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Economic Cost of U.S. Suicide and Nonfatal Self-harm

Cora Peterson, PhD,
Tadesse Haileyesus, MS,
Deborah M. Stone, PhD

National Center for Injury Prevention and Control, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia

Abstract

Introduction: The U.S. age-adjusted suicide rate is 35% higher than two decades ago and the COVID-19 pandemic era highlighted the urgent need to address nonfatal self-harm, particularly among youth. This study aimed to report the estimated annual economic cost of U.S. suicide and nonfatal self-harm.

Methods: In 2023 CDC's WISQARS Cost of Injury provided the retrospective number of suicides and nonfatal self-harm injury emergency department (ED) visits from national surveillance sources by sex and age group, as well as the estimated annual economic cost of associated medical spending, lost work productivity, reduced quality of life from injury morbidity, and avoidable mortality based on the value of statistical life during 2015–2020.

Results: The economic cost of suicide and nonfatal self-harm averaged $510 billion (2020 USD) annually, the majority from life years lost to suicide. Working-aged adults (aged 25–64 years) comprised nearly 75% of the average annual economic cost of suicide ($356B of $484B) and children and younger adults (aged 10–44 years) comprised nearly 75% of the average annual economic cost of nonfatal self-harm injuries ($19B of $26B).

Conclusions: Suicide and self-harm have substantial societal costs. Measuring the consequences in terms of comprehensive economic cost can inform investments in suicide prevention strategies.

INTRODUCTION

The U.S. age-adjusted suicide rate is over 35% higher than 2 decades ago—during which time many other high income countries instead had suicide rate declines—and the

Address correspondence to: Cora Peterson, PhD, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention (CDC), Mailstop 106-8, 4770 Buford Highway, Atlanta, GA 30341. vsm2@cdc.gov.

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CREDIT AUTHOR STATEMENT

Cora Peterson: Conceptualization, Methodology, Software, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition. Tadesse Haileyesus: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Writing – review & editing, Supervision, Project administration, Funding acquisition. Deborah M. Stone: Conceptualization, Methodology, Investigation, Resources, Writing – review & editing, Supervision, Project administration, Funding acquisition.

COVID-19 pandemic highlighted the urgent need to address nonfatal self-harm injuries, particularly among youth.[1–3] This study aimed to report the estimated annual economic cost of U.S. suicide and nonfatal self-harm.

METHODS

This cross-sectional retrospective cost analysis of the U.S. population followed STROBE reporting guidelines for observational studies and applicable elements of the CHEERS reporting guidelines for economic evaluations.[4] This study used publicly available data and did not require institutional review. In July 2023 CDC's Web-based Injury Statistics Query and Reporting System (WISQARS) Cost of Injury provided the number of suicides and nonfatal self-harm injury emergency department (ED) visits by sex (male/female) and age group (10–24, 25–44, 45–64, and 65+ years) and the annual economic cost of associated medical spending, lost work productivity, reduced quality of life from injury morbidity, and avoidable mortality (using the value of statistical life, VSL) during 2015–2020.[1] The data source uses the societal perspective, including tangible and intangible costs, and a 1-year time horizon (period over which costs are assessed) for nonfatal injuries.[5] Costs are 2020 U.S. dollars. Outcome measures were the number, age-adjusted rate, and annual economic cost of suicides and self-harm injuries by sex, age group, and cost element (e.g., medical spending).

WISQARS data and methods are comprehensively described elsewhere.[5] Suicide deaths were from the National Center for Health Statistics.[6] ED visits were from the National Electronic Injury Surveillance System-All Injury Program, a nationally representative probability sample of hospitals.[7] One-year follow-up medical spending (e.g., repeat nonfatal self-harm) and lost work unit costs due to nonfatal injuries were from the National Inpatient Sample and National Emergency Department Sample (which can produce survey-weighted national estimates of community hospital encounters) and Market-Scan Commercial Claims and Encounters Databases (which demonstrate medical payments to providers from approximately 350 health insurance payers—large employers, health plans, and government and public organizations).[8–11] The monetary value of injury morbidity and mortality in the data source used quality of life loss estimates for injuries and recommended methods for VSL, a monetary estimate of the collective value placed on mortality risk reduction as derived in research studies through revealed preferences (e.g., observed wage differences for dangerous occupations) or stated preferences from surveys of individual persons' willingness to pay for mortality risk reduction.[12–14] Data source VSL varied by decedent age (0–17 years, $18.0 million; 18–65 years, $11.4 million and values descending from $6.5 million (aged 66 years) to US$440,000 (aged ≥100 years), adjusted for older adults' decreasing general life expectancy, baseline quality of life and discounted 3% to present value[5]) and each quality-adjusted life year loss was valued at $580,000.[5,14]

RESULTS

The economic cost of suicide and ED-treated nonfatal self-harm injuries averaged $510 billion annually during 2015–2020 (range: $488B to $532B) (Table 1). The annual economic cost of suicides alone averaged $484 billion (95% of the total) due to the high cost of

lost life years ($484B), followed by medical spending ($13B for fatal and nonfatal injuries combined), injury morbidity reduced quality of life ($10B), and work loss due to non-fatal injuries ($3B) (Table 1).

Working-aged adults (aged 25–64 years) comprised nearly 75% of the economic cost of suicide (annual average: $356B) whereas children and younger adults (aged 10–44 years) comprised nearly 75% of the economic cost of nonfatal self-harm injuries ($19B) (Figure). ED visits for nonfatal self-harm were more common for females (60% of visits annually overall and 70% among aged 10–24 years). The number of ED visits for females and males aged 10–24 years was higher at the end of the study period, generating a higher economic cost (females: 151,448 visits [$7.2B] in 2020 versus 131,309 [$5.8B] in 2015—a 15% visit increase and a 17% age-adjusted visit rate increase; males: and 61,606 visits [$4.0B] versus 58,335 visits [$3.6B]—a 6% visit increase and a 9% age-adjusted visit rate]) compared to decreases among older age groups; the exception was an increase in visits among males aged 65+ years old (8,396 visits [$771M] in 2020 versus 6,814 [$698M] in 2015—a 23% visit increase and a 1% visit rate increase) (Table 1). Males comprised the majority (nearly 80% annually) of suicides. The number of suicides and associated economic cost were higher at the end of the study period for both males and females aged 10–24, 25–44 and 65+ years but lower among adults aged 45–64 years.

DISCUSSION

The average annual economic cost of medical spending, lost work, lower quality of life, and avoidable deaths from U.S. suicide and nonfatal self-harm using national data sources was $510B. This estimate is higher than a previous similar estimate of $94B based on an older version of the same data source.[15] The present study used more recent and comprehensive estimates of attributable medical spending, lost work costs, and measured economic costs during a period of higher incidence. However, the higher estimate presented here is primarily due to a change in CDC WISQARS Cost of Injury to value premature mortality and morbidity using VSL instead of lost labor market productivity; VSL is approximately 10 times more than foregone employment compensation.[5] Higher or lower total annual VSL in this study's results reflects the age distribution among individuals who died by suicide because VSL varies by age in the data source. Like previous reporting, this study's results highlight that suicides declined for the older working age population (45–64 year old) during the COVID-19 pandemic year of 2020.[16] This study identifies that nonfatal self-harm costs also decreased for both that age group and younger working ages (25–44 year old) that year.

Limitations

This study had several limitations. The economic cost presented here is underestimated; third-party costs are not included in VSL estimates of avoidable mortality, nonfatal self-harm costs addressed only the first year following ED-treated injuries, and other elements of the economic cost such as increased risk of suicide among family members were not addressed in the data source.[17] Suicide deaths may be undercounted in official mortality statistics and self-harm injuries may be undercounted in sources based on clinical diagnoses.[18,19] Medical spending represents financial costs to specific, identifiable payers

(including individual persons, health insurance payers, and employers) but most of the economic cost presented here comes from healthy life year losses based on VSL. The value of what is lost in quality and number of life years is not completely identifiable through financial transactions and thus not as visible as direct costs such as medical spending or employer costs from lost work productivity. The relationship between VSL and age (in particular, VSL for older adults) is likely more complex than is applied in the data source used for this study.[20]

CONCLUSIONS

The estimated economic cost of suicide and self-harm, in terms of direct costs such as medical spending or more expansively evaluated in terms of societal cost, can be used in decision-making on the present value of investment in prevention strategies. Suicide is preventable through a comprehensive public health approach inclusive of multisectoral partnerships, using data to drive prevention decision-making and implementation and evaluation of multiple culturally relevant prevention strategies to address the many factors associated with suicide.[21]

For persons in crisis, help is available 24/7 through the Suicide & Crisis Lifeline (https://www.988lifeline.org or by texting or calling 988).

Data source is publicly available.

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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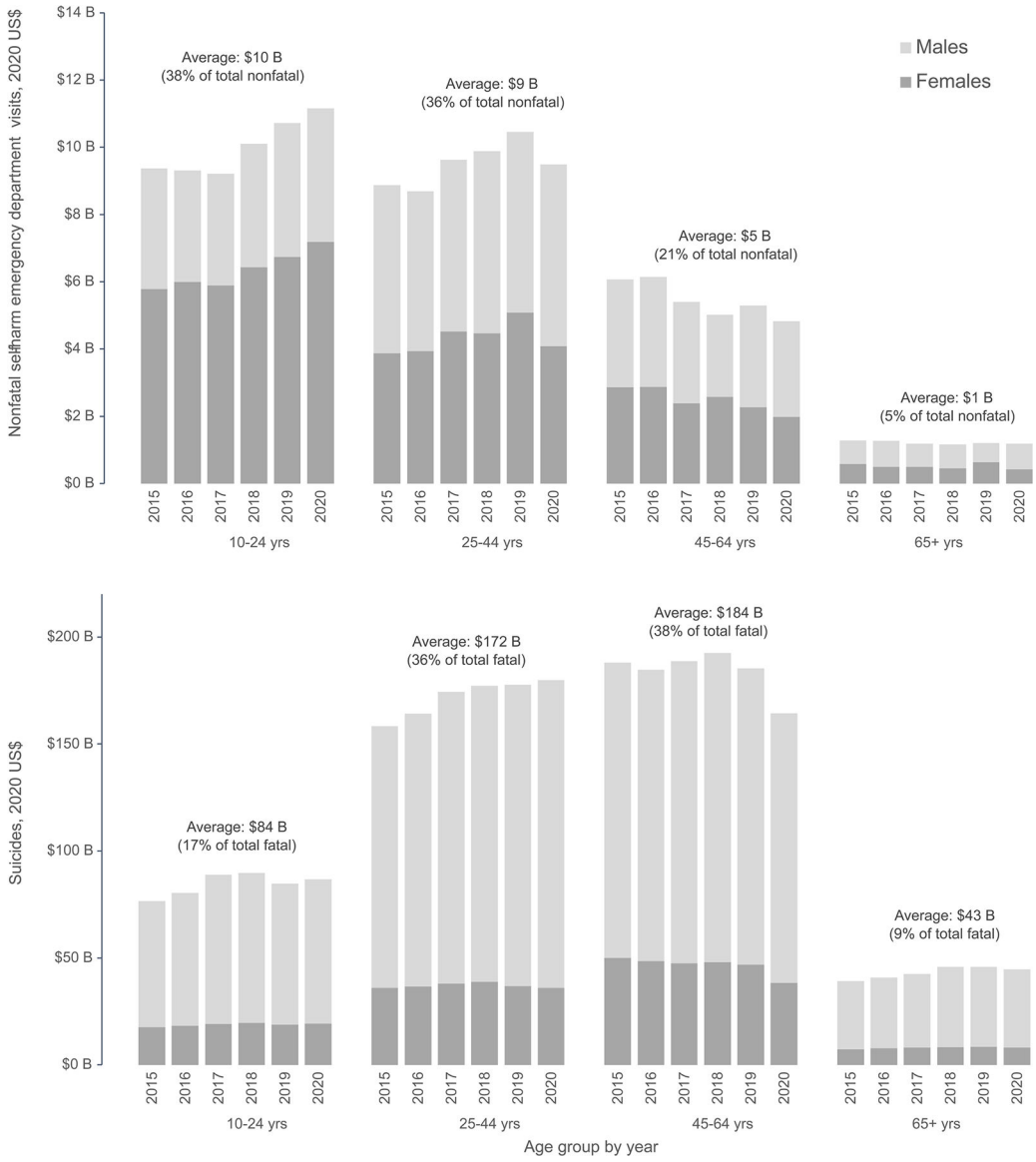

Figure.

Annual economic cost of US suicide and nonfatal self-harm.

Data source: Centers for Disease Control and Prevention's Web-Based Injury Statistics Query and Reporting System.

Table 1.

Cost Description[a]

Measure	Suicides or nonfatal emergency department visits, n (standard error)[b] Males Total	%	10–24y	25–44y	45–64y	65+y	Total	%	Females 10–24y	25–44y	45–64y	65+y	Total	Economic cost Medical spending	%	Work loss	%	QoL/VSL	%	Total
Nonfatal																				
Annual average	190,650	41	58,694	78,282	45,074	7,816	277,079	59	138,491	82,183	47,886	8,182	467,750	$13.1B	50	$3.2B	12	$9.9B	38	$26.3B
2020	182,881 (24,254)	40	61,606 (9,493)	74,203 (9,218)	38,012 (5,880)	8,396 (1,506)	271,838 (33,405)	60	151,448 (21,279)	76,425 (8,654)	37,501 (4,750)	6,398 (1,323)	454,838 (56,461)	$13.0B	48	$3.2B	12	$10.7B	40	$26.8B
		–						–						–	–	–	–	–	–	–
2019	186,954 (18,886)	41	61,371 (7,403)	74,848 (8,808)	43,652 (5,599)	6,440 (1,100)	273,455 (25,808)	59	141,397 (14,396)	83,641 (9,820)	38,990 (4,001)	8,781 (1,229)	460,416 (42,950)	$12.9B	46	$3.1B	11	$11.8B	42	$27.8B
		–						–						–	–	–	–	–	–	–
2018	192,594 (20,413)	41	60,359 (6,712)	83,111 (10,940)	38,203 (4,611)	9,780 (1,702)	273,770 (25,814)	59	136,411 (14,989)	83,403 (9,202)	45,770 (4,248)	7,943 (1,364)	466,364 (43,691)	$13.0B	49	$3.2B	12	$10.1B	38	$26.2B
		–						–						–	–	–	–	–	–	–
2017	187,271 (18,993)	40	54,682 (5,866)	78,293 (8,288)	46,337 (5,987)	7,438 (1,120)	276,072 (22,073)	60	135,202 (13,104)	82,578 (6,220)	49,349 (4,279)	8,494 (1,513)	463,343 (38,357)	$12.8B	50	$3.2B	12	$9.6B	38	$25.6B
		–						–						–	–	–	–	–	–	–
2016	193,931 (15,127)	41	55,808 (5,142)	77,845 (7,132)	51,271 (4,948)	8,028 (1,525)	282,236 (19,990)	59	135,179 (12,442)	81,101 (5,891)	56,129 (4,143)	9,467 (2,015)	476,167 (31,080)	$13.3B	52	$3.3B	13	$8.8B	35	$25.5B
		–						–						–	–	–	–	–	–	–
2015	200,267 (23,043)	41	58,335 (6,750)	81,394 (9,978)	52,967 (7,839)	6,814 (1,107)	285,102 (24,727)	59	131,309 (12,083)	85,952 (8,401)	59,574 (6,639)	8,007 (1,395)	485,369 (45,970)	$13.9B	54	$3.4B	13	$8.4B	33	$25.7B
		–						–						–	–	–	–	–	–	–
2020 vs. 2015																				
No. visits	−9%	–	+6%	−9%	−28%	+23%	−5%	–	+15%	−11%	−37%	−20%	−6%	–	–	–	–	–	–	–

Measure	Suicides or nonfatal emergency department visits, n (standard error)[b]													Economic cost						
	Males Total	%	10–24y	25–44y	45–64y	65+y	Total	%	Females 10–24y	25–44y	45–64y	65+y	Total	Medical spending	%	Work loss	%	QoL/VSL	%	Total
Age-adjusted rate	−9%	–	+9%	−12%	−28%	+1%	−4%	–	+17%	−15%	−36%	−28%	−6%	–	–	–	–	–	–	–
Fatal																				
Annual average	36,179	78	5,095	11,822	12,049	7,204	10,182	22	1,366	3,254	4,080	1,479	46,361	$254M	0.1	–	–	$483.5B	100	$483.7B
2020	36,551	79	5,236	12,605	11,053	7,643	9,428	21	1,407	3,163	3,356	1,494	45,979	$256M	0.1	–	–	$475.7B	100	$475.9B
2019	37,256	78	5,131	12,348	12,146	7,620	10,255	22	1,357	3,236	4,104	1,553	47,511	$257M	0.1	–	–	$493.7B	100	$493.9B
2018	37,761	78	5,379	12,129	12,673	7,576	10,583	22	1,428	3,412	4,212	1,526	48,344	$260M	0.1	–	–	$505.2B	100	$505.5B
2017	36,782	78	5,375	11,944	12,371	7,085	10,391	22	1,394	3,339	4,172	1,483	47,173	$264M	0.1	–	–	$494.2B	100	$494.5B
2016	34,727	77	4,840	11,181	11,943	6,754	10,238	23	1,319	3,215	4,253	1,450	44,965	$249M	0.1	–	–	$470.0B	100	$470.2B
2015	33,994	77	4,610	10,726	12,107	6,543	10,199	23	1,290	3,157	4,383	1,369	44,193	$240M	0.1	–	–	$461.9B	100	$462.2B
2020 vs. 2015																				
No. deaths	+8%	–	+14%	+18%	−9%	+17%	−8%	–	+9%	+0.2%	−23%	+9%	+4%	–	–	–	–	–	–	–
Age-adjusted rate	+3%	–	+17%	+10%	−10%	+3%	−9%	–	+10%	−5%	−22%	−3%	+1%	–	–	–	–	–	–	–
Total[c]														$13.4B	3	$3.2B	0.6	$493.4B	97	$510.0B

B, billion; ED, emergency department; M, million; NA, not applicable; QoL, quality of life; SE, standard error; VSL, value of statistical life.

[a]Data source: Centers for Disease Control and Prevention's Web-Based Injury Statistics Query and Reporting System. Costs are in 2020 USD.

[b]Suicide counts are population counts and variance for those values was not separately generated. Nonfatal self-harm counts refer to the estimated number of hospital visits for injury care that starts in an ED with disposition treated and released or hospitalized (includes transferred) based on a U.S. nationally representative probability sample of hospitals. Percentage of total counts, percentage changes, mean counts for the combined study period, and cost values are mathematical calculations using demonstrated point estimates, and variance for those values was not separately generated. Total counts include records with missing sex or age. Data may not sum to totals due to rounding.

[c]Annual average economic cost.