Trends in Death Rates for Leading Methods of Injury: United States, 2003–2023

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Key findings

Data from the National Vital Statistics System

• After a period of stability from 2003 to 2013, the total age-adjusted injury death rate increased 21% from 2013 (58.8 per 100,000 standard U.S. population) to 2019 (71.2) and an additional 25% through 2021 (89.0); it then declined 4% through 2023 (85.3).

• Unintentional drug overdose death rates tripled from 2003 to 2019, increased an additional 58% through 2022, and then declined 4% through 2023.

• Firearm-involved suicide death rates increased from 2006 to 2018, declined in 2019, increased through 2021, and remained stable through 2023.

• After declining from 2003 to 2014, the firearm-involved homicide death rate increased through 2021 and then declined through 2023.

Injury deaths are caused by an acute injury to the body, either by exposure to physical agents (such as the drugs involved in overdoses) or by the lack of an essential substance (such as oxygen in drowning) (1). These deaths are among the leading causes of death in the United States (2). Injury deaths can be intentional or unintentional and are categorized first according to intent and then secondarily by the method involved (for example, drug overdose or firearms). This Data Brief presents trends in injury death rates, in total and by the three leading intents (unintentional, suicide, and homicide) for 2003 to 2023. Trends in unintentional injury, suicide, and homicide death rates are presented by the three leading methods for each.

The injury death rate was stable from 2003 to 2013, generally increased through 2021, and then declined through 2023.

Figure 1. Age-adjusted injury death rate, by the three leading intents: United States, 2003–2023
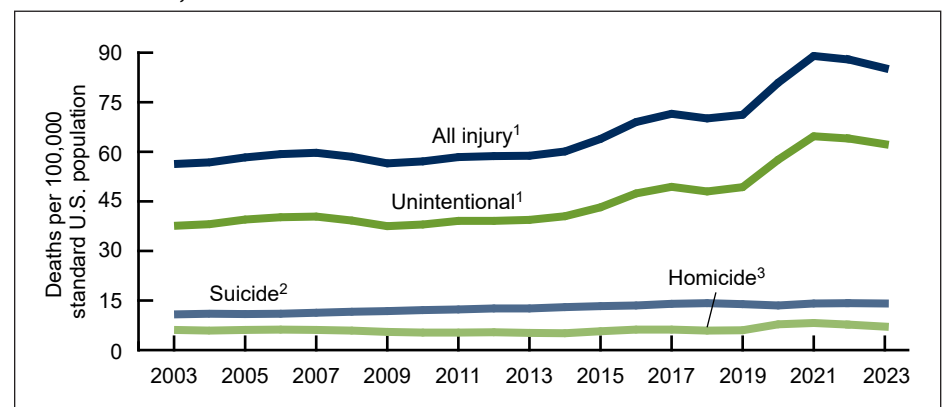
[1]No statistically significant trend from 2003 to 2013; significantly increasing trend from 2013 to 2021; rate in 2023 significantly lower than in 2021, *p* < 0.05.
[2]Significantly increasing trend from 2003 to 2018; rate in 2020 significantly lower than in 2018; rate in 2023 significantly higher than in 2020; *p* < 0.05.
[3]Significantly decreasing trend from 2003 to 2014; significantly increasing trend from 2014 to 2021; rate in 2023 significantly lower than in 2021; *p* < 0.05.
NOTES: Injury deaths are identified with *International Classification of Diseases,10th Revision* codes *U01–*U03, V01–Y36, Y85–Y87; unintentional injury deaths are identified with codes V01–X59, Y85–Y86; suicides are identified with codes *U03, X60–X84, and Y87.0; homicides are identifited with codes *U01–*U02, X85–Y09, and Y87.1. All injury includes injury deaths due to legal intervention/operations of war and injury deaths of undetermined intent not shown separately.
SOURCE: National Center for Health Statistics, National Vital Statistics System, mortality data file (NVSS–M).

- After a period of stability from 2003 to 2013, the total age-adjusted injury death rate increased 21% from 2013 (58.8 per 100,000 standard U.S. population) to 2019 (71.2) and an additional 25% through 2021 (89.0). The rate then declined 4% through 2023 (85.3) (Figure 1, Table 1).

- Unintentional injury death rates remained stable from 2003 to 2013, increased 25% from 2013 (39.4) to 2019 (49.3) and an additional 31% from 2019 to 2021 (64.7). The rate then declined 4% from 2021 to 2023 (62.3).

- Age-adjusted suicide death rates increased 31% from 2003 (10.8) to 2018 (14.2), declined 5% from 2018 to 2020 (13.5), and then increased 4% to 14.1 in 2021 and remained stable through 2023.

- Homicide death rates declined 16% from 2003 (6.1) to 2014 (5.1), increased 18% from 2014 to 2019 (6.0) and an additional 37% from 2019 to 2021 (8.2). The rate then declined 13% through 2023 (7.1).

Death rates for drug overdose, the leading method of unintentional injury, increased from 2003 to 2022 and then declined.

- Unintentional drug overdose death rates tripled from 2003 (6.3 per 100,000 standard U.S. population) to 2019 (19.1) and then increased 58% from 2019 to 2022 (30.1) (Figure 2, Table 2). The rate then declined 4% from 2022 to 2023 (29.0).

Figure 2. Age-adjusted unintentional injury death rate, by the three leading methods: United States, 2003–2023
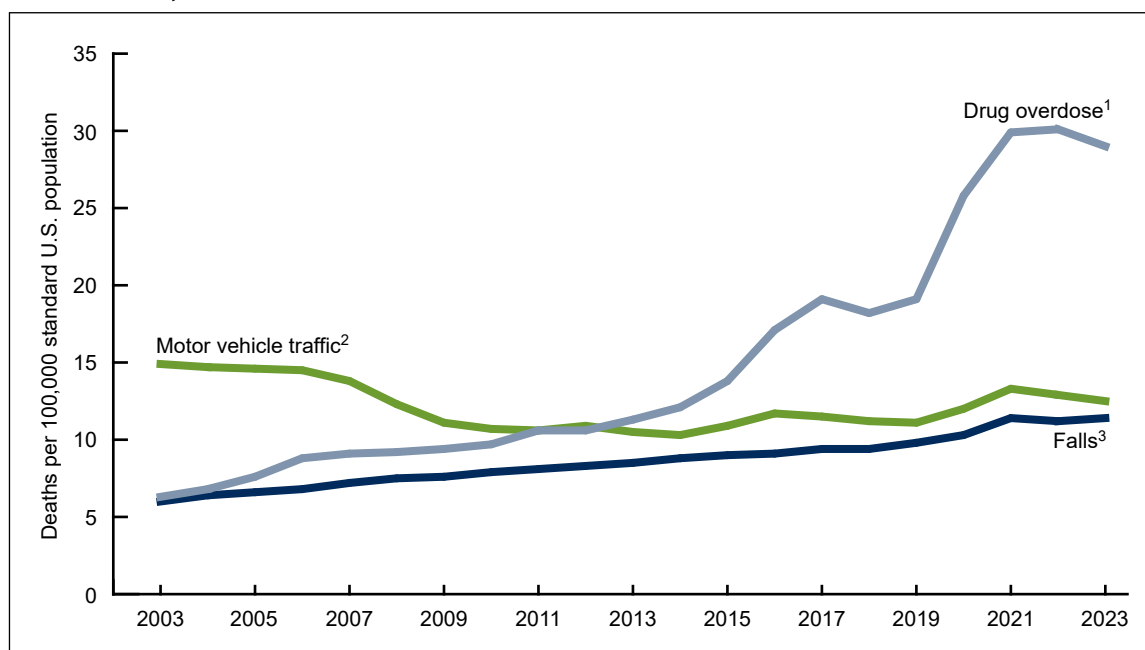
[1]Significantly increasing trend from 2003 to 2022, with different rates of change over time; rate in 2023 significantly lower than in 2022, $p < 0.05$.
[2]Significantly decreasing trend from 2003 to 2014; significantly increasing trend from 2014 to 2021; rate in 2023 significantly lower than in 2021; $p < 0.05$.
[3]Significantly increasing trend from 2003 to 2021, with different rates of change over time; no statistically significant trend from 2021 to 2023; $p < 0.05$.
NOTES: Unintentional drug overdose deaths are identified with *International Classification of Diseases, 10th Revision* codes X40–X44; unintentional motor vehicle traffic injuries are identified with codes V02–V04[.1,.9], V09.2, V12–V14[.3–.9], V19[.4–.6], V20–V28[.3-.9], V29–V79[.4–.9], V80[.3–.5], V81.1, V82.1, V83–V86[.0–.3], V87[.0–.8], V89.2; unintentional falls are identified with codes W00–W19.
SOURCE: National Center for Health Statistics, National Vital Statistics System, mortality data file (NVSS–M).

- Death rates for motor vehicle traffic deaths declined 31% from 2003 (14.9) to 2014 (10.3) and then generally increased 29% from 2014 to 2021 (13.3). The rate declined 6% from 2021 to 2023 (12.5).

- Death rates from falls increased 90% from 2003 (6.0) to 2021 (11.4) and then remained stable through 2023.

- Motor vehicle traffic accidents were the leading method of unintentional injury deaths from 2003 to 2010 but were surpassed by drug overdoses in 2013.

Firearms were the leading method of suicide during the period, with rates generally increasing from 2006 to 2021 and then remaining stable.

- After declining from 2003 (5.8 per 100,000 standard U.S. population) to 2006 (5.5), firearm-involved suicide death rates increased 27% from 2006 to 2018 (7.0) (Figure 3, Table 3). The rate declined to 6.8 in 2019 before increasing 10% through 2021 (7.5) and then remaining stable through 2023.

- The suffocation-involved suicide rate increased 87% from 2003 (2.3) to 2018 (4.3) and then declined 16% from 2018 to 2023 (3.6).

- Rates for suicide involving drug overdose increased 31% from 2003 (1.3) to 2012 (1.7), declined to 1.2 in 2020, and remained stable through 2023.

Figure 3. Age-adjusted suicide rate, by the three leading methods: United States, 2003–2023
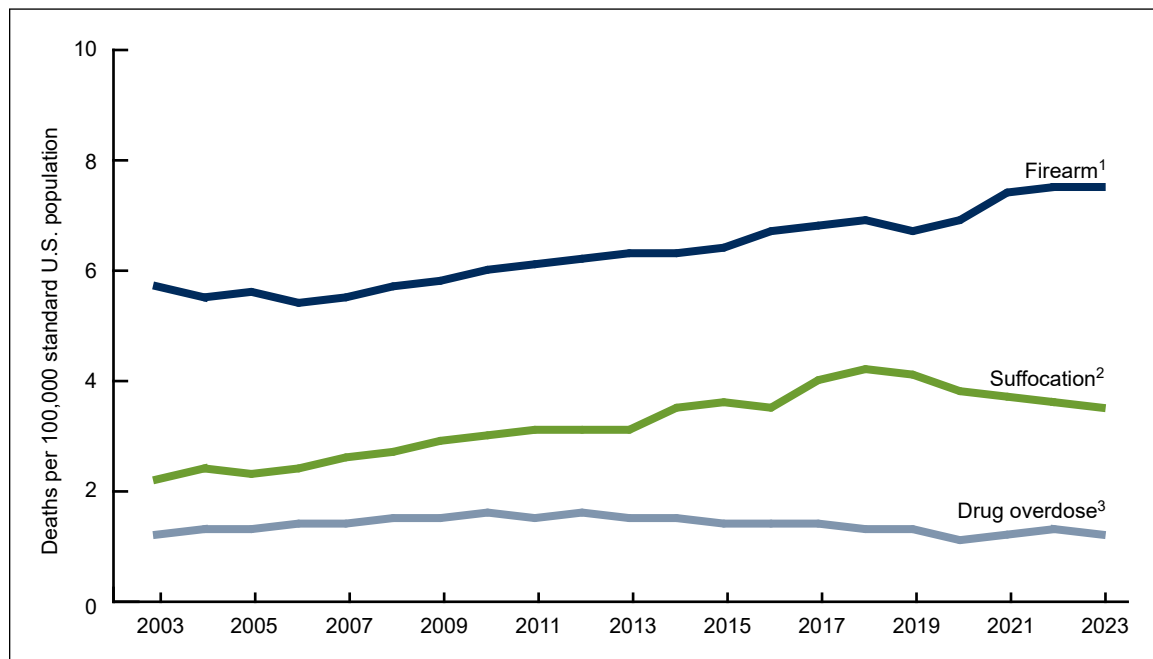
[1]Rate in 2006 significantly lower than in 2003; significantly increasing trend from 2006 to 2018; rate in 2019 significantly lower than in 2018; significantly increasing trend from 2019 to 2021; no statistically significant trend from 2021 through 2023, $p < 0.05$.
[2]Significantly increasing trend from 2003 to 2018; statistically decreasing trend from 2018 to 2023; $p < 0.05$.
[3]Significantly increasing trend from 2003 to 2012; significantly decreasing trend from 2012 through 2020; no statistically significant trend from 2020 through 2023; $p < 0.05$.
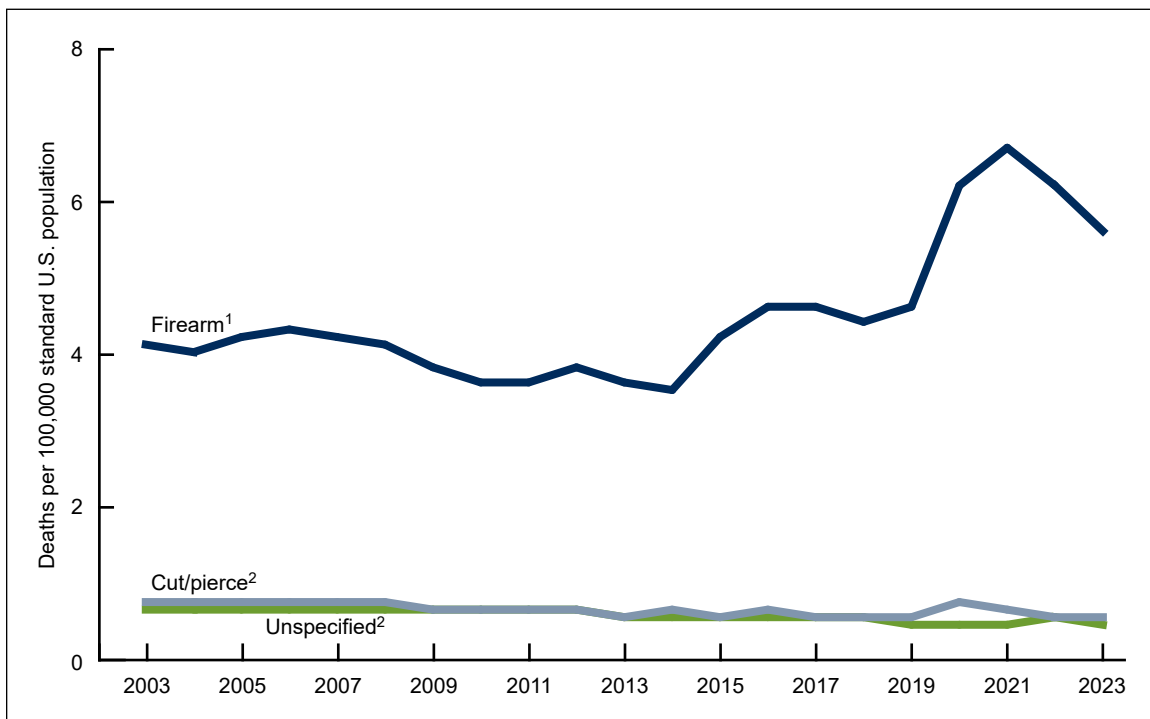NOTES: Suicides involving firearms are identified using *International Classification of Diseases, 10th Revision* underlying cause-of-death codes X72–X74; suicides involving suffocation are identified with code X70; suicides involving drug overdose are identified with codes X60–X64.
SOURCE: National Center for Health Statistics, National Vital Statistics System, mortality data file (NVSS–M).

Firearm-involved homicide death rates generally increased from 2014 to 2021 and then declined through 2023.

- Death rates for the leading method of homicide, firearms, declined 15% from 2003 (4.1 per 100,000) to 2014 (3.5) and then increased 91% through 2021 (6.7) (Figure 4, Table 4). The rate then declined 16% from 2021 to 2023 (5.6).

- Rates of homicide involving cutting or piercing (such as slashing or stabbing) declined over the period from 0.7 in 2003 to 0.5 in 2023.

- Homicide death rates with an unspecified method declined over the period, from 0.6 in 2003 to 0.4 in 2023.

Figure 4. Age-adjusted homicide rate, by the three leading methods: United States, 2003–2023

[1]Significantly decreasing trend from 2003 to 2014; significantly increasing trend from 2014 to 2021; rate in 2023 significantly lower than in 2021; $p < 0.05$.
[2]Significantly decreasing trend from 2003 to 2023; $p < 0.05$.
NOTES: Homicides involving firearms are identified with *International Classification of Diseases, 10th Revision* codes *U01.4, X93–X95; homicides involving cut/pierce are identified with code X99; homicides with unspecified method are identified with codes *U01.9, Y09.
SOURCE: National Center for Health Statistics, National Vital Statistics System, mortality data file (NVSS–M).

Summary

After a period of stability from 2003 to 2013, the total injury death rate increased 21% from 2013 to 2019 and an additional 25% through 2021 before declining 4% through 2023. This pattern of an increase before 2019 and an even greater increase from 2019 to 2021 was seen for both unintentional injury and homicide deaths. Despite declines since 2021 for the total injury death rate as well as rates for unintentional injury and homicide, rates were still higher than in 2019, before the COVID-19 pandemic. Suicide, however, exhibited a different pattern, with increases from 2003 to 2018 and then a decline from 2018 to 2020 before resuming an increase.

Drug overdose was the leading method of unintentional injury deaths during 2013 to 2023. Death rates increased from 2003 to 2022, with the largest increase from 2019 to 2022. The rate declined from 2022 to 2023. Death rates for motor vehicle traffic accidents fluctuated during the period, with the rate in 2023 lower than in 2003. Death rates due to falls rose steadily over most of the period and then stabilized from 2021 to 2023, increasing 90% in total.

Firearms were the leading method for both suicide and homicide, with rates generally increasing over the period. Firearm-involved homicide rates declined between 2021 and 2023, while firearm-involved suicide rates were stable. Suffocation-involved suicide rates increased over the period and despite a recent decline, were higher in 2023 than in 2003.

Data sources and methods

Mortality data for 2003–2020 are from the National Center for Health Statistics's 1999–2020 Underlying Cause of Death by Bridged-Race Categories and data for 2021–2023 are from the 2018–2023 Underlying Cause of Death by Single-Race Categories (3). Age-adjusted death rates are based on the 2000 standard U.S. population and are per 100,000 population (4).

Injury data in this report are presented using the external cause of injury mortality matrix for *International Classification of Diseases, 10th Revision* (ICD–10) (5). A detailed description of the categorization of injury deaths is available elsewhere (1). Injury deaths are organized principally by intent and then secondarily by method. Injury deaths are identified with ICD–10 codes U01–U03, V01–Y36, Y85–Y87, and Y89. In this report, age-adjusted death rates were presented for the three leading injury intents (unintentional, suicide, and homicide), which were based on the number of deaths. Within the intents, age-adjusted death rates were presented for the three leading methods, based on the number of deaths. As drug overdoses comprised 97% of total unintentional poisoning deaths and 80% of suicide poisoning deaths in 2023, rates were shown specifically for drug overdoses. When the method of injury had missing information, these were classified as unspecified method.

Trends in Figures 1–4 were evaluated using the Joinpoint Regression Program (6). The Joinpoint software was used to fit weighted least-squares regression models to the estimated proportions on the logarithmic scale. The default settings allowed for as few as three observed timepoints in the beginning, ending, and middle line segments, including the joinpoints. Using these settings, a maximum of three joinpoints were searched for using the grid search algorithm and permutation test, and an overall alpha level of 0.05. Pairwise comparisons of rates in Figures 1–4 were tested using the z test statistic at $p < 0.05$.

About the author

Sally C. Curtin is with the National Center for Health Statistics, Division of Vital Statistics.

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Figure Tables

Data table for Figure 1. Age-adjusted injury death rate, by the three leading intents: United States, 2003–2023

Year	Number of deaths				Rate per 100,000 standard U.S. population			
	Total[1]	Unintentional	Suicide	Homicide	Total[1]	Unintentional	Suicide	Homicide
2003.	164,002	109,277	31,484	17,732	56.3	37.6	10.8	6.1
2004.	167,184	112,012	32,439	17,357	56.8	38.1	11.0	5.9
2005.	173,753	117,809	32,637	18,124	58.3	39.5	10.9	6.1
2006.	179,065	121,599	33,300	18,573	59.3	40.2	11.0	6.2
2007.	182,479	123,706	34,598	18,361	59.7	40.4	11.3	6.1
2008.	181,226	121,902	36,035	17,826	58.5	39.2	11.6	5.9
2009.	177,154	118,021	36,909	16,799	56.5	37.5	11.8	5.5
2010.	180,811	120,859	38,364	16,259	57.1	38.0	12.1	5.3
2011.	187,464	126,438	39,518	16,238	58.4	39.1	12.3	5.3
2012.	190,385	127,792	40,600	16,688	58.7	39.1	12.6	5.4
2013.	192,945	130,557	41,149	16,121	58.8	39.4	12.6	5.2
2014.	199,752	135,928	42,826	15,872	60.1	40.5	13.0	5.1
2015.	214,008	146,571	44,193	17,793	63.9	43.2	13.3	5.7
2016.	231,991	161,374	44,965	19,362	69.0	47.4	13.5	6.2
2017.	243,039	169,936	47,173	19,510	71.5	49.4	14.0	6.2
2018.	240,583	167,127	48,344	18,830	70.1	48.0	14.2	5.9
2019.	246,041	173,040	47,511	19,141	71.2	49.3	13.9	6.0
2020.	278,345	200,955	45,979	24,576	80.9	57.6	13.5	7.8
2021.	306,086	224,935	48,183	26,031	89.0	64.7	14.1	8.2
2022.	307,785	227,039	49,476	24,849	87.9	64.0	14.2	7.7
2023.	300,900	222,698	49,316	22,830	85.3	62.3	14.1	7.1

[1]Includes injury deaths due to legal intervention/operations of war and injury deaths of undetermined intent not shown separately.

NOTES: Injury deaths are identified with *International Classification of Diseases, 10th Revision* codes U01–U03,V01–Y36,Y85–Y87; unintentional injury deaths are identified with codes V01–X59, Y85–Y86; suicides are identified with codes U03, X60–X84, and Y87.0; homicides are identified with codes U01–U02, X85–Y09, and Y87.1.

SOURCE: National Center for Health Statistics, National Vital Statistics System, mortality data file (NVSS–M).

Data table for Figure 2. Age-adjusted unintentional injury death rate, by the three leading methods: United States, 2003–2023

Year	Number of deaths			Rate per 100,000 standard U.S. population		
	Drug overdose	Motor vehicle traffic	Fall	Drug overdose	Motor vehicle traffic	Fall
2003.	18,294	43,340	17,229	6.3	14.9	6.0
2004.	19,838	43,432	18,807	6.8	14.7	6.4
2005.	22,448	43,667	19,656	7.6	14.6	6.6
2006.	26,400	43,664	20,823	8.8	14.5	6.8
2007.	27,658	42,031	22,631	9.1	13.8	7.2
2008.	28,171	37,985	24,013	9.2	12.3	7.5
2009.	28,754	34,485	24,792	9.4	11.1	7.6
2010.	30,006	33,687	26,009	9.7	10.7	7.9
2011.	33,071	33,783	27,483	10.6	10.6	8.1
2012.	33,175	34,935	28,753	10.6	10.9	8.3
2013.	35,663	33,804	30,208	11.3	10.5	8.5
2014.	38,718	33,736	31,959	12.1	10.3	8.8
2015.	44,126	36,161	33,381	13.8	10.9	9.0
2016.	54,793	38,748	34,673	17.1	11.7	9.1
2017.	61,311	38,659	36,338	19.1	11.5	9.4
2018.	58,908	37,991	37,455	18.2	11.2	9.4
2019.	62,172	37,595	39,443	19.1	11.1	9.8
2020.	83,558	40,698	42,114	25.8	12.0	10.3
2021.	98,268	45,404	44,686	29.9	13.3	11.4
2022.	99,592	44,534	46,630	30.1	12.9	11.2
2023.	97,231	43,273	47,026	29.0	12.5	11.4

NOTES: Unintentional drug overdose deaths are identified with *International Classification of Diseases, 10th Revision* codes X40–X44; unintentional motor vehicle traffic injuries are identified with codes V02–V04[.1,.9], V09.2, V12–V14[.3–.9], V19[.4–.6], V20–V28[.3–.9], V29–V79[.4–.9], V80[.3–.5], V81.1, V82.1, V83–V86[.0–.3], V87[.0–.8], V89.2; unintentional falls are identified with codes W00–W19.

SOURCE: National Center for Health Statistics, National Vital Statistics System, mortality data file (NVSS–M).

Data table for Figure 3. Age-adjusted suicide rate, by the three leading methods: United States, 2003–2023

Year	Number of deaths			Rate per 100,000 standard U.S. population		
	Firearm	Suffocation	Drug overdose	Firearm	Suffocation	Drug overdose
2003.............	16,907	6,635	3,890	5.8	2.3	1.3
2004.............	16,750	7,336	4,208	5.6	2.5	1.4
2005.............	17,002	7,248	4,240	5.7	2.4	1.4
2006.............	16,883	7,491	4,571	5.5	2.5	1.5
2007.............	17,352	8,161	4,772	5.6	2.7	1.5
2008.............	18,223	8,578	5,027	5.8	2.8	1.6
2009.............	18,735	9,000	5,041	5.9	3.0	1.6
2010.............	19,392	9,493	5,298	6.1	3.1	1.7
2011.............	19,990	9,913	5,298	6.2	3.2	1.6
2012.............	20,666	10,088	5,465	6.3	3.2	1.7
2013.............	21,175	10,062	5,432	6.4	3.2	1.6
2014.............	21,386	11,407	5,433	6.4	3.6	1.6
2015.............	22,018	11,855	5,206	6.5	3.7	1.5
2016.............	22,938	11,642	5,086	6.8	3.6	1.5
2017.............	23,854	13,075	5,097	6.9	4.1	1.5
2018.............	24,432	13,840	4,824	7.0	4.3	1.4
2019.............	23,941	13,563	4,777	6.8	4.2	1.4
2020.............	24,292	12,495	4,329	7.0	3.9	1.2
2021.............	26,328	12,431	4,375	7.5	3.8	1.3
2022.............	27,032	12,247	4,894	7.6	3.7	1.4
2023.............	27,300	12,023	4,660	7.6	3.6	1.3

NOTES: Suicides involving firearms are identified using *International Classification of Diseases, 10th Revision* underlying cause-of-death codes X72–X74; suicides involving suffocation are identified with code X70; suicides involving drug overdose are identified with codes X60–X64.

SOURCE: National Center for Health Statistics, National Vital Statistics System, mortality data file (NVSS–M).

Data table for Figure 4. Age-adjusted homicide rate, by the three leading methods: United States, 2003–2023

Year	Number of deaths			Rate per 100,000 standard U.S. population		
	Firearm	Cut/pierce	Unspecified	Firearm	Cut/pierce	Unspecified
2003.	11,920	2,049	1,670	4.1	0.7	0.6
2004.	11,624	2,079	1,699	4.0	0.7	0.6
2005.	12,352	2,097	1,714	4.2	0.7	0.6
2006.	12,791	2,080	1,758	4.3	0.7	0.6
2007.	12,632	1,981	1,846	4.2	0.7	0.6
2008.	12,179	2,043	1,795	4.1	0.7	0.6
2009.	11,493	1,874	1,728	3.8	0.6	0.6
2010.	11,078	1,799	1,735	3.6	0.6	0.6
2011.	11,068	1,797	1,773	3.6	0.6	0.6
2012.	11,622	1,776	1,806	3.8	0.6	0.6
2013.	11,208	1,639	1,720	3.6	0.5	0.5
2014.	11,008	1,740	1,585	3.5	0.6	0.5
2015.	12,979	1,622	1,631	4.2	0.5	0.5
2016.	14,415	1,781	1,544	4.6	0.6	0.5
2017.	14,542	1,721	1,482	4.6	0.5	0.5
2018.	13,958	1,718	1,425	4.4	0.5	0.5
2019.	14,414	1,702	1,247	4.6	0.5	0.4
2020.	19,384	2,063	1,375	6.2	0.7	0.4
2021.	20,958	1,895	1,376	6.7	0.6	0.4
2022.	19,651	1,800	1,503	6.2	0.5	0.5
2023.	17,927	1,704	1,293	5.6	0.5	0.4

NOTES: Homicides involving firearms are identified with *International Classification of Diseases, 10th Revision* codes U01.4, X93–X95; homicides involving cut/pierce are identified with code X99; homicides with unspecified method are identified with codes U01.9, Y09.

SOURCE: National Center for Health Statistics, National Vital Statistics System, mortality data file (NVSS–M).

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