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Patient-Level and County-Level Trends in Nonfatal Opioid-Involved Overdose Emergency Medical Services Encounters — 491 Counties, United States, January 2018–March 2022

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The number of nonfatal opioid-involved overdoses treated by health care providers has risen in the United States; the median number of emergency department (ED) visits for these overdoses was significantly higher during 2020 than during 2019 (*1*). ED visit data can underestimate nonfatal opioid-involved overdose incidence because, increasingly, persons experiencing a nonfatal opioid overdose are refusing transport to EDs by emergency medical services (EMS) (*2*). A study in Kentucky found that during a 6-month period, 19.8% of persons treated by EMS for an opioid overdose refused transport to an ED (*2*). Thus, EMS encounter data involving suspected nonfatal opioid-involved overdoses complement ED data and also allow for near real-time analysis (*3*). This report describes trends in rates of EMS encounters for nonfatal opioid-involved overdoses per 10,000 total EMS encounters (rates) by selected patient- and county-level characteristics during January 2018–March 2022 in 491 counties from 21 states using data from biospatial, Inc.* During this period, the nonfatal opioid-involved overdose rate increased, on average, 4.0% quarterly. Rates increased for both sexes and for most age groups. Rates were highest among non-Hispanic White (White) and non-Hispanic Native Hawaiian or other Pacific Islander (NH/OPI) persons, and increases were largest among non-Hispanic Black (Black), followed by Hispanic or Latino (Hispanic) persons. Rates increased in both urban and rural counties and for all quartiles of county-level characteristics (i.e., unemployment, education, and uninsured), except in counties with the lowest percentage of uninsured persons. Rates were highest and rate increases were largest in urban counties and counties with higher unemployment rates. This analysis of nonfatal opioid-involved overdose trends in EMS data highlights the utility of these data and the importance of addressing inequities that contribute to disproportionate overdose risk, such as through focused outreach to racial and ethnic minority groups, who disproportionately experience these inequities, and communities with higher levels of unemployment. EMS providers are in a unique position to engage in postoverdose response protocols and promote evidence-based overdose education and facilitate linkage to care and harm reduction services.[†,§]

* biospatial, Inc. receives EMS data from 43 states; among these states, 25 are full coverage and 18 are partial. For full coverage states, biospatial receives all records that the state office receives; for partial coverage states, biospatial receives some of the data from sources other than the state office (e.g., through partnerships directly with EMS providers). https://www.biospatial.io/

† https://emergency.cdc.gov/han/2020/han00438.asp
§ https://www.cdc.gov/drugoverdose/pdf/pubs/2018-evidence-based-strategies.pdf

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EMS data collected by biospatial, Inc. from 491 counties in 21 states[¶] with consistent data coverage[**] were analyzed by quarter during January 2018–March 2022. The Council of State and Territorial Epidemiologists (CSTE) standard guidance for querying EMS data for nonfatal opioid-involved overdoses was applied. The CSTE EMS Nonfatal Opioid Overdose Standard Guidance (published May 2022) queries coded data elements (provider's primary and secondary impression, primary and other associated symptoms, medication administered, and response to medication) and a free text field (patient care report narrative) to identify suspected nonfatal opioid-involved overdose encounters.[††] Encounters were included if the type of service requested was an emergency response and excluded if a fatal encounter was indicated, or if the encounter was cancelled or was an assist to the primary responding unit.[§§]

Trends were analyzed overall, by patient characteristics (i.e., age, sex, and race and ethnicity),[¶¶] incident disposition (i.e., transported or not transported by EMS), and the following county-level (incident location) characteristics: urban or rural classification,[***] percentage unemployed, percentage of population aged ≥25 years who are high school graduates or higher, and percentage uninsured (derived from the U.S. Census Bureau American Community Survey).[†††] Each American Community Survey variable was categorized into quartiles. The rate of nonfatal opioid-involved overdose EMS

[¶] The following states that share data with biospatial, Inc. included one or more counties that met the underlying event coverage (UEC) threshold (≥75%) for sufficient coverage during the study period and were included in the analysis: Alabama (17 counties), Alaska (two), Arizona (one), Arkansas (35), California (two), Colorado (three), Florida (32), Georgia (92), Illinois (49), Kansas (64), Michigan (29), Montana (13), New Mexico (14), Oregon (one), Rhode Island (five), South Carolina (41), Texas (three), Virginia (62), Washington (one), Wisconsin (seven), and Wyoming (18).

[**] UEC is a ratio of the records received by biospatial, Inc. compared with the estimated number of all EMS encounters expected for the specified geographic area (e.g., county); this metric is calculated using probabilistic models of historic data and county population characteristics. For this analysis, records from counties that had UEC ≥75% for each quarter during the study period were eligible for inclusion.

[††] https://cdn.ymaws.com/www.cste.org/resource/resmgr/opioidsurv/EMS_Nonfatal_Opioid_Overdose.pdf

[§§] Encounters were excluded if initial or final patient acuity or incident patient disposition indicated a fatal encounter or if incident patient disposition indicated the encounter was cancelled or that the encounter was an assist to the primary responding unit.

[¶¶] Persons of Hispanic or Latino ethnicity, regardless of race, were classified as Hispanic. For the remaining categories, persons who were non-Hispanic were reported by their indicated single race classification (e.g., Asian, Black, or White). Persons with other, unknown, or missing race or ethnicity were excluded.

[***] County urbanization was categorized using 2013 National Center for Health Statistics data. Urban counties were those considered to be large central metropolitan, large fringe metropolitan, medium metropolitan, and small metropolitan; rural counties were those considered to be micropolitan or noncore. https://www.cdc.gov/nchs/data_access/urban_rural.htm

[†††] The U.S. Census Bureau American Community Survey is conducted nationwide and collects information from a representative sample of households to understand demographic, social, economic, and housing characteristics at the county level. For this analysis, the 2020 American Community Survey 5-year estimates were queried. https://www.census.gov/data/developers/data-sets/acs-5year.html

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encounters per 10,000 total EMS encounters was calculated. Rates, rather than counts, were used to account for fluctuations in EMS use over time.

Joinpoint regression (version 4.9; National Cancer Institute) was used to measure the average quarterly percent change (AQPC) for the entire study period and quarterly percent change for each trend segment; the permutation model selection method was used, and the maximum number of joinpoints allowed was three. P<0.05 was considered statistically significant. This activity was reviewed by CDC and conducted consistent with applicable federal law and CDC policy.[§§§]

The rate of nonfatal opioid-involved overdose EMS encounters increased, on average, 4.0% per quarter during January 2018–March 2022, increasing from 98.1 per 10,000 EMS encounters during Quarter 1 (Q1)[¶¶¶] 2018 to 179.1 during Q1 2022 (Table). Nonfatal opioid-involved overdose rates increased for most strata; the most common inflection points were Quarter 3 (Q3) 2019 and Quarter 2 (Q2) 2020 (Figure 1) (Figure 2). Beginning in Q3 2020, overall nonfatal opioid-involved overdose rates stabilized after the onset of the COVID-19 pandemic.

Patient-Level Characteristics

Nonfatal opioid-involved overdose rates were highest among adults aged 25–34 years and lowest among children and adolescents aged 0–14 years (Figure 1). AQPCs for the entire study period were positive in all age groups except 15–24 years (range = 3.2%–5.8%). Rates were higher in males than in females, and the disparity widened over time (AQPC for males, 4.7%; for females, 3.1%) (Figure 1). Rates were highest among White and NH/OPI persons and lowest among non-Hispanic Asian (Asian) persons (Figure 1). Rates increased significantly among all racial and ethnic groups except NH/OPI persons; among groups with an increase, AQPCs ranged from 3.1% to 7.4%. Rates increased, on average, 3.4% quarterly among White persons, whereas increases were substantially higher among Black (7.4%) and Hispanic persons (5.7%). Rates were higher among persons transported by EMS than among those not transported by EMS (Figure 1); however, increases were larger among those not transported by EMS (AQPC for those not transported, 7.1%; for those transported, 3.9%).

County-Level Characteristics

Nonfatal opioid-involved overdose rates were higher in counties with higher unemployment (Figure 2); rates increased faster in counties with higher unemployment, with the AQPC for the entire period ranging from 2.1% in counties in the lowest quartile of unemployment to 5.9% in counties in the highest quartile. Rates were lowest in counties with the smallest proportion of high school graduates and highest among counties with the next smallest proportion (Figure 2). The AQPC for the entire study period was positive for all education quartiles (range = 3.1%–5.0%). AQPCs were positive (range = 3.3%–5.5%) for all quartiles of uninsured except the lowest quartile; rate increases were largest for the third quartile, which had the lowest rate in Q1 2018 and the highest rate in Q1 2022, more than doubling from 88.1 to 215.8 per 10,000 EMS encounters (Figure 2). Rates were higher in urban than in rural counties, and the disparity increased over time (AQPC for urban counties, 4.2%; for rural counties, 2.8%) (Figure 2).

Discussion

This report highlights several findings: 1) rates of nonfatal opioid-involved overdose EMS encounters per 10,000 total EMS encounters increased steadily from 2018 through the onset of the COVID-19 pandemic; 2) nonfatal opioid-involved overdose rates increased for both sexes, all age groups except persons aged 15–24 years, and all racial and ethnic groups except NH/OPI; 3) nonfatal opioid-involved overdose rates increased among all quartiles of county-level characteristics, except for counties with the lowest percentage of uninsured persons; and 4) higher nonfatal opioid-involved overdose rates and rate increases were observed in urban counties and in counties with higher unemployment rates.

Increases in nonfatal opioid-involved overdose EMS encounters through Q3 2020 are consistent with increases in nonfatal opioid-involved overdoses treated in EDs (*1*) and synthetic opioid-involved overdose deaths.[****] Nonfatal opioid-involved overdose rates in this study remained stable during Q3 2020–Q1 2022, which is consistent with opioid-involved overdose ED visits in CDC's Drug Overdose Surveillance and Epidemiology system.[††††] However, this finding is unlike those for mortality data, which have demonstrated increases in opioid-involved overdose deaths during this period. Further exploration into the types of opioids (e.g., fentanyl, heroin, and prescribed opioids) contributing to overdoses and the shifting drug supply will assist in better interpretation of these differences.

The increase in nonfatal opioid-involved overdose rates for most demographic groups is similar to findings from ED data (*4*). Although rates were highest among White and NH/OPI persons, rate increases were largest among Black, followed by Hispanic persons. According to a recent study, Black persons experienced the largest increase in fatal all-drug overdoses

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

[¶¶¶] Quarters were defined as Q1 (January 1–March 31), Q2 (April 1–June 30), Q3 (July 1–September 30), and Q4 (October 1–December 31).

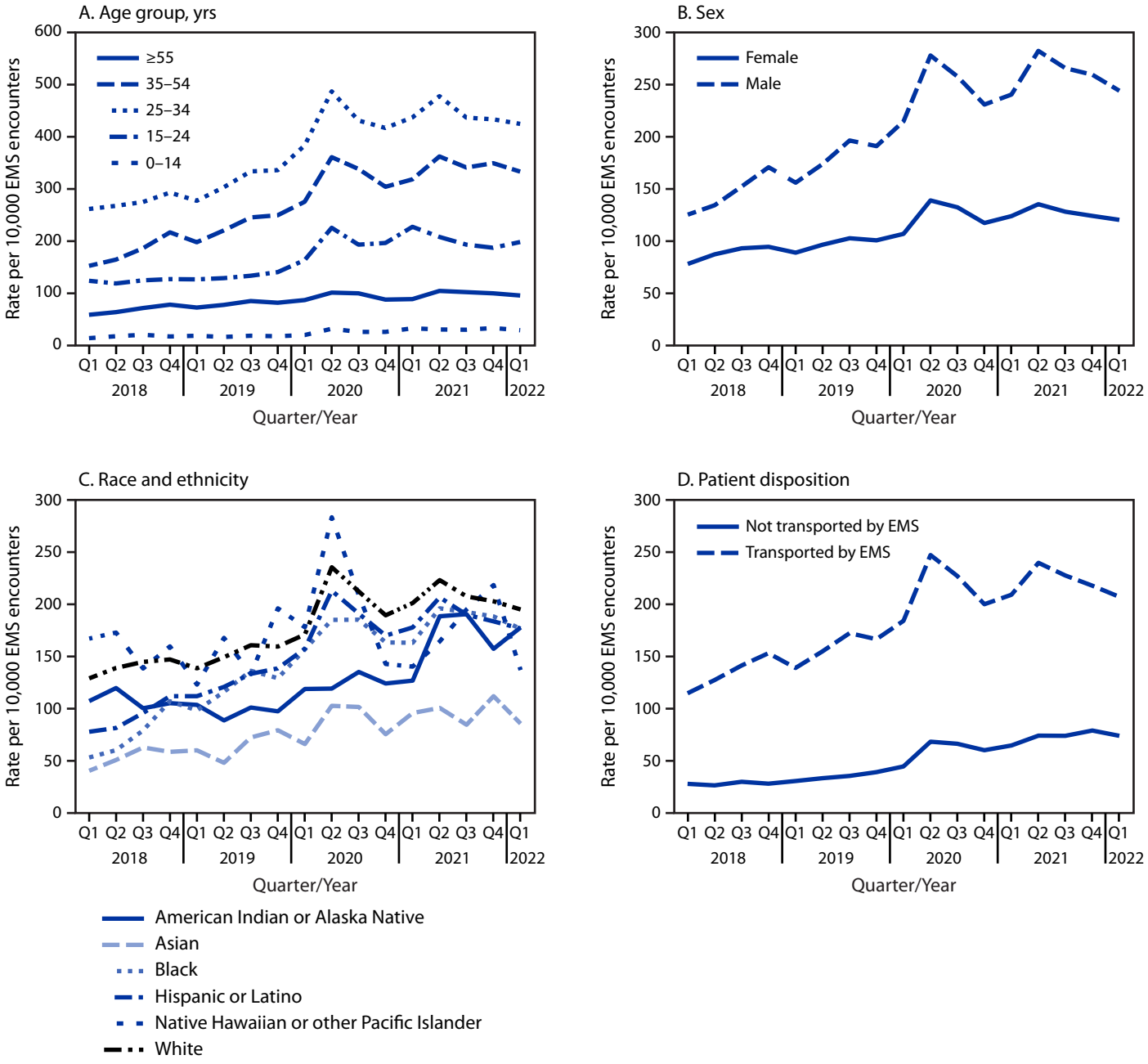
[****] https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm

[††††] https://www.cdc.gov/drugoverdose/nonfatal/dashboard/index.html

during 2019–2020 (*5*). Structural barriers, mistrust in the health care system, and other disparities that contribute to overdose risk underscore the need to address inequities, particularly among minority populations, as part of a comprehensive response to the U.S. drug overdose crisis (*5*).

This report highlights community characteristics that are associated with higher nonfatal opioid-involved overdose rates, such as county-level unemployment. This finding is consistent with a systematic review that reported that recessions and unemployment increased psychological stress and subsequent illegal drug use (*6,7*). Counties with the lowest percentage of uninsured persons represented the only quartile without a significant increase in the rate of nonfatal opioid-involved overdoses. A previous study found that drug overdose mortality

FIGURE 1. Nonfatal opioid-involved overdose rates by age group (A), sex (B), race and ethnicity (C),* and patient disposition (D), by quarter — 491 counties, United States, January 2018–March 2022



Abbreviations: EMS = emergency medical services; Q1 = quarter 1; Q2 = quarter 2; Q3 = quarter 3; Q4 = quarter 4.

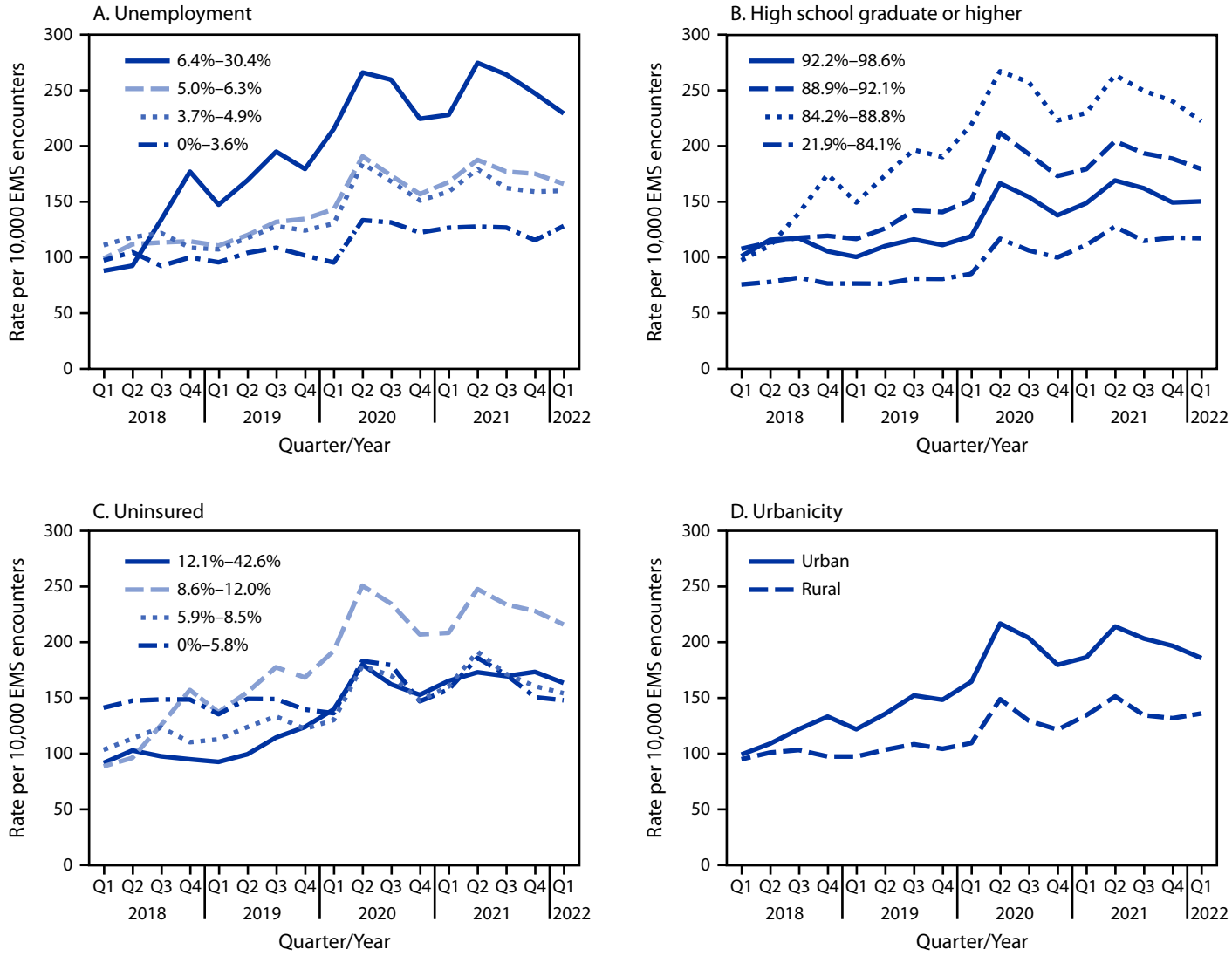
* Persons of Hispanic or Latino ethnicity, regardless of race, were classified as Hispanic. For the remaining categories, persons who were non-Hispanic are reported by their indicated single race classification (e.g., Asian, Black, or White). Persons with other, unknown, or missing race or ethnicity were excluded.

was elevated in U.S. Census Bureau tracts with higher rates of uninsured persons (*8*); however, in the current analysis, the quartile with the second highest percentage of uninsured persons had the highest rate and largest overall rate increase in nonfatal opioid-involved overdoses. Persons who are uninsured might be less likely to use EMS after an overdose; a study in Wisconsin found that Medicaid expansion resulted in an increase in the share of opioid-related ED visits covered by Medicaid among men aged 19–49 and women aged 19–29 years (*9*). In contrast to previous research reporting a higher rate of nonfatal opioid-involved overdose ED discharges in rural areas with lower levels of educational attainment (*10*), rates in the current analysis were lowest in counties with the smallest proportions of high school graduates. This divergent finding might be because of moderation by urbanicity or differences between ED discharge and EMS data (*10*).

The findings in this report are subject to at least five limitations. First, analyses are not nationally representative; therefore, the results cannot be generalized. Second, there are no toxicology results in EMS records to confirm the substance involved in suspected overdoses; however, EMS providers are trained to recognize the signs and symptoms of an opioid overdose so that they can administer appropriate treatment.[§§§§] Third, analyses were not able to identify reasons a person might or

[§§§§] https://www.ems.gov/projects/opioid-crisis.html

FIGURE 2. Nonfatal opioid-involved overdose rates by county-level unemployment (A), education (B), percentage uninsured (C),* and urbanicity (D), by quarter — 491 counties, United States, January 2018–March 2022



Abbreviations: EMS = emergency medical services; Q1 = quarter 1; Q2 = quarter 2; Q3 = quarter 3; Q4 = quarter 4.
* County-level unemployment, education, and percentage uninsured were categorized into quartiles.

TABLE. Joinpoint regression analysis of trends* in rates of emergency medical services encounters for nonfatal opioid-involved overdoses, overall and by patient- and county-level characteristics, by quarter — 491 counties, United States, January 2018–March 2022

Characteristic	Average quarterly % change (95% CI)	No. of joinpoints	Trend segments, quarterly % change (95% CI)		
			Segment 1	Segment 2	Segment 3
Overall	**4.0% (2.3 to 5.8)***	**1**	**Q1 2018–Q3 2020 6.6 (4.6 to 8.6)***	**Q3 2020–Q1 2022 −0.1 (−4.1 to 4.0)**	**NA**
Patient-level					
Age group, yrs					
0–14	5.8 (4.0 to 7.6)*	0	NA	NA	NA
15–24	3.0 (−0.1 to 6.3)	2	Q1 2018–Q3 2019 0.8 (−2.1 to 3.7)	Q3 2019–Q2 2020 17.9 (−0.8 to 40.1)	Q2 2020–Q1 2022 −0.8% (−3.1 to 1.5)
25–34	3.3 (0.9 to 5.7)*	2	Q1 2018–Q3 2019 3.1 (0.9 to 5.5)*	Q3 2019–Q2 2020 12.9 (−1.0 to 28.8)	Q2 2020–Q1 2022 −0.5% (−2.3 to 1.2)
35–54	5.3 (4.1 to 6.6)*	1	Q1 2018–Q2 2020 8.6 (6.9 to 10.3)*	Q2 2020–Q1 2022 1.3 (−1.0 to 3.6)	NA
≥55	3.2 (2.3 to 4.1)*	0	NA	NA	NA
Sex					
Female	3.1 (2.2 to 4.1)*	0	NA	NA	NA
Male	4.7 (3.3 to 6.1)*	1	Q1 2018–Q2 2020 7.8 (5.9 to 9.7)*	Q2 2020–Q1 2022 0.9 (−1.7 to 3.5)	NA
Race and ethnicity†					
American Indian or Alaska Native	3.1 (0.7 to 5.7)*	1	Q1 2018–Q2 2019 −4.0 (−10.7 to 3.2)	Q2 2019–Q1 2022 6.5 (4.3 to 8.9)*	NA
Asian	5.2 (3.3 to 7.0)*	0	NA	NA	NA
Black or African American	7.4 (5.0 to 9.7)*	1	Q1 2018–Q2 2020 13.5 (10.3 to 16.7)*	Q2 2020–Q1 2022 0 (−4.1 to 4.3)	NA
Hispanic or Latino	5.7 (4.4 to 7.0)*	1	Q1 2018–Q2 2020 10.4 (8.6 to 12.2)*	Q2 2020–Q1 2022 0 (−2.4 to 2.3)	NA
Native Hawaiian or other Pacific Islander	0.9 (−1.4 to 3.2)	0	NA	NA	NA
White	3.4 (2.3 to 4.4)*	0	NA	NA	NA
Disposition					
Not transported by EMS	7.1 (3.5 to 10.7)*	2	Q1 2018–Q3 2019 3.9 (0.6 to 7.2)*	Q3 2019–Q2 2020 23.2 (2.0 to 48.8)*	Q2 2020–Q1 2022 3.5% (0.9 to 6.1)*
Transported by EMS	3.9 (2.0 to 5.9)*	1	Q1 2018–Q3 2020 6.6 (4.5 to 8.7)*	Q3 2020–Q1 2022 −0.4 (−4.6 to 4.0)	NA
County-level					
Unemployment rate, % (quartile)§					
0–3.6	2.1 (1.2 to 3.0)*	0	NA	NA	NA
3.7–4.9	3.1 (2.0 to 4.3)*	0	NA	NA	NA
5.0–6.3	4.0 (2.9 to 5.0)*	0	NA	NA	NA
6.4–30.4	5.9 (3.1 to 8.8)*	1	Q1 2018–Q2 2020 11.2 (7.4 to 15.2)*	Q2 2020–Q1 2022 −0.6 (−5.6 to 4.7)	NA
High school graduate or higher, % (quartile)§					
21.9–84.1	3.6 (2.6 to 4.6)*	0	NA	NA	NA
84.2–88.8	5.0 (2.9 to 7.1)*	1	Q1 2018–Q2 2020 10.0 (7.2 to 12.9)*	Q2 2020–Q1 2022 −1.1 (−4.8 to 2.7)	NA
88.9–92.1	4.3 (3.1 to 5.4)*	0	NA	NA	NA
92.2–98.6	3.1 (2.0 to 4.3)*	0	NA	NA	NA
Uninsured, % (quartile)§					
0–5.8	0.9 (−0.1 to 1.9)	0	NA	NA	NA
5.9–8.5	3.3 (2.2 to 4.4)*	0	NA	NA	NA
8.6–12.0	5.5 (3.3 to 7.7)*	1	Q1 2018–Q2 2020 10.2 (7.2 to 13.2)*	Q2 2020–Q1 2022 −0.3 (−4.1 to 3.7)	NA
12.1–42.6	3.6 (1.7 to 5.6)*	2	Q1 2018–Q2 2019 0.2 (−2.8 to 3.4)	Q2 2019–Q2 2020 14.3 (6.6 to 22.6)*	Q2 2020–Q1 2022 0.3% (−1.6 to 2.2)
Urbanicity					
Urban	4.2 (2.4 to 6.0)*	1	Q1 2018–Q3 2020 7.0 (5.0 to 9.0)*	Q3 2020–Q1 2022 −0.3 (−4.3 to 3.8)	NA
Rural	2.8 (1.9 to 3.7)*	0	NA	NA	NA

Abbreviations: EMS = emergency medical services; NA = not applicable; Q1 = quarter 1; Q2 = quarter 2; Q3 = quarter 3.

* P<0.05 was considered statistically significant.

† Persons of Hispanic or Latino ethnicity, regardless of race, were classified as Hispanic. For the remaining categories, persons who were non-Hispanic are reported by their indicated single race classification (e.g., Asian, Black, or White). Persons with other, unknown, or missing race or ethnicity were excluded.

§ The cutoffs for each quartile (derived from the U.S. Census Bureau American Community Survey) are shown (e.g., the first unemployment rate quartile included counties with unemployment rates from 0 to 3.6%).

might not have been transported by EMS after an encounter. It is possible persons who were transported were more likely to be in critical condition (e.g., unconscious) compared with those not transported, and nontransport could have been because of factors other than refusal (e.g., hospitals were at capacity). Fourth, despite only including counties with consistent data coverage, during the onset of the COVID-19 pandemic in March 2020, total EMS encounters decreased by 12.6% in Q2 2020 compared with the previous quarter, and nonfatal opioid-involved EMS encounters increased 15.2%; thus, nonfatal opioid-involved overdose rates might be inflated during this time. Finally, quality and completeness of EMS data might vary by period, reporting agency, and location.

These findings illustrate the utility of EMS data to monitor nonfatal opioid-involved overdose trends, especially given past research findings indicating that persons are increasingly refusing EMS transport to EDs after an overdose (*2*). A study in Kentucky found that during January 14–April 26, 2020, 19.8% of patients treated by EMS for an opioid overdose refused transport to an ED, increasing from 16.4% before the onset of the COVID-19 pandemic to 22.4% after the onset (*2*). This analysis of nonfatal opioid-involved overdose trends highlights the need for increased access to services (e.g., harm reduction) among all populations, and also identifies characteristics of communities that are disproportionately affected by overdoses, such as those with higher unemployment rates. These data can guide public health efforts to ensure implementation of equitable prevention and response initiatives; for example, counties with higher unemployment rates might benefit from increased access to harm reduction services (e.g., naloxone and fentanyl test strip distribution), treatment (e.g., medications for opioid use disorder[¶¶¶¶]), and behavioral health services. Systems of care, which include EMS, mobile-integrated health, and community paramedicine, could collectively deploy to improve access to treatment and promote harm reduction strategies. For example, the Studying the PhilAdelphia Resilience Project as a Response to Overdose (SPARRow) program has staff members who accompany ambulances responding to overdoses and deliver harm reduction and care linkage to persons who refuse hospital transport.[*****] EMS data can also improve understanding of prehospital trends in nonfatal opioid-involved overdoses in near real time to guide tailored public health response and prevention efforts.

[¶¶¶¶] https://www.cdcfoundation.org/sites/default/files/files/PHAST_Web_Toolkit_Pilot_Version_2.0_For_Dissemination.pdf
[*****] https://app.dimensions.ai/details/grant/grant.8632499

Summary

What is already known about this topic?

Nonfatal opioid-involved overdoses treated in emergency departments (EDs) are increasing, yet ED surveillance does not capture all overdoses because persons who had a nonfatal opioid-involved overdose often refuse transport by emergency medical services (EMS).

What is added by this report?

The rate of nonfatal opioid-involved overdose EMS encounters increased, on average, 4.0% quarterly during January 2018–March 2022, from 98.1 to 179.1 per 10,000 EMS encounters. Rates increased across most sociodemographic and county characteristics.

What are the implications for public health practice?

Monitoring nonfatal opioid-involved overdose trends in EMS data in near real time can help identify communities disproportionately affected by overdose and can guide equitable response and prevention efforts, including increased access to harm reduction services and linkage to care and treatment.

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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. Josh Walters reports that he owns employee stock options in biospatial, Inc. No other potential conflicts of interest were disclosed.

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Review of CDC's Suspension of and Advance Written Approval Process for Dogs Entering the United States from Egypt — May 2019–December 2020

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Dog-maintained rabies virus variant (DMRVV) was eliminated in the United States in 2007. During 2015–2019, three dogs with rabies were imported into the United States from Egypt, where DMRVV is endemic. CDC developed a risk mitigation strategy, in consultation with a diverse group of subject matter experts, that permitted 296 dogs to be imported from Egypt during May 10, 2019–December 31, 2020, minimizing the risk for future rabid dog importations. The broadly vetted risk mitigation strategy, which included serologic testing for rabies antibody titer, improved CDC's ability to ensure that imported dogs from Egypt posed no public health risk in the United States. This strategy could be used to guide future policy decisions regarding dog importations.

Rabies is responsible for an estimated 59,000 human deaths annually worldwide; 98% of these deaths are attributed to bites from rabid dogs (*1*). Although numerous variants of the rabies virus exist, DMRVV is of greatest concern because of its global presence in unvaccinated dog populations (*1*). The endemicity of DMRVV in approximately 110 countries creates a risk that DMRVV could be reintroduced into the United States (*2*). Rabies virus is usually transmitted through saliva from the bite or scratch of an infected animal (*3*). The incubation period in dogs and humans is variable, but most dogs infected with the rabies virus begin to show clinical signs of disease within 1–3 months of exposure (*4*). Rabies is nearly 100% fatal in both humans and animals after clinical signs appear. However, routine rabies vaccination in dogs is nearly 100% effective in preventing rabies infection. Hence, the United States requires that all dogs from rabies endemic countries be vaccinated against rabies before importation.

Since 2015, three dogs with confirmed rabies have been exported from Egypt into the United States (*5*–*7*). Molecular characterization confirmed that the DMRVV known to circulate in Egypt was present in each dog, suggesting that the dogs were infected with DMRVV in Egypt before entering the United States. The repeated export of rabid dogs from Egypt in 2015, 2017, and 2019 suggests that challenges might exist with canine rabies control within the country; these challenges might include poor vaccine quality, improper vaccine storage or administration, inaccurate record keeping, and general lack of oversight from veterinary authorities within the country. With each instance of DMRVV importation into the United States, many persons and animals receive postexposure prophylaxis and undergo monitoring and assessment by their state or local health departments, resulting in costs of ≥$200,000 per event (*8*).

As a result of the public health threat posed by dogs imported from Egypt, a suspension of dogs entering the United States from Egypt was issued on May 10, 2019.* Recognizing that returning citizens, including military service members, might be importing their dogs into the United States, CDC developed and implemented a risk mitigation strategy to minimize the likelihood of importing DMRVV from Egypt during the suspension.

Data for the current report were collected through the CDC Application for Permission to Import A Dog Inadequately Immunized Against Rabies — Single Entry forms.† Applications were uploaded and stored in CDC's Quarantine Activity Reporting System (QARS), a secure database that records CDC's border public health activities, including actions taken for CDC-regulated importations. Application data were deidentified for analysis before being extracted from QARS for analysis. This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.§

Dogs were defined as inadequately immunized if they received a rabies vaccine not licensed for use in dogs in the United States, or if they were vaccinated by a veterinarian not state-licensed in the United States, because this is considered unverifiable documentation. Before importation, owners of inadequately vaccinated dogs were required to submit rabies antibody serologic test results from a laboratory approved by the World Organisation for Animal Health (WOAH). If serologic test results were >0.5 IU/mL, CDC issued a conditional import permit, which required revaccination with a rabies vaccine licensed by the U.S. Department of Agriculture within 10 days of arrival in the United States. Under the risk mitigation strategy, dogs entering the United States were required to be adequately protected against rabies and comply with recommendations outlined in the National Association of State Public Health Veterinarians Rabies Compendium (*7*) through the conditional permit process, which required dogs to be revaccinated upon arrival. This strategy was developed through consultation with rabies subject matter experts from federal and state agencies, CDC policy experts, and the

* https://www.federalregister.gov/documents/2019/05/10/2019-09654/notice-of-temporary-suspension-of-dogs-entering-the-united-states-from-egypt
† https://omb.report/icr/202203-0920-014/doc/119915200
§ 45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

U.S. Department of Health and Human Services (HHS) Office of the General Counsel.

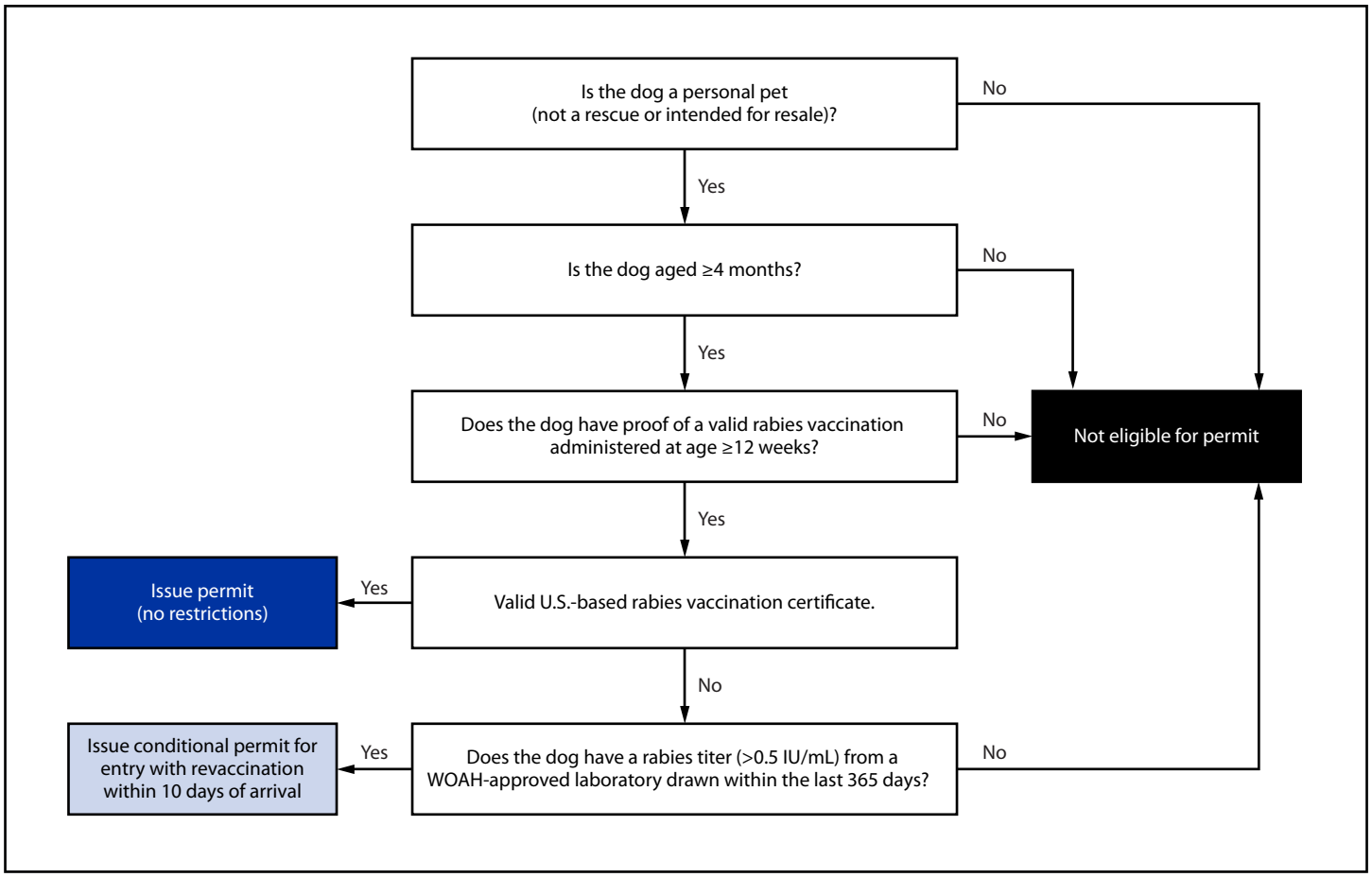
To prevent the import of rabid dogs into the United States, a working group consisting of state and federal partners, animal importation experts, and rabies subject matter experts was convened to discuss processes to reduce the possibility of DMRVV importation from countries with endemic DMRVV, in consultation with CDC policy experts and HHS Office of the General Counsel. The group reviewed rabies epidemiologic data from multiple sources and compared current U.S. dog importation requirements with those of other DMRVV-free countries. The group discussed critical data elements to include in the risk mitigation algorithm (Figure). The meetings also provided an opportunity for federal and state partners to voice their concerns and propose long-term solutions to address the heightened possibility of DMRVV importation from Egypt. Consultations with rabies and animal importation experts from the European Union, the Pan American Health Organization, and the Veterinary Border Inspection Office, Norwegian Food Safety Authority also contributed to the working group's deliberations.

Consensus was achieved on the following processes: persons wishing to import a dog from Egypt were required to apply for and receive a CDC dog importation permit; in addition eligible owners or importers working on behalf of an owner were required to submit 1) CDC Application for Permission to Import a Dog Inadequately Immunized Against Rabies form; 2) proof of a current, valid rabies vaccination certificate;¶ 3) a rabies serologic test result of >0.5 IU/mL from a WOAH-approved laboratory when the dog was considered to be inadequately immunized against rabies; 4) evidence that the dog was aged ≥4 months and eligible for entry into the United States;** 5) verifiable identification information (microchip); and 6) documentation of the owner's employment, university, or other evidence indicating relocation or return to the United States.

¶ Issues with vaccine quality and administration raise questions about the validity of dogs' foreign rabies vaccination certificates; these dogs are considered inadequately immunized.

** The age of dogs entering the United States is verified by licensed U.S. veterinarians using dentition eruption patterns of deciduous and permanent teeth.

FIGURE. Risk mitigation algorithm implemented following May 10, 2019 suspension of dog importations from Egypt — United States, May 10, 2019–December 31,2020



Abbreviation: WOAH = World Organisation for Animal Health.

During May 2019–December 2020, permits for the importation of 296 dogs from Egypt into the United States were issued (Table 1). None of the 296 dogs developed rabies after importation. Among the applicants, 42% were short-term travelers returning to the United States after vacationing in Egypt and 50% had dogs that had been vaccinated outside the United States (Table 2). The average processing time for permit requests was 7.9 days for U.S.-vaccinated dogs and 10.4 days for foreign-vaccinated dogs.

Discussion

The goals of the risk mitigation strategy were to maximize public health protection, reduce the possibility of DMRVV importation events, minimize the difficulties that importers might face when attempting to import a dog, align with state vaccination requirements, and reduce the costs faced by state government health agencies. Data from this analysis indicated that 50% of dogs imported from Egypt during May 2019–December 2020 were vaccinated outside the United States and might have posed a public health risk if CDC had not required the importers to submit pre-arrival rabies serologic test results and agree to postarrival revaccination of their dogs. The risk mitigation strategy improved CDC's ability to ensure that these dogs posed no public health risk in the United States. After attempts to import ineligible dogs during the COVID-19 pandemic, CDC temporarily suspended the entry of dogs into the United States from all countries considered high-risk for canine rabies on July 14, 2021.[††] This suspension used the risk mitigation strategy described in this report as a basis for the temporary CDC dog importation suspension issued in 2021, which uses a combination of import permits, pre-arrival serologic tests, postarrival revaccination, and quarantine (only available during the 2021 suspension).

The reintroduction of DMRVV in Texas in the 1980s led to a large-scale elimination effort by federal and state public health partners for decades. During that time, DMRVV was

TABLE 1. Permits issued to imported dogs from Egypt during the suspension — CDC, May 10, 2019–December 31, 2020

Characteristic	No. (%)
No. of permits (% of total)	
Port of entry	
Hartsfield-Jackson Atlanta International Airport	14 (4.7)
O'Hare International Airport	15 (5.1)
Detroit Metropolitan Wayne County Airport	3 (1.0)
Dulles International Airport	60 (20.3)
George Bush Intercontinental Airport	14 (4.7)
Los Angeles International Airport	18 (6.1)
Miami International Airport	7 (2.4)
Minneapolis-St. Paul International Airport	4 (1.4)
Newark Liberty International Airport	3 (1.0)
John F. Kennedy International Airport	105 (36.8)
Philadelphia International Airport	1 (0.3)
San Francisco International Airport	11 (3.7)
Seattle-Tacoma International Airport	7 (2.7)
Other*	29 (9.8)
Total	**296 (100.0)**
Entry method	
Hand carried	143 (48.3)
Checked baggage	102 (34.5)
Cargo	42 (14.2)
Land border	9 (3.0)
Total	**296 (100.0)**
Dog category/Importer affiliation	
Military working dog	
U.S. Department of Defense	13 (4.4)
Personal pet	
U.S. Department of Defense	14 (4.7)
U.S. Department of State	35 (11.8)
Nongovernment contractors	35 (11.8)
University employees	17 (5.7)
Travelers in Egypt <1 year	127 (42.9)
Other†	55 (18.6)
Total	**296 (100.0)**

* Ports of entry not staffed by CDC personnel.
† Travelers in Egypt >1 year; first time moving to the United States for work or school.

†† https://www.federalregister.gov/documents/2021/06/16/2021-12418/temporary-suspension-of-dogs-entering-the-united-states-from-high-risk-rabies-countries

TABLE 2. Number of permits* issued and number needing rabies serology to import dogs from Egypt during suspension, by time of arrival — CDC, May 10, 2019–December 31, 2020

Arrival year and month	No. (%) of permits issued	No. (%) of permits needing rabies serology
2019		
May	4 (1.4)	3 (75.0)
Jun	15 (5.1)	3 (20.0)
Jul	18 (6.1)	6 (33.0)
Aug	27 (9.1)	11 (41.0)
Sep	21 (7.1)	6 (29.0)
Oct	16 (5.4)	10 (63.0)
Nov	20 (6.8)	12 (60.0)
Dec	9 (3.0)	5 (56.0)
2019 total	**130 (44.0)**	**56 (37.8)**
2020		
Jan	28 (9.5)	16 (57.0)
Feb	13 (4.4)	8 (62.0)
Mar	11 (3.7)	5 (46.0)
Apr	14 (4.7)	6 (43.0)
May	10 (3.4)	8 (80.0)
Jun	10 (3.4)	7 (70.0)
Jul	16 (5.4)	10 (63.0)
Aug	15 (5.1)	6 (40.0)
Sep	12 (4.1)	6 (50.0)
Oct	12 (4.1)	6 (50.0)
Nov	11 (3.7)	7 (64.0)
Dec	14 (4.7)	7 (50.0)
2020 total	**166 (56.0)**	**86 (58.1)**
Overall total	**296 (100.0)**	**148 (50.0)**

* Excludes 40 applicants who changed their arrival dates after applying for permits and were reissued permits later.

Summary

What is already known about this topic?

Dog-maintained rabies virus variant (DMRVV) was eliminated from the United States in 2007. During 2015–2019, three rabid dogs were imported into the United States from Egypt, where DMRVV is endemic.

What is added by this report?

Consultation with subject matter experts enabled CDC to develop a risk mitigation strategy that permitted 296 dogs to be imported from Egypt during May 10, 2019–December 31, 2020, and reduced the risk for rabid dog importations.

What are the implications for public health practice?

The risk mitigation strategy improved CDC's ability to ensure that imported dogs posed no public health risk in the United States. This strategy could be used to guide future policy decisions regarding dog importations.

associated with the death of two persons (*9*) and approximately $25 million in elimination costs (*10*). Although DMRVV has been eliminated from the United States since 2007, DMRVV has a strong potential to adapt to new hosts, including novel reservoir species (*1*). Potential outcomes of importing rabid dogs include the reintroduction and sustained transmission of DMRVV among domestic animals and wildlife, high costs to eliminate DMRVV from animal populations, and the infection of humans and animals resulting in death. The risk mitigation strategy developed during the 2019–2020 suspension of dogs imported from Egypt allowed for the safe entry of some dogs and prevented transmission of rabies by minimizing the likelihood of introducing DMRVV from Egypt during that period. This strategy could be used to guide future policy decisions regarding dog importations.

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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.

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Laboratory-Confirmed COVID-19–Associated Hospitalizations Among Adults During SARS-CoV-2 Omicron BA.2 Variant Predominance — COVID-19–Associated Hospitalization Surveillance Network, 14 States, June 20, 2021–May 31, 2022

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Beginning the week of March 20–26, 2022, the Omicron BA.2 variant of SARS-CoV-2, the virus that causes COVID-19, became the predominant circulating variant in the United States, accounting for >50% of sequenced isolates.* Data from the COVID-19–Associated Hospitalization Surveillance Network (COVID-NET) were analyzed to describe recent COVID-19–associated hospitalization rates among adults aged ≥18 years during the period coinciding with BA.2 predominance (BA.2 period [Omicron BA.2 and BA.2.12.1; March 20–May 31, 2022]). Weekly hospitalization rates (hospitalizations per 100,000 population) among adults aged ≥65 years increased threefold, from 6.9 (week ending April 2, 2022) to 27.6 (week ending May 28, 2022); hospitalization rates in adults aged 18–49 and 50–64 years both increased 1.7-fold during the same time interval. Hospitalization rates among unvaccinated adults were 3.4 times as high as those among vaccinated adults. Among hospitalized nonpregnant patients in this same period, 39.1% had received a primary vaccination series and 1 booster or additional dose; 5.0% had received a primary series and ≥2 boosters or additional doses. All adults should stay up to date† with COVID-19 vaccination, and multiple nonpharmaceutical and medical prevention measures should be used to protect those at high risk for severe COVID-19 illness, irrespective of vaccination status§ (*1*).

COVID-NET conducts population-based surveillance for laboratory-confirmed COVID-19–associated hospitalizations (defined as receipt of a positive SARS-CoV-2 molecular or rapid antigen detection test result during hospitalization or during the 14 days preceding admission) in 99 counties across 14 U.S. states.¶ This analysis describes weekly hospitalization rates among adults aged ≥18 years during June 20, 2021–May 28, 2022; monthly clinical and vaccination data were available through May 31, 2022. Data from the BA.2 period were compared with those from the Delta (B.1.617.2; June 20–December 18, 2021) and BA.1 (Omicron B.1.1.529 and BA.1.1; December 19, 2021–March 19, 2022) periods.

Among all adults,** hospitalization rates were calculated overall, and by age and COVID-19 vaccination status. Vaccination status (i.e., unvaccinated, received primary series only, or received primary series and ≥1 booster or additional dose) was determined for individual hospitalized patients and for the catchment population using state immunization information systems data. Recipients of primary series only include hospitalized persons who received a positive SARS-CoV-2 test result from a specimen collected ≥14 days after either the second of a 2-dose vaccination series or after 1 dose of a single-dose vaccine but who have not received a booster or additional doses. Recipients of primary series with ≥1 booster or additional dose include hospitalized persons who received a primary vaccination series and a booster or additional dose on or after August 13, 2021, with a positive SARS-CoV-2 test result from a specimen collected ≥14 days after receipt of ≥1 booster or additional dose. Because the immune status of all patients is not known, an additional dose (recommended for persons with a compromised immune system) cannot be distinguished from a booster dose. This issue is a relevant consideration because vaccines can be less effective in persons with a compromised immune system. These data do not yet distinguish between multiple booster or additional doses. Unvaccinated patients include those with a positive SARS-CoV-2 test result who have no record of receiving any COVID-19 vaccine doses†† (*2*). Rate ratios were calculated by dividing rates of hospitalization among unvaccinated persons

* https://data.cdc.gov/Laboratory-Surveillance/SARS-CoV-2-Variant-Proportions/jr58-6ysp (Accessed August 21, 2022).

† https://www.cdc.gov/coronavirus/2019-ncov/vaccines/stay-up-to-date.html

§ https://www.cdc.gov/coronavirus/2019-ncov/your-health/treatments-for-severe-illness.html

¶ Data are collected in selected counties in California, Colorado, Connecticut, Georgia, Iowa, Maryland, Michigan, Minnesota, New Mexico, New York, Ohio, Oregon, Tennessee, and Utah. A list of these counties is available at https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e3.htm. Iowa did not provide immunization data but is included in the overall population-based hospitalization rates. Maryland did not contribute data after December 4, 2021, but did contribute data for previous weeks. Additional information on surveillance methods is available at https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covid-net/purpose-methods.html.

** Rates are calculated using the CDC National Center for Health Statistics' vintage 2020 bridged-race postcensal population estimates for the counties included in surveillance (https://www.cdc.gov/nchs/nvss/bridged_race.htm). Rates cannot be stratified by pregnancy status because the underlying population of pregnant persons in the catchment area is unknown.

†† https://covid.cdc.gov/covid-data-tracker/#covidnet-hospitalizations-vaccination (Accessed August 21, 2022).

by rates among vaccinated persons by month and by period of variant predominance and age group.

Using previously described methods (*3,4*), clinical data were collected on an age- and site-stratified representative sample of hospitalized adult patients. Pregnant patients were excluded because their reasons for hospital admission (*3*) might differ from those for nonpregnant persons. Surveillance officers abstracted data on sampled patients from medical charts, including reason for admission.[§§]

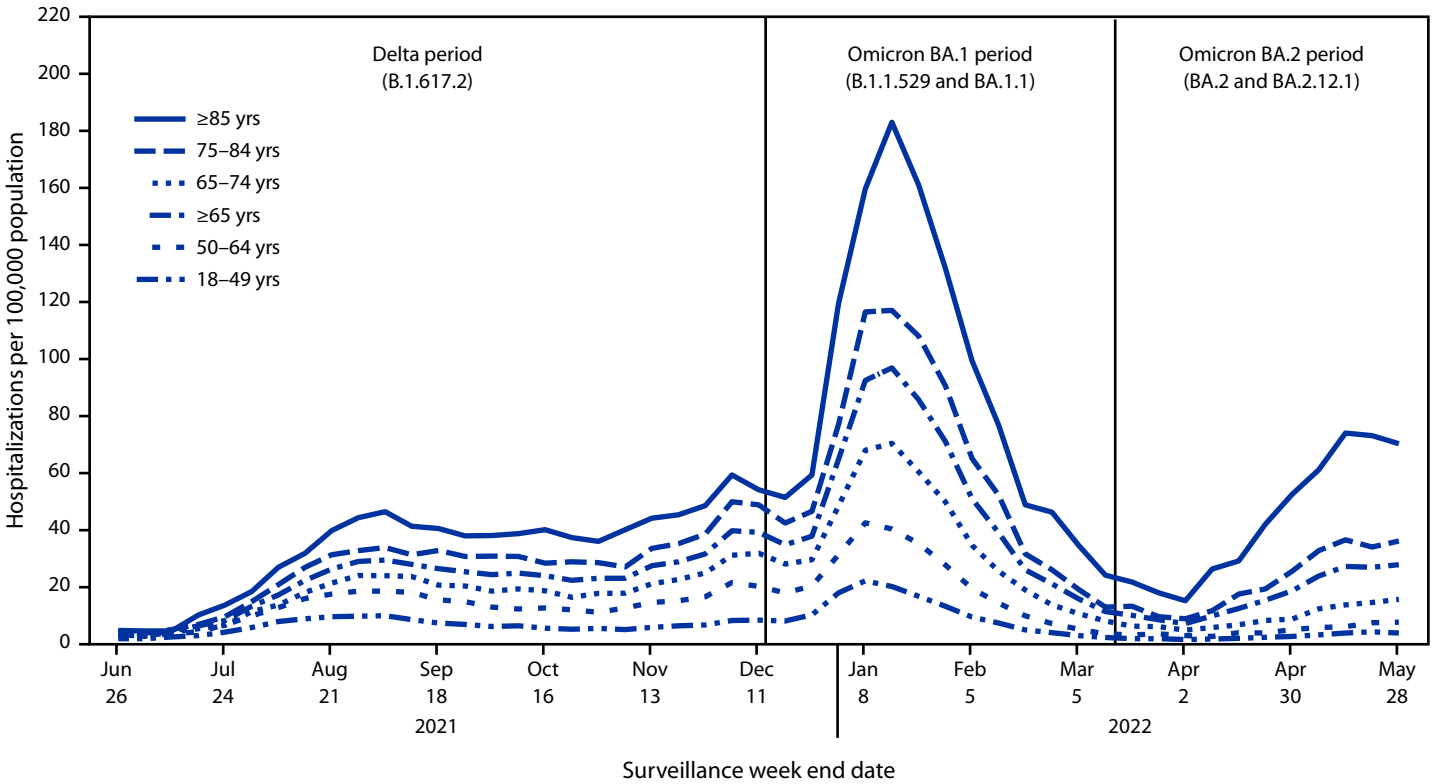
Percentages presented were weighted to account for the probability of selection for sampled cases. Variances were estimated using Taylor series linearization method. Analyses were conducted using SAS statistical software survey procedures (version 9.4; SAS Institute). This activity was reviewed by CDC and conducted consistent with applicable federal law and CDC policy.[¶¶]

During June 20, 2021–May 31, 2022, a total of 121,007 hospitalizations in COVID-NET were recorded. During the BA.2 period, among adults aged ≥65 years, hospitalization rates increased threefold, from a nadir of 6.9 (week ending April 2, 2022) to a peak of 27.6 (week ending May 28, 2022). During the same weeks, rates increased from 1.3 to 3.6 among adults aged 18–49 years and from 2.7 to 7.4 among adults aged 50–64 years, both a 1.7-fold increase (Figure 1). Compared

[§§] COVID-19–related illness as a likely reason for admission is indicated by COVID-19 diagnosis or symptoms consistent with COVID-19 as the chief complaint or reason for admission in the history of present illness. COVID-19–related signs and symptoms included respiratory symptoms (e.g., congestion or runny nose, cough, hemoptysis or bloody sputum, shortness of breath or respiratory distress, sore throat, upper respiratory infection, influenza-like illness, and wheezing) and nonrespiratory signs and symptoms (e.g., abdominal pain, altered mental status or confusion, anosmia or decreased smell, chest pain, conjunctivitis, diarrhea, dysgeusia or decreased taste, fatigue, fever or chills, headache, muscle aches or myalgias, nausea or vomiting, rash, and seizures). Non–COVID-19 reasons for admission included planned inpatient surgery or procedures, psychiatric admission needing acute medical care, trauma, other, and unknown. Two physicians reviewed other reasons for admission and chief complaints to determine whether they likely were not COVID-19–related (e.g., skin and soft tissue infections).

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

FIGURE 1. Weekly COVID-19–associated hospitalization rates among adults aged ≥18 years, by age group and period of COVID-19 variant predominance* — COVID-19–Associated Hospitalization Surveillance Network, 14 states,† weeks ending June 26, 2021–May 28, 2022§



* SARS-CoV-2 variant predominance defined by period when variant accounted for >50% of sequenced isolates.

† Data are collected in selected counties in California, Colorado, Connecticut, Georgia, Iowa, Maryland, Michigan, Minnesota, New Mexico, New York, Ohio, Oregon, Tennessee, and Utah. A list of these counties is available at https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e3.htm. Iowa did not provide immunization data but is included in the overall population-based hospitalization rates. Additional information on surveillance methods is available at https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covid-net/purpose-methods.html.

§ Maryland did not contribute data after December 4, 2021, but did contribute data for previous weeks.

with adults aged 18–49 years, hospitalization rate ratios for adults aged ≥65 years were 3.9, 5.7, and 8.2 in the Delta, BA.1, and BA.2 periods, respectively (Figure 2).

Among 8,266 nonpregnant adults whose medical charts were abstracted, adults aged ≥65 years accounted for 41.0%, 49.6% and 61.5% of hospitalizations during the Delta, BA.1, and BA.2 periods, respectively (Table). Among nonpregnant hospitalized adults who received a positive SARS-CoV-2 test result, the proportion likely admitted for a COVID-19–related illness accounted for 95.5% of hospitalizations during the Delta period, declining to 87.8% and 85.4% in the BA.1 and BA.2 periods, respectively. In adults aged ≥65 years, the proportions likely admitted for a COVID-19–related illness were 96.4%, 92.6%, and 93.4% for the Delta, BA.1, and BA.2 periods, respectively; these proportions were 95.8%, 89.2%, and 80.8% in adults aged 50–64 years and 93.4%, 76.3% and 70.6% in adults aged 18–49 years, respectively.

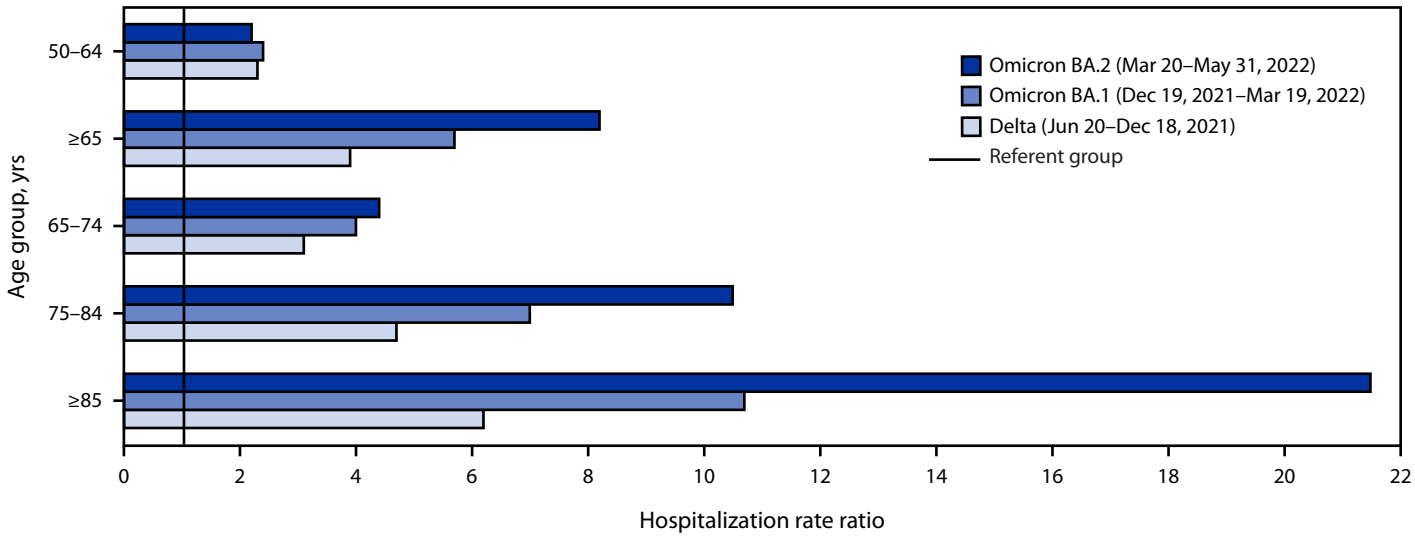
During the BA.2 period, 27.8% of hospitalized adults were unvaccinated, representing a 60% decrease from 69.4% during the Delta period and a 41% decrease from 47.2% during the BA.1 period. The proportion who had received a primary series and ≥1 booster or additional dose increased from 1.4%, 15.6%, and 44.1% during the Delta, BA.1, and BA.2 periods, respectively. In May 2022, the monthly population-based, age-adjusted hospitalization rate among unvaccinated adults aged ≥18 years was 3.4 times as high (95% CI = 3.2–3.6) as rates among vaccinated adults who had received ≥1 booster or additional dose (CDC, COVID-19–Associated Hospitalization Surveillance Network, unpublished data, 2022).

During all periods, the percentage of hospitalized adults with at least one underlying medical condition ranged from 89.3% (Delta) to 95.1% (BA.2). Proportions of hospitalized adults admitted to an intensive care unit during the Delta, BA.1 and BA.2 periods were 24.3%, 17.9% and 13.2%, respectively. The proportion of in-hospital deaths during these periods declined from 12.4% (Delta) to 7.5% (BA.1) and 5.1% (BA.2).

Discussion

During March 20–May 31, 2022, coinciding with the period of the Omicron BA.2 variant predominance, COVID-19–associated hospitalization rates increased among adults aged ≥65 years relative to those in younger adults, and a higher proportion of those hospitalized were aged ≥65 years compared with that during the Delta and BA.1 periods. Nearly all hospitalized adults had one or more underlying medical condition. Hospitalization rates continue to remain higher among unvaccinated adults than among adults who received a primary COVID-19 vaccination series and ≥1 booster or additional dose. Approximately one third of hospitalized adults during the BA.2 period completed a primary series and received 1 booster or additional dose, and 5.0% received ≥2 booster or additional doses. These findings underscore the continued risk

FIGURE 2. COVID-19–associated hospitalization rate ratios* among adults aged ≥18 years, by age group and period of COVID-19 variant predominance — COVID-19–Associated Hospitalization Surveillance Network, 14 states,† July 2021–May 2022§



* Adults aged 18–49 years are the referent group; the rate ratio for this group is 1.0 for all periods.
† Data are collected in selected counties in California, Colorado, Connecticut, Georgia, Iowa, Maryland, Michigan, Minnesota, New Mexico, New York, Ohio, Oregon, Tennessee, and Utah. A list of these counties is available at https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e3.htm. Iowa did not provide immunization data but is included in the overall population-based hospitalization rates. Additional information on surveillance methods is available at https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covid-net/purpose-methods.html.
§ Maryland did not contribute data after December 4, 2021, but did contribute data for previous weeks.

TABLE. Demographic characteristics and clinical interventions and outcomes among nonpregnant adults aged ≥18 years hospitalized with COVID-19* during periods of SARS-CoV-2 B.1.617.2 (Delta), Omicron BA.1, and Omicron BA.2 predominance† (N = 8,266) — COVID-19–Associated Hospitalization Surveillance Network, 14 states,§ June 20, 2021–May 31, 2022¶

Characteristic	Hospitalizations,** No. (%)		
	Delta (Jun 20–Dec 18, 2021)	Omicron BA.1 (Dec 19, 2021–Mar 19, 2022)	Omicron BA.2 (Mar 20–May 31, 2022)
Overall	**5,234 (52.2)**	**1,804 (38.5)**	**1,228 (9.2)**
Demographic characteristic††			
Age, median, yrs (IQR)	59.9 (46.7–72.0)	63.8 (49.8–76.8)	70.5 (55.8–81.5)
Age group, yrs			
18–49	1,523 (28.5)	501 (24.1)	312 (17.5)
50–64	1,859 (30.5)	615 (26.3)	480 (21.0)
≥65	1,852 (41.0)	688 (49.6)	436 (61.5)
65–74	859 (19.2)	287 (19.6)	136 (18.2)
75–84	635 (14.0)	248 (17.5)	175 (24.2)
≥85	358 (7.8)	153 (12.6)	125 (19.1)
Sex			
Male	2,782 (52.9)	971 (52.5)	635 (51.0)
Female	2,452 (47.1)	833 (47.5)	593 (49.0)
Race and ethnicity§§			
White	3,138 (58.0)	1,103 (55.2)	811 (69.5)
Black or African American	1,012 (23.7)	319 (26.2)	208 (15.7)
AI/AN	67 (1.5)	21 (1.3)	13 (0.6)
A/PI	144 (3.5)	51 (4.6)	46 (7.2)
Hispanic or Latino	652 (13.3)	219 (12.7)	118 (7.0)
Long-term care facility residence¶¶	289 (5.7)	146 (9.0)	134 (14.2)
Any underlying medical condition	4,556 (89.3)	1,596 (91.7)	1,118 (95.1)
Immunosuppressive condition	535 (11.0)	288 (16.0)	225 (19.2)
Reason for admission* **			
Likely COVID-19–related	4,838 (95.5)	1,530 (87.8)	1,009 (85.4)
Inpatient surgery	43 (0.4)	44 (1.9)	49 (3.2)
Psychiatric admission requiring medical care	80 (1.4)	72 (3.8)	61 (4.2)
Trauma	78 (1.2)	63 (3.1)	49 (3.2)
Other	72 (1.3)	48 (3.1)	37 (3.7)
Unknown	14 (0.2)	7 (0.4)	6 (0.4)
Vaccination status†††			
Unvaccinated	3,516 (69.4)	800 (47.2)	377 (27.8)
Primary series	1,269 (25.1)	551 (32.6)	322 (24.3)
Primary series with ≥1 booster or additional dose	48 (1.4)	310 (15.6)	443 (44.1)
Primary series with 1 booster or additional dose	43 (1.3)	297 (14.9)	398 (39.1)
Primary series with ≥2 boosters or additional doses	5 (0.1)	13 (0.7)	45 (5.0)
Length of hospital stay, days, median (IQR)	4.8 (2.4–10.0)	3.9 (1.9–8.7)	3.3 (1.6–7.4)
ICU admission§§§	1,252 (24.3)	338 (17.9)	187 (13.2)
Received mechanical ventilation¶¶¶	676 (13.5)	153 (7.6)	80 (5.7)
In-hospital death****	574 (12.4)	131 (7.5)	48 (5.1)

See table footnotes on the next page.

for COVID-19–associated hospitalization, particularly among unvaccinated persons and among older adults, irrespective of vaccination status.

Older adults have experienced the highest hospitalization rates throughout the COVID-19 pandemic, and the proportion of hospitalized adults aged ≥65 years increased during the Delta and Omicron periods. Approximately 90% of COVID-NET hospitalizations among adults aged ≥65 years during the BA.2 period were likely admitted for COVID-19–related illness, which demonstrates that severe COVID-19 continues to affect older adults.

Multiple reasons likely contribute to the disproportionate increase in COVID-19–associated hospitalization rates among older adults. Older age remains the strongest risk factor for severe COVID-19 outcomes; other risk factors include the presence of certain underlying medical conditions*** and being unvaccinated or not having received a COVID-19 primary vaccination series and a booster dose. Although vaccines remain effective at preventing severe illness (*5*), the proportion of hospitalized patients who are vaccinated is expected to increase

*** https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/underlyingconditions.html

TABLE. (*Continued*) Demographic characteristics and clinical interventions and outcomes among nonpregnant adults aged ≥18 years hospitalized with COVID-19* during periods of SARS-CoV-2 B.1.617.2 (Delta), Omicron BA.1, and Omicron BA.2 predominance† (N = 8,266) — COVID-19–Associated Hospitalization Surveillance Network, 14 states,§ June 20, 2021–May 31, 2022¶

Abbreviations: AI/AN = American Indian or Alaska Native; A/PI = Asian or Pacific Islander; COVID-NET = COVID-19–Associated Hospitalization Surveillance Network; ICU = intensive care unit.

* Data are from a weighted sample of hospitalized nonpregnant adults with completed medical record abstractions and a discharge disposition. Sample sizes presented are unweighted with weighted percentages.

† During the Delta period (June 20–December 18, 2021), the Delta (B.1.617.2) variant was the predominant variant (accounting for >50% of sequenced case isolates) in the United States. For the B.1 period (December 19, 2021–March 19, 2022), B.1.1.529 and BA.1.1 were the predominant Omicron variants. For the BA.2 period (March 20, 2022–May 31, 2022), the predominant variants were Omicron subvariants BA.2 and BA.2.12.1.

§ Data are collected in selected counties in California, Colorado, Connecticut, Georgia, Iowa, Maryland, Michigan, Minnesota, New Mexico, New York, Ohio, Oregon, Tennessee, and Utah. A list of these counties is available at https://www.cdc.gov/mmwr/volumes/69/wr/mm6915e3.htm. Iowa did not provide immunization data but is included in the overall population-based hospitalization rates. Additional information on surveillance methods is available at https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covid-net/purpose-methods.html.

¶ Maryland did not contribute data after December 4, 2021, but did contribute data for previous weeks.

** Total hospitalizations include data from selected counties in all 14 COVID-NET states with vaccination status, including fully vaccinated, partially vaccinated, and unvaccinated adults. As a result, the number of total hospitalizations exceeds the sum of fully vaccinated and unvaccinated adults.

†† Percentages presented for demographic and other characteristics are weighted column percentages.

§§ Black or African American, White, AI/AN, and A/PI persons were not Hispanic or Latino (non-Hispanic); Hispanic or Latino (Hispanic) persons could be of any race. If Hispanic ethnicity was unknown, non-Hispanic ethnicity was assumed. Persons with multiple, unknown, or missing race accounted for 3.4% (weighted) of all cases. These persons are excluded from the proportions of race and ethnicity but are otherwise included elsewhere in the analysis.

¶¶ Long-term care facility residents include hospitalized adults who were identified as residents of a nursing home or skilled nursing facility, rehabilitation facility, assisted living or residential care, long-term acute care hospital, group or retirement home, or other long-term care facility upon hospital admission. A free-text field for other types of residences was examined; patients with a long-term care facility-type residence were also categorized as long-term care facility residents.

*** COVID-19–related illness as a likely reason for admission is indicated by COVID-19 diagnosis or symptoms consistent with COVID-19 as the chief complaint or reason for admission in the history of present illness. COVID-19–related symptoms included respiratory signs and symptoms (e.g., congestion or runny nose, cough, hemoptysis or bloody sputum, shortness of breath or respiratory distress, sore throat, upper respiratory infection, influenza-like illness, and wheezing) and nonrespiratory signs and symptoms (e.g., abdominal pain, altered mental status or confusion, anosmia or decreased smell, chest pain, conjunctivitis, diarrhea, dysgeusia or decreased taste, fatigue, fever or chills, headache, muscle aches or myalgias, nausea or vomiting, rash, and seizures). Non–COVID-19 reason for admissions included planned inpatient surgery or procedures, psychiatric admission needing acute medical care, trauma, other, and unknown. Two physicians reviewed other reasons for admission and chief complaints to determine whether they likely were not COVID-19-related (e.g., skin and soft tissue infections).

††† Primary series only includes persons who received a positive SARS-CoV-2 test result from a specimen collected ≥14 days after either the second of a 2-dose vaccination series or after 1 dose of a single dose vaccine but no booster or additional doses. Primary series with ≥1 booster or additional dose includes persons who received a primary vaccination series and a booster or additional dose on or after August 13, 2021, with a positive SARS-CoV-2 test result from a specimen collected ≥14 days after receipt of ≥1 booster or additional dose. Persons who did not receive any COVID-19 vaccine dose were considered unvaccinated. Partially vaccinated persons who received ≥1 vaccine dose but did not complete a primary series ≥14 days before a positive SARS-CoV-2 test result are excluded from data shown.

§§§ ICU admission status was missing in 1.3% (weighted) of hospitalizations; these hospitalizations are otherwise included elsewhere in the analysis.

¶¶¶ Invasive mechanical ventilation status was missing in 1.4% (weighted) of hospitalizations; these hospitalizations are otherwise included elsewhere in the analysis.

**** In-hospital death status was missing in 1.3% (weighted) of hospitalizations; these hospitalizations are otherwise included elsewhere in the analysis.

as vaccination coverage increases. As of July 6, 2022, 91.6% of adults aged ≥65 years had received a primary series, 64.4% had received 1 booster or additional dose, and 22.2% received a second booster or additional doses,††† which was recommended for adults aged ≥50 years on March 29, 2022, during the BA.2 period.§§§ Not being up to date with COVID-19 vaccination might contribute to the increased hospitalization rates among adults in this age group. In addition, COVID-19 vaccine effectiveness has been found to decline 6 months after vaccination, at least in part because of waning immunity, which might disproportionately affect rates among vaccinated older adults who received approval for vaccines earlier than did those in other age groups¶¶¶ (*6*).

Nearly one half of adults hospitalized during the BA.2 period had received a primary vaccination series and ≥1 booster or additional dose. This finding indicates that in addition to increasing vaccination coverage and encouraging all adults to stay up to date with vaccinations, other multiple nonpharmaceutical and medical prevention measures should be implemented to protect persons at high risk for severe illness and hospitalization because of older age, disability, moderate or severe immunocompromise, or other underlying medical conditions (*1*). These additional measures include the use of masks or respirators that provide more protection for the wearer,**** early access to and use of antivirals, including ritonavir-boosted nirmatrelvir (Paxlovid) and remdesivir (Veklury),†††† preexposure prophylaxis if indicated (e.g., Evusheld for persons who are immunocompromised), and following guidance on testing, isolation, and managing exposures§§§§ (*1*).

††† https://data.cdc.gov/Vaccinations/COVID-19-Vaccinations-in-the-United-States-Jurisdi/unsk-b7fc/data (Accessed August 21, 2022).

§§§ https://www.cdc.gov/media/releases/2022/s0328-covid-19-boosters.html

¶¶¶ https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/covid-19.html

**** https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/types-of-masks.html#DifferentSituations

†††† https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/outpatient-treatment-overview.html; https://www.covid19treatmentguidelines.nih.gov/management/clinical-management/clinical-management-summary/

§§§§ https://www.fda.gov/media/154703/download; https://www.covid19treatmentguidelines.nih.gov/overview/prioritization-of-therapeutics/

Summary

What is already known about this topic?

Older adults and those with underlying medical conditions infected with SARS-CoV-2 have increased risks for hospitalization.

What is added by this report?

Increased hospitalization rates among adults aged ≥65 years compared with rates among younger adults were most pronounced during the Omicron BA.2–predominant period. Among hospitalized nonpregnant patients, 44.1% had received primary vaccination and ≥1 booster or additional dose. Hospitalization rates among unvaccinated adults were approximately triple those of vaccinated adults.

What are the implications for public health practice?

Adults should stay up to date with COVID-19 vaccination, including booster doses. Multiple nonpharmaceutical and medical prevention measures should be used to protect persons at high risk for severe SARS-CoV-2, regardless of vaccination status.

The findings in this report are subject to at least five limitations. First, some COVID-19–associated hospitalizations might have been missed because of hospital testing practices. Second, vaccination status is subject to misclassification, which might affect estimation of rates by vaccination status. In addition, because immunocompromise status is not always known, it is not possible to distinguish between booster and additional doses administered to persons who are immunocompromised; not having this information could also have influenced observed rates. Third, information on prehospital COVID-19 treatment was not reliably available in abstracted inpatient records to aid interpretation of clinical data. Fourth, the reason for admission was determined based on a specified algorithm; misclassification might have occurred, because reasons for admission are not always clear. Even among hospitalizations in which COVID-19 was not a likely reason for admission, COVID-19 might still affect clinical decision-making and outcomes. Finally, COVID-NET catchment areas include approximately 10% of the U.S. population; thus, findings might not be nationally generalizable.

Coinciding with the predominance of the Omicron BA.2 variant, COVID-19–associated hospitalization rates increased during March–May 2022, mainly among adults aged ≥65 years. Hospitalization rates continue to be higher among those who are unvaccinated compared with those who were vaccinated with a primary series and ≥1 booster or additional dose. Older adults and those with underlying medical conditions, including those who have been vaccinated, might still be at risk for severe disease as demonstrated by the fact that nearly one half of hospitalized patients during the BA.2 period had received a primary series and ≥1 booster or additional dose. In addition to staying up to date with vaccinations, other multiple nonpharmaceutical and medical prevention measures are important to reduce the risk for hospitalization among adults at high risk for severe COVID-19 illness.

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High-Contact Object and Surface Contamination in a Household of Persons with *Monkeypox Virus* Infection — Utah, June 2022

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In May 2022, the Salt Lake County Health Department reported two real-time polymerase chain reaction (PCR)–confirmed travel-associated cases of monkeypox to the Utah Department of Health and Human Services (UDHHS). The two persons with monkeypox (patients A and B) lived together without other housemates. Both persons experienced prodromal symptoms (e.g., fatigue and body aches). Eight days after symptom onset, patient A experienced penile lesions; lesions spread to the lips, hands, legs, chest, and scalp by day 10. Patient B experienced prodromal symptoms 8 days after illness onset of patient A; patient B experienced a lesion on the foot which spread to the leg and finger by day 11. Although both patients had lesions in multiple anatomic areas, the overall number of lesions was small, and lesions varied in presentation from "pimple-like" or ulcerated, to characteristically well-circumscribed and centrally umbilicated. Both patients had mild illness. The time from symptom onset to resolution was approximately 30 days for patient A and approximately 22 days for patient B.

To assess the presence and degree of surface contamination of household objects contacted by monkeypox patients, UDHHS swabbed objects in the home of the patients. The patients identified high-contact objects and surfaces for sampling; the patients also described cleaning and disinfection activities performed within the home during their illness and locations within the home where they spent substantial amounts of time while ill. The patients had isolated at home for 20 days before their home was entered for sampling. The patients were still symptomatic at the time UDHHS collected specimens from their home. The temperature in the two-story home ranged from 69°F (20.6°C) to 75°F (23.9°C) during their period of isolation. CDC monkeypox-specific cleaning and decontamination guidance (*1*) was shared with the occupants at the time the home surfaces were swabbed.

UDHHS personnel entered the residence discreetly wearing recommended personal protective equipment (*2*). They performed targeted environmental sampling using published methods (*3*). Specimens were obtained from 30 objects in nine areas of the home and were transported to the Utah Public Health Laboratory for shipment to CDC where they were processed and tested with both nonvariola Orthopoxvirus and West African *Monkeypox virus*–specific real-time PCR assays (*4*,*5*). Viral culture was only pursued if the qualitative PCR result was positive.* This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.†

Among the 30 specimens, 21 (70%) yielded positive real-time PCR results, including those from all three porous items (i.e., cloth furniture and blankets), 17 of 25 (68%) nonporous surfaces (e.g., handles and switches), and one of two mixed surface types (i.e., chair) (Table). No specimen yielded a positive viral culture result. During the period of isolation both residents of the home reported showering once or twice each day, performing hand hygiene approximately 10 times daily, laundering bedding and clothing weekly, and performing routine household cleaning (e.g., mopping and daily use of a multisurface spray on most high-contact surfaces). The cleaning spray used was not listed on the Environmental Protection Agency's List of Disinfectants for Emerging Viral Pathogens.§

Monkeypox virus DNA was detected from many objects and surfaces sampled indicating that some level of contamination occurred in the household environment. However, the inability to detect viable virus suggests that virus viability might have decayed over time or through chemical or environmental inactivation. Although both patients were symptomatic and isolated in their home for >3 weeks, their cleaning and disinfection practices during this period might have limited the level of contamination within the household. These data are limited, and additional studies are needed to assess the presence and degree of surface contamination and investigate the potential for indirect transmission of *Monkeypox virus* in household environments.

* https://www.cdc.gov/poxvirus/monkeypox/clinicians/prep-collection-specimens.html (Accessed August 3, 2022).
† 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.
§ https://www.epa.gov/pesticide-registration/disinfectants-emerging-viral-pathogens-evps-list-q#evps (Accessed August 10, 2022).

TABLE. Results of testing for evidence of *Monkeypox virus* on high-contact objects and surfaces swabbed in a household of persons with monkeypox — Utah, June 2022

Surface type	Object/Surface	Room	Material type	Visibly soiled	Average* OPXV PCR Ct value	Average* West African clade MPXV PCR Ct value	Real-time PCR interpretation†	Culture result
Porous	Couch and blanket	Living room	Fabric	No	32.5	32.9	Positive	Negative
Porous	Chaise lounge	Bedroom	Cloth	No	35.2	35.3	Positive	Negative
Porous	Blankets (bed, top)	Bedroom	Fleece	No	34.3	36.1	Positive	Negative
Nonporous	Light switch	Bathroom 1	Plastic	No	37.1	35.6	Positive	Negative
Nonporous	Toilet handle	Bathroom 1	Metal	No	38.0	36.7	Positive	Negative
Nonporous	Toilet seat	Bathroom 1	Plastic	Yes	31.0	30.5	Positive	Negative
Nonporous	Refrigerator handle/ Ice dispenser	Kitchen	Stainless steel	No	35.9	36.9	Positive	Negative
Nonporous	Coffee maker	Kitchen	Stainless steel	No	36.5	36.4	Positive	Negative
Nonporous	Light switch	Bathroom 2	Plastic	No	36.4	37.3	Positive	Negative
Nonporous	Shower door handle	Bathroom 2	Plastic	No	35.3	36.3	Positive	Negative
Nonporous	Toilet handle	Bathroom 2	Metal	No	36.9	36.8	Positive	Negative
Nonporous	Sink handle	Bathroom 2	Metal	No	30.9	31.5	Positive	Negative
Nonporous	Faucet handle	Bathroom 3	Metal	No	28.7	29.6	Positive	Negative
Nonporous	Shower attachment	Bathroom 3	Unknown	No	36.2	37.1	Positive	Negative
Nonporous	Light switch	Landing	Plastic	No	36.9	37.7	Positive	Negative
Nonporous	Banister	Landing	Wood	No	33.5	33.2	Positive	Negative
Nonporous	Computer mouse	Office	Plastic	No	36.2	35.5	Positive	Negative
Nonporous	Keyboard	Office	Plastic	No	34.9	35.2	Positive	Negative
Nonporous	Medicine tube	Office	Plastic	No	33.7	34.5	Positive	Negative
Nonporous	Oven knobs	Kitchen	Stainless steel	Yes	ND	ND	Negative	NT
Nonporous	Door handle	Bathroom 2	Metal	No	ND	39.0	Inconclusive	NT
Nonporous	Blind pull	Office	Wood	No	37.8	ND	Inconclusive	NT
Nonporous	Computer mouse	Dining room	Plastic	No	36.3	37.1	Positive	Negative
Nonporous	Dining room chair	Dining room	Leather	No	37.5	38.5	Inconclusive	NT
Nonporous	Microwave handle	Kitchen	Stainless steel	No	37.5	37.6	Inconclusive	NT
Nonporous	Television remote	Living room	Plastic	No	37.3	37.3	Inconclusive	NT
Nonporous	Thermostat	Living room	Plastic	No	38.1	37.3	Inconclusive	NT
Nonporous	Remote	Bedroom	Plastic	No	38.2	ND	Inconclusive	NT
Mixed	Desk chair	Office	Imitation leather/ Plastic	No	34.0	34.4	Positive	Negative
Mixed	Pillow/Desk chair	Dining room	Flannel/Wood	No	37.4	38.4	Inconclusive	NT

Abbreviations: Ct = cycle threshold; MPXV = *Monkeypox virus*; ND = not detected; NT = not tested; OPXV = *Orthopoxvirus*; PCR = polymerase chain reaction.
* PCR assays were run in duplicate for each specimen.
† In both PCR assays, Ct values of 37–40 are considered inconclusive. Because of differential sensitivities between the real-time PCR assays, interpretation of discordant results are as follows: positive + inconclusive = positive; negative + inconclusive = inconclusive; positive + negative = inconclusive.

Monkeypox virus primarily spreads through close, personal, often skin-to-skin contact with the rash, scabs, lesions, body fluids, or respiratory secretions of a person with monkeypox; transmission via contaminated objects or surfaces (i.e., fomites) is also possible.¶ Persons living in or visiting the home of someone with monkeypox should follow appropriate precautions against indirect exposure and transmission by wearing a well-fitting mask, avoiding touching possibly contaminated surfaces, maintaining appropriate hand hygiene, avoiding sharing eating utensils, clothing, bedding, or towels, and following home disinfection recommendations.**,††

¶ https://www.cdc.gov/poxvirus/monkeypox/transmission.html (Accessed August 15, 2022).
** https://www.cdc.gov/poxvirus/monkeypox/clinicians/infection-control-home.html (Accessed August 8, 2022).
†† https://www.cdc.gov/poxvirus/monkeypox/specific-settings/home-disinfection.html (Accessed August 15, 2022).

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Notes From the Field

Coccidioidomycosis Outbreak Among Wildland Firefighters — California, 2021

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Coccidioidomycosis, also known as Valley fever, is caused by inhalation of spores of the soil-dwelling fungi *Coccidioides* spp. Although most illness is mild, coccidioidomycosis can cause severe disease resulting in hospitalization or death. On July 28, 2021, the California Department of Forestry and Fire Protection (CAL FIRE) notified the California Department of Public Health (CDPH) of seven wildland firefighters from two crews who had respiratory illness. Crew A (19 members) and crew B (21 members) had worked on wildfires in late June 2021 near the Tehachapi Mountains, a California region with historically high coccidioidomycosis incidence.* Among the seven symptomatic firefighters, three cases of coccidioidomycosis were laboratory-confirmed; two patients developed severe disease. All three firefighters with confirmed coccidioidomycosis reported working in dusty conditions without wearing respiratory protection. Because no vaccine for coccidioidomycosis currently exists, correct use of respiratory protection is important for preventing coccidioidomycosis, especially in regions with high disease incidence.

During July 17–August 4, 2021, the seven ill firefighters each visited an emergency department two or three times with cough, chest pain, or shortness of breath; all received negative test results for SARS-CoV-2, the virus that causes COVID-19. Three of the seven firefighters were hospitalized, had serologic test results that were positive for coccidioidomycosis, and were treated with antifungal medication. CDPH interviewed these three patients and reviewed their medical records. Coccidioidomycosis serologic test results for the other four firefighters were negative; however, repeat serology is often suggested if coccidioidomycosis is suspected.† Two of these four were retested and results remained negative and were managed in ambulatory clinics, and two were lost to follow-up. All confirmed cases occurred in patients who worked on crew B, resulting in an attack rate for confirmed cases of 14.3% (three of 21).

The three confirmed cases occurred in men aged 25–34 years, none of whom had any remarkable past medical history. Two patients reported Hispanic or Latino race or ethnicity, and one did not report race or ethnicity. Length of hospital stay ranged from 8 to 17 days. All three patients were treated with the antifungal fluconazole; interval from illness onset to commencement of treatment ranged from 10 to 12 days.

Illness onset and work history dates suggested that *Coccidioides* exposure likely occurred during a 3-day fire near the Tehachapi Mountains. All three patients reported digging trenches and "mopping up" the fire, which included digging and moving soil, with heavy dust exposure and without respiratory protection. All had been fit-tested for a respirator and reported having been trained to minimize dust exposure.

Coccidioidomycosis outbreaks have been reported among wildland firefighters in California, where job-related soil and dust exposure in areas with coccidioidomycosis increases the risk for infection (*1*,*2*). The fungus that causes coccidioidomycosis is endemic in the soil in the southwestern United States, particularly Arizona and California, and in parts of Mexico and Central and South America§; endemicity is also likely expanding (*3*). Use of respiratory protection is challenging in wildland firefighting because of concerns about respirator flammability and compatibility with other equipment, as well as the hot, strenuous nature of the emergency-related work. Despite these challenges, fire agencies could consider evaluating the feasibility of respirator use under specific conditions (e.g., during dust-generating activities away from active burning) and adopt policies accordingly.

Early recognition of coccidioidomycosis and disease management are essential to mitigating severity (*4*). CDPH has previously recommended that all California wildland firefighters receive coccidioidomycosis training regarding exposure risks, prevention, and when to seek care¶ (*2*); CAL FIRE policy is to conduct this training at the beginning of each fire season. Based on findings of this investigation, CDPH recommends safety briefings on coccidioidomycosis prevention, such as use of respirator protection or wetting of soil before disturbance, before deployment to, and return from, possible areas with endemic *Coccidioides* spp. During this outbreak, CAL FIRE was proactive in recommending coccidioidomycosis testing; cases were diagnosed within 12 days, compared with a median of 55 days from illness onset to diagnosis reported in an Arizona study (*5*). California health care providers should ask patients with respiratory illness about work location, high-risk occupations, and exposure to soil disturbance. Providers should also consider that signs and symptoms of coccidioidomycosis might

* https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/CocciEpiSummary2018.pdf
† https://vfce.arizona.edu/valley-fever-people/order-right-tests
§ https://www.cdc.gov/fungal/diseases/coccidioidomycosis/maps.html
¶ https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/OHB/Pages/Cocci.aspx

be similar to those of COVID-19 to avoid unnecessary delays in diagnosis. As frequency of coccidioidomycosis and wildfires increase in California, exploration of protective equipment and additional training are needed to better protect wildland firefighters (*3*).

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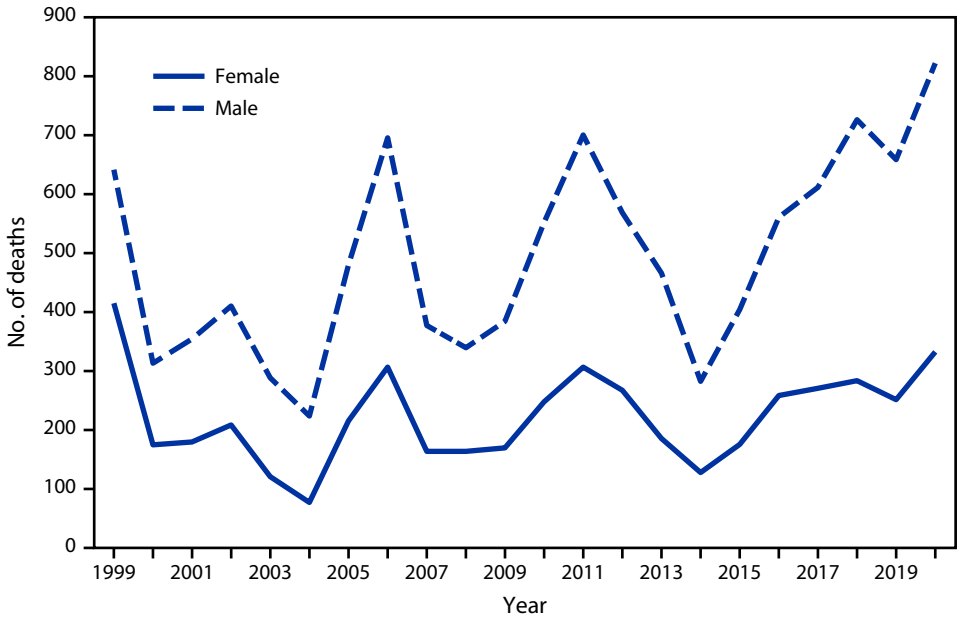
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Deaths Involving Exposure to Excessive Heat,* by Sex — National Vital Statistics System, United States, 1999–2020



* Deaths attributed to exposure to excessive natural heat as the underlying or contributing cause of death were identified using the *International Classification of Diseases, Tenth Revision* codes P81.0 (environmental hyperthermia of newborn), T67 (effects of heat and light), and X30 (exposure to excessive natural heat, i.e., hyperthermia), for a total of 15,707 deaths during 1999–2020. Deaths with underlying cause W92 (exposure to excessive heat of man-made origin, such as malfunctioning heating appliances) were excluded.

During 1999–2020, the annual number of deaths from excessive natural heat ranged from a low of 297 in 2004 to a high of 1,153 in 2020. The number of deaths among males increased from 622 deaths in 1999 to 822 deaths in 2020, but there was no statistically significant increase among females. During 1999–2020, there were generally twice as many deaths among males than among females each year.

Source: National Vital Statistics System, multiple cause of death data, 1999–2020. https://wonder.cdc.gov/mcd.html

Reported by: Arialdi Miniño, MPH, avm9@cdc.gov, 301-458-4376.

For more information on this topic, CDC recommends the following link: https://www.cdc.gov/disasters/extremeheat/index.html

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