HHS Public Access

Author manuscript

*Med Care*. Author manuscript; available in PMC 2022 February 01.

Published in final edited form as:

*Med Care*. 2021 February 01; 59: S92–S99. doi:10.1097/MLR.0000000000001482.

# Circumstances Associated With Suicides Among Females—16 States, United States, 2005–2016

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## Abstract

**Background:** Suicide rates in the United States have been consistently increasing since 2005 and increasing faster among females than among males. Understanding circumstances related to the changes in suicide may help inform prevention programs. This study describes the circumstances associated with suicides among females in the United States using the National Violent Death Reporting System.

**Methods:** We analyzed the circumstances of suicides occurring from 2005 to 2016 in 16 states (Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin) among females aged 10 years and above. We compared the percentages of circumstances reported for the entire sample, by age group, and by race/ethnicity. Trends in changes in the leading circumstances were analyzed using Joinpoint regression.

**Results:** From 2005 to 2016, there were 27,809 suicides among females 10 years and older in the 16 states. Overall, the 2 leading precipitating circumstances were current mental health problem and ever treated for mental health problem. The leading circumstances differed by demographics. Joinpoint analysis showed inflection points in reports of job problems, financial problems, and non—intimate partner relationship problems during 2005–2009. During 2010–2016, downward inflections were seen in reports of job problems and financial problems and upward inflections in substance abuse problems and a recent or impending crisis.

**Conclusions:** These findings show changes by age group and race/ ethnicity in the circumstances associated with suicides among females in the 16 states have occurred. Studying

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The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the Centers for Disease Control and Prevention/the Agency for Toxic Substances and Disease Registry.

The authors declare no conflict of interest.

Supplemental Digital Content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's website, www.lww-medicalcare.com.

these shifts and identifying the most salient circumstances among female suicide decedents may help prevention programs adapt to different needs.

**Keywords**

suicide; circumstances; females; trends; age groups; ethnicity; NVDRS

**S**uicidal behavior presents a challenge to public health in the United States and worldwide.[1] From 1999 to 2017, the overall age-adjusted suicide rate increased 33% from 10.5 per 100,000 standard population to 14.0 in the United States across multiple demographic groups.[2] During that interval, age-adjusted rates among males increased by 26%, but rates increased by 53% among females.[2] From 1999 to 2017, the suicide rate increased faster among females than males by racial/ethnic group and among most age groups from 10 to 74 years,[3] and from 1999 to 2016 rates for females increased in more states than for males.[4] In 2017, the latest year for which there is complete US death certificate data, suicide was the 14th overall leading cause among females, accounting for over 10,000 deaths.[5] It was the second leading cause of death among females aged 15–19 years and among those in their 20s, and fourth among those in their 30s.[5,6] One of the reasons that suicides among females have not been studied as extensively is that almost 80% of suicides in the United States occur among males.[7] Studies have shown that there are some differences between the sexes regarding factors that affect suicide; these factors include the following: the duration of the suicidal process, help-seeking behavior, suicidal intent, and some of the circumstances associated with their respective suicides.[8,9] There are likely several intersecting root causes of those differences in suicide. There may be biological, behavioral, social, and/or cultural influences that explain the differences.[10,11] These root causes might be manifested in the circumstances associated with suicides such as access and use of health services, relationship, or economic issues.[12] Understanding circumstances related to suicide among females may help inform prevention programs overall for females along with specific age groups among females. In this study, we performed a descriptive study to examine the trends in suicide-related circumstances among females whether those patterns have changed. We also examined age groups among the female decedents so that any specific factors associated with suicide by age groups might be identified possibly pointing to specific age appropriate prevention approaches.

## METHODS

The Centers for Disease Control and Prevention’s National Violent Death Reporting System (NVDRS) is a population-based, active surveillance system designed to capture violent deaths at the state level.[13] The system collects information on homicides, suicides, deaths of undetermined intent (ie, a death that results from the use of force or power against oneself or another person for which the evidence indicating one manner of death is no more compelling than evidence indicating another), deaths from legal intervention (eg, deaths caused by law enforcement and other persons with legal authority to use deadly force acting in the line of duty, excluding legal executions), and unintentional firearm deaths. NVDRS uses a multisource approach (ie, death certificates, coroner/medical examiner reports, and law enforcement records) for analysis of violence to provide a more comprehensive

understanding of violent deaths. Currently, the NVDRS operates in all 50 states, Washington, DC, and Puerto Rico. Funding for NVDRS has been awarded incrementally to states on a competitive basis, as federal funding has allowed. NVDRS data collection began with 6 states in 2003. Seven states began data collection in 2004, and 3 more in 2005. The remaining states began data collection in 2010, 2015, 2017, and 2019. To be consistent with the state data over the study period, we used the 16 states that collected data for the entire period from 2005 to 2016. We examined NVDRS data on suicides among females occurring during 2005–2016 from 16 states: Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin. From 2005 to 2016 (the most recent data available), the total number of suicides among females in the 16 NVDRS states was 27,809. Circumstances associated with the suicide were known for 25,720 (92%) of those decedents.

The percentage of decedents with each suicide circumstance (the full list of suicide-related circumstances and the definitions can be found in the NVDRS coding manual)[14] were calculated by year for all suicides, by age group (10–17, 18–39, 40–64, 65+ y), and by race/ ethnicity (White non-Hispanic, Black non-Hispanic, non-Hispanic American Indian/ Alaska Native, non-Hispanic Asian Pacific Islander, and Hispanic). Circumstances preceding death are defined as the precipitating events that contributed to the infliction of a fatal injury. The circumstances are reported based on the content of coroner/medical examiner and law enforcement investigative reports.[14] Please see definition of selected circumstances in Supplemental table, Supplemental Digital Content 1 (http://links.lww.com/MLR/C158). We initially examined all the circumstances and then limited the analysis to the highest ranked based on the percentage. The top 10 most commonly reported circumstances for each year for female suicides in ranked order current mental health problem; ever treated for mental health problem; current treatment for mental illness; depressed mood; alcohol problem; substance abuse other (nonalcohol related); intimate partner problem; other (non—intimate partner) relationship problem; history of suicide attempts [definition of suicide attempt=(A nonfatal, self-directed, potentially injurious behavior with any intent to die as a result of the behavior; which may or may not result in injury), the victim must engage in a potentially injurious behavior. A potentially injurious behavior is one which in and of itself has the ability to cause injury and/or death]; physical health problem; recent or impending crisis [A crisis is defined as some event perceived by the victim as having life-changing impact. An impending crisis is one that was to occur within 2 wk of death (eg, victim was to be served divorce papers).] were identified and retained for analysis. The most reported circumstances differed by age group and by race/ ethnicity so the list may differ by demographics. Sample size became unstable when analyzing more than top 10 circumstances for some groups. Analyses were limited to suicide decedents aged 10 years and above because intent for selfharm is often not ascribed to young children. Trends in the overall top suicide circumstances over the study period were evaluated using Joinpoint regression analyses.[15] Joinpoint regression detects statistically significant trends as well as changes in trends that occur within a time series. This method defines the best fitting regression line across time, starting with the minimum number of Joinpoints (ie, 0 Joinpoints, indicating a straight line) and testing whether more Joinpoints are statistically significant, using a Monte Carlo Permutation method for tests of significance. Trends in percentages of most commonly

occurring circumstances reported for suicide were also tested using Joinpoint regression analysis by age group and race/ethnicity.

## RESULTS

### Overall Trends in Circumstances

During the 2005–2016 period, the leading circumstances among female decedents with known circumstance information in NVDRS were as follows in descending order: current mental health problem (63.2%); history of ever being treated for a mental health problem (55.4%); current treatment for mental illness (48.4%); depressed mood (42.0%); history of suicide attempts (33.5%); intimate partner problem (26.4%); recent or impending crisis (25.8%); physical health problem (23.1%); substance abuse problem (17.9%); other (non—intimate partner) relationship problem (defined as decedent was experiencing problems with a friend, associate, or family member other than an intimate partner) (15.8%); alcohol problem (15.2%) (Fig. 1). The figure depicts trends in the leading 11 circumstances by percentage. Table 1 shows the 10 leading precipitating circumstances by race/ethnicity and age group. Among all female decedents with known circumstance information, the percentages with a mental health problem, intimate partner problem, physical health problem, alcohol problem, or death of a friend or family member did not change significantly between 2005 and 2016 (Table 2). For the entire study period, the percentage of female suicide decedents with a history of suicide attempts decreased by 7.7%, whereas substance abuse problems increased by 23.6%. Similar trends were identified in the percentage of female suicide decedents with other relationship (non—intimate partner) problems, financial problems, and job problems. Other relationship (non—intimate partner) problems and financial problems increased by 57.1% and 27% between 2005 and 2009 and decreased by 21.9% and 38.1% between 2009 and 2016, respectively. Similarly, job problems increased by 55.2% between 2005 and 2010 and decreased by 37.5% between 2010 and 2016.

### Trends in Circumstance by Age Group

Although leading circumstances varied by age groups, mental health problems, depressed mood, a recent or impending crisis, and history of suicide attempts were leading circumstances for all age groups, other leading circumstances and trends in circumstances varied by age group. Over the time period, among females aged 10–17 years (Table 3), the top 7 leading circumstances were ranked as follows: mental health problem, other relationship (non—intimate partner) problem, depressed mood, recent or impending crisis, history of suicide attempts, intimate partner problem, and school problem. During this time period, significant changes in trends were identified in 2 circumstances among females aged 10–17 years: mental health problem and intimate partner problem. The percent of decedents with a mental health problem decreased by 25.0% from 2005 to 2010 but then increased by 58.3% from 2010 to 2016. From 2005 to 2014, the percentage of decedents with an intimate partner problem decreased by 25.4%; however, no significant changes were identified between 2014 and 2016.

Over the study time period, among females aged 18–39 years (Table 3), the leading circumstances, in descending order, were: mental health problems, depressed mood, intimate partner relationship problems, history of suicide attempts, and a recent or impending crisis. Between 2005 and 2016, the percentage of decedents aged 18–39 years with a reported depressed mood and history of suicide attempts decreased by 21.4% and 11.9%, respectively. The percentage of decedents with a recent or impending crisis decreased by 17.4% from 2005 to 2014, but then increased by 31.9% from 2014 to 2016. No significant trends in the percentage of decedents with mental health problems and intimate partner problems were identified during the study period.

From 2005 to 2016, among females aged 40–64 years (Table 3), the leading circumstances were: mental health problems, depressed mood, history of suicide attempts, physical health problems, intimate partner problems, and recent or impending crisis. During the study period, 2 Joinpoints were identified in the percentage of decedents with a reported depressed mood. The percentage of decedents aged 40–64 years with a depressed mood decreased by 15.6% from 2005 to 2007, remained stable from 2007 to 2014, and decreased by 16.9% from 2014 to 2016. The percentage of decedents with a history of suicide attempts also decreased significantly during the study period.

Between 2005 and 2016, among females aged 65 years and older (Table 3), the leading circumstances were: mental health problems, physical health problems, depressed mood, history of suicide attempts, and a recent or impending crisis. During the study period, the percentage of decedents with mental health problems and a recent or impending crisis increased significantly by 17.4% and 67.4%, respectively. The percentage of decedents aged 65 years and older with physical health problems, depressed mood, and a history of suicide attempts remained consistent across the study period.

### Trends in Circumstances by Race/Ethnicity

From 2005 to 2016, the leading circumstances among White non-Hispanic females (Table 4) were as follows: mental health problems, depressed mood, history of suicide attempts, intimate partner violence, a recent or impending crisis, and physical health problem. During the study period, significant trends were identified in the percentage of decedents with a depressed mood, history of suicide attempts, and a recent or impending crisis. The percentage of White non-Hispanic female decedents with a depressed mood decreased by 16.2% from 2005 to 2007, remained stable from 2007 to 2013, and then decreased by 15.6% from 2013 to 2016. The percentage of decedents with a history of suicide attempts decreased by 10.1% across the study period. From 2005 to 2011, no significant change in the percentage of decedents with a recent or impending crisis occurred, but the percentage increased significantly by 43.2% from 2011 to 2016.

From 2005 to 2016 the leading circumstances among Black non-Hispanic females (Table 4) were: mental health problems, depressed mood, history of suicide attempts, intimate partner problems, a recent or impending crisis, physical health problem, and other relationship problem. During the same time period, the percentage of decedents with intimate partner problems decreased by 22.9%.

Over the entire study period, the leading circumstances among Hispanic females (Table 4) were mental health problems, depressed mood, intimate partner problem, history of suicide attempts, and a recent or impending crisis. There were 2 circumstances with Joinpoint changes: depressed mood and a recent or impending crisis. Although there were 2 Joinpoints identified for depressed mood, there were no significant trends in the percentages during those time periods. There was no significant trend in the percentage of decedents with a recent or impending crisis from 2005 to 2011; however, the percentage decreased significantly by 79.8% from 2011 to 2016.

## DISCUSSION

There have been changes over time (2005–2016) in several of the circumstances associated with suicides among females in 16 states. Overall association with substance abuse problems increased whereas association with history of suicide attempts decreased. The early period (2005–2009/2010) shows increases in job problems, financial problems, and other relationship (non—intimate partner) problems. The more recent period (2010–2016) shows decreases in job problems, financial problems, depressed mood, and other relationship (non—intimate partner) problems and increases in recent or impending crises. Findings from this study highlight changes in circumstances associated with suicides among females that occurred during the same timeframe, by race/ethnicity and age group. Being aware of the changes in trends can help suicide prevention professionals develop relevant programs that target appropriate circumstances in affected populations. Changes among racial/ethnic groups may reflect the differing impact of social determinants of health on these populations.

Changes observed in various age groups may relate to developmental periods associated with those groups or life stressors that are associated with certain stages of life such as physical health problems among middle-aged or older adults. By identifying the factors associated with selected age groups, more appropriate prevention strategies may be implemented. Among middle-aged and older adult females, implementing suicide prevention programs that address the interaction of mental and physical health problems may be a good approach. This is consistent with studies that have shown the association between chronic illness and mental health problems.[16,17] Relevant programs may involve providing safer care through systems change which includes improved continuity of care for patients and improved training of health care providers. Among youth aged 10–17 years, mental health problems showed an increase, and this may indicate a greater need for primary prevention programs that enhance coping and resiliency skills and those that expand evidence-based mental health care and treatment. However, in other groups intimate partner and other relationship problems may be crucial factors to address. There are approaches identified in the CDC’s suicide prevention technical package such as parenting and family skills training approaches that may be relevant to these issues. In still other local areas among individuals or families that are experiencing economic stressors, those communities could benefit from prevention efforts that include components that address economic support such as strengthening financial security and providing housing stabilization. These economic issues have been documented and discussed regarding the economic recession of 2007–2009 and the COVID-19 pandemic that resulted in increases in unemployment.[18–20]

Multiple individual, peer, family, community, and societal factors have been associated with differences and similarities in suicidal behaviors between the sexes.[8] For example, previous studies have suggested that duration of the suicidal process may be longer among females compared with males.[21] The findings in this study indicate that as suicide rates were increasing in the United States, some of the circumstances were changing. Previous analyses have shown some circumstances associated with suicide were similar for males and females whereas others were different.[22] The results of this study were similar to others using NVRDS data in reporting the percentage of circumstances for suicide among females.[9,22] Also, results were consistent with analysis from the National Mortality Followback Survey regarding association of suicide with depressive symptoms for females and use of mental health services.[23]

## LIMITATIONS

There are limitations to this study that are worth noting. First, only 16 states were included in this trend analysis and therefore results are not representative of all suicides that occurred in the United States. Second, findings in the study may be impacted by changes in the ability to identify suicide-related circumstances over time, such as increased awareness of clinical depression by health care providers.[24,25] The variable “a recent or impending crisis during the previous or upcoming two weeks” was modified in 2013 to allow for entering data on which specific crisis was involved.[13] This did not appear to alter the results of the study since the Joinpoint analysis showed that the trend in that variable started changing in 2011 before the variable was modified. Third, data from NVDRS are limited by the thoroughness and accuracy of the death investigation and the next of kin’s knowledge about the stressors or other circumstances that lead to the suicide.[26] Furthermore, incorrect or incomplete information gathered during the death investigation might have resulted in misclassification of the intent of the deceased, especially when distinguishing among suicide, undetermined deaths, and unintentional injury poisoning deaths.[27,28] Causality could not be inferred between the circumstances and the suicides. Circumstance information was obtained from previous reports and interviews, which might include all information about the incidents. Mental and medical health information was obtained from coroner or medical examiners, family members, and friends of the victims. These informants might not have known all of the decedents’ health information; therefore, some health conditions might have been underestimated. Fourth, deaths for all causes for non-Hispanic American Indian/Alaska Native, non-Hispanic Asian Pacific Islander, and Hispanic persons are sometimes misclassified to other race and ethnicity groups.[29] Fifth, historically suicides have been more likely to be underreported among females than among males.[30]

## CONCLUSIONS

Suicide is an ongoing, serious public health problem in the United States that affects all races, sexes, and backgrounds. Rates of suicide have been on the rise in the United States for more than a decade.[4] Data are critically important in identifying the scope of the problem and administering prevention programs. These results can be used by those who plan and administer prevention programs to focus on changing factors and specific communities. The findings of this study underscore previous work establishing that numerous circumstances

impact suicide.[31,32] Studying trends and identifying the most salient circumstances among female suicide decedents may help prevention programs adapt to different factors and needs in different age group and racial/ethnic populations. Effective prevention strategies are available to lessen the impact these circumstances have on suicide.[33] Using a comprehensive, evidence-based, public health approach to prevent suicides can lessen the impact of immediate and long-term harms of suicidal behavior.[34] Two resources that may be useful in identifying and then implementing a comprehensive prevention strategy are the CDC' s suicide prevention technical package[33] and its implementation guidance.[35]

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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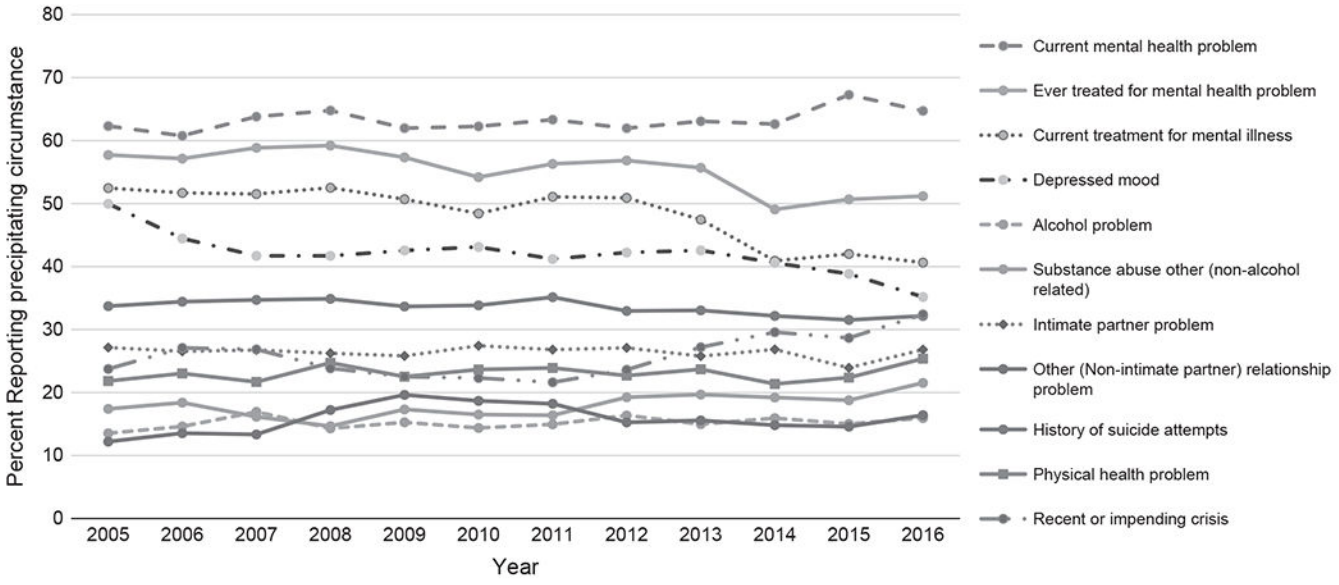


**FIGURE 1.**

Precipitating circumstances* of suicide among females—16 states, CDC's National Violent Death Reporting System, United States, 2005–2016. *Includes those suicides with 1 or more precipitating circumstances. Percentages may add to more than 100 since a suicide may have had > 1 precipitating circumstance.

**TABLE 1.**

Rank of Precipitating Circumstances Among Females Dying by Suicide by Age Group and Race/Ethnicity—16 States,* National Violent Death Reporting System, United States 2005–2016

| Rank | Overall | | White Non-Hispanic | | Black Non-Hispanic | | Hispanic | |
|---|---|---|---|---|---|---|---|---|
| | Circumstance | % | Circumstance | % | Circumstance | % | Circumstance | % |
| 1 | Current mental health problem | 63.2 | Current mental health problem | 64.2 | Current mental health problem | 54.3 | Current mental health problem | 54.4 |
| 2 | Ever treated for mental health problem | 55.4 | Depressed mood | 42.3 | Depressed mood | 33.8 | Depressed mood | 46.1 |
| 3 | Current treatment for mental illness | 48.4 | History suicide attempts | 34.0 | History suicide attempts | 27.5 | IP problem | 37.0 |
| 4 | Depressed mood | 42.0 | IP problem | 25.6 | IP problem | 26.3 | History suicide attempts | 34.6 |
| 5 | History of suicide attempts | 33.5 | Any crisis | 25.4 | Any crisis | 25.0 | Any crisis | 31.9 |
| 6 | Intimate partner problem (IP problem) | 26.4 | Physical health problem | 24.1 | Physical health problem | 15.4 | Non-IP problem | 23.3 |
| 7 | Recent or impending crisis | 25.8 | Substance abuse other | 18.7 | Non-IP problem | 13.3 | Physical health problem | 19.0 |
| 8 | Physical health problem | 23.1 | Alcohol problem | 15.9 | Substance abuse problem | 12.5 | Substance abuse problem | 17.5 |
| 9 | Other substance abuse (nonalcohol related) | 17.9 | Non-IP problem | 15.4 | Job problem | 10.2 | Alcohol problem | 15.0 |
| 10 | Other (non-intimate partner) relationship problem (non-IP problem) | 15.8 | Financial problem | 9.5 | Financial problem | 8.9 | Job | 7.9 |
| Rank (y) | 10–17 | | 18–39 | | 40–64 | | 65+ | |
| | Circumstance | % | Circumstance | % | Circumstance | % | Circumstance | % |
| 1 | Current mental health problem | 47.9 | Current mental health problem | 60.3 | Current mental health problem | 66.7 | Current mental health problem | 53.8 |
| 2 | Non-IP problem | 46.4 | Depressed mood | 40.4 | Depressed mood | 43.2 | Physical health problem | 48.1 |
| 3 | Depressed mood | 39.5 | IP problem | 39.4 | History suicide attempt | 34.0 | Depressed mood | 41.1 |
| 4 | Any crisis | 39.2 | History suicide attempt | 37.2 | Physical health problem | 25.5 | History suicide attempts | 21.4 |
| 5 | History suicide attempt | 32.3 | Any crisis | 31.5 | IP problem | 23.4 | Any crisis | 18.4 |
| 6 | IP problem | 26.8 | Substance abuse problem | 25.3 | Any crisis | 23.2 | Other death | 10.9 |
| 7 | School problem | 22.5 | Non-IP problem | 16.8 | Alcohol problem | 17.5 | Non-IP problem | 9.4 |
| 8 | Substance abuse problem | 9.6 | Alcohol problem | 15.8 | Substance abuse problem | 17.1 | Alcohol problem | 6.4 |
| 9 | Anniversary of other (nonsuicide) death | 6.5 | Physical health problem | 12.0 | Non-IP problem | 14.4 | IP problem | 5.8 |
| 10 | Recent suicide of friend/family | 6.0 | Job problem | 9.0 | Financial problem | 11.3 | Financial problem | 5.2 |

*Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin. IP problem indicates intimate partner problem; Non-IP problem, non-intimate partner relationship problem.

**TABLE 2.**

Trends in Precipitating Circumstances Among Females Dying by Suicide—16 States,* National Violent Death Reporting System, United States 2005–2016

| Circumstance | No. Joinpoints | Joinpoint Year Range | APC | Observed Percent Range | Modeled Percent Range | Overall % Change in Modeled Range |
|---|---|---|---|---|---|---|
| Mental health problem | 0 | 2005–2016 | 0.17 | 60.0–65.8 | 61.6–63.5 | 3.1 |
| Depressed mood | 2 | 2005–2007 | −3.92† | 41.7–50.0 | 41.6–49.5 | −16.0 |
| | | 2007–2013 | 0.18 | 41.2–43.1 | 41.6–42.7 | 2.6 |
| | | 2013–2016 | −2.31† | 35.2–40.6 | 35.8–42.7 | −16.2 |
| History of suicide attempts | 0 | 2005–2016 | −0.25† | 31.5–35.2 | 32.2–34.9 | −7.7 |
| Intimate partner problem | 0 | 2005–2016 | −0.09 | 23.9–27.4 | 25.9–26.9 | −3.7 |
| Recent or impending crisis | 1 | 2005–2011 | −0.67 | 21.6–27.1 | 22.2–26.0 | −14.6 |
| | | 2011–2016 | 2.05† | 21.6–32.4 | 22.2–32.7 | 47.3 |
| Physical health problem | 0 | 2005–2016 | 0.09 | 21.4–25.4 | 22.6–23.5 | 4.0 |
| Substance abuse problem | 0 | 2005–2016 | 0.35† | 14.7–21.5 | 16.1–19.9 | 23.6 |
| Alcohol problem | 0 | 2005–2016 | 0.11 | 13.5–16.9 | 14.6–15.8 | 8.2 |
| Other relationship (non—intimate) partner) problem | 1 | 2005–2009 | 1.76† | 12.2–19.6 | 11.9–18.7 | 57.1 |
| | | 2009–2016 | −0.58† | 14.6–19.6 | 14.6–18.7 | −21.9 |
| Financial problem | 1 | 2005–2009 | 0.58† | 8.9–11.9 | 8.9–11.3 | 27.0 |
| | | 2009–2016 | −0.62† | 7.3–11.9 | 7.0–11.3 | −38.1 |
| Job problem | 1 | 2005–2010 | 0.75† | 7.0–11.5 | 6.7–10.4 | 55.2 |
| | | 2010–2016 | −0.67† | 6.8–11.5 | 6.5–10.4 | −37.5 |
| Death of friend/family | 0 | 2005–2016 | 0.06 | 5.9–9.0 | 7.0–7.6 | 8.6 |

*Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin.

†The APC is statistically different from 0 ($P < 0.05$).

APC indicates annual percent change.

**TABLE 3.**

Trends in Precipitating Circumstances Among Females Dying by Suicide by Age Group—16 States,* National Violent Death Reporting System, United States 2005–2016

| Characteristic | No. Joinpoints | Joinpoint Year Range | APC | Range During Joinpoint Year (%) | Modeled Percent Range | Overall % Change in Modeled Range |
|---|---|---|---|---|---|---|
| Leading circumstances of suicides among females aged 10–17 y—NVDRS, 2005–2016 | | | | | | |
| Mental health problem | 1 | 2005–2010 | −5.62† | 37.3–53.5 | 38.6–51.5 | −25.0 |
| | | 2010–2016 | 7.96† | 37.3–60.0 | 38.6–61.1 | 58.3 |
| Other relationship problem | 0 | 2005–2016 | −1.09 | 33.3–58.6 | 43.2–48.7 | −11.3 |
| Depressed mood | 0 | 2005–2016 | −0.99 | 27.1–55.2 | 36.6–40.8 | −10.3 |
| Any crisis | 0 | 2005–2016 | −0.68 | 27.1–50.0 | 37.3–40.2 | −7.2 |
| History of suicide attempts | 0 | 2005–2016 | −1.16 | 24.7–43.1 | 30.0–34.1 | −12.0 |
| Intimate partner problem | 1 | 2005–2014 | −3.20† | 21.4–31.9 | 22.3–29.9 | −25.4 |
| | | 2014–2016 | 22.51 | 22.8–34.6 | 22.3–33.5 | 50.2 |
| School problem | 0 | 2005–2016 | 3.43 | 18.3–26.5 | 18.3–26.5 | 44.8 |
| Leading circumstances of suicides among females aged 18–39 y—NVDRS, 2005–2016 | | | | | | |
| Mental health problem | 0 | 2005–2016 | 0.36 | 56.6–64.2 | 59.1–61.4 | 3.9 |
| Depressed mood | 0 | 2005–2016 | −2.17† | 34.1–47.4 | 35.7–45.4 | −21.4 |
| Intimate partner problem | 0 | 2005–2016 | −0.18 | 35.3–42.5 | 39.0–39.8 | −2.0 |
| History of suicide attempts | 0 | 2005–2016 | −1.15† | 33.8–39.5 | 34.9–39.6 | −11.9 |
| Any crisis | 1 | 2005–2014 | −3.75† | 26.7–33.2 | 27.6–33.4 | −17.4 |
| | | 2014–2016 | 4.70† | 26.7–37.6 | 27.6–36.4 | 31.9 |
| Leading circumstances of suicides among females aged 40–64 y—NVDRS, 2005–2016 | | | | | | |
| Mental health problem | 0 | 2005–2016 | 0.08 | 63.2–70.2 | 66.4–66.9 | 0.75 |
| Depressed mood | 2 | 2005–2007 | −8.14† | 43.1–52.4 | 43.2–51.2 | −15.6 |
| | | 2007–2014 | −0.01 | 42.8–43.9 | 43.2–43.2 | 0 |
| | | 2014–2016 | −8.83† | 35.8–42.9 | 35.9–43.2 | −16.9 |
| History of suicide attempt | 0 | 2005–2016 | −0.66† | 32.3–35.7 | 32.8–35.3 | −7.1 |
| Physical health problem | 0 | 2005–2016 | 0.7 | 23.0–29.5 | 24.5–26.4 | 7.8 |
| Intimate partner problem | 0 | 2005–2016 | −0.18 | 21.8–25.5 | 23.1–23.6 | −2.1 |
| Any crisis | 0 | 2005–2016 | 2.57 | 18.3–30.1 | 19.9–26.4 | 32.7 |
| Leading circumstances of suicides among females aged 65+ y—NVDRS, 2005–2016 | | | | | | |
| Mental health problem | 0 | 2005–2016 | 1.46† | 47.2–59.8 | 49.5–58.1 | 17.4 |
| Physical health problem | 0 | 2005–2016 | −0.02 | 45.1–52.2 | 48.0–48.1 | −0.2 |
| Depressed mood | 0 | 2005–2016 | −0.55 | 35.7–45.9 | 39.7–42.2 | −5.9 |
| History of suicide attempt | 0 | 2005–2016 | 2.21 | 15.0–26.9 | 18.8–23.9 | 27.1 |

| Characteristic | No. Joinpoints | Joinpoint Year Range | APC | Range During Joinpoint Year (%) | Modeled Percent Range | Overall % Change in Modeled Range |
|---|---|---|---|---|---|---|
| Any crisis | 0 | 2005–2016 | 4.77† | 13.6–25.9 | 13.8–23.1 | 67.4 |

*Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin.

†The APC is statistically different from 0 ($P<0.05$).

APC indicates annual percent change.

**TABLE 4.**

Trends in Precipitating Circumstances Among Females Dying by Suicide by Race/Ethnicity—16 States,* National Violent Death Reporting System, United States 2005–2016

| Characteristic | No. Joinpoint | Joinpoints Year Range | APC | Observed Range During Joinpoint Year (%) | Modeled Percent Range | Overall % Change in Modeled Range |
|---|---|---|---|---|---|---|
| Leading circumstances of suicides among non-Hispanic White females—NVDRS, 2005–2016 | | | | | | |
| Mental health problem | 0 | 2005–2016 | 0.27 | 62.5–66.8 | 63.2–65.1 | 3.0 |
| Depressed mood | 2 | 2005–2007 | −8.48† | 42.3–50.9 | 42.0–50.1 | −16.2 |
| | | 2007–2013 | 0.36 | 41.9–42.9 | 42.0–42.9 | 2.1 |
| | | 2013–2016 | −5.48† | 35.6–42.8 | 36.2–42.9 | −15.6 |
| History of suicide attempt | 0 | 2005–2016 | −0.96† | 31.3–35.8 | 32.2–35.8 | −10.1 |
| Intimate partner problem | 0 | 2005–2016 | −0.44 | 23.0–26.5 | 25.0–26.2 | −4.6 |
| Any crisis | 1 | 2005–2011 | −2.02 | 21.6–26.9 | 22.2–25.1 | −11.6 |
| | | 2011–2016 | 7.43† | 21.6–32.2 | 22.2–31.8 | 43.2 |
| Physical health problem | 0 | 2005–2016 | 0.50 | 22.4–26.8 | 23.4–24.7 | 5.6 |
| Leading circumstances of suicides among non-Hispanic Black females—NVDRS, 2005–2016 | | | | | | |
| Mental health problem | 0 | 2005–2016 | −0.85 | 47.2–59.5 | 51.7–56.8 | −9.0 |
| Depressed mood | 1 | 2005–2014 | 1.25 | 28.2–43.2 | 33.4–37.3 | 11.7 |
| | | 2014–2016 | −22.8 | 23.4–39.0 | 22.2–37.3 | −40.5 |
| History of suicide attempt | 0 | 2005–2016 | 0.77 | 21.6–32.9 | 26.2–28.5 | 8.8 |
| Intimate partner problem | 0 | 2005–2016 | −2.35† | 20.4–32.3 | 22.9–29.7 | −22.9 |
| Any crisis | 0 | 2005–2016 | −0.34 | 16.8–38.2 | 24.1–25.0 | −3.6 |
| Physical health problem | 0 | 2005–2016 | −2.76 | 9.2–27.0 | 12.7–17.3 | −26.6 |
| Other relationship problem | 0 | 2005–2016 | 1.34 | 8.1–23.2 | 11.8–13.7 | 16.1 |
| Leading circumstances of suicides among Hispanic females—NVDRS, 2005–2016 | | | | | | |
| Mental health problem | 0 | 2005–2016 | 1.58 | 45.4–66.2 | 49.5–58.9 | 19.0 |
| Depressed mood | 2 | 2005–2008 | −10.97 | 41.8–63.9 | 43.2–61.3 | −29.5 |
| | | 2008–2014 | −1.12 | 39.5–45.6 | 40.4–43.2 | −6.5 |
| | | 2014–2016 | 11.82 | 39.5–51.0 | 40.4–50.5 | 25.0 |
| Intimate partner problem | 0 | 2005–2016 | −0.51 | 29.7–44.4 | 35.7–37.8 | −5.6 |
| History of suicide attempt | 0 | 2005–2016 | 0.19 | 28.6–40.3 | 34.1–34.8 | 2.1 |
| Any crisis | 1 | 2005–2011 | −6.98 | 22.7–38.9 | 23.8–36.7 | −35.1 |
| | | 2011–2016 | 12.45† | 22.7–39.1 | 23.8–42.8 | 79.8 |

*Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin.

†The APC is statistically different from 0 ($P < 0.05$).

APC indicates annual percent change.