

# Letters

## RESEARCH LETTER

### Alcohol-Related Deaths During the COVID-19 Pandemic

Research suggests that alcohol consumption and related harms increased during the first year of the COVID-19 pandemic. Studies reported increases in drinking to cope with stress,<sup>1</sup> transplants for alcohol-associated liver disease,<sup>2</sup> and

**+**  
Supplemental content

emergency department visits for alcohol withdrawal.<sup>3</sup>

We examined mortality data to assess whether alcohol-related deaths increased during the pandemic as well.

**Methods** | US mortality data from the National Center for Health Statistics were used to compare numbers and rates of alcohol-related and all-cause deaths among all individuals 16 years or older in 2019 and 2020. Provisional data for the first half of 2021 (as of January 2022) were obtained from the Centers for Disease Control and Prevention Wide-ranging Online Data for Epidemiologic Research. The National Institutes of Health Office of Intramural Research deemed the project exempt from institutional review board oversight.

Death certificates list an underlying cause and up to 20 multiple (contributing) causes. Deaths were identified as alcohol-related if an alcohol-induced cause was listed as an underlying or contributing cause (Supplement).<sup>4</sup> Age-adjusted rates were calculated using the 2000 US Standard Population. For age groups, age-specific rates were presented instead. Comparisons between rates in 2019 and 2020 overall and by age group and sex were conducted with SAS, version 9.4 (TS Level 1M3) using 2-tailed z tests with an  $\alpha$  level of .05.

**Results** | The number of deaths involving alcohol increased between 2019 and 2020 (from 78 927 to 99 017 [relative change, 25.5%]), as did the age-adjusted rate (from 27.3 to 34.4 per 100 000 [relative change, 25.9%]) (Table). Comparatively, deaths from all causes had smaller relative increases in number (from 2 823 460 to 3 353 547 [18.8%]) and rate (from 938.3 to 1094.3 per 100 000 [16.6%]). Alcohol-related deaths accounted for 2.8% of all deaths in 2019 and 3.0% in 2020.

The Figure presents the number of alcohol-related deaths in 2019 and 2020 by month, with provisional data included for the first 6 months of 2021.

**Table. Number and Rate of Alcohol-Related Deaths Among People 16 Years and Older in the US in 2019 and 2020**

Demographics	No. of deaths		Death rate (95% CI) <sup>a,b</sup>		Rate difference (95% CI) <sup>c,d,e</sup>	P value <sup>e</sup>	Relative change, % <sup>d,f</sup>
	2019	2020	2019	2020			
Deaths from all causes	2 823 460	3 353 547	938.3 (937.2-939.4)	1094.3 (1093.1-1095.5)	156.0 (154.4-157.6)	<.001	16.6
Alcohol-related deaths	78 927	99 017	27.3 (27.1-27.5)	34.4 (34.2-34.6)	7.1 (6.8-7.4)	<.001	25.9
Sex							
Female	19 983	25 328	13.7 (13.5-13.9)	17.5 (17.2-17.7)	3.7 (3.4-4.0)	<.001	27.3
Male	58 944	73 689	42.1 (41.7-42.4)	52.6 (52.2-53.0)	10.6 (10.0-11.1)	<.001	25.1
Age groups, y <sup>g</sup>							
16-20	257	333	1.2 (1.1-1.4)	1.6 (1.4-1.7)	0.4 (0.1-0.6)	.002	29.8
21-24	857	1069	4.9 (4.6-5.3)	6.2 (5.8-6.6)	1.3 (0.8-1.8)	<.001	25.6
25-34	5413	7427	11.8 (11.5-12.1)	16.1 (15.8-16.5)	4.4 (3.9-4.8)	<.001	37.0
35-44	9550	13 490	22.9 (22.5-23.4)	32.0 (31.5-32.6)	9.1 (8.4-9.8)	<.001	39.7
45-54	16 675	20 243	40.8 (40.2-41.4)	50.1 (49.5-50.8)	9.3 (8.4-10.3)	<.001	22.9
55-64	26 187	31 846	61.7 (61.0-62.5)	75.1 (74.3-75.9)	13.4 (12.3-14.5)	<.001	21.7
65-74	14 606	18 252	46.4 (45.7-47.2)	56.1 (55.3-56.9)	9.7 (8.6-10.8)	<.001	20.8
≥75	5382	6357	23.9 (23.2-24.5)	27.5 (26.8-28.2)	3.7 (2.7-4.6)	<.001	15.3

<sup>a</sup> Rate per 100 000 population. All death rates are age-adjusted to the 2000 US Standard Population, except for age groups, where age-specific death rates are shown.

<sup>b</sup> A 95% CI was calculated as the rate  $\pm$  1.96 times the standard error. A standard error was calculated following the technical guidance of the National Vital Statistics Reports to take into account random variation (Supplement).

<sup>c</sup> A rate difference was calculated as the 2020 death rate minus the 2019 death rate.

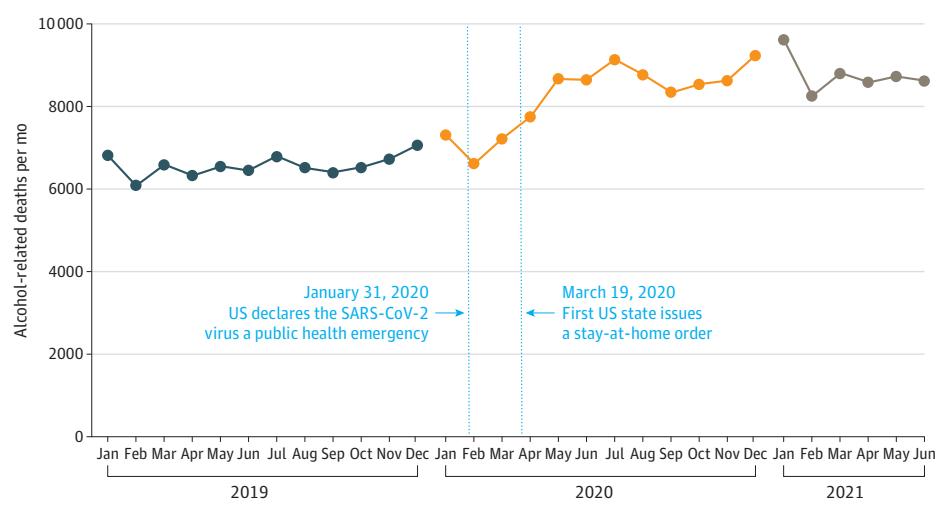
<sup>d</sup> Numbers were not rounded until the end, so they can be slightly different from the numbers directly calculated from the table.

<sup>e</sup> A 95% CI and P value were obtained from a 2-tailed z test with an  $\alpha$  level of .05 (Supplement).

<sup>f</sup> A relative change was calculated as the rate difference divided by the 2019 death rate.

<sup>g</sup> Age on some death certificates was unknown, so numbers may not sum to total.

Figure. Monthly Alcohol-Related Deaths Among People 16 Years and Older



The dotted vertical lines indicate important dates in the US at the beginning of the COVID-19 pandemic. Deaths increased in the spring of 2020 as the pandemic unfolded, and the number of deaths remained elevated in the first half of 2021.

Rates increased for all age groups, with the largest increases occurring for people aged 35 to 44 years (from 22.9 to 32.0 per 100 000 [39.7%]) and 25 to 34 years (from 11.8 to 16.1 per 100 000 [37.0%]). Increases in rates were similar for females (from 13.7 to 17.5 per 100 000 [27.3%]) and males (from 42.1 to 52.6 per 100 000 [25.1%]) (Table).

The number of deaths with an underlying cause of alcohol-associated liver diseases increased from 24 106 to 29 504 (22.4%) and the number of deaths with an underlying cause of alcohol-related mental and behavioral disorders increased from 11 261 to 15 211 (35.1%). Opioid overdose deaths involving alcohol as a contributing cause increased from 8503 to 11 969 (40.8%). Deaths in which alcohol contributed to overdoses specifically on synthetic opioids other than methadone (eg, fentanyl) increased from 6302 to 10 032 (59.2%).

During 2020, a total of 2042 death certificates listed alcohol and COVID-19 as causes (1475 listed COVID-19 as the underlying cause, 323 listed alcohol as the underlying cause). As such, only a small proportion of the increase in alcohol-related deaths involved COVID-19 directly.

**Discussion** | The number and rate of alcohol-related deaths increased approximately 25% between 2019 and 2020, the first year of the COVID-19 pandemic. Rates increased prior to the pandemic, but less rapidly (2.2% mean annual percent change between 1999 and 2017<sup>4</sup>). The rate increase for alcohol-related deaths in 2020 outpaced the increase in all-cause mortality, which was 16.6%.

Previous reports suggest the number of opioid overdose deaths increased 38% in 2020, with a 55% increase in deaths involving synthetic opioids such as fentanyl.<sup>5</sup> There were similar increases in the number of deaths in which alcohol contributed to overdoses of opioids (40.8%) and, specifically, synthetic opioids (59.2%).

Deaths involving alcohol reflect hidden tolls of the pandemic. Increased drinking to cope with pandemic-related stressors, shifting alcohol policies, and disrupted treatment

access are all possible contributing factors.<sup>1</sup> Whether alcohol-related deaths will decline as the pandemic wanes, and whether policy changes could help reduce such deaths, warrants consideration.

Study limitations include inaccurate death certificates, such as underreporting of alcohol involvement,<sup>6</sup> and unclear causal relationships among listed causes of deaths. Provisional data are subject to change when more death certificates are processed.

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**Disclaimer:** The views and opinions expressed in this report are those of the authors and should not be construed to represent the views of the federal government.

**Additional Information:** All data used in the project are publicly accessible from the website for the Centers for Disease Control and Prevention National Center for Health Statistics.

1. Koob GF, Powell P, White A. Addiction as a coping response: hyperkatifeia, deaths of despair, and COVID-19. *Am J Psychiatry*. 2020;177(11):1031-1037. doi:10.1176/appi.ajp.2020.20091375
2. Moon AM, Curtis B, Mandrekar P, Singal AK, Verna EC, Fix OK. Alcohol-associated liver disease before and after COVID-19—an overview and call for ongoing investigation. *Hepatol Commun*. 2021;5(9):1616-1621. doi:10.1002/hep4.1747
3. Sharma RA, Subedi K, Gbadebo BM, Wilson B, Jurkowitz C, Horton T. Alcohol withdrawal rates in hospitalized patients during the COVID-19 pandemic. *JAMA Netw Open*. 2021;4(3):e210422. doi:10.1001/jamanetworkopen.2021.0422
4. White AM, Castle IP, Hingson RW, Powell PA. Using death certificates to explore changes in alcohol-related mortality in the United States, 1999 to 2017. *Alcohol Clin Exp Res*. 2020;44(1):178-187. doi:10.1111/acer.14239
5. Overdose death rates. National Institute on Drug Abuse. Accessed February 15, 2022. <https://nida.nih.gov/drug-topics/trends-statistics/overdose-death-rates>
6. Castle IJ, Yi HY, Hingson RW, White AM. State variation in underreporting of alcohol involvement on death certificates: motor vehicle traffic crash fatalities as an example. *J Stud Alcohol Drugs*. 2014;75(2):299-312. doi:10.15288/jsad.2014.75.299