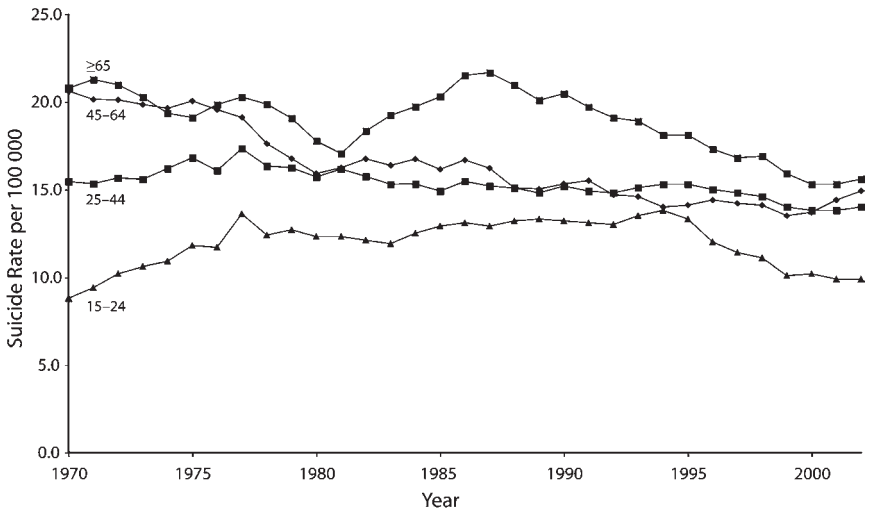

FIGURE 1—US Suicide Rates per 100 000 people from 1970 to 2002.

Period Effect

The observed rates among the youngest and oldest age groups reflected period effects, i.e., changes in rates or trends that affected several age groups at about the same time. Although there was a short time lag between points of trend reversal, with the change coming earlier for the oldest age group, the period of time we examined is relatively brief. It is this period effect that is of central importance. Conversely, it is too soon to know if the slight increase across all but the youngest age group from 2001 to 2002 is an aberration or a reversal of the trend. If it is the latter, it will be important to investigate factors that may have contributed to the reversal, including economic adversity, military engagements, and the psychological impact of natural disasters or terrorism.

DISCUSSION

Our data show an overall decline in suicide rates dating back more than 15 years among the oldest age group and more than 10 years among the youngest group. Both age groups had increasing rates before the most recent declines,[13,14] although the underlying factors influencing those rising trends were not well understood.[15,16] If there were external factors at work—contextual or societal factors and personal or psychological factors—then similar types of factors or changes could be operating to reverse the recent trend of rising rates. Notably, rates have increased and now decreased among all age groups despite different risk factors for each group. Poisson regression analysis of the oldest and youngest groups showed that the recent declines were not merely random fluctuations but statistically significant decreases in rates.

There are indications that the trends we observed were not uniform across age, gender, race/ethnicity, or rural/urban settings.[18,46–49] For example, most of the increase in suicide rates among adolescents occurred between 1950 and 1980.[46] Little of that increase is attributable to changing suicide rates among females, which have been more stable.[18] Brent et al.[50] found that the increase in adolescent male suicide completion during this period coincided with a significant increase in alcohol use.

The highest rates of suicide in the United States occur among older white men.[46] Maris and Nisbet[51] found that rates among White females and Black males and females peak during midlife. The US population has an increasing proportion of persons aged 85 years and older. If their rates were lower, that could account for declining rates among the 65-year-and-older age group, but the data for those aged 85 years and older show that their rates are higher compared with the 65-year-and-older age group as a whole. However, the decline in rates among the 85-year-and-older age group could be driving the decline in rates among the 65-year-and-older age group. More extensive analysis of these age effects is needed.

Maris et al.[47] noted that the gender ratio has changed over time, an indication that temporal trends in rates are not parallel by gender. The decline in rates among females appears to have preceded the more recent decline in rates among males, and the previous sharp increase in rates among males contributed to an increasing gender ratio.[47] Mohler and Earls[52] noted the importance of considering misclassification in studies of suicide rates; however, their own examination of trends in adolescent rates did not result in substantially altering trends, and their data extended only until 1994.

Since the Epidemiologic Catchment Area study (conducted in the 1980s and published in 1991), there has been discussion about a possible cohort effect on mental disorders, with younger cohorts having higher rates of disorder.[48,49] If such an effect were operating and had an impact on suicide rates, it would be expected that rates would increase over time and from one age group to the next. That would not explain the more recent decline in rates that we observed. On the other hand, if the cohort effect were reversing, there might be increases and then decreases. Our data did not lend themselves to a precise analysis for answering this question. A thorough age-effect, period-effect, and cohort-effect analysis that was controlled for gender, race/ethnicity, and region would provide a much clearer picture of recent trends.

Events or contextual factors that have an impact on suicide could have been operating to reverse the upward trend among older adults during the late 1980s and among adolescents and the youngest adults during the latter 1990s. Why these unknown factors did not have a similar impact on the middle 2 groups is puzzling. Our goal is not to provide definitive explanations for these trends. Instead, we intend to question frequently held—and now outdated—assumptions about increasing rates and suggest some potential avenues for future research, with a particular focus on the recent controversy about certain antidepressants.

Possible Reasons for the Observed Trends

One large-scale factor that could be influencing suicide rates is the economy. Overall, the US economy thrived during the 1990s, with correspondingly lower unemployment rates. The stock market created wealth and security for many older persons who depend on investments during retirement, and younger persons had a lower risk for unemployment. If economic prosperity of the 1990s is a major factor, the recent economic downturn could be expected to result in increased rates. While data for 2001 did reflect an increase in the overall rate, only one group (those aged 45 to 64 years) showed an increase.[53] In 2002 there was an increase across all but the youngest age group,[45] although no inferences should be made on the basis of 1 or 2 years of data.

A second possible contributor is the increase in healthy life expectancy. As individuals live longer, maintaining both close relationships and relatively better health, feelings of loneliness and depression and being a burden to the family are delayed, and the risk for suicide may be reduced. This explanation applies primarily to the oldest age groups and would not be applicable to the youngest age group.

Substance abuse, another risk factor for suicide, showed a rather marked decline from levels observed during the late 1970s to the early 1990s across all categories of drugs and across all age groups younger than 35 years. However, during the 1990s, patterns of substance abuse and suicide were less clear, and there were some increases during the latter half of the decade.[54] The 2002 Monitoring the Future report[55] stated that illicit drug use among adolescents had been stable or declining in recent years. However, the reversal of suicide rates appears to predate the onset of the decline in illicit drug use.

In an examination of homicide rates from 1960 to 1999, Harris et al.[56] found a noticeable decline in homicide despite a dramatic increase in aggravated assault. They attributed improvements in medical support services and developments in trauma care, particularly the increasing sophistication of emergency departments and available life-saving techniques in trauma care after the Vietnam war era, to the drop in lethality. As emergency departments became more skilled at rescue efforts, the homicide rate decreased. These same advances might be expected to have an impact on suicide rates as well, but the trends Harris et al.[56] depicted did not appear to coincide with the patterns we observed. Parallel analysis of trends in attempted and completed suicide rates and treatment for self-inflicted injuries by emergency departments could shed light on the role trauma centers have played.

Evidence for Newer Antidepressants

Olfson et al.[20] found an inverse association between increasing use of SSRIs and decreasing adolescent suicide rates in an analysis of prescription drug data obtained from the nation's largest pharmacy benefit manager, AdvancePCS, in Irving, Tex. The largest association Olfson et al. found was among adolescent males. Similarly, Hall[34] found changes in Australian suicide rates were significantly associated with exposure to antidepressants. Similar results were observed in the United States by Grunebaum et al. between 1985 and 1999[33] and in Scandinavia by Isacsson between 1978 and 1996.[35] Grunebaum et al.[33] also investigated alcohol consumption and unemployment rates, but found the model with SSRI prescriptions to be the best fitting model. Another Swedish study found that the proportion of suicides associated with depression declined significantly after general practitioners participated in a training program about depression, which resulted in increased diagnosis and prescription of antidepressants.[36]

The change in suicide rates among older adults is associated with the introduction of SSRIs in January 1988. Dewa et al.[57] reported SSRI use was growing considerably after the introduction of fluoxetine, and by 1999, 3 of the 4 available SSRIs were among the top 10 most frequently used drugs in the United States. Better treatments for depression and increased compliance with medications owing to decreased side effects may account for the decreasing suicide rate during this period. However, similar declines would be expected during this period among the 25-to-44-year-old and 45-to-64-year-old age groups, but the rate changes for these 2 groups did not track the introduction of SSRIs as clearly as did the rate changes for the oldest and youngest age groups.

Olfson et al.[30] used national medical expenditure survey data from 1987 and 1997 to assess changes in outpatient treatment for depression. They reported markedly higher outpatient treatment for depression in 1997 (2.33 per 100 persons) compared with 1987 (0.73 per 100 persons; $P<.001$). The proportion of those treated who were prescribed antidepressants also increased from 37.3% to 74.5% ($P<.001$) between 1987 and 1997. Although there were declines in both psychotherapy and number of visits for treatment during this period, there was a substantial increase in the proportion of patients treated by physicians (68.9% to 87.3%, $P<.001$). In another study, Olfson et al.[58] found SSRI use among adolescents aged 15 to 18 years increased from 0.5% to 2.1% between 1987 and 1996.

In response to Olfson et al.'s findings,[30] Lester[29] cited a Swedish study that had found that the increase in antidepressant prescriptions after 1991 coincided with a decrease in the Swedish suicide rate. Lester also noted the decline in the overall US suicide rate between 1987 and 1997. Olfson et al.[31] responded that antidepressants may be an explanation for the trend in the United States, but they cited a study by Barbui et al.[23] in Italy that showed no association between increases in antidepressant use and that country's suicide rate from 1988 to 1996. Olfson et al. then investigated US data[20] and found an inverse association between regional changes in SSRI prescriptions and suicide rates among adolescents.

Sclar et al.[32] examined antidepressant prescribing trends between 1990 and 1995 with data from the National Ambulatory Medical Care Survey. They found the number of office-based visits during which an antidepressant was prescribed increased 73.4% between 1990 (28 664 796 visits) and 1995 (16 534 268 visits). Likewise, the rate of SSRI use increased 74.1% during this period. In recent years, the largest increase in antidepressant prescriptions has been among children, adolescents, and young adults.[18,59]

While use of SSRI medications was increasing dramatically, the use of older tricyclic

antidepressants (TCA) was concomitantly decreasing. TCAs are highly lethal medications when used in a suicide attempt by overdose. People who have greater access to TCAs are better able to commit suicide by fatal overdose using this medication. As the rate of TCA use declined, researchers expected to see an increasing number of unsuccessful suicide attempts using SSRIs, which would effectively lower the rate of completed suicides. This is a theoretical possibility that bears further investigation. Bolstering this hypothesis, Shah et al.[57] studied data from a national database in England and Wales on deaths owing to overdose and poisoning. They found SSRIs and other new antidepressants were associated with less than 10% of the occurrence of suicide deaths caused by overdose compared with older medications, TCAs, and monoamine oxidase inhibitors.

Controversy About SSRIs

In juxtaposition to these hypotheses about the impact of SSRIs on treatment for depression and the risk for suicide is the contradictory hypothesis of an increased risk for violence and suicide as a result of SSRI use. This hypothesis began with a report by Teicher et al.[61] about a series of 6 patients treated with fluoxetine who developed violent and suicidal preoccupations after treatment. This caused great concern during the early and mid-1990s, and there was a flurry of research that analyzed the suicide rate among patients treated with SSRIs.

In 1995, Hegarty[26] criticized much of the information that associated SSRI use with increased risk for suicide. He reviewed the literature and concluded that there was an increased risk for suicide among depressed patients during early treatment, but the risk did not appear to vary by type of antidepressant used. In a recent analysis of FDA data from clinical trials that included 48 277 depressed patients taking 1 or more antidepressants, Khan et al.[62] found no statistical difference in suicide rate among those who used SSRIs, other antidepressants, and placebos. These data included 77 patients who committed suicides.

Shortly after Khan et al.'s study was published, regulatory agencies in both Great Britain and the United States issued statements recommending that 1 SSRI, paroxetine, not be prescribed to patients aged younger than 18 years who were being treated for depression.[63,64] These recommendations were made on the basis of an assessment of benefits (little evidence of effectiveness in treating childhood depression) and risks (observation of higher proportions of suicidal ideation and behaviors, but not actual suicides, among patients assigned to paroxetine compared with those assigned to a placebo).[65]

Against this backdrop came data about a possible increase in suicide risk among adolescents who use SSRIs. In June 2003, the Medicines and Healthcare Products Regulatory Agency (MHRA)—the FDA counterpart in the United Kingdom—warned physicians about the possible increased risk for suicidal ideation or suicide among children and adolescents who use paroxetine. In December 2003, after further analysis of data on all SSRIs, the MHRA found that—with the exception of fluoxetine—SSRIs had not been proven effective for youths with depression and may increase the risk for suicidal ideation or attempts. The FDA, partly in response to the actions of the MHRA, issued a warning about paroxetine and held hearings on the issue of SSRIs and suicide in February 2004.

As a result of those hearings, the FDA issued a public health advisory and asked the makers of all newer antidepressants—including fluoxetine—to add a warning statement to their labeling that recommends adults and children treated with these agents be closely observed for worsening depression or the emergence of suicidality. The FDA also established the Suicidality Classification Project to improve the definition of suicidal behaviors and to reanalyze all available data from the studies. The need for improved classification of suicidal behavior stems from the inclusion of behaviors that were not directly associated with suicidal behavior in the MHRA analysis of suicide risk.

There are several theories about the possible causes of the increased suicidality when taking SSRIs, if it does indeed exist. First, a long-held belief among psychiatrists is that as a patient's depression improves, that person becomes more energetic, less apathetic, and better able to make decisions. If a patient remains suicidal as depression decreases, the risk for suicide increases. While this theory has some appeal, there has never been any evidence to support or refute it. A second hypothesis concerns possible side effects of antidepressants—activation, agitation, impulsivity, disinhibition, and akathisia[66,67]—and whether they increase the risk for considering suicide.

Jick et al.[27] studied suicidal behavior after initiation of antidepressant use and found an increased risk for suicidal ideation and behavior during the first month of treatment—particularly the first 9 days—compared with later in the course of treatment. Nothing can be inferred about whether the medications caused this increased risk during early treatment because there was no placebo control group. In fact, Jick et al. speculated that patients who start antidepressant use begin this treatment when their depression is at its worst and they are most at risk for suicidal behavior. There were no significant differences in the rate of suicidal behavior among the 4 drugs they studied: 2 TCAs (amytriptyline and dothiepin) and 2 SSRIs (fluoxetine and paroxetine). There also was no difference among those aged 10 to 19 years compared with adults; however, the numbers in the study were small for the 10-to-19-year-old age group. While the study provided some indication of increased risk for suicidal behavior during early treatment, it did not compare active drugs with placebos; however, the study does provide evidence against the hypothesis that withdrawal from antidepressants causes suicidal behavior.

Another point of interest is that, included in the database used by Jick et al.—the UK General Practice Research Database for 1993 to 1999—were 15 youths aged 10 to 19 years who committed suicide. None of these youths had received a prescription for an antidepressant. This is similar to results reported by Gray et al.[24] in the Utah Youth Suicide Study. Of 151 youth suicides, 137 blood samples were available for toxicology, but only 24 (18%) tested positive for any medications, and only 4 (3%) had levels of psychotropic medication that were detectable (2 of which were SSRIs) (Douglas Gray, MD, written communication, October 2004). In interviews with families of 49 suicide victims, 14 reported that the deceased was using prescription psychotropic medication; however,

toxicology reports were negative for all 14 youths.[25] Additionally, a review of youth suicides in New York City found that 62 of the 66 deceased had no detectable antidepressants in their blood at autopsy; 2 had a TCA (imipramine), and 2 had an SSRI (fluoxetine) in their blood.[28]

Finally, sometimes a patient who is depressed can switch to mania after beginning antidepressant treatment. This conversion can increase the risk for suicide. Peripubertal children (aged 10 to 14 years) have been shown to have a higher risk for antidepressant-induced manic conversion compared with individuals aged 15 to 29 years.[68] Further research is needed to clarify the role of antidepressants in reducing or increasing risk for suicide. It is possible that suicide risk could increase as a result of medication side effects or as a result of improving depression with continued suicidal symptoms during the first 10 to 30 days of treatment, as indicated in the Jick et al. study.[27] SSRIs also may reduce suicide overall during the course of treatment. Of note is the fact that antidepressants do not begin working for 2 to 4 weeks. Further research needs to clearly identify the time course of any suicidal ideation or behavior that occurs during SSRI use.

The results of the reanalysis of SSRI data have recently been posted on the FDA Web site.[69] Although no individual drug trial has shown a statistically significant increase in suicide attempts or suicidal ideation, there was a consistent 1.5- to 2-fold increase in the risk ratio among all the antidepressants examined except fluoxetine, which showed a protective effect. However, fluoxetine had an odds ratio of 1.77 (95% CI=0.76, 4.15) for suicide-related events (worsening suicidal ideation or suicide attempt) in the Treatment for Adolescents with Depression Study,[70] which is roughly the same as the odds ratio for other SSRIs in the FDA data. The odds ratio of 1.77 applies to anyone in the study who used fluoxetine, including adolescents who used the drug only and those who used the drug plus cognitive behavioral therapy (CBT). The CBT may mitigate the effects, if any, of fluoxitine (CBT plus fluoxetine OR=1.6, 95% CI=0.44, 5.86; fluoxetine alone OR=2.4, 95% CI=0.73, 8.14; CBT alone OR=1.3, 95% CI=0.33, 4.87; all with placebo is the referent group). Please note that all estimates are imprecise and have wide confidence intervals.

Even when data from studies of the same drug were pooled and data on suicidal ideation were combined with suicidal behavior, only venlafaxine had a statistically significant increase from the placebo (although paroxetine was very close to significant). The evidence of a signal was rather weak, but the implications are significant. These data prompted the FDA advisory panel—after a split vote (15-8)—to recommend a black-box warning for all antidepressants. Although parents and adolescents do need to be informed about this possible—albeit small—risk, the impact of a new black-box warning may have unintended consequences. Parents and primary care physicians may react to this news by refusing to prescribe antidepressants to children and adolescents who need them. If the reduction in the US suicide rate is at least partially the result of dramatic increases in the rate of SSRI use, there may then be a reversal of the trend of decreasing suicide rates among adolescents. This remains a controversial issue demanding further study. Additional research is needed to clarify the possible association of certain SSRIs with increased risk for suicidal behaviors among younger patients. It is critical to quickly fund further research for answering these questions.

CONCLUSION

A more careful analysis of complete death data for each year should be undertaken to examine age effects, period effects, and cohort effects in the trends and differences by gender, race/ethnicity, and region. Finer age stratification could reveal more subtle patterns, although precision may suffer because of small numbers of events in narrow age categories. Olfson et al.[30] noted that epidemiological research that investigates changes in antidepressant use associated with suicide rates in small geographical areas might help to illuminate this intriguing hypothesis. This approach also may allow study of the impact of local or state public policy decisions; for example, the impact of restricted Medicaid or managed care formularies, which have been widely instituted as a cost containment measure.

The implications of decreasing rather than increasing suicide rates are significant. If the conventional wisdom that suicide rates are increasing held, attention would be redirected from current strategies that are considered to be failing. However, our evidence indicates that rates have been declining significantly, especially if seen through a 10-year, or even a 5-year, window. Because of this more recent trend, attention should be focused on identifying the component(s) in the current approach to depression diagnosis and treatment, suicide prevention, and postsuicide attempt–care most responsible for this decline. Furthermore, if the decline is associated with some of the contextual factors we have described, especially those affected by public policy, clarifying the association between the decline and related factors will better inform health care discussion and public policy debate.

Our intent is to stimulate a broader discussion about trends in suicide rates and to encourage a more extensive investigation of the larger social, contextual, policy, and treatment trends that may be contributing to the decline in one of the major causes of preventable death. If we can understand what has contributed to the recent declines, we will be better able to develop and disseminate effective interventions for preventing suicide. ■

About the Authors

Robert E. McKeown is with the Department of Epidemiology and Biostatistics, Arnold School of Public Health, University of South Carolina, Columbia. Steven P. Cuffe is with the Department of Neuropsychiatry and Behavioral Science, School of Medicine, University of South Carolina, and the William S. Hall Psychiatric Institute, South Carolina Department of Mental Health, Columbia. Richard M. Schulz is with the College of Pharmacy, University of South Carolina, Columbia.

Requests for reprints should be sent to Robert E. McKeown, PhD, Arnold School of Public Health, University of South Carolina, Columbia, SC 29208 (e-mail: rmckeown@sc.edu).

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Contributors

R.E. McKeown originated the study, oversaw data collection, performed the analysis, and led the writing. S.P. Cuffe and R.M. Schulz assisted with interpreting data and writing and editing the article.

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Human Subject Protection

No protocol approval was needed for this study.

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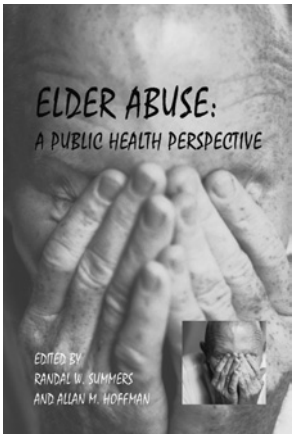

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