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Cluster of Influenza A(H5) Cases Associated with Poultry Exposure at Two Facilities — Colorado, July 2024

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Abstract

Persons who work in close contact with dairy cattle and poultry that are infected with highly pathogenic avian influenza (HPAI) A(H5N1) virus are at increased risk for infection. In July 2024, the Colorado Department of Public Health & Environment responded to two poultry facilities with HPAI A(H5N1) virus detections in poultry. Across the two facilities, 663 workers assisting with poultry depopulation (i.e., euthanasia) received screening for illness; 109 (16.4%) reported symptoms and consented to testing. Among those who received testing, nine (8.3%) received a positive influenza A(H5) virus test result, and 19 (17.4%) received a positive SARS-CoV-2 test result. All nine workers who received positive influenza A(H5) test results had conjunctivitis, experienced mild illness, and received oseltamivir. This poultry exposure–associated cluster of human cases of influenza A(H5) is the first reported in the United States. The identification of these cases highlights the ongoing risk to persons who work in close contact with infected animals. Early response to each facility using multidisciplinary, multilingual teams facilitated case-finding, worker screening, and treatment. As the prevalence of HPAI A(H5N1) virus clade 2.3.4.4b genotype B3.13 increases, U.S. public health agencies should prepare to rapidly investigate and respond to illness in agricultural workers, including workers with limited access to health care.

Investigation and Results

Public Health Notification and Response

On July 8, 2024, poultry in a commercial egg-layer operation in northeast Colorado (facility A)* were confirmed to have highly pathogenic avian influenza (HPAI) A(H5N1).† Facility A hired approximately 250 contract workers to conduct depopulation (i.e., euthanasia) of all poultry on the premises, which began on July 9. On July 11, the Colorado Department of Public Health & Environment (CDPHE)

* Facility A was a large commercial operation with 1.8 million egg-laying poultry. Facility B was a large commercial operation with 1.3 million egg-laying poultry. Facility B was located in the same county as facility A, but the two facilities had no connection to each other.

† Confirmatory testing was conducted by the National Veterinary Services Laboratory (NVSL), and the virus was later identified as clade 2.3.4.4b genotype B3.13. Facility A received a confirmatory laboratory result by NVSL on July 8; facility B received confirmation by NVSL on July 16.

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and Colorado Department of Agriculture were notified of several ill workers. Based on potential exposure and symptoms consistent with influenza A(H5N1) virus infection, a field team was mobilized to conduct testing among symptomatic workers and offer them empiric treatment with the influenza neuraminidase inhibitor oseltamivir (75 mg twice daily for 5 days). Seven workers reported symptoms and received testing on July 11, and 45 symptomatic workers received testing on July 12; all received oseltamivir. To ensure an adequate supply of the recommended personal protective equipment (PPE) for exposed workers (*1*), CDPHE delivered goggles, N95[§] filtering facepiece respirators (FFRs), and nitrile gloves to facility A on July 12. On July 13, a small team returned to determine PPE-use practices during work activities.

Because many workers had symptoms, including several who received presumptive positive test results for influenza A(H5),[¶] and because observed PPE compliance was low, CDPHE distributed oseltamivir to all workers as postexposure prophylaxis (PEP),[**] irrespective of symptoms. On July 15 and 16, an on-site team conducted symptom screening, testing for symptomatic workers, and distribution of oseltamivir; 13 additional workers with symptoms received testing and empiric treatment, and 219 workers received a 10-day course of oseltamivir PEP.[††] CDPHE returned to facility A on July 23, and identified no additional workers with symptoms.

On July 14, 2024, CDPHE was notified that poultry at facility B, located in the same county as facility A, had a nonnegative test result[§§] for influenza A(H5). CDPHE delivered goggles and N95 FFRs to facility B on July 15. Facility B commenced poultry depopulation on July 15, with approximately 400 contract workers participating. The facility initially reported no illness among workers and high PPE compliance. Therefore, oseltamivir PEP was not offered. Instead, CDPHE established routine screening and offered testing and empiric oseltamivir treatment (75 mg twice daily for 5 days) during six visits[¶¶] to 44 workers experiencing symptoms.

Between CDPHE site visits, staff member team leads at facilities A and B conducted screening among workers before shifts based on guidance from CDPHE. Facility A identified no additional symptomatic workers after July 16. Facility B reported two symptomatic workers during facility-led screening; both

[§] N95 is a certification mark of the U.S. Department of Health and Human Services registered in the United States and several international jurisdictions.

[¶] Samples were considered presumptively positive until testing at CDC confirmed the positive result.

[**] https://www.cdc.gov/bird-flu/spotlights/hpai-health-recommendations.html

[††] On July 15–16, 188 workers received a 10-day course of oseltamivir PEP. Thirty-one workers who received testing July 11–12, initially received a 5-day oseltamivir course for empiric treatment, and received negative test results were offered an additional 5-day supply of oseltamivir for the complete 10-day PEP course. The 10-day course was offered because of ongoing occupational exposure.

[§§] A nonnegative test result refers to an initial detection in poultry, as opposed to detection of a human case.

[¶¶] Worker-reported illness and testing participation at facility B site visits: July 17 (one), July 19 (18), July 20 (five), July 22 (six), July 24 (four), and July 26 (10).

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workers declined testing and empiric oseltamivir treatment. As depopulation activities concluded, CDPHE visited both facilities to distribute cards providing information in English and Spanish about symptoms of avian influenza A virus infection in humans, where to seek care if workers became ill, and information for health care providers regarding workers' exposure to H5N1-infected poultry.

Screening and Testing Among Workers

Workers conducting poultry depopulation, carcass removal, and disposal were asked if they were feeling ill. Those with self-reported symptoms were asked to complete a brief questionnaire including information on exposures, symptom onset, specific symptoms,*** and PPE use.††† Nasopharyngeal swabs and conjunctival swab specimens were collected from workers reporting symptoms; swab specimens were tested for influenza A and A(H5) virus at the CDPHE laboratory. Specimens testing negative for influenza A and A(H5) virus were tested for SARS-CoV-2.§§§ Specimens testing presumptively positive for influenza A(H5) virus or with inconclusive results were sent to CDC for confirmatory testing. This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.¶¶¶

CDPHE screened 663 workers for symptoms during July 11–July 26, 2024. The median age of workers was 30 years (range = 15–56 years), and most spoke only Spanish. At facility A, 65 (25%) of 265 workers who received screening reported symptoms and received testing, and six (9%) of 65 (2.3% of all workers) received a positive influenza A(H5) test result (Table 1). At facility B, 44 (11%) of 398 workers who received screening reported symptoms and received testing, and three (7%) of these 44 workers (0.8% of all workers) received a positive influenza A(H5) test result. Among those who received a negative influenza A and A(H5) test result, one worker at facility A and 18 at facility B received a positive SARS-CoV-2 test result. Symptom onset date was known for 25 (38%) of 65 workers at facility A and 39 (89%) of 44 workers at facility B (Figure).

TABLE 1. Influenza A(H5) test result, age, and use of personal protective equipment among symptomatic workers conducting depopulation in two poultry facilities — Colorado, July 2024

Characteristic	No. (%) of symptomatic workers	
	Facility A N = 65	Facility B N = 44
Influenza A(H5) cases, by PCR	**6 (9)**	**3 (7)**
Median age, yrs (IQR)	**35 (27–41)**	**28 (23–35)**
Self-reported PPE use*		
Eye protection	28 (43)	38 (86)
Mask	32 (49)	44 (100)
Coveralls	23 (35)	41 (93)
Gloves	20 (31)	43 (98)
Boots or boot covers	12 (18)	41 (93)
Head cover	20 (31)	34 (77)

Abbreviations: FFR = filtering facepiece respirator; PCR = polymerase chain reaction; PPE = personal protective equipment.

* PPE provided by producers varied but included N95 and KN95 FFRs, Tyvek suits, boot covers, nitrile gloves, safety glasses, and goggles. Many workers owned shoes designated for work activities that remained at the facility. The Colorado Department of Public Health & Environment provided goggles, nitrile gloves, and N95 FFRs.

PPE Use Among Workers Who Were Symptomatic

Self-reported PPE use among workers who were symptomatic varied by facility. At facility A, workers reported lowest usage for boots or boot covers (18%) and highest usage for masks (49%). At facility B, workers reported lowest usage for head covers (77%) and highest usage for masks (100%).

Clinical Description of Human Influenza A(H5) Cases

All nine workers who received positive influenza A(H5) test results completed the questionnaire at the time of testing, and eight were reached for detailed interviews after receipt of their positive test result. Five cases occurred among women and four among men. The median age was 32 years (range = 18–56 years). Two patients had diabetes, one had asthma, and one was a longtime smoker. All reported direct contact with sick or dead poultry during depopulation and carcass disposal activities. Symptom onset occurred a median of 1 day after initial occupational exposure (range = 1–8 days),**** and symptomatic workers received testing a median of 2 days after symptom onset (range = 0–3 days). All nine patients reported conjunctivitis, seven reported eye tearing, and six reported subjective fever or chills. All patients reporting subjective fever or chills worked at facility A. Respiratory symptoms such as sore throat, cough, and shortness of breath were less frequently reported (Table 2). All patients received oseltamivir

*** Symptoms included red eyes, eye tearing, subjective fever or chills, cough, sore throat, runny or stuffy nose, sneezing, difficulty breathing, shortness of breath, fatigue or feeling very tired, muscle or body aches, headaches, nausea, vomiting, diarrhea, seizures, or rash.

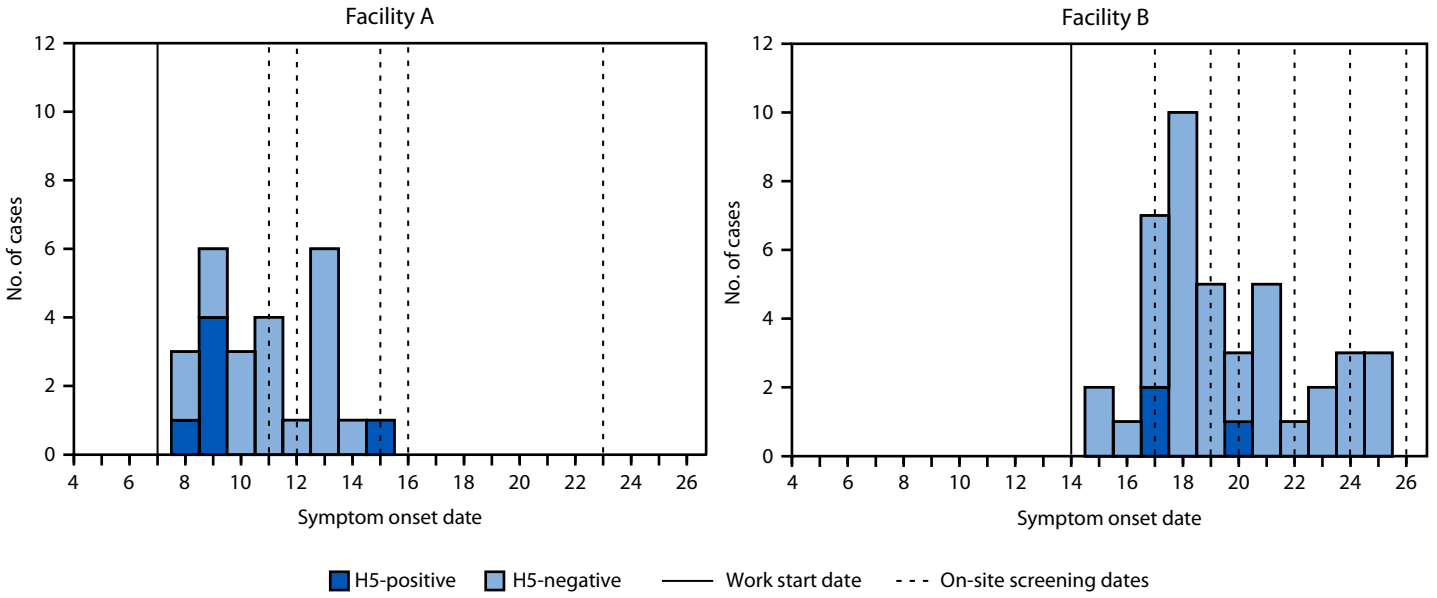
††† The survey asked if workers typically used any of the following during work activities: eye protection, mask, coveralls, gloves, boots or boot covers, or head covering. PPE provided by producers varied but included N95 and KN95 FFRs, Tyvek suits, booties, nitrile gloves, safety glasses, and goggles. CDPHE also provided goggles, nitrile gloves, and N95 FFRs. The survey did not distinguish among masks, N95 respirators, or other types of face coverings.

§§§ Samples were tested for influenza A(H5) via reverse transcription polymerase chain reaction on the CDC Influenza A/H5 Subtyping Diagnostic assay. Samples that tested negative for influenza A(H5) were tested for SARS-CoV-2 on the CDC Influenza SARS-CoV-2 (Flu SC2) Multiplex assay.

¶¶¶ 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

**** Date of initial exposure was defined as the date when depopulation or disposal of sick poultry began, or the person's first day working at the facility, whichever was later.

FIGURE. Work start date,* on-site screening dates, and known symptom onset dates† for symptomatic workers who received testing results for influenza A(H5), by poultry facility — Colorado, July 2024



Abbreviation: H-5 = influenza A(H5).
* Work start date was defined as the date when depopulation or disposal of sick poultry began at each facility.
† Symptom onset was known for 25 (38%) of 65 symptomatic workers at facility A and 39 (89%) of 44 symptomatic workers at facility B.

treatment. Symptoms resolved for seven patients a median of 4 days after onset (range = 1–8 days). Two patients interviewed 2 days after symptom onset reported ongoing or improving conjunctivitis; however, these persons were not able to be interviewed again. No hospitalizations or deaths occurred; one patient sought outpatient medical care for conjunctivitis on the day of symptom onset. Four patients remained symptomatic and were retested 1–5 days after receipt of their initial positive test result; none received a positive follow-up test result. Among the nine workers who received a positive test result for influenza A(H5), both nasopharyngeal and conjunctival swabs were positive for three, only the conjunctival swab was positive for five, and only the nasopharyngeal swab was positive for one. Virus was successfully isolated from specimens from five infected workers, codon complete genomes were successfully sequenced for four cases, and six of eight gene segments were successfully sequenced for one, identifying the viruses as clade 2.3.4.4b genotype B3.13.

Discussion

Before this outbreak, five human cases of influenza A(H5) had been reported in the United States: one in 2022 in Colorado associated with poultry exposure†††† and four among dairy workers reported during April–July 2024 associated with clade 2.3.4.4b genotype B3.13 circulating in dairy cattle (*2*,*3*). HPAI A(H5N1) has been detected both in dairy cattle herds§§§§ and poultry flocks in Colorado this year.¶¶¶¶ This report describes the first cluster of U.S. cases associated with a common source of occupational exposure to poultry. The identification of nine cases across two poultry facilities highlights the ongoing risk to persons who work in close contact with infected animals.

Epidemiologic and clinical characteristics of cases in this cluster were similar to those in U.S. human cases of influenza A(H5) associated with exposure to dairy cattle (*2*,*4*). All infected workers had occupational exposure to sick or dead poultry, and all reported mostly mild symptoms. However, influenza A(H5N1) virus is known to result in a broad spectrum of illness among humans, including severe disease and death (*5*), underscoring the importance of prompt investigation and treatment of potential human cases (*6*). Although environmental contamination (e.g., nasal or ocular carriage of noninfectious viral particles) cannot be ruled out in this cluster, evidence suggests that many of these cases represent actual infection. Four of nine cases occurred in persons who received testing as they arrived at work in the morning, before

†††† https://emergency.cdc.gov/han/2022/han00464.asp

§§§§ https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/hpai-confirmed-cases-livestock (Accessed August 2, 2024).

¶¶¶¶ https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/commercial-backyard-flocks (Accessed August 2, 2024).

TABLE 2. Reported symptoms among workers conducting depopulation who received screening by Colorado Department of Public Health & Environment, by influenza A(H5) test result and poultry facility — Colorado, July 2024

	Influenza A(H5) test result, no. (%)					
	A(H5)-positive			A(H5)-negative		
Symptom	Overall N = 9	Facility A n = 6	Facility B n = 3	Overall N = 100	Facility A n = 59	Facility B n = 41
Red eyes/Conjunctivitis	9 (100)	6 (100)	3 (100)	66 (66)	42 (71)	24 (59)
Eye tearing	7 (78)	5 (83)	2 (67)	51 (51)	36 (61)	15 (37)
Fever or chills	6 (67)	6 (100)	0 (—)	33 (33)	13 (22)	20 (49)
Cough	3 (33)	3 (50)	0 (—)	38 (38)	13 (22)	25 (61)
Sore throat	4 (44)	4 (67)	0 (—)	62 (62)	32 (54)	30 (73)
Runny or stuffy nose	2 (22)	2 (33)	0 (—)	41 (41)	15 (25)	26 (63)
Sneezing	1 (11)	1 (17)	0 (—)	15 (15)	5 (8)	10 (24)
Difficulty breathing	1 (11)	1 (17)	0 (—)	7 (7)	1 (2)	6 (15)
Shortness of breath	3 (33)	3 (50)	0 (—)	10 (10)	1 (2)	9 (22)
Fatigue	1 (11)	1 (17)	0 (—)	16 (16)	2 (3)	14 (34)
Rash	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)
Body aches	5 (56)	5 (83)	0 (—)	28 (28)	5 (8)	23 (56)
Headaches	5 (56)	5 (83)	0 (—)	38 (38)	12 (20)	26 (63)
Nausea	3 (33)	2 (33)	1 (33)	16 (16)	5 (8)	11 (27)
Vomiting	1 (11)	1 (17)	0 (—)	9 (9)	1 (2)	8 (20)
Diarrhea	1 (11)	1 (17)	0 (—)	12 (12)	6 (10)	6 (15)
Seizures	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)

exposure to environmental or occupational contaminants occurred on the day of testing.***** In addition, all nine infected workers reported symptoms of conjunctivitis and received testing within 3 days of symptom onset; conjunctivitis has been observed in previous cases with occupational exposure to HPAI-infected poultry (*7*). Influenza A(H5N1) virus was also isolated, and full-length gene segments were sequenced from clinical specimens collected from five patients.

Poultry depopulation activities and their attendant environments are associated with high potential for viral exposure at affected facilities. In addition to handling and disposing of dead birds, the predominant depopulation method used at both facilities also involved handling each live bird,††††† which increased exposure and the risk for displacement of or damage to PPE, especially in these cage-free facilities where birds roam free and must be physically caught. Agricultural worker health and safety should be prioritized by employers through the use of engineering, administrative, and PPE controls. Challenges were reported and observed in the acquisition, provision, and training in the use of proper PPE for a large number of workers who were urgently hired to depopulate poultry. Self-reported PPE use was low for certain components, observations revealed some inconsistent or improper PPE use, and extreme heat made compliance difficult. However, cases were also identified in facility B where frequency of PPE use was higher, but still <100%.

This cluster of influenza A(H5) cases in a predominantly Spanish-speaking migrant workforce highlights the importance of a public health response that prioritizes health equity. Multilingual teams including Spanish speakers were fundamental to building trust and conducting postexposure screening and testing and providing treatment. The robust public health response by CDPHE, including on-site screening and timely

Summary

What is already known about this topic?

Humans who have contact with influenza A(H5N1) virus–infected cattle or poultry can become infected.

What is added by this report?

The first known cluster of human influenza A(H5) cases in the United States associated with poultry exposure occurred in Colorado; 109 (16.4%) of 663 workers performing poultry depopulation reported symptoms and received testing, and nine (8.3%) of the workers who received testing for influenza A(H5) received a positive result. All nine cases were associated with mild illness, with conjunctivitis as the most common symptom.

What are the implications for public health practice?

As the prevalence of highly pathogenic avian influenza A(H5N1) virus clade 2.3.4.4b genotype B3.13 increases, U.S. public health agencies should prepare to rapidly investigate and respond to illness in agricultural workers, including workers with limited access to health care.

***** These workers received testing as they reported for work on a given day; however, they had worked on previous days, when they were presumably exposed.

††††† Containerized gassing with carbon dioxide was determined as the preferred depopulation method in consultation with the Colorado Department of Agriculture and U.S. Department of Agriculture in accordance with American Veterinary Medical Association recommendations. Facility A used this method in 100% of bird houses, and facility B used it in approximately 55% of bird houses. https://www.avma.org/resources-tools/avma-policies/avma-guidelines-depopulation-animals

testing of symptomatic workers, increased access to care and likely optimized case-finding. Testing was also critical to identifying cases from a larger cohort of symptomatic persons working in close contact in an enclosed environment, which can facilitate spread of respiratory pathogens such as SARS-CoV-2, and environmental respiratory irritation was likely (*8*).

Implications for Public Health Practice

These findings suggest that poultry workers who are exposed to enclosed environments with birds infected with HPAI A(H5N1) virus are at increased risk for infection. Given the continued circulation of this virus in the United States, public health agencies should proactively prepare for additional human cases in both dairy and poultry facilities. This preparation should include distributing PPE; training public health field teams on proper PPE use; determining the logistics of large-scale screening, specimen collection, and laboratory testing to distinguish influenza A(H5) virus from seasonal respiratory viruses; acquiring oseltamivir; and developing standardized protocols for empiric treatment or PEP with oseltamivir. In addition, response preparation should include the cultural and language needs of the agricultural workforce in the jurisdiction. A One Health§§§§§ approach that takes into consideration human, animal, and environmental health is also required for a timely and coordinated response, including collaboration with industry, labor, and regulatory agriculture partners.

§§§§§ https://www.cdc.gov/one-health/

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References

1. CDC. Avian influenza (bird flu): information for farm workers exposed to H5N1 bird flu. Atlanta, GA: US Department of Health and Human Services, CDC; 2024. https://www.cdc.gov/bird-flu/prevention/farm-workers.html
2. Uyeki TM, Milton S, Abdul Hamid C, et al. Highly pathogenic avian influenza A(H5N1) virus infection in a dairy farm worker. N Engl J Med 2024;390:2028–9. PMID:38700506 https://doi.org/10.1056/NEJMc2405371
3. CDC. CDC newsroom: CDC reports fourth human case of H5 bird flu tied to dairy cow outbreak [Press release]. Atlanta, GA: US Department of Health and Human Services, CDC; 2024. https://www.cdc.gov/media/releases/2024/p-0703-4th-human-case-h5.html
4. Garg S, Reed C, Davis CT, et al. Outbreak of highly pathogenic avian influenza A(H5N1) viruses in U.S. dairy cattle and detection of two human cases—United States, 2024. MMWR Morb Mortal Wkly Rep 2024;73:501–5. PMID:38814843 https://doi.org/10.15585/mmwr.mm7321e1
5. Van Kerkhove MD. Brief literature review for the WHO global influenza research agenda—highly pathogenic avian influenza H5N1 risk in humans. Influenza Other Respir Viruses 2013;7(Suppl 2):26–33. PMID:24034480 https://doi.org/10.1111/irv.12077
6. Kandun IN, Tresnaningsih E, Purba WH, et al. Factors associated with case fatality of human H5N1 virus infections in Indonesia: a case series. Lancet 2008;372:744–9. PMID:18706688 https://doi.org/10.1016/S0140-6736(08)61125-3
7. Koopmans M, Wilbrink B, Conyn M, et al. Transmission of H7N7 avian influenza A virus to human beings during a large outbreak in commercial poultry farms in the Netherlands. Lancet 2004;363:587–93. PMID:14987882 https://doi.org/10.1016/S0140-6736(04)15589-X
8. Donham KJ, Cumro D, Reynolds SJ, Merchant JA. Dose-response relationships between occupational aerosol exposures and cross-shift declines of lung function in poultry workers: recommendations for exposure limits. J Occup Environ Med 2000;42:260–9. PMID:10738705 https://doi.org/10.1097/00043764-200003000-00006

Changes in Health Indicators Among Caregivers — United States, 2015–2016 to 2021–2022

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Abstract

Caregivers provide support to persons who might otherwise require placement in long-term care facilities. Approximately one in five U.S. adults provides care to family members or friends who have a chronic health condition or disability. Promoting the well-being of this large segment of the population is a public health priority as recognized by the 2022 National Strategy to Support Family Caregivers. Although negative associations between caregiving and caregiver health are known, changes in the health status of caregivers over time are not. Data from the 2015–2016 and 2021–2022 Behavioral Risk Factor Surveillance System were analyzed to compare changes in the prevalence of 19 health indicators among cross-sectional samples of caregivers and noncaregivers at different time points. Caregivers experienced improvements in prevalence of four health indicators, whereas six worsened. Some health indicators, such as cigarette smoking, improved for both caregivers and noncaregivers, although smoking prevalence remained higher for caregivers (16.6% versus 11.7%). Prevalence of lifetime depression increased for both groups and remained higher among caregivers (25.6%) than among noncaregivers (18.6%). During 2021–2022, age-adjusted estimates for caregivers were unfavorable for 13 of the 19 health indicators when compared with noncaregivers. Strategies for supporting caregivers are available, and integrating these with existing programs to address mental health and chronic diseases among this population might improve caregiver well-being. For example, many community organizations support caregivers by offering interventions designed to relieve caregiver strain, including skills training, support groups, and care coordination.

Introduction

Caregivers provide support to persons who might otherwise require placement in long-term care facilities. Approximately one in five U.S. adults provides regular care or assistance to a friend or family member with a health condition or disability (*1*). Promoting the long-term well-being of this large segment of the population is a public health priority as recognized by the first National Strategy to Support Family Caregivers (*2*). The time commitment and responsibilities of caregiving can place an undue emotional, economic, and physical burden on caregivers (*2*). During 2015–2017, caregivers in the generation born during 1946–1964 had more chronic health conditions and more frequent mental distress than noncaregivers of the same age (*3*). Although studies have described differences in health indicators between caregivers and noncaregivers (*4*,*5*), this report compares changes in the prevalence of 19 health indicators among caregivers and noncaregivers from 2015–2016 to 2021–2022.

Methods

Data Source

The Behavioral Risk Factor Surveillance System (BRFSS) is an annual, state-based, random-digit–dialed telephone survey of the noninstitutionalized U.S. adult population aged ≥18 years in all 50 states, the District of Columbia, and U.S. territories.* In addition to core questions administered to all participants, states can include optional modules. Data from the core BRFSS questionnaire and the optional caregiver module during 2015–2016 and 2021–2022 were assessed for 35 states and Puerto Rico, where the optional caregiver module was included at least once in both periods.† This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.§ Among all respondents, 92,461 who responded "yes" to the question, "During the past 30 days, did you provide regular care or assistance to a friend or family member who has a health problem or a disability?" were classified as caregivers. Those who responded "no" or indicated that their care recipient died during the previous 30 days (353,242) were classified as noncaregivers; 2,489 who responded "did not know/not sure" or refused to answer were excluded. Estimates for both periods were available for demographic characteristics (sex, age, race and ethnicity, education level, employment status,

* https://www.cdc.gov/brfss/

† States included Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Texas, Utah, Virginia, West Virginia, Wisconsin, and Wyoming. If a state or territory completed both years within a single period (e.g., 2015 and 2016), only the most recent year was retained.

§ 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

marital status, home ownership, and annual household income) and the following 19 health indicators: 1) current cigarette smoking, 2) binge drinking,[¶] 3) heavy drinking,[**] 4) physical inactivity,[††] 5) fair or poor self-rated health, 6) frequent mental distress,[§§] 7) frequent physical distress,[¶¶] 8) lifetime diagnosed depression,[***] 9) coronary heart disease, 10) stroke, 11) chronic obstructive pulmonary disease, 12) arthritis, 13) diabetes, 14) obesity, 15) diagnosed asthma, 16) any chronic physical health condition,[†††] 17) multiple chronic physical health conditions, 18) having no health coverage,[§§§] and 19) inability to see a doctor because of cost.[¶¶¶]

Statistical Methods

Percentage point changes (changes) in the unadjusted prevalence of demographic characteristics and caregiving status by state during 2015–2016 and 2021–2022 were compared using *t*-tests. Logistic regression, with age-adjustment using a continuous age variable, was used to measure percentage point differences in health indicators (dependent variable) between caregivers and noncaregivers (independent variable) as well as changes in health indicators (with time indicator as independent variable). Logistic regression was used to determine whether age-adjusted changes among caregivers and noncaregivers were different (i.e., time interaction). Statistical tests with p-values <0.05 were considered significant. Analyses were conducted using SAS software (version 9.4; SAS Institute) and SAS-callable SUDAAN software (version 11.0.1; RTI International) to account for complex sample design and weighting.

[¶] Five or more drinks on at least one occasion for men or four or more drinks for women during the previous 30 days.

[**] Fifteen or more drinks per week for men; eight or more drinks per week for women during the previous 30 days.

[††] No leisure-time physical activity during the previous 30 days.

[§§] A response of ≥14 days to the question, "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"

[¶¶] A response of ≥14 days to the question, "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?"

[***] Respondents self-reported diagnosis of depression in their lifetime.

[†††] Respondents reported diagnosis of physical chronic conditions in their lifetime for coronary heart disease (including myocardial infarction or angina), stroke, chronic obstructive pulmonary disease, arthritis (including rheumatoid arthritis, gout, lupus, or fibromyalgia), or diabetes (excluding those who reported only gestational diabetes, prediabetes, or borderline diabetes) and currently having asthma. Obesity was defined as having a body mass index ≥30.0 kg/m^2 based on self-reported height and weight.

[§§§] During 2015–2016, responded no to the question, "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, government plans such as Medicare, or Indian Health Service?" During 2021–2022, responded "no coverage of any type" to the question, "What is the current primary source of your health insurance?"

[¶¶¶] During 2015–2016, the question was "Was there a time in the past 12 months when you needed to see a doctor but could not because of cost?" During 2021–2022, the end of the question was revised to "… because you could not afford it?"

Results

The percentage of U.S. adults who were caregivers during 2015–2016 (20.2%) and 2021–2022 (20.1%) was similar; the percentage increased in three states and decreased in 11 states and Puerto Rico (Figure). The proportion of caregivers aged ≥60 years increased from 28.0% during 2015–2016 to 35.4% during 2021–2022. This increase was larger than among noncaregivers (28.8% to 31.5%) (Table 1).

Four health indicators improved among caregivers from 2015–2016 to 2021–2022: decrease in prevalence of current smoking, physical inactivity, no health coverage, and inability to see a doctor due to cost. Six indicators worsened: the prevalences of frequent mental distress, depression, asthma, obesity, and having any or multiple chronic physical conditions all increased (Table 2).

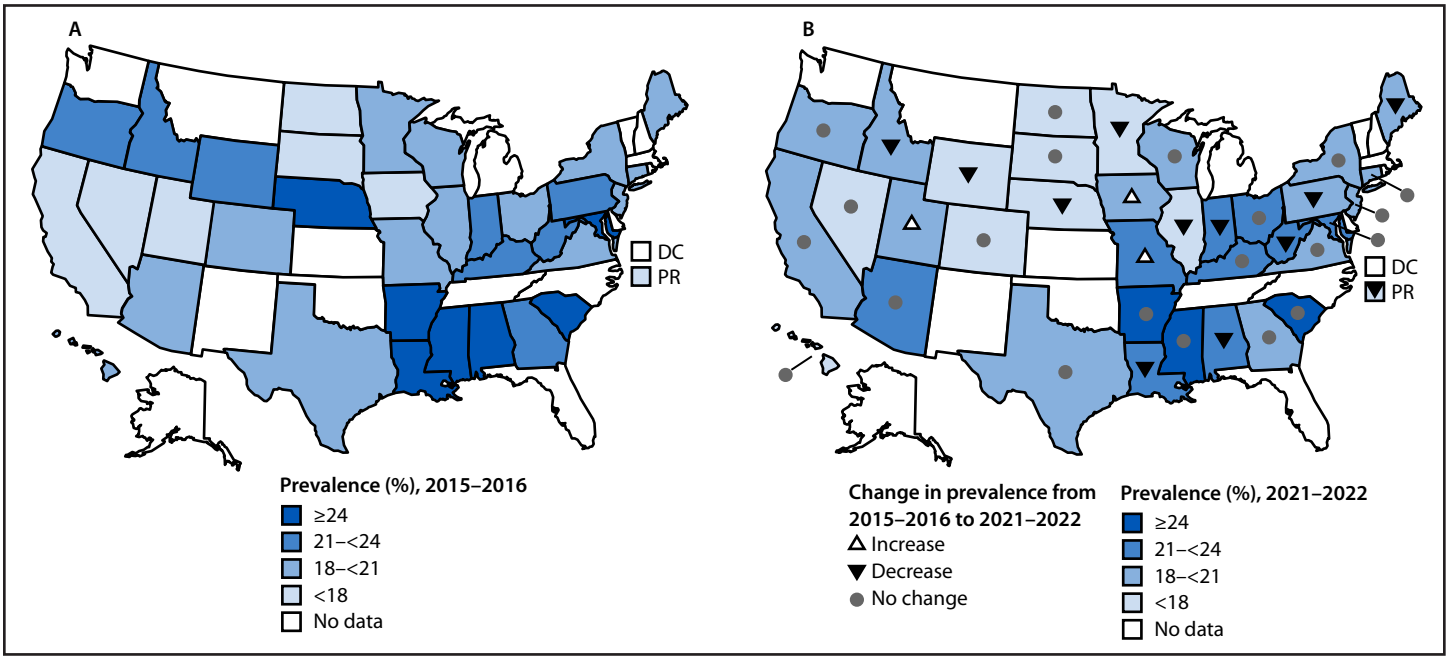
From 2015–2016 to 2021–2022, the prevalence of current smoking decreased among both caregivers and noncaregivers (Table 2). Caregivers were more likely than were noncaregivers to smoke during both periods. The prevalence of physical inactivity decreased for both caregivers and noncaregivers; the decrease for caregivers was larger (2.0 versus 0.8 percentage points; age-adjusted time interaction p = 0.03).

From 2015–2016 to 2021–2022, the prevalence of frequent mental distress increased among both caregivers and noncaregivers (Table 2). The prevalence of lifetime diagnosed depression increased from 2015–2016 to 2021–2022 for both noncaregivers (3.8 percentage points) and caregivers (2.3 percentage points; age-adjusted time interaction p = 0.007). Both mental health indicators (frequent mental distress and depression) were more prevalent among caregivers when compared with noncaregivers during both periods.

During 2021–2022, measures for 13 of the 19 health indicators were unfavorable for caregivers when compared with noncaregivers. Four of the seven chronic physical conditions were more common among caregivers in both periods: obesity, current asthma, chronic obstructive pulmonary disease, and arthritis. The prevalence of obesity and current asthma increased for both caregivers and noncaregivers; the prevalence of chronic obstructive pulmonary disease and arthritis did not change.

The percentage of adults aged <65 years with no health care coverage was similar among caregivers and noncaregivers during 2015–2016 and decreased during 2021–2022 among both groups (caregivers 5.1 percentage points and noncaregivers 2.6 percentage points; age-adjusted time interaction p = 0.006) (Table 2). Caregivers were more likely than noncaregivers to report inability to see a doctor due to cost during both periods.

FIGURE. Prevalence of caregiving* (A) and changes in caregiving† (B) among U.S. adults — Behavioral Risk Factor Surveillance System, 35 states§ and Puerto Rico, 2015–2016 to 2021–2022



Abbreviations: DC = District of Columbia; PR = Puerto Rico.
* Provided regular care or assistance during the previous 30 days to a friend or family member who had a health problem or disability.
† Prevalence for 2015–2016 compared with 2021–2022 using *t*-test.
§ Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Texas, Utah, Virginia, West Virginia, Wisconsin, and Wyoming.

Discussion

A positive social connection can grow between a caregiver and care recipient, providing a sense of purpose for the caregiver and less stress for the care recipient (*4*). However, caregivers had worse age-adjusted outcomes for 13 of the 19 health indicators examined during 2021–2022. Many of these findings are consistent with previous reports, including the association between caregiving and smoking (*5*,*6*), poor mental health (*3*,*4*,*7*), obesity (*5*), and asthma (*3*).

Overarching circumstances during the time of the study, including the COVID-19 pandemic and health care reform policies, affected the U.S. population. Increased prevalence of lifetime depression and frequent mental distress among both caregivers and noncaregivers is consistent with findings of population-level mental health impacts during the COVID-19 pandemic (*8*). Expanded eligibility for Medicaid occurred during the study period,**** and national data indicate that public health plan coverage (including Medicaid) increased among adults aged <65 years (*9*).

**** https://www.kff.org/affordable-care-act/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/

Summary

What is already known about this topic?

One in five U.S. adults are caregivers to family members or friends with a chronic health condition or disability. Negative associations between caregiving and caregiver health are known.

What is added by this report?

Among caregivers, prevalence of four health indicators improved and six worsened from 2015–2016 to 2021–2022. Changes among caregivers were often similar to changes among noncaregivers, and most health indicators remained worse for caregivers. During 2021–2022, measures for 13 of 19 indicators were worse for caregivers than for noncaregivers.

What are the implications for public health practice?

Strategies for supporting caregivers are available. Integrating these strategies with existing programs to address mental health and chronic diseases among this population might improve caregiver well-being.

The National Strategy to Support Family Caregivers has raised awareness of the need to support the health of caregivers nationwide. Goals outlined in the strategy include

TABLE 1. Changes in demographic characteristics among caregivers* and noncaregivers — Behavioral Risk Factor Surveillance System, 35 states† and Puerto Rico, 2015–2016 and 2021–2022

Characteristic	Caregivers n = 92,461			Noncaregivers n = 353,242			Difference in change (caregivers minus noncaregivers)	
	2015–2016 (%)§	2021–2022 (%)§	Percentage point change	2015–2016 (%)§	2021–2022 (%)§	Percentage point change	Percentage point	p-value¶
Sex								
Female	57.9	59.2	1.3	49.9	49.8	−0.1	1.4	0.17
Male	42.1	40.8	−1.3	50.1	50.2	0.1	−1.4	0.17
Age group, yrs								
18–29	18.0	13.3	−4.7**	20.8	19.9	−0.9**	−3.8	<0.001
30–39	14.4	14.5	0.1	17.0	17.3	0.3	−0.2	0.81
40–49	17.8	15.9	−1.9**	16.2	15.6	−0.6	−1.3	0.14
50–59	21.9	21.0	−0.9	17.2	15.6	−1.6**	0.7	0.20
60–69	16.9	19.8	2.9**	14.9	15.3	0.4	2.5	<0.001
70–79	8.3	11.3	3.0**	9.2	10.9	1.7**	1.3	0.01
≥80	2.9	4.3	1.4**	4.8	5.3	0.5**	0.9	<0.001
Race and ethnicity††								
American Indian or Alaska Native	1.2	0.9	−0.3	0.8	0.8	0	−0.3	0.29
Asian	2.3	4.2	1.9**	5.7	6.9	1.2**	0.7	0.02
Black or African American	12.8	12.4	−0.4	11.0	10.9	−0.1	−0.3	0.70
Native Hawaiian or Pacific Islander	0.1	0.2	0.1	0.2	0.2	0	0.1	0.44
White	66.8	65.4	−1.4	61.5	58.8	−2.7**	1.3	0.27
Hispanic or Latino	14.3	14.1	−0.2	18.9	20.4	1.5**	−1.7	0.15
Other races	0.5	0.6	0.1	0.4	0.4	0	0.1	0.63
Multiple races	2.0	2.2	0.2	1.5	1.8	0.3**	−0.1	0.56
Education level								
Less than high school	11.4	8.7	−2.7**	15.0	12.9	−2.1**	−0.6	0.08
High school graduate	27.3	26.4	−0.9	28.1	27.2	−0.9**	0	0.98
Some college or technical school	36.1	34.8	−1.3	30.0	29.4	−0.6	−0.7	0.55
College graduate	25.2	30.1	4.9**	27.0	30.5	3.5**	1.4	0.10
Employment status								
Employed for wages	46.6	44.1	−2.5**	48.5	48.3	−0.2	−2.3	0.03
Self-employed	9.5	9.6	0.1	8.5	8.6	0.1	0.0	0.84
Out of work	7.0	8.0	1.0	5.3	6.1	0.8**	0.2	0.95
Homemaker	7.2	5.8	−1.4**	6.8	5.1	−1.7**	0.3	0.47
Student	4.4	3.4	−1.0**	5.8	5.3	−0.5	−0.5	0.18
Retired	17.8	22.3	4.5**	18.4	20.6	2.2**	2.3	0.001
Unable to work	7.7	6.8	−0.9**	6.7	5.9	−0.8**	−0.1	0.97

See table footnotes on the next page.

strengthening services and supports for family caregivers and expanding data, research, and evidence-based practices (*2*). Providing relief from caregiving tasks, broadly known as "respite care," was identified as a priority. Availability of such services can be optimized through public policies and community collaboration, resulting in high-quality, affordable, and flexible care (*2*). Additional strategies to ensure financial and workplace security for caregivers have been implemented in some states, and include enhancement of paid family leave and antidiscrimination laws.††††

†††† https://nashp.org/financial-and-workplace-security-for-family-caregivers/

Limitations

The findings in this report are subject to at least four limitations. First, all measures are self-reported and might be subject to recall and social desirability bias, possibly resulting in misclassification of health indicators. Second, data were not available in all states, and estimates might not be representative of all U.S. adults. Third, the study design was cross-sectional at two time points rather than longitudinal (i.e., survey participants were not followed over time to observe changes). Finally, this study was descriptive and further adjustment might explain differences between caregivers and noncaregivers. Despite these limitations, this study is the first to examine changes in the health of caregivers from a population health perspective using a large sample.

TABLE 1. (*Continued*) Changes in demographic characteristics among caregivers* and noncaregivers — Behavioral Risk Factor Surveillance System, 35 states† and Puerto Rico, 2015–2016 and 2021–2022

Characteristic	Caregivers n = 92,461			Noncaregivers n = 353,242			Difference in change (caregivers minus noncaregivers)	
	2015–2016 (%)§	2021–2022 (%)§	Percentage point change	2015–2016 (%)§	2021–2022 (%)§	Percentage point change	Percentage point	p-value¶
Marital status								
Married	52.0	55.7	3.7**	51.1	49.7	−1.4**	5.1	<0.001
Divorced or separated	14.5	13.5	−1.0	13.0	12.4	−0.6**	−0.4	0.58
Widowed	4.9	5.7	0.8**	7.3	7.5	0.2	0.6	0.10
Never married	22.9	20.3	−2.6**	24.0	25.1	1.1**	−3.7	<0.001
Unmarried couple	5.6	4.8	−0.8	4.6	5.3	0.7**	−1.5	0.004
Own or rent home								
Own	70.8	73.6	2.8**	67.0	67.6	0.6	2.2	0.02
Rent	23.2	21.2	−2.0**	27.0	26.2	−0.8	−1.2	0.14
Other arrangement	5.9	5.2	−0.7	6.0	6.2	0.2	−0.9	0.06
Annual household income								
<$10,000	4.9	3.0	−1.9**	5.2	3.5	−1.7**	−0.2	0.39
$10,000–$19,999	12.1	6.7	−5.4**	11.1	6.9	−4.2**	−1.2	0.10
$20,000–$34,999	17.1	16.2	−0.9	16.4	14.3	−2.1**	1.2	0.07
$35,000–$49,999	12.4	11.0	−1.4**	11.3	10.1	−1.2**	−0.2	0.89
$50,000–$74,999	14.3	13.9	−0.4	12.1	12.5	0.4	−0.8	0.30
≥$75,000	25.6	32.5	6.9**	29.3	33.1	3.8**	3.1	0.001
Missing	13.6	16.8	3.2**	14.6	19.6	5.0**	−1.8	0.06

* Provided regular care or assistance during the previous 30 days to a friend or family member who had a health problem or disability.
† Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Texas, Utah, Virginia, West Virginia, Wisconsin, and Wyoming.
§ Percentages are weighted and unadjusted.
¶ Using logistic regression model with caregiving status (dependent variable), demographic indicator (independent variable), time period indicator (independent variable), and an interaction term for demographic × time.
** p<0.05, using *t*-test with Taylor series linearization.
†† Adults of Hispanic or Latino (Hispanic) origin might be of any race but are categorized as Hispanic; all racial groups are non-Hispanic.

Implications for Public Health Practice

National, state, and local public health strategies that address comprehensive chronic disease prevention and management§§§§ could be tailored for caregivers. Many community organizations support caregivers by offering interventions designed to relieve caregiver strain, including skills training, support groups, and care coordination.¶¶¶¶ Specialized training designed to help caregivers cope with the unique challenges of dementia care can be especially helpful for persons who care for those with memory loss or cognitive decline.***** In health care settings, professionals can take steps to identify patients who serve in a caregiving role and encourage them to seek any support they might need to prioritize their own mental and physical health. Additional critical strategies outlined in the National Strategy to Support Family Caregivers call on public and private sectors to provide resources for caregivers (*2*).

§§§§ https://www.cdc.gov/nccdphp/impact/index.html; https://www.astho.org/topic/population-health-prevention/chronic-disease/
¶¶¶¶ https://www.caregiver.org/connecting-caregivers/
***** https://bpc.caregiver.org/pro/index.html#searchPrograms

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References

1. AARP and National Alliance for Caregiving. Caregiving in the United States 2020. Washington, DC: AARP; 2020. https://www.aarp.org/pri/topics/ltss/family-caregiving/caregiving-in-the-united-states/
2. The Recognize, Assist, Include, Support, and Engage (RAISE) Act Family Caregiving Advisory Council; The Advisory Council to Support Grandparents Raising Grandchildren. 2022 National Strategy to Support Family Caregivers. Washington, DC: Administration for Community Living; 2022. https://acl.gov/sites/default/files/RAISE_SGRG/NatlStrategyToSupportFamilyCaregivers-2.pdf

TABLE 2. Changes in prevalence of selected health indicators among caregivers* and noncaregivers — Behavioral Risk Factor Surveillance System, 35 states† and Puerto Rico, 2015–2016 and 2021–2022

Health indicator	% (95% CI)§		Change from 2015–2016 to 2021–2022		Difference in change (caregivers minus noncaregivers)	
	2015–2016	2021–2022	Percentage point change, unadjusted	Age-adjusted p-value¶	Percentage point	Age-adjusted p-value**
Behavior						
Current cigarette smoking						
Caregivers	20.9†† (19.7–22.0)	16.6†† (15.8–17.4)	−4.3§§	<0.001	−1.0	0.70
Noncaregivers	15.0 (14.5–15.5)	11.7 (11.4–12.1)	−3.3§§	<0.001		
Binge drinking¶¶						
Caregivers	15.3 (14.1–16.4)	14.2 (13.4–15.1)	−1.1	0.87	0.4	0.11
Noncaregivers	16.6 (16.1–17.1)	15.1 (14.6–15.5)	−1.5§§	<0.001		
Heavy drinking* **						
Caregivers	5.9 (5.2–6.7)	6.5††(5.7–7.2)	0.6	0.13	0.6	0.23
Noncaregivers	5.7(5.4–6.1)	5.7(5.4–6.0)	0	0.95		
Physical inactivity†††						
Caregivers	24.0†† (22.8–25.2)	22.0†† (21.1–22.9)	−2.0§§	<0.001	−1.2	0.03
Noncaregivers	25.8 (25.2–26.4)	25.0 (24.5–25.6)	−0.8	0.02		
General/Mental health						
Fair or poor self-rated health						
Caregivers	19.7†† (18.6–20.7)	19.6†† (18.7–20.4)	−0.1	0.34	0.5	0.81
Noncaregivers	17.5 (17.0–18.0)	16.9 (16.4–17.4)	−0.6	0.01		
Frequent mental distress§§§						
Caregivers	17.2†† (16.1–18.3)	20.5†† (19.5–21.5)	3.3§§	<0.001	−0.3	0.15
Noncaregivers	10.0 (9.6–10.5)	13.6 (13.1–14.0)	3.6§§	<0.001		
Frequent physical distress¶¶¶						
Caregivers	14.7†† (13.7–15.7)	14.3†† (13.5–15.0)	−0.4	0.17	0.2	0.71
Noncaregivers	11.8 (11.3–12.2)	11.2 (10.8–11.5)	−0.6§§	0.005		
Depression** **						
Caregivers	23.3†† (22.2–24.4)	25.6†† (24.6–26.6)	2.3§§	<0.001	−1.5	0.007
Noncaregivers	14.8 (14.4–15.3)	18.6 (18.1–19.0)	3.8§§	<0.001		
Chronic physical conditions††††						
CHD						
Caregivers	7.3†† (6.7–7.8)	7.3 (6.8–7.8)	0	0.02	0.1	0.17
Noncaregivers	6.4 (6.1–6.7)	6.3 (6.1–6.6)	−0.1	0.04		
Stroke						
Caregivers	3.5 (3.0–3.9)	3.8 (3.3–4.2)	0.3	0.84	0.1	0.51
Noncaregivers	3.1 (2.9–3.3)	3.3 (3.1–3.5)	0.2	0.99		
COPD						
Caregivers	8.2†† (7.6–8.9)	9.1†† (8.5–9.7)	0.9§§	0.49	0.7	0.83
Noncaregivers	6.0 (5.7–6.3)	6.2 (5.9–6.4)	0.2	0.80		
Arthritis						
Caregivers	32.6†† (31.3–33.9)	34.8†† (33.7–35.9)	2.2§§	0.36	1.5	0.28
Noncaregivers	23.8 (23.4–24.3)	24.5 (24.0–25.0)	0.7	0.52		
Diabetes						
Caregivers	11.2 (10.5–11.9)	12.9 (12.2–13.5)	1.7§§	0.36	1.0	0.95
Noncaregivers	11.2 (10.8–11.6)	11.9 (11.5–12.3)	0.7§§	0.27		
Current asthma						
Caregivers	11.6†† (10.7–12.4)	12.8†† (12.0–13.5)	1.2§§	0.009	0.4	0.70
Noncaregivers	8.3 (8.0–8.7)	9.1 (8.7–9.4)	0.8§§	0.005		
Obesity						
Caregivers	34.1†† (32.7–35.4)	38.0†† (36.8–39.2)	3.9§§	<0.001	0.1	0.80
Noncaregivers	29.4 (28.8–30.1)	33.2 (32.6–33.8)	3.8§§	<0.001		
Any chronic physical condition						
Caregivers	60.6†† (59.2–62.1)	65.7†† (64.4–66.9)	5.1§§	<0.001	1.9	0.79
Noncaregivers	51.7 (51.0–52.5)	54.9 (54.3–55.5)	3.2§§	<0.001		

See table footnotes on the next page.

TABLE 2. (*Continued*) Changes in prevalence of selected health indicators among caregivers* and noncaregivers — Behavioral Risk Factor Surveillance System, 35 states† and Puerto Rico, 2015–2016 and 2021–2022

Health indicator	% (95% CI)§		Change from 2015–2016 to 2021–2022		Difference in change (caregivers minus noncaregivers)	
	2015–2016	2021–2022	Percentage point change, unadjusted	Age-adjusted p-value¶	Percentage point	Age-adjusted p-value**
Multiple chronic physical conditions						
Caregivers	28.9†† (27.7–30.1)	32.5†† (31.3–33.6)	3.6§§	0.04	1.4	0.40
Noncaregivers	22.0 (21.5–22.5)	24.2 (23.6–24.7)	2.2§§	<0.001		
Health care access						
No health coverage (age <65 yrs)§§§§						
Caregivers	14.1 (12.8–15.4)	9.0†† (8.2–9.8)	−5.1§§	<0.001	−2.5	0.006
Noncaregivers	13.7 (13.0–14.3)	11.1 (10.6–11.6)	−2.6§§	<0.001		
Inability to see doctor due to cost¶¶¶¶						
Caregivers	16.6†† (15.6–17.7)	13.2†† (12.4–14.0)	−3.4§§	<0.001	−0.8	0.36
Noncaregivers	11.7 (11.3–12.2)	9.1 (8.8–9.5)	−2.6§§	<0.001		

Abbreviations: CHD = coronary heart disease; COPD = chronic obstructive pulmonary disease; HMO = health management organization.

* Provided regular care or assistance during the previous 30 days to a friend or family member who had a health problem or disability.

† Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Jersey, New York, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Texas, Utah, Virginia, West Virginia, Wisconsin, and Wyoming.

§ Percentages are weighted and unadjusted; CIs account for complex sample design.

¶ Using logistic regression model with health indicator (dependent variable), period indicator (independent variable), and continuous age (independent variable). Significant results indicate the percentage during 2015–2016 was different compared with 2021–2022 after age adjustment (p<0.05).

** Age adjusted time interaction, using logistic regression model with health indicator (dependent variable), caregiving status (independent variable), time period indicator (independent variable), continuous age (independent variable), and an interaction term for caregiving × time.

†† p<0.05, using logistic regression model with health indicator (dependent variable), caregiving status (independent variable), and continuous age (independent variable). Significant results indicate the percentage for caregivers was different from noncaregivers after age adjustment.

§§ Statistically significant difference from 2015–2016 to 2021–2022 using *t*-test with Taylor series linearization.

¶¶ Five or more drinks on at least one occasion for men or four or more drinks for women during the previous 30 days.

*** Fifteen or more drinks per week for men; eight or more drinks per week for women during the previous 30 days.

††† No leisure-time physical activity during the previous 30 days.

§§§ A response of ≥14 days to the question, "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?"

¶¶¶ A response of ≥14 days to the question, "Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?"

**** Respondents self-reported diagnosis of depression in their lifetime.

†††† Respondents reported diagnosis of physical chronic conditions in their lifetime for CHD (including myocardial infarction or angina), stroke, COPD, arthritis (including rheumatoid arthritis, gout, lupus, or fibromyalgia), or diabetes (excluding those who reported only gestational diabetes, prediabetes, or borderline diabetes) and currently having asthma. Obesity was defined as having a body mass index ≥30.0 kg/m^2 based on self-reported height and weight.

§§§§ During 2015–2016, responded no to "Do you have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, government plans such as Medicare, or Indian Health Service?" During 2021–2022, responded "no coverage of any type" to "What is the current primary source of your health insurance?"

¶¶¶¶ During 2015–2016, the question was "Was there a time in the past 12 months when you needed to see a doctor but could not because of cost?" During 2021–2022, the end of the question was revised to "… because you could not afford it?"

3. Miyawaki CE, Bouldin ED, Taylor CA, McGuire LC. Baby boomers as caregivers: results from the Behavioral Risk Factor Surveillance System in 44 states, the District of Columbia, and Puerto Rico, 2015–2017. Prev Chronic Dis 2020;17:E80. PMID:32790608 https://doi.org/10.5888/pcd17.200010
4. Bouldin ED, Andresen EM, Edwards VJ, Kearley JP, Reed N, McGuire LC. Public health perspectives on the family care gap. In: Gaugler JE, ed. Bridging the family care gap. Elsevier Academic Press; 2021:3–41.
5. Gottschalk S, König HH, Brettschneider C. The association between informal caregiving and behavioral risk factors: a cross-sectional study. Int J Public Health 2020;65:911–21. PMID:32519023 https://doi.org/10.1007/s00038-020-01402-6
6. Secinti E, Wu W, Kent EE, Demark-Wahnefried W, Lewson AB, Mosher CE. Examining health behaviors of chronic disease caregivers in the U.S. Am J Prev Med 2022;62:e145–58. PMID:34579984 https://doi.org/10.1016/j.amepre.2021.07.004
7. Anderson LA, Edwards VJ, Pearson WS, Talley RC, McGuire LC, Andresen EM. Adult caregivers in the United States: characteristics and differences in well-being, by caregiver age and caregiving status. Prev Chronic Dis 2013;10:E135. PMID:23948336 https://doi.org/10.5888/pcd10.130090
8. Kraut RE, Li H, Zhu H. Mental health during the COVID-19 pandemic: impacts of disease, social isolation, and financial stressors. PLoS One 2022;17:e0277562. PMID:36417414 https://doi.org/10.1371/journal.pone.0277562
9. Cohen RA, Martinez ME. Health insurance coverage: early release of estimates from the National Health Interview Survey, January–June 2023. Hyattsville, MD: CDC, National Center for Health Statistics; 2023. https://doi.org/10.15620/cdc:134757

Reported Non–Substance-Related Mental Health Disorders Among Persons Who Died of Drug Overdose — United States, 2022

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Abstract

Drug overdose deaths remain a public health crisis in the United States; nearly 107,000 and nearly 108,000 deaths occurred in 2021 and 2022, respectively. Persons with mental health conditions are at increased risk for overdose. In addition, substance use disorders and non–substance-related mental health disorders (MHDs) frequently co-occur. Using data from CDC's State Unintentional Drug Overdose Reporting System, this report describes characteristics of persons in 43 states and the District of Columbia who died of unintentional or undetermined intent drug overdose and had any MHD. In 2022, 21.9% of persons who died of drug overdose had a reported MHD. Using the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* criteria, the most frequently reported MHDs were depressive (12.9%), anxiety (9.4%), and bipolar (5.9%) disorders. Overall, approximately 80% of overdose deaths involved opioids, primarily illegally manufactured fentanyls. Higher proportions of deaths among decedents with an MHD involved antidepressants (9.7%) and benzodiazepines (15.3%) compared with those without an MHD (3.3% and 8.5%, respectively). Nearly one quarter of decedents with an MHD had at least one recent potential opportunity for intervention (e.g., approximately one in 10 decedents were undergoing substance use disorder treatment, and one in 10 visited an emergency department or urgent care facility within 1 month of death). Expanding efforts to identify and address co-occurring mental health and substance use disorders (e.g., integrated screening and treatment) and strengthen treatment retention and harm reduction services could save lives.

Introduction

Drug overdose deaths remain a public health crisis in the United States; nearly 107,000 and nearly 108,000 deaths occurred in 2021 and 2022, respectively.* Persons with mental health conditions are at increased risk for nonfatal and fatal overdose (*1*). The *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) defines mental health conditions, including both substance use disorders (SUDs) and non–substance-related mental health disorders (MHDs) (e.g., depressive, anxiety, and bipolar disorders). SUDs and MHDs commonly co-occur as both have shared risk factors and can influence each other (e.g., persons with certain MHDs might use substances for coping).† In 2022, 23.1% of U.S. adults reported an MHD in the past year, and 8.4% had co-occurring MHDs and SUDs.§ Although mental health is an important consideration for overdose risk, characteristics of persons who died of overdose and had any non–substance-related MHD have not been widely studied.

Methods

Data Source

Data from CDC's State Unintentional Drug Overdose Reporting System (SUDORS)¶ were analyzed to identify evidence and type of MHD among persons who died of unintentional or undetermined intent drug overdose during 2022. Jurisdictions participating in SUDORS entered data from death certificates, postmortem toxicology reports, and medical examiner and coroner reports into a web-based system.

Identification of Mental Health Disorders

Jurisdictions used available source documents to identify MHDs (e.g., documentation of a diagnosis in the medical examiner or coroner report); non–substance-related MHD type** was selected from a drop-down menu or written into a free-text box.†† For this analysis, two independent analysts reviewed and categorized text box MHD entries according to the DSM-5; a licensed clinical psychologist confirmed categorizations and resolved discrepancies.

* https://www.cdc.gov/nchs/data/databriefs/db491.pdf

† https://nida.nih.gov/publications/research-reports/common-comorbidities-substance-use-disorders/why-there-comorbidity-between-substance-use-disorders-mental-illnesses

§ https://www.samhsa.gov/data/report/2022-nsduh-annual-national-report

¶ https://www.cdc.gov/overdose-prevention/php/od2a/index.html; https://www.cdc.gov/overdose-prevention/data-research/facts-stats/about-sudors.html

** Includes attention-deficit/hyperactivity disorder, anxiety disorder, autism spectrum, bipolar disorder, dementia (e.g., Alzheimer disease), depression or dysthymia, eating disorder, obsessive-compulsive disorder, posttraumatic stress disorder, schizophrenia, other, not applicable, and unknown. Substance-related mental health disorders, including substance use disorders and substance-induced disorders (e.g., intoxication, withdrawal, and other substance-induced mental disorders, such as substance-induced psychotic disorder), were excluded from the MHD group for this analysis because they are likely to be overrepresented among persons who died of drug overdose.

†† If a decedent had multiple disorders or "other" was selected, jurisdictions used the free text box to enter additional information. In addition, text narratives describing each death were reviewed in duplicate for instances where "unknown" or "not applicable" was selected.

Data Analysis

For deaths with and without evidence of MHD, decedent demographics and selected overdose circumstances were examined among 43 states and the District of Columbia (jurisdictions)[§§] with complete medical examiner or coroner data[¶¶] for the first and second halves of 2022; in addition, drug involvement was examined among 43 jurisdictions that also had complete data on drugs causing death during 2022.[***] The following recent potential intervention opportunities to prevent overdose within 1 month of death were also examined: release from an institutional setting (i.e., prison or jail, residential treatment facility, or psychiatric hospital), treatment for SUD, emergency department or urgent care visit for any reason, or nonfatal overdose. Because the data represent a census of deaths in included jurisdictions, Pearson chi-square tests were used to compare characteristics of decedents with and without an MHD; for variables with multiple categories, pairwise comparisons were conducted if the global p-value was <0.05. Analyses were performed using SAS software (version 9.4; SAS Institute). This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.[†††]

Results

Frequency of Mental Health Disorders

During 2022, among 63,424 unintentional and undetermined intent drug overdose deaths across 44 jurisdictions, 21.9% of decedents had any reported non–substance-related MHD (Table 1). By DSM-5 criteria, the most common disorders were depressive (12.9%), anxiety (9.4%), and bipolar (5.9%).

Demographics and Selected Circumstances

Compared with those without a reported MHD, higher percentages of decedents with any reported MHD were female (40.0% versus 25.9%) and non-Hispanic White (White) (71.1% versus 61.4%), and lower percentages were non-Hispanic Black or African American (Black) (15.9% versus 24.8%) and Hispanic or Latino (Hispanic) (8.8% versus 10.3%) (Table 2). A higher percentage of decedents with an MHD had a known history of opioid use or misuse compared with those without an MHD (42.4% versus 29.8%).

Drug Involvement

Overall, 82.2% of overdose deaths involved opioids, primarily illegally manufactured fentanyl and fentanyl analogs (75.2% of overdose deaths). Higher proportions of deaths among decedents with any MHD involved antidepressants (9.7%), benzodiazepines (15.3%), and prescription opioids (16.0%) compared with those without an MHD (3.3%, 8.5%, and 11.6%, respectively).

Potential Intervention Opportunities

Approximately one quarter of decedents with any reported MHD (24.5%) had one or more potential intervention opportunities in the month before death (versus 14.6% of decedents without MHD) (Figure). Decedents with reported MHD, compared with those without, more commonly experienced the following intervention opportunities: released from an institutional setting (11.2% versus 7.8%), treatment for SUD (10.1% versus 4.5%), emergency department or urgent care visit (9.5% versus 4.7%), and nonfatal overdose (4.1% versus 2.7%).

Discussion

More than one in five persons (21.9%) who died of drug overdose in 2022 had any reported non–substance-related MHD, underscoring the importance of addressing mental health in overdose prevention and response efforts. MHDs and SUDs frequently co-occur and have shared risk factors and bidirectional associations (e.g., persons with certain MHDs might use substances to cope with their symptoms, and persons with SUDs might be at greater risk for other MHDs) (*2*,*3*). This finding suggests the need to screen for SUDs and other MHDs, which is consistent with U.S. Preventive Services Task

[§§] The District of Columbia and the following 35 states reported deaths from the full jurisdiction: Alaska, Arizona, Arkansas, Colorado, Connecticut, Delaware, Georgia, Hawaii, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Utah, Vermont, Virginia, West Virginia, and Wisconsin. The following eight states reported deaths from counties that accounted for ≥75% of drug overdose deaths in the respective state, per SUDORS funding requirements: Alabama, Illinois, Indiana, Louisiana, Missouri, New York, Pennsylvania, and Washington.

[¶¶] Forty-four jurisdictions were included because death certificates and medical examiner or coroner reports were available for ≥75% of deaths during either 6-month reporting period (January–June or July–December 2022). Thirty-six jurisdictions reported data for both 6-month periods, and eight reported data for just one 6-month period (Alabama, Michigan, Nevada, New Mexico, New York, South Dakota, West Virginia, and Wisconsin). Analyses were restricted to deaths with an available medical examiner or coroner report (63,424; 92.3% of all deaths in the included jurisdictions for the first half or second half of 2022, or both).

[***] Among the 44 jurisdictions included in demographics and circumstances analyses, a single state (West Virginia) was excluded from analyses of drug involvement, because these analyses also required jurisdictions to have data on drugs causing death for ≥75% of deaths during either 6-month reporting period. Analyses were restricted to deaths with an available medical examiner or coroner report (62,746; 92.2% of all deaths).

[†††] 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

TABLE 1. Reported non–substance-related mental health disorders* among persons who died of unintentional or undetermined intent drug overdose — State Unintentional Drug Overdose Reporting System, United States,† 2022

Non–substance-related mental health disorders§	No. of decedents	% of all decedents n = 63,424	% of decedents with any reported mental health disorder n = 13,897
Any mental health disorder	13,897	21.9	100.0
Depressive disorders¶	8,189	12.9	58.9
Anxiety disorders**	5,983	9.4	43.1
Bipolar and related disorders††	3,728	5.9	26.8
Schizophrenia spectrum and other psychotic disorders§§	1,988	3.1	14.3
Trauma- and stressor-related disorders¶¶	1,712	2.7	12.3
Neurodevelopmental disorders***	1,363	2.1	9.8
Other mental health disorders†††	889	1.4	6.4
Unspecified mental health disorders§§§	361	0.6	2.6

Abbreviation: SUDORS = State Unintentional Drug Overdose Reporting System.

* Evidence of mental health disorders was obtained from available source documents (e.g., medical records or witness report of a diagnosis in the medical examiner or coroner report) and categorized by *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* classification.

† The District of Columbia and the following 35 states reported deaths from the full jurisdiction: Alaska, Arizona, Arkansas, Colorado, Connecticut, Delaware, Georgia, Hawaii, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Utah, Vermont, Virginia, West Virginia, and Wisconsin. The following eight states reported deaths from counties that accounted for ≥75% of drug overdose deaths in the respective state, per SUDORS funding requirements: Alabama, Illinois, Indiana, Louisiana, Missouri, New York, Pennsylvania, and Washington. These 44 jurisdictions were included because death certificates and medical examiner or coroner reports were available for ≥75% of deaths during either 6-month reporting period (January–June or July–December 2022). Analyses were restricted to deaths with an available medical examiner or coroner report (92.3% of all deaths included).

§ Categories are not mutually exclusive. Decedents might have had more than one reported mental health disorder.

¶ Includes depression (except manic depression, which was included in the category for bipolar and related disorders), dysthymia, and other depressive disorders.

** Includes agoraphobia, anxiety, claustrophobia, panic disorder, and social phobia.

†† Includes bipolar and manic depression.

§§ Includes delusional disorder, paranoid disorder, psychoactive disorder, psychotic disorder, schizoaffective disorder, schizophrenia, schizophreniform disorder, and schizotypal disorder.

¶¶ Includes adjustment disorder, grief reaction, stress disorder, and posttraumatic stress disorder.

*** Includes attention-deficit/hyperactivity disorder, autism spectrum, borderline intellectual functioning, developmental disorder, dyslexia, learning disability/disorder, tic disorder, and Tourette's disorder.

††† Includes other disorders that did not fit into a specific category listed as personality disorders; mood disorders; sleep-wake disorders; obsessive-compulsive and related disorders; feeding and eating disorders; neurocognitive disorders; disruptive, impulse-control, or conduct disorders; and somatic symptom and related disorders.

§§§ Includes broader unspecified results for mental condition, disorder, or illness, and psychiatric disease or disorder.

Force (USPSTF) recommendations for adults in primary care settings,§§§ and the need to link and integrate treatments to prevent overdose and improve mental health (*2*).

Compared with decedents without any reported MHD, decedents with MHD were more commonly female and White, and less frequently Black and Hispanic. These sex and racial and ethnic differences could partly reflect disparities in mental health diagnoses. Historically, for example, women have been more likely to seek mental health care than men (*4*), and stigma surrounding seeking mental health care might be more pronounced among Black communities (*5*); potential racial and ethnic biases in provider diagnosing might also exist (*6*). Comprehensive screening for comorbid conditions across all demographic characteristics could decrease stigma and bias surrounding mental health and substance use and increase diagnosis and linkage to evidence-based treatment and care. For example, USPSTF recommends screening for unhealthy drug use, anxiety disorders, and depression among adults in primary care settings.¶¶¶

Compared with decedents without an MHD, decedents with an MHD more commonly had a known history of opioid use or misuse, and deaths in which the decedent had an MHD more often involved antidepressants, benzodiazepines, and prescription opioids. Screening for opioid use disorder and other SUDs, when persons receive a diagnosis of MHD, and screening for MHD and SUD when opioids and other drugs (e.g., antidepressants and benzodiazepines) are prescribed, could help identify co-occurring disorders and aid linkage to care (*7*). Although most overdose deaths involved opioids, it might also be helpful for providers to consider overdose risk

§§§ https://www.uspreventiveservicestaskforce.org/files/uspstf-2023-year-in-review.pdf

¶¶¶ https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/drug-use-illicit-screening; https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/anxiety-adults-screening; https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/screening-depression-suicide-risk-adults

TABLE 2. Demographic characteristics, select circumstances, and drug involvement among persons who died of unintentional or undetermined intent drug overdose, by non–substance-related mental health disorder status* — State Unintentional Drug Overdose Reporting System, United States,† 2022

Characteristic	Overdose deaths, no. (%)		
	Total N = 63,424	With any reported mental health disorder n = 13,897	Without reported mental health disorder n = 49,527
Sex§			
Female¶	**18,386 (29.0)**	5,553 (40.0)	12,833 (25.9)
Male¶	**45,036 (71.0)**	8,343 (60.0)	36,693 (74.1)
Age group, yrs§			
<15¶	**193 (0.3)**	17 (0.1)	176 (0.4)
15–24¶	**3,675 (5.8)**	901 (6.5)	2,774 (5.6)
25–34	**13,624 (21.5)**	3,047 (21.9)	10,577 (21.4)
35–44	**16,770 (26.4)**	3,762 (27.1)	13,008 (26.3)
45–54	**13,428 (21.2)**	2,894 (20.8)	10,534 (21.3)
55–64¶	**12,036 (19.0)**	2,553 (18.4)	9,483 (19.1)
≥65¶	**3,694 (5.8)**	723 (5.2)	2,971 (6.0)
Race and ethnicity§			
American Indian or Alaska Native, non-Hispanic	**1,087 (1.7)**	263 (1.9)	824 (1.7)
Asian, non-Hispanic	**406 (0.6)**	97 (0.7)	309 (0.6)
Black or African American, non-Hispanic¶	**14,351 (22.9)**	2,190 (15.9)	12,161 (24.8)
Native Hawaiian or Pacific Islander, non-Hispanic	**63 (0.1)**	9 (0.1)	54 (0.1)
White, non-Hispanic¶	**39,837 (63.5)**	9,780 (71.1)	30,057 (61.4)
Hispanic or Latino¶	**6,258 (10.0)**	1,218 (8.8)	5,040 (10.3)
Multiple races, non-Hispanic¶	**735 (1.2)**	206 (1.5)	529 (1.1)
Select circumstances			
Potential bystander present¶,**	**26,955 (42.5)**	6,485 (46.7)	20,470 (41.3)
Fatal drug use witnessed¶	**5,094 (8.0)**	1,046 (7.5)	4,048 (8.2)
Naloxone administered¶	**14,147 (22.3)**	3,191 (23.0)	10,956 (22.1)
Ever treated for SUD¶	**7,845 (12.4)**	2,974 (21.4)	4,871 (9.8)
History of opioid use or misuse¶	**20,651 (32.6)**	5,897 (42.4)	14,754 (29.8)

See table footnotes on the next page.

when prescribing antidepressants and benzodiazepines among patients with a known or suspected SUD (*8*).

Approximately one quarter of decedents with an MHD had at least one potential intervention opportunity within 1 month of death; each of these reflects a possible missed opportunity to implement overdose prevention. As these touchpoint locations included emergency departments and urgent care facilities, institutions (e.g., prisons or jails and residential treatment facilities), and SUD treatment settings, the availability and expansion of substance use screening, treatment, referrals or linkage, and harm reduction services within those settings could be explored. For example, efforts to link persons with SUD to treatment services upon release from jail via peer navigators have resulted in persons expressing a desire to start or continue treatment for SUD or MHD (*9*). Further, the findings that approximately one in 10 decedents with an MHD were being treated for SUD at the time of death and one in 25 decedents with an MHD had experienced a nonfatal overdose within 1 month of death reflect important missed opportunities for prevention among persons with a high risk

Summary

What is already known about this topic?

During 2022, nearly 108,000 persons died of drug overdose in the United States. Persons with substance use disorders and non–substance-related mental health disorders, which frequently co-occur, are at increased risk for overdose.

What is added by this report?

In 2022, 22% of persons who died of drug overdose had a non–substance-related mental health disorder. The most common disorders were depressive (13%) and anxiety (9%). Approximately one quarter of decedents with a non–substance-related mental health disorder had at least one recent potential opportunity for intervention (e.g., current treatment for substance use disorders or recent emergency department visit).

What are the implications for public health practice?

Implementing evidence-based screening for substance use and mental health disorders during potential intervention opportunities and expanding efforts to integrate care for these disorders could improve mental health and reduce overdoses.

TABLE 2. (*Continued*) Demographic characteristics, select circumstances, and drug involvement among persons who died of unintentional or undetermined intent drug overdose, by non–substance-related mental health disorder status* — State Unintentional Drug Overdose Reporting System, United States,† 2022

Characteristic	Overdose deaths, no. (%)		
	Total N = 63,424	With any reported mental health disorder n = 13,897	Without reported mental health disorder n = 49,527
Drugs involved††			
Antidepressants¶	**2,961 (4.7)**	1,334 (9.7)	1,627 (3.3)
Benzodiazepines¶	**6,294 (10.0)**	2,113 (15.3)	4,181 (8.5)
Any opioid¶	**51,578 (82.2)**	11,216 (81.4)	40,362 (82.4)
Heroin¶,§§	**4,645 (7.4)**	946 (6.9)	3,699 (7.6)
IMFs¶,¶¶	**47,188 (75.2)**	9,807 (71.2)	37,381 (76.3)
Prescription opioids¶,***	**7,890 (12.6)**	2,204 (16.0)	5,686 (11.6)
Any stimulant¶	**36,102 (57.5)**	7,206 (52.3)	28,896 (59.0)
Cocaine¶	**19,174 (30.6)**	3,639 (26.4)	15,535 (31.7)
Methamphetamine¶	**18,324 (29.2)**	3,724 (27.0)	14,600 (29.8)
Prescription stimulants¶,§§§	**922 (1.5)**	326 (2.4)	596 (1.2)

Abbreviations: IMFs= illegally manufactured fentanyl and fentanyl analogs; SUD = substance use disorder; SUDORS = State Unintentional Drug Overdose Reporting System.

* Evidence of mental health disorders was obtained from available source documents (e.g., medical records or witness report of a diagnosis in the medical examiner or coroner report) and categorized by *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* classification.

† The District of Columbia and the following 35 states reported deaths from the full jurisdiction: Alaska, Arizona, Arkansas, Colorado, Connecticut, Delaware, Georgia, Hawaii, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Utah, Vermont, Virginia, West Virginia, and Wisconsin. The following eight states reported deaths from counties that accounted for ≥75% of drug overdose deaths in the respective state, per SUDORS funding requirements: Alabama, Illinois, Indiana, Louisiana, Missouri, New York, Pennsylvania, and Washington. These 44 jurisdictions were included because death certificates and medical examiner or coroner reports were available for ≥75% of deaths during either 6-month reporting period (January–June or July–December 2022). Analyses were restricted to deaths with an available medical examiner or coroner report (92.3% of all deaths included).

§ Missing values were excluded from calculations of percentages. Percentages might not sum to 100% because of rounding.

¶ Pearson chi-square was $p<0.05$, indicating a statistically significant difference between decedents with and without a mental health disorder.

** Potential bystander is defined in the footnotes section of the SUDORS Data Dashboard. https://www.cdc.gov/overdose-prevention/data-research/facts-stats/sudors-dashboard-fatal-overdose-data.html

†† A drug was considered involved if it was listed as a cause of death on the death certificate or in the medical examiner or coroner report. Percentages sum to >100% because drug categories are not mutually exclusive. Among the 44 jurisdictions included in demographics and circumstances analyses, a single state (West Virginia) was excluded from analyses of drug involvement, because these analyses also required jurisdictions to have data on drugs causing death for ≥75% of deaths during either 6-month reporting period. Analyses were restricted to deaths with an available medical examiner or coroner report (92.2% of all deaths included). Analyses included 62,746 total deaths (13,779 deaths among persons with any reported mental health disorder and 48,967 deaths among persons without).

§§ Includes heroin and 6-acetylmorphine. Morphine was coded as heroin if detected along with 6-acetylmorphine or if scene, toxicology, or witness evidence indicated presence of known heroin adulterants or impurities (including quinine, procaine, xylazine, noscapine, papaverine, thebaine, or acetylcodeine), injection, illicit drug use, or a history of heroin use.

¶¶ IMFs were identified using both toxicology and scene evidence because toxicology alone cannot distinguish between pharmaceutical fentanyl and IMFs.

*** Includes alfentanil, buprenorphine, butorphanol, codeine, dextrorphan, dihydrocodeine, hydrocodone, hydromorphone, levorphanol, loperamide, meperidine, methadone, morphine, nalbuphine, noscapine, oxycodone, oxymorphone, pentazocine, prescription fentanyl, propoxyphene, sufentanil, tapentadol, and tramadol. Includes brand names and metabolites (e.g., nortramadol) of these drugs and combinations of these drugs and nonopioids (e.g., acetaminophen-oxycodone). Morphine was included only if scene or witness evidence did not indicate likely heroin use and if 6-acetylmorphine was not also detected. Fentanyl was included based on scene, toxicology, or witness evidence of prescription.

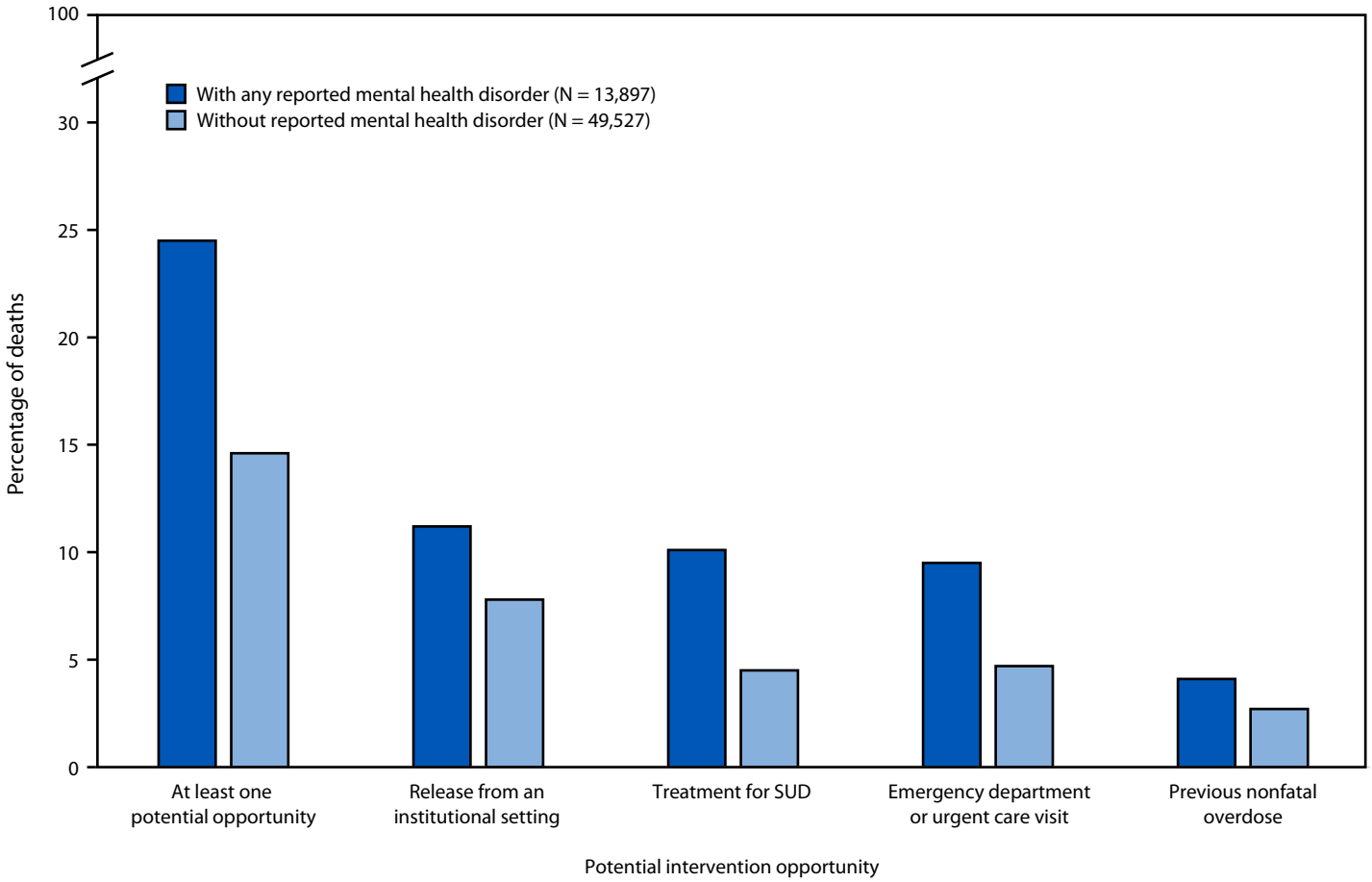
§§§ Includes amphetamine (in the absence of methamphetamine), armodafinil, dextroamphetamine, levoamphetamine, lisdexamfetamine, mephentermine, methylphenidate, modafinil, and propylhexedrine. Includes prescription stimulant brand names and metabolites of these drugs.

for overdose. This finding emphasizes the need to strengthen care integration among persons with MHD and SUD and to ensure harm reduction and linkage to treatment and care services are provided during overdose response.

Limitations

The findings in this report are subject to at least six limitations. First, analyses include 43 or 44 jurisdictions and data for some or all of 2022 and, therefore, might not be generalizable. Second, MHD might be undiagnosed. Third, MHD diagnoses are likely underestimated because data were limited to available source documents of varying completeness. The actual percentage of decedents with MHD is likely higher than what is captured in SUDORS because of undiagnosed MHD and underestimation in source documents. Underestimation might also vary by decedent demographics. Fourth, data for current or recent mental health treatment were not available. Fifth, SUD might have been captured as an MHD when the MHD was unspecified. Finally, an MHD might not reflect a medical diagnosis consistent with DSM-5 criteria when obtained from nonmedical sources (e.g., witness reports).

FIGURE. Potential opportunities for intervention* within 1 month of death among persons who died of unintentional or undetermined intent drug overdose, by non–substance-related mental health disorder status† — State Unintentional Drug Overdose Reporting System, United States,§ 2022¶



Abbreviations: SUD = substance use disorder; SUDORS = State Unintentional Drug Overdose Reporting System.

* Specific opportunities for intervention are not mutually exclusive (e.g., a person could have both current treatment for SUD and an emergency department or urgent care visit within 1 month of death and would be counted in both). Institutional setting includes prison or jail, residential treatment facility, or psychiatric hospital.

† Evidence of mental health disorders was obtained from available source documents (e.g., medical records or witness report of a diagnosis in the medical examiner or coroner report) and categorized by *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* classification.

§ The District of Columbia and the following 35 states reported deaths from the full jurisdiction: Alaska, Arizona, Arkansas, Colorado, Connecticut, Delaware, Georgia, Hawaii, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Utah, Vermont, Virginia, West Virginia, and Wisconsin. The following eight states reported deaths from counties that accounted for ≥75% of drug overdose deaths in the respective state, per SUDORS funding requirements: Alabama, Illinois, Indiana, Louisiana, Missouri, New York, Pennsylvania, and Washington. These 44 jurisdictions were included because death certificates and medical examiner or coroner reports were available for ≥75% of deaths during either 6-month reporting period (January–June or July–December 2022). Analyses were restricted to deaths with an available medical examiner or coroner report (92.3% of all deaths included).

¶ Results for all Pearson chi-square tests were $p<0.05$, indicating statistically significant differences for all presented results between decedents with and without a mental health disorder.

Implications for Public Health Practice

Mental health is an important consideration for drug overdose risk, and screening and integration of mental health and substance use treatment services might improve outcomes among persons with comorbid diagnoses (*10*). Adopting a multidisciplinary approach by incorporating evidence-based mental health screening into nonfatal overdose encounters (e.g., at emergency departments) and linking patients to comprehensive treatment and harm reduction services as needed might reduce overdoses and improve mental health. Persons with SUD and MHD can experience similar barriers, such as stigma, access to care, and economic factors, which could affect the willingness or ability of those facing such obstacles to seek care; removing these barriers could help reduce overdose deaths. Although SUD is a mental health disorder, some providers might experience discomfort in addressing

MHD with persons who have an SUD. Therefore, provider education and training are important for addressing barriers to providing comprehensive care to persons with SUD and MHD. It is important for providers to 1) conduct evidence-based mental health screenings with persons using drugs; 2) consider overdose risk and MHD when prescribing opioids, antidepressants, and benzodiazepines, particularly among patients with known or suspected SUD; and 3) link and retain persons with SUD and MHD to treatment and harm reduction services as needed. Adopting these strategies might help prevent future overdose deaths and improve mental health.

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References

1. van Draanen J, Tsang C, Mitra S, et al. Mental disorder and opioid overdose: a systematic review. Soc Psychiatry Psychiatr Epidemiol 2022;57:647–71. PMID:34796369 https://doi.org/10.1007/s00127-021-02199-2
2. Iqbal MN, Levin CJ, Levin FR. Treatment for substance use disorder with co-occurring mental illness. Focus Am Psychiatr Publ 2019;17:88–97. PMID:31975963 https://doi.org/10.1176/appi.focus.20180042
3. Santucci K. Psychiatric disease and drug abuse. Curr Opin Pediatr 2012;24:233–7. PMID:22327950 https://doi.org/10.1097/MOP.0b013e3283504fbf
4. Mackenzie CS, Gekoski WL, Knox VJ. Age, gender, and the underutilization of mental health services: the influence of help-seeking attitudes. Aging Ment Health 2006;10:574–82. PMID:17050086 https://doi.org/10.1080/13607860600641200
5. Pederson AB, Hawkins D, Conteh N. Ethnic identity and mental health stigma among Black adults in the United States. Ethics Med Public Health 2022;25:100774. PMID:35756327 https://doi.org/10.1016/j.jemep.2022.100774
6. Alves-Bradford JM, Trinh NH, Bath E, Coombs A, Mangurian C. Mental health equity in the twenty-first century: setting the stage. Psychiatr Clin North Am 2020;43:415–28. PMID:32773071 https://doi.org/10.1016/j.psc.2020.05.001
7. Dowell D, Ragan KR, Jones CM, Baldwin GT, Chou R. CDC clinical practice guideline for prescribing opioids for pain—United States, 2022. MMWR Recomm Rep 2022;71(No. RR-3):1–95. PMID:36327391 https://doi.org/10.15585/mmwr.rr7103a1
8. Cho J, Spence MM, Niu F, Hui RL, Gray P, Steinberg S. Risk of overdose with exposure to prescription opioids, benzodiazepines, and non-benzodiazepine sedative-hypnotics in adults: a retrospective cohort study. J Gen Intern Med 2020;35:696–703. PMID:31919729 https://doi.org/10.1007/s11606-019-05545-y
9. Tillson M, Fallin-Bennett A, Staton M. Providing peer navigation services to women with a history of opioid misuse pre- and post-release from jail: a program description. J Clin Transl Sci 2022;6:e106. PMID:36128341 https://doi.org/10.1017/cts.2022.441
10. Peterson AL. Integrating mental health and addictions services to improve client outcomes. Issues Ment Health Nurs 2013;34:752–6. PMID:24066651 https://doi.org/10.3109/01612840.2013.809830

Notes from the Field

Intimate Partner Homicide Among Women — United States, 2018–2021

Adam Rowh, MD[1,2]; Shane Jack, PhD[2]

Stay-at-home orders and other stressors associated with the COVID-19 pandemic prompted concerns about a possible increase in intimate partner violence (*1*), including intimate partner homicide, which disproportionately affects women (*2*). Subsequent research on this topic has produced inconsistent results (*3*). CDC analyzed changes in the incidence and characteristics of intimate partner homicide during January 1, 2018–December 31, 2021, using data from the National Violent Death Reporting System (NVDRS) (*4*).

Investigation and Outcomes

Data Source and Analysis

This report summarizes NVDRS data covering 49 states (all except Florida), the District of Columbia, and Puerto Rico. Analysis subjects included female victims of intimate partner homicide* aged ≥18 years. Population crude rates (female intimate partner homicide deaths per 100,000 women) were calculated for 2018–2019 and 2020–2021.† Selected characteristics of the victim, suspected perpetrator (suspect), and incident were tabulated. Observations were compared between periods using Wilcoxon rank sum and Pearson's chi-square tests as appropriate; p-values <0.05 were considered statistically significant. This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.§

Overall Intimate Partner Homicide Characteristics

During 2018–2021, a total of 3,991 female victims of intimate partner homicide were reported to NVDRS (Table). The median victim age was 38 years; 49.3% were non-Hispanic White (White), 29.9% were non-Hispanic Black or African American, (Black), 14.8% were Hispanic or Latino (Hispanic), and 6.0% comprised all other races and ethnicities.¶ Incidents most often occurred at the victim's residence (68.0%) and involved a male suspect (98.5%), a single victim (61.4%), and a firearm (66.6%). In addition, 20.3% of the suspects were known to have a previous history of abusing the victim, 15.8% had suspected alcohol or substance use near the time of the incident, 14.7% had previous contact with law enforcement during the 12 months preceding the homicide, and 6.0% were known to have mental illness that directly contributed to the homicide** (*4*).

Comparison of Intimate Partner Homicide Rates During 2018–2019 and 2020–2021

The rates of intimate partner homicide during 2018–2019 (0.97 per 100,000) and 2020–2021 (0.95) were not significantly different (p = 0.39). During the two periods, most incident characteristics were similar, including the proportion of victims injured at their residence (2018–2019 = 68.9%; 2020–2021 = 67.2%; p = 0.24). However, during 2020–2021, victims were more frequently Black (32.1%, versus 27.3% during 2018–2019; p<0.01) and less frequently White (47.7%, versus 51.2% during 2018–2019; p = 0.03), and suspects more frequently had previous law enforcement contact (16.5%, versus 12.6% during 2018–2019; p<0.01). During 2020–2021, homicides more frequently involved a single victim (63.2%, versus 59.3% during 2018–2019; p = 0.01).

Preliminary Conclusions and Analysis

Overall rates and most characteristics of intimate partner homicide involving female victims in the United States did not significantly change during 2018–2021. Black women were disproportionately victims of intimate partner homicide throughout the study period (i.e., during this period, Black women constituted approximately 13.4% of the population but accounted for 29.9% of intimate partner homicide victims); this disparity widened during 2020–2021. Further, during 2020–2021, the proportion of suspects in intimate

* Incidents defined as intimate partner homicides reflected the following relationships between victim and suspected perpetrator: spouse, ex-spouse, girlfriend or boyfriend, ex-girlfriend or ex-boyfriend, and girlfriend or boyfriend with unknown current relationship status.

† Denominators for the rates for California, Illinois, Pennsylvania, and Texas represent the population of the counties from which the data were collected. https://wonder.cdc.gov/single-race-v2021.html

§ 45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

¶ Victims who were not Black, White, or Hispanic were combined into a heterogenous group to avoid low count suppression. This group consisted of persons who were Asian or Pacific Islander (47.5%), American Indian or Alaska Native (30.0%), multiracial (16.7%), other or unspecified race or ethnicity (5.4%), and unknown race or ethnicity (0.8%).

** Including alcohol problem, current depressed mood, current diagnosed mental health problem, current mental health or substance use treatment, history of ever being treated for mental health or substance use problem, other addiction, or other substance use problem.

TABLE. Number, percentage,* and rate† of intimate partner homicides§ among females aged ≥18 years, by victim, suspect, and incident characteristics — National Violent Death Reporting System, United States,¶ 2018–2021

Characteristic	No. (%) Overall N = 3,991	2018–2019 n = 1,832	2020–2021 n = 2,159	p-value**
Overall rate (homicides per 100,000 women)	**0.96**	**0.97**	**0.95**	**0.39**
Victim characteristics				
Age, yrs, median (IQR)	**38 (29–50)**	**39 (29–50)**	**38 (29–50)**	**0.06**
Race and ethnicity				
Black or African American, non-Hispanic	**1,193 (29.9)**	501 (27.3)	692 (32.1)	<0.01
White, non-Hispanic	**1,968 (49.3)**	938 (51.2)	1,030 (47.7)	0.03
Hispanic or Latino	**590 (14.8)**	272 (14.8)	318 (14.7)	0.93
All others††	**240 (6.0)**	121 (6.6)	119 (5.5)	0.16
Suspect characteristics				
Suspect age, yrs, median (IQR)	**41 (31, 54)**	41 (32, 54)	40 (30, 53)	0.15
Male sex	**3,908 (98.5)**	1,797 (98.7)	2,111 (98.4)	0.48
History of abusing the victim	**811 (20.3)**	355 (19.4)	456 (21.1)	0.17
Homicide was direct result of suspect's mental illness§§	**238 (6.0)**	114 (6.2)	124 (5.7)	0.52
Suspected alcohol or substance use in hours preceding incident	**631 (15.8)**	303 (16.5)	328 (15.2)	0.25
Previous contact with law enforcement (past 12 mos)	**587 (14.7)**	230 (12.6)	357 (16.5)	<0.01
Incident characteristics				
Incident type				
Single-victim homicide	**2,451 (61.4)**	1,087 (59.3)	1,364 (63.2)	0.01
Single-victim homicide followed by suspect suicide	**1,151 (28.8)**	557 (30.4)	594 (27.5)	0.05
Multivictim homicide	**191 (4.8)**	83 (4.5)	108 (5.0)	0.50
Multivictim homicide followed by suspect suicide	**153 (3.8)**	80 (4.4)	73 (3.4)	0.12
All others¶¶	**45 (1.1)**	25 (1.4)	20 (0.9)	0.23
Selected precipitating circumstances* **				
Argument preceding incident	**1,700 (42.6)**	755 (41.2)	945 (43.8)	0.10
Injured at victim's residence	**2,714 (68.0)**	1,263 (68.9)	1,451 (67.2)	0.24
Jealousy or "love triangle"	**307 (7.7)**	165 (9.0)	142 (6.6)	<0.01
Method of injury				
Firearm	**2,660 (66.6)**	1,193 (65.1)	1,467 (67.9)	0.06
Sharp instrument	**598 (15.0)**	294 (16.0)	304 (14.1)	0.09
Personal and strangulation	**390 (9.8)**	188 (10.3)	202 (9.4)	0.34
Blunt instrument	**193 (4.8)**	81 (4.4)	112 (5.2)	0.27
All others†††	**150 (3.8)**	76 (4.1)	74 (3.4)	0.24

* Percentages might not sum to 100% because of rounding.
† Rates (intimate partner homicides per 100,000 women) were calculated using population data from CDC WONDER. Denominators for the rates for California, Illinois, Pennsylvania, and Texas represent the population of the counties from which the data were collected.
§ Incidents defined as intimate partner homicides reflected the following relationships between victim and suspected perpetrator: spouse, ex-spouse, girlfriend or boyfriend, ex-girlfriend or ex-boyfriend, and girlfriend or boyfriend with unknown current relationship status.
¶ Forty-five states reported statewide data. California, Illinois, Pennsylvania, and Texas reported data from selected counties representing a subset of their population during this period. Data for Florida were excluded because the data did not meet the completeness threshold for circumstances.
** Wilcoxon rank sum test was performed for continuous variables; Pearson's chi-square test was performed for categorical variables. P-values <0.05 were considered statistically significant.
†† Victims who were not Hispanic or Latino, Black or African American, or White were combined into a heterogenous group to avoid low count suppression. This group consisted of the following proportion of persons: 47.5% Asian or Pacific Islander, 30.0% American Indian or Alaska Native, 16.7% multiracial (two or more races or ethnicities), 5.4% other or unspecified race or ethnicity, and 0.8% of unknown race or ethnicity.
§§ Including alcohol problem, current depressed mood, current diagnosed mental health problem, current mental health or substance use treatment, history of ever being treated for mental health or substance use problem, other addiction, or other substance use problem. Complete variable definition available at https://pubmed.ncbi.nlm.nih.gov/37220104/.
¶¶ Includes multiple homicides followed by legal intervention deaths, mutual homicide/shootout, and other unclassified multiple deaths.
*** Denominator includes those homicides with one or more precipitating circumstances (3,984). The sums of percentages in columns exceed 100% because more than one circumstance could have been present per victim.
††† Includes poisoning, falls, explosives, drowning, fire or burns, shaking, motor vehicles including buses and motorcycles, other transport vehicles, intentional neglect, biological weapons, or other unclassified weapons.

partner homicide incidents who had contact with law enforcement during the preceding 12 months increased approximately 30%, suggesting a potential missed opportunity for prevention. These findings highlight the importance of a comprehensive approach to violence prevention such as that summarized in CDC's Prevention Resources for Action (https://www.cdc.gov/violence-prevention/php/resources-for-action). Future research is needed on the role that structural factors play in the risk for intimate partner homicide, including those related to risk for violence in general (*5*).

Summary

What is already known about this topic?

Stressors associated with the COVID-19 pandemic prompted concern about a possible increase in intimate partner violence.

What is added by this report?

The overall rate of intimate partner homicide among women remained stable from 2018–2019 to 2020–2021. However, during 2020–2021, the proportion of victims who were non-Hispanic Black or African American women increased, and suspects were more frequently previously known to law enforcement.

What are the implications for public health practice?

The exacerbation of racial disparities highlights the importance of comprehensive prevention efforts and further research into the influences of structural factors on intimate partner violence, including homicide. Contact with law enforcement represents a potential missed opportunity for preventing future violence.

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References

1. Evans ML, Lindauer M, Farrell ME. A pandemic within a pandemic—intimate partner violence during covid-19. N Engl J Med 2020;383:2302–4. PMID:32937063 https://doi.org/10.1056/NEJMp2024046
2. Smith E. Just the stats: female murder victims and victim-offender relationship, 2021. Washington, DC: US Department of Justice, Bureau of Justice Statistics; 2022. https://bjs.ojp.gov/female-murder-victims-and-victim-offender-relationship-2021.
3. McNeil A, Hicks L, Yalcinoz-Ucan B, Browne DT. Prevalence & correlates of intimate partner violence during COVID-19: a rapid review. J Fam Violence 2023;38:241–61. PMID:35368512 https://doi.org/10.1007/s10896-022-00386-6
4. Nguyen BL, Lyons BH, Forsberg K, et al. Surveillance for violent deaths—National Violent Death Reporting System, 48 states, the District of Columbia, and Puerto Rico, 2021. MMWR Surveill Summ 2024;73(No. SS-5):1–44. PMID:38980822 https://doi.org/10.15585/mmwr.ss7305a1
5. Armstead TL, Wilkins N, Nation M. Structural and social determinants of inequities in violence risk: a review of indicators. J Community Psychol 2021;49:878–906. PMID:31421656 https://doi.org/10.1002/jcop.22232

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