HHS Public Access

Author manuscript

J Adolesc Health. Author manuscript; available in PMC 2023 April 01.

Published in final edited form as:

J Adolesc Health. 2023 April ; 72(4): 519–525. doi:10.1016/j.jadohealth.2022.11.009.

Circumstances Contributing to Suicide Among U.S. Adolescents Aged 10–19 Years With and Without a Known Mental Health Condition: National Violent Death Reporting System, 2013–2018

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Abstract

Purpose: Suicide is the second leading cause of death for adolescents in the United States; however, suicide is preventable and a better understanding of circumstances that contribute to death can inform prevention efforts. While the association between adolescent suicide and mental health is well established, multiple circumstances contribute to suicide risk. This study examines characteristics of adolescents who died by suicide and differences in circumstances between those with and without known mental health conditions at the time of death.

Methods: Logistic regression models were used to estimate adjusted odds ratios and 95% confidence intervals of circumstances contributing to suicide between decedents with and without known mental health conditions using data from the 2013 to 2018 National Violent Death Reporting System (analyzed in 2021).

Results: Decedents with a known mental health condition were 1.2–1.8 times more likely to experience problematic alcohol misuse, substance misuse, family and other nonintimate relationship problems, and school problems; however, there were no significant differences between those with and without a known mental health condition for the preceding circumstances of arguments or conflicts, criminal or legal problems, or any crisis occurring within the two weeks prior to death.

Discussion: A comprehensive suicide prevention approach can address not only mental health conditions as a risk factor but also life stressors and other crises experienced among adolescents without known mental health conditions.

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Conflicts of interest: The authors have no conflicts of interest to declare.

Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jadohealth.2022.11.009.

Keywords

Adolescent suicide; Adolescent mental health; Upstream suicide prevention

Suicide is the second leading cause of death, after unintentional injuries, for adolescents in the United States [1]. Between 2009 and 2019, 26,197 deaths among adolescents aged 10–19 years were suicides, constituting 13.3% of all deaths among those aged 10–14 years and 19.0% of all deaths among those aged 15–19 years [1]. The cumulative economic burden of suicide fatality among adolescents, from 2009 to 2017, is estimated at more than 41 billion dollars in total lifetime costs. This includes medical costs and the value of lost productivity due to premature death [2]. The American Academy of Child and Adolescent Psychiatry states that the majority of children and adolescents who attempt suicide have a mental health disorder" [3]. Additional studies confirm a well-established association between suicide and mental health [4]; however, suicide is a complex issue with a variety of other risk factors, including adverse childhood experiences, bullying and cyberbullying, social isolation, interpersonal conflict, and knowing someone who died by suicide [5–17]. Research shows that adolescents who report being bullied at school and online are more likely to report suicidal thoughts and attempts [11]; and interpersonal losses such as relationship break-ups and peer rejection are strong predictors of suicide attempts in late adolescence [18]. Suicide prevention has often been focused on identification and treatment of mental health conditions; however, a comprehensive suicide prevention approach can address not only mental health but also the circumstances and life stressors impacting adolescents [19,20].

One of the strongest predictors of eventual suicide fatality among adolescents is a previous suicide attempt [21,22]. In 2018, an estimated 145,197 suicide attempt–related emergency department visits and in-patient hospitalizations occurred among adolescents aged 10–19 years [23]. While males accounted for the majority of suicide fatalities, females accounted for more than 64% of emergency department visits and in-patient hospitalizations. Additional data from the Centers for Disease Control and Prevention's (CDC) 2019 Youth Risk Behavior Surveillance Survey show that 18.8% of high school students reported having seriously considered suicide and 8.9% reported having made an attempt [24]. Rates for seriously considering suicide were highest among females (24.1%); White non-Hispanic students (19.1%); and students who identified as lesbian, gay, or bisexual (46.8%). Among students who reported having made an attempt, reports were highest among females (11.0%); students who identified as lesbian, gay, or bisexual (23.4%); and Black non-Hispanic students (11.8%) [24].

Suicide prevention has been designated as a national priority by the U.S. Surgeon General and identifying and supporting adolescents at risk of suicide is of primary importance. The Surgeon General's "Call to Action To Implement the National Strategy for Suicide Prevention" provides a comprehensive action plan for suicide prevention that addresses both downstream and upstream risk factors [19]. In addition, CDC's suicide prevention technical package "Preventing Suicide: A Technical Package of Policies, Programs, and Practices" provides downstream and upstream strategies to help states and partners focus

on their prevention activities [20]. Downstream efforts are aimed at those in acute crisis to prevent suicide fatalities and prevent reattempts, while upstream efforts focus on increasing protective factors and decreasing risk factors known to be associated with suicide from a population perspective. Examples of these strategies range from increasing access to treatment for those in crisis (downstream) to developing policies to strengthen economic support (upstream). Suicide among adolescents is preventable and a better understanding of circumstances, including those unrelated to mental health conditions that contribute to death can inform prevention efforts. It is important to thus understand the circumstances contributing to suicide at multiple levels of influence to appropriately tailor prevention efforts. The purpose of this study was to identify characteristics of adolescents aged 10–19 years who died by suicide and the precipitating circumstances contributing to death. We examine circumstances for suicide decedents with and without a known mental health condition. This is the first study to examine circumstances contributing to suicide among adolescents based on their known mental health status. The evidence provided in this study will help support current and future suicide prevention efforts for adolescents at risk of death by suicide.

Methodology

Characteristics of adolescents aged 10–19 years who died by suicide, and circumstances preceding the suicide, were examined using CDC's National Violent Death Reporting System (NVDRS) Restricted Access Database. NVDRS is an ongoing, state-based, active surveillance system that collects data on all violent deaths, including suicides. NVDRS data are collected from three sources: death certificates, coroner/medical examiner reports, and law enforcement reports. The sources are linked for each incident to provide a comprehensive picture of the death. Trained data abstractors compile information from these records into standardized variables in the NVDRS web-based system using CDC guidance and definitions. Final manner of death is assigned by the NVDRS data abstractors using information from these sources [25]. NVDRS was selected due to its inclusion of circumstance data on each suicide decedent. This analysis included suicide fatality data reported from participating U.S. states, districts, and territories between 2013 and 2018 (Appendix A) [26]. Data were restricted to 2013–2018 due to key circumstances of interest (i.e., history of suicide thoughts/plans and crisis-related circumstance variables) not collected in NVDRS prior to 2013 and 2018 being the latest year of NVDRS data available.

Descriptive analyses of the number and percentage of suicide deaths by demographic characteristics, method of injury, substance use, and a range of circumstances (i.e., alcohol-related and nonalcohol-related substance misuse and treatment, relationship problems, life stressors, recent crisis, and suicide event history) were conducted. We examined differences in characteristics and circumstances between adolescents with a known mental health condition versus no known mental health condition similar to a prior CDC study [5]. NVDRS defines mental health conditions as disorders and syndromes listed in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition [27], with the exception of problematic alcohol use and other substance use, which are captured separately in NVDRS [25]. Circumstances captured are those identified as contributing to the decedent's suicide in coroner/medical examiner or law enforcement reports. Decedents

could have experienced multiple circumstances. Circumstances are coded as “Yes/Present” or “No/Not Present/Unknown.” “No” and “Unknown” are grouped together because NVDRS cannot determine if the circumstance did not occur or occurred and was not discovered during the investigation by authorities [25]. Chi-squared tests of proportions were performed to determine the statistical difference between the proportion with and without a known mental health condition. Two-tailed p values < .05 were considered statistically significant. Logistic regression models were used to estimate adjusted odds ratios (aORs) and 95% confidence intervals (CIs) controlling for sex, age group, and race/ethnicity of specific circumstances among suicide decedents with and without a known mental health condition. Those with no known mental health condition were used as the reference group. SAS Version 9.4 (SAS Institute Inc.) was used to conduct statistical analyses. The study was exempt by the Institutional Review Board as it constituted the use of secondary analysis with deidentified data.

Results

Between 2013 and 2018, 8,298 suicide deaths among adolescents aged 10–19 years were reported in the participating NVDRS states. Of these, 3,492 were of adolescents with a known mental health condition and 4,806 were of adolescents with no known mental health condition (Table 1). Overall, decedents were predominately male (74.7%), predominately older adolescents between the ages of 15 and 19 years (81.9%; mean age = 16.5, data not shown), and predominately non-Hispanic White (68.0%). Among adolescents with a known mental health condition, males comprised 67.9% of decedents; however, they were less likely to have a known mental health condition relative to females (odds ratio [OR] = 0.54, 95% CI = 0.49–0.60). Younger adolescents (aged 10–14 years) were less likely to have a known mental health condition compared to older adolescents (OR = 0.81, CI = 0.73–0.91). Among racial and ethnic minorities, decedents were predominantly Hispanic (12.4%), followed by non-Hispanic Black (10.4%), non-Hispanic Asian/Pacific Islander (3.5%), and non-Hispanic American Indian/Alaskan Native (2.7%). Other and unknown races constituted 2.9% of the remaining decedents. Percentages constitute the share of deaths reported during the study time period. All racial and ethnic minority groups were less likely to have a known mental health condition, relative to Whites (OR range = 0.41–0.76). Decedents identified as a sexual minority (i.e., Lesbian, Gay, or Bisexual) constituted 2.1% of deaths (only 11% of adolescents had sexual orientation reported); sexual minorities were more likely to have a known mental health condition relative to those identified as straight/heterosexual (OR = 1.76, CI = 1.26–2.46).

Death by hanging/strangulation/suffocation was the most common method of suicide overall (45.6%), followed by firearms (41.1%); however, a higher prevalence of suicide by firearm (47.6%) was reported for those without a known mental health condition compared to those with a known mental health condition (32.3%). Those with a known mental health condition were more likely to die by suicide involving hanging/strangulation/suffocation, poisoning, or motor vehicle/transport relative to those with no known mental health condition (aOR range = 1.33–2.30). The presence of alcohol and other substances among decedents was examined; of decedents tested for alcohol, 14.9% tested positive, and of decedents tested for marijuana, 30.9% tested positive. Of substances tested, decedents with a known mental health condition

were more likely to be tested across all substances (aOR range = 1.32–2.04). Among those tested, those with a known mental health condition were less likely to test positive for alcohol (aOR = 0.72, CI = 0.61–0.86) but more likely to test positive for all other substances (aOR range = 1.36–9.57) compared to decedents with no known mental health condition (exceptions are cocaine, marijuana, and opioids which showed no significant differences between groups). Of decedents with a known mental health condition, 40.9% tested positive for antidepressants.

Of the 8,298 total suicide deaths reported, 7,414 (89.3%) included additional data on circumstances reported as a contributing factor to the suicide (Table 2). As mental health condition is one of the circumstance variables, information on circumstances were available for 100% of decedents with a known mental health condition and 81.6% of decedents with no known mental health condition. Of adolescents with a known mental health condition, the most common diagnoses were depression (71.5%), anxiety disorder (18.6%), attention deficit disorder/attention deficit hyperactivity disorder (14.6%), and bipolar disorder (9.9%). In addition, a total of 2,502 adolescents (33.7%) with circumstances known were identified as having a current depressed mood (feeling down or sad as per reports of informants; not a clinical diagnosis of depression) prior to the suicide. Roughly 29.2% of adolescents were in current treatment for either a mental health or substance misuse condition, while 39.4% reported a history of treatment for a mental health or substance misuse condition.

Adolescents with a known mental health condition were more likely to have a problematic alcohol or other substance misuse problem relative to those with no known mental health condition (aOR = 1.67, CI = 1.34–2.09 and aOR = 1.78, CI = 1.54–2.05, respectively). Adolescents with a known mental health condition were less likely to have family relationship problems (aOR = 0.81, CI = 0.73–0.91) but more likely to have other nonintimate relationship problems (aOR = 1.27, CI = 1.05–1.53) relative to those with no known mental health condition. Adolescents with a known mental health condition were also more likely to have the death of a loved one or suicide of a family member or friend noted as a contributing factor relative to those with no known mental health condition (aOR = 1.41, CI = 1.13–1.77 and aOR = 1.53, CI = 1.21–1.93, respectively). Notably, there were 1,535 adolescents (20.7%) noted to have an argument or conflict prior to suicide and there was no significant difference in this contributing circumstance between those with and without a known mental health condition. Adolescents with a known mental health condition were more likely to have a history of abuse as a child as a contributing circumstance relative to those with no known mental health condition (aOR = 3.03, CI = 2.35–3.90). There were no significant differences between those with and without a known mental health condition for the circumstances of a recent criminal legal problem or any crisis experienced within 2 weeks of death. This included a crisis related to family relationship problems, school crisis, criminal/legal problem crisis, and crisis related to suicide or death of a family member or friend.

Regarding suicide history, 2,614 (35.3%) adolescents had a history of suicidal thoughts and 1,600 (21.6%) had a history of attempts. Relative to the fatal suicide attempt, 2,768 (37.3%) decedents left a suicide note and 1,921 (25.9%) disclosed suicidal intent. Adolescents with a known mental health condition were more likely to disclose intent and have a history of

ideation and attempts reported (aOR range = 1.60–5.64) relative to those with no known mental health condition.

Discussion

This study examined circumstances contributing to suicide among adolescents with and without known mental health conditions. Nearly 58% of adolescents whose suicide deaths were reported in NVDRS between 2013 and 2018 had no known mental health condition. While decedents with known mental health conditions were more likely to experience problematic alcohol misuse, substance misuse, nonintimate relationship problems, and school problems, there were no significant differences between these groups for the contributing factors of arguments or conflicts, criminal or legal problems, or any crisis occurring within the previous two weeks of death. This finding suggests some adolescents may have difficulty coping with conflict and crisis regardless of mental health condition. Experiencing crises may be overwhelming and leave adolescents vulnerable to risk of suicide. Thus, suicide prevention efforts which recognize life stressors and other crises experienced among adolescents irrespective of diagnosed mental health conditions may be instrumental in reducing the risk of suicide.

While a majority of decedents were not reported to have a known mental health condition, nearly 40% of those with a known mental health condition were also reported to not be in current treatment for mental health at the time of death. Comprehensive suicide prevention which includes identifying and remedying barriers to treatment and increasing education of the need for mental health services at the community level is also important in reducing the risk of suicide. This study also found that rates of firearm suicide were higher among those with no known mental health condition compared to other methods. This may indicate perceived lethality of firearms among those experiencing crisis and further supports creating protective environments by reducing access to lethal means among adolescents at risk of suicide.

Studies show that one of the strongest predictors of eventual suicide fatality among adolescents is a previous suicide attempt [21,22]; however, adolescents with no known mental health condition were less likely to have a history of suicide thoughts or attempts or to have disclosed their intent or written a note prior to death. Previous research found that adolescents exhibit domains of impulsivity at different stages of their development that are associated with an increased risk of suicidal ideation and attempt [28], therefore a broader approach to suicide prevention that focuses on strategies for reducing impulsive behaviors and impulsive responses to emotions may be beneficial for adolescents both with and without known mental health conditions [20]. In addition, upstream approaches to suicide prevention that include community strategies to reduce the stigma associated with disclosing thoughts of suicide can promote help seeking behavior among adolescents before suicide attempts are made.

Overall, the most common known circumstances contributing to suicide among all decedents were current depressed mood, mental health/substance misuse treatment (current treatment and ever treated), family and intimate partner relationship problems, arguments or conflicts,

school problems, and having a school or family relationship crisis within 2 weeks of death. The Surgeon General's call to action for suicide prevention recognizes the need for broadening of interventions that not only include individual-focused mental health treatment but also a focus on teaching coping and problem-solving skills, strengthening interpersonal relationships, promoting connectedness, and strengthening community and societal-level family support [19]. The CDC's suicide prevention technical package also provides guidance for implementing interventions aimed at promoting connectedness and teaching coping and problem-solving skills; these interventions include social-emotional learning programs to help adolescents build skills in emotional regulation and conflict resolution [20]. Strong suicide prevention efforts recognize the multilayered challenges faced by adolescents as they cope with physical, physiological, psychological, social, and emotional changes through growth and development [29]. Recognizing challenges can help guide suicide prevention interventions and enable a smooth transition from adolescence into adulthood.

The results of this study are subject to several limitations. First, this report is based on data from U.S. states and jurisdictions that participated in NVDRS between 2013 and 2018. Data collected did not include all 50 states; however, in 2018, NVDRS expanded to include all 50 states, Puerto Rico, and Washington, DC, to begin collecting data in 2019 [25]. A future replication of the present study with multiple years of information available in the expanded NVDRS database might yield more representative results. Second, in our study, 18.4% of adolescents with no known mental health condition were missing additional data on circumstances preceding the death. Consequently, the frequencies of the particular circumstances examined in our study likely are underestimates. Third, because NVDRS cannot determine if a particular circumstance did not occur or occurred and was not discovered by authorities, persons coded as without known mental health conditions may have had mental health challenges that were unknown, undiagnosed, or not reported during investigation. Fourth, prior CDC survey data show higher rates of suicide ideation and attempt among lesbian, gay, and bisexual identifying adolescents [24]; however, sparse data on the sexual orientation status of decedents in NVDRS, an issue common in mortality data due to difficulties with collecting postmortem information about sexual orientation, hindered additional analyses specific to this population. There are significant steps being taken to systematically enhance and standardize NVDRS data collection to identify sexual orientation at the time of death and enhance coding through more in-depth qualitative analysis of the NVDRS narrative data [30,31]. Fifth, NVDRS relies on partnerships between states and local agencies to obtain the information recorded in the database; the degree of completeness might vary among and within states and depends on the degree of knowledge available from family, friends, and other informants during the death investigation. Finally, given that the study is cross-sectional, it should be noted that findings do not imply causality.

Conclusion

This study provides evidence for the development of comprehensive strategies for adolescent suicide prevention. Suicide is a complex issue, requiring not only downstream clinical interventions but also upstream nonclinical interventions to create environments that prevent suicide in the first place. This study indicates the importance of an upstream comprehensive

approach to adolescent suicide prevention, addressing both mental health conditions and the life stressors adolescents experience. Just as there is no single cause for suicide, no single sector can prevent suicide. Shifting the focus of suicide prevention from downstream, individual-level clinical treatment to include upstream comprehensive community and societal-level strategies engages communities in shared responsibility to prevent the tragedy of adolescent suicide.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

The authors thank Dr. Deborah Stone and Dr. Curtis Florence for their review and feedback in early drafts of this manuscript.

Author Contributions: Dr. Ketra Rice conceptualized and designed the study, acquired the data, developed the methodology, carried out formal analysis and interpretation of the data, drafted the initial manuscript, reviewed and revised the manuscript, and critically reviewed the manuscript for important intellectual content. Drs. Melissa Brown and Nisha Nataraj conceptualized and designed the study, drafted the initial manuscript, reviewed and revised the manuscript, and critically reviewed the manuscript for important intellectual content. Dr. Likang Xu carried out formal analysis and interpretation of the data, reviewed and revised the manuscript, and critically reviewed the manuscript for important intellectual content. All authors approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

This research uses data from NVDRS, a surveillance system administered by the Centers for Disease Control and Prevention's National Center for Injury Prevention and Control. The findings are based, in part, on the contributions of the funded states and territories that collected violent death data and the contributions of the states' partners, including personnel from law enforcement, vital records, medical examiners/coroners, and crime laboratories. The findings and conclusions presented here represent those of the authors and do not necessarily reflect the official position of the Centers for Disease Control and Prevention. Persons interested in obtaining data files from NVDRS should contact Centers for Disease Control and Prevention's National Center for Injury Prevention and Control, 4770 Buford Hwy, NE, MS F-64, Atlanta, Georgia 30341-3717, (800) CDC-INFO (232-4636).

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IMPLICATIONS AND CONTRIBUTION

Suicide is the second leading cause of death of U.S. adolescents aged 10–19 years. This study examines circumstances contributing to suicide among U.S. adolescents. Identifying contributing circumstances is needed to inform the scope of clinical and nonclinical adolescent suicide prevention.

Table 1

Selected demographic and descriptive characteristics of suicides among persons aged 10–19 years with and without known mental health conditions—National Violent Death Reporting System, 2013–2018[a]

	Total		Known mental health condition[b]		No known mental health condition		*p* value	OR and aOR (95% CI)[f]
	N = 8,298		n = 3,492		n = 4806			
	No.	%	No.	%	No.	%		
Sex								
Male	6,200	74.7%	2,371	67.9%	3,829	79.7%	<.01	0.54 (0.49–0.60)
Female	2,098	25.3%	1,121	32.1%	977	20.3%		referent
Age Group								
10–14	1,505	18.1%	572	16.4%	933	19.4%	<.01	0.81 (0.73–0.91)
15–19	6,793	81.9%	2,920	83.6%	3,873	80.6%		referent
Race/Ethnicity								
White, non-Hispanic	5,645	68.0%	2,587	74.1%	3,058	63.6%		referent
Black, non-Hispanic	863	10.4%	262	7.5%	601	12.5%	<.01	0.52 (0.44–0.60)
American Indian/Alaskan Native (AI/AN), non-Hispanic	226	2.7%	58	1.7%	168	3.5%	<.01	0.41 (0.30–0.55)
Asian/Pacific Islander (PI), non-Hispanic	294	3.5%	102	2.9%	192	4.0%	<.01	0.63 (0.49–0.80)
Hispanic	1,033	12.4%	390	11.2%	643	13.4%	<.01	0.72 (0.63–0.82)
Other or Unknown	237	2.9%	93	2.7%	144	3.0%	<.05	0.76 (0.59–1.00)
Extended Demographic Characteristics[c]								
Sexual Orientation identified as Straight/Heterosexual	741	8.9%	327	9.4%	414	8.6%		referent
Sexual Orientation identified as Gay, Lesbian, or Bisexual	172	2.1%	100	2.9%	72	1.5%	<.01	1.76 (1.26–2.46)
Method[d]								
Firearm	3,414	41.1%	1,128	32.3%	2,286	47.6%	<.01	0.53 (0.48–0.58)
Hanging/Strangulation/Suffocation	3,788	45.6%	1,803	51.6%	1,985	41.3%	<.01	1.56 (1.42–1.71)
Poisoning	474	5.7%	310	8.9%	164	3.4%	<.01	2.30 (1.88–2.81)
Motor/Transport Vehicles	244	2.9%	122	3.5%	122	2.5%	<.05	1.33 (1.03–1.73)
Fall	202	2.4%	90	2.6%	112	2.3%	.48	NS
Other	116	2.1%	39	1.1%	77	1.6%	<.05	0.66 (0.44–0.98)
Substance detected[e]								

	Total		Known mental health condition[b]		No known mental health condition		*p* value	OR and aOR (95% CI)[f]
	N = 8,298		n = 3,492		n = 4806			
	No.	%	No.	%	No.	%		
Alcohol								
Tested	4,448	53.6%	2,028	58.1%	2,420	50.4%	<.01	2.04 (1.38–3.03)
Positive	662	14.9%	263	13.0%	399	16.5%	<.01	0.72 (0.61–0.86)
Opioids								
Tested	3,608	43.5%	1,696	48.6%	1,912	39.8%	<.01	1.55 (1.29–1.85)
Positive	258	7.2%	137	8.1%	121	6.3%	.28	NS
Benzodiazepines								
Tested	3,349	40.4%	1,575	45.1%	1,774	36.9%	<.01	1.32 (1.14–1.54)
Positive	381	11.4%	213	13.5%	168	9.5%	<.01	1.36 (1.09–1.69)
Cocaine								
Tested	3,561	42.9%	1,659	47.5%	1,902	39.6%	<.01	1.53 (1.28–1.83)
Positive	103	2.9%	55	3.3%	48	2.5%	.38	NS
Amphetamines								
Tested	3,564	43.0%	1,676	48.0%	1,888	39.3%	<.01	1.50 (1.27–1.78)
Positive	279	7.8%	176	10.5%	103	5.5%	<.01	2.14 (1.65–2.77)
Marijuana								
Tested	3,175	38.3%	1,464	41.9%	1,711	35.6%	< .05	1.16 (1.01–1.32)
Positive	980	30.9%	446	30.5%	534	31.2%	.84	NS
Antidepressants								
Tested	2,345	28.3%	1,251	35.8%	1,094	22.8%	<.01	1.70 (1.49–1.93)
Positive	580	24.7%	512	40.9%	68	6.2%	<.01	9.57 (7.29–12.57)
Antipsychotics								
Tested	1,956	23.6%	970	27.8%	986	20.5%	<.01	1.34 (1.18–1.53)
Positive	96	4.9%	74	7.6%	22	2.2%	<.01	3.57 (2.18–5.84)

OR = odds ratio; aOR = adjusted odds ratio; CI = confidence interval; NS = not significant.

[a]2013: Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin. 2014: Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, Michigan, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin. 2015: Alaska, Arizona, Colorado, Connecticut, Georgia, Hawaii, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Virginia, and Wisconsin. 2016: Alaska, Arizona, Colorado, Connecticut, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode

Island, South Carolina, Utah, Vermont, Virginia, Washington, and Wisconsin. 2017: Alaska, Arizona, California (4 counties reporting), Colorado, Connecticut, Delaware, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin. 2018: Alabama, Alaska, Arizona, California (21 counties reporting), Colorado, Connecticut, Delaware, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

[b] Decedent identified in record as having a current diagnosis of mental health condition in coroner/medical examiner or law enforcement reports.

[c] Sexual orientation was not captured for 89% of adolescent decedents.

[d] 67 observations for weapon type unknown/not reported.

[e] Denominator for each positive group is the number tested for the substance in that group.

[f] Logistic regression was used to estimate odds ratios with 95% confidence intervals. Odds ratios for demographics are crude ratios; all other odds ratios are adjusted (controlling for sex, age group, and race/ethnicity). For all adjusted odds ratios, no known mental health condition was used as the reference group.

Table 2

Circumstances preceding suicide among decedents aged 10–19 years with and without known mental health conditions—National Violent Death Reporting System, 2013–2018[a]

Characteristics	Total		Known mental health condition[b]		No known mental health condition		*p* value	aOR (95% CI)[g]
	N = 8,298		n = 3,492		n = 4,806			
	No.	%	No.	%	No.	%		
Suicide with known circumstances	7,414	89.3%	3,492	100.0%	3,922	81.6%	<.01	N/A
Any current diagnosed mental health condition[c,d]								
Depression/Dysthymia	N/A	N/A	2,496	71.5%	N/A	N/A	N/A	N/A
Anxiety Disorder	N/A	N/A	650	18.6%	N/A	N/A	N/A	N/A
Bipolar Disorder	N/A	N/A	344	9.9%	N/A	N/A	N/A	N/A
Schizophrenia	N/A	N/A	75	2.1%	N/A	N/A	N/A	N/A
PTSD	N/A	N/A	93	2.7%	N/A	N/A	N/A	N/A
ADD/ADHD	N/A	N/A	509	14.6%	N/A	N/A	N/A	N/A
Eating Disorder	N/A	N/A	40	1.1%	N/A	N/A	N/A	N/A
Obsessive Compulsive Disorder	N/A	N/A	36	1.0%	N/A	N/A	N/A	N/A
Other Disorders	N/A	N/A	375	10.7%	N/A	N/A	N/A	N/A
Current depressed mood (non-diagnosed)	2,502	33.7%	1,309	37.5%	1,193	30.4%	<.01	1.76 (1.60–1.94)
Treatment								
Current mental health/substance misuse treatment	2,164	29.2%	2,119	60.7%	45	1.1%	<.01	121.14 (141.22–222.10)
Ever treated for mental health/substance misuse	2,920	39.4%	2,703	77.4%	217	5.5%	<.01	71.25 (60.73–83.58)
Problematic Substance Misuse								
Alcohol	338	4.6%	186	5.3%	152	3.9%	<.01	1.67 (1.34–2.09)
Nonalcohol-related substance misuse	926	12.5%	512	14.7%	414	10.6%	<.01	1.78 (1.54–2.05)
Relationship problems/loss								
Victim of interpersonal violence in past month	51	0.7%	23	0.7%	28	0.7%	.66	NS
Perpetuator of interpersonal violence in past month	99	1.3%	48	1.4%	51	1.3%	.19	NS
Family relationship problem	1,867	25.2%	848	24.3%	1,019	26.0%	<.01	0.81 (0.73–0.91)
Intimate partner problem	1,805	24.3%	749	21.4%	1,056	26.9%	.57	NS
Other relationship problem (nonintimate)	487	6.6%	234	6.7%	253	6.5%	<.05	1.27 (1.05–1.53)

Characteristics	Total		Known mental health condition[b]		No known mental health condition		*p* value	aOR (95% CI)[g]
	N = 8,298		n = 3,492		n = 4,806			
	No.	%	No.	%	No.	%		
Argument or conflict (not specified)	1,535	20.7%	621	17.8%	914	23.3%	.15	NS
Death of a loved one (any death)	333	4.5%	169	4.8%	164	4.2%	<.05	1.41 (1.13–1.77)
Suicide of family or friend	300	4.0%	161	4.6%	139	3.5%	<.01	1.53 (1.21–1.93)
Other life stressors								
Abused as child	306	4.1%	212	6.1%	94	2.4%	<.01	3.03 (2.35–3.90)
Recent criminal or legal problem	511	6.9%	208	6.0%	303	7.7%	.52	NS
Physical health problem	272	3.7%	144	4.1%	128	3.3%	<.01	1.50 (1.17–1.92)
School problem	1,387	18.7%	638	18.3%	749	19.1%	<.05	0.79 (0.70–0.89)
Recent release from an institution[e]	558	7.5%	337	9.7%	221	5.6%	<.01	2.14 (1.79–2.56)
Hospital	79	14.2%	62	18.4%	17	7.7%	<.01	2.64 (1.48–4.68)
Psychiatric hospital/psychiatric treatment facility	212	38.0%	194	57.6%	18	8.1%	<.01	14.18 (8.33–24.15)
Jail/Detention facility	59	10.6%	33	9.8%	26	11.8%	.46	NS
Other (includes halfway house, nursing facility, other treatment facility)	198	35.5%	42	12.5%	156	70.6%	<.01	0.06 (0.04–0.09)
Crisis within 2 weeks of death[f]								
Any crisis	2,518	34.0%	1,084	31.0%	1,434	36.6%	.24	NS
School crisis	370	14.7%	147	13.6%	223	15.6%	.35	NS
Family relationship crisis	647	25.7%	279	25.7%	368	25.7%	.58	NS
Criminal legal problem crisis	202	8.0%	74	6.8%	128	8.9%	.11	NS
Suicide of family or friend crisis	59	2.3%	26	2.4%	33	2.3%	.76	NS
Other death of family or friend crisis	60	2.4%	24	2.2%	36	2.5%	.74	NS
Suicide event/history								
Left a note	2,768	37.3%	1,266	36.3%	1,502	38.3%	<.01	0.89 (0.81–0.98)
Disclosed suicide intent	1,921	25.9%	984	28.2%	937	23.9%	<.01	1.60 (1.44–1.78)
History of ideation	2,614	35.3%	1,673	47.9%	941	24.0%	<.01	3.71 (3.36–4.09)
History of attempts	1,600	21.6%	1,211	34.7%	389	9.9%	<.01	5.65 (4.97–6.42)

aOR = adjusted odds ratio; CI = confidence interval; PTSD = posttraumatic stress disorder; ADD/ADHD = attention deficit disorder/attention deficit hyperactivity disorder; N/A = non-applicable; NS = not significant.

[a] 2013: Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin. 2014: Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, Michigan, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin. 2015: Alaska, Arizona, Colorado, Connecticut, Georgia, Hawaii, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Vermont, Virginia, and Wisconsin. 2016: Alaska, Arizona, Colorado, Connecticut, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Utah, Vermont, Virginia, Washington, and Wisconsin. 2017: Alaska, Arizona, California (4 counties reporting), Colorado, Connecticut, Delaware, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin. 2018: Alabama, Alaska, Arizona, California (21 counties reporting), Colorado, Connecticut, Delaware, District of Columbia, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Puerto Rico, Rhode Island, South Carolina, Utah, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

[b] Decedent identified in record as having a current diagnosis of mental health condition in coroner/medical examiner or law enforcement reports.

[c] Includes decedents with one or more current diagnosed mental health conditions, which are not mutually exclusive. Therefore, the sum for the percentages for the diagnosed conditions exceeds 100%. The denominator includes the number of decedents with one or more known diagnosed mental health conditions.

[d] The specific type of mental health condition was calculated only among those with one or more known diagnosed mental health conditions.

[e] Denominator of institution subgroup is decedents with recent release from an institution, defined as having occurred within the past month. Institution subgroups with less than 10 decedents are not reported.

[f] Denominator of crisis subgroup is decedents with any crisis within 2 weeks of death.

[g] Logistic regression was used to estimate adjusted odds ratios with 95% confidence intervals (controlling for sex, age group, and race/ethnicity). No known mental health condition was used as the reference group.