

## Provisional Numbers and Rates of Suicide by Month and Demographic Characteristics: United States, 2021

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### Abstract

**Objectives**—This report presents provisional numbers of deaths due to suicide by month and demographic characteristics (age and sex) for 2021 and compares them with final numbers for 2020. Age-adjusted and age-specific suicide rates are presented by sex and compared with final 2020 rates.

**Methods**—Data are based on 99% of all 2021 death records received and processed by the National Center for Health Statistics as of May 15, 2022. Comparisons are made with final 2020 data. Deaths due to suicide were identified using *International Classification of Diseases, 10th Revision* underlying cause-of-death codes U03, X60–X84, and Y87.0.

**Results**—The provisional number of suicides in 2021 (47,646) was 4% higher than in 2020 (45,979). The provisional age-adjusted suicide rate also was 4% higher in 2021 (14.0 per 100,000 standard population) than in 2020 (13.5). The monthly number of suicides was lower in 2021 than in 2020 for January, February, and July, and higher in all other months. The largest percentage difference between monthly numbers for 2020 and 2021 occurred in October, where the provisional number in 2021 (4,211) was 11% higher than in 2020 (3,781). The age-adjusted suicide rate was 3% higher in 2021 than in 2020 for males (22.7 compared with 22.0). The 2% increase in the age-adjusted suicide rate for females (5.6 in 2021 compared with 5.5 in 2020) was not statistically significant. Suicide

rates increased for males aged 15–24, 25–34, 35–44, and 65–74. For females, all age-specific rates were statistically unchanged between 2020 and 2021.

**Keywords:** cause of death • intentional self-harm • COVID-19 • National Vital Statistics System

### Introduction

Suicide is a major contributor to premature death in the United States, especially among people aged 10–34, for whom it is the second leading cause of death (1). In the United States, suicide increased 35% from 1999 to 2018 before declining by 5% through 2020 (2). Despite the overall recent decline, rates continued to increase among females aged 10–24 and among males aged 10–44 and 75 and over (2). This report presents provisional numbers of suicide by month in 2021 and compares them with final 2020 numbers, in total, and by sex. Provisional rates of suicide are presented by sex and age combined and compared with 2020 rates.

### Data Source and Methods

#### Data and methods

Data for 2021 are based on death certificate data received and processed by the National Center for Health Statistics (NCHS) as of May 15, 2022. Populations for computing the rates are based on July 1, 2021, postcensal population estimates from the 2010 decennial census. Because most suicides

typically require a death investigation, provisional suicide rates typically are computed using death data after a 6-month lag following date of death, which is longer than the 3-month lag used to compute rates for most other causes of death (3). For this report, 2021 data for all months had at least a 6-month lag except for December, which had a 5½-month lag based on the data cutoff. Particularly, the method of the suicide plays a role in the timing of the reporting, with reporting for suicides involving drug poisoning typically lagging behind other methods (4). Suicides involving drug poisoning make up a larger proportion of suicides among females, so the completeness of provisional suicide counts for females typically lags behind that for males.

Completeness and timeliness of provisional death data can vary by other factors as well, such as month of the year and age of the decedent (5). Mortality data used in this report include over 99% of the expected deaths that occurred in 2021. However, some death records that have been received with a “pending” cause of death (0.2% of all death records) eventually may be classified as suicides. A *Vital Statistics Rapid Release* report for 2020 data with a similar data cutoff (May 19, 2021) included a total suicide number of 45,855 (6), which was 124 fewer deaths (0.3%) than the eventual final number (45,979). Suicides were identified using *International Classification of Diseases, 10th Revision* underlying cause-of-death codes U03, X60–X84, and Y87.0 (7).

## Rates and significance testing

Age-adjusted suicide rates were calculated as the number of deaths per 100,000 U.S. 2000 standard population and included all ages. Age-specific suicide rates begin with age group 10–14 because determining suicidal intent in children under age 10 is difficult. Consequently, very few deaths are classified as suicides for people under age 10 (20 in 2020 and 11 in 2021). Pairwise comparisons between rates for 2021 and 2020 use the *z* test statistic at the 0.05 level of significance. Comparisons made in the text among rates are statistically significant unless otherwise specified. See Technical Notes for more information.

## Results

### Suicides by month

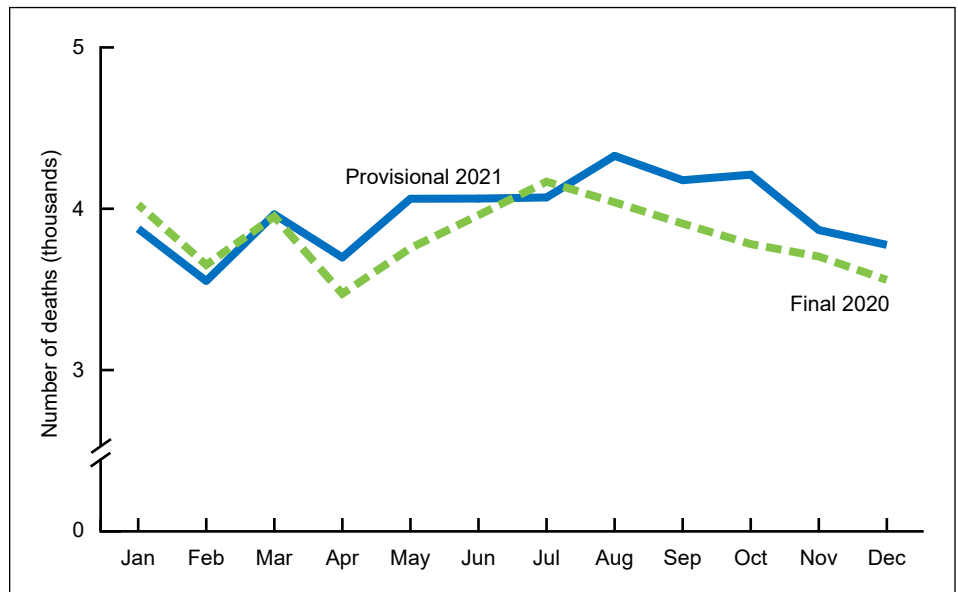
#### Total

Provisional suicide counts in 2021 totaled 47,646, 4% higher than in 2020 (45,979) (Table 1). By month, the provisional number of suicides was lower in 2021 than in 2020 for January, February, and July, and higher for all other months (Figure 1). The largest percentage difference in monthly numbers occurred in October, where the number in 2021 (4,211) was 11% higher than in 2020 (3,781). August had the highest number of suicides in 2021 (4,328), while February had the fewest (3,552). By quarter, the number of suicides in Quarter 4, 2021 (11,855) was 7% higher than in the same 2020 quarter (11,044), the largest percentage difference by quarter between years.

#### By sex

The number of suicides for males in 2021 (38,025) was 4% higher than in 2020 (36,551) (Table 1). The number for males was lower in 2021 than in 2020 for all months in Quarter 1 (January, February, and March) and again in July, but higher for all other months. The largest percentage difference in suicides for males occurred in October, with 15%

Figure 1. Number of suicides, by month: United States, final 2020 and provisional 2021



NOTES: Suicides are identified with *International Classification of Diseases, 10th Revision* underlying cause-of-death codes U03, X60–X84, and Y87.0. Provisional 2021 data are based on death records received and processed by the National Center for Health Statistics as of May 15, 2021.

SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

more suicides in 2021 (3,388) than in 2020 (2,935). February had the lowest number of suicides for males in 2021 (2,809), while August had the highest (3,426).

Suicide numbers were 2% higher for females from 2020 (9,428) to 2021 (9,621) (Table 1). The number of suicides per month among females was lower in 2021 compared with 2020 for 6 months (January, February, June, September, October, and November) and higher for the remaining 6 months. The largest percentage difference in the number of suicides was in August, which was 15% higher in 2021 (902) than in 2020 (785). August was also the month with the highest number in 2021. The fewest number of suicides among females in 2021 occurred in December (733) and April (734).

### Age-adjusted rates by demographic characteristics

The age-adjusted suicide rate in 2021 (14.0 per 100,000 standard population) was 4% higher than in 2020 (13.5) (Table 2 and Figure 2). Rates for people in age groups 10–74 increased between 2020 and 2021, although only the

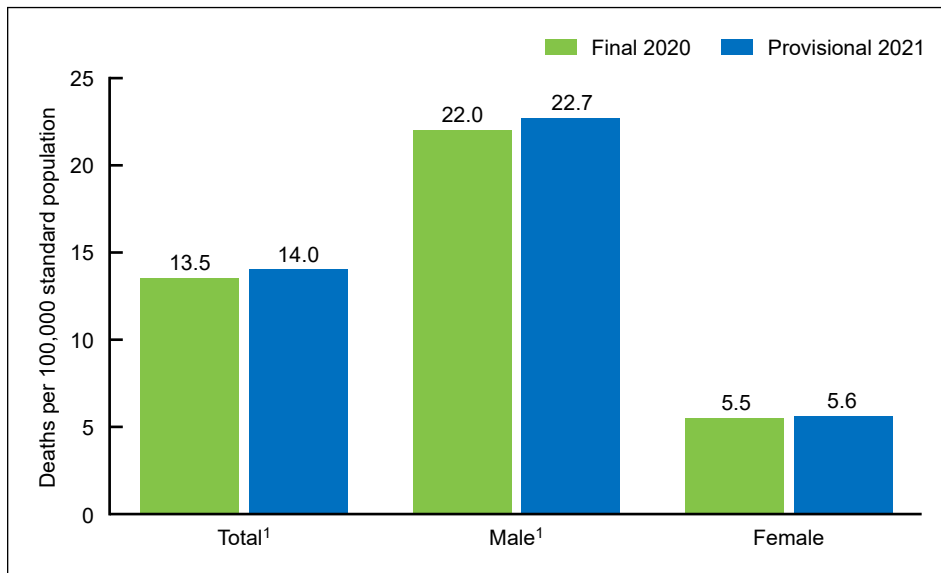
increases for those aged 15–24 (from 14.2 to 15.3), 25–34 (18.4 to 19.1), 35–44 (17.4 to 18.2), and 65–74 (14.5 to 15.1) were statistically significant. The 2% decline for people aged 75 and over (19.1 to 18.8) was not statistically significant.

#### By sex and age

For males, the age-adjusted suicide rate increased 3% from 2020 (22.0 per 100,000) to 2021 (22.7) (Figure 2). Rates for males in age groups 15–24, 25–34, 35–44, and 65–74 increased significantly, with the largest percentage increase (8%) for those aged 15–24 (from 22.4 to 24.1) (Figure 3). The age group for males with the lowest rate in 2021, 10–14, and the age group with the highest rate, 75 and over, each had declines that were not statistically significant. The rate for males aged 55–64 remained unchanged at 27.0.

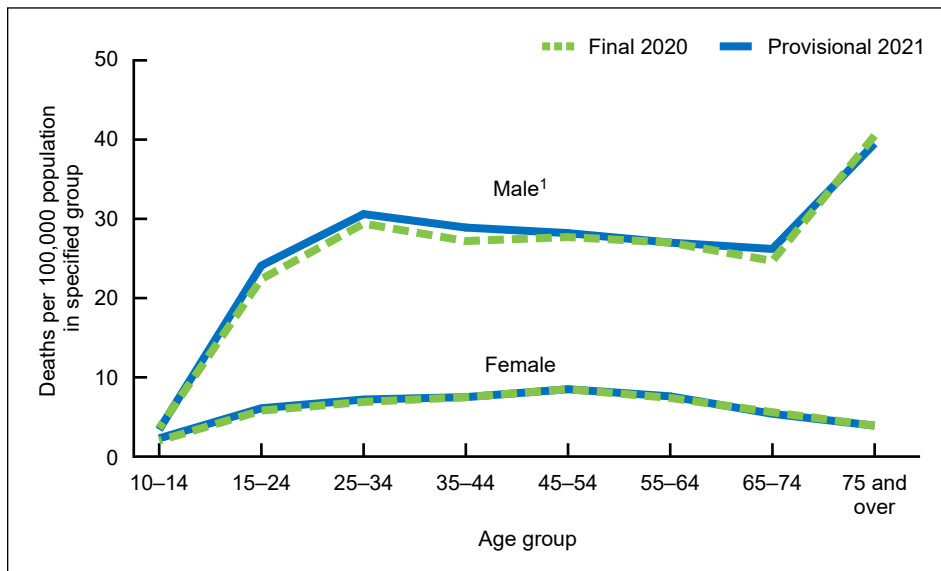
For females, the age-adjusted suicide rate in 2021 (5.6) was 2% higher than in 2020 (5.5), although the change was not significant (Figure 2). Rates increased for females in age groups 10–14, 15–24, 25–34, and 55–64, although none of these changes were statistically significant (Table 2 and Figure 3).

Figure 2. Age-adjusted suicide rate, by sex: United States, final 2020 and provisional 2021



<sup>1</sup>Difference in rates between 2020 and 2021 was statistically significant;  $p < 0.05$ .  
 NOTES: Suicides are identified with *International Classification of Diseases, 10th Revision* underlying cause-of-death codes U03, X60–X84, and Y87.0. Provisional 2021 data are based on death records received and processed by the National Center for Health Statistics as of May 15, 2021.  
 SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

Figure 3. Suicide rate, by age and sex: United States, final 2020 and provisional 2021



<sup>1</sup>Difference in rates between 2020 and 2021 was statistically significant at ages 15–24, 25–34, 35–44, and 65–74;  $p < 0.05$ .  
 NOTES: Suicides are identified with *International Classification of Diseases, 10th Revision* underlying cause-of-death codes U03, X60–X84, and Y87.0. Provisional 2021 data are based on death records received and processed by the National Center for Health Statistics as of May 15, 2021.  
 SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

Females aged 65–74 were the only age group to experience a decline from 2020 to 2021 (from 5.6 to 5.4), although this 4% decline was not significant. Rates for females in age groups 35–44, 45–54, and 75 and over remained unchanged from 2020 to 2021.

## Discussion

The provisional number of suicides for 2021 (47,646) was 4% higher than the 2020 final number (45,979), but was still 1% below the 2018 peak (48,344) (2). Numbers of suicides were higher in 2021 than in 2020 for 9 months, with the

largest percentage increase occurring in October (11%). The increase in the number of suicides was greater for males (4%) than females (2%), with the provisional 2021 number for males (38,025) nearly four times that of females (9,621). Suicide numbers for males were lower in 2021 than in 2020 for all months of the first quarter of the year (January, February, and March) and again in July, but higher for all other months. For females, numbers were lower in 2021 than in 2020 for 6 months throughout the year and higher for the remaining 6 months.

The overall age-adjusted suicide rate increased 4% from 2020 (13.5) to 2021 (14.0) but was 1% lower than the recent peak in 2018 (14.2). The 3% increase in the age-adjusted rate for males (from 22.0 to 22.7) was greater than the 2% increase for females (from 5.5 to 5.6), whose change was not statistically significant. By age group, the largest statistically significant percentage increase from 2020 to 2021 was for males aged 15–24, by 8%. Rates also increased for males in age groups 25–34, 35–44, and 65–74, with no significant declines for any age group. Although rates increased for females in age groups 10–14, 15–24, 25–34, and 55–64, none of the changes were statistically significant. The decline in the rate for females aged 65–74 also was not significant.

A limitation of this report is that the changes in rates for some age groups were underpowered (insufficient numbers of deaths) to detect statistical significance. This does not mean that the findings are not important, but rather that they did not reach the threshold for statistical significance (alpha less than 0.05 or 95% confidence that the changes were not due to random variation alone). For example, the suicide rate for females aged 10–14 increased 15% from 2020 to 2021, the largest increase of any age group. However, the change did not reach statistical significance because it was based on relatively few cases: 204 deaths in 2020 and 237 in 2021. Accordingly, assessment of changes between 2020 and 2021 should consider the number

of deaths and the criteria for statistical significance presented in [Table 2](#) and [Figures 2](#) and [3](#).

Because the numbers and rates presented in this report are provisional, they are subject to change. Reporting of suicides in particular can be delayed because of investigations regarding the cause and circumstances surrounding the death. Suicides for females are more likely to be incomplete in this report than suicides for males because their deaths more frequently involve drug poisonings (4). However, this analysis is based on more than 99% of expected death records, and the lag from the event to the reporting is more than 6 months for all months except December. Based on a comparison of the provisional 2020 suicide data (with a May 19, 2021, cutoff) (6) and final 2020 suicide data, the findings in this report for provisional 2021 suicide data are expected to be consistent with final 2021 data.

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Table 1. Number of suicides, by month and sex: United States, final 2020 and provisional 2021

Quarter and month	Total			Male			Female		
	Final 2020	Provisional 2021	Percent change between 2020 and 2021	Final 2020	Provisional 2021	Percent change between 2020 and 2021	Final 2020	Provisional 2021	Percent change between 2020 and 2021
Total . . . . .	45,979	47,646	4	36,551	38,025	4	9,428	9,621	2
Quarter 1 . . . . .	11,630	11,393	-2	9,278	9,022	-3	2,352	2,371	1
January . . . . .	4,026	3,876	-4	3,195	3,069	-4	831	807	-3
February . . . . .	3,652	3,552	-3	2,906	2,809	-3	746	743	0
March . . . . .	3,952	3,965	0	3,177	3,144	-1	775	821	6
Quarter 2 . . . . .	11,189	11,823	6	8,909	9,468	6	2,280	2,355	3
April . . . . .	3,473	3,698	6	2,766	2,964	7	707	734	4
May . . . . .	3,756	4,062	8	2,991	3,232	8	765	830	8
June . . . . .	3,960	4,063	3	3,152	3,272	4	808	791	-2
Quarter 3 . . . . .	12,116	12,575	4	9,708	10,013	3	2,408	2,562	6
July . . . . .	4,168	4,070	-2	3,358	3,214	-4	810	856	6
August . . . . .	4,040	4,328	7	3,255	3,426	5	785	902	15
September . . . . .	3,908	4,177	7	3,095	3,373	9	813	804	-1
Quarter 4 . . . . .	11,044	11,855	7	8,656	9,522	10	2,388	2,333	-2
October . . . . .	3,781	4,211	11	2,935	3,388	15	846	823	-3
November . . . . .	3,704	3,868	4	2,880	3,091	7	824	777	-6
December . . . . .	3,559	3,776	6	2,841	3,043	7	718	733	2

NOTES: Suicides are identified using *International Classification of Diseases, 10th Revision* underlying cause-of-death codes U03, X60–X84, and Y87.0. Provisional 2021 data are based on death records received and processed by the National Center for Health Statistics as of May 15, 2022.

SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

# Vital Statistics Surveillance Report

Table 2. Number and rate of suicides, by age group and sex: United States, final 2020 and provisional 2021

[Rates are per 100,000 population estimated as of July 1 in 2020 and 2021]

Age group and sex	Number			Rate		
	Final 2020	Provisional 2021	Percent change between 2020 and 2021	Final 2020	Provisional 2021	Percent change between 2020 and 2021
Total <sup>1,2</sup>	45,979	47,646	4	13.5	14.0	†4
Age group:						
10–14	581	593	2	2.8	2.9	4
15–24	6,062	6,468	7	14.2	15.3	†8
25–34	8,454	8,772	4	18.4	19.1	†4
35–44	7,314	7,751	6	17.4	18.2	†5
45–54	7,249	7,313	1	18.0	18.3	2
55–64	7,160	7,171	0	16.9	17.0	1
65–74	4,716	5,087	8	14.5	15.1	†4
75 and over	4,421	4,477	1	19.1	18.8	-2
Male <sup>1,2</sup>	36,551	38,025	4	22.0	22.7	†3
Age group:						
10–14	377	356	-6	3.6	3.4	-6
15–24	4,859	5,204	7	22.4	24.1	†8
25–34	6,882	7,158	4	29.4	30.6	†4
35–44	5,723	6,158	8	27.2	28.9	†6
45–54	5,514	5,581	1	27.7	28.2	2
55–64	5,539	5,514	0	27.0	27.0	0
65–74	3,743	4,111	10	24.7	26.2	†6
75 and over	3,900	3,932	1	40.5	39.5	-2
Female <sup>1,2</sup>	9,428	9,621	2	5.5	5.6	2
Age group:						
10–14	204	237	16	2.0	2.3	15
15–24	1,203	1,264	5	5.8	6.1	5
25–34	1,572	1,614	3	6.9	7.2	4
35–44	1,591	1,593	0	7.5	7.5	0
45–54	1,735	1,732	0	8.5	8.5	0
55–64	1,621	1,657	2	7.4	7.6	3
65–74	973	976	0	5.6	5.4	-4
75 and over	521	545	5	3.9	3.9	0

† Percent change in rates between 2020 and 2021 was statistically significant;  $p < 0.05$ .

<sup>1</sup>Includes deaths to people under age 10 years and age not stated.

<sup>2</sup>Rate adjusted to the standard 2000 population; see Data Source and Methods and Technical Notes in this report.

NOTES: Suicides are identified using *International Classification of Diseases, 10th Revision* underlying cause-of-death codes U03, X60–X84, and Y87.0. Provisional 2021 data are based on death records received and processed by the National Center for Health Statistics as of May 15, 2022.

SOURCE: National Center for Health Statistics, National Vital Statistics System, Mortality.

## Technical Notes

### Census population data

The population data used to estimate the death rates shown in this report are July 1, 2021, monthly postcensal population estimates based on the 2010 decennial census. These data are available from the U.S. Census Bureau website at: <https://www.census.gov/data/tables/time-series/demo/popest/2010s-national-detail.html>.

### Cause-of-death classification

Cause of death was classified according to World Health Organization (WHO) regulations, which specify that member countries classify and code causes of death according to the current revision of the *International Classification of Diseases* (ICD). ICD provides the basic guidance used in most countries to code and classify causes of death. Starting with deaths occurring in 1999, the United States began using the 10th revision of this classification (ICD–10) (7).

In this report, cause-of-death statistics are based solely on the underlying cause of death. The underlying cause of death is defined by WHO as “the disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury.” The underlying cause is selected from the conditions entered by the medical certifier in the cause-of-death section of the death certificate. When more than one cause or condition is entered by the medical certifier, the underlying cause is determined by the sequence of conditions on the certificate, provisions of ICD, and associated selection rules and modifications. Suicides were identified by ICD–10 underlying cause-of-death codes U03, X60–X84, and Y87.0.

### Computing rates

Rates for all ages combined in this report were age adjusted based on the standard 2000 population per 100,000 estimated U.S. population. Age-specific rates are per 100,000 population in the specified age group. Comparisons made in the text among rates are statistically significant at the 0.05 level of significance unless otherwise specified. Lack of comment in this report about any two rates does not mean that the difference was tested and found not to be significant at this level.

### Random variation

The mortality data presented in this report are not subject to sampling error. Provisional mortality data may be affected by random variation—that is, the number of deaths that actually occurred may be considered as one of a large series of possible results that could have occurred under the same circumstances.

When the number of deaths is large, a normal approximation may be used to calculate confidence intervals and statistical tests. However, the definition of “large,” in terms of number of deaths, is subjective. Generally, for age-specific death rates, the normal approximation performs well when the number of deaths is 100 or greater. More information on statistical testing is published elsewhere (8).

### Availability of mortality data

Mortality data used in this report are available in online products as described on the National Center for Health Statistics mortality website: <https://www.cdc.gov/nchs/deaths.htm>. Provisional mortality data are available from: <https://www.cdc.gov/nchs/nvss/vsrr/mortality.htm>, and from CDC WONDER: <https://wonder.cdc.gov/mcd-icd10-provisional.html>.

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