



Timeliness of Death Certificate Data by Sex, Age, and Geography

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Abstract

Objective—This report evaluates the timeliness of death certificate information by demographic and geographic factors using provisional and final mortality data from the National Vital Statistics System.

Methods—The percentage of provisional death certificate records for deaths occurring from January 1, 2017, through December 31, 2017, that were available for analysis in the National Center for Health Statistics' (NCHS) database each week were compared with final data. Timeliness, as measured by mean percentage of available records in the database, was analyzed for overall deaths and selected underlying causes of death (e.g., heart disease, injury-related, drug overdose, and suicides) by demographic and geographic factors (e.g., sex, age, race or ethnicity, and state of occurrence).

Results—The study included death certificate records for 2,820,034 deaths occurring between January 1, 2017, and December 31, 2017. Overall, an average of 94.6% of all death certificate records were available by 13 weeks (1 quarter), 99.2% by 26 weeks (2 quarters), and 99.8% by 39 weeks (3 quarters). This pattern of timeliness was similar among deaths for males and females for all deaths and heart disease deaths. Data were over 90% complete for all age categories for all causes of deaths, while data timeliness was less than 90% for decedents aged 45 and under by 13 weeks for heart disease and injury-

related deaths. Timeliness varied by jurisdiction, although most jurisdictions had over 95% completeness by 13 weeks.

Conclusion—The results of this analysis inform future expansions of NCHS' Vital Statistics Rapid Release mortality surveillance program, which may include provisional death rates by demographic and geographic factors.

Keywords: mortality surveillance • National Vital Statistics System • Vital Statistics Rapid Release

Introduction

The National Center for Health Statistics (NCHS) collects and disseminates the nation's official vital statistics through the National Vital Statistics System (NVSS). Through NVSS, 57 jurisdictions, which include all 50 states, New York City, the District of Columbia, and five U.S. territories, send birth and death data to NCHS. Data are then processed, and data sets are created through coding, validation, and other standardization processes. NCHS serves as the custodian and distributor of national vital records in the United States and produces annual national natality and mortality statistics. NCHS also uses provisional vital statistics data for conducting public health surveillance in near real time, publishing provisional estimates based on data received and processed by a specified cutoff date before data are finalized and released (1,2). Completeness and timeliness of provisional death data vary by cause of death and month of the year (3,4).

For example, the lag time (i.e., the length of time between the week a death occurred and the week when information on the death certificate becomes available for NCHS mortality surveillance) is longer for injury-related deaths compared with noninjury-related deaths, such as heart disease. This difference in lag time is often due to longer investigation of circumstances of death for injury-related causes such as suicide and drug overdoses (3–6).

NCHS' Vital Statistics Rapid Release (VSRR) program publishes a quarterly report of provisional mortality rates for all deaths and for select causes of death (1). The report includes provisional crude and age-adjusted rates by quarter of death based on a snapshot of all the vital statistics data received and processed by NCHS as of a specified cutoff date. Because reliable estimates for the most recent quarters may not be available for certain causes of death, provisional rates for these causes of death are presented with a lag. Rates for falls for persons aged 65 and over, firearm-related injury, homicide, suicide, and unintentional injury are presented with a 6-month lag, and rates for drug overdose deaths are presented with a 9-month lag. For example, a report on the provisional rates for Quarter 4, 2019, would present heart disease death rates for Quarter 4, 2019, suicide rates for Quarter 3, 2019, and drug overdose death rates for Quarter 2, 2019.

While studies have examined differences in timeliness by cause of death, demographic and geographic

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factors have not yet been evaluated. Examining the timeliness of these factors would provide assessment of the feasibility of expanding the quarterly provisional data to include sex, age, and jurisdiction of occurrence for surveillance purposes. This report describes timeliness of death certificate data with respect to the quarter in which the death occurred, age at death, sex of the decedent, and the jurisdiction where the death occurred. This report also looks at potential differences in timeliness by cause of death for these demographic and geographic variables. The results of this analysis will inform future expansions of NCHS' VSRR mortality surveillance program, which may include provisional death rates by demographic and geographic factors.

Methods

Since 2014, NCHS has created a set of data files at the end of each week, including data on all death certificate records received, processed, and coded as of that date. These weekly data files

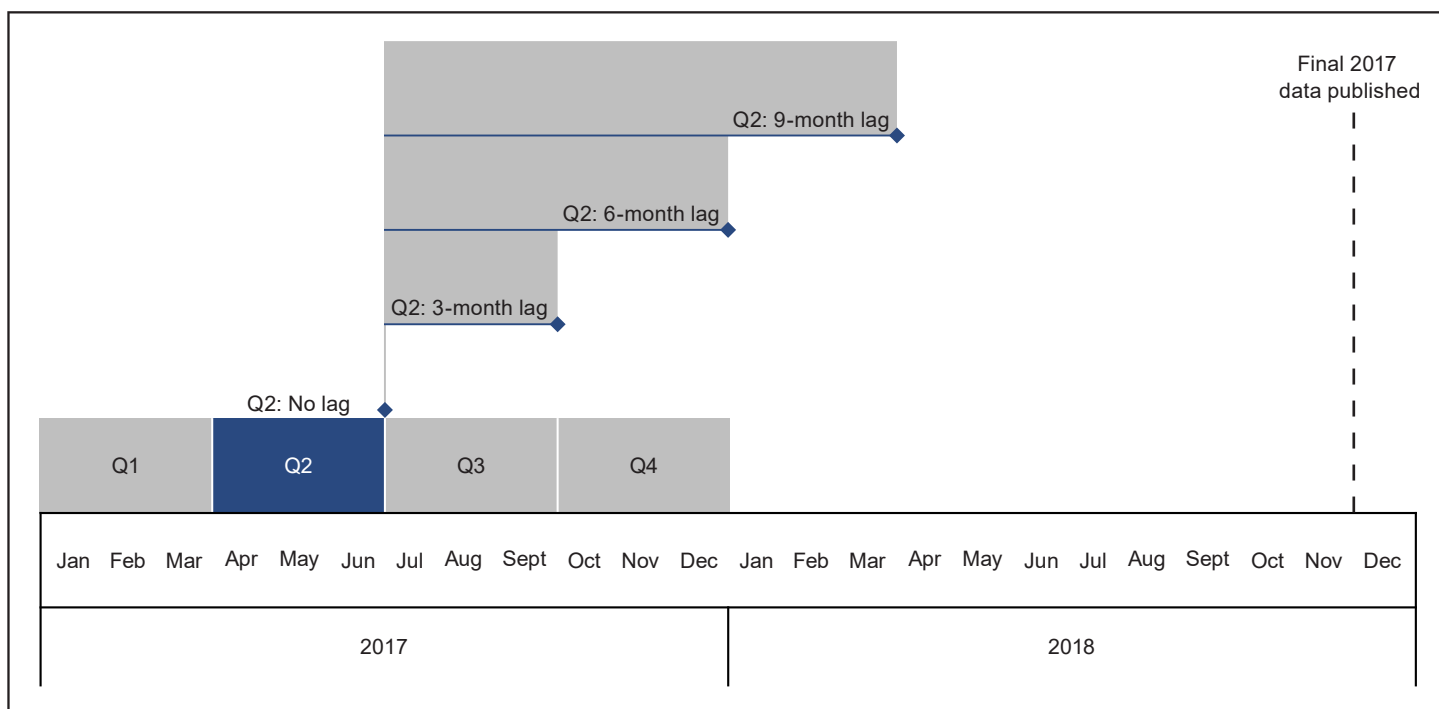
(referred to as “snapshots”) include provisional data for deaths occurring in the previous 24 months in all 50 states, New York City, and the District of Columbia. These data files enable NCHS to evaluate how long it takes for records to become available for analysis after a death occurred, and to examine the timeliness of data, measured by completeness of the data at certain specified time intervals (i.e., lag times) following the date of death. For this assessment, death counts from the snapshot files were compared with death counts in final data files for overall and selected underlying causes of death (heart disease, injury, suicides, and drug overdose) by demographic and geographic factors (e.g., sex, age, and state of occurrence). The analysis includes one natural cause of death (heart disease) and two injury-related causes of death (suicide and drug overdose) based on the underlying cause of death. These three causes of death are reported as part of VSRR's quarterly provisional estimates with different lengths of lag time—3 months for heart disease, 6

months for suicide, and 9 months for drug overdose deaths (1). The analysis also looked at the timeliness of all injury-related deaths, which also include suicide and drug overdose deaths, to serve as a comparison to prior timeliness evaluations of VSRR data (1).

Deaths occurring in the United States in 2017 were aggregated into four cohorts according to the quarter of the year in which the death occurred. Based on these cohorts, provisional snapshots corresponding to a set of lag times following the close of each quarter (e.g., 0, 3, 6, 9, and 12 months) were used to tabulate the completeness of provisional data relative to final death counts at each lag time (Figure 1). These provisional death counts were compared with final death counts to determine the percentage of death records available in the surveillance database at 3, 6, 9, and 12 months after the death occurred.

Provisional counts were further broken down by sex, age, and jurisdiction of occurrence to determine percent completeness by demographic and

Figure 1. Timeframe for analyzing provisional data to compare with final data: Provisional 2017 Quarter 2 data period, with 0-, 3-, 6-, and 9-month reporting lags



NOTES: This figure depicts the reporting lag for analyzing provisional data compared with final data. Each diamond represents the time point for data analysis by lag. A dashed vertical line represents the time when final data are published and available for comparison. SOURCE: NCHS, National Vital Statistics System.

geographic characteristics. The analysis for timeliness by sex categorizes deaths into two groups: male and female. The analysis for timeliness by age categorizes deaths into 11 age groups: under 1 year, 1–4 years, 5–14 years, 15–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84, and 85 and over. To assess deaths by geographic characteristics, data were categorized by the jurisdiction in which the death occurred.

Results are presented as the mean percentage of death certificates available. Mean percentage refers to the sum of the percentages of available death records (i.e., death records in a given provisional snapshot divided by death records in the final data) aggregated across the 4 quarters of the year and divided by 4. A threshold of 90% mean percentage of records available is considered in evaluating the results. The VSRR “Monthly Provisional Drug Overdose Death Counts” report, currently the only other VSRR provisional report that publishes jurisdiction-level data, uses a data quality threshold of 90% completeness by jurisdiction for publication; only provisional data for

jurisdictions with over 90% of records available at the time of analysis are presented (7). This threshold sets data quality standards to ensure relative accuracy of provisional estimates.

Results

Overall deaths

Analyses included death certificate records for 2,820,034 deaths occurring between January 1, 2017, and December 31, 2017. **Table 1** shows mean percentage of available death certificate records at 13-, 26-, and 39-week (1-, 2-, and 3-quarter) lags by quarter of the year. Overall, an average of 94.6% of all death certificate records were available by 13 weeks (1 quarter), 99.2% by 26 weeks (2 quarters), and 99.8% by 39 weeks (3 quarters) (**Table 1**, **Figure 2**). Timeliness of death certificate records showed differences by quarter when a death occurred, with completeness lowest for Quarter 1 (Q1) compared with later quarters. At 13 weeks after the week of death, 92.1% of Q1 deaths were available, compared with 95.2% for Q2, 95.7% for

Q3, and 95.4% for Q4. At 26 weeks after the week of death, 98.8% of Q1 deaths were available, compared with 99.3% for Q2, 98.7% for Q3, and 100% for Q4. At 39 weeks, death certificate completeness was 99.7% for deaths occurring in Q1, 99.6% for deaths occurring in Q2, and 100% for deaths occurring in Q3 and Q4.

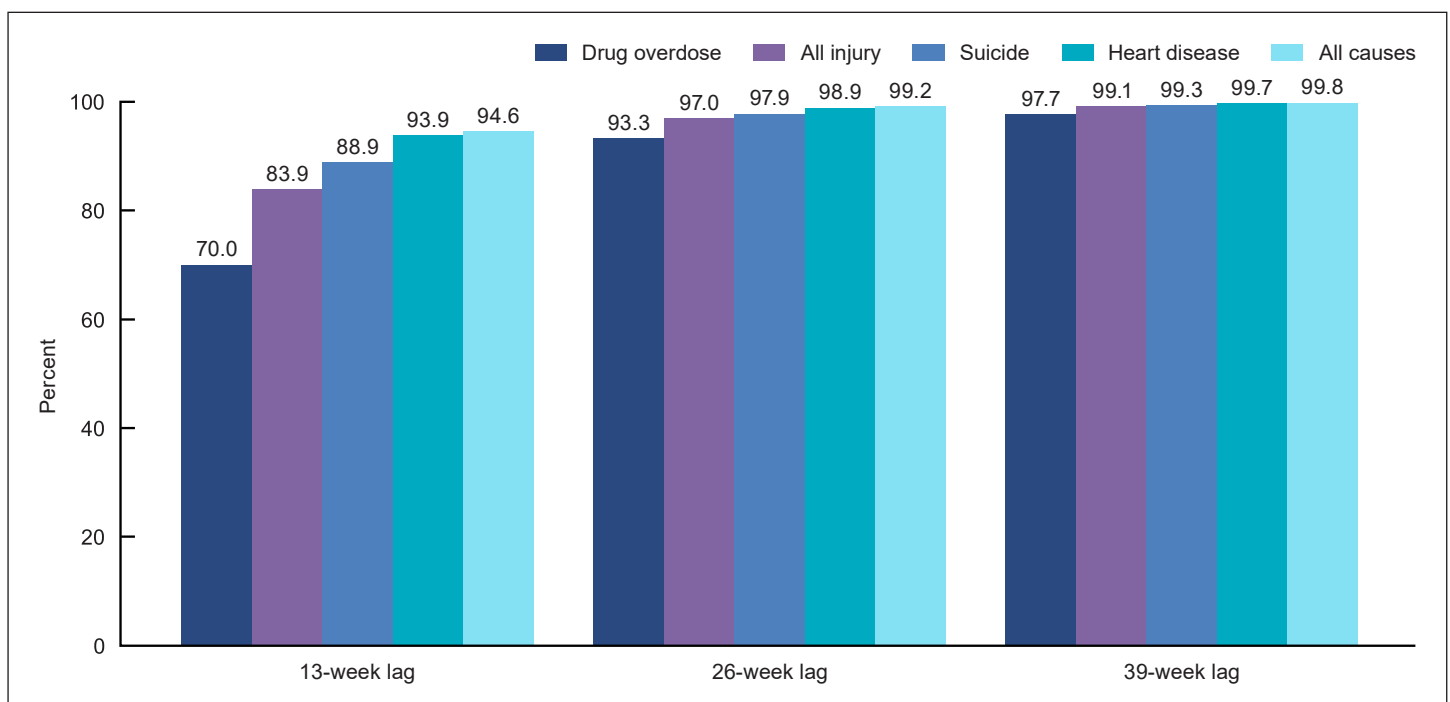
Timeliness by sex

Figure 3 shows the mean percentage of available death certificate records at 13-, 26-, and 39-week (1-, 2-, and 3-quarter) lags by sex for all deaths. By 13 weeks, records for 94.5% of male deaths and 94.7% of female deaths were available. By 26 weeks, 99.2% of male and female deaths were available, and by 39 weeks, 99.8% of male and female deaths were available (**Table 2**).

Timeliness by age at time of death

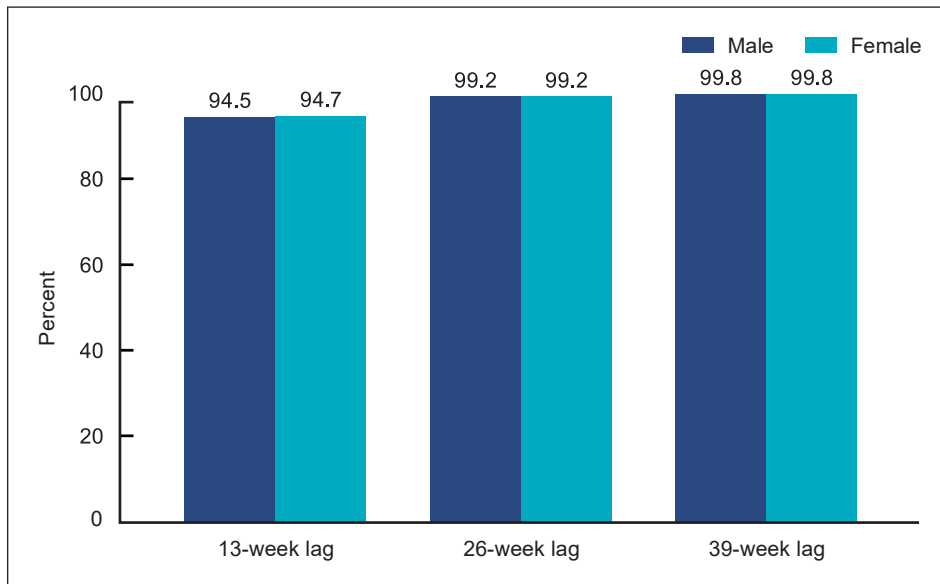
Age was categorized into 11 age groups: under 1 year, 1–4 years, 5–14 years, 15–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75–84, and 85 and over. The mean percentage of death certificate

Figure 2. Mean percentage of death certificate records available for analysis after a 13-, 26-, and 39-week lag, by cause of death: United States, 2017



NOTE: Mean percentage refers to the sum of the percentages of available death records (i.e., death records in a given provisional snapshot divided by death records in the final data) aggregated across the 4 quarters of the year and divided by 4.
SOURCE: NCHS, National Vital Statistics System, 2017.

Figure 3. Mean percentage of death certificate records available for analysis after a 13-, 26-, and 39-week lag, by sex: United States, 2017



NOTE: Mean percentage refers to the sum of the percentages of available death records (i.e., death records in a given provisional snapshot divided by death records in the final data) aggregated across the 4 quarters of the year and divided by 4. SOURCE: NCHS, National Vital Statistics System, 2017.

records available at 13 weeks ranged from 90.7% to 94.8% and generally increased with age (Figure 4). At 26 weeks, over 98% of records were available for all age categories, ranging from 98.0% to 99.4%. At 39 weeks, over 99% of records were available for all age categories, ranging from 99.4% to 99.9% (Table 3).

Timeliness by jurisdiction of occurrence

Figure 5 shows the mean percentage of available death certificate records at 13 weeks and 26 weeks by jurisdiction. Timeliness varied by jurisdiction, particularly in the first few weeks after a death occurred, but data for most jurisdictions were over 90% complete by 13 weeks (Table 4). Arizona, Connecticut, Pennsylvania, and West Virginia lagged with 84.6%, 68.2%, 65.4%, and 87.4%, respectively, of records available for analysis. By 26 weeks, over 90% of records were available for all jurisdictions, with most jurisdictions having over 99%.

Timeliness for cause-of-death data by demographic and geographic factors

Heart disease

Analyses included death certificate records for 649,181 heart disease deaths occurring between January 1, 2017, and December 31, 2017. Figure 2 shows the mean percentage of available death certificate records at 13-, 26-, and 39-week (quarterly) thresholds by cause of death. Overall, an average of 93.9% of death certificate records for heart disease deaths were available by 13 weeks (1 quarter), 98.9% by 26 weeks (2 quarters), and 99.7% by 39 weeks (3 quarters) (Table 2). For heart disease deaths for males, an average of 93.7% of death certificate records were available by 13 weeks, 98.8% by 26 weeks, and 99.7% by 39 weeks. For females, an average of 94.2% of death certificate records for heart disease were available by 13 weeks, 99.0% by 26 weeks, and 99.7% by 39 weeks.

With respect to age at death from heart disease, the mean percentage of death records available ranged from 82.0% to 94.7% at 13 weeks, 94.1% to 99.1% at 26 weeks, and 97.4% to 99.8% at 39

weeks (Table 3). The mean percentage of available data at 13 weeks for age groups under age 45 ranged from 82.0% to 88.5% compared with 90.8% to 94.7% for age groups 45 and over. The pattern across jurisdictions for heart disease data was similar to patterns observed for all-cause mortality, with most jurisdictions having over 90% of heart disease death records complete by 13 weeks, except for six states (Arizona, Connecticut, Michigan, Pennsylvania, Tennessee, and West Virginia), and most jurisdictions having close to 99% completeness by 26 weeks (Table 4).

Injury-related deaths

Analyses included death certificate records for 244,648 injury-related deaths occurring between January 1, 2017, and December 31, 2017. Overall, an average of 83.9% of death certificate records for injury-related deaths were available by 13 weeks (1 quarter), 97.0% by 26 weeks (2 quarters), and 99.1% by 39 weeks (3 quarters). For females, an average of 83.4% of death certificate records for injury-related deaths were available by 13 weeks, 96.8% by 26 weeks, and 99.1% by 39 weeks. For males, an average of 84.1% of the death certificate records were available by 13 weeks, 97.1% by 26 weeks, and 99.1% by 39 weeks. By 13 weeks, the mean percentage of available death certificate records was over 90% for two age groups: those aged 75–84 and 85 and over. All age groups except under 1 year (89.6%) had over 90% of records available by 26 weeks, and all age groups had over 95% of records available at 39 weeks. By 13 weeks, 22 jurisdictions had over 90% of records available. By 26 weeks, 50 jurisdictions had over 90% of records available, with only Michigan and Tennessee lagging at 85.6% and 88.0%, respectively. At 39 weeks, all jurisdictions had over 90% of records available.

Suicide

Analyses included death certificate records for 47,353 suicides occurring between January 1, 2017, and December 31, 2017. Overall, an average of 88.9% of death certificate records for suicides

were available by 13 weeks (1 quarter), 97.9% by 26 weeks (2 quarters), and 99.3% by 39 weeks (3 quarters). For males, an average of 90.1% of death certificate records for suicides were available by 13 weeks, 98.2% by 26 weeks, and 99.4% by 39 weeks. For females, an average of 84.4% of death certificate records for suicides were available by 13 weeks, 96.6% by 26 weeks, and 99.0% by 39 weeks. The mean percentage of records available by age group ranged from 87.0% to 92.0% at 13 weeks, from 97.4% to 98.7% at 26 weeks, and from 99.2% to 99.9% at 39 weeks. While only 34 jurisdictions had over 90% of records available by 13 weeks, all jurisdictions had over 90% by 26 weeks (Table 4).

Drug overdose

Analyses included death certificate records for 70,699 drug overdose deaths occurring between January 1, 2017, and December 31, 2017. Overall, an average of 70.0% of death certificate records for drug overdose deaths were available by 13 weeks (1 quarter), 93.3% by 26 weeks (2 quarters), and 97.7% by 39 weeks

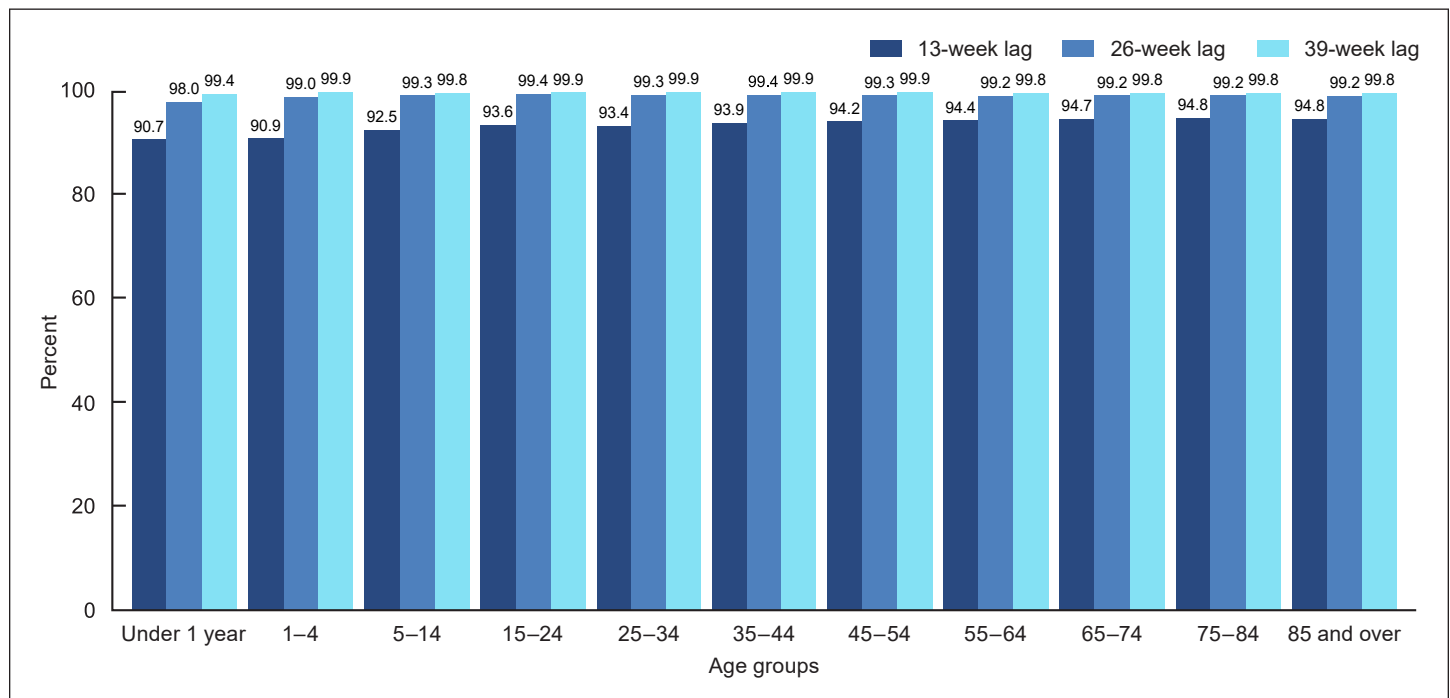
(3 quarters). For males, an average of 70.3% of drug overdose death records were available by 13 weeks, 93.6% by 26 weeks, and 97.8% by 39 weeks. For females, an average of 69.5% of drug overdose death records were available by 13 weeks, 92.6% by 26 weeks, and 97.6% by 39 weeks. Completeness at 13 weeks by age was lowest for age groups under 1 year (42.3%) and 1–4 years (61.5%), and highest for age groups 75 and over (over 80%). Completeness was above 90.0% for all age groups except under 1 year (83.9%) at 26 weeks and was over 95% for all groups at 39 weeks. By 13 weeks, 8 jurisdictions had over 90% completeness (District of Columbia, Michigan, Mississippi, Missouri, New Jersey, New York, North Carolina, and Tennessee). By 26 weeks and 39 weeks, most jurisdictions had over 90% completeness (45 and 51 jurisdictions, respectively) while only Michigan lagged in average completeness (79.1% at 39 weeks).

Discussion

Timeliness of death record data for specific causes of death showed similar patterns to previous studies, and generally showed 90% completeness or higher for most demographic groups by 13 weeks, although this varied by cause of death. Timeliness has improved for all causes of deaths reported here, including drug overdose deaths, compared with the data used in previous studies (3). Data for heart disease deaths are more complete by 13 weeks after the death occurred than data for all injury deaths, suicides, and drug overdose deaths.

Timeliness of death records for all causes combined was similar by sex; death record availability was similar for males and females at 13 weeks and identical at 26- and 39-week lags. Timeliness by sex was also similar for the causes of death analyzed for heart disease, injury-related deaths, and drug overdose deaths. At 13 weeks, completeness for suicide deaths was slightly higher among males than among females, but completeness was similar at 26 weeks. Because suicide rates are

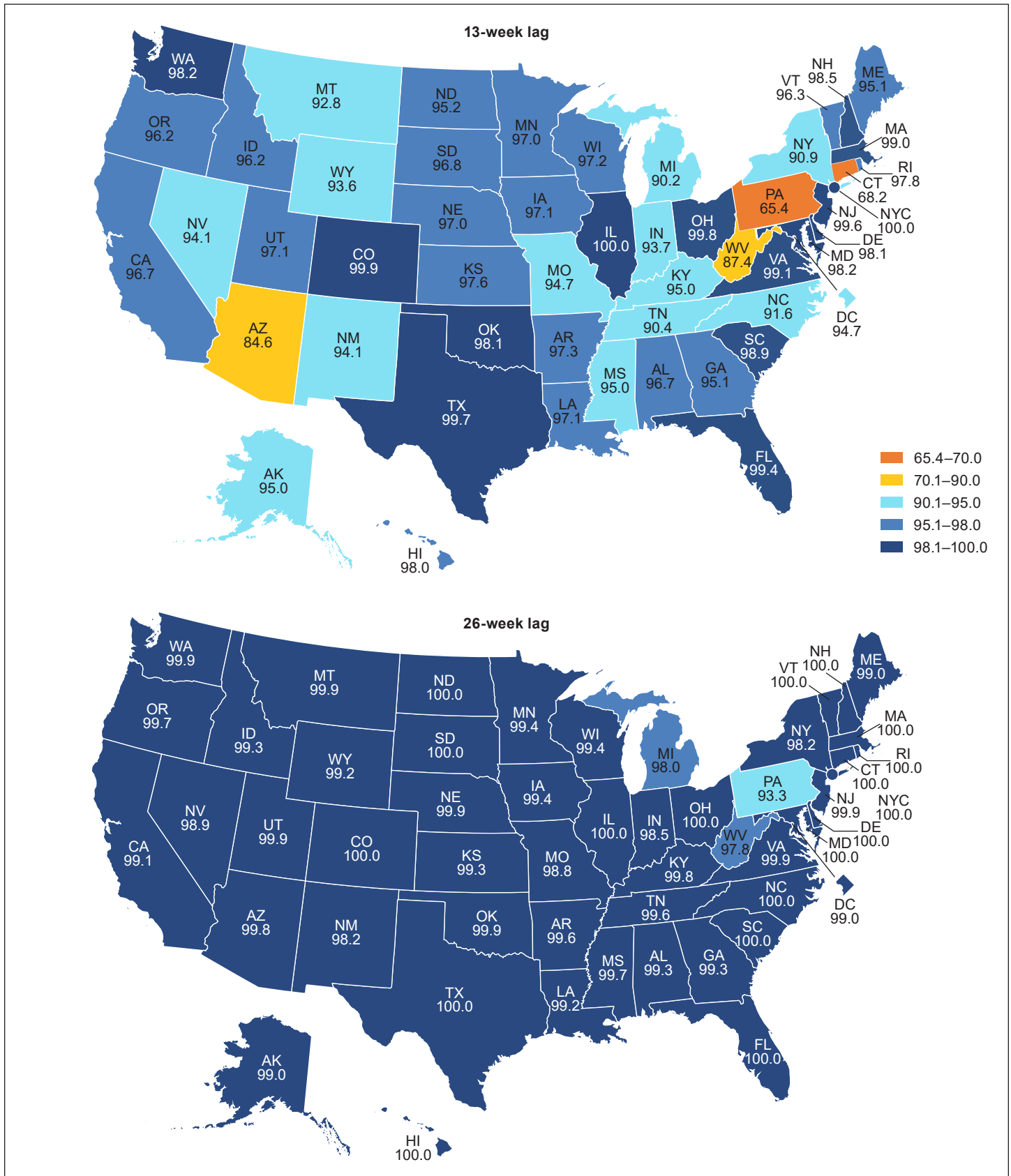
Figure 4. Mean percentage of death certificate records available for analysis after a 13-, 26-, and 39-week lag, by age group: United States, 2017



NOTE: Mean percentage refers to the sum of the percentages of available death records (i.e., death records in a given provisional snapshot divided by death records in the final data) aggregated across the 4 quarters of the year and divided by 4.
SOURCE: NCHS, National Vital Statistics System, 2017.

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Figure 5. Mean percentage of death certificate records available for analysis after a 13- and 26-week lag, by jurisdiction: United States, 2017



NOTE: Mean percentage refers to the sum of the percentages of available death records (i.e., death records in a given provisional snapshot divided by death records in the final data) aggregated across the 4 quarters of the year and divided by 4.
SOURCE: NCHS, National Vital Statistics System, 2017.

currently presented with a 6-month lag, any difference in the percentage of available records by sex would be diminished by the time provisional rates are published.

The timeliness of death certificate data differs by age at the time of death. Completeness of provisional death data at 13 weeks varied by age of the decedent, although data were 90% complete or higher for all age groups for all causes combined. Completeness increased at 26 and 39 weeks, and variability by age was less apparent with longer lag times. Differences by age in timeliness across various causes of death were observed, with completeness generally lower for younger age groups.

Timeliness varied by the jurisdiction in which the death occurred, though all but four jurisdictions had over 90% completeness at 13 weeks for all causes combined. The VSRR “Monthly Provisional Drug Overdose Death Counts” report, currently the only other VSRR provisional report that publishes jurisdiction-level data, uses a data quality threshold of 90% completeness by jurisdiction for publication; only provisional data for jurisdictions with over 90% of records available at the time of analysis are presented (7). To maintain consistent data quality standards, provisional estimates for jurisdictions with less than 90% completeness for the quarter of data being reported may be suppressed.

The variation in completeness of provisional data by demographic and geographic factors should be considered when presenting provisional estimates, particularly for age-specific data and for some jurisdictions for specific causes of death. Presentation of provisional estimates by age and jurisdiction should acknowledge the limitations of data completeness and timeliness and, when necessary, delay the publication of certain estimates to ensure accuracy.

The findings also suggest overall improvements in timeliness compared with prior analyses and timeliness benchmarks (3). Recent improvements

reflect dedicated efforts by NCHS and partners at the state level and professional organizations to improve data quality and timeliness. These improvements allow for more complete data, which can be analyzed and reported in greater detail by sex, age, and jurisdiction. Future expansions of the provisional estimates of mortality may include cause-of-death-specific provisional rates by sex, age, and jurisdiction. The additional demographic and geographic detail will facilitate real-time surveillance of mortality trends by cause of death, sex, age, and geography.

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Table 1. Mean percentage of death certificate records available for analysis at 13-, 26-, and 39-week (1-, 2-, and 3-quarter) lags, by quarter of the year: United States, 2017

Quarter	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)
All	94.6	99.2	99.8
Quarter 1	92.1	98.8	99.7
Quarter 2	95.2	99.3	99.6
Quarter 3	95.7	98.7	100.0
Quarter 4	95.4	100.0	100.0

NOTE: Mean percentage refers to the sum of the percentages of available death records (i.e., death records in a given provisional snapshot divided by death records in the final data) aggregated across the 4 quarters of the year and divided by 4.

SOURCE: NCHS, National Vital Statistics System, 2017.

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Table 2. Mean percentage of death certificate records available for analysis at 13-, 26-, and 39-week (1-, 2-, and 3-quarter) lags, by sex and cause of death: United States, 2017

Cause of death	Male			Female			Total population		
	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)
All causes	94.5	99.2	99.8	94.7	99.2	99.8	94.6	99.2	99.8
Heart disease	93.7	98.8	99.7	94.2	99.0	99.7	93.9	98.9	99.7
All injury	84.1	97.1	99.1	83.4	96.8	99.1	83.9	97.0	99.1
Suicide	90.1	98.2	99.4	84.4	96.6	99.0	88.9	97.9	99.3
Drug overdose	70.3	93.6	97.8	69.5	92.6	97.6	70.0	93.3	97.7

NOTE: Mean percentage refers to the sum of the percentages of available death records (i.e., death records in a given provisional snapshot divided by death records in the final data) aggregated across the 4 quarters of the year and divided by 4.

SOURCE: NCHS, National Vital Statistics System, 2017.

Table 3. Mean percentage of death certificate records available for analysis at 13-, 26-, and 39-week (1-, 2-, and 3-quarter) lags, by age and cause of death: United States, 2017

Age group (years)	All causes			Heart disease			All injury			Suicide			Drug overdose		
	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)
All ages	94.6	99.2	99.8	93.9	98.9	99.7	83.9	97.0	99.1	88.9	97.9	99.3	70.0	93.2	97.7
Under 1	90.7	98.0	99.4	82.0	96.9	98.8	64.3	89.6	95.6	...	...	...	42.3	83.9	95.8
1-4	90.9	99.0	99.9	82.0	96.8	99.2	78.4	94.7	98.3	...	...	...	61.5	90.4	100.0
5-14	92.5	99.3	99.8	85.6	96.4	97.4	87.4	98.0	99.6	88.6	98.7	99.8	68.5	93.4	100.0
15-24	93.6	99.4	99.9	83.2	94.1	97.9	86.0	97.5	99.2	90.1	98.1	99.4	70.1	93.3	97.7
25-34	93.4	99.3	99.9	84.4	96.3	98.8	80.8	96.2	98.7	89.1	97.9	99.2	69.2	93.2	97.7
35-44	93.9	99.4	99.9	88.5	97.3	99.0	80.1	96.2	98.8	88.9	98.0	99.4	70.0	93.5	98.0
45-54	94.2	99.3	99.9	90.8	97.9	99.3	80.2	95.9	98.7	87.0	97.4	99.2	70.0	92.8	97.6
55-64	94.4	99.2	99.8	92.8	98.5	99.6	82.5	96.5	98.8	87.9	97.5	99.2	70.4	92.9	97.5
65-74	94.7	99.2	99.8	94.0	99.0	99.7	87.7	98.2	99.6	89.5	98.0	99.4	71.8	93.2	97.5
75-84	94.8	99.2	99.8	94.6	99.1	99.8	90.9	99.1	99.9	92.0	98.2	99.4	80.2	95.8	99.5
85 and over	94.8	99.2	99.8	94.7	99.1	99.8	91.5	99.3	99.9	91.0	98.7	99.9	80.7	97.6	100.0

... Category not applicable.

NOTE: Mean percentage refers to the sum of the percentages of available death records (i.e., death records in a given provisional snapshot divided by death records in the final data) aggregated across the 4 quarters of the year and divided by 4.

SOURCE: NCHS, National Vital Statistics System, 2017.

Table 4. Mean percentage of death certificate records available for analysis at 13-, 26-, and 39-week (1-, 2-, and 3-quarter) lags, by reporting jurisdiction and cause of death: United States, 2017

Jurisdiction	All causes			Heart disease			All injury			Suicide			Drug overdose		
	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)
Alabama	96.7	99.3	100.0	96.5	99.2	100.0	88.7	98.3	99.6	93.6	98.4	99.7	71.3	97.1	99.2
Alaska	95.0	99.0	100.0	96.1	99.0	100.0	92.6	100.0	100.0	97.2	100.0	100.0	87.5	99.2	100.0
Arizona	84.6	99.8	100.0	83.0	99.1	99.8	75.3	95.6	98.5	79.7	97.9	99.2	62.5	90.3	97.1
Arkansas	97.3	99.6	99.9	97.1	99.6	99.8	89.6	99.3	100.1	93.8	99.2	99.7	69.5	97.4	99.5
California	96.7	99.1	100.0	95.5	98.8	99.8	84.2	97.1	99.2	88.2	98.0	99.5	65.6	92.4	97.5
Colorado	99.9	100.0	100.0	99.2	99.9	100.0	97.0	99.9	100.0	96.6	99.7	99.9	94.9	99.6	99.6
Connecticut	68.2	100.0	100.0	69.2	99.7	99.9	53.8	97.4	100.1	50.6	98.2	100.0	48.7	95.4	99.8
Delaware	98.1	100.0	100.0	98.9	100.3	100.2	90.4	100.0	100.0	93.7	99.4	100.0	85.9	99.7	100.0
District of Columbia	94.7	99.0	99.9	90.4	97.4	99.7	60.8	91.0	97.4	71.8	95.1	98.2	39.3	85.5	94.8
Florida	99.4	100.0	100.0	98.6	99.9	100.0	92.6	98.8	99.9	94.5	98.6	99.8	81.7	96.7	99.7
Georgia	95.1	99.3	99.9	95.4	99.3	99.9	83.7	98.6	99.8	89.6	99.1	99.9	66.0	96.6	99.5
Hawaii	98.0	100.0	100.0	96.8	100.0	100.1	90.1	99.1	99.8	94.3	99.6	99.6	87.1	96.7	98.6
Idaho	96.2	99.3	100.0	95.7	99.2	100.0	93.4	100.0	100.0	94.2	98.5	99.2	87.8	100.0	100.0
Illinois	100.0	100.0	100.0	99.8	99.9	100.0	97.0	99.7	99.9	96.5	99.3	99.7	97.0	99.5	100.0
Indiana	93.7	98.5	100.0	93.9	98.2	100.0	88.1	98.6	99.5	92.6	98.6	99.6	84.2	98.2	99.1
Iowa	97.1	99.4	100.0	97.6	99.4	100.0	92.1	99.9	100.0	95.5	100.0	100.0	91.5	100.0	100.0
Kansas	97.6	99.3	100.0	96.9	99.0	99.9	90.7	99.0	99.8	93.2	99.1	99.7	77.9	96.4	99.0
Kentucky	95.0	99.8	100.0	95.7	99.8	100.0	89.0	99.7	100.0	90.7	98.9	99.9	86.2	99.9	100.0
Louisiana	97.1	99.2	100.0	96.9	99.2	99.9	96.0	99.4	99.8	96.7	99.1	99.7	95.2	99.7	99.6
Maine	95.1	99.0	100.0	95.1	98.9	100.0	93.0	98.6	100.0	94.4	98.9	100.0	88.8	96.1	99.7
Maryland	98.2	100.0	100.0	98.3	100.0	100.0	92.7	99.8	100.0	95.2	99.9	100.0	91.4	99.9	100.0
Massachusetts	99.0	100.0	100.0	97.8	99.6	99.8	90.2	97.1	99.2	93.0	97.6	99.2	82.9	95.0	98.6
Michigan	90.2	98.0	99.1	87.7	96.7	98.2	70.8	85.6	90.9	84.7	91.2	93.8	41.7	66.5	79.1
Minnesota	97.0	99.4	100.0	97.6	99.4	100.0	91.8	99.8	100.0	92.2	99.1	99.6	85.4	99.7	100.0
Mississippi	95.0	99.7	99.9	95.6	99.5	99.8	78.4	96.9	98.8	82.7	97.4	98.8	51.1	88.6	96.3
Missouri	94.7	98.8	100.0	95.6	98.7	99.9	83.6	98.6	99.6	88.5	99.1	99.8	77.7	97.0	98.4
Montana	92.8	99.9	100.0	92.6	99.8	100.0	88.4	99.3	99.9	94.3	100.0	100.0	71.4	96.9	99.4
Nebraska	97.0	99.9	100.0	97.7	99.9	100.0	90.3	100.0	100.0	90.3	99.4	99.7	89.8	100.0	100.0
Nevada	94.1	98.9	99.9	95.0	99.0	99.9	86.6	98.7	99.8	91.8	99.7	99.9	85.1	98.6	99.7
New Hampshire	98.5	100.0	100.0	97.9	99.8	100.0	88.5	98.1	99.9	92.4	98.5	100.0	73.8	95.3	99.6
New Jersey	99.6	99.9	100.0	98.4	99.5	99.9	80.0	94.4	98.3	89.5	96.4	99.0	62.7	89.8	96.9
New Mexico	94.1	98.2	99.7	94.4	98.0	99.8	68.5	94.8	98.8	79.5	96.9	99.6	53.0	93.5	98.7
New York ¹	90.9	98.2	99.5	90.3	97.7	99.0	58.7	91.0	97.1	71.7	94.6	97.6	32.1	80.7	94.6
New York City ²	100.0	100.0	100.0	99.5	99.9	100.0	94.6	99.5	99.9	96.4	99.6	99.6	92.6	99.2	99.8
North Carolina	91.6	100.0	100.0	90.4	99.2	99.7	65.3	91.4	96.8	79.5	94.5	98.1	22.9	75.2	90.7
North Dakota	95.2	100.0	100.0	95.9	100.0	99.9	88.2	99.8	100.0	97.2	100.0	100.0	70.7	96.9	100.0
Ohio	99.8	100.0	100.0	97.6	99.9	100.0	75.6	99.1	99.9	87.2	99.6	100.0	64.1	98.6	99.9
Oklahoma	98.1	99.9	100.0	97.9	99.8	99.9	89.4	99.3	99.7	91.6	99.6	99.7	77.1	98.7	99.5
Oregon	96.2	99.7	100.0	96.2	99.6	100.0	86.1	98.4	99.8	89.4	99.2	99.5	55.7	93.4	97.7
Pennsylvania	65.4	93.3	99.5	65.5	93.0	97.7	64.1	94.3	99.2	64.4	94.0	99.0	63.7	93.8	98.6
Rhode Island	97.8	100.0	100.0	97.6	99.9	99.9	81.7	99.7	100.0	86.8	99.3	100.0	66.8	99.7	100.0

See footnotes at end of table.

Table 4. Mean percentage of death certificate records available for analysis at 13-, 26-, and 39-week (1-, 2-, and 3-quarter) lags, by reporting jurisdiction and cause of death: United States, 2017—Con.

Jurisdiction	All causes			Heart disease			All injury			Suicide			Drug overdose		
	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)	13 weeks (1 quarter)	26 weeks (2 quarters)	39 weeks (3 quarters)
South Carolina	98.9	100.0	100.0	98.0	99.8	99.9	89.5	99.2	99.8	93.2	99.2	99.7	73.0	97.2	99.2
South Dakota	96.8	100.0	100.0	97.3	100.0	100.0	92.1	99.9	100.0	92.6	99.5	99.5	87.3	100.0	100.0
Tennessee	90.4	99.6	100.0	87.9	97.7	99.6	67.8	88.0	97.5	75.7	91.0	98.2	39.2	71.4	93.9
Texas	99.7	100.0	100.0	99.2	99.9	100.0	96.1	99.2	99.7	96.9	99.3	99.7	89.5	98.6	99.7
Utah	97.1	99.9	99.9	96.5	99.6	99.9	87.6	97.9	99.1	90.5	99.1	99.6	75.9	95.1	97.9
Vermont	96.3	100.0	100.0	95.3	99.8	99.8	91.4	99.8	100.0	92.2	97.9	99.0	83.3	97.3	98.0
Virginia	99.1	99.9	100.0	98.8	99.8	100.0	96.3	99.7	100.0	96.4	98.9	98.9	90.3	99.2	99.9
Washington	98.2	99.9	100.0	97.8	99.8	99.9	93.7	98.5	99.5	94.9	98.8	99.7	79.7	95.1	99.0
West Virginia	87.4	97.8	100.0	84.6	96.9	99.7	70.3	91.4	97.4	79.8	91.3	98.8	55.7	90.8	97.0
Wisconsin	97.2	99.4	100.0	95.9	98.9	99.9	91.4	97.2	99.5	91.3	97.3	99.6	77.3	92.1	99.1
Wyoming	93.6	99.2	100.0	94.7	99.1	100.0	89.6	100.0	100.0	93.0	99.0	100.0	76.0	95.7	95.7

¹Excludes New York City.

²New York City, excluding the rest of the state of New York.

NOTE: Mean percentage refers to the sum of the percentages of available death records (i.e., death records in a given provisional snapshot divided by death records in the final data) aggregated across the 4 quarters of the year and divided by 4.

SOURCE: NCHS, National Vital Statistics System, 2017.

Technical Notes

Nature and source of data

Since 2014, the National Center for Health Statistics (NCHS) has taken weekly snapshots of its mortality data, which include death certificate records from all 50 states, New York City, and the District of Columbia. Records that did not provide a specific date of death were not analyzed.

Cause-of-death classification

Mortality statistics are compiled in accordance with World Health Organization (WHO) regulations specifying that WHO member nations classify and code causes of death in accordance with the current revision of the *International Statistical Classification of Diseases and Related Health Problems, 10th Revision* (ICD–10) (8). Causes of death are coded according to ICD guidelines described in annual issues of Part 2a of the NCHS Instruction Manual (9). This report focused entirely on the underlying cause of death ICD–10 codes. Deaths from heart disease were identified using underlying cause-of-death codes I00–I09, I11, I13, and I20–I51. Injury-related deaths were identified using the ICD–10 codes U01–U03, V01–Y36, Y85–Y87, and Y89. Suicides were identified using the following ICD–10 codes: U03, X60–X84, and Y87.0. Drug overdose deaths were defined using the following ICD–10 codes: X40–X44, X60–X64, X85, and Y10–Y14.

Provisional data on cause of death are subject to some nonrandom sampling error. This is because the delay in receiving the report of a death depends on the cause of death. Furthermore, for some deaths, the final cause may not be available at the time the death was reported. In those cases, the causes of death may be reported as unknown or pending investigation and coded to the ICD–10 code R99 (other ill-defined and unspecified causes of mortality). In the final data, some of the deaths with unknown cause will be reassigned to

specific causes if further, more specific cause-of-death information is provided.

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