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Suicidal behavior in children and adolescents: Epidemiology and risk factors

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INTRODUCTION

Suicide in children and adolescents is relatively rare; nevertheless, it is one of the leading causes of death in this population [1,2]. By contrast, suicide attempts and suicidal ideation are common.

This topic reviews the epidemiology of and risk factors for suicide in children and adolescents. The evaluation and disposition of children and adolescents with suicidal ideation and behavior are discussed separately, as are the prevention and treatment of suicidality. (See "[Suicidal ideation and behavior in children and adolescents: Evaluation and disposition](#)" and "[Suicidal ideation and behavior in children and adolescents: Prevention and treatment](#)".)

EPIDEMIOLOGY

Prevalence

Suicidal ideation — Suicidal ideation is common in adolescents. A 2015 nationally representative survey of high school students (n>15,000) in the United States found that the 12-month prevalence of suicidal ideation was 18 percent, and the prevalence of planning a suicide attempt was 15 percent [3].

Suicidal ideation often precedes suicide attempts. A nationally representative survey in the United States found that in adolescents with suicidal ideation, a subsequent attempt occurred in 34 percent [4].

Suicide attempts — Suicide attempts occur in approximately 10 percent of adolescents in the United States and Europe:

- A 2015 nationally representative survey of high school students ($n > 15,000$) in the United States found that the 12-month prevalence of suicide attempts was 9 percent [3]. In addition, the prevalence of suicide attempts that resulted in treatment by a physician or nurse was 3 percent.
- A 2007 survey of high school students ($n > 45,000$) in 17 European countries found that the median lifetime prevalence of suicide attempts was 11 percent [5]. In addition, the median prevalence of multiple lifetime suicide attempts was 5 percent.

Suicide — The absolute number of suicides in pediatric populations is relatively small:

- In 2014, among youth aged 10 to 14 years in the United States, there were 425 suicide deaths, which equated to a suicide rate of 2 per 100,000 [6].
- In 2015, among males aged 15 to 19 years in the United States, the 1537 suicide deaths equated to a suicide rate of 14 per 100,000 [7]. Among females aged 15 to 19 years, the 524 suicide deaths equated to a suicide rate of 5 per 100,000.
- A retrospective study in England between 2011 and 2013 found that among adolescents aged 12 to 17 years, 57 died by suicide per year [2].

Nevertheless, suicide is a leading cause of death and thus an important public health problem for children and adolescents around the world [8]. As an example:

- The World Health Organization reported in 2014 that suicide was the third leading cause of global mortality among children and adolescents aged 10 to 19 years, with nearly 100,000 deaths [9]. In addition, suicide was the leading cause of death in girls aged 15 to 19 years.
- In 2016, among all children and adolescents aged 10 to 19 years in the United States, suicide was the second leading cause of death, with a total of 2553 deaths [10]. Data from 2014 indicated that suicide accounted for more than 12 percent of all pediatric deaths [11].

Age — Although suicidal ideation occurs in preteen children, suicide attempts and deaths are rare [12,13]. Nevertheless, the incidence of suicide among children age 8 to 12 years appears to be increasing over time by approximately 40 to 70 percent:

- A community study in Japan found that the rate of suicide between the periods 2009 to 2015 and 2016 to 2023 increased by 40 percent (incidence relative risk 1.4, 95% CI 1.1-1.8) [14].

- In the United States, data from the Centers for Disease Control and Prevention indicated that suicides between the periods 2001 to 2007 and 2008 to 2022 increased by 70 percent (incidence relative risk 1.7, 95% CI 1.5-1.9) [15].

The rate of suicide attempts may increase with age, based upon deliberate self-harm as a proxy for suicide attempts. Deliberate self-harm is defined as nonfatal self-injury or self-poisoning with or without suicidal intent. A study found that nationally representative estimates of deliberate self-harm in the United States in 2015 were greater in males aged 15 to 19 years, compared with males aged 10 to 14 years (257/100,000 versus 44/100,000) [16]. Likewise, estimates of deliberate self-harm per 100,000 were greater in females aged 15 to 19 years than females aged 10 to 14 years (633 versus 318).

After puberty, the rate of suicide among adolescents increases with age, such that the rate is three to eight times greater in older adolescents than younger adolescents [17]. As an example:

- Data from 81 countries indicated that from 2000 to 2009 [18,19]:
 - The average rate of suicide per 100,000 in boys aged 10 to 14 years was 1.5 and in boys aged 15 to 19 years was 9.5.
 - The average rate of suicide per 100,000 in girls aged 10 to 14 years was 0.9 and in girls aged 15 to 19 years was 4.2.
- Data from the United States collected from 2005 to 2010 showed that the rate of suicide deaths among children aged 10 to 14 years was 1 per 100,000, and for children aged 15 to 19 years was 7 to 8 per 100,000 [20].
- Among adolescents in England who died by suicide between 2011 and 2013, the incidence of suicide was three times greater in male adolescents aged 15 to 17 years than male adolescents aged 12 to 14 years, and was also three times greater in older female adolescents than younger female adolescents [2].

Potential explanations for the increased incidence of suicide attempts and deaths with increasing age include increased access to firearms and potentially lethal drugs, increased rates of psychiatric illness, substance use disorders, and other comorbidities, as well as changes in cognitive development. As adolescents develop their capacities for abstract and complex thinking, they are more capable of contemplating life circumstances, envisioning a hopeless future, generating suicide as a possible solution, and planning and executing a suicide attempt [21]. Younger children who die by suicide are more likely to possess above-average intelligence, which possibly exposes them to the developmental level of stress experienced by older children [22].

In addition, puberty may have a negative impact, particularly for girls, when there is a lack of synchrony between the timing of pubertal development and chronologic age. In a large cross-sectional study, girls who matured early were more likely to have a lifetime history of disruptive behavior disorder and suicide attempts than their peers [23]. (See ["Normal puberty", section on 'Psychological changes'](#).)

Sex — Suicidal ideation occurs approximately twice as often in adolescent girls than boys. A 2015 nationally representative survey of high school students (n>15,000) in the United States found that the 12-month prevalence of suicidal ideation was nearly two times greater in girls than boys (23 versus 12 percent) [3]. In addition, specific suicide plans were nearly two times more prevalent in girls than boys (19 versus 10 percent).

Suicide attempts also occur twice as often in adolescent girls than boys [24]:

- A 2015 nationally representative survey of high school students (n>15,000) in the United States found that the 12-month prevalence of suicide attempts was twice as high in girls than boys (12 versus 6 percent) [3]. In addition, the prevalence of suicide attempts that resulted in treatment by a physician or nurse was twice as high in girls than boys (4 versus 2 percent).
- A 2007 survey of high school students (n>45,000) in 17 European countries found that the median lifetime prevalence of suicide attempts was twice as high in girls than boys (14 versus 7 percent) [5]. In addition, the median prevalence of multiple lifetime suicide attempts was twice as high in girls than boys (6 versus 3 percent).

Differences between boys and girls in the rate of major depression may explain at least some of the difference in the rate of suicide attempts [25]. During adolescence, the prevalence of depression increases and becomes twice as high among girls as boys. Other potential factors include victimization in the form of violence, sexual abuse, and exploitation; discrimination and rigid gender norms that exclude girls from education and decision making; child marriage; lack of control over reproductive health; and unequal responsibility for chores and caretaking. Separate topics discuss the epidemiology of pediatric depression and abuse. (See ["Pediatric unipolar depression: Epidemiology, clinical features, assessment, and diagnosis"](#) and ["Evaluation of sexual abuse in children and adolescents"](#) and ["Physical child abuse: Diagnostic evaluation and management"](#).)

Adolescent males are more likely to die by suicide than females. Multiple studies suggest that the incidence of suicide is approximately two or three times greater in males than females [17]:

- Data from 81 countries indicated that from 2000 to 2009:

- The average rate of suicide per 100,000 in boys aged 10 to 14 years was 1.5 and in girls was 0.9 [18].
- The average rate of suicide per 100,000 in boys aged 15 to 19 years was 9.5 and in girls was 4.2 [19].
- Public health data from the United States showed that the:
 - Rate of suicide deaths in 2010 among males aged 10 to 19 years was 6.9 per 100,000, and for females was 2.0 per 100,000 [20].
 - In 2015, among males aged 15 to 19 years, the 1537 suicide deaths equated to a suicide rate of 14 per 100,000 [7]. Among females aged 15 to 19 years, there were 524 deaths, which equated to a suicide rate of 5 per 100,000.
- National registry data in England and Wales from 1972 to 2011 found that in youth aged 10 to 14 years, the ratio of male to female suicide deaths was approximately 2 to 1 [26]. In youth aged 15 to 19 years, the ratio of male to female suicide deaths was approximately 3 to 1.

In a subsequent study of adolescents in England who died by suicide between 2011 and 2013, the incidence of suicide was two times greater in male adolescents aged 12 to 14 years than females of the same age, and was also two times greater in male adolescents aged 15 to 17 years than females of the same age [2].

Race/ethnicity — Suicide attempts and deaths may vary by race/ethnicity.

- Suicide attempts – A 2015 nationally representative survey of high school students (n>15,000) in the United States found that the 12-month prevalence of suicide attempts was greater for Hispanic Americans than White Americans (11 versus 7 percent) [3]. The rate in Black Americans (9 percent) was comparable with Hispanic and White Americans.
- Suicide deaths – Data from 2016 to 2020 collected by the United States Centers for Disease Control and Prevention (CDC) indicate that suicide mortality is 2.6 (95% CI 2.4-2.9) times greater in American Indian or Alaska Native children and adolescents, compared with White youth [27]. The increased risk appeared to be due to firearms [27,28].

In contrast to American Indian or Alaska Native youth, suicide occurs less often among Asian or Pacific Islander, Black, and Hispanic youth than White youth [27].

RISK FACTORS

Numerous studies have attempted to identify risk factors for suicide. Improved ability to identify individuals who are at risk for suicide attempts and death may facilitate prevention and enable more appropriate allocation of resources. Although factors that reliably differentiate between suicide ideators, attempters, and completers have not yet been identified, general categories of factors that affect an individual's vulnerability to suicide have been identified [29,30]. These factors can help determine the level of intervention necessary for a particular patient [29,31,32]. (See "[Suicidal ideation and behavior in children and adolescents: Prevention and treatment](#)".)

Risk factors for suicidal behavior in children and adolescents can be categorized as predisposing or precipitating factors. Predisposing factors increase an individual's risk for suicide and include [12,33]:

- Psychiatric disorders
- Previous suicide attempt
- Family history of mood disorder and/or suicidal behavior
- History of physical or sexual abuse
- Exposure to violence

Precipitating factors (also called "proximal" or "potentiating" factors) are unlikely to contribute to suicide risk in and of themselves. However, they play a vital role in interaction with predisposing factors. Precipitating factors include:

- Access to means (eg, firearms)
- Alcohol and drug use
- Exposure to suicide
- Social stress and isolation
- Emotional and cognitive factors
- Bereavement

Multiple concurrent risk factors are often present in youth who commit suicide [1].

Psychiatric disorder — The majority of adolescents who attempt or commit suicide have a psychiatric disorder, with depressive disorder being the most common [4]. Other predisposing psychiatric disorders include oppositional defiant disorder, conduct disorder, bipolar disorder, anxiety disorder, eating disorder, personality disorder, and substance use disorders [34,35]. (See '[Alcohol and drug use](#)' below.)

Most children and adolescents who commit suicide have a mental illness, and suicide victims are more likely to meet criteria for a psychiatric disorder than matched community control subjects [36-38]. In one retrospective "psychiatric autopsy" study of 119 subjects who committed suicide

(mean age 17 years), at least one psychiatric diagnosis was present in 91 percent [36]. Depressive syndromes, conduct disorder, and substance use disorders were most common. However, the prevalence of psychiatric illness appears to be greater among older adolescent suicide victims than younger victims. A retrospective study in 140 suicide victims found that a psychiatric disorder was present in more subjects ≥ 16 years of age, compared with subjects < 16 years of age (90 versus 60 percent) [37]. (See "[Pediatric unipolar depression: Epidemiology, clinical features, assessment, and diagnosis](#)".)

Adolescents who attempt suicide also have high rates of psychiatric disorders [39-41]. In a case-control study, 129 adolescents and young adults (aged 13 to 24 years) who made serious suicide attempts were compared with 153 randomly selected controls [39]. Adolescents who made suicide attempts had higher rates of affective disorders (70 versus 15 percent), substance use disorders (39 versus 7 percent), anxiety disorders (15 versus 6 percent), eating disorders (9 versus 5 percent), and antisocial disorders (35 versus 7 percent) than did controls.

Psychosis — The risk of suicide is elevated in patients with psychotic symptoms (eg, command auditory hallucinations to commit self-harm):

- In a prospective observational study of adolescents ($n > 1100$) who were followed for up to 12 months [42]:
 - Suicide attempts were more likely in adolescents with psychotic symptoms at baseline ($n = 77$) than adolescents without psychosis (odds ratio 11, 95% CI 4-29).
 - Among adolescents with baseline psychopathology such as depressive disorders, anxiety disorders, or conduct disorder ($n = 193$), the probability of suicide attempts was greater in adolescents who were also psychotic ($n = 47$), compared with adolescents who were not psychotic (odds ratio 33, 95% CI 10-102).
- A community-based study found that among adolescents aged 11 to 13 years ($n = 78$), suicidal ideation or behavior were more common in adolescents with psychiatric disorders (eg, depressive disorder, anxiety disorder, or attention deficit hyperactivity disorder) plus psychotic symptoms, compared to adolescents with psychiatric disorders but no psychotic symptoms (odds ratio 5.1, 95% CI 1.2-22.8) [43]. Similar results were found in adolescents aged 13 to 15 years ($n = 72$).

Additional information about pediatric psychosis is discussed separately. (See "[Emergency department approach to acute-onset psychosis in children](#)" and "[Schizophrenia in children and adolescents: Epidemiology, clinical features, assessment, and diagnosis](#)".)

Comorbidity — Among patients with a psychiatric disorder, comorbid psychiatric diagnoses further increase the risk of suicidality [35,44-48], although the degree of increased risk depends in part upon the specific disorders that are present [49]. Among depressed youth, particularly among males, suicide risk increases with comorbid conduct disorder and substance use disorders [48,50]. In one case control study, the odds of a serious suicide attempt in subjects with two or more psychiatric disorders were 90 times greater than the odds in subjects with no disorder [45].

Hospitalization — Multiple hospitalizations for suicidality within a short period of time appears to predict subsequent suicide attempts. A one-year observational study prospectively followed adolescents (n = 373) who were hospitalized for acute suicidal ideation or recent suicide attempt [51]. Youth who were rehospitalized within the first three months of the index hospitalization, compared with youth not rehospitalized, were three times more likely to attempt suicide during the subsequent nine months.

Deliberate self-harm — Deliberate self-harm is defined as nonfatal self-injury or self-poisoning with or without suicidal intent [52]. Suicide attempts, which by definition require suicidal intent, are a subset of deliberate self-harm. The other subset of deliberate self-harm is nonsuicidal self-injury. (See "[Nonsuicidal self-injury in children and adolescents: Clinical features and proposed diagnostic criteria](#)".)

Deliberate self-harm is far more common than suicide. As an example, a retrospective study of adolescents aged 15 to 17 years in England found that for each male suicide, more than 100 male adolescents presented to a hospital after an episode of self-harm [2].

Nonfatal self-harm in adolescents is associated with a large increased risk of subsequently committing suicide [53,54]. Across different studies, the risk increases approximately 10 to 50 times, may be greater in the first year after deliberate self-harm, and remains elevated for several years:

- A study of primary care health records from 2001 to 2014 identified patients aged 10 to 19 years with an episode of self-harm (n>8000), and control patients with no record of self-harm (n>170,000) [55]. Self-harm included nonsuicidal self-injury and suicide attempts, and the analyses were adjusted for socioeconomic status. Compared with the control group, children and adolescents who harmed themselves were 9 times more likely to die from unnatural causes, including 17 times more likely to die from suicide (hazard ratio 17, 95% CI 8-40) and 34 times more likely to die from acute alcohol or drug poisoning. In addition, self-harm increased the risk of death from all natural causes three-fold.

- A study of administrative health claims and a national registry identified adolescent patients with an episode of deliberate self-harm ($n > 17,000$) and followed them for up to one year [52]. The ensuing rate of suicide in the patients was 46 times greater than the rate in the general population matched for age, sex, and race/ethnicity (standardized mortality ratio 46, 95% CI 30-68).
- A national registry study identified male ($n > 2000$) and female ($n > 6000$) children and adolescents hospitalized for nonfatal self-harm, and found that their risk of subsequent suicide during the first year of follow-up was greater, compared with age and sex matched general population controls (males incident rate ratio 50, 95% CI 11-229; females 8, 95% CI 2-34) [56]. In addition, the increased risk of later suicide after deliberate self-harm remained elevated during the entire nine-year follow-up period (male incident rate ratio 14, 95% CI 10-20; females 13, 95% CI 9-18).

The risk of suicide in adolescents after an episode of deliberate self-harm is greater after self-harm events with violent methods (eg, firearms, hanging, and jumping from heights) than nonviolent methods (eg, cutting or self-poisoning) [52,56].

Previous suicide attempts — Adolescents who have attempted suicide in the past are at greater risk for subsequent suicide attempts and/or death, especially if they have a history of multiple attempts [57,58]. The risk of completed suicide in previous attempters may be greatest in the first year following the previous attempt [58].

In addition, the increased risk of suicide after a nonfatal attempt persists for many years [59]. A registry study identified patients who survived a first self-poisoning episode ($n > 20,000$) and controls with no such history ($n > 1$ million); up to 12 years of follow-up data were available [58]. Among adolescents with a first self-poisoning episode, the risk of suicide within one year was more than 30 times greater than the risk in controls (hazard ratio 32, 95% CI 24-44), and after 10 years of follow-up, the risk was 10 times greater (hazard ratio 10, 95% CI 6-17). The median time to suicide for adolescents with a first self-poisoning episode was three years. Risk factors for suicide included recurrent episodes of self-poisoning and male sex, as well as prior psychiatric treatment, which may have been a proxy for more severe psychiatric illness. Depression and substance use disorders contributed indirectly to the risk for suicide by increasing the likelihood for multiple episodes of self-poisoning. (See '[Psychiatric disorder](#)' above.)

Compared with high school students who attempt suicide once, students with multiple suicide attempts more frequently reported wishing to die at the time of the attempt, regretting recovery, and timing the attempt to avoid intervention [57].

Childhood adversity — Childhood adversity in various forms is associated with subsequent death by suicide in adolescence and young adulthood. A national registry study identified a cohort of nearly 550,000 adolescents and young adults (age 15 to 24 years), including 431 who committed suicide, and examined the association between childhood adversity from birth to 14 years and the risk of suicide [60]. Indicators of childhood adversity included death of a parent or sibling, parental psychiatric disorder, substantial parental criminality, single parent household, household receiving public assistance, and residential instability. After controlling for potential confounding factors (eg, childhood school performance and psychopathology, foreign-born parent, and parental education and income), the analyses found that each indicator of adversity was associated with an increased risk of suicide during adolescence and young adulthood [61]. The relative risks ranged from 1.4 (single parent household) to 2.3 (parental criminality). In addition, the results suggested that there may be a dose-response relationship, such that exposure to multiple childhood adversities was associated with a greater risk of suicide, compared with exposure to one adversity.

History of abuse — Based upon multiple studies, sexual and/or physical abuse in children and adolescents increases the risk of suicidal ideation and suicide attempts. As an example, a review of 52 sexual abuse studies in community and clinical settings found clear evidence in 49 studies that a history of sexual abuse increases the risk of adolescent suicidal ideation and/or suicide attempts [62]. Among 34 studies of physical abuse, 31 demonstrated that physical abuse is associated with increased rates of suicidal ideation and/or suicide attempts. The associations typically remained significant after controlling for youth sociodemographics and psychiatric problems, as well as family and peer factors. When sexual and physical abuse co-occur, there appears to be an additive effect, such that victims of both types of abuse report more suicide attempts than victims of one type of abuse.

Based upon relatively large and more recent studies of nonclinical populations, sexual and/or physical abuse of youths increases the likelihood of suicide attempts approximately 4 to 11 times:

- A nationally representative survey of adolescents in the United States (n>9000) found that after controlling for potential confounding factors (sociodemographic variables and prior or current psychiatric disorder), the risk of suicide attempts was four times greater in adolescents with a history of sexual abuse, compared with adolescents who were not sexually abused (odds ratio 4, 95% CI 2-8) [63]. In addition, the risk of suicide attempts was six times greater in adolescents with a history of physical abuse, compared with adolescents who were not physically abused (odds ratio 6, 95% CI 2-19).

- A community survey of middle and high school students in the United States (n>83,000) found that after controlling for grade level, family structure, and race, the risk of suicide attempts was five to six times greater in female students who were sexually abused, compared with females who were not (odds ratio 5.6, 95% CI 4.9-6.4) [64]. In addition, the risk of suicide attempts was nearly 11 times greater in male students who were sexually abused, compared with males who were not (odds ratio 10.8, 95% CI 8.9-13.1).

Exposure to violence — Children and adolescents who are witnesses to or victims of violence are at increased risk for suicidal behavior [65,66]. One study of more than 2000 adolescent females found that 20 percent had been victims of intimate partner violence; after controlling for potential confounding factors (eg, age, substance use disorder, and first intercourse before age 15), suicide attempts were nine times more likely to occur in girls who were victims of intimate partner violence than girls who were not (odds ratio 9, 95% CI 5-14) [67]. (See "[Peer violence and violence prevention](#)" and "[Intimate partner violence: Childhood exposure](#)", section on 'Behavioral and mental health effects'.)

Peer victimization (bullying) — Another risk factor for suicide is peer victimization or bullying, which has been defined as repeated, unwanted aggressive behavior that is inflicted by other youth who are not siblings and involves an imbalance of power [68]. Bullying can be exercised physically (eg, hitting or pushing the targeted individual), verbally (eg, making threats, teasing, or name calling), by harming the relationships of the targeted youth (eg, excluding the victim), and by damaging property. The targeted individual may thus suffer physical and/or psychologic harm.

Multiple studies indicate that the risk of suicidal behavior is increased three to six times in youth who are involved in bullying (as a victim, a perpetrator, or both at different times), compared with youth who are not involved in bullying. As an example:

- A systematic review conducted a series of meta-analyses, based upon 47 studies from around the world (n>300,000 children and adolescents), and found that suicidal behavior occurred [69]:
 - Three times more often in bullying victims, compared with youth not involved in bullying (odds ratio 3, 95% CI 2-4).
 - Three times more often in bullying perpetrators (odds ratio 3, 95% CI 2-5).
 - Four times more often in youth who were both a victim and a perpetrator at different times (odds ratio 4, 95% CI 2-7).

- In a subsequent prospective study of youth (n>1100), the primary findings included the following [70]:
 - Suicide attempts occurred in more youth aged 15 years who were victims of peer violence in the past year, compared with youth who were not (7 versus 2 percent).
 - In analyses that controlled for potential confounding factors (eg, prior suicidal ideation and suicide attempts, mental health problems, and family adversity):
 - Peer victimization at age 13 years was associated with a three-fold increase in suicide attempts at age 15 years (odds ratio 3.1, 95% CI 1.4-6.8).
 - Peer victimization, at age 13 years and again at age 15 years, was associated with a six-fold increase in suicide attempts at age 15 years (odds ratio 5.9, 95% CI 2.1-16.2).
- A nationally representative survey of high school students in the United States found that among those who attempted suicide in the past 12 months (n>1000), the rate of suicide attempts was more than three times greater in students who were bullied than students who were not (18 versus 5 percent) [71].

In addition, a study found that suicidal or nonsuicidal self-harm was nearly three times greater in youth who were bullied by siblings, compared with youth who were not [72].

More information about peer victimization is discussed separately. (See "[Peer violence and violence prevention](#)".)

Cyberbullying — A common form of peer victimization is cyberbullying, in which bullying is perpetrated through online or electronic platforms such as email, social media/social networking sites, blogs, chat rooms, and text messages [73-75]. Most victims of cyberbullying are also victims of traditional bullying [76]. Reviews estimate that among adolescents, the lifetime prevalence of cyberbullying ranges from 10 to 40 percent [74,75].

Evidence that indicates cyberbullying is associated with an increased risk of suicidal behavior includes a meta-analysis of 10 studies (n>85,000 participants), which found that suicide attempts were three times more likely to occur in cyberbullying victims than nonvictims (odds ratio 3, 95% CI 2-4) [77]. One of the larger studies surveyed more than 20,000 high school students and found that in the past year, 1269 were cyberbullying victims; among the victims, more than 9 percent attempted suicide [76].

Cyberbullying may exert a more harmful effect than traditional bullying [75]. A meta-analysis of 34 studies (n>284,000 children and adolescents) found that the risk of suicidal ideation was

greater with cyberbullying (odds ratio 3.1, 95% CI 2.4-4.1) than traditional bullying (odds ratio 2.2, 95% CI 2.1-2.3) [78].

Cyberbullying may be especially harmful for several reasons: the victimization can occur anytime and anyplace, including places that are generally safe such as one's home; a relatively wide audience may view the online bullying, making it highly embarrassing; and the bullying may be viewed or relived multiple times because it is stored online [74,75,78].

Perpetrators of cyberbullying are also at increased risk of suicide attempts, but to a lesser extent than victims. A meta-analysis of five studies (n>4000 participants) found that suicidal behaviors were 20 percent more likely to occur in cyberbullying perpetrators than nonperpetrators (odds ratio 1.21, 95% CI 1.02-1.44) [77].

Internet, screen, and social media use — Internet and screen use includes social media/social networking sites (eg, Facebook, Instagram, and Twitter), online forums and chat rooms, and video sharing (eg, YouTube). It is estimated that more than 95 percent of adolescents in the United States use the internet [75].

Studies of the association of internet use and screen-based activities with suicidal behavior are characterized by heterogeneity in study design, populations, and outcome measures, and indicate that using the internet may potentially have both harmful and beneficial influences on the risk for suicidal behavior. Negative influences may arise from internet sites that normalize, glorify, and encourage suicidal behavior; provide information about different methods of harming oneself and concealing the behavior; and serve as a source of contagion (see '[Suicide contagion](#)' below) [79]. Alternatively, internet and social media use may benefit some youth at risk for suicide by providing opportunities to communicate distress, join an online community, reduce social isolation, and obtain crisis support [79,80]. The internet can also enable clinicians to conduct outreach to youth at risk for suicide.

In a review of studies that examined the influence of internet use on self-harm and suicidal behavior, the investigators found that the perceived influence was [79]:

- Harmful in 18 studies (n>119,000 participants)
- Beneficial in 11 studies (n>38,000 participants)
- Mixed in 17 studies (n>35,000 participants)

The review concluded that simply using social media does not increase the risk of suicidal behavior [79]. However, a high level of internet use (eg, greater than five hours per day) was associated with suicidal ideation.

In addition, addictive internet and screen use appear to be associated with self-harm and suicidal behavior [79,81]. Addictive use is indicated by behaviors and emotions such as progressively greater use; an inability to reduce use; distress when not using social media or one's mobile phone; and impaired functioning at school [82]. In a four-year, prospective study of children and adolescents ($n > 3800$), which adjusted the analyses for demographic and clinical factors (eg, baseline suicidal ideation and behavior), the risk of suicidal behavior was two times greater in youth with increasing addictive use of social media than youth with low addictive use (relative risk 2.1, 95% CI 1.6-2.9) [82]. However, the total amount of screen time at baseline was not related to suicidal behavior.

Peer victimization that occurs through the internet is called cyberbullying and is associated with increased suicidal behavior. (See '[Cyberbullying](#)' above.)

Family history — The risk of suicide attempts and completed suicide is increased in adolescents (and adults) who have a family history of mood disorders and/or suicidal behavior [83-87]. As an example:

- A systematic review conducted a meta-analysis that included three studies with more than 1.3 million offspring, whose age ranged from childhood (10 years) to adulthood [88]. After controlling for potential confounding factors (offspring age, sex, psychiatric disorders, and parental psychopathology), the analysis found that the rate of suicide was nearly two times greater in offspring who lost a parent to suicide, compared with offspring of two living parents (odds ratio 1.9, 95% CI 1.5-2.5).

The review also conducted a second meta-analysis that included four studies with more than 240,000 offspring, whose age ranged from childhood (10 years) to adulthood [88]. After controlling for potential confounding factors, the analysis found that the rate of suicide attempts was nearly two times greater in offspring whose parents attempted suicide, compared with offspring whose parents did not attempt suicide (odds ratio 2.1, 95% CI 1.9-2.2).

- One prospective observational study followed more than 700 offspring of mood disordered parents for an average of six years; the mean age of the offspring at baseline was 18 years [89]. After controlling for potential confounding factors (eg, offspring mood disorders and history of suicide attempt at baseline), the analyses found that the rate of suicide attempts was nearly five times greater in the offspring of parents who attempted suicide, compared with offspring whose parents did not attempt suicide (odds ratio 4.8, 95% CI 1.8-13.1).
- A national registry study identified a cohort of nearly 550,000 adolescents and young adults (age 15 to 24 years), including more than 3000 who were children (age 0 to 14 years) when a

parent or sibling committed suicide [60]. The analyses found that after controlling for potential confounding factors (eg, childhood school performance and psychopathology, foreign-born parent, and parental education and income), the risk of suicide was three time greater in adolescents and young adults who were exposed to suicide in the family during childhood (relative risk 2.9, 95% CI 1.4-5.9).

Twin studies suggest that the association of parental mood disorders and suicidal behavior with suicidality in the offspring involves both environmental and genetic factors [90,91]. However, it is not clear whether the genetic component is primarily responsible for the underlying psychiatric disorder or for the suicide itself. In one study, a family history of both suicide and psychiatric illness were risk factors for suicide, and the effect of family suicide history was independent of the family history of psychiatric illness [83].

The risk of suicide attempt may be greater for children who suffer parental suicide than adolescents who experience the same loss. A national registry study compared time to hospitalization for suicide attempt in three groups who lost a parent to suicide: children 0 to 12 years of age (n>10,000), adolescents 13 to 17 years of age (n>6000), and young adults 18 to 24 years of age (n>9000) [92]. Although the absolute risk of suicide attempt was small, the risk in children was greater than that for young adults, and for offspring who lost a parent during early childhood (ages 0 to 5 years), the risk continued to rise for two decades. By contrast, the risk of suicide attempt in adolescents was comparable to the risk for young adults.

In addition, the risk of suicide attempt may be greater for youth who lose their mother to suicide rather than their father [88]. A retrospective study of national registries examined time to hospitalization for suicide attempt, comparing children and adolescents who lost a mother to suicide (n>5000) with youth who lost a mother to an accident (n>2000); the study also compared time to hospitalization for suicide attempt in youth who lost a father to suicide (n>17,000) or to an accident (n>12,000) [85]. Propensity scoring was used to match suicide decedents with fatal accident decedents with regard to observed potential confounders. Hospitalization for suicide attempt was greater for youth who lost a mother to suicide compared with youth who lost a mother to an accident (adjusted hazard ratio 1.8). By contrast, the risk for hospitalization in offspring of paternal suicide and paternal accidental death was comparable.

Access to means — Access to the means of attempting suicide is a potent precipitating factor [93,94]. This is true even after controlling for other risk factors such as depression or substance use. Firearms are the most common means for suicide. Other means include medications, illicit drugs, toxic chemicals, carbon monoxide, hanging, and cutting. Almost anything can be used as a means to attempt suicide, but prevention should focus upon restricting access to those means

with the highest case fatality ratio (likelihood of death if employed). (See ["Firearm injuries in children: Prevention", section on 'Framework for prevention'](#).)

Firearms — Firearms are frequently present and accessible in the homes of children and adolescents at risk for suicide [95,96]. In addition, suicidal behavior often involves firearms. Among youth in the United States aged 10 to 19 years who died by suicide in 2016, firearms were used in more than 40 percent of suicide deaths [10].

For children and adolescents who reside in homes with firearms and are at increased risk of suicidal behavior (eg, youth with suicidal ideation, depressive disorders, or a history of suicide attempt), we recommend that parents either remove the firearms or restrict access by storing firearms locked, unloaded, and separate from ammunition. This approach is consistent with recommendations from the American Academy of Pediatrics [97]. Evidence supporting this practice includes the following observations:

- Most of the firearms used by youths who commit suicide are obtained from their home [95].
- The risk of youth suicide is increased by the presence of guns in the house [95,97]. A meta-analysis of four studies found that the risk of suicide was three times greater in adolescents residing in homes with guns, compared with adolescents residing in homes with no guns (odds ratio 3, 95% CI 2-4) [98].
- Storing firearms locked and unloaded is associated with a reduced risk of suicide attempts and deaths. As an example, a retrospective study identified cases in which children and adolescents gained access to a household firearm and attempted suicide (n = 82, 95 percent fatal); age matched controls also resided in a house with at least one gun, but did not attempt suicide (n = 480) [99]. After adjusting for potential confounding factors (eg, type of firearm), the analyses found that guns used in suicide attempts were 70 percent less likely to be stored locked, compared with guns not used in suicide attempts (odds ratio 0.3, 95% CI 0.2-0.5). In addition, guns used in suicide attempts were 60 percent less likely to be stored unloaded (odds ratio 0.4, 95% CI 0.2-0.8). Locking guns and removing the ammunition may prevent impulsive suicide attempts.

Prevention of firearm injuries is discussed in detail separately. (See ["Firearm injuries in children: Prevention", section on 'Framework for prevention'](#).)

Alcohol and drug use — Alcohol and drug use are known risk factors for suicide [50,100-103], largely because of their disinhibiting effects. Between 25 and 46 percent of adolescents who die by suicide and approximately 20 percent of those who attempt suicide have alcohol or another drug in their bodies at the time of suicide or suicide attempt [93,104]. Increased rates of alcohol

and substance use among adolescents since the 1960s, particularly among White males, may be related to the increased suicide rate in this population [93]. Adolescent intoxication, in combination with psychiatric disorder and a firearm in the home, is a particularly high risk and lethal combination [94].

Exposure to suicide — Children who are exposed to the suicide of a family member or friend are at risk for internalizing symptoms, depression, anxiety, and/or posttraumatic stress [105,106]. Teenagers who are exposed to relatives who commit suicide may be at particular risk because of exposure to violence, exposure to suicide, and possible genetic predisposition to suicide [91,107,108]. The individual contribution of each of these factors to the overall risk of suicide is not known. (See '[Family history](#)' above and '[Exposure to violence](#)' above.)

Suicide contagion — Suicidal contagion refers to the phenomenon of suicide clusters or "outbreaks" of suicides in a community [109-111]. Clusters of suicide account for approximately 5 percent of youth suicide in the United States [112]. These clusters may occur when a vulnerable adolescent reads or hears an account of another suicide [113]. However, most studies show that friends of suicide victims are not at risk for imitation. Adolescents who imitate the suicide of another peer are usually not close friends of the victim and may have deficits in coping skills and lack models for healthy coping strategies. Adolescents and young adults between the ages of 12 and 24 appear to be the group at greatest risk for imitation [112,114-117]. It is controversial whether exposure to the suicide of a friend is a risk factor for suicide independent of depression, anxiety, withdrawal, somatic complaints, and posttraumatic stress [106,118].

Data that suggest exposure to a suicide is a risk factor for imitation includes a two year prospective, observational study of a nationally representative sample of Canadian youth that controlled for age, sex, socioeconomic status, prior depression and anxiety, and substance use [117]. Both a schoolmate's suicide and personally knowing someone who died by suicide were each associated with an increased rate of suicide attempts. As an example, the adjusted risk of suicide attempt was greater among 14- and 15-year-olds (n>7800) who were exposed in the past year to suicide by someone personally known, compared with 14- and 15-year-olds with no exposure (odds ratio 4, 95% CI 2-6).

General medical disorders — Medical or physical concerns can be stressful issues for adolescents and are associated with suicidal behavior. These may include the physical changes related to puberty and/or chronic illness, teenage pregnancy, and the threat of sexually transmitted infections, including human immunodeficiency virus (HIV) [119-123]. An increased risk for suicidal ideation and behavior has been documented for central nervous system diseases (eg, epilepsy and migraine) and inflammatory diseases (eg, asthma and irritable bowel

syndrome). In addition, use of hormonal contraception is associated with subsequent suicide attempt and suicide in adolescents [124]. Although the overall risk of suicide during pregnancy is low [125], teenagers may have a variety of emotional responses to a newly diagnosed pregnancy; those with a previous suicide attempt may be at increased risk for another [126]. (See ['Previous suicide attempts'](#) above and ["Pregnancy in adolescents", section on 'History'](#).)

Social stress — Stressful life events typically increase the risk of suicide only in the context of preexisting vulnerability. Nonetheless, adolescents who attempt or die by suicide are more likely to have suffered major stress in their lives than those who do not [65,127-132]. Common stressful events for adolescents include:

- Interpersonal loss or conflict
- Economic problems
- School-related difficulties
- Workplace problems
- Legal or disciplinary problems

Interpersonal problems, such as a relationship breakdown and/or argument with partner, family, or friend(s), are the most commonly cited reason for suicide attempts provided by both previous attempters and their significant others. Legal difficulties or charges and being in trouble with the police are another important category of stressful life events that are associated with increased risk of adolescent suicide attempt [133].

Other life events that are not typically viewed as negative can also precipitate stress in adolescents (eg, birth of sibling, high school graduation, etc). Whether an event is potentially stressful depends upon the adolescent's perceptions and interpretations of the event as well as the adolescent's coping repertoire.

Social isolation — Social isolation and alienation are often associated with adolescent suicide. Adolescents who attempt suicide are more likely to isolate themselves than those who only think about committing suicide [134]. Suicidal adolescents who keep thoughts to themselves appear to be at greater risk for suicide attempt than those who discuss their suicidal ideation with others.

Adoption — The risk of attempting suicide may be increased among teens who were adopted [135]. A prospective study enrolled adoptees (n = 657) and nonadoptees (n = 508) with a mean age of 15 years and followed them for approximately three years [136]. After controlling for suicide risk factors (eg, psychiatric disorders), the investigators found that the probability of suicide attempts was nearly four times greater in the adoptees (odds ratio 3.7, 95% CI 1.7-8.0). (See ["Adoption", section on 'Other mental health issues'](#).)

Sexual orientation — Sexual orientation is often bifurcated into the two categories of heterosexual and sexual minority. The sexual minority category includes individuals who self-identify as lesbian, gay, bisexual, or transgender, as well as individuals who are not sure of their sexual identity (questioning).

Multiple studies indicate that suicidal behavior is two to five times greater in sexual minority youth than heterosexual youth:

- A meta-analysis of six studies examined suicide attempts in lesbian, gay, bisexual, and heterosexual youth drawn from nonclinical settings (n>29,000, aged 12 to 26 years); most of the studies were prospective and the duration of follow-up ranged from 6 months to 26 years [137]. The rate of suicide attempts was two times greater in sexual minority youth than heterosexual youth (odds ratio 2.3, 95% CI 1.6-3.2).
- A representative community survey of high school students in the United States (n>3000) found that the prevalence of suicidal attempts in the past 12 months was five times greater in lesbian, gay, bisexual, or questioning students, compared with heterosexual students (20 versus 4 percent) [138].
- A nationally representative survey of high school students in the United States (n>15,000) found that the rate of suicide attempts was four times greater in sexually diverse adolescents than heterosexual youth (25 versus 6 percent) [139]. In addition, the rate of attempts was greater in each subgroup of adolescents who reported their sexual orientation as:
 - Questioning – 14 percent attempted suicide
 - Gay or lesbian – 20 percent
 - Bisexual – 32 percent

Other analyses found that the risk of suicide attempts was increased for female sexual minority youth and male sexual minority youth.

Although the studies did not assess suicidal behavior in transgender youth, the risk of suicide attempts is probably elevated in this subgroup as well [140]:

- A representative survey of high school students in California (United States, n>25,000) found that the prevalence of suicidal ideation in the past 12 months was nearly two times greater in transgender students than non-transgender students (34 versus 19 percent) [141].
- Electronic health records of youth aged 10 to 17 years were used to study deliberate self-harm, which includes nonfatal self-injury with or without suicidal intent [142]. The prevalence of deliberate self-harm was examined for transfeminine (n>400) and transmasculine (n>600)

youth, as well as matched controls consisting of cisgender males (n>4000) and cisgender females (n>6000). The findings included the following:

- Deliberate self-harm was 70 times greater in transfeminine youth than male controls and was 21 times higher in transmasculine youth than female controls.
- Suicidal ideation occurred 54 times more often in transfeminine youth than male controls and was 25 times more often in transmasculine youth than female controls.

The increased risk for suicidal ideation and behavior in sexual minority youth may be attributable to their higher rates of substance use disorder, depression, family conflict, peer victimization (see '[Peer victimization \(bullying\)](#)' above), and childhood sexual victimization [[143,144](#)]. In addition, sexual minority youth may experience discrimination and feel ashamed due to their sexual orientation, and may be reluctant to discuss their distress [[140](#)]. Also, sexual minority youth may be at increased risk for suicidal behavior because of other factors not related to sexual orientation, such as general medical disorders and financial problems.

By contrast, supportive social environments may help reduce the risk of suicide attempts in sexual minority youth [[145](#)]. Protective factors include schools with nondiscrimination policies and gay-straight alliances.

Additional information about the health concerns of sexual minority youth are discussed separately. (See "[Lesbian, gay, bisexual, and other sexual minoritized youth: Epidemiology and health concerns](#)", section on '[Mental health and self-harm](#)'.)

Emotional and cognitive factors — Emotional and cognitive factors that may precipitate suicidal behavior include:

- Hopelessness and helplessness
- Despair and/or agitation
- Impaired problem-solving

Before suicide, adolescents often perceive their future to be fundamentally negative and hopeless. They perceive themselves and others as powerless to change their dire circumstances. Suicide is a desperate attempt at a solution for such adolescents whose hopelessness renders them unable to generate or even imagine helpful options.

Other risk factors — Other risk factors for suicide and suicide attempts include poor self-esteem, impulsivity and risk-taking behavior, aggressiveness, delinquent behavior, family dysfunction, parenting style characterized by little warmth and little control (rejecting and

neglectful), nonintact family, having run away from home, and residing in rural communities [146-152].

ANTIDEPRESSANTS

The association between antidepressants and suicide risk in children and adolescents is discussed separately. (See "[Effect of antidepressants on suicide risk in children and adolescents](#)".)

CONSEQUENCES

Adolescents who attempt suicide are at increased risk of poor outcomes as young adults. As an example, a prospective community study of adolescents age 16 years (n = 4799) found that self-harm at any age up to 16 years was associated with multiple adverse outcomes in early adulthood (ages 18 to 21 years) [153]. Compared to adolescents with no self-harm by age 16 years, adolescents with suicide attempts by age 16 years were at increased risk of a subsequent anxiety disorder (odds ratio 3), self-harm incident (odds ratio 15), cannabis use (odds ratio 4), substance use disorder other than cannabis (odds ratio 3), and poor educational and occupational outcomes (odds ratio 2).

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "[Society guideline links: Depressive disorders](#)".)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or email these topics to your patients. (You can also locate patient education articles on a variety

of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see ["Patient education: Suicide prevention \(The Basics\)"](#) and ["Patient education: Keeping children and teens safe online and on social media \(The Basics\)"](#))

OTHER RESOURCES FOR PATIENTS AND FAMILIES

Other resources for patients and families are listed in the two tables ([table 1A-B](#)).

SUMMARY AND RECOMMENDATIONS

- **Scope of the problem** – Suicide in children and adolescents is relatively rare; nevertheless, it is one of the leading causes of death in this population. By contrast, suicide attempts are common. (See ['Introduction'](#) above.)
- **Prevalence**
 - **Suicide attempts** – Suicide attempts occur in approximately 10 percent of adolescents in the United States and Europe. (See ['Suicide attempts'](#) above.)
 - **Suicide** – Among children and adolescents aged 10 to 19 years, suicide is the third leading cause of global mortality, with nearly 100,000 deaths per year. In this population in the United States, there are approximately 2600 suicides per year, accounting for more than 12 percent of all pediatric deaths and making suicide the second leading cause of mortality. (See ['Suicide'](#) above.)
 - **Age effects** – After puberty, the rate of suicide among adolescents increases with age, such that the rate is three to eight times greater in older adolescents than younger adolescents (See ['Age'](#) above.)
 - **Sex effects** – Among adolescents, suicidal ideation and suicide attempts occur twice as often in girls than boys. However, the incidence of suicide deaths is approximately two or three times greater in males than females. (See ['Sex'](#) above.)
- **Risk factors** – Factors that increase the risk of suicidal behavior in children and adolescents include (see ['Risk factors'](#) above):
 - Psychiatric disorders
 - History of deliberate self-harm, including previous suicide attempt
 - History of physical or sexual abuse

- Exposure to violence or peer victimization
 - Family history of depressive disorders and/or suicidal behavior
 - Access to firearms
 - Alcohol and drug use
 - Internet, screen, and social media use
 - Sexual orientation
- **Effect of antidepressants** – The potential benefits and harms of antidepressant medications with regard to suicidal ideation and behavior is discussed separately. (See "[Effect of antidepressants on suicide risk in children and adolescents](#)".)

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GRAPHICS

Table 1A: Suicide resources

In an emergency, call 1-800-SUICIDE (1-800-273-8255), the national suicide hotline	
National Institute of Mental Health (NIMH) www.nimh.nih.gov/health/topics/suicide-prevention/index.shtml	Provides information on preventing suicide.
American Academy of Pediatrics www.healthychildren.org/English/health-issues/conditions/emotional-problems/Pages/Help-Stop-Teen-Suicide.aspx 630-626-6000	Provides information on preventing suicide.
American Academy of Child and Adolescent Psychiatry www.aacap.org 202-966-7300	Provides information about developmental, behavioral, and mental disorders
American Association of Suicidology www.suicidology.org 202-237-2280	Provides information on current research, prevention, ways to help a suicidal person, and surviving suicide. A list of crisis centers is also included.
American Foundation for Suicide Prevention www.afsp.org 888-333-AFSP (2377)	Provides research, education, and current statistics regarding suicide; links to other suicide and mental health sites are offered.
American Psychiatric Association www.psych.org 800-852-8330	Information and referrals to psychiatrists.
Boys Town www.boystown.org 800-448-3000 (crisis hotline) or 800-545-5771	Cares for troubled children - both boys and girls - and for families in crisis. Their hotline staff is trained to handle calls and questions about violence and suicide.
Centers for Disease Control Center for Injury Prevention and Control, Division of Violence Prevention www.cdc.gov/ncipc/ 770-488-4362	Provides links to suicide statistics, the SafeUSA Web site, and safety information.

National Alliance for the Mentally Ill (NAMI) www.nami.org 800-950-NAMI (6264)	Provides information about family support and self-help groups, links to information about teen suicide, child suicide, brain biology and suicide, as well as general suicide information links.
Depression and Bipolar Support Alliance www.dbsalliance.org 800-826-3632	Provides information about mood disorders including support groups and local chapters.

Data from: www.cdc.gov/ncipc/dvp/youth/suicide.htm and www.cdc.gov/safeusa/suicide.htm#Safety%20Resources.

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Table 1B: Suicide resources (continued)

In an emergency, call 1-800-SUICIDE (1-800-273-8255), the national suicide hotline.	
National Mental Health Association (NMHA) www.nmha.org 800-228-1114 800-969-NMHA (6642) 800-433-5959 (TTY)	Provides information on depression and its treatment and referrals to local screening sites.
The National Mental Illness Screening Project Suicide Division www.nmisp.org 800-573-4433	Provides information regarding free, confidential screening near you.
Suicide Awareness-Voices of Education (SAVE) www.save.org 612-946-7998	Provides suicide education, facts, and statistics on suicide and depression. It links to information on warning signs of suicide and the role a friend or family member can play in helping a suicidal person.
Suicide Information & Education Centre (SIEC) www.siec.ca 403-245-3900	Library and resource center providing information on suicide and suicidal behavior.
Suicide Prevention Advocacy Network (SPAN) spanusa.org 888-649-1366 Substance Abuse and Mental Health Administration (SAMHSA) www.samhsa.gov	SPAN is a nonprofit organization dedicated to creating an effective national suicide prevention strategy. SPAN links the energy of those bereaved by suicide with the expertise of leaders in science, business, government, and public service to achieve the goal of significantly reducing the national suicide rate by the year 2010.

Data from: www.cdc.gov/ncipc/dvp/youth/suicide.htm and www.cdc.gov/safeusa/suicide.htm#Safety%20Resources.

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