

Youth Suicide Risk and Preventive Interventions: A Review of the Past 10 Years

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ABSTRACT

Objective: To review critically the past 10 years of research on youth suicide. **Method:** Research literature on youth suicide was reviewed following a systematic search of *PsycINFO* and *Medline*. The search for school-based suicide prevention programs was expanded using two education databases: *ERIC* and *Education Full Text*. Finally, manual reviews of articles' reference lists identified additional studies. The review focuses on epidemiology, risk factors, prevention strategies, and treatment protocols. **Results:** There has been a dramatic decrease in the youth suicide rate during the past decade. Although a number of factors have been posited for the decline, one of the more plausible ones appears to be the increase in antidepressants being prescribed for adolescents during this period. Youth psychiatric disorder, a family history of suicide and psychopathology, stressful life events, and access to firearms are key risk factors for youth suicide. Exciting new findings have emerged on the biology of suicide in adults, but, while encouraging, these are yet to be replicated in youths. Promising prevention strategies, including school-based skills training for students, screening for at-risk youths, education of primary care physicians, media education, and lethal-means restriction, need continuing evaluation studies. Dialectical behavior therapy, cognitive-behavioral therapy, and treatment with antidepressants have been identified as promising treatments but have not yet been tested in a randomized clinical trial of youth suicide. **Conclusions:** While tremendous strides have been made in our understanding of who is at risk for suicide, it is incumbent upon future research efforts to focus on the development and evaluation of empirically based suicide prevention and treatment protocols. *J. Am. Acad. Child Adolesc. Psychiatry*, 2003, 42(4):386–405. **Key Words:** suicide, epidemiology, risk factors, prevention, treatment, adolescence.

The research contributing to our understanding of who is at risk for suicide and how to prevent and treat suicide will be critically evaluated. A comprehensive understanding of this information is critical to clinicians who deal with the mental health problems of children and adolescents. Each year, one in five teenagers in the United States seri-

ously considers suicide (Grunbaum et al., 2002); 5% to 8% of adolescents attempt suicide, representing approximately 1 million teenagers, of whom nearly 700,000 receive medical attention for their attempt (Grunbaum et al., 2002); and approximately 1,600 teenagers die by suicide (Anderson, 2002). Only by recognizing who is at risk for suicide, and knowing how to prevent suicidal behavior and provide treatment for suicidal individuals, will mental health practitioners and those designing educational and public health prevention programs have sufficient armamentaria to combat this major public health and clinical problem in youths. The current review is based on a comprehensive, but not exhaustive, review of the research on youth suicide conducted in the past decade. Preference was given to population-based epidemiological and longitudinal investigations and controlled prevention/intervention studies.

OVERALL RATES AND SECULAR PATTERNS

Suicide was the third leading cause of death among 10- to 14-year-olds and 15- to 19-year-olds in the United

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States in 2000 (Anderson, 2002). While the rates of completed suicide are low (1.5 per 100,000 among 10- to 14-year-olds and 8.2 per 100,000 among 15- to 19-year-olds), when nonlethal suicidal behavior and ideation are taken into account, the magnitude of the problem becomes obvious. The surge of general population studies of suicide attempts and ideation has yielded reliable estimates of their rates (e.g., Andrews and Lewinsohn, 1992; Fergusson and Lynskey, 1995; Fergusson et al., 2000; Garrison et al., 1993; Gould et al., 1998; Grunbaum et al., 2002; Lewinsohn et al., 1996; Roberts and Chen, 1995; Sourander et al., 2001; Swanson et al., 1992; Wichstrom, 2000; Windle et al., 1992). Of these studies, the largest and the most representative is the Youth Risk Behavior Survey (YRBS) (Grunbaum et al., 2002), conducted by the Centers for Disease Control and Prevention (CDC). The YRBS indicated that during the past year, 19% of high school students "seriously considered attempting suicide," nearly 15% made a specific plan to attempt suicide, 8.8% reported any suicide attempt, and 2.6% made a *medically serious* suicide attempt that required medical attention. These results are consistent with those cited in the epidemiological literature.

Age

Suicide is uncommon in childhood and early adolescence. Within the 10- to 14-year-old group, most suicides occur between ages 12 and 14. Suicide incidence increases markedly in the late teens and continues to rise until the early twenties, reaching a level that is maintained throughout adulthood until the sixth decade, when the rates increase markedly among men (Anderson, 2002).

In 2000, the suicide mortality rate for 10- to 14-year-olds in the United States was 1.5 per 100,000. Although 10- to 14-year-olds represented 7.2% of the U.S. population, the 300 children who committed suicide represented only 1.0% of all suicides. The suicide mortality rate for 15- to 19-year-olds was 8.2 per 100,000, five times the rate of the younger age group.

The rarity of completed suicide before puberty is a universal phenomenon (World Health Organization, 2002). Shaffer et al. (1996) suggested that the most likely reason underlying the age of onset of suicide is that depression and exposure to drugs and alcohol, two significant risk factors for suicide in adults (e.g., Barraclough et al., 1974; Robins et al., 1959) and adolescents (e.g., Brent et al., 1993a; Shaffer et al., 1996), are rare in very young children and become prevalent only in later adolescence.

Like completed suicides, suicide attempts are relatively rare among prepubertal children and increase in frequency through adolescence (Andrus et al., 1991; Velez and Cohen, 1988). However, unlike completed suicides, attempts peak between 16 and 18 years of age, after which there is a marked decline in frequency (Kessler et al., 1999), particularly for young women (Lewinsohn et al., 2001).

Gender

Paradoxically, although suicidal ideation and attempts are more common among females (Garrison et al., 1993; Gould et al., 1998; Grunbaum et al., 2002; Lewinsohn et al., 1996) in the United States, completed suicide is more common among males. Five times more 15- to 19-year-old boys than girls commit suicide (Anderson, 2002). The same pattern of sex differences does not exist in all countries (World Health Organization, 2002). While completed suicide is more common in 15- to 24-year old males than females in North America, Western Europe, Australia, and New Zealand, sex rates are equal in some countries in Asia (e.g., Singapore), and in China, the majority of suicides are committed by females.

The YRBS (Grunbaum et al., 2002) indicated that girls were significantly more likely to have seriously considered attempting suicide (23.6%), made a specific plan (17.7%), and attempted suicide (11.2%) than were boys (14.2%, 11.8%, 6.2%, respectively); however, no significant difference by gender in the prevalence of medically serious attempts (3.1% females, 2.1% males) was found.

Both psychopathological factors and sex-related method preferences are considered to contribute to the pattern of sex differences (Shaffer and Hicks, 1994). Completed suicide is often associated with aggressive behavior and substance abuse (see discussion below), and both are more common in males. Methods favored by women, such as overdoses, which account for 30% of all female suicides yet only 6.7% of all male suicides (CDC, 2002), tend to be less lethal in the United States. However, in societies where treatment resources are not readily available or when the chosen ingestant is untreatable, overdoses are more likely to be lethal. Whereas in the United States, only 11% of completed suicides in 1999 resulted from an ingestion, in some South Asian and South Pacific countries, the majority of suicides are due to ingestions of herbicides, such as paraquat, for which no effective treatment is available (Haynes, 1987; Shaffer and Hicks, 1994).

Ethnicity

Youth suicide is more common among whites than African Americans in the United States (Anderson, 2002), although the rates are highest among Native Americans and generally the lowest among Asian/Pacific Islanders (Anderson, 2002; Shiang et al., 1997; Wallace et al., 1996). Latinos are not overrepresented among completed suicides in the United States (Demetriades et al., 1998; Gould et al., 1996; Smith et al., 1985). The historically higher suicide rate among Native Americans is not fully understood, but proposed risk factors include low social integration, access to firearms, and alcohol or drug use (Borowsky et al., 1999; Middlebrook et al., 2001). The historically lower suicide rate among African Americans has been attributed to greater religiosity and differences in “outwardly” rather “inwardly” directed aggression (Gibbs, 1997; Shaffer et al., 1994). However, the difference in suicide rates between whites and African Americans has decreased during the past 15 years because of a marked increase in the suicide rate among African-American males between 1986 and 1994.

The YRBS (Grunbaum et al., 2002) found that African-American students were significantly less likely (13.3%) than white or Latino students (19.7% and 19.4%, respectively) to have considered suicide or to have made a specific plan (African-Americans: 10.3%; whites: 15.3%; Latinos: 14.1%). Latino students (12.1%) were significantly more likely than either African-American or white students to have made a suicide attempt (8.8% and 7.9%, respectively); however, there was no preponderance of medically serious attempts among Latinos (3.4%) compared with whites (2.3%) or African Americans (3.4%). Although some studies have found higher rates of suicidal ideation and attempts among Latino youths (Roberts et al., 1997; Roberts and Chen, 1995), Grunbaum et al. (1998) and Walter et al. (1995) did not find a higher prevalence of either among Latinos. These equivocal findings highlight the need for further research in this area.

Secular Trends

Secular changes in the incidence of a disease are important because they may give an indication of causal and/or preventive factors. Following a nearly threefold increase in the adolescent male suicide rate between 1964 and 1988, the consistent increase in the white male suicide rate ceased and in the mid 1990s started to decline. Rates in African-American males, while still lower than among whites, showed no sign of a plateau or decrease until 1995.

At that time the decline gathered pace and included both white and African-American males and females. The rate among white males, nearly 20/100,000 in 1988, had fallen to approximately 14/100,000 by the year 2000 (Fig. 1).

The reasons for the decline are by no means clear. One of the more plausible reasons for the earlier increase had been the effects of greater exposure of the youth population to drugs and alcohol. Alcohol use had been noted to be a significant risk factor for suicide since the first psychological autopsy study (Robins et al., 1959), and at least in some studies (Shaffer et al., 1996) it has been a significantly more important risk factor for males, the group that had showed the dramatic increase. However, repeat benchmark studies that use similar measures and sampling methods such as the YRBS (CDC, 1995, 1996, 1998, 2000; Grunbaum et al., 2002) give no indication of a decline in alcohol or cocaine use during this time. Another reason posited for the earlier increase was an increased availability of firearms (Brent et al., 1991). Legislation restricting access to firearms was passed in 1994 (Ludwig and Cook, 2000), at the time that the decrease became more marked and the rate of handling firearms among high school students declined (CDC, 1995, 1996, 1998, 2000; Grunbaum et al., 2002). However, the proportion of suicides by firearms, a plausible proxy for method availability (Cutright and Fernquist, 2000), did not change between 1988 and 1999. There has been a decline ranging from 20% to 30% in the youth suicide rates in England, Finland, Germany, and Sweden, where firearms account for very few suicides (Krug et al., 1998), and a systematic examination of the proportion of suicides committed with firearms over a long period of time has shown that the proportion is only weakly related to overall changes in the rate (Cutright and Fernquist, 2000).

Another plausible cause of the reduction has been the extraordinary increase in antidepressants being prescribed for adolescents during this period. Olfson et al. (2002b) showed that between 1987 and 1996 the annual rate of antidepressant use increased from approximately 0.3% to 1.0% of those aged 6 to 19 years in the United States. Selective serotonin reuptake inhibitors (SSRIs) affect not only depression (see “Psychopharmacological Interventions” below), but also aggressive outbursts, and have been shown in adults to reduce suicidal thinking. It is unlikely that the increase in the prescription of antidepressants is an indication of a more general increase in access or use of mental health services. During the period from 1987 to 1997, the number of adolescents who received psycho-

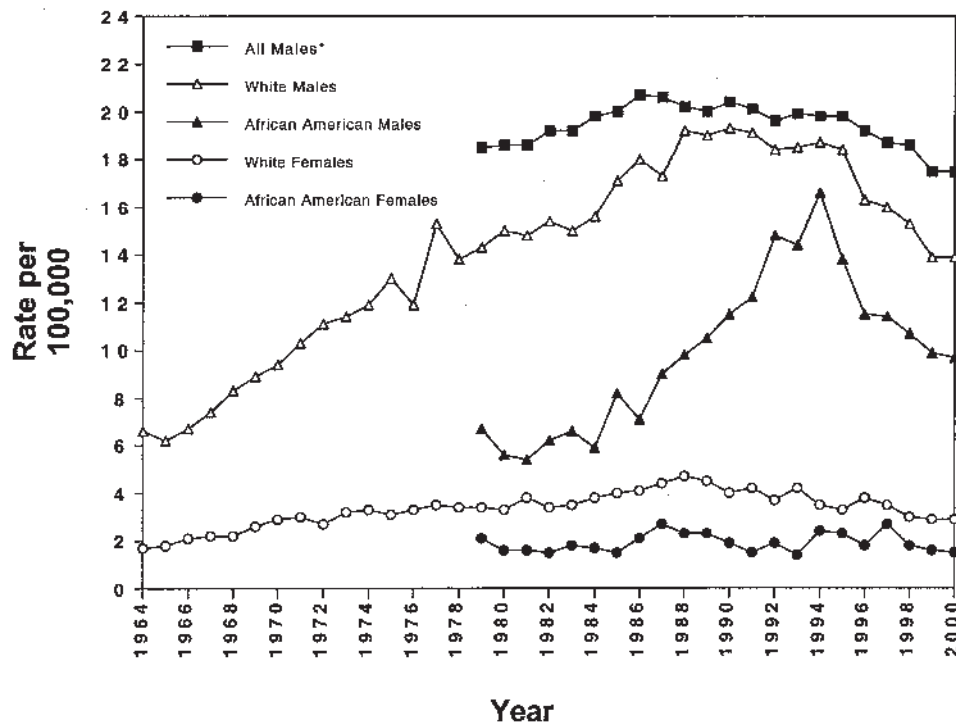


Fig. 1 Teen suicide rates, 1964–2000: United States, ages 15–19 years. Sources: Anderson, 2002; CDC, 2002; National Center for Health Statistics, 1999. *Crude rates; prior to 1979, African-American data not broken out.

therapy actually declined (Olfson et al., 2002a). The delay in the onset of the decline in African-American suicides is compatible with a treatment effect because of African Americans' greater difficulty in accessing treatment resources (Goodwin et al., 2001). Another indication that antidepressant treatment may be a factor in the recent decline is the finding in Sweden that the proportion of suicide victims who received antidepressant treatment is lower than the rest of the depressed population (Isacsson, 2000). Firm conclusions, however, are not possible given the ecological nature of the supporting data. Randomized clinical trials will be necessary before the decline in rates can be confidently attributed to treatment with antidepressants.

RISK FACTORS

Personal Characteristics

Psychopathology. More than 90% of youth suicides have had at least one major psychiatric disorder, although younger adolescent suicide victims have lower rates of psychopathology, averaging around 60% (Beautrais, 2001; Brent et al., 1999; Groholt et al., 1998; Shaffer et al., 1996). Depressive disorders are consistently the most

prevalent disorders among adolescent suicide victims, ranging from 49% to 64% (Brent et al., 1993a; Marttunen et al., 1991; Shaffer et al., 1996). The increased risk of suicide (odds ratios) for those with an affective disorder ranges from 11 to 27 (Brent et al., 1988, 1993a; Groholt et al., 1998; Shaffer et al., 1996; Shafii et al., 1988). Female victims are more likely than males to have had an affective disorder (Brent et al., 1999; Shaffer et al., 1996). Substance abuse is another significant risk factor, especially among older adolescent male suicide victims (Marttunen et al., 1991; Shaffer et al., 1996). A high prevalence of comorbidity between affective and substance abuse disorder has consistently been found (Brent et al., 1993a; Shaffer et al., 1996). Disruptive disorders are also common in male teenage suicide victims (Brent et al., 1993a; Shaffer et al., 1996). Approximately one third of male suicides have had a conduct disorder, often comorbid with a mood, anxiety, or substance abuse disorder. Discrepant results have been reported for bipolar disorder: Brent et al. (1988, 1993a) reported relatively high rates, whereas others reported no or few bipolar cases (Apter et al., 1993a; Marttunen et al., 1991; Rich et al., 1990; Runeson, 1989; Shaffer et al., 1994). Despite the generally high risk of suicide among people with schizo-

phrenia, schizophrenia accounts for very few of all youth suicides (Brent et al., 1993a; Shaffer et al., 1996).

The psychiatric problems and gender-specific diagnostic profiles of youth suicide *attempters* are quite similar to the profiles of those who *complete* suicide (e.g., Andrews and Lewinsohn, 1992; Beautrais et al., 1996, 1998; Gould et al., 1998). However, despite the overlap between suicidal *attempts* and *ideation* (Andrews and Lewinsohn, 1992; Reinherz et al., 1995) and the significant prediction of future attempts from ideation (Lewinsohn et al., 1994; McKeown et al., 1998; Reinherz et al., 1995), the diagnostic profiles of attempters and ideators are somewhat distinct (Gould et al., 1998). Substance abuse/dependence is more strongly associated with suicide attempts than with ideation (Garrison et al., 1993; Gould et al., 1998; Kandel, 1988). Recent studies have found an association between posttraumatic stress disorder and suicidal behavior among adolescents (Giaconia et al., 1995; Mazza, 2000; Wunderlich et al., 1998), but in the largest and most representative of the studies (Wunderlich et al., 1998), the association was not maintained after adjusting for comorbid psychiatric problems. Panic attacks have also been reported to be associated with an increased risk of suicidal behavior in adolescents, even after adjusting for comorbid psychiatric disorders and demographic factors (Gould et al., 1996; Pilowsky et al., 1999). The negative finding by Andrews and Lewinsohn (1992) may be due to a gender specificity of the association: panic attacks may increase suicide risk for girls only (Gould et al., 1996). Inconsistent findings have been reported in the adult literature (Johnson et al., 1990; Warshaw et al., 2000; Weissman et al., 1989)

Prior Suicide Attempts. A history of a prior suicide attempt is one of the strongest predictors of completed suicide, conferring a particularly high risk for boys (30-fold increase) and a less elevated risk for girls (3-fold increase) (Shaffer et al., 1996). Between one quarter to one third of youth suicide victims have made a prior suicide attempt (see Groholt et al., 1997). Similarly strong associations between a history of suicidal behavior and future attempts have been reported in general population surveys and longitudinal studies (Lewinsohn et al., 1994; McKeown et al., 1998; Reinherz et al., 1995; Wichstrom, 2000) and clinical samples (Hulten et al., 2001; Pfeffer et al., 1991), with risk for an attempt increasing between 3 and 17 times for those with prior suicidal behavior.

Cognitive and Personality Factors. Hopelessness has been linked with suicidality (Howard-Pitney et al., 1992;

Marcenko et al., 1999; Overholser et al., 1995; Rubenstein et al., 1989; Russell and Joyner, 2001; Shaffer et al., 1996); however, it has not consistently proven to be an independent predictor, once depression is taken into account (Cole, 1988; Howard-Pitney et al., 1992; Lewinsohn et al., 1994; Reifman and Windle, 1995; Rotheram-Borus and Trautman, 1988). Poor interpersonal problem-solving ability has also been reported to differentiate suicidal from nonsuicidal youths (Asarnow et al., 1987; Rotheram-Borus et al., 1990), even after adjusting for depression (Rotheram-Borus et al., 1990). Social problem-solving has been found to partially mediate the influence of life stress on suicide, although life stress was a stronger predictor than social problem-solving (Chang, 2002). Aggressive-impulsive behavior has also been linked with an increased risk of suicidal behavior (Apter et al., 1993b; McKeown et al., 1998; Sourander et al., 2001). In a Finnish school study (Sourander et al., 2001), aggressive 8-year-olds were more than twice as likely to think about or attempt suicide at age 16.

Sexual Orientation. Recent cross-sectional and longitudinal epidemiological studies found a significant two- to sixfold increased risk of nonlethal suicidal behavior for homosexual and bisexual youths (Blake et al., 2001; Faulkner and Cranston, 1998; Garofalo et al., 1998; Remafedi et al., 1998; Russell and Joyner, 2001; see McDaniel et al., 2001, for a recent review). In a study of a nationally representative sample of nearly 12,000 adolescents, those who reported same-sex sexual orientation also exhibited significantly higher rates of other suicide risk factors (Russell and Joyner, 2001). After adjusting for these risks, the effects of same-sex sexual orientation on suicidal behavior remained, but were substantially mediated by depression, alcohol abuse, family history of attempts, and victimization. Notably, most youths who reported same-sex sexual orientation reported no suicidality at all: 84.6% of males and 71.7% of females.

Biological Factors. Over the past 25 years, a substantial body of knowledge has accrued, indicating abnormalities of serotonin function in suicidal and in impulsive, aggressive individuals, regardless of psychiatric diagnosis. Earlier studies focused on simple indices of serotonin activity, such as the reduced concentration of serotonin metabolites in the brain and cerebrospinal fluid (CSF) in suicide victims or among suicide attempters compared with age- and gender-matched controls (see Oquendo and Mann, 2000). More recently, neuroanatomical studies have shown a reduction in the overall density of sero-

tonin 1A receptors and serotonin transporter receptors (which regulate serotonin uptake) in the prefrontal cortex. Most recently, Arango and her colleagues (2001) found significant reductions in the number and binding capacity of serotonin 1A receptors in the dorsal raphe nucleus, from which serotonin innervation of the prefrontal cortex arises (Arango et al., 2001).

To explain the often-replicated finding that serotonin dysregulation is associated with suicidality regardless of diagnosis, Mann et al. (1999) suggested that the dysregulation is a biological trait that predisposes to suicide—a stress-diathesis model. Thus a mentally ill person with the diathesis is more likely to respond to a stressful experience in an impulsive fashion that may include a decision to commit suicide.

Despite the great volume of work, unanswered questions remain. The behavioral correlates of low-serotonin states are assumed to include irritability, impulsivity, and emotional volatility, but most studies address diagnosis rather than specific symptoms and the correlation has yet to be explored in the general population. An absence of representative studies has meant that neither the relative risk of serotonin dysfunction nor the fraction of suicides attributable to serotonin underfunctioning is yet known. Finally, the examination of the association of serotonin metabolism with suicide has largely been limited to studies of adults.

The documented suicide risk associated with family history (see “Family History of Suicidal Behavior” below) has led to an active investigation of candidate genes, attempting to identify what suicidogenic factor might be inherited. Given the substantial body of data that point to reduced serotonin neurotransmission in suicide (see above), the target of most recent association studies has been polymorphisms in three genes that play important roles in the regulation of serotonin. One gene is tryptophan hydroxylase (*TPH*), the rate-limiting enzyme for the biosynthesis of serotonin. Early studies (Mann and Stoff, 1997; Nielsen et al., 1994, 1998) reported a relationship between attempted suicide and a polymorphism on intron 7 of the *TPH* gene. Since then, a large number of studies with inconsistent findings have been carried out on suicidal patients with various diagnoses with and without suicidality. The Utah Youth Suicide Study has been the main study to have examined adolescents (Bennet et al., 2000), and it has failed to find an association. There are several possible reasons for the inconsistent findings, including the probable heterogeneity and

complexity of the suicide phenotype; that the genetic effect is small and requires examination of large samples; or because a single genetic variant is less important than patterns of variance (Marshall et al., 1999). Support for this is offered by haplotype analyses (haplotypes are clusters of genes that are usually found together) that have shown a distinctive profile among both suicide completers (Turecki et al., 2001) and attempters (Rotondo et al., 1999) in samples in which single-gene polymorphisms did not differ significantly from those of controls.

The other two candidate genes that have been studied are the serotonin transporter (*SERT*) gene and the serotonin A receptor gene. Polymorphisms in these genes have been reported in completed and attempted suicide (Arango et al., 2001; Courtet et al., 2001; Du et al., 2001; Neumeister et al., 2002).

While biological findings currently have little impact on clinical practice, Nordstrom and colleagues' (1994) finding that suicide attempters with low levels of CSF 5-hydroxyindoleacetic acid have a significantly higher likelihood of making further suicide attempts and/or committing suicide, coupled with the promising research on candidate genes, may eventually take suicide prediction and prevention to new, more precise levels and/or may lead to specific interventions that will reduce the impact of the predisposing trait.

Family Characteristics

Family History of Suicidal Behavior. A family history of suicidal behavior greatly increases the risk of completed suicide (Agerbo et al., 2002; Brent et al., 1988, 1994a, 1996; Gould et al., 1996; Shaffer, 1974; Shafiq et al., 1985) and attempted suicide (Bridge et al., 1997; Glowinski et al., 2001; Johnson et al., 1998). Because suicide and psychiatric illness almost always co-occur, account has to be taken of whether apparent familiarity reflects suicide specifically or instead an association with parental psychiatric illness (Brent et al., 1996). Most recently, the Danish Registry study (Agerbo et al., 2002) found youth suicide to be nearly five times more likely in the offspring of mothers who have completed suicide and twice as common in the offspring of fathers, adjusting for parental psychiatric history.

The Missouri Adolescent Twin Study (Heath et al., 2002) addressed the question of inheritance versus environment among teenage suicide attempters. One hundred thirty twin pairs had been affected by a suicide attempt within the total representative sample of 3,416

female adolescent twins. After controlling for other psychiatric risk factors, the twin/cotwin odds ratio was 5.6 (95% confidence interval [CI] 1.75–17.8) for monozygotes and 4.0 (95% CI 1.1–14.7) for dizygotes, suggesting a degree of inheritance for suicidality (Glowinski et al., 2001). The heritability of youth suicide gains further support from a meta-analysis by McGuffin et al. (2001), who reexamined a large body of published twin data (all ages). They concluded that first-degree relatives of suicides have more than twice the risk of the general population, with the relative risk increasing among identical cotwins of suicides to about 11. The estimated heritability for completed suicide was 43% (95% CIs 25–60).

Parental Psychopathology. High rates of parental psychopathology, particularly depression and substance abuse, have been found to be associated with completed suicide (Brent et al., 1988, 1994a; Gould et al., 1996) and with suicidal ideation and attempts in adolescence (e.g., Fergusson and Lynskey, 1995; Joffe et al., 1988; Kashani et al., 1989). Brent and his colleagues (1994a) reported that a family history of depression and substance abuse significantly increased the risk of completed suicide, even after controlling for the victim's psychopathology. They concluded that familial psychopathology adds to suicide risk by mechanisms other than merely increasing the liability for similar psychopathology in an adolescent. In contrast, Gould and her colleagues (1996) found that the impact of parental psychopathology no longer contributed to the youth's suicide risk after the study controlled for the youth's psychopathology. To date, it is unclear precisely how familial psychopathology increases the risk for completed suicide.

Parental Divorce. Suicide victims are more likely to come from nonintact families of origin (Beautrais, 2001; Brent et al., 1993a, 1994a; Gould et al., 1996; Groholt et al., 1998; Sauvola et al., 2001). However, the association between separation/divorce and suicide decreases when accounting for parental psychopathology (Brent et al., 1994a; Gould et al., 1996). Similarly, although many population-based studies have found significant univariate associations (e.g., Andrews and Lewinsohn, 1992; Fergusson and Lynskey, 1995), these associations are no longer evident or are markedly attenuated once psychosocial risk factors are taken into account (e.g., Beautrais et al., 1996; Fergusson et al., 2000; Groholt et al., 2000).

Parent–Child Relationships. Impaired parent–child relationships are associated with increased risk of suicide and suicide attempts among youths (Beautrais et al., 1996;

Brent et al., 1994a, 1999; Fergusson and Lynskey, 1995; Fergusson et al., 2000; Gould et al., 1996; Lewinsohn et al., 1993, 1994; McKeown et al., 1998; Tousignant et al., 1993). However, because an underlying psychiatric problem in the youth may precipitate impaired parent–child relationships, it is necessary to disentangle these factors. While Gould et al. (1996) found that suicide victims still had significantly less frequent and less satisfying communication with their mothers and fathers than community controls, even after adjusting for their psychiatric disorders, others have found that the associations between nonlethal suicidal behavior and poor attachment and family cohesion are not independent of the youth's psychological problems (Fergusson et al., 2000; McKeown et al., 1998). Similarly, parent–child conflict has been found to be no longer associated with completed suicide (Brent et al., 1994a) or attempts (Lewinsohn et al., 1993) once the youth's psychopathology is taken into account.

Adverse Life Circumstances

Stressful Life Events. Life stressors, such as interpersonal losses (e.g., breaking up with a girlfriend or boyfriend) and legal or disciplinary problems, are associated with completed suicide (Beautrais, 2001; Brent et al., 1993c; Gould et al., 1996; Marttunen et al., 1993; Rich et al., 1988; Runeson, 1990) and suicide attempts (Beautrais et al., 1997; Fergusson et al., 2000; Lewinsohn et al., 1996), even after adjusting for psychopathology (Brent et al., 1993c; Gould et al., 1996) and antecedent social, family, and personality factors (Beautrais et al., 1997). The prevalence of specific stressors among suicide victims varies by age: parent–child conflict is a more common precipitant for younger adolescent victims, whereas romantic difficulties are more common in older adolescents (Brent et al., 1999; Groholt et al., 1998). Stressors also vary by psychiatric disorder: interpersonal losses are more common among suicide victims with substance abuse disorders (Brent et al., 1993c; Gould et al., 1996; Marttunen et al., 1994; Rich et al., 1988), and legal or disciplinary crises are more common in victims with disruptive disorders (Brent et al., 1993c; Gould et al., 1996) or substance abuse disorders (Brent et al., 1993c). Bullying, whether as victim or perpetrator, has also recently been demonstrated to increase the risk for suicidal ideation (Kaltiala-Heino et al., 1999).

Physical Abuse. The association between physical abuse and suicide reported in case-control psychological autopsy studies (Brent et al., 1994a, 1999) has been replicated in

prospective longitudinal community studies (Brown et al., 1999; Johnson et al., 2002; Silverman et al., 1996), the most methodologically rigorous design to examine this issue. Childhood physical abuse has been found to be associated with an increased risk of suicide attempts in late adolescence or early adulthood, even after adjusting for demographic characteristics, psychiatric symptoms during childhood and early adolescence, and parental psychiatric disorders (Johnson et al., 2002). Interpersonal difficulties during middle adolescence, such as frequent arguments with adults and peers and having no close friends, were found to mediate the association between child abuse and later suicide attempts (Johnson et al., 2002). Johnson and his colleagues (2002) suggested that children who are physically abused may have difficulty developing the social skills necessary for healthy relationships, which leads to social isolation and/or antagonistic interactions with others, which in turn puts them at increased risk for suicidal behavior.

Sexual Abuse. Longitudinal community studies are also the most methodologically rigorous design to examine the association between child sexual abuse (CSA) and subsequent suicidality due to the serious problems of retrospective recall in this area. Two such studies have found self-reported CSA to be significantly associated with an increased risk of suicidal behavior in adolescence (Fergusson et al., 1996; Silverman et al., 1996). Because CSA may be associated with reported risk factors for suicide (e.g., parental substance abuse), it is necessary to control for such factors. Fergusson et al. (1996) found that the association between CSA and suicidality was greatly reduced but was not eliminated, after controlling for a wide range of potentially confounding factors. This suggests that the increased risk of suicide from CSA may be partly, but not entirely, accounted for by other factors.

Socioenvironmental and Contextual Factors

Socioeconomic Status. Studies of suicide victims generally have found no or small effects of socioeconomic disadvantage (Agerbo et al., 2002; Brent et al., 1988). Specifically, Agerbo et al. (2002) noted that the effect of socioeconomic disadvantage decreased after adjustment for family history of mental illness or suicide. Gould et al. (1996) also found no effect of socioeconomic status for white or Latino victims, but African-American victims had a significantly higher socioeconomic status than their general population counterparts. Youth suicide attempters, compared with community controls, have consistently

been found to have higher rates of sociodemographic disadvantage, even after controlling for other social and psychiatric risk factors (Beautrais et al., 1996; Fergusson et al., 2000; Wunderlich et al., 1998).

School and Work Problems. Difficulties in school, neither working nor being in school, and not going to college pose significant risks for completed suicide (Gould et al., 1996). Beautrais et al. (1996) reported that serious suicide attempters were also more likely to drop out of high school or not attend college, and Wunderlich and colleagues (1998) reported that German school dropouts were 37 times more likely to attempt suicide, even after adjusting for diagnostic and social risk factors.

Contagion/Imitation. Evidence continues to amass from studies of suicide clusters and the impact of the media, supporting the existence of suicide contagion. Several studies have reported significant clustering of suicides, defined by temporal-spatial factors, among teenagers and young adults (Brent et al., 1989; Gould et al., 1990a,b, 1994), with only minimal effects beyond 24 years of age (Gould et al., 1990a,b). Similar age-specific patterns have been reported for clusters of attempted suicides (Gould et al., 1994). Since 1990, the effect of the media on suicide rates has been documented in many other countries besides the United States, including Australia (e.g., Hassan, 1995), Austria (e.g., Etzersdorfer et al., 1992), Germany (e.g., Jonas, 1992), Hungary (e.g., Fekete and Macsai, 1990), and Japan (Ishii, 1991; Stack, 1996), adding to the extensive work prior to 1990 in the United States on newspaper articles, television news reports, and fictional dramatizations. Overall, the magnitude of the suicide increase is proportional to the amount, duration, and prominence of media coverage, and the impact of suicide stories on subsequent completed suicides appears to be greatest for teenagers (see Gould, 2001; Schmidtke and Schaller, 2000; Stack, 2000).

Stack's (2000) review of 293 findings from 42 studies indicates that methodological differences among studies are strong predictors of differences in their findings. For example, although a highly publicized recent study (Mercy et al., 2001) found that exposure to media accounts of suicidal behavior and exposure to suicidal behavior in friends or acquaintances were associated with a *lower* risk of youth suicide attempts, the interpretability of the findings is limited because (1) the media exposure factor was a conglomerate of different types of media stories; (2) attempters may have had less exposure to media generally (e.g., read fewer books, fewer newspapers, etc.); (3) attempters had signifi-

cantly more proximal stressors, possibly overshadowing their recollection of media exposure; (4) the timing of exposure was a 30-day interval, in contrast to most other studies, which examined a shorter interval following the exposure; and (5) nearly half of the sample was between 25 and 34 years of age, a group not particularly sensitive to imitation. Another study finding—no effect of parental suicide—was also inconsistent with the prevailing research literature. A summary of interactive factors that may moderate the impact of media stories, including characteristics of the stories, individual reader/viewer attributes, and social context of the stories, is presented by Gould (2001).

PROTECTIVE FACTORS

Family Cohesion

Family cohesion has been reported as a protective factor for suicidal behavior among adolescents in a longitudinal study of middle school students (McKeown et al., 1998) and cross-sectional community studies of high school (Rubenstein et al., 1989, 1998) and college students (Zhang and Jin, 1996). Students who described family life in terms of a high degree of mutual involvement, shared interests, and emotional support were 3.5 to 5.5 times less likely to be suicidal than were adolescents from less cohesive families who had the same levels of depression or life stress (Rubenstein et al., 1989, 1998).

Religiosity

Since Durkheim's (1966) formulation of a social integration model, the protective role of religiosity on suicide has been a focus of scientific investigation (e.g., Hovey, 1999; Lester, 1992; Neeleman, 1998; Neeleman and Lewis, 1999; Sorri et al., 1996; Stack, 1998; Stack and Lester, 1991). As noted previously, greater religiosity has been posited as underlying the historically lower suicide rate among African Americans. However, only recently has the protective value of religiosity against suicidal behavior (Hilton et al., 2002; Siegrist, 1996; Zhang and Jin, 1996) and depression (Miller et al., 1997b) been documented in adolescents and young adults. Regrettably, these studies have not controlled for potential confounders, such as substance abuse, which may be less prevalent among religious youths.

PREVENTION STRATEGIES

Youth suicide prevention strategies have primarily been implemented within three domains—school, commu-

nity, and health-care systems—and generally have one of two general goals: case finding with accompanying referral and treatment or risk factor reduction (CDC, 1994; Gould and Kramer, 2001).

School-Based Suicide Prevention Programs

Suicide Awareness Curriculum. These programs seek to increase awareness of suicidal behavior in order to facilitate self-disclosure and prepare teenagers to identify at-risk peers and take responsible action (Kalafat and Elias, 1994). The underlying rationale of these programs is that teenagers are more likely to turn to peers than adults for support in dealing with suicidal thoughts (Hazell and King, 1996; Kalafat and Elias, 1994; Ross, 1985).

Several studies evaluated school-based suicide awareness programs in the past decade (Ciffone, 1993; Kalafat and Elias, 1994; Kalafat and Gagliano, 1996; Shaffer et al., 1991; Silbert and Berry, 1991; Vieland et al., 1991). While improvements in knowledge (Kalafat and Elias, 1994; Silbert and Berry, 1991), attitudes (Ciffone, 1993; Kalafat and Elias, 1994; Kalafat and Gagliano, 1996), and help-seeking behavior (Ciffone, 1993) have been found, other studies reported either no benefits (Shaffer et al., 1990, 1991; Vieland et al., 1991) or detrimental effects of suicide prevention education programs (Overholser et al., 1989; Shaffer et al., 1991). Detrimental effects included a decrease in desirable attitudes (Shaffer et al., 1991); a reduction in the likelihood of recommending mental health evaluations to a suicidal friend (Kalafat and Elias, 1994); more hopelessness and maladaptive coping responses among boys after exposure to the curriculum (Overholser et al., 1989); and negative reactions among students with a history of suicidal behavior, including their not recommending the programs to other students and feeling that talking about suicide in the classroom “makes some kids more likely to try to kill themselves” (Shaffer et al., 1990). Other limitations of this strategy are that baseline knowledge and attitudes of students are generally sound (Kalafat and Elias, 1994; Shaffer et al., 1991), changes in attitudes and knowledge are not necessarily highly correlated with behavioral change (Kirby, 1985; McCormick et al., 1985), and the format and content of some programs might inadvertently stimulate imitation (Gould, 2001).

To date there is insufficient evidence to either support or not support curriculum-based suicide awareness programs in schools (Guo and Harstall, 2002). Accordingly, emphasis has shifted toward alternative school-based strategies that will be presented below.

Skills Training. In contrast to suicide *awareness* curriculum in schools, skills training programs emphasize the development of problem-solving, coping, and cognitive skills, as suicidal youths have deficits in these areas (e.g., Asarnow et al., 1987; Cole, 1989; Rotheram-Borus et al., 1990). It is hoped that an “immunization” effect can be produced against suicidal feelings and behaviors. The reduction of suicide risk factors (e.g., depression, hopelessness, and drug abuse) is also a targeted outcome.

Several evaluation studies have shown promising results, with some evidence for reductions in completed and attempted suicides (Zenere and Lazarus, 1997) and improvements in attitudes, emotions, and distress coping skills (Klingman and Hochdorf, 1993; Orbach and Bar-Joseph, 1993). The most systematic evaluations have been conducted by a team of researchers (Eggert et al., 1995; Randell et al., 2001; Thompson et al., 2000, 2001) who have focused on skills training and social support programs for students at high risk for school failure or dropout. Enhancements of protective factors and reductions in risk factors following the “active” interventions were consistently found, while the control “intervention as usual” did not yield an increase of protective factors. However, “intervention as usual” sometimes produced significant reductions in suicide risk behaviors (Eggert et al., 1995; Randell et al., 2001). Thus it is not clear which aspects of the skills training program were responsible for risk reduction, a limitation of other studies also (Zenere and Lazarus, 1997). While these studies yield encouraging data, additional research is sorely needed to refine the evaluation of this type of intervention.

Screening. A prevention strategy that has received increased attention is case-finding through direct screening of individuals. Self-report and individual interviews are used to identify youngsters at risk for suicidal behavior (Joiner et al., 2002; Reynolds, 1991; Shaffer and Craft, 1999; Thompson and Eggert, 1999). School-wide screenings, involving multistage assessments, have focused on depression, substance abuse problems, recent and frequent suicidal ideation, and past suicide attempts. The few studies that have examined the efficacy of school-based screening (Reynolds, 1991; Shaffer and Craft, 1999; Thompson and Eggert, 1999) found that the sensitivity of the screens ranged from 83% to 100%, while the specificities ranged from 51% to 76%. Thus, while there were few false-negatives, there were many false-positives. Although the number of false-positives could be minimized by using a more stringent cutoff criterion, the seri-

ousness of missing a suicidal individual precludes this scheme. Thus a tolerance for false-positives is essential for such endeavors (Thompson and Eggert, 1999), necessitating second-stage assessments to determine who is *not* actually at risk for suicide. Second-stage assessments usually employ systematic clinical evaluations, using interviews such as the Suicidal Behaviors Interview (Reynolds, 1990) or the Diagnostic Interview Schedule for Children (DISC), now available in a spoken, self-completion (Voice-DISC) version (Shaffer and Craft, 1999).

Although a screening strategy appears to be quite promising, a number of dilemmas still need to be addressed. First, because suicide risk “waxes and wanes” over time, multiple screenings may be necessary in order to minimize “false-negatives” (Berman and Jobes, 1995). Second, school-wide student screening programs have been rated by high school principals as significantly less acceptable than curriculum-based and staff in-service programs, although most respondents in this study have had either no or minimal exposure to screening programs (Miller et al., 1999). Finally, the ultimate success of this strategy is dependent on the effectiveness of the referral. Considerable effort must be made to assist the families and adolescents in obtaining help if it is needed.

Gatekeeper Training. Programs to train school personnel as gatekeepers are based on the premise that suicidal youths are underidentified and that we can increase identification by providing adults with knowledge about suicide. Only 9% of a national random sample of U.S. high school teachers believed they could recognize a student at risk for suicide, and while the overwhelming majority of counselors knew the risk factors for suicide, only one in three believed they could identify a student at risk (King et al., 1999).

The purpose of gatekeeper training is to develop the knowledge, attitudes, and skills to identify students at risk, determine the levels of risk, and make referrals when necessary (Garland and Zigler, 1993; Kalafat and Elias, 1995). Research examining the effectiveness of gatekeeper training is limited, but the findings are encouraging, with significant improvements in school personnel’s knowledge, attitudes, intervention skills, preparation for coping with a crisis, referral practices (Garland and Zigler, 1993; King and Smith, 2000; Mackesy-Amiti et al., 1996; Shaffer et al., 1988; Tierney, 1994), and general satisfaction with the training (Nelson, 1987). As previously noted, in-service training programs are significantly more acceptable by principals than school-wide screening programs

(Miller et al., 1999). This is consistent with the finding that 46% of school districts in Washington have gatekeeper training programs, while no districts use group screening of students (Hayden and Lauer, 2000).

Peer Helpers. The rationale underlying these programs is similar to that of suicide awareness programs: Suicidal youths are more likely to confide in a peer than an adult (e.g., Kalafat and Elias, 1994). The role that peers play varies considerably by program, with some limited to listening and reporting any possible warning signs and others involving counseling responsibilities. Many programs address serious mental health problems, such as drug abuse, eating disorders, and depression, with 24% of programs in Washington State involving some suicide prevention role (Lewis and Lewis, 1996). Empirical evaluations of these programs are quite limited (Lewis and Lewis, 1996) and often confined to student satisfaction measures (Morey et al., 1993). Potential negative side effects are rarely examined. To date, there is not a sufficient body of evidence documenting the efficacy or safety of peer helping programs, despite their widespread use (Lewis and Lewis, 1996).

Postvention/Crisis Intervention. The rationale for school-based postvention/crisis intervention is that a timely response to a suicide is likely to reduce subsequent morbidity and mortality in fellow students, including suicidality, the onset or exacerbation of psychiatric disorders (e.g., posttraumatic stress disorder, major depressive disorder), and other symptoms related to pathological bereavement (Brent et al., 1993b,e, 1994b). The major goals of postvention programs are to assist survivors in the grief process, identify and refer those individuals who may be at risk following the suicide, provide accurate information about suicide while attempting to minimize suicide contagion, and implement a structure for ongoing prevention efforts (Hazell, 1993; Underwood and Dunne-Maxim, 1997).

The existing research on school-based postvention programs is sparse. Hazell and Lewin (1993) examined the efficacy of 90-minute group counseling sessions offered to groups of 20 to 30 students on the seventh day following a suicide. No differences in outcome were found between counseled subjects and matched controls. It was unclear whether this finding was due to inclusion criteria for postvention counseling (close friends of deceased student), the intervention itself, or the duration of the distress, or whether short-term effects dissipated by the assessment at 8 months after the death. An encouraging, though small and methodologically limited, study by Poijula et al. (2001) found that

no new suicides took place during a 4-year follow-up period in schools where an adequate intervention took place, whereas the number of suicides significantly increased after suicides with no adequate subsequent crisis intervention. It is imperative for crisis interventions to be well planned and evaluated; otherwise, not only may they not help survivors, but they may potentially exacerbate problems through the induction of imitation.

Community-Based Prevention Programs

Crisis Centers and Hotlines. The rationale for crisis hotlines (Mishara and Daigle, 2001; Shaffer et al., 1988; Shneidman and Farberow, 1957) is that suicidal behavior is often associated with a crisis (Brent et al., 1993c; Gould et al., 1996; Marttunen et al., 1993; Rich et al., 1988; Runeson, 1990) and telephone crisis services can provide the opportunity for immediate support at these critical times by offering services that are convenient, accessible, and available outside of usual office hours.

Evidence of their efficacy on adult suicide is equivocal (Lester, 1997), and few studies have examined the utilization or efficacy of hotlines among teenagers (Boehm and Campbell, 1995; King, 1977; Slem and Cotler, 1973). Overall, between 1% and 6% of adolescents in the community use hotlines (Offer et al., 1991; Slem and Cotler, 1973; Vieland et al., 1991) and only 4% of calls concern suicide (Boehm and Campbell, 1995). However, between 14% and 18% of suicidal youths have used hotlines (Beautrais et al., 1998; Shaffer et al., 1990). There is a dearth of information about the efficacy of telephone crisis services for teenagers and whether they adequately address suicide risk.

Restrictions of Firearms. The underlying rationale for means restrictions is that suicidal individuals are often impulsive, they may be ambivalent about killing themselves, and the risk period for suicide is transient (Hawton et al., 2001; Miller and Hemenway, 1999). Restricting access to lethal methods during this period may prevent suicides, although it is not clear that method restriction has substantially contributed to the recent secular change in youth suicide.

Because the most common method of committing suicide in the United States is by firearms (CDC, 2002), this review will focus on restricting their access. The presence of firearms in the home is a significant risk factor for suicide in youths (Brent et al., 1988, 1991, 1993d, 1999) and adults (Kellermann et al., 1992). Several studies have found that restrictions on guns reduced the over-

all suicide rate, as well as firearm-related suicides (e.g., Boor and Bair, 1990; Carrington and Moyer, 1994; Lester and Murrell, 1980, 1986; Loftin et al., 1991; Medoff and Magaddino, 1983), while others have found no overall effect (Rich et al., 1990) or equivocal results (Cantor and Slater, 1995; Cummings et al., 1997; Sloan et al., 1990). The equivocal findings largely reflected age-specific effects (Cantor and Slater, 1995; Sloan et al., 1990), in that restrictive gun laws had a greater impact on adolescents and young adults. Unfortunately, recent legislative initiatives such as the 1994 Brady Bill, which imposes a delay in purchasing a handgun, did not find promising results: A comparison of states that did and did not pass Brady Bill statutes showed no impact on the proportion of suicides attributable to firearms except in elderly males (Ludwig and Cook, 2000).

Less controversial means-restriction measures in the United States involve education to parents of high-risk youths. Kruesi and colleagues (1999) demonstrated that injury prevention education in emergency rooms led parents to take new action to limit access to lethal means, such as locking up their firearms. Unfortunately, Brent et al. (2000) found that parents of depressed adolescents were frequently noncompliant with recommendations to remove firearms from the home.

A common concern is that method substitution will occur following a means-restriction program. Some evidence of method substitution exists (Lester and Leenaars, 1993; Lester and Murrell, 1982; Rich et al., 1990); however, method substitution does not appear to be an inevitable reaction to firearms restriction (Cantor and Slater, 1995; Carrington and Moyer, 1994; Lester and Murrell, 1986; Loftin et al., 1991). Moreover, even if some individuals do substitute other methods, the chances of survival may be greater if the new methods are less lethal (Cantor and Baume, 1998).

Media Education. Given the substantial evidence for suicide contagion, a recommended suicide prevention strategy involves educating media professionals about contagion, in order to yield stories that minimize harm. Moreover, the media's positive role in educating the public about risks for suicide and shaping attitudes about suicide should be encouraged.

A set of recommendations on reporting of suicide were recently developed by an international workgroup headed by the American Foundation for Suicide Prevention and the Annenberg School of Communication and Public Policy (American Foundation for Suicide Prevention,

2001). Guidelines for media reporting now exist in several countries. Recommendations generally include descriptions of factors that should be avoided because they are more likely to induce contagion (e.g., front page coverage) and suggestions on how to increase the usefulness of the report (e.g., describing treatment resources).

Following the implementation of media guidelines in Austria, suicide rates declined 7% in the first year, nearly 20% in the 4-year follow-up period, and subway suicides (a particular focus of the media guidelines) decreased by 75% (Etzersdorfer et al., 1992; Etzersdorfer and Sonneck, 1998; Sonneck et al., 1994). In Switzerland, Michel et al. (2000) found that following the implementation of guidelines, the number of articles increased but they were significantly shorter and less likely to be on the front page; headlines, pictures, and text were less sensational; there were relatively fewer articles with pictures; and their overall "Imitation Risk Scores" were lower. Given the successful strategy of engaging the media in Austria and Switzerland, efforts to systematically disseminate and evaluate media recommendations in the United States are recommended.

Health Care-Based Prevention Programs

Educational/Training Programs for Primary Care Physicians and Pediatricians. The need for training primary care physicians and pediatricians in the United States is highlighted by the finding that while 72% of 600 family physicians and pediatricians in North Carolina had prescribed a SSRI for a child or adolescent patient, only 8% said they had received adequate training in the treatment of childhood depression and only 16% reported that they felt comfortable treating children for depression (Voelker, 1999). Furthermore, although many suicidal young people (15–34 years) seek general medical care in the month preceding their suicidal behavior (Pfaff et al., 1999), fewer than half of physicians surveyed reported that they routinely screen their patients for suicide risk (Frankenfield et al., 2000).

Pfaff et al. (2001) demonstrated that after a 1-day training workshop for 23 primary care physicians in Australia, inquiry about suicidal ideation increased by 32.5% and identification of suicidal patients increased by 130%, although no significant change in patient management resulted and referrals of suicidal youths to mental health specialists remained low. The effectiveness of educational programs for health care professionals has also been demonstrated by the Gotland study (Rutz et al., 1992). After the implementation of an intensive postgraduate training pro-

gram aimed at improving general practitioners' diagnosis and treatment of depression on the island of Gotland, Sweden, the adult suicide rate significantly declined. The decline was almost totally due to decreases in female suicides with major depression (the number of male suicides was unchanged). Three years after the project ended, the suicide rate returned almost to baseline rates (Rihmer et al., 1995), suggesting that ongoing repetition of the educational program is warranted. A similar educational program for pediatricians could be an effective youth suicide prevention strategy; however, other adjunctive approaches to reach at-risk males should be considered.

TREATMENT

Recent reviews (e.g., Hawton et al., 1998, 2002; Rudd, 2000) note that few studies have systematically evaluated interventions aimed at reducing suicidal ideation and behavior in children and adolescents, i.e., randomized controlled trials that obtain reliable and valid measures of outcome variables during pretreatment, posttreatment, and follow-up periods. Most treatment efficacy studies of adolescent psychiatric populations exclude suicidal individuals, possibly because the potential risks of treating high-risk youths outweigh benefits. The National Institute of Mental Health recently published guidelines that highlight a number of ethical, legal, and safety considerations associated with such studies (Pearson et al., 2001).

Treatment Service Utilization

Many adolescents contact a mental health professional before their suicidal behavior. Among suicide completers, rates of contact vary from 7% to 15% within the previous month, 20% to 25% within the previous year, and 25% to 35% over the lifetime (Brent et al., 1993a; Groholt et al., 1997; Marttunen et al., 1992; Shaffer et al., 1996). Contact rates were higher, between 59% and 78%, in a New Zealand sample of attempters admitted for 24-hour hospital stay (Beautrais et al., 1998).

Emergency/Crisis-Service Interventions and Triage

Procedures for the acute care of suicidal adolescents have been described elsewhere (American Academy of Child and Adolescent Psychiatry, 2001). These recommendations are largely based on common sense approaches and expert clinical consensus. Such guidelines emphasize that certain preconditions must be satisfied before children and adolescents are discharged from the emergency service, e.g., the need to "sanitize" the home—make

firearms and/or lethal medications inaccessible to the child (Kruesi et al., 1999).

Similarly, a written or verbal "no-suicide" contract is commonly negotiated at the start of treatment in the hope that it will improve treatment compliance and reduce the likelihood of further suicidal behavior (Brent, 1997; Rotheram, 1987). However, no empirical studies have evaluated the effectiveness of no-suicide contracts (Reid, 1998).

Rotheram-Borus et al. (1999) found that the implementation of a brief set of specialized emergency room procedures increased eventual treatment adherence among Latina adolescent suicide attempters. The procedures augmented typical emergency room care by (1) using a standardized protocol for training emergency room staff, (2) presenting a 20-minute videotape to patients and their families that models realistic expectations for aftercare treatment, and (3) providing a bilingual crisis therapist to promote compliance with outpatient therapy. Suicidal adolescents receiving the specialized emergency room procedure attended 3.8 more outpatient follow-up sessions than those receiving standard aftercare. The research was not able to identify which of these components were responsible for the increase in compliance.

Inpatient Care and Partial Hospitalization

While inpatient and partial hospitalization offer intensive multidisciplinary treatments and skilled observation and support, there is no empirical evidence that either of these interventions is effective in reducing rates of suicidal ideation, nonlethal attempts, or completed suicide among adolescents.

Outpatient Follow-up Treatment

Generally low rates of compliance with outpatient treatment among adolescent suicide attempters (e.g., Piacentini et al., 1995) make such investigations difficult to implement. Dropout rates as high as 59% have been reported (Spirito et al., 1992). King et al. (1997) found that compliance rates were highest for medication follow-up (66.7%), relative to rates for individual therapy (50.8%) and family therapy/parent psychoeducation (33.3%). Results of that study also indicate that non-compliance is associated with parental psychopathology and family dysfunction.

Psychotherapy

Hawton et al. (1998, 2002) reviewed all randomized controlled trials targeting suicide attempters. Of 23 stud-

ies, only two explicitly obtained an adolescent sample (Cotgrove et al., 1995; Harrington et al., 1998). Unsuccessful treatments included problem-solving (e.g., Rudd et al., 1996), enhanced access to clinical service (e.g., Cotgrove et al., 1995; van der Sande et al., 1997), and home-based family therapy (Harrington et al., 1998). The only psychotherapy that has been shown to reduce repeat attempts in a randomized clinical trial is dialectical behavior therapy (DBT), a 12-month cognitive-behavioral intervention designed for adults with borderline personality disorder (Linehan et al., 1991). This study found that adults assigned to DBT engaged in fewer and less severe parasuicidal behaviors post-treatment than patients assigned to treatment-as-usual, but this may partly be attributable to higher baseline attempt rates characteristic of patients with borderline personality disorder. Downward extensions of DBT such as DBT-A (Miller et al., 1997a) may be of value; however, they have not yet been systematically evaluated in this age group or in males, who are most at risk for suicide (Anderson, 2002). No studies of cognitive-behavioral therapy with adolescent suicide attempters have been published, although it has been used successfully in adolescent patients with depression (Brent et al., 1997; Harrington and Clark, 1998).

Psychopharmacological Interventions

To our knowledge, there have been no psychopharmacological studies that have specifically targeted suicidal adolescents. However, it is likely that in spite of the absence of documented support, the use of SSRIs is common among teenagers who have been referred for suicidal ideation or after they have made an attempt. Rates of prescription of antidepressants among teenagers are extremely high (Olfson et al., 2002b) and almost certainly include adolescents who have attempted suicide. Indeed, this practice may be a factor leading to the dramatic and encouraging decline in youth suicide rates over the past decade (Isacsson, 2000). There are few a priori reasons not to treat suicidal adolescents with SSRIs, providing their progress and response to the medication is closely monitored.

SSRI antidepressants have been shown to reduce suicidal ideation in both depressed (Letizia et al., 1996) and nondepressed adults with cluster B personality disorders (Verkes et al., 1998) and in individuals who have made a limited number of previous suicide attempts. SSRIs have been shown to be more effective than placebo in treating depressed teenagers (Emslie and Mayes, 2001; Emslie et al., 1997; Keller et al., 2001), they are consid-

erably less dangerous in overdose than are tricyclic antidepressants (Ryan and Varma, 1998), and there is evidence that they reduce the frequency of impulsive and aggressive behaviors (Coccaro and Kavoussi, 1997), which are a common occurrence in suicidal teenagers.

In rare instances, ruminative suicidal ideation combined with akathisia can occur during the course of antipsychotic (Hamilton and Opler, 1992) or SSRI treatment (King et al., 1991; Teicher et al., 1990). This complication has been reported to respond to propranolol (Adler et al., 1985; Chandler, 1990). When SSRI treatment is started, parents should be routinely advised to inform the psychiatrist if akathisia develops; the suicidal teenager should likewise be advised to inform parents or physicians if there is an upsurge in suicidal ideation.

In adults with bipolar or other major affective disorders, long-term lithium treatment significantly reduces the recurrence of suicide attempts (Tondo et al., 1997) and sudden withdrawal from lithium increases the risk of suicide independent of any effect on other symptoms of mania (Tondo and Baldessarini, 2000). Similarly, clozapine is effective in reducing suicidality in adults with schizophrenia even when there is no apparent effect or impact on other symptoms of schizophrenia (see Meltzer, 2001). The antisuicidal effects of lithium and clozapine have not been assessed in children or adolescents. If lithium is being used to treat an adolescent, it would be wise to observe the same degree of caution as has been used in adults with respect to sudden withdrawal of the medication.

CONCLUSIONS

The past decade has witnessed a surge in research on youth suicide risk. The current review has underscored youth psychiatric disorder, a family history of suicide and psychopathology, stressful life events, and access to firearms as key risk factors for youth suicide. Exciting new findings have emerged on the biology of suicide in adults, but, while encouraging, these are yet to be replicated in youths. Factors that had been previously thought to be risks for youth suicide, such as divorce and impaired parent-child relationships, have been found to be largely explained by underlying psychiatric problems in the youth and/or parents, whereas other risk factors, such as same-sex sexual orientation and sexual abuse, while mediated by other psychosocial risks, have recently been found to make an independent contribution to youth suicide.

Despite the burgeoning research literature on risk factors, there remains a paucity of information on protec-

tive factors. Family cohesiveness and religiosity may be somewhat protective, but much more work needs to be done before we can have confidence that they mitigate the impact of accumulating risk factors. Future research needs to increasingly identify factors that protect against suicidal behavior so that they may be enhanced.

Several promising empirically based prevention strategies have been identified, including school-based skills training for students, screening for at-risk youths, education of primary care physicians, media education, and lethal-means restriction; however, these strategies need continuing evaluation studies before their efficacy can be established.

Because the decline in youth suicide seems likely to be a product of more widely administered and more effective treatment, the burden on professionals to identify depressed and suicidal teenagers and bring them to treatment is greater than ever before. Well-designed studies on candidate medications and psychotherapies must be conducted as a matter of urgency.

Given the complexity of the mechanism of youth suicide, it seems likely that no one prevention/intervention strategy, by itself, is enough to combat this critical problem. Rather, a comprehensive, integrated effort, involving multiple domains—the individual, family, school, community, media, and health care system—is needed.

REFERENCES

- Adler L, Angrist B, Peselow E, Corwin J, Rotrosen J (1985), Efficacy of propranolol in neuroleptic-induced akathisia. *J Clin Psychopharmacol* 5:164–166
- Agerbo E, Nordentoft M, Mortensen PB (2002), Familial, psychiatric, and socioeconomic risk factors for suicide in young people: nested case-control study. *BMJ* 325:74
- American Academy of Child and Adolescent Psychiatry (2001), Practice parameters for the assessment and treatment of children and adolescents with suicidal behavior. *J Am Acad Child Adolesc Psychiatry* 40(suppl):24S–51S
- American Foundation for Suicide Prevention (2001), *Reporting a Suicide: Recommendations for the Media*. Available online: www.afsp.org (accessed July 1, 2002)
- Anderson RN (2002), Deaths: leading causes for 2000. *National Vital Statistics Reports* 50(16). Hyattsville, MD: National Center for Health Statistics
- Andrews JA, Lewinsohn PM (1992), Suicidal attempts among older adolescents: prevalence and co-occurrence with psychiatric disorders. *J Am Acad Child Adolesc Psychiatry* 31:655–662
- Andrus JK, Fleming DW, Heumann MA, Wassell JT, Hopkins DD, Gordon J (1991), Surveillance of attempted suicide among adolescents in Oregon, 1988. *Am J Public Health* 81:1067–1069
- Apter A, Bleich A, King R et al. (1993a), Death without warning? A clinical postmortem study of suicide in 43 Israeli adolescent males. *Arch Gen Psychiatry* 50:138–142
- Apter A, Plutchik R, van Praag HM (1993b), Anxiety, impulsivity and depressed mood in relation to suicidal and violent behavior. *Acta Psychiatr Scand* 87:1–5
- Arango V, Underwood MD, Boldrini M et al. (2001), Serotonin 1A receptors, serotonin transporter binding and serotonin transporter mRNA expression in the brainstem of depressed suicide victims. *Neuropsychopharmacology* 25:892–903
- Asarnow J, Carlson G, Guthrie D (1987), Coping strategies, self-perceptions, hopelessness, and perceived family environments in depressed and suicidal children. *J Consult Clin Psychol* 55:361–366
- Barracough BM, Bunch J, Nelson B, Sainsbury P (1974), A hundred cases of suicide: clinical aspects. *Br J Psychiatry* 125:355–373
- Beautrais AL (2001), Child and young adolescent suicide in New Zealand. *Aust N Z J Psychiatry* 35:647–653
- Beautrais AL, Joyce PR, Mulder RT (1996), Risk factors for serious suicide attempts among youths aged 13 through 24 years. *J Am Acad Child Adolesc Psychiatry* 35:1174–1182
- Beautrais AL, Joyce PR, Mulder RT (1997), Precipitating factors and life events in serious suicide attempts among youths aged 13 through 24 years. *J Am Acad Child Adolesc Psychiatry* 36:1543–1551
- Beautrais AL, Joyce PR, Mulder RT (1998), Psychiatric contacts among youths aged 13 through 24 years who have made serious suicide attempts. *J Am Acad Child Adolesc Psychiatry* 37:504–511
- Bennett PJ, McMahon WM, Watabe J et al. (2000), Tryptophan hydroxylase polymorphisms in suicide victims. *Psychiatr Genet* 10:13–17
- Berman AL, Jobes DA (1995), Suicide prevention in adolescents (age 12–18). *Suicide Life Threat Behav* 25:143–154
- Blake SM, Ledsky R, Lehman T, Goodenow C, Sawyer R, Hack T (2001), Preventing sexual risk behaviors among gay, lesbian, and bisexual adolescents: the benefits of gay-sensitive HIV instruction in schools. *Am J Public Health* 91:940–946
- Boehm KE, Campbell NB (1995), Suicide: a review of calls to an adolescent peer listening phone service. *Child Psychiatry Hum Dev* 26:61–66
- Boor M, Bair JH (1990), Suicide rates, handgun control laws, and socio-demographic variables. *Psychol Rep* 66:923–930
- Borowsky IW, Resnick MD, Ireland M, Blum RW (1999), Suicide attempts among American Indian and Alaska Native youth: risk and protective factors. *Arch Pediatr Adolesc Med* 153:573–580
- Brent DA (1997), The aftercare of adolescents with deliberate self-harm. *J Child Psychol Psychiatry* 38:277–286
- Brent DA, Baugher M, Birmaher B, Kolko DJ, Bridge J (2000), Compliance with recommendations to remove firearms in families participating in a clinical trial for adolescent depression. *J Am Acad Child Adolesc Psychiatry* 39:1220–1226
- Brent DA, Baugher M, Bridge J, Chen T, Chiappetta L (1999), Age- and sex-related risk factors for adolescent suicide. *J Am Acad Child Adolesc Psychiatry* 38:1497–1505
- Brent DA, Bridge J, Johnson BA, Connolly J (1996), Suicidal behavior runs in families: a controlled family study of adolescent suicide victims. *Arch Gen Psychiatry* 53:1145–1152
- Brent DA, Holder D, Kolko D et al. (1997), A clinical psychotherapy trial for adolescent depression comparing cognitive, family, and supportive therapy. *Arch Gen Psychiatry* 54:877–885
- Brent DA, Kerr MM, Goldstein C, Bozigar J, Wartella ME, Allan MJ (1989), An outbreak of suicide and suicidal behavior in high school. *J Am Acad Child Adolesc Psychiatry* 28:918–924
- Brent DA, Perper JA, Allman CJ, Moritz GM, Wartella ME, Zelenak JZ (1991), The presence and accessibility of firearms in the homes of adolescent suicides: a case-control study. *JAMA* 266:2989–2995
- Brent DA, Perper JA, Goldstein CE et al. (1988), Risk factors for adolescent suicide: a comparison of adolescent suicide victims with suicidal inpatients. *Arch Gen Psychiatry* 45:581–588
- Brent DA, Perper JA, Moritz G et al. (1993a), Psychiatric risk factors for adolescent suicide: a case-control study. *J Am Acad Child Adolesc Psychiatry* 32:521–529
- Brent DA, Perper JA, Moritz GM et al. (1993b), Bereavement or depression? The impact of the loss of a friend to suicide. *J Am Acad Child Adolesc Psychiatry* 32:1189–1197
- Brent DA, Perper JA, Moritz G et al. (1993c), Stressful life events, psychopathology and adolescent suicide: a case control study. *Suicide Life Threat Behav* 23:179–187
- Brent DA, Perper JA, Moritz GM, Baugher M, Schweers J, Ross C (1993d), Firearms and adolescent suicide: a community case control study. *Am J Dis Child* 147:1066–1071

- Brent DA, Perper JA, Moritz GM et al. (1993e), Adolescent witness to a peer suicide. *J Am Acad Child Adolesc Psychiatry* 32:1184–1188
- Brent DA, Perper JA, Moritz G et al. (1994a), Familial risk factors for adolescent suicide: a case-control study. *Acta Psychiatr Scand* 89:52–58
- Brent DA, Perper JA, Moritz GM, Liotus L, Schweers J, Canobbio R (1994b), Major depression or uncomplicated bereavement? A follow-up of youth exposed to suicide. *J Am Acad Child Adolesc Psychiatry* 33:231–239
- Bridge JA, Brent D, Johnson BA, Connolly J (1997), Familial aggregation of psychiatric disorders in a community sample of adolescents. *J Am Acad Child Adolesc Psychiatry* 36:628–636
- Brown J, Cohen P, Johnson JG, Smailes EM (1999), Childhood abuse and neglect: specificity of effects on adolescent and young adult depression and suicidality. *J Am Acad Child Adolesc Psychiatry* 38:1490–1496
- Cantor CH, Baume PJ (1998), Access to methods of suicide: what impact? *Aust N Z J Psychiatry* 31:8–14
- Cantor CH, Slater PJ (1995), The impact of firearm control legislation on suicide in Queensland: preliminary findings. *Med J Aust* 162:583–585
- Carrington PJ, Moyer S (1994), Gun control and suicide in Ontario. *J Psychiatry* 151:606–608
- Centers for Disease Control and Prevention (1994), Programs for the prevention of suicide among adolescents and young adults; and Suicide contagion and the reporting of suicide: recommendations from a national workshop. *MMWR Morb Mortal Wkly Rep* 43:1–19
- Centers for Disease Control and Prevention (1995), Youth Risk Behavior Surveillance—United States, 1993. *MMWR Morb Mortal Wkly Rep* 44(SS01):1–56
- Centers for Disease Control and Prevention (1996), Youth Risk Behavior Surveillance—United States, 1995. *MMWR Morb Mortal Wkly Rep* 45(SS04):1–84
- Centers for Disease Control and Prevention (1998), Youth Risk Behavior Surveillance—United States, 1997. *MMWR Morb Mortal Wkly Rep* 47(SS03):1–89
- Centers for Disease Control and Prevention (2000), Youth Risk Behavior Surveillance—United States, 1999. *MMWR Morb Mortal Wkly Rep* 49(SS05):1–96
- Centers for Disease Control and Prevention (2002), Mortality Query, CDC Wonder, Data and Statistics (<http://wonder.cdc.gov/mortsql.html>; accessed 4/10/02)
- Chandler JD (1990), Propranolol treatment of akathisia in Tourette's syndrome. *J Am Acad Child Adolesc Psychiatry* 29:475–477
- Chang EC (2002), Predicting suicide ideation in an adolescent population: examining the role of social problem solving as a moderator and a mediator. *Pers Individ Dif* 32:1279–1291
- Ciffone J (1993), Suicide prevention: a classroom presentation to adolescents. *Soc Work* 38:197–203
- Coccaro EF, Kavoussi RJ (1997), Fluoxetine and impulsive aggressive behavior in personality-disordered subjects. *Arch Gen Psychiatry* 54:1081–1088
- Cole DA (1988), Hopelessness, social desirability, depression, and parasuicide in two college student samples. *J Consult Clin Psychol* 56:131–136
- Cole DA (1989), Psychopathology of adolescent suicide: hopelessness, coping beliefs, and depression. *J Abnorm Psychol* 98:248–255
- Cotgrove A, Zirinsky L, Black D, Weston D (1995), Secondary prevention of attempted suicide in adolescence. *J Adolesc* 18:569–577
- Courter P, Baud P, Abbar M et al. (2001), Association between violent suicidal behavior and the low activity allele of the serotonin transporter gene. *Mol Psychiatry* 6:338–341
- Cummings P, Koepsell TD, Grossman DC, Savarino J, Thompson RS (1997), The association between the purchase of a handgun and homicide or suicide. *Am J Public Health* 87:974–978
- Cutright P, Fernquist RM (2000), Firearms and suicide: the American experience, 1926–1996. *Death Stud* 24:705–719
- Demetriades D, Murray J, Myles D et al. (1998), Epidemiology of major trauma and trauma deaths in Los Angeles County. *J Am Coll Surg* 187:373–383
- Du L, Faludi G, Palkovits M, Bakish D, Hrdina PD (2001), Serotonergic genes and suicidality. *Crisis* 22:54–60
- Durkheim E (1966), *Suicide*. New York: Free Press
- Eggert LL, Thompson EA, Herting JR, Nicholas LJ (1995), Reducing suicide potential among high-risk youth: tests of a school-based prevention program. *Suicide Life Threat Behav* 25:276–296
- Emslie GJ, Mayes TL (2001), Mood disorders in children and adolescents: psychopharmacological treatment. *Biol Psychiatry* 49:1082–1090
- Emslie GJ, Rush AJ, Weinberg WA et al. (1997), A double-blind, randomized, placebo-controlled trial of fluoxetine in children and adolescents with depression. *Arch Gen Psychiatry* 54:1031–1037
- Etzersdorfer E, Sonneck G (1998), Preventing suicide by influencing mass-media reporting: the Viennese experience 1980–1996. *Arch Suicide Res* 4:67–74
- Etzersdorfer E, Sonneck G, Nagel-Kuess S (1992), Newspaper reports and suicide. *N Engl J Med* 327:502–503
- Faulkner AH, Cranston K (1998), Correlates of same-sex behavior in a random sample of Massachusetts high school students. *Am J Public Health* 88:262–266
- Fekete S, Macsai E (1990), Hungarian suicide models, past and present. In: *Suicidal Behavior and Risk Factors*, Ferrari G, ed. Bologna: Monduzzi Editore, pp 149–156
- Fergusson DM, Horwood LJ, Lynskey MT (1996), Childhood sexual abuse and psychiatric disorder in young adulthood, II: psychiatric outcomes of childhood sexual abuse. *J Am Acad Child Adolesc Psychiatry* 35:1365–1374
- Fergusson DM, Lynskey M (1995), Childhood circumstances, adolescent adjustment, and suicide attempts in a New Zealand birth cohort. *J Am Acad Child Adolesc Psychiatry* 34:612–622
- Fergusson DM, Woodward LJ, Horwood LJ (2000), Risk factors and life processes associated with the onset of suicidal behaviour during adolescence and early adulthood. *Psychol Med* 30:23–39
- Frankenfield DL, Keyl PM, Gielen A, Wissow LS, Werthamer L, Baker SP (2000), Adolescent patients: healthy or hurting? Missed opportunities to screen for suicide risk in the primary care setting. *Arch Pediatr Adolesc Med* 154:162–168
- Garland AF, Zigler E (1993), Adolescent suicide prevention: current research and social policy implications. *Am Psychol* 48:169–182
- Garofalo R, Wolf R, Cameron MS, Kessel S, Palfrey J, DuRant RH (1998), The association between health risk behaviors and sexual orientation among a school-based sample of adolescents. *Pediatrics* 101:895–902
- Garrison CZ, McKeown RE, Valois RF, Vincent ML (1993), Aggression, substance use, and suicidal behaviors in high school students. *Am J Public Health* 83:179–184
- Giaconia RM, Reinherz HZ, Silverman AB, Pakiz B, Frost AK, Cohen E (1995), Traumas and posttraumatic stress disorder in a community population of older adolescents. *J Am Acad Child Adolesc Psychiatry* 34:1369–1380
- Gibbs JT (1997), African-American suicide: a cultural paradox. *Suicide Life Threat Behav* 27:68–79
- Glowinski AL, Bucholz KK, Nelson EC et al. (2001), Suicide attempts in an adolescent female twin sample. *J Am Acad Child Adolesc Psychiatry* 40:1300–1307
- Goodwin R, Gould MS, Blanco C, Olfson M (2001), Prescription of psychotropic medications to youths in office-based practice. *Psychiatr Serv* 52:1081–1087
- Gould MS (2001), Suicide and the media. In: *Suicide Prevention: Clinical and Scientific Aspects, Annals of the New York Academy of Sciences*, Hendin H, Mann JJ, eds. New York: New York Academy of Sciences
- Gould MS, Fisher P, Parides M, Flory M, Shaffer D (1996), Psychosocial risk factors of child and adolescent completed suicide. *Arch Gen Psychiatry* 53:1155–1162
- Gould MS, King R, Greenwald S et al. (1998), Psychopathology associated with suicidal ideation and attempts among children and adolescents. *J Am Acad Child Adolesc Psychiatry* 37:915–923
- Gould MS, Kramer RA (2001), Youth suicide prevention. *Suicide Life Threat Behav* 31(suppl):6–31
- Gould MS, Petrie K, Kleinman M, Wallenstein S (1994), Clustering of attempted suicide: New Zealand national data. *Int J Epidemiol* 23:1185–1189
- Gould MS, Wallenstein S, Kleinman M (1990a), Time-space clustering of teenage suicide. *Am J Epidemiol* 131:71–78
- Gould MS, Wallenstein S, Kleinman M, O'Carroll P, Mercy J (1990b), Suicide clusters: an examination of age-specific effects. *Am J Public Health* 80:211–212
- Groholt B, Ekeberg O, Wichstrom L, Haldorsen T (1997), Youth suicide in Norway, 1990–1992: a comparison between children and adolescents completing suicide and age- and gender-matched controls. *Suicide Life Threat Behav* 27:250–263

- Groholt B, Ekeberg O, Wichstrom L, Haldorsen T (1998), Suicide among children and younger and older adolescents in Norway: a comparative study. *J Am Acad Child Adolesc Psychiatry* 37:473-481
- Groholt B, Ekeberg O, Wichstrom L, Haldorsen T (2000), Young suicide attempters: a comparison between a clinical and an epidemiological sample. *J Am Acad Child Adolesc Psychiatry* 39:868-875
- Grunbaum JA, Basen-Engquist K, Pandey D (1998), Association between violent behaviors and substance use among Mexican-American and non-Hispanic white high school students. *J Adolesc Health* 23:153-159
- Grunbaum JA, Kann L, Kinchen SA et al. (2002), Youth Risk Behavior Surveillance—United States, 2001. *MMWR CDC Surveill Summ* 51(SS4):1-64
- Guo G, Harstall C (2002), *Efficacy of Suicide Prevention Programs for Children and Youth*. HTA 26: Services A Health Technology Assessment. Alberta, Canada: Alberta Heritage Foundation for Medical Research (available from Director, Health Technology Assessment, Alberta Heritage Foundation for Medical Research, 1500, 10104-103 Avenue, Edmonton, Alberta, Canada T5J 4A7; 780-423-5727)
- Hamilton MS, Opler LA (1992), Akathisia, suicidality, and fluoxetine. *J Clin Psychiatry* 53:401-406
- Harrington R, Clark A (1998), Prevention and early intervention for depression in adolescence and early adult life. *Eur Arch Psychiatry Clin Neurosci* 248:32-45
- Harrington R, Kerfoot M, Dyer E et al. (1998), Randomized trial of a home-based family intervention for children who have deliberately poisoned themselves. *J Am Acad Child Adolesc Psychiatry* 37:512-518
- Hassan R (1995), Effects of newspaper stories on the incidence of suicide in Australia: a research note. *Aust N Z J Psychiatry* 29:480-483
- Hawton K, Arensman E, Townsend E et al. (1998), Deliberate self harm: systematic review of efficacy of psychosocial and pharmacological treatments in preventing repetition. *BMJ* 317:441-447
- Hawton K, Townsend E, Arensman E et al. (2002), Psychosocial versus pharmacological treatments for deliberate self-harm. *Cochrane Database Syst Rev* 2:CD001764
- Hawton K, Townsend E, Deeks J et al. (2001), Effects of legislation restricting pack sizes of paracetamol and salicylate on self poisoning in the United Kingdom: before and after study. *BMJ* 322:1203-1207
- Hayden DC, Lauer P (2000), Prevalence of suicide programs in schools and roadblocks to implementation. *Suicide Life Threat Behav* 30:239-251
- Haynes RH (1987), Suicide and social response in Fiji: a historical survey. *Br J Psychiatry* 151:21-26
- Hazell P (1993), Adolescent suicide clusters: evidence, mechanisms and prevention. *Aust N Z J Psychiatry* 27:653-665
- Hazell P, King R (1996), Arguments for and against teaching suicide prevention in schools. *Aust N Z J Psychiatry* 30:633-642
- Hazell P, Lewin T (1993), An evaluation of postvention following adolescent suicide. *Suicide Life Threat Behav* 23:101-109
- Heath AC, Howells W, Bucholz KK, Glowinski AL, Nelson EC, Madden PA (2002), Ascertainment of a mid-western US female adolescent twin cohort for alcohol studies: assessment of sample representativeness using birth record data. *Twin Res* 5:107-112
- Hilton SC, Fellingham GW, Lyon JL (2002), Suicide rates and religious commitment in young adult males in Utah. *Am J Epidemiol* 155:413-419
- Hovey JD (1999), Religion and suicidal ideation in a sample of Latin American immigrants. *Psychol Rep* 85:171-177
- Howard-Pitney B, LaFromboise TD, Basil M, September B, Johnson M (1992), Psychological and social indicators of suicide ideation and suicide attempts in Zuni adolescents. *J Consult Clin Psychol* 60:473-476
- Hulten A, Jiang GX, Wasserman D et al. (2001), Repetition of attempted suicide among teenagers in Europe: frequency, timing and risk factors. *Eur Child Adolesc Psychiatry* 10:161-169
- Isacson G (2000), Suicide prevention: a medical breakthrough? *Acta Psychiatr Scand* 102:113-117
- Ishii K (1991), Measuring mutual causation: effect of suicide news on suicides in Japan. *Soc Sci Res* 20:188-195
- Joffe RT, Offord DR, Boyle MH (1988), Ontario Child Health Study: suicidal behavior in youth aged 12-16 years. *Am J Psychiatry* 145:1420-1423
- Johnson BA, Brent DA, Bridge J, Connolly J (1998), The familial aggregation of adolescent suicide attempts. *Acta Psychiatr Scand* 97:18-24
- Johnson J, Weissman MM, Klerman GL (1990), Panic disorder, comorbidity, and suicide attempts. *Arch Gen Psychiatry* 47:805-808
- Johnson JG, Cohen P, Gould MS, Kasen S, Brown J, Brook JS (2002), Childhood adversities, interpersonal difficulties, and risk for suicide attempts during late adolescence and early adulthood. *Arch Gen Psychiatry* 59:741-749
- Joiner TE, Pfaff JJ, Acres JG (2002), A brief screening tool for suicidal symptoms in adolescents and young adults in general health settings: reliability and validity data from the Australian National General Practice Youth Suicide Prevention Project. *Behav Res Ther* 40:471-481
- Jonas K (1992), Modelling and suicide: a test of the Werther effect. *Br J Soc Psychol* 31:295-306
- Kalafat J, Elias M (1994), An evaluation of a school-based suicide awareness intervention. *Suicide Life Threat Behav* 24:224-233
- Kalafat J, Elias M (1995), Suicide prevention in an educational context: broad and narrow foci. *Suicide Life Threat Behav* 25:123-133
- Kalafat J, Gagliano C (1996), The use of simulations to assess the impact of an adolescent suicide response curriculum. *Suicide Life Threat Behav* 26:359-364
- Kaltiala-Heino R, Rimpela M, Marttunen M, Rimpela A, Rantanen P (1999), Bullying, depression, and suicidal ideation in Finnish adolescents: school survey. *BMJ* 319:348-351
- Kandel DB (1988), Substance use, depressive mood, and suicidal ideation in adolescence and young adulthood. In: *Advancement in Adolescent Mental Health*, Stiffman AR, Feldman RA, eds. Greenwich, CT: JAI Press, pp 127-142
- Kashani JH, Goddard P, Reid JC (1989), Correlates of suicidal ideation in a community sample of children and adolescents. *J Am Acad Child Adolesc Psychiatry* 28:912-917
- Keller MB, Ryan ND, Strober M et al. (2001), Efficacy of paroxetine in the treatment of adolescent major depression: a randomized, controlled trial. *J Am Acad Child Adolesc Psychiatry* 40:762-772
- Kellermann AL, Rivera FP, Somes G et al. (1992), Suicide in the home in relation to gun ownership. *N Engl J Med* 327:467-472
- Kessler RC, Borges G, Walters EE (1999), Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Study. *Arch Gen Psychiatry* 36:617-626
- King CA, Hovey JD, Brand E, Wilson R, Ghaziuddin N (1997), Suicidal adolescents after hospitalization: parent and family impacts on treatment follow-through. *J Am Acad Child Adolesc Psychiatry* 36:85-93
- King GD (1977), An evaluation of the effectiveness of a telephone counseling center. *Am J Community Psychol* 5:75-83
- King KA, Price JH, Telljohann SK, Wahl J (1999), High school health teachers' perceived self-efficacy in identifying students at risk for suicide. *J Sch Health* 69:202-207
- King KA, Smith J (2000), Project SOAR: a training program to increase school counselors' knowledge and confidence regarding suicide prevention and intervention. *J Sch Health* 70:402-407
- King RA, Riddle MA, Chappell PB et al. (1991), Emergence of self-destructive phenomena in children and adolescents during fluoxetine treatment. *J Am Acad Child Adolesc Psychiatry* 30:179-186
- Kirby D (1985), Sexuality education: a more realistic view of its effects. *J Sch Health* 55:421-424
- Klingman A, Hochdorf Z (1993), Coping with distress and self harm: the impact of a primary prevention program among adolescents. *J Adolesc* 16:121-140
- Kruesi MJ, Grossman J, Pennington JM, Woodward PJ, Duda D, Hirsch JG (1999), Suicide and violence prevention: parent education in the emergency department. *J Am Acad Child Adolesc Psychiatry* 38:250-255
- Krug EG, Powell KE, Dahlbert LL (1998), Firearm-related deaths in the United States and 35 other high- and upper-middle-income countries. *Int J Epidemiol* 27:214-221
- Lester D (1992), Religiosity, suicide and homicide: a cross-national examination. *Psychol Rep* 71:1282
- Lester D (1997), The effectiveness of suicide prevention centers: a review. *Suicide Life Threat Behav* 27:304-310
- Lester D, Leenaars A (1993), Suicide rates in Canada before and after tightening firearm control laws. *Psychol Rep* 72:787-790
- Lester D, Murrell M (1980), The influence of gun control laws on suicidal behavior. *Am J Psychiatry* 137:121-122

- Lester D, Murrell M (1982), The preventive effect of strict gun control laws on suicide and homicide. *Suicide Life Threat Behav* 12:131-141
- Lester D, Murrell M (1986), The influence of gun control laws on personal violence. *J Community Psychol* 14:315-318
- Letizia C, Kapik B, Flanders WD (1996), Suicidal risk during controlled clinical investigations of fluvoxamine. *J Clin Psychiatry* 57:415-421
- Lewinsohn PM, Rohde P, Seeley JR (1993), Psychosocial characteristics of adolescents with a history of suicide attempt. *J Am Acad Child Adolesc Psychiatry* 32:60-68
- Lewinsohn PM, Rohde P, Seeley JR (1994), Psychosocial risk factors for future adolescent suicide attempts. *J Consult Clin Psychol* 62:297-305
- Lewinsohn PM, Rohde P, Seeley JR (1996), Adolescent suicidal ideation and attempts: prevalence, risk factors, and clinical implications. *Clin Psychol Sci Pract* 3:25-36
- Lewinsohn PM, Rohde P, Seeley JR, Baldwin CL (2001), Gender differences in suicide attempts from adolescence to young adulthood. *J Am Acad Child Adolesc Psychiatry* 40:427-434
- Lewis MW, Lewis AC (1996), Peer helping programs: helper role, supervisor training, and suicidal behavior. *J Couns Dev* 74:307-313
- Linehan MM, Armstrong HE, Suarez A, Allmon D, Heard HL (1991), Cognitive-behavioral treatment of chronically parasuicidal borderline patients. *Arch Gen Psychiatry* 48:1060-1064
- Loftin C, McDowall D, Wiersema B, Cottey TJ (1991), Effects of restrictive licensing of handguns on homicide and suicide in the District of Columbia. *N Engl J Med* 325:1615-1620
- Ludwig J, Cook PJ (2000), Homicide and suicide rates associated with implementation of the Brady Handgun Violence Prevention Act. *JAMA* 284:585-591
- Mackesy-Amiti ME, Fendrich M, Libby S, Goldenberg D, Grossman J (1996), Assessment of knowledge gains in proactive training for postvention. *Suicide Life Threat Behav* 26:161-174
- Mann JJ, Stoff DM (1997), A synthesis of current findings regarding neurobiological correlates and treatment of suicidal behavior. *Ann NY Acad Sci* 836:352-363
- Mann JJ, Waternaux C, Haas GL, Malone KM (1999), Toward a clinical model of suicidal behavior in psychiatric patients. *Am J Psychiatry* 156:181-189
- Marcenko MO, Fishman G, Friedman J (1999), Reexamining adolescent suicidal ideation: a developmental perspective applied to a diverse population. *J Youth Adolesc* 28:121-138
- Marshall SE, Bird TG, Hart K, Welsh KI (1999), Unified approach to the analysis of genetic variation in serotonergic pathways. *Am J Med Genet* 88:621-627
- Marttunen MJ, Aro HM, Henriksson MM, Lonnqvist JK (1991), Mental disorders in adolescent suicide. *Arch Gen Psychiatry* 48:834-839
- Marttunen MJ, Aro HM, Henriksson MM, Lonnqvist JK (1994), Psychosocial stressors more common in adolescent suicides with alcohol abuse compared with depressive adolescent suicides. *J Am Acad Child Adolesc Psychiatry* 33:490-497
- Marttunen MJ, Aro HM, Lonnqvist JK (1992), Adolescent suicide: endpoint of long-term difficulties. *J Am Acad Child Adolesc Psychiatry* 31:649-654
- Marttunen MJ, Aro HM, Lonnqvist JK (1993), Precipitant stressors in adolescent suicide. *J Am Acad Child Adolesc Psychiatry* 32:1178-1183
- Mazza JJ (2000), The relationship between posttraumatic stress symptomatology and suicidal behavior in school-based adolescents. *Suicide Life Threat Behav* 30:91-103
- McCormick N, Folcik J, Izzo A (1985), Sex-education needs and interests of high school students in a rural New York county. *Adolescence* 20:581-592
- McDaniel JS, Purcell D, D'Augelli AR (2001), The relationship between sexual orientation and risk for suicide: research findings and future directions for research and prevention. *Suicide Life Threat Behav* 31(suppl):84-105
- McGuffin P, Marusic A, Farmer A (2001), What can psychiatric genetics offer suicidology? *Crisis* 22:61-65
- McKeown RE, Garrison CZ, Cuffe SP, Waller JL, Jackson KL, Addy CL (1998), Incidence and predictors of suicidal behaviors in a longitudinal sample of young adolescents. *J Am Acad Child Adolesc Psychiatry* 37:612-619
- Medoff MH, Magaddino JP (1983), Suicides and firearm control laws. *Eval Rev* 7:357-372
- Meltzer HY (2001), Treatment of suicidality in schizophrenia. *Ann NY Acad Sci* 932:44-58
- Mercy JA, Kresnow MJ, O'Carroll PW et al. (2001), Is suicide contagious? A study of the relation between exposure to the suicidal behavior of others and nearly lethal suicide attempts. *Am J Epidemiol* 154:120-127
- Michel K, Frey C, Wyss K, Valach L (2000), An exercise in improving suicide reporting in print media. *Crisis* 21:1-10
- Middlebrook DL, LeMaster PL, Beals J, Novins DK, Manson SM (2001), Suicide prevention in American Indian and Alaska Native communities: a critical review of programs. *Suicide Life Threat Behav* 31(suppl):132-149
- Miller AL, Rathus JH, Linehan MM, Wetzler S, Leigh E (1997a), Dialectical behavior therapy adapted for suicidal adolescents. *J Pract Psychol Behav Health* 3:78-86
- Miller DN, Eckert TL, DuPaul GJ, White GP (1999), Adolescent suicide prevention: acceptability of school-based programs among secondary school principals. *Suicide Life Threat Behav* 29:72-85
- Miller L, Warner V, Wickramaratne P, Weissman M (1997b), Religiosity and depression: ten-year follow-up of depressed mothers and offspring. *J Am Acad Child Adolesc Psychiatry* 36:1416-1425
- Miller M, Hemenway D (1999), The relationship between firearms and suicide: a review of the literature. *Aggress Violent Behav* 4:59-75
- Mishara BL, Daigle MS (2001), Helplines and crisis intervention services: challenges for the future. In: *Suicide Prevention: Resources for the Millennium*, Lester D, ed. Philadelphia: Brunner/Mazel, pp 153-171
- Morey RE, Miller CD, Rosen LA, Fulton R (1993), High school peer counseling: the relationship between student satisfaction and peer counselors' style of helping. *Sch Couns* 40:293-300
- National Center for Health Statistics (Centers for Disease Control and Prevention) (1999), Data provided by Division of Vital Statistics, Mortality Statistics Branch. Bethesda, MD: National Center for Health Statistics
- Neeleman J (1998), Regional suicide rates in the Netherlands: does religion still play a role? *Int J Epidemiol* 27:466-472
- Neeleman J, Lewis G (1999), Suicide, religion, and socioeconomic conditions: an ecological study in 26 countries, 1990. *J Epidemiol Community Health* 53:204-210
- Nelson F (1987), Evaluation of a youth suicide prevention school program. *Adolescence* 88:813-825
- Neumeister A, Konstantinidis A, Stastny J et al. (2002), Association between serotonin transporter gene promoter polymorphism (5HTTLPR) and behavioral responses to tryptophan depletion in healthy women with and without family history of depression. *Arch Gen Psychiatry* 59:613-620
- Nielsen DA, Goldman D, Virkkunen M, Tokola R, Rawlings R, Linnoila M (1994), Suicidality and 5-hydroxyindoleacetic acid concentration associated with a tryptophan hydroxylase polymorphism. *Arch Gen Psychiatry* 51:34-38
- Nielsen DA, Virkkunen M, Lappalainen J et al. (1998), A tryptophan hydroxylase gene marker for suicidality and alcoholism. *Arch Gen Psychiatry* 55:593-602
- Nordstrom P, Samuelsson M, Asberg M et al. (1994), CSF 5-HIAA predicts suicide risk after attempted suicide. *Suicide Life Threat Behav* 24:1-9
- Offer D, Howard KI, Schonert KA, Ostrov E (1991), To whom do adolescents turn for help? Differences between disturbed and nondisturbed adolescents. *J Am Acad Child Adolesc Psychiatry* 30:623-630
- Olsson M, Marcus SC, Druss B, Pincus HA (2002a), National trends in the use of outpatient psychotherapy. *Am J Psychiatry* 159:1914-1920
- Olsson M, Marcus SC, Weissman MM, Jensen PS (2002b), National trends in the use of psychotropic medications by children. *J Am Acad Child Adolesc Psychiatry* 41:514-521
- Oquendo MA, Mann JJ (2000), The biology of impulsivity and suicidality. *Psychiatr Clin North Am* 23:11-25
- Orbach I, Bar-Joseph H (1993), The impact of a suicide prevention program for adolescents on suicidal tendencies, hopelessness, ego identity, and coping. *Suicide Life Threat Behav* 23:120-129
- Overholser JC, Adams DM, Lehnert KL, Brinkman DC (1995), Self-esteem deficits and suicidal tendencies among adolescents. *J Am Acad Child Adolesc Psychiatry* 34:919-928
- Overholser JC, Hemstreet A, Spirito A, Vyse S (1989), Suicide awareness programs in the schools: effect of gender and personal experience. *J Am Acad Child Adolesc Psychiatry* 28:925-930
- Pearson JL, Stanley B, King C, Fisher C (2001), *Issues to Consider in Intervention Research With Persons at High Risk for Suicidality*. Bethesda, MD: National

- Institute of Mental Health. Available online: <http://www.nimh.nih.gov/research/highrisksuicide.cfm> (accessed July 1, 2002)
- Pfaff J, Acres J, Wilson M (1999), The role of general practitioners in para-suicide: a Western Australia perspective. *Arch Suicide Res* 5:207–214
- Pfaff JJ, Acres JG, McKelvey RS (2001), Training general practitioners to recognise and respond to psychological distress and suicidal ideation in young people. *Med J Aust* 174:222–226
- Pfeffer CR, Klerman GL, Hurt SW, Lesser M, Peskin JR, Siefker CA (1991), Suicidal children grow up: demographic and clinical risk factors for adolescent suicide attempts. *J Am Acad Adolesc Child Psychiatry* 30:609–616
- Piacentini J, Rotheram-Borus MJ, Gillis JR et al. (1995), Demographic predictors of treatment attendance among adolescent suicide attempters. *J Consult Clin Psychol* 63:469–473
- Pilowsky DJ, Wu L, Anthony JC (1999), Panic attacks and suicide attempts in mid-adolescence. *Am J Psychiatry* 156:1545–1549
- Pojula S, Wahlberg KE, Dyregrov A (2001), Adolescent suicide and suicide contagion in three secondary schools. *Int J Emerg Ment Health* 3:163–168
- Randell BP, Eggert LL, Pike KC (2001), Immediate post intervention effects of two brief youth suicide prevention interventions. *Suicide Life Threat Behav* 31:41–61
- Reid WH (1998), Promises, promises: don't rely on patients' no-suicide/no-violence "contracts." *J Pract Psychiatry Behav Health* 4:316–318
- Reifman A, Windle M (1995), Adolescent suicidal behaviors as a function of depression, hopelessness, alcohol use, and social support: a longitudinal investigation. *Am J Community Psychol* 23:329–354
- Reinherz HA, Giaconia RM, Silverman AB et al. (1995), Early psychosocial risks for adolescent suicidal ideation and attempts. *J Am Acad Child Adolesc Psychiatry* 34:599–611
- Remafedi G, French S, Story M, Resnick MD, Blum R (1998), The relationship between suicide risk and sexual orientation: results of a population-based study. *Am J Public Health* 88:57–60
- Reynolds WM (1990), Development of a semi-structured clinical interview for suicidal behaviors in adolescents. *Psychol Assess* 2:382–390
- Reynolds WM (1991), A school-based procedure for the identification of adolescents at risk for suicidal behaviors. *Fam Community Health* 14:64–75
- Rich CL, Fowler RC, Fogarty LA, Young D (1988), San Diego Suicide Study, III: relationships between diagnoses and stressors. *Arch Gen Psychiatry* 45:589–592
- Rich CL, Young JG, Fowler RC, Wagner J, Black NA (1990), Guns and suicide: possible effects of some specific legislation. *Am J Psychiatry* 147:342–346
- Rihmer Z, Rutz W, Pihlgren H (1995), Depression and suicide on Gotland: an intensive study of all suicides before and after a depression-training program for general practitioners. *J Affect Disord* 35:147–152
- Roberts RE, Chen Y (1995), Depressive symptoms and suicidal ideation among Mexican-origin and Anglo adolescents. *J Am Acad Child Adolesc Psychiatry* 34:81–90
- Roberts RE, Chen Y, Roberts CR (1997), Ethnocultural differences in prevalence of adolescent suicidal behaviors. *Suicide Life Threat Behav* 27:208–217
- Robins E, Murphy PI, Wilkinson RH Jr, Gassner S, Kayes J (1959), Some clinical considerations in the prevention of suicide based on a study of 134 successful suicides. *Am J Public Health* 49:888–988
- Ross CP (1985), Teaching children the facts of life and death: suicide prevention in the schools. In: *Youth Suicide*, Peck ML, Farberow NL, Litman RE, eds. New York: Springer, pp 147–169
- Rotheram MJ (1987), Evaluation of imminent danger for suicide among youth. *Am J Orthopsychiatry* 57:102–110
- Rotheram-Borus MJ, Piacentini J, Van Rossem R et al. (1999), Treatment adherence among Latina female adolescent suicide attempters. *Suicide Life Threat Behav* 29:319–331
- Rotheram-Borus MJ, Trautman PD (1988), Hopelessness, depression and suicidal intent among adolescent suicide attempters. *J Am Acad Child Adolesc Psychiatry* 27:700–704
- Rotheram-Borus MJ, Trautman PD, Dopkins SC, Shrout PE (1990), Cognitive style and pleasant activities among female adolescent suicide attempters. *J Consult Clin Psychol* 58:554–561
- Rotondo A, Schuebel K, Bergen A et al. (1999), Identification of four variants in the tryptophan hydroxylase promoter and association to behavior. *Mol Psychiatry* 4:360–368
- Rubenstein JL, Halton A, Kasten L, Rubin C, Stechler G (1998), Suicidal behavior in adolescents: stress and protection in different family contexts. *Am J Orthopsychiatry* 68:274–284
- Rubenstein JL, Heeren T, Housman D, Rubin C, Stechler G (1989), Suicidal behavior in "normal" adolescents: risk and protective factors. *Am J Orthopsychiatry* 59:59–71
- Rudd MD (2000), Integrating science into the practice of clinical suicidology: a review of the psychotherapy literature and a research agenda for the future. In: *Review of Suicidology, 2000*, Maris RW, Canetto SS, eds. New York: Guilford, pp 47–83
- Rudd MD, Rajab MH, Orman DT, Joiner T, Stulman DA, Dixon W (1996), Effectiveness of an outpatient intervention targeting suicidal young adults: preliminary results. *J Consult Clin Psychol* 64:179–190
- Runeson B (1989), Mental disorder in youth suicide: *DSM-III-R* Axes I and II. *Acta Psychiatr Scand* 79:490–497
- Runeson B (1990), Psychoactive substance use disorder in youth suicide. *Alcohol Alcohol* 25:561–568
- Russell ST, Joyner K (2001), Adolescent sexual orientation and suicide risk: evidence from a national study. *Am J Public Health* 91:1276–1281
- Rutz W, von Knorring L, Walinder J (1992), Long-term effects of an educational program for general practitioners given by the Swedish Committee for the Prevention and Treatment of Depression. *Acta Psychiatr Scand* 85:83–88
- Ryan ND, Varma D (1998), Child and adolescent mood disorders: experience with serotonin-based therapies. *Biol Psychiatry* 44:336–340
- Sauvola A, Rasanen PK, Joukamaa MI, Jokelainen J, Jarvelin MR, Isohanni MK (2001), Mortality of young adults in relation to single-parent family background: a prospective study of the northern Finland 1966 birth cohort. *Eur J Public Health* 11:284–286
- Schmidtke A, Schaller S (2000), The role of mass media in suicide prevention. In: *The International Handbook of Suicide and Attempted Suicide*, Hawton K, van Heeringen K, eds. New York: Wiley, pp 675–698
- Shaffer D (1974), Suicide in childhood and early adolescence. *J Child Psychol Psychiatry* 15:275–291
- Shaffer D, Craft L (1999), Methods of adolescent suicide prevention. *J Clin Psychiatry* 60:70–74
- Shaffer D, Garland A, Gould M, Fisher P, Trautman P (1988), Preventing teenage suicide: a critical review. *J Am Acad Child Adolesc Psychiatry* 27:675–687
- Shaffer D, Garland A, Vieland V, Underwood MM, Busner C (1991), The impact of curriculum-based suicide prevention program for teenagers. *J Am Acad Child Adolesc Psychiatry* 30:588–596
- Shaffer D, Gould M, Hicks R (1994), Worsening suicide rate in black teenagers. *Am J Psychiatry* 151:1810–1812
- Shaffer D, Gould MS, Fisher P et al. (1996), Psychiatric diagnosis in child and adolescent suicide. *Arch Gen Psychiatry* 53:339–348
- Shaffer D, Hicks R (1994), Suicide. In: *The Epidemiology of Childhood Disorders*, Pless IB, ed. New York: Oxford University Press, pp 339–365
- Shaffer D, Vieland V, Garland A, Rojas M, Underwood MM, Busner C (1990), Adolescent suicide attempters: response to suicide-prevention programs. *JAMA* 264:3151–3155
- Shafiq M, Carrigan S, Whittinghill JR, Derrick A (1985), Psychological autopsy of completed suicide in children and adolescents. *Am J Psychiatry* 142:1061–1064
- Shafiq M, Steltz-Lenarsky J, Derrick AM, Beckner C, Whittinghill JR (1988), Comorbidity of mental disorders in the post-mortem diagnosis of completed suicide in children and adolescents. *J Affect Disord* 15:227–233
- Shiang J, Blinn R, Bongar B, Stephens B, Allison D, Schatzberg A (1997), Suicide in San Francisco, CA: a comparison of Caucasian and Asian groups, 1987–1994. *Suicide Life Threat Behav* 27:80–91
- Shneidman ES, Farberow NL (1957), *Clues to Suicide*. New York: Blakiston
- Siegrist M (1996), Church attendance, denomination, and suicide ideology. *J Soc Psychol* 136:559–566
- Silbert KL, Berry GL (1991), Psychological effects of a suicide prevention unit on adolescents' levels of stress, anxiety and hopelessness: implications for counselling psychologists. *Couns Psychol* 4:45–58
- Silverman AB, Reinherz HZ, Giaconia RM (1996), The long-term sequelae of child and adolescent abuse: a longitudinal community study. *Child Abuse Negl* 20:709–723

- Slem CM, Cotler S (1973), Crisis phone services: evaluation of a hotline program. *Am J Community Psychol* 1:219–227
- Sloan JH, Rivara FP, Reay DT, Ferris JA, Kellermann AL (1990), Firearm regulations and rates of suicide: a comparison of two metropolitan areas. *N Engl J Med* 322:369–373
- Smith JC, Mercy JA, Warren CW (1985), Comparison of suicides among Anglos and Hispanics in five Southwest states. *Suicide Life Threat Behav* 15:14–26
- Sonneck G, Etzersdorfer E, Nagel-Kuess S (1994), Imitative suicide on the Viennese subway. *Soc Sci Med* 38:453–457
- Sorri H, Henriksson M, Lonnqvist J (1996), Religiosity and suicide: findings from a nationwide psychological autopsy study. *Crisis* 17:123–127
- Sourander A, Helstela L, Haavisto A, Bergroth L (2001), Suicidal thoughts and attempts among adolescents: a longitudinal 8-year follow-up study. *J Affect Disord* 63:59–66
- Spirito A, Plummer B, Gispert M et al. (1992), Adolescent suicide attempts: outcomes at follow-up. *Am J Orthopsychiatry* 62:464–468
- Stack S (1996), The effect of the media on suicide: evidence from Japan, 1955–1985. *Suicide Life Threat Behav* 26:132–142
- Stack S (1998), Heavy Metal, religiosity, and suicide acceptability. *Suicide Life Threat Behav* 28:388–394
- Stack S (2000), Media impacts on suicide: a quantitative review of 293 findings. *Soc Sci Q* 81:956–971
- Stack S, Lester D (1991), The effect of religion on suicide ideation. *Soc Psychiatry Psychiatr Epidemiol* 26:168–170
- Swanson JW, Linskey AO, Quintero-Salinas R, Pumariaga AJ, Holzer CE III (1992), A binational school survey of depressive symptoms, drug use, and suicidal ideation. *J Am Acad Child Adolesc Psychiatry* 31:669–678
- Teicher MH, Glod C, Cole JO (1990), Emergence of intense suicidal preoccupation during fluoxetine treatment. *Am J Psychiatry* 147:207–210
- Thompson EA, Eggert LL (1999), Using the suicide risk screen to identify suicidal adolescents among potential high school dropouts. *J Am Acad Child Adolesc Psychiatry* 38:1506–1514
- Thompson EA, Eggert LL, Herting JR (2000), Mediating effects of an indicated prevention program for reducing youth depression and suicide risk behaviors. *Suicide Life Threat Behav* 30:252–271
- Thompson EA, Eggert LL, Randell BP, Pike KC (2001), Evaluation of indicated suicide risk prevention approaches for potential high school dropouts. *Am J Public Health* 91:742–752
- Tierney RJ (1994), Suicide intervention training evaluation: a preliminary report. *Crisis* 15:69–76
- Tondo L, Baldessarini RJ (2000), Reduced suicide risk during lithium maintenance treatment. *J Clin Psychiatry* 61(suppl 9):97–104
- Tondo L, Jamison KR, Baldessarini RJ (1997), Effect of lithium maintenance on suicidal behavior in major mood disorders. *Ann NY Acad Sci* 836:339–351
- Tousignant M, Bastien MF, Hamel S (1993), Suicidal attempts and ideations among adolescents and young adults: the contribution of the father's and mother's care and of parental separation. *Soc Psychiatry Psychiatr Epidemiol* 28:256–261
- Turecki G, Zhu Z, Tzenova J et al. (2001), TPH and suicidal behavior: a study in suicide completers. *Mol Psychiatry* 6:98–102
- Underwood MM, Dunne-Maxim K (1997), Managing sudden traumatic loss in the schools. University of Medicine and Dentistry of New Jersey. New Jersey Adolescent Suicide Prevention Project. 1–134 (available at www.maximkd@cmbc.umdnj.edu)
- van der Sande R, van Rooijen L, Buskens E et al. (1997), Intensive in-patient and community intervention versus routine care after attempted suicide: a randomised controlled intervention study. *Br J Psychiatry* 171:35–41
- Velez CN, Cohen P (1988), Suicidal behavior and ideation in a community sample of children: maternal and youth reports. *J Am Acad Child Adolesc Psychiatry* 27:349–356
- Verkes RJ, van der Mast RC, Hengeveld MW, Tuyl JP, Zwinderman AH, Van Kempen GM (1998), Reduction by paroxetine of suicidal behavior in patients with repeated suicide attempts but not major depression. *Am J Psychiatry* 155:543–547
- Vieland V, Whittle B, Garland A, Hicks R, Shaffer D (1991), The impact of curriculum-based suicide prevention programs for teenagers: an 18-month follow-up. *J Am Acad Child Adolesc Psychiatry* 30:811–815
- Voelker R (1999), SSRI use common in children. *JAMA* 281:1882
- Wallace JD, Calhoun AD, Powell KE, O'Neil J, James SP (1996), *Homicide and Suicide Among Native Americans, 1979–1992*. Atlanta: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Violence Surveillance Series, No. 2
- Walter HJ, Vaughan RD, Armstrong B et al. (1995), Sexual, assaultive, and suicidal behaviors among urban minority junior high school students. *J Am Acad Child Adolesc Psychiatry* 34:73–80
- Warshaw MG, Dolan RT, Keller MB (2000), Suicidal behavior in patients with current or past panic disorder: five years of prospective data from the Harvard/Brown anxiety research program. *Am J Psychiatry* 157:1876–1878
- Weissman MM, Klerman GL, Markowitz JS, Ouellette R (1989), Suicidal ideation and suicide attempts in panic disorder and attacks. *N Engl J Med* 321:1209–1214
- Wichstrom L (2000), Predictors of adolescent suicide attempts: a nationally representative longitudinal study of Norwegian adolescents. *J Am Acad Child Adolesc Psychiatry* 39:603–610
- Windle M, Miller-Tutzauer C, Domenico D (1992), Alcohol use, suicidal behavior, and risky activities among adolescents. *J Res Adolesc* 2:317–330
- World Health Organization (2002), Suicide rates and absolute numbers of suicide by country (2002). Available online: http://www.who.int/mental_health (accessed August 1, 2002)
- Wunderlich U, Bronisch T, Wittchen HU (1998), Comorbidity patterns in adolescents and young adults with suicide attempts. *Eur Arch Psychiatry Clin Neurosci* 248:87–95
- Zenere FJ, Lazarus PJ (1997), The decline of youth suicidal behavior in an urban, multicultural public school system following the introduction of a suicide prevention and intervention program. *Suicide Life Threat Behav* 27:387–403
- Zhang J, Jin S (1996), Determinants of suicide ideation: a comparison of Chinese and American college students. *Adolescence* 31:451–467