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Lifetime Prevalence of Self-Reported Work-Related Health Problems Among U.S. Workers — United States, 2018

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Approximately 2.8 million nonfatal workplace illnesses and injuries were reported in the United States in 2018 (*1*). Current surveillance methods might underestimate the prevalence of occupational injuries and illnesses (*2*,*3*). One way to obtain more information on occupational morbidity is to assess workers' perceptions about whether they have ever experienced health problems related to work (*4*). Occupational exposures might directly cause, contribute to, exacerbate, or predispose workers to various health problems (work-related health problems). CDC's National Institute for Occupational Safety and Health estimated the lifetime prevalence of self-reported, work-related health problems for the currently employed population overall and stratified by various demographic and job characteristics using data from the 2018 version of the SummerStyles survey. Overall, 35.1% of employed respondents had ever experienced a work-related health problem (95% confidence interval [CI] = 33.0%–37.3%). The most commonly reported work-related health problem was back pain (19.4%, 95% CI = 17.6%–21.2%). Among industries, construction (48.6%, 95% CI = 36.54%–60.58%) had the highest prevalence of any work-related health problems. Workplace injury and illness prevention programs are needed to reduce the prevalence of work-related health problems, especially in higher-risk industries.

The SummerStyles survey is one in a series of annual, online surveys conducted by the communications firm Porter Novelli Public Services using panelists recruited using probability-based sampling methods. It has been conducted since 1995 and evaluates respondents' beliefs about health topics including self-reported health problems (*5*). SummerStyles survey data have been demonstrated to be valid for reporting health outcomes when compared with the Behavioral Risk Factor Surveillance System (*5*,*6*).

In its 2018 survey, SummerStyles included questions about job characteristics of currently employed adults and whether respondents had experienced various types of work-related health problems. The survey was sent to 5,584 panelists; the response rate was 73.2%. The full survey sample included 4,088 adults aged ≥18 years. Work-related questions were only administered to adult respondents who described themselves as full-time paid employees, part-time paid employees, or self-employed, representing a sample of 2,425 for this analysis. Additional SummerStyles questions collect data on demographic characteristics including age, race, ethnicity, and

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education, as well as employment situation, industry sector, occupation category, and type of work arrangement.

Current workers who had ever experienced work-related health problems were identified by their response to the question "Have you ever experienced any of the following health problems related to any job you have ever held?" Respondents were asked to select all options that applied to them from a list of major categories of injuries and illnesses commonly related to work. This included 1) an injury that required medical treatment, 2) an injury that caused the respondent to miss work, 3) back pain, 4) other joint or muscle problem, 5) asthma or other lung condition, 6) hearing difficulty, 7) cancer, 8) mental health problem (e.g., depression), 9) skin condition, and 10) other health problem not listed. Respondents could also choose the option "no health problems related to work" or "I don't know." Point estimates and 95% CIs for the weighted* lifetime prevalence of any work-related health problem and specific types of work-related health problems among all workers were calculated. Prevalence ratios (PRs) were calculated to compare the prevalence of any work-related health problem across demographic and job characteristics. Analyses were performed using SAS statistical software (version 9.4; SAS Institute).

The overall lifetime prevalence of any work-related health problem was 35.1% (Table 1). The most commonly reported work-related health problem was back pain, reported by 19.4% of respondents; 14.7% of respondents reported a work-related injury that required medical treatment.

The prevalence of any work-related health problem did not vary significantly by sex; however, there was significant variation by age group, education, and race/ethnicity (Table 2). Respondents aged 55–64 years reported the highest prevalence of work-related health problems (41.3%), nearly twice that of persons aged 18–24 years (21.7%), and prevalences among all age groups except respondents aged ≥75 years were significantly higher than those of respondents aged 18–24 years. Non-Hispanic multiracial respondents had the highest prevalence of work-related health problems (49.1%). Prevalence among non-Hispanic blacks (39.9%) was also significantly higher compared with that of non-Hispanic other race respondents (28.2%). By educational attainment, prevalence was highest (39.2%) among respondents with less than a high school diploma and lowest (30.6%) among those with a bachelor's degree or higher. The prevalence of any work-related health problem did not vary significantly by occupation, or work arrangement, but did vary significantly by industry and employment situation. Compared with the referent (Education) prevalence ratios were significantly higher for the Construction (PR = 1.6; 95% CI = 1.2%–2.2%), Public Safety (PR = 1.5; 95% CI = 1.1%–2.0%), Service (excluding Public Safety and Food) (PR = 1.3; 95% CI = 1.0%–1.7%) and Social Assistance/Healthcare (PR = 1.3; 95% CI = 1.1%–1.7%) industries. By employment situation, prevalence was

* Weights were used to match the U.S. Current Population Survey proportions for gender, age, income, race, ethnicity, household size, education, U.S. Census region, and metro status.

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TABLE 1. Overall weighted* lifetime prevalence of work-related health problems — SummerStyles Survey, United States, 2018

Work-related health problem	Raw count (n = 2,425)†	Weighted % (95% CI)
Any work-related health problem	886	35.1 (33.0–37.3)
Back pain	488	19.4 (17.6–21.2)
Injury that required medical treatment	385	14.7 (13.2–16.3)
Injury that caused missed work	307	11.5 (10.1–12.9)
Other joint or muscle problem	286	10.9 (9.5–12.2)
Mental health problem (e.g., depression)	150	6.3 (5.1–7.4)
Other health problem not listed	66	2.9 (2.1–3.6)
Skin condition	61	2.5 (1.8–3.2)
Asthma or other lung condition	49	2.2 (1.4–2.9)
Hearing difficulty	59	1.8 (1.3–2.3)
Cancer	18	0.6 (0.32–0.9)

Abbreviation: CI = confidence interval.
* By gender, age, income, race, ethnicity, household size, education, U.S. Census region, and metro status, using U.S. Current Population Survey proportions.
† Question responses were not mutually exclusive; therefore, totals do not sum to 2,425.

significantly higher among self-employed respondents (PR = 1.3; 95% CI = 1.1%–1.6%) than among part-time paid employees (referent group).

Discussion

A history of self-reported, work-related injury or illness is common in the working population; approximately one in three currently employed workers reported having experienced at least one health problem related to work during their lifetime. In this online panel survey, the prevalence of self-reported, work-related health problems varied by industry, employment situation, and certain demographic characteristics.

The current study provides the broadest published estimate of the total lifetime prevalence of occupational morbidity in the United States. This estimate is similar to findings from the 2005 European Working Conditions Survey, which estimated that an average of 35% of workers across 27 European Union countries reported that their work affected their health (*7*). An occupational health supplement to the 1988 National Health Interview Survey found that the overall prevalence of any of a set of 13 work-related chronic conditions was 7.5% among U.S. adults who had ever worked; however, that study did not include work-related injuries or acute illnesses and has not been repeated. Most studies focus on specific work-related health outcomes or exposures, not the overall prevalence of occupational morbidity (*8*). Available research on the overall occurrence of occupational morbidity typically estimates annualized incidence rates. The Bureau of Labor Statistics (BLS) reported an incidence rate of 2.8 cases per 100 full-time equivalent workers in 2018 (*1*). BLS estimates are based on employer reporting of certain types of injuries and illnesses. A 2019 study added to BLS estimates by combining additional resources to account for limitations in the BLS's scope and incorporating attributable fractions to estimate additional types of work-related illnesses and injuries but was still limited to annual incidence estimates (*9*). The current study uniquely estimates lifetime (or cumulative) work-related morbidity and provides complementary industry and occupation-specific estimates of total nonfatal work-related health problems among currently working adults in the United States.

The findings in this report are subject to at least four limitations. First, the data are self-reported, so there is potential for recall and response bias. If a respondent developed a work-related health problem early in their employment, they might be less likely to recall a problem compared with a respondent who either recently experienced or received a diagnosis of a health problem. Depending on how respondents view the survey, they might also be more inclined or less inclined to report that they had a work-related health problem. Second, only those persons who were currently employed were included in the study, so the results could underestimate the prevalence of occupational health problems in the entire population. Third, variance might be underestimated because no sample design variables were available from SummerStyles. Finally, there were small numbers within certain groups such as workers paid by temporary agencies, resulting in very wide confidence intervals for estimates for these subgroups.

Occupational health surveillance relies on data from a variety of sources, including employer-based reporting, public health case reporting, workers' compensation claims, health care records, and population-based surveys. All of these sources have limitations, and surveillance research is needed to determine how their use for occupational health surveillance can be improved (*10*). This is one of the few studies that estimates the lifetime prevalence of total work-related health problems and compares them among different industries. Although this

Summary

What is already known about this topic?

Workers are subject to injury and illness related to their work. Current surveillance methods likely underestimate the prevalence of occupational injuries and illnesses in the population.

What is added by this report?

A history of perceived work-related injury or illness is common among the working population (35.1%), and the prevalence varies by employment situation, industry of employment, and some demographic characteristics.

What are the implications for public health practice?

Workplace injury and illness prevention programs are needed to prevent work-related health problems, such as back pain, and reduce the number of health problems in higher-risk industries such as construction.

TABLE 2. Weighted* prevalences and prevalence ratios of work-related health problems stratified by demographic and work characteristics — SummerStyles Survey, United States, 2018

Characteristic	Raw count (n = 2,425)†	Weighted % of work-related health problems (95% CI)	PR (95% CI)
Sex			
Men	1,307	36.7 (33.7–39.7)	1.1 (1.0–1.2)
Women	1,118	33.3 (30.2–36.4)	Referent
Age group (yrs)			
18–24	107	21.7 (13.8–29.6)	Referent
25–34	445	34.5 (29.7–39.3)	1.6 (1.2–2.0)
35–44	553	34.6 (30.2–38.9)	1.6 (1.2–2.0)
45–54	593	39.5 (35.1–43.9)	1.8 (1.4–2.3)
55–64	568	41.3 (37.0–45.6)	1.9 (1.5, 2.4)
65–74	139	33.0 (25.0–40.9)	1.5 (1.1–2.1)
≥75	20	29.1 (8.4–49.8)	1.3 (0.6–3.0)
Race/Ethnicity			
White, non-Hispanic	1,766	35.2 (32.7–37.6)	1.2 (1.0 1.6)
Black, non-Hispanic	218	39.9 (32.8–46.9)	1.4 (1.1–1.9)
Other, non-Hispanic	128	28.2 (19.8–36.5)	Referent
Hispanic	239	33.8 (27.2–40.4)	1.2 (0.9–1.6)
Multiracial, non-Hispanic	74	49.1 (36.6–61.6)	1.7 (1.1–2.6)
Education			
Less than high school	81	39.2 (27.4–51.0)	1.3 (1.0–1.6)
High school	558	38.7 (34.1–43.3)	1.3 (1.1–1.5)
Some college	682	37.3 (33.2–41.3)	1.2 (1.1–1.4)
Bachelor's degree or higher	1,104	30.6 (27.6–33.6)	Referent
Employment situation			
Full-time paid employee	1,814	35.3 (32.8–38.2)	1.1 (1.0–1.3)
Part-time paid employee	383	31.6 (26.4–36.8)	Referent
Self-employed	228	41.2 (33.9–48.4)	1.3 (1.1–1.6)
Industry			
Construction	89	48.6 (36.5–60.6)	1.6 (1.2–2.2)
Manufacturing	191	35.4 (27.6–43.2)	1.2 (0.9–1.6)
Wholesale or Retail Trade	196	35.1 (27.5–42.8)	1.2 (0.9–1.5)
Education	285	29.8 (23.9–35.7)	Referent
Food service	127	38.3 (28.7–47.9)	1.3 (1.0–1.7)
Public Safety	68	43.3 (30.1–56.6)	1.5 (1.1–2.0)
Service, excluding Public Safety or Food	278	38.9 (32.4–45.4)	1.3 (1.0–1.7)
Mining, Oil or Gas Extraction and Agriculture, Forestry, or Fishing	64	40.6 (25.9–55.2)	1.4 (1.0–1.9)
Transportation, Warehousing or Utilities	112	39.1 (28.7–49.5)	1.3 (1.0–1.8)
Other sector/None of the above	662	29.0 (25.1–32.9)	1.0 (0.8–1.2)
Social assistance and Healthcare	352	39.4 (33.7–45.2)	1.3 (1.1,1.7)
Occupation			
Manager	444	38.7 (33.5–43.8)	1.3 (1.0–1.6)
Professional	793	32.6 (28.9–36.3)	1.1 (0.8–1.3)
Community/Social Service	78	38.6 (26.0–51.3)	0.9 (0.7–1.0)
Services	358	38.2 (32.4–44.0)	1.2 (1.0–1.6)
Sales	181	30.8 (23.2–38.4)	Referent
Production and related	152	37.5 (28.9–46.1)	1.2 (0.9–1.6)
Other/None of the above	416	34.0 (28.8–39.2)	1.1 (0.9–1.4)
Work arrangement			
Independent contractor, independent consultant, or freelance worker	223	41.9 (34.6–49.2)	1.3 (1.0 1.8)
Paid by a temporary agency	35	37.5 (18.8–56.1)	1.2 (0.8–1.8)
Work for a contractor who provides workers and services to others under contract	77	39.1 (26.6–51.6)	1.2 (0.9–1.7)
Regular, permanent employee (standard work arrangement)	1,953	34.4 (32.1–36.8)	1.1 (0.8–1.4)
Some other work arrangement	134	31.8 (22.7–40.9)	Referent

Abbreviations: CI = confidence interval; PR = prevalence ratio.
* By gender, age, income, race, ethnicity, household size, education, U.S. Census region, and metro status, using U.S. Current Population Survey proportions.
† Some categories do not sum to the total because of missing values.

study provides new information, more could be done to measure occupational morbidity. Studies using samples weighted specifically to be representative of industry and occupation groups and larger sample sizes are needed to more accurately represent the distribution of work-related health problems. Because respondents who left the workforce because of a work-related health problem, retirement, family commitments, or other reasons were not captured by this analysis, these results are still not capturing the entirety of work-related illnesses and injuries in the United States. Work-related health problems likely represent a public health problem that is larger than is assumed because of lack of information. Workplace prevention programs should be considered to decrease work-related health problems, especially in the higher prevalence industries of Construction, Public Safety, Service (excluding Public Safety and Food), and Social Assistance and Healthcare.

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Antiretroviral Therapy and Viral Suppression Among Active Duty Service Members with Incident HIV Infection — United States, January 2012–June 2018

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Human immunodeficiency virus (HIV) infection is a deployment-limiting medical condition for U.S. armed forces in the Department of Defense (DoD) (*1*). HIV management using contemporary antiretroviral therapy (ART) regimens permits effective suppression of viremia among persons in clinical care. Although service members with HIV infection can remain in military service, treatment outcomes have not been fully described. Data from the Defense Medical Surveillance System (DMSS) were analyzed to estimate ART use and viral suppression among DoD service members with diagnosed HIV infection during January 2012–June 2018 (*2*). Among 1,050 service members newly diagnosed with HIV infection during January 1, 2012–December 31, 2017, 89.4% received ART within 6 months of HIV diagnosis, 95.4% within 12 months, and 98.7% by the end of the surveillance period on June 30, 2018. Analyses determined that, among 793 persons who initiated ART and remained in military service for ≥1 year, 93.8% received continuous ART, 99.0% achieved viral suppression within 1 year after ART initiation, and 96.8% were virally suppressed at receipt of their last viral load test. The DoD model of HIV care demonstrates that service members with HIV infection who remain in care receive timely ART and can achieve both early and sustained viral suppression.

DoD routinely screens its service members for HIV infection to ensure force health protection and to protect the battlefield blood supply (*1*). All active duty service members with HIV infection receive care through the Military Health System and can be retained in service if they can perform their duties. Clinical evaluations are performed by military infectious disease physicians following diagnosis of HIV infection and at least every 6 to 12 months thereafter.

Demographic information, military service personnel records, and laboratory data were extracted from the DMSS, which maintains longitudinal service-related and clinical surveillance data for all personnel throughout their military service. All cases of incident HIV infection occurring among active duty service members during January 1, 2012–December 31, 2017, were identified from surveillance data validated against HIV case lists maintained by each military service. Activated reservists and National Guard members were excluded because DMSS does not record accurate follow-up time for reserve or National Guard members. Pharmacy records for dispensed ART prescriptions were obtained from the DoD Pharmacy Data Transaction Service. This analysis was conducted by the Armed Forces Health Surveillance Branch as part of routine medical surveillance efforts on the health outcomes of service members living with HIV infection. Because the branch was conducting this analysis in its capacity as a public health authority providing medical surveillance support to DoD policymakers, institutional review board approval was not required.

ART initiation was assessed for 1,050 service members with incident HIV infection who remained in service for ≥6 months after diagnosis. ART initiation was defined as dispensation of an initial ART prescription during a specified time frame following diagnosis of HIV infection (within 6 months, within 12 months, or by the end of the study period).

Among 1,050 service members with incident HIV infection, 243 (23.1%) were excluded from analysis of continuous ART and viral suppression because of inadequate follow-up time (206; 19.6%) or incomplete viral load testing (37; 3.5%) and an additional 14 (1.3%) because ART history was missing, leaving 793 (75.5%) service members with incident HIV infection and at least 1 year of follow-up for analysis.* The 243 service members who initiated ART but were not included in additional analysis for continuous ART and viral suppression were similar demographically to the 793 who were included and had no evidence of being immunocompromised (median baseline CD4 count = 513 [interquartile range (IQR) = 386–659] cells/μL).

Continuous receipt of ART and viral suppression were assessed among the 793 persons who remained in service for at least 1 year after ART initiation and who had documented viral suppression within 6 months of ART initiation or a viral load test 6–12 months after ART initiation. Continuous ART was defined as dispensation of at least a 6 months' supply of ART within 6 months of initiating ART. Viral suppression was defined as a viral load measurement of <200 copies of HIV RNA per mL within 1 year of ART initiation. Viral suppression was also reported at the last viral load test during follow-up 1 year after ART initiation and at the last viral load

* Chart review determined that among the 14 persons without documentation of ART receipt, four received ART through civilian care, three were "elite controllers" who had spontaneous viral suppression without ART, three refused ART, three started ART after the end of the surveillance period, and one had provider documentation stating "no indication" because of a CD4 count >500 cells/μL.

test of the surveillance period. In addition, viral suppression was calculated for each year of follow-up after HIV diagnosis, as the percentage of service members whose last viral load test during each year of follow-up was <200 copies of HIV RNA per mL, among service members with at least one viral load test during that follow-up year.

The median interval from diagnosis of HIV infection to the first viral load test indicating viral suppression was also calculated overall and stratified by year of HIV diagnosis. In addition, the overall median interval from HIV diagnosis to the last viral load test in the surveillance period was calculated. Median CD4 counts were calculated at baseline and at the last CD4 test during the surveillance period. SAS statistical software (version 9.4; SAS Institute) was used for all analyses.

Among 1,050 service members with incident HIV infection, 939 (89.4%) initiated ART within 6 months of diagnosis, 1,002 (95.4%) within 12 months, and 1,036 (98.7%) by the end of the surveillance period (Table 1). ART initiation within 6 months of diagnosis was more common among older service members, males, and those in the Air Force (Table 1). Initial ART regimens were anchored by integrase strand transfer inhibitors (63.0%), nonnucleoside reverse transcriptase inhibitors (28.2%), protease inhibitors (6.2%), or other combinations of these agents with or without nucleoside reverse transcriptase inhibitors (2.6%). After exclusion of the 243 service members with inadequate follow-up or viral load testing and the 14 with missing history of ART, among the remaining 793 service members, 744 (93.8%) received continuous ART, and 785 (99.0%) had at least one viral load result indicating viral suppression within 1 year after ART initiation (Table 2). Continuous receipt of ART was more prevalent among older service members, non-Hispanic whites, non-Hispanic blacks, males, officers, and pilot/aircrew personnel, compared with their respective counterparts. A high percentage of viral load suppression within 1 year after ART initiation (>96%) was achieved among all demographic subgroups. A total of 772 (97.4%) service members were virally suppressed at their last viral load test during follow-up 1 year after ART initiation and 768 (96.8%) were virally suppressed at their last viral load test of the surveillance period (Table 2). The percentage of service members with HIV infection who achieved viral suppression ranged from 91.6% of 787 persons in the first year of follow-up to 100% of 15 persons in the seventh year (Table 3). The interval from HIV diagnosis to first viral load test indicating viral suppression ranged from 6.9 months (IQR = 4.9–10.9) in 2012 to 2.9 months (IQR = 2.5–4.3) in 2017 (median = 4.6 months ([IQR = 2.9–7.2]). The median CD4 count at baseline was 486 cells/μL (IQR = 342–625) and 717 (IQR = 565–909) at the last test during the surveillance period.

Discussion

In 2014, based on surveillance data, CDC indicated that 96% of adults with HIV infection in the United States receiving outpatient medical care self-reported currently taking ART, and 98% reported ever taking ART (*3*). In addition, national data indicate that 81.5% to 85.9% of persons engaged in HIV clinical care during 2016–2017 were virally suppressed at their last test (*4*,*5*). Findings from the current analysis suggest that a high percentage of active duty service members receive ART and achieve viral suppression. The Military Health System permits free universal access for active duty service members throughout all aspects of the HIV care continuum, such as routine testing, specialty care evaluations, laboratory monitoring, and ART. The DoD model of HIV care demonstrates that ART and viral suppression goals can be achieved among a segment of the U.S. population who receive clinical care in a large health care system, despite high mobility and geographic dispersal.

Viral suppression among U.S. service members with HIV infection has increased over time. A study of Air Force service members with HIV infection found that 93% attained viral suppression 1 year after ART initiation during 2006–2011, an increase from 78.6% during 2000–2005 (*6*). The U.S. Military HIV Natural History Study, an observational study of military service members and beneficiaries with HIV infection, determined that viral suppression at 1 year after diagnosis among active duty patients who initiated ART during 2000–2007 was 84%, compared with 64% during 1996–1999 (*7*). Since the 1990s, duration of military service after diagnosis of HIV infection has increased substantially, and the number of AIDS-defining illnesses has decreased (*8*,*9*). The combination of more potent ART with fewer adverse effects and the increased availability of single-tablet regimens have likely contributed to improved outcomes, including the high ART uptake and levels of viral suppression noted in this analysis. In addition, the U.S. military mandates periodic evaluations for service members with HIV infection. DoD and service-specific HIV-related policies stipulate that progressive clinical illness or immune deficiency necessitates duty restrictions and, potentially, a referral for medical evaluation for continued service.[†,§,¶,**] Cumulatively, these policies likely enhance adherence to ART among service members with HIV infection. Viral suppression also has population-level benefits; a recent CDC study of HIV transmission along the continuum of care in 2016 reported that the Treatment as Prevention[††] strategy can effectively

[†] https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/648501p.pdf.
[§] https://www.med.navy.mil/sites/nmcphc/Documents/nbimc/648501p.pdf.
[¶] https://static.e-publishing.af.mil/production/1/af_sg/publication/afi44-178/afi44-178.pdf.
[**] https://www.army.mil/e2/downloads/rv7/r2/policydocs/r600_110.pdf.
[††] https://www.hiv.gov/tasp.

TABLE 1. Service members* who initiated antiretroviral therapy (ART) within 6 months, 12 months, or by the end of the surveillance period after diagnosis of incident human immunodeficiency virus (HIV) infection — U.S. Armed Forces, January 2012–June 2018

Characteristic† (total no.)	Time of ART initiation after HIV diagnosis no. (%)		
	6 mos	12 mos	Ever§
Total (1,050)	**939 (89.4)**	**1,002 (95.4)**	**1,036 (98.7)**
Sex			
Male (1,023)	916 (89.5)	976 (95.4)	1,009 (98.6)
Female (27)	23 (85.2)	26 (96.3)	27 (100.0)
Age group, yrs			
<20 (31)	27 (87.1)	29 (93.5)	30 (96.8)
20–29 (744)	659 (88.6)	709 (95.3)	733 (98.5)
30–39 (224)	204 (91.1)	215 (96.0)	222 (99.1)
40–49 (44)	42 (95.5)	42 (95.5)	44 (100.0)
≥50 (7)	7 (100.0)	7 (100.0)	7 (100.0)
Race/Ethnicity			
White, non-Hispanic (296)	271 (91.6)	283 (95.6)	293 (99.0)
Black, non-Hispanic (483)	418 (86.5)	459 (95.0)	475 (98.3)
Hispanic (160)	150 (93.8)	155 (96.9)	159 (99.4)
Asian/Pacific Islander (30)	27 (90.0)	30 (100.0)	30 (100.0)
Other/Unknown (81)	73 (90.1)	75 (92.6)	79 (97.5)
Marital status			
Married (352)	318 (90.3)	338 (96.0)	349 (99.1)
Single (659)	587 (89.1)	627 (95.1)	648 (98.3)
Other (39)	34 (87.2)	37 (94.9)	39 (100.0)
Service			
Army (422)	348 (82.5)	394 (93.4)	414 (98.1)
Navy (345)	322 (93.3)	335 (97.1)	343 (99.4)
Air Force (190)	187 (98.4)	187 (98.4)	188 (98.9)
Marine Corps (93)	82 (88.2)	86 (92.5)	91 (97.8)
Rank			
Enlisted (965)	861 (89.2)	920 (95.3)	951 (98.5)
Officer (85)	78 (91.8)	82 (96.5)	85 (100.0)
Occupation			
Combat-specific (105)	91 (86.7)	99 (94.3)	103 (98.1)
Motor transport (51)	46 (90.2)	49 (96.1)	50 (98.0)
Pilot/Aircrew (16)	14 (87.5)	14 (87.5)	15 (93.8)
Repair/Engineer (264)	244 (92.4)	256 (97.0)	261 (98.9)
Communications/Intelligence (305)	273 (89.5)	290 (95.1)	300 (98.4)
Health care (127)	111 (87.4)	121 (95.3)	127 (100.0)
Other (182)	160 (87.9)	173 (95.1)	180 (98.9)

* Service members were required to have at least 6 months follow-up time after diagnosis of incident HIV infection.
† All demographic and military characteristics ascertained at the time of incident HIV infection diagnosis.
§ By June 30, 2018.

eliminate secondary sexual transmission of HIV from persons virally suppressed on ART (*10*).

The findings in this report are subject to at least two limitations. First, records of dispensed ART medications were used to estimate ART initiation and continued use; no data on adherence were available. However, viral load determinations following ART dispensation suggest a high level of adherence. Second, DoD service members constitute an open population with varying entry and exit dates; therefore, rates of ART use and viral suppression could only be assessed for persons who remained in service during specified periods.

DoD embodies a contemporary national model of successful HIV care, given the high uptake of HIV treatment and achievement of viral suppression by its service members. DoD will continue to review its policies and the scientific literature and report findings of health outcomes among service members living with HIV infection.

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TABLE 2. Continuous antiretroviral therapy (ART)*,† and viral suppression within 1 year after ART initiation and at last viral load test during the surveillance period,§ among active duty service members in military human immunodeficiency virus (HIV) care¶ — U.S. Armed Forces, January 2012–June 2018

Characteristic (total no.)	No. (%)		
	Continuous ART	Viral suppression within 1 year	Viral suppression, last test
Total (793)	**744 (93.8)**	**785 (99.0)**	**768 (96.8)**
Sex			
Male (771)	728 (94.4)	763 (99.0)	746 (96.8)
Female (22)	16 (72.7)	22 (100.0)	22 (100.0)
Age group, yrs			
<20 (23)	22 (95.7)	23 (100.0)	20 (87.0)
20–29 (553)	512 (92.6)	547 (98.9)	534 (96.6)
30–39 (178)	171 (96.1)	176 (98.9)	175 (98.3)
40–49 (35)	35 (100.0)	35 (100.0)	35 (100.0)
≥50 (4)	4 (100.0)	4 (100.0)	4 (100.0)
Race/Ethnicity			
White, non-Hispanic (207)	199 (96.1)	206 (99.5)	203 (98.1)
Black, non-Hispanic (370)	355 (95.9)	365 (98.6)	357 (96.5)
Hispanic (137)	118 (86.1)	135 (98.5)	132 (96.4)
Asian/Pacific Islander (23)	19 (82.6)	23 (100.0)	23 (100.0)
Other/Unknown (56)	53 (94.6)	56 (100.0)	53 (94.6)
Marital status			
Married (257)	241 (93.8)	256 (99.6)	254 (98.8)
Single (507)	474 (93.5)	501 (98.8)	485 (95.7)
Other (29)	29 (96.6)	28 (96.6)	29 (100.0)
Service			
Army (300)	278 (92.7)	295 (98.3)	292 (97.3)
Navy (277)	257 (92.8)	274 (98.9)	266 (96.0)
Air Force (149)	144 (96.6)	149 (100.0)	143 (96.0)
Marine Corps (67)	65 (97.0)	67 (100.0)	67 (100.0)
Rank			
Enlisted (724)	675 (93.2)	716 (98.9)	699 (96.5)
Officer (69)	69 (100.0)	69 (100.0)	69 (100.0)
Occupation			
Combat-specific (74)	72 (97.3)	73 (98.6)	73 (98.6)
Motor transport (37)	34 (91.9)	36 (97.3)	36 (97.3)
Pilot/Aircrew (11)	11 (100.0)	11 (100.0)	11 (100.0)
Repair/Engineer (213)	202 (94.8)	212 (99.5)	209 (98.1)
Communications/Intelligence (231)	212 (91.8)	227 (98.3)	222 (96.1)
Health care (103)	95 (92.2)	102 (99.0)	99 (96.1)
Other (124)	118 (95.2)	124 (100.0)	118 (95.2)

* Continuous ART was defined as having been dispensed at least 180 days' supply of ART medications within 6 months of initiating ART.
† Service members were required to have at least 1-year follow-up time after ART initiation. In addition, they must have been virally suppressed within 6 months of ART initiation or have a viral load test on file from 6 to 12 months after ART initiation.
§ Viral suppression was defined as having a viral load <200 copies of HIV RNA per mL according to any viral load test that was performed within 1 year after ART initiation.
¶ All demographic/military characteristics measured at the time of incident HIV diagnosis.

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TABLE 3. Viral suppression among active duty service members in military human immunodeficiency virus (HIV) care (N = 793),* by year of follow-up — U.S. Armed Forces, January 1, 2012–June 30, 2018

No. of follow-up† yrs	No. with ≥1 viral load test	No. (%) virally suppressed§
1	787¶	721 (91.6)
2	727	705 (97.0)
3	511	500 (97.8)
4	315	305 (96.8)
5	182	177 (97.3)
6	78	76 (97.4)
7	15	15 (100.0)

* Service members were required to have at least 1 year of follow-up after ART initiation and to have been virally suppressed within 6 months of ART initiation or have a viral load test on file from 6 to 12 months after ART initiation.
† After diagnosis of HIV infection.
§ Last viral load of each follow-up year <200 copies of HIV RNA per mL.
¶ No. of persons who had a viral load test within 1 year of HIV diagnosis = 787 of 793.

Summary

What is already known about this topic?

U.S. Department of Defense (DoD) service members with human immunodeficiency virus (HIV) infection can remain in military service; however, treatment outcomes have not been fully described.

What is added by this report?

During January 2012–June 2018, 93.8% of service members with HIV infection who remained in care received continuous antiretroviral therapy (ART). Viral suppression was achieved in 99.0% within 1 year of ART initiation and in 96.8% at the last test during the surveillance period.

What are the implications for public health practice?

The DoD model of HIV care demonstrates that the goals of high ART uptake and viral suppression can be achieved and maintained in a large health care system.

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Nonfatal Drug Overdoses Treated in Emergency Departments — United States, 2016–2017

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In 2017, drug overdoses caused 70,237 deaths in the United States, a 9.6% rate increase from 2016 (*1*). Monitoring nonfatal drug overdoses treated in emergency departments (EDs) is also important to inform community prevention and response activities. Analysis of discharge data provides insights into the prevalence and trends of nonfatal drug overdoses, highlighting opportunities for public health action to prevent overdoses. Using discharge data from the Healthcare Cost and Utilization Project's (HCUP) Nationwide Emergency Department Sample (NEDS), CDC identified nonfatal overdoses for all drugs, all opioids, nonheroin opioids, heroin, benzodiazepines, and cocaine and examined changes from 2016 to 2017, stratified by drug type and by patient, facility, and visit characteristics. In 2017, the most recent year for which population-level estimates of nonfatal overdoses can be generated, a total of 967,615 nonfatal drug overdoses were treated in EDs, an increase of 4.3% from 2016, which included 305,623 opioid-involved overdoses, a 3.1% increase from 2016. From 2016 to 2017, the nonfatal overdose rates for all drug types increased significantly except for those involving benzodiazepines. These findings highlight the importance of continued surveillance of nonfatal drug overdoses treated in EDs to inform public health actions and, working collaboratively with clinical and public safety partners, to link patients to needed recovery and treatment resources (e.g., medication-assisted treatment).

The 2017 HCUP NEDS data set is a nationally representative, stratified sample of ED visits from nonfederal, hospital-based EDs in 36 U.S. states and the District of Columbia.* Hospital discharge data represent the reference standard in nonfatal overdose surveillance and allow generation of population-level estimates to examine rate changes over time. Using 2016 and 2017 NEDS data, six drug overdose indicators were classified using *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD-10-CM) discharge diagnosis codes: 1) all-drugs, 2) all opioids, 3) nonheroin opioids, 4) heroin, 5) benzodiazepines, and 6) cocaine. All diagnosis fields were searched for initial encounter† visits for intent (i.e., unintentional, intentional self-harm, assault, and undetermined).§ Polysubstance overdoses could be classified under multiple overdose indicators; thus, groups are not mutually exclusive.

Annual rates for drug overdose per 100,000 population were calculated by sex, age group, U.S. Census region of facility,¶ county urbanization level of facility,** and intent. All rates, except age group, were age-adjusted.†† Absolute and relative rate changes§§ were calculated from 2016 to 2017 by patient, facility, and visit characteristics for each overdose indicator; z-tests were used to compare changes that occurred from 2016 to 2017 and for pairwise comparisons between groups for 2017 rates, with p-values <0.05 considered statistically significant. Only selected comparisons were tested for statistical significance, and all results presented were statistically significant. Analyses were conducted using SAS (version 9.4; SAS Institute) to account for HCUP's complex survey design and weighting.

In 2017, there were 967,615 nonfatal drug overdose ED visits (300.2 per 100,000 population) (Table 1). From 2016 to 2017, rates for nonfatal overdoses increased for those involving all drugs (4.3%), all opioids (3.1%), nonheroin opioids (3.6%), heroin (3.6%), and cocaine (32.9%), whereas the rate for overdoses involving benzodiazepines decreased 5.2% (Table 1) (Table 2) (Table 3).

In 2017, the highest overdose rates for all drugs were among females (308.2), persons aged 15–34 years

* https://www.hcup-us.ahrq.gov/db/nation/neds/NEDS2017Introduction.pdf.

† https://www.cdc.gov/injury/wisqars/pdf/ICD-10-CM_External_Cause_Injury_Codes-a.pdf.

§ Intent was set to missing for ED visits with multiple overdose intents listed for any of the ICD-10-CM diagnosis codes.

¶ Facility geographic regions were derived from U.S. Census regions: https://www.hcup-us.ahrq.gov/db/vars/hosp_region/nedsnote.jsp. *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *Midwest:* Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South:* Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West:* Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

** County urbanization levels for facilities were determined using the 2013 NCHS Urban-Rural Classification Scheme for Counties. https://www.cdc.gov/nchs/data_access/urban_rural.htm.

†† Age-adjusted rates were calculated using the 2000 U.S. Census standard population age distribution. All rates were calculated per 100,000 population. Crude rates were rounded to one decimal place before age-adjusting, and statistical testing was completed using rates rounded to one decimal place and standard errors rounded to three decimal places.

§§ Absolute rate change is the difference in rates from 2016 to 2017. Relative change is the absolute rate change divided by the 2016 rate, multiplied by 100.

TABLE 1. Annual number and age-adjusted rate* of emergency department visits[†] for nonfatal overdoses involving all drugs[§] and nonfatal overdoses involving all opioids,[¶] by patient, facility, and visit characteristics — United States, 2016 and 2017

	All drugs[§]						All opioids[¶]					
	2016		2017		Change from 2016 to 2017**		2016		2017		Change from 2016 to 2017**	
Characteristic	No.	Rate (SE)	No.	Rate (SE)	Absolute rate change	Relative rate change	No.	Rate (SE)	No.	Rate (SE)	Absolute rate change	Relative rate change
All	**921,337**	**287.9 (0.304)**	**967,615**	**300.2 (0.310)**	**12.3**	**4.3[††]**	**293,900**	**90.2 (0.169)**	**305,623**	**93.0 (0.171)**	**2.8**	**3.1[††]**
Sex												
Male	443,132	278.5 (0.424)	469,426	292.4 (0.432)	13.9	5.0[††]	172,609	107.5 (0.262)	182,169	112.6 (0.268)	5.1	4.7[††]
Female	478,026	297.1 (0.438)	498,064	308.2 (0.445)	11.1	3.7[††]	121,223	72.5 (0.213)	123,428	73.1 (0.213)	0.6	0.8[††]
Age group (yrs)												
0–14	93,923	154.0 (0.503)	92,945	152.3 (0.500)	−1.7	−1.1[††]	3,918	6.4 (0.103)	3,721	6.1 (0.100)	−0.3	−4.7[††]
15–19	94,134	445.5 (1.452)	100,666	476.4 (1.501)	30.9	6.9[††]	8,426	39.9 (0.434)	7,541	35.7 (0.411)	−4.2	−10.5[††]
20–24	95,313	425.9 (1.379)	94,476	427.1 (1.390)	1.2	0.3	35,679	159.4 (0.844)	31,865	144.1 (0.807)	−15.3	−9.6[††]
25–34	189,474	424.1 (0.974)	202,987	447.7 (0.994)	23.6	5.6[††]	89,090	199.4 (0.668)	94,915	209.3 (0.679)	9.9	5.0[††]
35–44	130,904	323.5 (0.894)	141,605	346.4 (0.921)	22.9	7.1[††]	50,084	123.8 (0.553)	54,223	132.7 (0.570)	8.9	7.2[††]
45–54	125,147	292.5 (0.827)	127,210	300.2 (0.842)	7.7	2.6[††]	43,589	101.9 (0.488)	44,533	105.1 (0.498)	3.2	3.1[††]
55–64	99,521	240.0 (0.761)	108,543	258.5 (0.785)	18.5	7.7[††]	37,773	91.1 (0.469)	41,246	98.2 (0.484)	7.1	7.8[††]
≥65	92,921	188.7 (0.619)	99,183	195.0 (0.619)	6.3	3.3[††]	25,341	51.5 (0.323)	27,579	54.2 (0.327)	2.7	5.2[††]
U.S. Census region[§§]												
Northeast	162,663	293.6 (0.742)	163,785	293.6 (0.741)	0.0	0.0	66,993	120.0 (0.472)	63,742	113.0 (0.457)	−7	−5.8[††]
Midwest	235,882	356.7 (0.746)	250,181	378.6 (0.770)	21.9	6.1[††]	79,534	119.7 (0.432)	86,002	129.2 (0.449)	9.5	7.9[††]
South	343,134	283.0 (0.490)	358,356	292.0 (0.495)	9.0	3.2[††]	104,092	84.2 (0.265)	110,478	88.6 (0.271)	4.4	5.2[††]
West	179,658	233.5 (0.558)	195,293	252.3 (0.578)	18.8	8.1[††]	43,280	54.0 (0.263)	45,402	56.1 (0.267)	2.1	3.9[††]
County urbanization level[¶¶]												
Large central metro	250,565	249.5 (0.505)	284,375	278.6 (0.529)	29.1	11.7[††]	74,142	71.0 (0.264)	86,882	81.8 (0.282)	10.8	15.2[††]
Large fringe metro	202,228	257.0 (0.579)	199,486	251.8 (0.571)	−5.2	−2.0[††]	77,997	99.5 (0.361)	74,211	94.0 (0.350)	−5.5	−5.5[††]
Medium metro	214,132	323.1 (0.710)	228,701	343.2 (0.730)	20.1	6.2[††]	73,838	110.8 (0.416)	74,709	111.4 (0.416)	0.6	0.5
Small metro	93,891	326.6 (1.091)	92,991	322.5 (1.083)	−4.1	−1.3[††]	24,952	85.5 (0.556)	25,296	86.5 (0.558)	1.0	1.2
Micropolitan (nonmetro)	92,509	352.3 (1.187)	94,676	363.3 (1.210)	11.0	3.1[††]	25,877	97.3 (0.622)	26,256	100.4 (0.636)	3.1	3.2[††]
Noncore (nonmetro)	58,074	328.2 (1.409)	55,800	318.9 (1.396)	−9.3	−2.8[††]	12,780	69.7 (0.644)	13,414	74.5 (0.671)	4.8	6.9[††]
Intent* **												
Unintentional	580,671	178.9 (0.238)	622,351	189.9 (0.245)	11.0	6.1[††]	240,919	73.8 (0.153)	258,437	78.5 (0.157)	4.7	6.4[††]
Intentional self-harm	283,205	91.0 (0.173)	297,540	95.4 (0.177)	4.4	4.8[††]	33,823	10.5 (0.058)	31,682	9.8 (0.056)	−0.7	−6.7[††]
Assault	2,437	0.8 (0.016)	2,072	0.7 (0.015)	−0.1	−12.5[††]	248	0.1 (0.005)	189	0.1 (0.004)	0.0	0.0
Undetermined	49,404	15.4 (0.070)	39,764	12.4 (0.063)	−3.0	−19.5[††]	17,309	5.3 (0.041)	13,533	4.1 (0.036)	−1.2	−22.6[††]

Abbreviation: SE = standard error.

* Rates are age-adjusted using the direct method and the 2000 U.S. Census standard population, except for age-specific crude rates. All rates are per 100,000 population. Statistical testing was completed using rates rounded to 1 decimal place and standard errors rounded to 3 decimal places.

† Categories of nonfatal drug overdose visits are not mutually exclusive because overdose visits might involve more than one drug. Summing of categories will result in greater than the total number of visits in a year.

§ Nonfatal drug overdose visits are classified using the *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD–10-CM). ICD-10-CM diagnosis codes for all drugs included codes with T36-T50 with a sixth character of 1, 2, 3, or 4 (exceptions for T36.9, T37.9, T39.9, T41.4, T42.7, T43.9, T45.9, T47.9, and T49.9, which were included if the code had a fifth character of 1, 2, 3, or 4). Only codes with a seventh character of "A" (initial encounter) were included.

¶ ICD-10-CM diagnosis codes for all opioids included T40.0X1A–T40.0X4A, T40.1X1A–T40.1X4A, T40.2X1A–T40.2X4A, T40.3X1A–T40.3X4A, T40.4X1A–T40.4X4A, T40.601A–T40.604A, and T40.691A–T40.694A.

** Absolute rate change is the difference in rates from 2016 to 2017. Relative rate change is the absolute rate change divided by the 2016 rate, multiplied by 100. Z-tests were used to determine significance.

†† Statistically significant (p-value <0.05).

§§ Facility geographic regions were derived from U.S. Census regions: https://www.hcup-us.ahrq.gov/db/vars/hosp_region/nedsnote.jsp. *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *Midwest:* Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South:* Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West:* Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

¶¶ County urbanization levels for facilities were determined using the 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties. https://www.cdc.gov/nchs/data_access/urban_rural.htm.

*** In ICD-10-CM, the fifth or sixth character in the diagnosis code indicates intent. Possible values include accidental (unintentional), intentional self-harm, assault, undetermined intent, adverse effect, and underdosing. Adverse effect and underdosing are not applicable values for all of the different drug poisoning diagnosis codes. In this report, the intent was set to "Missing" for emergency department visits with multiple overdose intents listed.

(range = 427.1–476.4), persons in the Midwest (378.6), and persons in micropolitan (nonmetro) counties (363.3) (Table 1). From 2016 to 2017, overdose rates for all drugs increased 5.0% among males and 3.7% among females. The highest overdose rates for all opioids were among males (112.6), persons aged 25–34 years (209.3), persons in the Midwest (129.2), and persons in medium metro counties (111.4). Rates for all opioid overdoses decreased 4.7% among persons aged 0–14 years, 10.5% in persons aged 15–19 years, and 9.6% among persons aged 20–24 years. In the Midwest, overdose rates for all drugs increased by 6.1% and for all opioids by 7.9%; in the South rates for all drugs and all opioids increased by 3.2% and 5.2%, respectively; and in the West by 8.1% and 3.9%, respectively.

TABLE 2. Annual number and age-adjusted rate[*] of emergency department visits[†] for nonfatal overdoses involving nonheroin opioids[§] and nonfatal overdoses involving heroin,[¶] by patient, facility, and visit characteristics — United States, 2016 and 2017

	Nonheroin opioids[§]						Heroin[¶]					
	2016		2017		Change from 2016 to 2017[**]		2016		2017		Change from 2016 to 2017[**]	
Characteristic	No.	Rate (SE)	No.	Rate (SE)	Absolute rate change	Relative rate change	No.	Rate (SE)	No.	Rate (SE)	Absolute rate change	Relative rate change
All	**139,326**	**41.3 (0.113)**	**145,363**	**42.8 (0.115)**	**1.5**	**3.6[††]**	**147,720**	**46.9 (0.123)**	**154,626**	**48.6 (0.125)**	**1.7**	**3.6[††]**
Sex												
Male	68,034	41.6 (0.162)	73,113	44.5 (0.167)	2.9	**7.0[††]**	101,442	64.1 (0.204)	106,466	66.7 (0.207)	2.6	4.1[††]
Female	71,244	40.8 (0.157)	72,236	40.9 (0.156)	0.1	0.2	46,258	29.6 (0.139)	48,146	30.5 (0.141)	0.9	3.0[††]
Age group (yrs)												
0–14	3,575	5.9 (0.098)	3,480	5.7 (0.097)	−0.2	−3.4	99	0.2 (0.016)	87	0.1 (0.015)	−0.1	−50.0[††]
15–19	5,165	24.4 (0.340)	5,017	23.7 (0.335)	−0.7	−2.9	3,111	14.7 (0.264)	2,437	11.5 (0.234)	−3.2	−21.8[††]
20–24	10,350	46.2 (0.455)	10,563	47.8 (0.465)	1.6	3.5[††]	25,113	112.2 (0.708)	21,326	96.4 (0.660)	−15.8	−14.1[††]
25–34	25,869	57.9 (0.360)	28,893	63.7 (0.375)	5.8	10.0[††]	62,398	139.7 (0.559)	65,445	144.3 (0.564)	4.6	3.3[††]
35–44	20,452	50.5 (0.353)	22,342	54.7 (0.366)	4.2	8.3[††]	28,621	70.7 (0.418)	30,972	75.8 (0.431)	5.1	7.2[††]
45–54	24,631	57.6 (0.367)	23,894	56.4 (0.365)	−1.2	−2.1[††]	17,452	40.8 (0.309)	19,612	46.3 (0.330)	5.5	13.5[††]
55–64	26,607	64.2 (0.393)	27,344	65.1 (0.394)	0.9	1.4	9,367	22.6 (0.233)	12,027	28.6 (0.261)	6.0	26.5[††]
≥65	22,678	46.1 (0.306)	23,831	46.9 (0.304)	0.8	1.7	1,558	3.2 (0.080)	2,720	5.3 (0.103)	2.1	65.6[††]
U.S. Census region[§§]												
Northeast	23,841	41.0 (0.272)	24,048	41.1 (0.272)	0.1	0.2	42,094	77.3 (0.382)	38,797	70.5 (0.364)	−6.8	−8.8[††]
Midwest	32,665	47.2 (0.267)	35,244	51.2 (0.279)	4.0	8.5[††]	45,744	70.9 (0.336)	50,004	77.0 (0.350)	6.1	8.6[††]
South	55,674	43.6 (0.188)	58,171	45.1 (0.191)	1.5	3.4[††]	46,039	38.8 (0.183)	50,278	42.0 (0.189)	3.2	8.2[††]
West	27,146	33.5 (0.206)	27,899	34.0 (0.207)	0.5	1.5	13,843	17.7 (0.152)	15,547	19.7 (0.160)	2.0	11.3[††]
County urbanization level[¶¶]												
Large central metro	35,096	33.6 (0.182)	39,954	37.6 (0.191)	4.0	11.9[††]	36,565	35.0 (0.186)	45,025	42.5 (0.203)	7.5	21.4[††]
Large fringe metro	32,213	39.0 (0.221)	32,207	39.0 (0.221)	0.0	0.0	44,890	59.5 (0.283)	41,175	54.2 (0.269)	−5.3	−8.9[††]
Medium metro	33,229	47.8 (0.268)	36,026	51.6 (0.278)	3.8	7.9[††]	39,216	61.1 (0.313)	37,316	57.8 (0.304)	−3.3	−5.4[††]
Small metro	13,761	45.3 (0.398)	13,693	44.5 (0.392)	−0.8	−1.8	10,358	37.4 (0.375)	11,031	40.1 (0.388)	2.7	7.2[††]
Micropolitan (nonmetro)	14,771	52.3 (0.446)	13,435	47.9 (0.429)	−4.4	−8.4[††]	10,522	43.0 (0.425)	12,330	50.8 (0.463)	7.8	18.1[††]
Noncore (nonmetro)	8,896	45.5 (0.508)	8,588	43.8 (0.498)	−1.7	−3.7[††]	3,365	21.5 (0.375)	4,475	28.9 (0.437)	7.4	34.4[††]
Intent[***]												
Unintentional	103,785	30.4 (0.096)	113,392	33.1 (0.100)	2.7	8.9[††]	131,886	41.9 (0.117)	140,419	44.1 (0.119)	2.2	5.3[††]
Intentional self-harm	26,149	8.1 (0.051)	24,434	7.5 (0.049)	−0.6	−7.4[††]	6,700	2.1 (0.026)	6,517	2.1 (0.026)	0.0	0.0
Assault	127	0.04 (0.003)	63	0.02 (0.003)	−0.02	−50.0[††]	111	0.03 (0.003)	92	0.03 (0.003)	0.0	0.0
Undetermined	8,208	2.5 (0.028)	6,209	1.9 (0.024)	−0.6	−24.0[††]	8,447	2.7 (0.029)	6,909	2.2 (0.026)	−0.5	−18.5[††]

Abbreviation: SE = standard error.

* Rates are age-adjusted using the direct method and the 2000 U.S. Census standard population, except for age-specific crude rates. All rates are per 100,000 population. Statistical testing was completed using rates rounded to one decimal place and standard errors rounded to three decimal places.

† Categories of nonfatal drug overdose visits are not mutually exclusive because overdose visits might involve more than one drug. Summing of categories will result in greater than the total number of visits in a year.

§ Nonfatal drug overdose visits are classified using the *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD–10-CM). ICD-10-CM diagnosis codes for nonheroin opioids included T40.0X1A–T40.0X4A, T40.2X1A–T40.2X4A, T40.3X1A–T40.3X4A, T40.4X1A–T40.4X4A, T40.601A–T40.604A, T40.691A–T40.694A.

¶ ICD-10-CM diagnosis codes for heroin included T40.1X1A–T40.1X4A.

** Absolute rate change is the difference in rates from 2016 to 2017. Relative rate change is the absolute rate change divided by the 2016 rate, multiplied by 100. Z-tests were used to determine significance.

†† Statistically significant (p-value <0.05).

§§ Facility geographic regions were derived from U.S. Census regions: https://www.hcup-us.ahrq.gov/db/vars/hosp_region/nedsnote.jsp. *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *Midwest:* Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South:* Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West:* Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

¶¶ County urbanization levels for facilities were determined using the 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties. https://www.cdc.gov/nchs/data_access/urban_rural.htm.

*** In ICD-10-CM, the fifth or sixth character in the diagnosis code indicates intent. Possible values include accidental (unintentional), intentional self-harm, assault, undetermined intent, adverse effect, and underdosing. Adverse effect and underdosing are not applicable values for all of the different drug poisoning diagnosis codes. In this report, the intent was set to "Missing" for emergency department visits with multiple overdose intents listed.

In the Northeast, the overdose rate for all drugs remained stable, and the overdose rate for all opioids decreased 5.8%.

Overdose rates for nonheroin opioids and heroin were highest among males (44.5 and 66.7, respectively), persons aged 25–34 years (63.7 and 144.3, respectively), persons in the Midwest (51.2 and 77.0, respectively), and those in medium metro counties (51.6 and 57.8, respectively) (Table 2). Increases in rates for heroin overdose were observed among males (4.1%) and females (3.0%), whereas rates for nonheroin opioid overdoses increased only among males (7.0%). Heroin overdose rates decreased 50% among persons aged 0–14 years, 21.8% among persons aged 15–19 years, and 14.1% among persons aged 20–24 years. Rates for overdoses involving nonheroin opioids and heroin increased 8.5% and 8.6% in the Midwest, respectively, and 3.4% and 8.2%, respectively, in the South. Heroin overdose rates also increased 11.3% in the

TABLE 3. Annual number and age-adjusted rate* of emergency department visits[†] for nonfatal overdoses involving benzodiazepines[§] and nonfatal overdoses involving cocaine,[¶] by patient, facility, and visit characteristics — United States, 2016 and 2017

	Benzodiazepines[§]						Cocaine[¶]					
	2016		2017		Change from 2016 to 2017**		2016		2017		Change from 2016 to 2017**	
Characteristic	No.	Rate (SE)	No.	Rate (SE)	Absolute rate change	Relative rate change	No.	Rate (SE)	No.	Rate (SE)	Absolute rate change	Relative rate change
All	**123,548**	**38.1 (0.110)**	**118,352**	**36.1 (0.107)**	**−2.0**	**−5.2[††]**	**27,247**	**8.5 (0.052)**	**36,919**	**11.3 (0.060)**	**2.8**	**32.9[††]**
Sex												
Male	50,313	31.3 (0.142)	48,218	29.7 (0.138)	−1.6	−5.1[††]	18,498	11.5 (0.086)	24,852	15.2 (0.098)	3.7	32.2[††]
Female	73,219	44.6 (0.168)	70,130	42.3 (0.163)	−2.3	−5.2[††]	8,745	5.5 (0.060)	12,052	7.5 (0.069)	2.0	36.4[††]
Age group (yrs)												
0–14	3,866	6.3 (0.102)	3,563	5.8 (0.098)	−0.5	−7.9[††]	129	0.2 (0.019)	160	0.3 (0.021)	0.1	50.0[††]
15–19	9,721	46.0 (0.467)	8,951	42.4 (0.448)	−3.6	−7.8[††]	689	3.3 (0.124)	876	4.1 (0.140)	0.8	24.2[††]
20–24	11,882	53.1 (0.487)	11,278	51.0 (0.480)	−2.1	−4.0[††]	2,546	11.4 (0.225)	2,857	12.9 (0.242)	1.5	13.2[††]
25–34	23,707	53.1 (0.345)	22,914	50.5 (0.334)	−2.6	−4.9[††]	6,703	15.0 (0.183)	8,903	19.6 (0.208)	4.6	30.7[††]
35–44	21,439	53.0 (0.362)	20,776	50.8 (0.353)	−2.2	−4.2[††]	5,437	13.4 (0.182)	7,132	17.4 (0.207)	4.0	29.9[††]
45–54	22,890	53.5 (0.354)	20,552	48.5 (0.338)	−5.0	−9.3[††]	6,804	15.9 (0.193)	8,687	20.5 (0.220)	4.6	28.9[††]
55–64	18,260	44.0 (0.326)	18,478	44.0 (0.324)	0.0	0.0	4,121	9.9 (0.155)	6,787	16.2 (0.196)	6.3	63.6[††]
≥65	11,783	23.9 (0.220)	11,841	23.3 (0.214)	−0.6	−2.5	816	1.7 (0.058)	1,517	3.0 (0.077)	1.3	76.5[††]
U.S. Census region[§§]												
Northeast	18,948	33.1 (0.246)	17,920	31.1 (0.238)	−2.0	−6.0[††]	6,892	12.3 (0.152)	8,040	14.2 (0.162)	1.9	15.4[††]
Midwest	29,863	45.0 (0.265)	27,706	41.4 (0.254)	−3.6	−8.0[††]	5,188	7.7 (0.110)	6,430	9.6 (0.123)	1.9	24.7[††]
South	49,807	40.6 (0.185)	48,459	39.0 (0.180)	−1.6	−3.9[††]	12,494	10.3 (0.094)	18,878	15.1 (0.112)	4.8	46.6[††]
West	24,931	32.1 (0.206)	24,267	30.9 (0.202)	−1.2	−3.7[††]	2,673	3.4 (0.066)	3,571	4.5 (0.076)	1.1	32.4[††]
County urbanization level[¶¶]												
Large central metro	32,154	31.6 (0.179)	34,086	33.1 (0.182)	1.5	4.7[††]	9,926	9.6 (0.098)	17,525	16.5 (0.127)	6.9	71.9[††]
Large fringe metro	27,493	34.1 (0.209)	24,013	29.5 (0.194)	−4.6	−13.5[††]	6,171	7.8 (0.101)	6,901	8.7 (0.107)	0.9	11.5[††]
Medium metro	27,875	41.6 (0.255)	29,427	43.5 (0.259)	1.9	4.6[††]	6,390	9.7 (0.124)	6,948	10.5 (0.129)	0.8	8.2[††]
Small metro	13,829	48.2 (0.421)	11,541	39.5 (0.378)	−8.7	−18.0[††]	1,877	6.8 (0.160)	2,051	7.4 (0.167)	0.6	8.8[††]
Micropolitan (nonmetro)	12,574	47.2 (0.434)	11,083	41.6 (0.408)	−5.6	−11.9[††]	1,418	5.6 (0.153)	1,770	7.0 (0.170)	1.4	25.0[††]
Noncore (nonmetro)	8,604	48.2 (0.541)	7,229	41.1 (0.503)	−7.1	−14.7[††]	678	4.0 (0.157)	859	5.3 (0.186)	1.3	32.5[††]
Intent* **												
Unintentional	57,597	17.4 (0.074)	55,843	16.7 (0.072)	−0.7	−4.0[††]	20,758	6.4 (0.045)	30,364	9.2 (0.054)	2.8	43.8[††]
Intentional self-harm	57,200	17.9 (0.076)	55,583	17.3 (0.075)	−0.6	−3.4[††]	3,717	1.2 (0.020)	3,828	1.2 (0.020)	0.0	0.0
Assault	325	0.1 (0.006)	287	0.1 (0.006)	0.0	0.0	101	0.03 (0.003)	73	0.02 (0.003)	−0.01	−33.3[††]
Undetermined	7,024	2.2 (0.027)	5,286	1.6 (0.023)	−0.6	−27.3[††]	2,396	0.7 (0.015)	2,297	0.7 (0.015)	0.0	0.0

Abbreviation: SE = standard error.

* Rates are age-adjusted using the direct method and the 2000 U.S. Census standard population, except for age-specific crude rates. All rates are per 100,000 population. Statistical testing was completed using rates rounded to one decimal place and standard errors rounded to three decimal places.

† Categories of nonfatal drug overdose visits are not mutually exclusive because overdose visits might involve more than one drug. Summing of categories will result in greater than the total number of visits in a year.

§ Nonfatal drug overdose visits are classified using the *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD–10-CM). ICD-10-CM diagnosis codes for benzodiazepines included T42.4X1A–T42.4X4A.

¶ ICD-10-CM diagnosis codes for cocaine included T40.5X1A–T40.5X4A.

** Absolute rate change is the difference in rates from 2016 to 2017. Relative rate change is the absolute rate change divided by the 2016 rate, multiplied by 100. Z-tests were used to determine significance.

†† Statistically significant (p-value <0.05).

§§ Facility geographic regions were derived from U.S. Census regions: https://www.hcup-us.ahrq.gov/db/vars/hosp_region/nedsnote.jsp. *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *Midwest:* Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South:* Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West:* Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

¶¶ County urbanization levels for facilities were determined using the 2013 NCHS Urban-Rural Classification Scheme for Counties. https://www.cdc.gov/nchs/data_access/urban_rural.htm.

*** In ICD-10-CM, the fifth or sixth character in the diagnosis code indicates intent. Possible values include accidental (unintentional), intentional self-harm, assault, undetermined intent, adverse effect, and underdosing. Adverse effect and underdosing are not applicable values for all of the different drug poisoning diagnosis codes. In this report, the intent was set to "Missing" for emergency department visits with multiple overdose intents listed.

West. In the Northeast, the rate for heroin-involved overdoses decreased 8.8%.

In 2017, the highest overdose rates for benzodiazepines were among females (42.3), persons aged 20–44 years (range = 50.5–51.0), persons in the Midwest (41.4), and persons in medium metro counties (43.5) (Table 3). The rates for cocaine overdoses in 2017 were highest among males (15.2), persons aged 25–34 years (19.6) and aged 45–54 years (20.5), as well as persons in the South census region (15.1) and large central metro counties (16.5). From 2016 to 2017, rates for benzodiazepine overdoses decreased 5.1% among males and 5.2% among females. Benzodiazepine overdose rates decreased among most age groups, and cocaine-involved overdoses rates increased across all age groups. All regions of the country experienced decreases in the rates of benzodiazepine overdoses and increases in the rates of cocaine overdoses.

In large central metro counties, overdose rates increased for all drugs (11.7%), all opioids (15.2%), nonheroin opioids (11.9%), heroin (21.4%), benzodiazepines (4.7%), and cocaine (71.9%) (Table 1) (Table 2) (Table 3). Most overdoses were unintentional (75% overall; range = 48% for benzodiazepines to 91% for heroin). A consistent finding across all overdose indicators, except for benzodiazepines, was that unintentional overdoses significantly increased from 2016 to 2017. Intentional self-harm overdoses increased 4.8% for all drugs but decreased 6.7% for all opioids, 7.4% for nonheroin opioids, and 3.4% for benzodiazepines.

Discussion

In 2017, a total of 967,615 nonfatal drug overdoses were treated in U.S. EDs. From 2016 to 2017, nonfatal overdose ED visit rates increased for each drug type except benzodiazepines, for which rates decreased 5.2%. The large increase in cocaine overdose rates (32.9%) might indicate potential increase in polysubstance overdose. A previous study found that in 2016, approximately 27% of nonfatal cocaine overdoses treated in EDs also involved an opioid, and cocaine-involved overdoses with an opioid reported increased 17% from 2015 to 2016, whereas cocaine-involved overdoses without an opioid decreased 14% (*2*). Future analyses examining drug combinations could help to determine the extent to which polysubstance use affects overdose surveillance of specific drug types. In this study, rates for nonfatal unintentional overdoses were shown to increase for each drug type except benzodiazepines and for the all-drug overdose category with self-harm intent. Rates for nonfatal drug overdoses associated with intentional self-harm, assault, and undetermined intent decreased or remained stable for most overdose indicators. Results suggest a leveling of intentional drug overdoses consistent with mortality data (*3*). Continued monitoring of nonfatal drug overdoses treated in EDs is important to inform community prevention and response activities.

Changes in rates of drug overdoses varied by age group, region, and urbanization level. Decreases in rates among persons aged 15–24 years for all opioids and heroin might be due to decreases in self-reported drug use and initiation.[¶¶] Regionally, increases in overdose rates occurred for all drugs, all opioids, heroin, and cocaine in the West, Midwest, and South, which are consistent with increases in drug supply and deaths across these regions and states (*4*,*5*). For example, from 2016 to 2017, cocaine drug reports increased significantly in the South and Midwest (*4*), and cocaine-involved deaths increased in the West, Midwest, and South (*5*). The decrease in the rate for nonfatal all opioid overdoses seen in the Northeast is not consistent with drug supply reports, which increased in 2017 (*4*). However, it is possible that the lethality of opioids in the supply (e.g., illicitly manufactured fentanyl)[***] might result in an increase in cases with rapid progression to death, with fewer opportunities for transport to an ED for care. Large central metro areas experienced increases in every overdose indicator; these are largely consistent with results from other data sources, including syndromic ED surveillance and mortality data from similar periods (*6*,*7*).

The findings in this report are subject to at least seven limitations. First, CDC did not assess polysubstance overdose, and it is possible that some overdoses were not classified correctly given limits of drug testing in EDs (*8*). Second, CDC could not determine whether illicit or prescribed drugs were driving some drug-specific overdose rate increases from 2016 to 2017. Third, coding practices might vary by facility and might affect the rates presented rather than actual changes in overdose prevalence. Fourth, ED visits included unique events, not unique persons, and might reflect multiple visits for one person. Fifth, these findings likely underestimated the actual prevalence of nonfatal drug overdoses because some overdoses might not be seen in EDs. Sixth, determining overdose intent in the ED setting without necessary patient context might be challenging, which might affect the accuracy of recording of intent. Finally, hospital discharge data are not as timely or localized as other data sources, including ED syndromic surveillance and emergency medical services data. Syndromic surveillance and emergency medical services data are also available at the state level and smaller geographic areas and can inform allocation of resources at a more local level. The results might not represent current trends in overdose morbidity because of the data time lag and the rapidly evolving drug market. However, they do provide more representative, comparable population estimates derived from final clinical diagnoses than do other data sources.

Overall, the increases in nonfatal overdoses suggest that enhanced surveillance, prevention, treatment, and public safety response efforts are needed to curb the increasing trends of nonfatal drug overdoses. In September 2019, CDC implemented the Overdose Data to Action (OD2A)[†††] program, that strives to improve and expand surveillance and prevention efforts for states, territories, and localities through higher quality, more comprehensive, and more timely data on drug overdose morbidity and mortality, along with enhanced and data-driven prevention activities. With these activities, many

¶¶ https://www.cdc.gov/drugoverdose/pdf/pubs/2019-cdc-drug-surveillance-report.pdf.

*** https://www.dea.gov/sites/default/files/2018-11/DIR-032-18%202018%20NDTA%20final%20low%20resolution.pdf.

††† https://www.cdc.gov/drugoverdose/od2a/index.html.

Summary

What is already known about this topic?

In 2017, U.S. drug overdose deaths increased 9.6% from 2016. Emergency department (ED) discharge data can estimate nonfatal overdose prevalence and, because of the ability to conduct standardized analyses, track changes across time.

What is added by this report?

From 2016 to 2017, the nonfatal overdose ED visits rates for all drugs, all opioids, nonheroin opioids, heroin, and cocaine increased significantly, whereas those for benzodiazepines decreased significantly.

What are the implications for public health practice?

Using ED data to track trends in nonfatal drug overdoses is a critical strategy for expanding overdose surveillance and tailoring prevention resources to populations most affected, including initiation of medication-assisted treatment in ED settings and subsequent linkage to care for substance use disorders.

persons who would have died from a fatal overdose are now able to receive lifesaving care, including better access to medication-assisted treatment, which might be initiated in ED settings, and subsequent linkage to care for substance use disorders and co-occurring mental disorders (*9*). In addition, implementing postoverdose protocols in EDs, including naloxone provision to patients who use opioids or other illicit drugs (*9*), checking patients' prescription histories in prescription drug monitoring program data, and following the CDC Guideline for Prescribing Opioids for Chronic Pain when treating patients with chronic pain might prevent future overdoses (*10*).

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Asymptomatic and Presymptomatic SARS-CoV-2 Infections in Residents of a Long-Term Care Skilled Nursing Facility — King County, Washington, March 2020

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Older adults are susceptible to severe coronavirus disease 2019 (COVID-19) outcomes as a consequence of their age and, in some cases, underlying health conditions (*1*). A COVID-19 outbreak in a long-term care skilled nursing facility (SNF) in King County, Washington that was first identified on February 28, 2020, highlighted the potential for rapid spread among residents of these types of facilities (*2*). On March 1, a health care provider at a second long-term care skilled nursing facility (facility A) in King County, Washington, had a positive test result for SARS-CoV-2, the novel coronavirus that causes COVID-19, after working while symptomatic on February 26 and 28. By March 6, seven residents of this second facility were symptomatic and had positive test results for SARS-CoV-2. On March 13, CDC performed symptom assessments and SARS-CoV-2 testing for 76 (93%) of the 82 facility A residents to evaluate the utility of symptom screening for identification of COVID-19 in SNF residents. Residents were categorized as asymptomatic or symptomatic at the time of testing, based on the absence or presence of fever, cough, shortness of breath, or other symptoms on the day of testing or during the preceding 14 days. Among 23 (30%) residents with positive test results, 10 (43%) had symptoms on the date of testing, and 13 (57%) were asymptomatic. Seven days after testing, 10 of these 13 previously asymptomatic residents had developed symptoms and were recategorized as presymptomatic at the time of testing. The reverse transcription–polymerase chain reaction (RT-PCR) testing cycle threshold (Ct) values indicated large quantities of viral RNA in asymptomatic, presymptomatic, and symptomatic residents, suggesting the potential for transmission regardless of symptoms. Symptom-based screening in SNFs could fail to identify approximately half of residents with COVID-19. Long-term care facilities should take proactive steps to prevent introduction of SARS-CoV-2 (*3*). Once a confirmed case is identified in an SNF, all residents should be placed on isolation precautions if possible (*3*), with considerations for extended use or reuse of personal protective equipment (PPE) as needed (*4*).

Immediately upon identification of the index case in facility A on March 1, nursing and administrative leadership instituted visitor restrictions, twice-daily assessments of COVID-19 signs and symptoms among residents, and fever screening of all health care personnel at the start of each shift. On March 6, Public Health – Seattle and King County, in collaboration with CDC, recommended infection prevention and control measures, including isolation of all symptomatic residents and use of gowns, gloves, eye protection, facemasks, and hand hygiene for health care personnel entering symptomatic residents' rooms. A data collection tool was developed to ascertain symptom status and underlying medical conditions for all residents.

On March 13, the symptom assessment tool was completed by facility A's nursing staff members by reviewing screening records of residents for the preceding 14 days and by clinician interview of residents at the time of specimen collection. For residents with significant cognitive impairment, symptoms were obtained solely from screening records. A follow-up symptom assessment was completed 7 days later by nursing staff members. Nasopharyngeal swabs were obtained from all 76 residents who agreed to testing and were present in the facility at the time; oropharyngeal swabs were also collected from most residents, depending upon their cooperation. The Washington State Public Health Laboratory performed one-step real-time RT-PCR assay on all specimens using the SARS-CoV-2 CDC assay protocol, which determines the presence of the virus through identification of two genetic markers, the N1 and N2 nucleocapsid protein gene regions (*5*). The Ct, the cycle number during RT-PCR testing when detection of viral amplicons occurs, is inversely correlated with the amount of RNA present; a Ct value <40 cycles denotes a positive result for SARS-CoV-2, with a lower value indicating a larger amount of viral RNA.

Residents were assessed for stable chronic symptoms (e.g., chronic, unchanged cough) as well as typical and atypical signs and symptoms of COVID-19. Typical COVID-19 signs and symptoms include fever, cough, and shortness of breath (*3*); potential atypical symptoms assessed included sore throat,

Summary

What is already known about this topic?

Once SARS-CoV-2 is introduced in a long-term care skilled nursing facility (SNF), rapid transmission can occur.

What is added by this report?

Following identification of a case of coronavirus disease 2019 (COVID-19) in a health care worker, 76 of 82 residents of an SNF were tested for SARS-CoV-2; 23 (30.3%) had positive test results, approximately half of whom were asymptomatic or presymptomatic on the day of testing.

What are the implications for public health practice?

Symptom-based screening of SNF residents might fail to identify all SARS-CoV-2 infections. Asymptomatic and presymptomatic SNF residents might contribute to SARS-CoV-2 transmission. Once a facility has confirmed a COVID-19 case, all residents should be cared for using CDC-recommended personal protective equipment (PPE), with considerations for extended use or reuse of PPE as needed.

chills, increased confusion, rhinorrhea or nasal congestion, myalgia, dizziness, malaise, headache, nausea, and diarrhea. Residents were categorized as asymptomatic (no symptoms or only stable chronic symptoms) or symptomatic (at least one new or worsened typical or atypical symptom of COVID-19) on the day of testing or during the preceding 14 days. Residents with positive test results and were asymptomatic at time of testing were reevaluated 1 week later to ascertain whether any symptoms had developed in the interim. Those who developed new symptoms were recategorized as presymptomatic. Ct values were compared for the recategorized symptom groups using one-way analysis of variance (ANOVA) for all residents with positive test results for SARS-CoV-2. Analyses were conducted using SAS statistical software (version 9.4; SAS Institute).

On March 13, among the 82 residents in facility A; 76 (92.7%) underwent symptom assessment and testing; three (3.7%) refused testing, two (2.4%) who had COVID-19 symptoms were transferred to a hospital before testing, and one (1.2%) was unavailable. Among the 76 tested residents, 23 (30.3%) had positive test results.

Demographic characteristics were similar among the 53 (69.7%) residents with negative test results and the 23 (30.3%) with positive test results (Table 1). Among the 23 residents with positive test results, 10 (43.5%) were symptomatic, and 13 (56.5%) were asymptomatic. Eight symptomatic residents had typical COVID-19 symptoms, and two had only atypical symptoms; the most common atypical symptoms reported were malaise (four residents) and nausea (three). Thirteen (24.5%) residents who had negative test results also reported typical and atypical COVID-19 symptoms during the 14 days preceding testing.

One week after testing, the 13 residents who had positive test results and were asymptomatic on the date of testing were reassessed; 10 had developed symptoms and were recategorized as presymptomatic at the time of testing (Table 2). The most common signs and symptoms that developed were fever (eight residents), malaise (six), and cough (five). The mean interval from testing to symptom onset in the presymptomatic residents was 3 days. Three residents with positive test results remained asymptomatic.

Real-time RT-PCR Ct values for both genetic markers among residents with positive test results for SARS-CoV-2 ranged from 18.6 to 29.2 (symptomatic [typical symptoms]), 24.3 to 26.3 (symptomatic [atypical symptoms only]), 15.3 to 37.9 (presymptomatic), and 21.9 to 31.0 (asymptomatic) (Figure). There were no significant differences between the mean Ct values in the four symptom status groups ($p = 0.3$).

Discussion

Sixteen days after introduction of SARS-CoV-2 into facility A, facility-wide testing identified a 30.3% prevalence of infection among residents, indicating very rapid spread, despite early adoption of infection prevention and control measures. Approximately half of all residents with positive test results did not have any symptoms at the time of testing, suggesting that transmission from asymptomatic and presymptomatic residents, who were not recognized as having SARS-CoV-2 infection and therefore not isolated, might have contributed to further spread. Similarly, studies have shown that influenza in the elderly, including those living in SNFs, often manifests as few or atypical symptoms, delaying diagnosis and contributing to transmission (*6*–*8*). These findings have important implications for infection control. Current interventions for preventing SARS-CoV-2 transmission primarily rely on presence of signs and symptoms to identify and isolate residents or patients who might have COVID-19. If asymptomatic or presymptomatic residents play an important role in transmission in this population at high risk, additional prevention measures merit consideration, including using testing to guide cohorting strategies or using transmission-based precautions for all residents of a facility after introduction of SARS-CoV-2. Limitations in availability of tests might necessitate taking the latter approach at this time.

Although these findings do not quantify the relative contributions of asymptomatic or presymptomatic residents to SARS-CoV-2 transmission in facility A, they suggest that these residents have the potential for substantial viral shedding. Low Ct values, which indicate large quantities of viral RNA, were identified for most of these residents, and there was no statistically significant difference in distribution of Ct values among the symptom status groups. Similar Ct values were reported in asymptomatic adults in China who were known to

TABLE 1. Demographics and reported symptoms for residents of a long-term care skilled nursing facility at time of testing* (N = 76), by SARS-CoV-2 test results — facility A, King County, Washington, March 2020

Characteristic	Initial SARS-CoV-2 test results	
	Negative, no. (%)	Positive, no. (%)
Overall	**53 (100)**	**23 (100)**
Women	32 (60.4)	16 (69.6)
Age, mean (SD)	75.1 (10.9)	80.7 (8.4)
Current smoker†	7 (13.2)	1 (4.4)
Long-term admission type to facility A	35 (66.0)	15 (65.2)
Length of stay in facility A before test date, days, median (IQR)	94 (40–455)	70 (21–504)
Symptoms in last 14 days		
Symptomatic	13 (24.5)	10 (43.5)
At least one typical COVID-19 symptom§	9 (17.0)	8 (34.8)
Only atypical COVID-19 symptoms¶	4 (7.5)	2 (8.7)
Asymptomatic	40 (75.5)	13 (56.5)
No symptoms	32 (60.4)	8 (34.8)
Only stable, chronic symptoms	8 (15.1)	5 (21.7)
Specific signs and symptoms reported as new or worse in last 14 days		
Typical symptoms		
Fever	3 (5.7)	1 (4.3)
Cough	6 (11.3)	7 (30.4)
Shortness of breath	0 (0)	1 (4.4)
Atypical symptoms		
Malaise	1 (1.9)	4 (17.4)
Nausea	0 (0)	3 (13.0)
Sore throat	2 (3.8)	2 (8.7)
Confusion	2 (3.8)	1 (4.4)
Dizziness	1 (1.9)	1 (4.4)
Diarrhea	3 (5.7)	1 (4.4)
Rhinorrhea/Congestion	1 (1.9)	0 (0)
Myalgia	0 (0)	0 (0)
Headache	0 (0)	0 (0)
Chills	0 (0)	0 (0)
Any preexisting medical condition listed	53 (100)	22 (95.7)
Specific conditions**		
Chronic lung disease	16 (30.2)	10 (43.5)
Diabetes	20 (37.7)	9 (39.1)
Cardiovascular disease	36 (67.9)	20 (87.0)
Cerebrovascular accident	19 (35.9)	8 (34.8)
Renal disease	18 (34.0)	9 (39.1)
Received hemodialysis	2 (3.8)	2 (8.7)
Cognitive Impairment	28 (52.8)	13 (56.5)
Obesity	11 (20.8)	6 (26.1)

Abbreviations: COVID-19 = coronavirus disease 2019; IQR = interquartile range, SD = standard deviation.
* Testing performed on March 13, 2020.
† Unknown for one resident with negative test results.
§ Typical symptoms include fever, cough, and shortness of breath.
¶ Atypical symptoms include chills, malaise, sore throat, increased confusion, rhinorrhea or nasal congestion, myalgia, dizziness, headache, nausea, and diarrhea.
** Residents might have multiple conditions.

transmit SARS-CoV-2 (*9*). Studies to determine the presence of viable virus from these specimens are currently under way.

SNFs have additional infection prevention and control challenges compared with those of assisted living or independent living long-term care facilities. For example, SNF residents might be in shared rooms rather than individual apartments, and there is often prolonged and close contact between residents and health care providers related to the residents' medical conditions and cognitive function. The index patient in this outbreak was a health care provider, which might have contributed to rapid spread in the facility. In addition, health care personnel in all types of long-term care facilities might have limited experience with proper use of PPE. Symptom ascertainment and room isolation can be exceptionally challenging in elderly residents with neurologic conditions, including dementia. In addition, symptoms of COVID-19 are common and might have multiple etiologies in this population; 24.5% of facility A residents with negative test results for SARS-CoV-2 reported typical or atypical symptoms.

The findings in this report are subject to at least two limitations. First, accurate symptom ascertainment in persons with cognitive impairment and other disabilities is challenging; however, this limitation is estimated to be representative of

TABLE 2. Follow-up symptom assessment 1 week after testing for SARS-CoV-2 among 13 residents of a long-term care skilled nursing facility who were asymptomatic on March 13, 2020 (date of testing) and had positive test results — facility A, King County, Washington, March 2020

Symptom status 1 week after testing	No. (%)
Asymptomatic	3 (23.1)
Developed new symptoms	10 (76.7)
Fever	8 (61.5)
Malaise	6 (46.1)
Cough	5 (38.4)
Confusion	4 (30.8)
Rhinorrhea/Congestion	4 (30.8)
Shortness of breath	3 (23.1)
Diarrhea	3 (23.1)
Sore throat	1 (7.7)
Nausea	1 (7.7)
Dizziness	1 (7.7)

symptom data collected in most SNFs, and thus, these findings might be generalizable. Second, because this analysis was conducted among residents of an SNF, it is not known whether findings apply to the general population, including younger persons, those without underlying medical conditions, or similarly aged populations in the general community.

This analysis suggests that symptom screening could initially fail to identify approximately one half of SNF residents with SARS-CoV-2 infection. Unrecognized asymptomatic and presymptomatic infections might contribute to transmission in these settings. During the current COVID-19 pandemic, SNFs and all long-term care facilities should take proactive steps to prevent introduction of SARS-CoV-2, including restricting visitors except in compassionate care situations, restricting nonessential personnel from entering the building, asking staff members to monitor themselves for fever and other symptoms, screening all staff members at the beginning of their shift for fever and other symptoms, and supporting staff member sick leave, including for those with mild symptoms (*3*). Once a facility has a case of COVID-19, broad strategies should be implemented to prevent transmission, including restriction of resident-to-resident interactions, universal use of facemasks for all health care personnel while in the facility, and if possible, use of CDC-recommended PPE for the care of all residents (i.e., gown, gloves, eye protection, N95 respirator, or, if not available, a face mask) (*3*). In settings where PPE supplies are limited, strategies for extended PPE use and limited reuse should be employed (*4*). As testing availability improves, consideration might be given to test-based strategies for identifying residents with SARS-CoV-2 infection for the purpose of cohorting, either in designated units within a facility or in a separate facility designated for residents with COVID-19. During the COVID-19 pandemic, collaborative efforts are crucial to protecting the most vulnerable populations.

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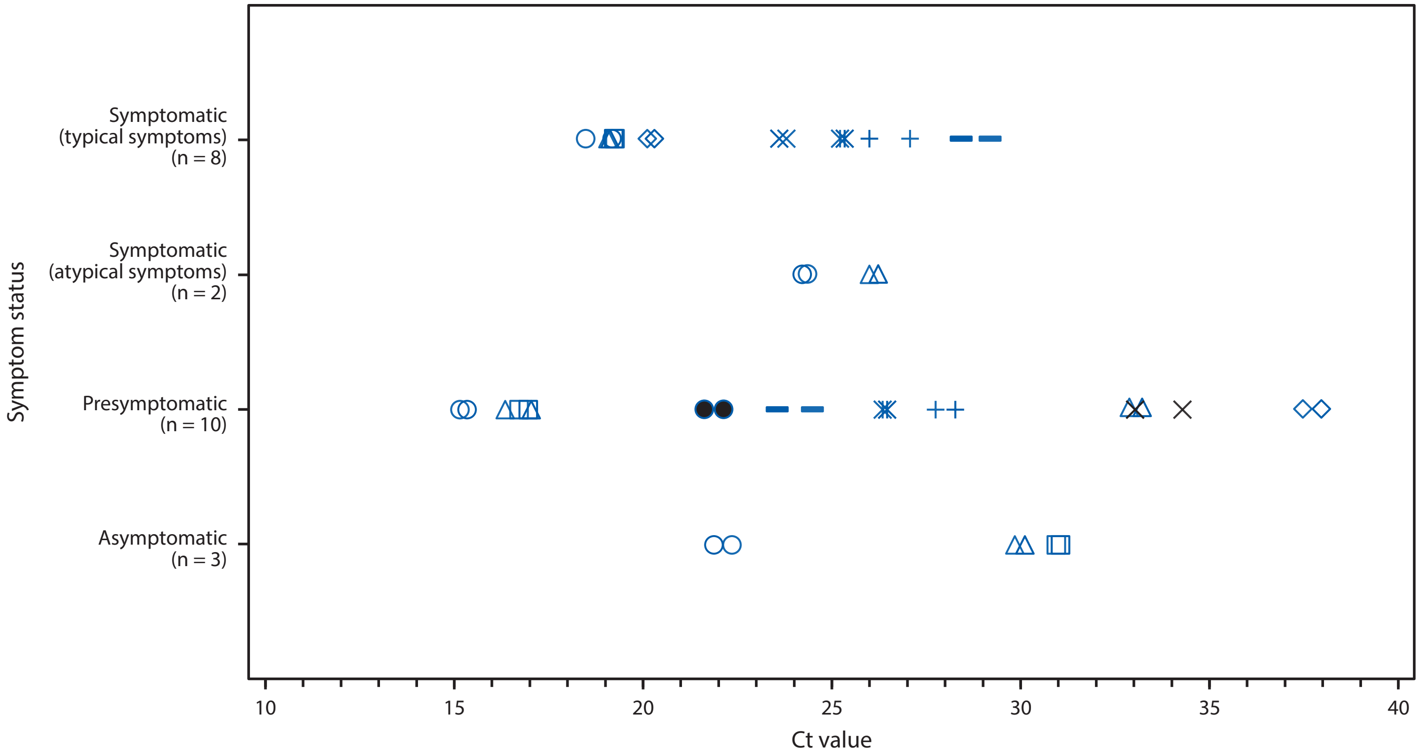
FIGURE. Cycle threshold (Ct) values* for residents of a long-term care skilled nursing facility with positive test results for SARS-CoV-2 by real-time reverse transcription–polymerase chain reaction on March 13, 2020 (n = 23), by symptom status†,§ at time of test — facility A, King County, Washington



* Ct values are the number of cycles needed for detection of each genetic marker identified by real-time reverse transcription–polymerase chain reaction testing. A lower Ct value indicates a higher amount of viral RNA. Paired values for each resident are depicted using a different shape. Each resident has two Ct values for the two genetic markers (N1 and N2 nucleocapsid protein gene regions).

† Typical symptoms include fever, cough, and shortness of breath.

§ Atypical symptoms include chills, malaise, sore throat, increased confusion, rhinorrhea or nasal congestion, myalgia, dizziness, headache, nausea, and diarrhea.

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Preliminary Estimates of the Prevalence of Selected Underlying Health Conditions Among Patients with Coronavirus Disease 2019 — United States, February 12–March 28, 2020

CDC COVID-19 Response Team

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On March 11, 2020, the World Health Organization declared Coronavirus Disease 2019 (COVID-19) a pandemic (*1*). As of March 28, 2020, a total of 571,678 confirmed COVID-19 cases and 26,494 deaths have been reported worldwide (*2*). Reports from China and Italy suggest that risk factors for severe disease include older age and the presence of at least one of several underlying health conditions (*3*,*4*). U.S. older adults, including those aged ≥65 years and particularly those aged ≥85 years, also appear to be at higher risk for severe COVID-19–associated outcomes; however, data describing underlying health conditions among U.S. COVID-19 patients have not yet been reported (*5*). As of March 28, 2020, U.S. states and territories have reported 122,653 U.S. COVID-19 cases to CDC, including 7,162 (5.8%) for whom data on underlying health conditions and other known risk factors for severe outcomes from respiratory infections were reported. Among these 7,162 cases, 2,692 (37.6%) patients had one or more underlying health condition or risk factor, and 4,470 (62.4%) had none of these conditions reported. The percentage of COVID-19 patients with at least one underlying health condition or risk factor was higher among those requiring intensive care unit (ICU) admission (358 of 457, 78%) and those requiring hospitalization without ICU admission (732 of 1,037, 71%) than that among those who were not hospitalized (1,388 of 5,143, 27%). The most commonly reported conditions were diabetes mellitus, chronic lung disease, and cardiovascular disease. These preliminary findings suggest that in the United States, persons with underlying health conditions or other recognized risk factors for severe outcomes from respiratory infections appear to be at a higher risk for severe disease from COVID-19 than are persons without these conditions.

Data from laboratory-confirmed COVID-19 cases reported to CDC from 50 states, four U.S. territories and affiliated islands, the District of Columbia, and New York City with February 12–March 28, 2020 onset dates were analyzed. Cases among persons repatriated to the United States from Wuhan, China, and the Diamond Princess cruise ship were excluded. For cases with missing onset dates, date of onset was estimated by subtracting 4 days (median interval from symptom onset to specimen collection date among cases with known dates in these data) from the earliest specimen collection. Public health departments reported cases to CDC using a standardized case report form that captures information (yes, no, or unknown) on the following conditions and potential risk factors: chronic lung disease (inclusive of asthma, chronic obstructive pulmonary disease [COPD], and emphysema); diabetes mellitus; cardiovascular disease; chronic renal disease; chronic liver disease; immunocompromised condition; neurologic disorder, neurodevelopmental, or intellectual disability; pregnancy; current smoking status; former smoking status; or other chronic disease (*6*). Data reported to CDC are preliminary and can be updated by health departments over time; critical data elements might be missing at the time of initial report; thus, this analysis is descriptive, and no statistical comparisons could be made.

The percentages of patients of all ages with underlying health conditions who were not hospitalized, hospitalized without ICU admission, and hospitalized with ICU admission were calculated. Percentages of hospitalizations with and without ICU admission were estimated for persons aged ≥19 years with and without underlying health conditions. This part of the analysis was limited to persons aged ≥19 years because of the small sample size of cases in children with reported underlying health conditions (N = 32). To account for missing data among these preliminary reports, ranges were estimated with a lower bound including cases with both known and unknown status for hospitalization with and without ICU admission as the denominator and an upper bound using only cases with known outcome status as the denominator. Because of small sample size and missing data on underlying health conditions among COVID-19 patients who died, case-fatality rates for persons with and without underlying conditions were not estimated.

As of March 28, 2020, a total of 122,653 laboratory-confirmed COVID-19 cases (Figure) and 2,112 deaths were reported to CDC. Case report forms were submitted to CDC for 74,439 (60.7%) cases. Data on presence or absence of underlying health conditions and other recognized risk factors for severe outcomes from respiratory infections (i.e., smoking and pregnancy) were available for 7,162 (5.8%) patients (Table 1). Approximately one third of these patients (2,692, 37.6%), had at least one underlying condition or risk factor. Diabetes mellitus (784, 10.9%), chronic lung disease (656, 9.2%), and cardiovascular disease (647, 9.0%) were the most frequently reported conditions among all cases. Among 457 ICU admissions and 1,037 non-ICU hospitalizations, 358 (78%) and 732 (71%), respectively occurred among persons with one or more reported underlying health condition. In contrast, 1,388 of 5,143 (27%) COVID-19 patients who were not hospitalized were reported to have at least one underlying health condition.

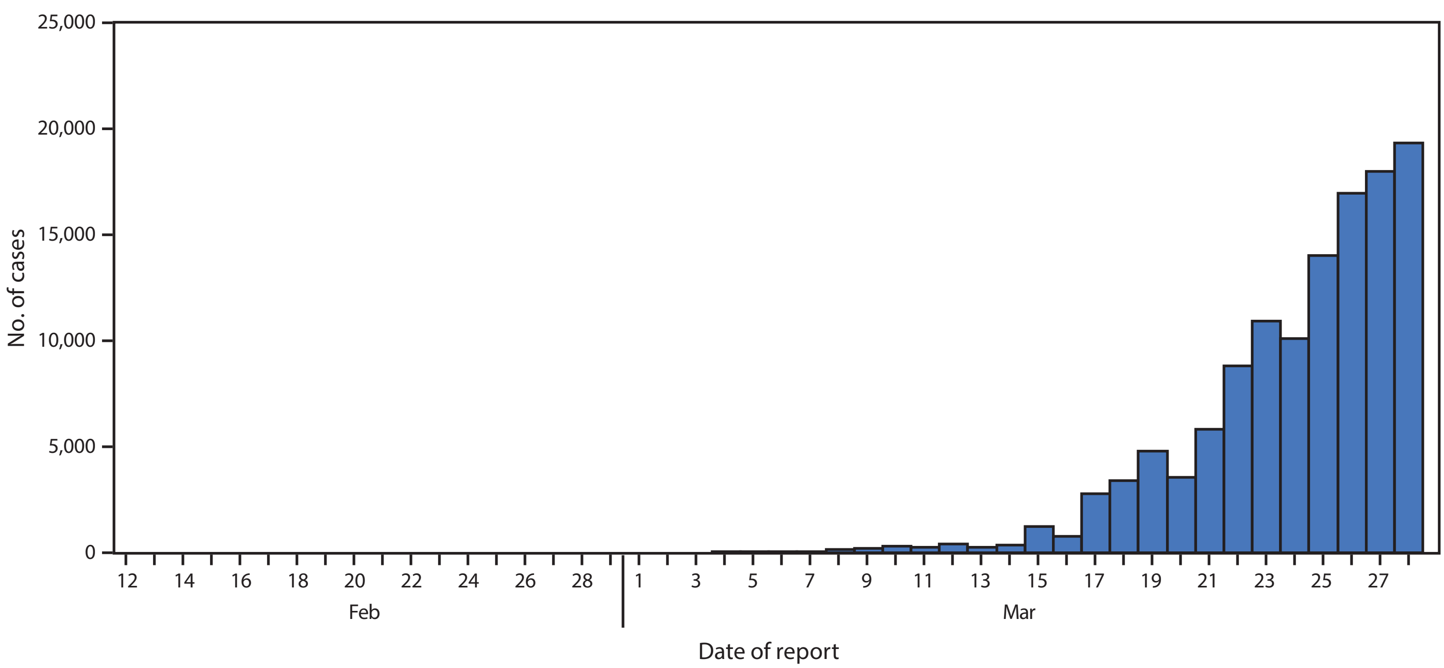
Among patients aged ≥19 years, the percentage of non-ICU hospitalizations was higher among those with underlying health conditions (27.3%–29.8%) than among those without underlying health conditions (7.2%–7.8%); the percentage of cases that resulted in an ICU admission was also higher for those with underlying health conditions (13.3%–14.5%) than those without these conditions (2.2%–2.4%) (Table 2). Small numbers of COVID-19 patients aged <19 years were reported to be hospitalized (48) or admitted to an ICU (eight). In contrast, 335 patients aged <19 years were not hospitalized and 1,342 had missing data on hospitalization. Among all COVID-19 patients with complete information on underlying conditions or risk factors, 184 deaths occurred (all among patients aged ≥19 years); 173 deaths (94%) were reported among patients with at least one underlying condition.

Discussion

Among 122,653 U.S. COVID-19 cases reported to CDC as of March 28, 2020, 7,162 (5.8%) patients had data available pertaining to underlying health conditions or potential risk factors; among these patients, higher percentages of patients with underlying conditions were admitted to the hospital and to an ICU than patients without reported underlying conditions. These results are consistent with findings from China and Italy, which suggest that patients with underlying health conditions and risk factors, including, but not limited to, diabetes mellitus, hypertension, COPD, coronary artery disease, cerebrovascular disease, chronic renal disease, and smoking, might be at higher risk for severe disease or death from COVID-19 (*3*,*4*). This analysis was limited by small numbers and missing data because of the burden placed on reporting health departments with rapidly rising case counts, and these findings might change as additional data become available.

It is not yet known whether the severity or level of control of underlying health conditions affects the risk for severe disease associated with COVID-19. Many of these underlying health conditions are common in the United States: based on self-reported 2018 data, the prevalence of diagnosed diabetes among U.S. adults was 10.1% (*7*), and the U.S. age-adjusted prevalence of all types of heart disease (excluding hypertension without other heart disease) was 10.6% in 2017 (*8*). The age-adjusted prevalence of COPD among U.S. adults is 5.9% (*9*), and in 2018, the U.S. estimated prevalence of current asthma among persons of all ages was 7.9% (*7*). CDC continues to develop and update resources for persons with underlying

FIGURE. Daily number of reported COVID-19 cases* — United States, February 12–March 28, 2020†



* Cases among persons repatriated to the United States from Wuhan, China, and the Diamond Princess cruise ship are excluded.
† Cumulative number of COVID-19 cases reported daily by jurisdictions to CDC using aggregate case count was 122,653 through March 28, 2020.

TABLE 1. Reported outcomes among COVID-19 patients of all ages, by hospitalization status, underlying health condition, and risk factor for severe outcome from respiratory infection — United States, February 12–March 28, 2020

Underlying health condition/Risk factor for severe outcomes from respiratory infection (no., % with condition)	No. (%)			
	Not hospitalized	Hospitalized, non-ICU	ICU admission	Hospitalization status unknown
Total with case report form (N = 74,439)	**12,217**	**5,285**	**1,069**	**55,868**
Missing or unknown status for all conditions (67,277)	**7,074**	**4,248**	**612**	**55,343**
Total with completed information (7,162)	**5,143**	**1,037**	**457**	**525**
One or more conditions (2,692, 37.6%)	1,388 (27)	732 (71)	358 (78)	214 (41)
Diabetes mellitus (784, 10.9%)	331 (6)	251 (24)	148 (32)	54 (10)
Chronic lung disease* (656, 9.2%)	363 (7)	152 (15)	94 (21)	47 (9)
Cardiovascular disease (647, 9.0%)	239 (5)	242 (23)	132 (29)	34 (6)
Immunocompromised condition (264, 3.7%)	141 (3)	63 (6)	41 (9)	19 (4)
Chronic renal disease (213, 3.0%)	51 (1)	95 (9)	56 (12)	11 (2)
Pregnancy (143, 2.0%)	72 (1)	31 (3)	4 (1)	36 (7)
Neurologic disorder, neurodevelopmental, intellectual disability (52, 0.7%)†	17 (0.3)	25 (2)	7 (2)	3 (1)
Chronic liver disease (41, 0.6%)	24 (1)	9 (1)	7 (2)	1 (0.2)
Other chronic disease (1,182, 16.5%)§	583 (11)	359 (35)	170 (37)	70 (13)
Former smoker (165, 2.3%)	80 (2)	45 (4)	33 (7)	7 (1)
Current smoker (96, 1.3%)	61 (1)	22 (2)	5 (1)	8 (2)
None of the above conditions¶ (4,470, 62.4%)	3,755 (73)	305 (29)	99 (22)	311 (59)

Abbreviation: ICU = intensive care unit.
* Includes any of the following: asthma, chronic obstructive pulmonary disease, and emphysema.
† For neurologic disorder, neurodevelopmental, and intellectual disability, the following information was specified: dementia, memory loss, or Alzheimer's disease (17); seizure disorder (5); Parkinson's disease (4); migraine/headache (4); stroke (3); autism (2); aneurysm (2); multiple sclerosis (2); neuropathy (2); hereditary spastic paraplegia (1); myasthenia gravis (1); intracranial hemorrhage (1); and altered mental status (1).
§ For other chronic disease, the following information was specified: hypertension (113); thyroid disease (37); gastrointestinal disorder (32); hyperlipidemia (29); cancer or history of cancer (29); rheumatologic disorder (19); hematologic disorder (17); obesity (17); arthritis, nonrheumatoid, including not otherwise specified (16); musculoskeletal disorder other than arthritis (10); mental health condition (9); urologic disorder (7); cerebrovascular disease (7); obstructive sleep apnea (7); fibromyalgia (7); gynecologic disorder (6); embolism, pulmonary or venous (5); ophthalmic disorder (2); hypertriglyceridemia (1); endocrine (1); substance abuse disorder (1); dermatologic disorder (1); genetic disorder (1).
¶ All listed chronic conditions, including other chronic disease, were marked as not present.

TABLE 2. Hospitalization with and without intensive care unit (ICU) admission, by age group among COVID-19 patients aged ≥19 years with and without reported underlying health conditions — United States, February 12–March 28, 2020*

	Hospitalized without ICU admission, No. (% range†)		ICU admission, No. (% range†)	
	Underlying condition present/reported§		Underlying condition present/reported§	
Age group (yrs)	Yes	No	Yes	No
19–64	285 (18.1–19.9)	197 (6.2–6.7)	134 (8.5–9.4)	58 (1.8–2.0)
≥65	425 (41.7–44.5)	58 (16.8–18.3)	212 (20.8–22.2)	20 (5.8–6.3)
Total ≥19	**710 (27.3–29.8)**	**255 (7.2–7.8)**	**346 (13.3–14.5)**	**78 (2.2–2.4)**

* Includes COVID-19 patients aged ≥19 years with known status on underlying conditions.
† Lower bound of range = number of persons hospitalized or admitted to an ICU among total in row stratum; upper bound of range = number of persons hospitalized or admitted to an ICU among total in row stratum with known outcome status: hospitalization or ICU admission status.
§ Includes any of following underlying health conditions or risk factors: chronic lung disease (including asthma, chronic obstructive pulmonary disease, and emphysema); diabetes mellitus; cardiovascular disease; chronic renal disease; chronic liver disease; immunocompromised condition; neurologic disorder, neurodevelopmental, or intellectual disability; pregnancy; current smoker; former smoker; or other chronic disease.

health conditions to reduce the risk of acquiring COVID-19 (*10*). The estimated higher prevalence of these conditions among those in this early group of U.S. COVID-19 patients and the potentially higher risk for more severe disease from COVID-19 associated with the presence of underlying conditions highlight the importance of COVID-19 prevention in persons with underlying conditions.

The findings in this report are subject to at least six limitations. First, these data are preliminary, and the analysis was limited by missing data related to the health department reporting burden associated with rapidly rising case counts and delays in completion of information requiring medical chart review; these findings might change as additional data become available. Information on underlying conditions was only available for 7,162 (5.8%) of 122,653 cases reported to CDC. It cannot be assumed that those with missing information are similar to those with data on either hospitalizations or underlying health conditions. Second, these data are subject to bias in outcome ascertainment because of short follow-up time. Some outcomes might be underestimated, and long-term outcomes cannot be assessed in this analysis. Third, because of the limited availability of testing in many jurisdictions during this period, this analysis is likely biased toward more severe cases, and findings might change as testing becomes more widespread. Fourth, because of the descriptive nature of these data, attack rates among persons with and without underlying health conditions could not be compared, and thus the risk difference of severe disease with COVID-19 between these groups could not be estimated. Fifth, no conclusions could be drawn about underlying conditions that were not included in the case report form or about different conditions that were reported in a single, umbrella category. For example, asthma and COPD were included in a chronic lung disease category. Finally, for some underlying health conditions and risk factors, including neurologic disorders, chronic liver disease, being a current smoker, and pregnancy, few severe outcomes were reported; therefore, conclusions cannot be drawn about the risk for severe COVID-19 among persons in these groups.

Persons in the United States with underlying health conditions appear to be at higher risk for more severe COVID-19, consistent with findings from other countries. Persons with underlying health conditions who have symptoms of COVID-19, including fever, cough, or shortness of breath, should immediately contact their health care provider. These persons should take steps to protect themselves from COVID-19, through washing their hands; cleaning and disinfecting high-touch surfaces; and social distancing, including staying at home, avoiding crowds, gatherings, and travel, and avoiding contact with persons who are ill. Maintaining at least a 30-day supply of medication, a 2-week supply of food and other necessities, and knowledge of COVID-19 symptoms are recommended for those with underlying health conditions (*10*). All persons should take steps to protect themselves from COVID-19 and to protect others. All persons who are ill should stay home, except to get medical care; should not go to work; and should stay away from others. This is especially important for those who work with persons with underlying conditions or who otherwise are at high risk for severe outcomes from COVID-19. Community mitigation strategies, which aim to slow the spread of COVID-19, are important to protect all persons from COVID-19, especially persons with underlying health conditions and other persons at risk for severe COVID-19–associated disease (https://www.cdc.gov/coronavirus/2019-ncov/downloads/community-mitigation-strategy.pdf).

Acknowledgments

State, local, and territorial health departments; clinical staff members caring for patients.

Summary

What is already known about this topic?

Published reports from China and Italy suggest that risk factors for severe COVID-19 disease include underlying health conditions, but data describing underlying health conditions among U.S. COVID-19 patients have not yet been reported.

What is added by this report?

Based on preliminary U.S. data, persons with underlying health conditions such as diabetes mellitus, chronic lung disease, and cardiovascular disease, appear to be at higher risk for severe COVID-19–associated disease than persons without these conditions.

What are the implications for public health practice?

Strategies to protect all persons and especially those with underlying health conditions, including social distancing and handwashing, should be implemented by all communities and all persons to help slow the spread of COVID-19.

CDC COVID-19 Response Team

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Notes from the Field

First Evidence of Locally Acquired Dengue Since 1944 — Guam, 2019

Stephanie Kern-Allely, MPH[1,2]; Ann Pobutsky, PhD[2]; W. Thane Hancock, MD[3]

On September 9, 2019, a resident of Guam with no travel history experienced a dengue-like illness that was reported to the Guam Department of Public Health and Social Services (DPHSS). On September 10, 2019, the Guam Public Health Laboratory (PHL) detected dengue virus 3 (DENV-3) in the patient's serum specimen by reverse transcription–polymerase chain reaction (RT-PCR). This was the first detection of a locally acquired dengue case on Guam since 1944 (*1*). On September 11, Guam DPHSS initiated enhanced surveillance for suspected dengue cases and distributed a health alert to all health care providers with instructions for receiving dengue testing at the Guam PHL. On September 13, the Government of Guam declared a state of emergency to assist Guam DPHSS (*2*). Primary emergency response efforts included visits to homes within a 656-ft (200-m) radius of the primary residence of persons with confirmed locally acquired cases to provide educational materials, conduct case finding, implement mosquito source reduction, set traps for mosquito surveillance, and apply pesticides at homes of consenting residents. Public education efforts included billboards, pamphlets, and educational sessions held in schools and other community areas at risk. Updates on the clinical management of dengue using guidelines from CDC* and the World Health Organization (*3*) were delivered to all hospitals, medical societies, and most outpatient clinics.

A suspected case of dengue was defined as febrile illness in a Guam resident accompanied by at least two of the following signs or symptoms: myalgia, headache, arthralgia, eye or retro-orbital pain, rash, or hemorrhagic manifestations. A confirmed case was defined as any suspected case with laboratory confirmation of dengue virus infection by RT-PCR or anti-DENV immunoglobulin M (IgM) enzyme-linked immunosorbent assay (ELISA) (*4*).

During September 9–November 25, a total of 249 suspected cases were identified. Serum samples from 213 patients were submitted for RT-PCR testing at the Guam PHL. Diagnostic testing by IgM ELISA was conducted off-island by private clinical laboratories for 124 suspected cases, including 93 that had RT-PCR testing and 31 that did not. Among cases tested, 17 (7%) were confirmed, including 13 locally acquired and four travel-associated cases. Eleven of the locally acquired cases were RT-PCR–confirmed as DENV-3, and two were serologically confirmed. Onset dates of confirmed locally acquired cases occurred during September 3–November 11 (Figure). The median age of patients with locally acquired dengue was 12 years (range = <1–67 years) and 62% were male; two patients were hospitalized. Both suspected and confirmed cases were concentrated in the more densely populated northern and central regions of the island.

Dengue outbreaks occur regularly in the Pacific Islands and outbreaks of DENV-3 are currently occurring in the Marshall Islands, Palau, the Philippines, and Yap State of the Federated States of Micronesia (*5*). Guam encounters imported dengue cases nearly annually because of frequent travel to and from Guam and areas with active DENV transmission. During 1988–2018, 42 cases of dengue were reported in Guam (*6*), and in 2019, before the outbreak in September, an additional three cases were reported (Guam Department of Public Health and Social Services, unpublished data, 2019); all 45 reported cases were travel-associated, most commonly from the Philippines (69%).

The last reported locally acquired dengue cases on Guam in 1944 involved *Aedes aegypti* as the vector (*1*). After the dengue outbreak and a subsequent outbreak of Japanese encephalitis in 1947, the U.S. military launched extensive vector control operations on the island, successfully eradicating *A. aegypti* (*1*). Current mosquito surveillance on Guam has identified *Aedes albopictus*, another DENV vector, but not *A. aegypti*. This outbreak provides evidence that autochthonous transmission of DENV is possible on Guam and likely transmitted by *A. albopictus*. It is important that future arboviral preparedness addresses gaps in detection and response exposed by the reemergence of dengue on Guam.

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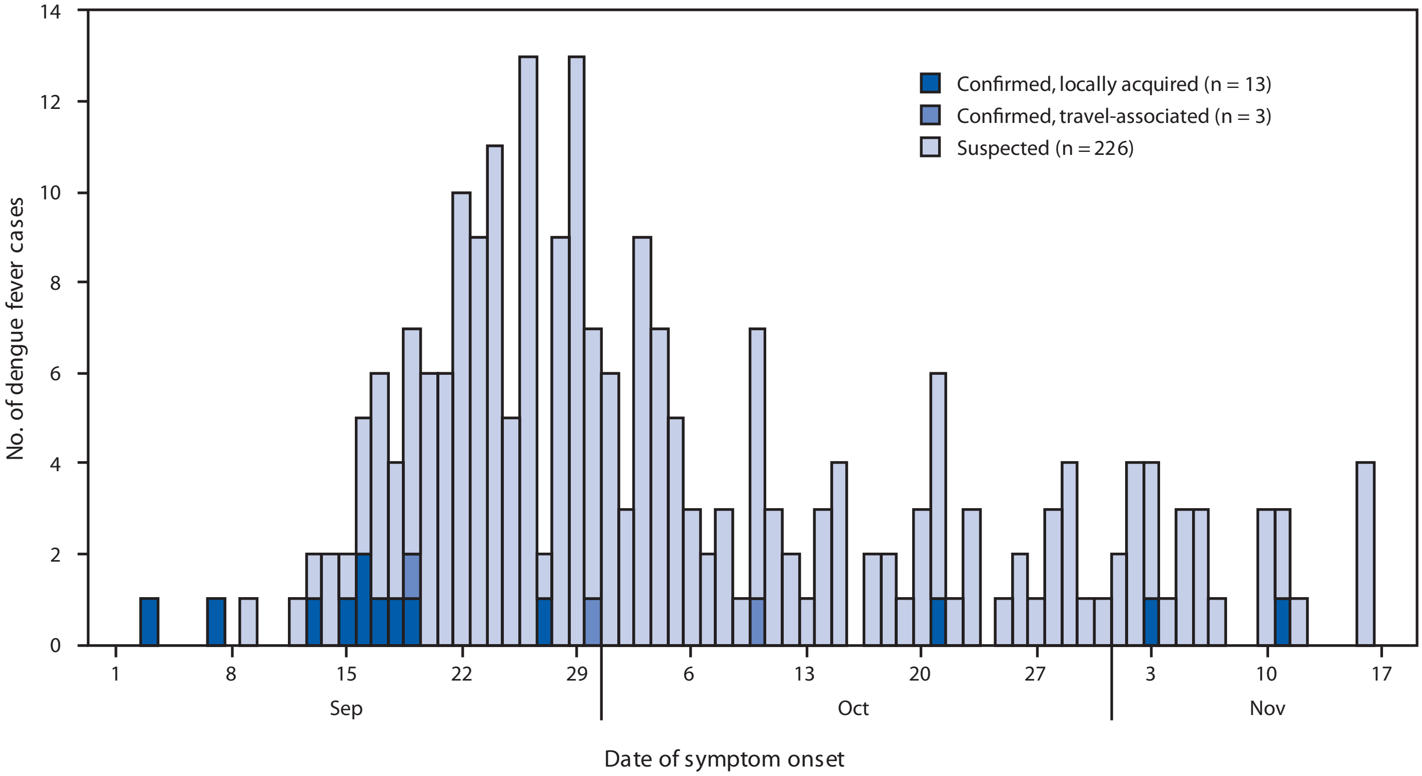
All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

* https://www.cdc.gov/dengue/resources/dengue-clinician-guide_508.pdf.

FIGURE. Number of confirmed*,† and suspected§ cases of dengue fever, by date of symptom onset¶ and source of infection (N = 242) — Guam, September 3–November 16, 2019**



* Confirmed cases that had symptom onset dates of September 18, September 27, and October 10, 2019, had positive results by immunoglobulin M (IgM) testing; all other confirmed cases were those that had positive results by reverse transcription–polymerase chain reaction (RT-PCR).
† Two confirmed cases had both positive RT-PCR and IgM results.
§ All suspected cases had negative results by RT-PCR or IgM testing.
¶ Some illness onset dates have been estimated from date of specimen collection or date of laboratory results.
** One travel-associated case was identified during the surveillance period by IgM testing but had symptom onset before the surveillance period began; six suspected cases had not completed RT-PCR or IgM testing during the period and are not included.

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Erratum

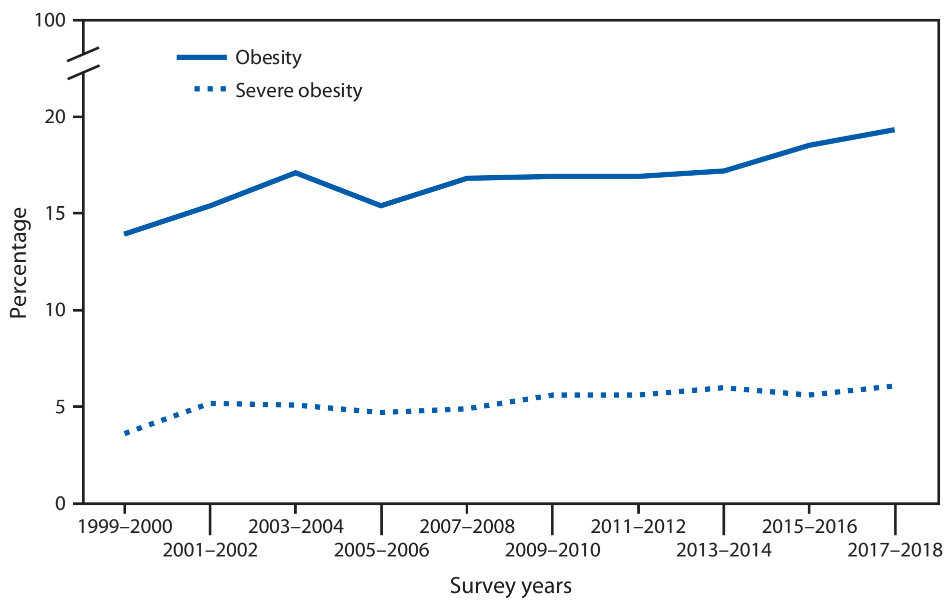
Vol. 69, No. 11

In the report "Initial Investigation of Transmission of COVID-19 Among Crew Members During Quarantine of a Cruise Ship — Yokohama, Japan, February 2020," on page 312, the second sentence of the first complete paragraph in the second column should have read "The earliest laboratory-confirmed COVID-19 cases in crew members occurred in food service workers; 15 of the 20 confirmed cases in crew members occurred among food service workers who prepared food for other crew members **and passengers**, and 16 of the 20 cases occurred among persons with cabins on deck 3, the deck on which the food service workers lived (Table)."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Prevalence of Obesity* and Severe Obesity† Among Persons Aged 2–19 Years — National Health and Nutrition Examination Survey, 1999–2000 through 2017–2018



* Body mass index (BMI) is calculated as weight in kilograms divided by height in meters squared. Obesity was defined as BMI ≥95th percentile for age and sex on CDC growth charts (https://www.cdc.gov/growthcharts/cdc_charts.htm).

† Severe obesity was defined as BMI ≥120% of the 95th percentile for age and sex on CDC growth charts (https://www.cdc.gov/growthcharts/cdc_charts.htm).

From 1999–2000 to 2017–2018, the prevalence of obesity among persons aged 2–19 years increased from 13.9% to 19.3%, and the prevalence of severe obesity increased from 3.6% to 6.1%.

Source: National Center for Health Statistics, National Health and Nutrition Examination Survey, 1999–2000 to 2017–2018. https://www.cdc.gov/nchs/nhanes.htm.

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