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County-Level Social Vulnerability and Emergency Department Visits for Firearm Injuries — 10 U.S. Jurisdictions, January 1, 2018–December 31, 2021

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At least 100,000 persons in the United States experience a fatal or nonfatal firearm injury each year.* CDC examined rates of firearm injury emergency department (ED) visits by community social vulnerability using data from CDC's Firearm Injury Surveillance Through Emergency Rooms (FASTER) program.† ED visit data, shared with CDC's National Syndromic Surveillance Program (NSSP)§ during 2018–2021, were analyzed for 647 counties in 10 FASTER-funded jurisdictions.¶ County-level social vulnerability data were obtained from the 2018 Social Vulnerability Index (SVI).** Rates of ED visits for firearm injuries (number of firearm injury ED visits per 100,000 ED visits) were calculated across tertile levels of social vulnerability. Negative binomial regression models were used to estimate rate ratios (RRs) and associated 95% CIs comparing rates of ED visits across social vulnerability levels. During 2018–2021, compared with rates in counties with low overall social vulnerability, the firearm injury ED visit rate was 1.34 times as high in counties with medium social vulnerability and 1.80 times as high in counties with high social vulnerability. Similar patterns were observed for the SVI themes of socioeconomic status and housing type and transportation, but not for the themes of household composition and disability status or racial and ethnic minority status and language proficiency. More timely data†† on firearm injury ED visits by social vulnerability can help identify communities disproportionately experiencing elevated firearm injury rates. States and communities can use the best available evidence to implement comprehensive prevention strategies that address inequities in the social and structural conditions that contribute to risk for violence, including creating protective community environments, strengthening economic supports, and intervening to reduce harms and prevent future risk (e.g., with hospital-based violence intervention programs) (*1*,*2*).

In 2021, CDC's FASTER program was established to provide more timely and comprehensive data on firearm injuries at the state and local levels than were available through traditional data sources. CDC analyzed ED visit data during January 1, 2018–December 31, 2021, for 647 counties in 10 FASTER-funded jurisdictions. Aggregated data were shared through CDC's NSSP platform (*3*). The 10 jurisdictions included in this analysis reported data on a minimum of 75% of ED visits occurring within their jurisdictions, including a minimum of 90% of visits from Level 1–3 trauma centers.§§ Initial firearm injury encounters (including those classified as unintentional,

* https://www.cdc.gov/injury/wisqars/index.html
† https://www.cdc.gov/violenceprevention/firearms/funded-surveillance.html
§ Analyses were limited to ED encounters. NSSP is a collaboration among CDC; local and state health departments; and federal, academic, and private sector partners. Electronic patient encounter data are collected from EDs, urgent and ambulatory care centers, inpatient health care settings, and laboratories. https://www.cdc.gov/nssp/index.html
¶ The 10 FASTER-funded jurisdictions were the District of Columbia, Florida, Georgia, New Mexico, North Carolina, Oregon, Utah, Virginia, Washington, and West Virginia.
** https://www.atsdr.cdc.gov/placeandhealth/svi/index.html
†† https://www.norc.org/PDFs/A%20Blueprint%20for%20U.S.%20Firearms%20Data%20Infrastructure/Improving%20Data%20Infrastructure%20to%20Reduce%20Firearms%20Violence_Final%20Report.pdf
§§ https://www.amtrauma.org/page/traumalevels

Continuing Education examination available at https://www.cdc.gov/mmwr/mmwr_continuingEducation.html

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intentional self-harm, assault, legal intervention, terrorism, and undetermined intent) were identified using a syndrome definition including diagnosis codes and chief complaint text fields (Supplementary Box, https://stacks.cdc.gov/view/cdc/118752).

Data on county-level social vulnerability were obtained from the 2018 SVI, which uses U.S. Census Bureau American Community Survey 2014–2018 5-year data[¶¶] estimates for 15 population-based county-level sociodemographic indicators to form an overall social vulnerability metric, as well as four additional focused metrics representing themes of socioeconomic status, household composition and disability, racial and ethnic minority status and language proficiency, and housing type and transportation. The SVI includes ranked scores ranging from 0–1 applied to 3,142 counties in the United States.

Counties in the 10 FASTER-funded jurisdictions were categorized into tertiles (low, medium, high) of social vulnerability for the overall SVI, the SVI themes, and the individual indicators of each SVI theme, with higher values representing higher levels of social vulnerability. Crude rates of firearm injury ED visits (number of ED visits for firearm injuries per 100,000 ED visits) were calculated for each level of social vulnerability. A total of 647 (99.2%) of 652 counties sharing data with NSSP in the 10 jurisdictions had data on ED visits and the SVI, and were included in the analyses. Negative binomial regression models including fixed effects for jurisdictions were fit to estimate RRs and associated 95% CIs comparing rates among high and medium social vulnerability counties with those in low social vulnerability counties across the overall SVI, separate SVI themes, and individual SVI indicators.[***] Regression analyses were conducted using SAS software (version 9.4; SAS Institute). SVI tertiles were included in the models as categorical variables. This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.[†††]

During 2018–2021, the overall crude firearm injury ED visit rate among the 10 jurisdictions was 74 per 100,000 ED visits, with low, medium, and high social vulnerability counties experiencing rates of 55, 77, and 92 firearm injury ED visits per 100,000 ED visits, respectively. Compared with counties with low overall social vulnerability, rates of firearm injury ED visits were 1.34 and 1.80 times as high in counties with

¶¶ https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes/2018/5-year.html

*** The number of facilities sharing data with NSSP can vary over time and potentially influence ED visit trends. Although this study used a cross-sectional analysis using data aggregated across years and did not examine trends, sensitivity analyses were conducted by restricting to facilities consistently reporting informative data (specifically, facilities with a coefficient of variation ≤40 and average number of weekly discharge diagnoses with useful information of ≥75 through the analysis period; average number of weekly discharge diagnoses with useful information was not applied to facilities in the District of Columbia). Results from the sensitivity analyses were similar to results presented in this report, which analyzed data from all facilities sharing data with NSSP in the 10 FASTER-funded jurisdictions during the study period.

††† 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.

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medium and high overall social vulnerability, respectively (Table). Similar patterns were observed for the SVI theme of socioeconomic status, with rates of firearm injury ED visits higher among counties with medium (RR = 1.27) and high (RR = 1.61) vulnerability compared with counties with low social vulnerability. This pattern was apparent for all four indicators of socioeconomic status, with the most pronounced differences in firearm injury ED visit rates observed when comparing SVI tertiles across the poverty indicator.

For the housing type and transportation theme, rates of firearm injury ED visits were also higher among medium (RR = 1.32) and high (RR = 1.75) social vulnerability counties compared with low social vulnerability counties. This pattern was apparent for two of five indicators constituting the theme: percentage of persons living in group quarters and percentage of households with no vehicle access.

Although ED visit rates were not higher in medium and high social vulnerability counties for the two SVI themes of household composition and disability status and racial and ethnic minority status and language proficiency, among specific indicators for each, rates were higher among counties with higher percentages of single-parent households and persons identifying as a racial or ethnic minority; rates were lower among counties with higher percentages of persons aged ≥65 years.

Discussion

In this multistate report analyzing syndromic surveillance ED data for firearm injuries across FASTER-funded jurisdictions, counties with higher overall social vulnerability experienced higher rates of firearm injury ED visits during 2018–2021. Higher community social vulnerability has been previously associated with higher rates of firearm deaths (*4*). The findings of this report indicate that social vulnerability is also associated with the percentage of ED visits that are for firearm injuries.

TABLE. Rates of ED visits for firearm injuries* in medium and high social vulnerability areas compared with rates in low social vulnerability areas† — FASTER program, 10 U.S. jurisdictions,§ 2018–2021

SVI themes	SVI tertile (vulnerability level), RR¶ (95% CI)		
	1 (Low)**	2 (Medium)	3 (High)
Overall	**Ref**	**1.34 (1.22–1.47)**	**1.80 (1.50–2.16)**
Socioeconomic status	Ref	1.27 (1.15–1.39)	1.61 (1.33–1.94)
Percentage of persons living below poverty	Ref	1.40 (1.27–1.53)	1.95 (1.62–2.34)
Percentage of persons unemployed	Ref	1.18 (1.07–1.30)	1.39 (1.15–1.68)
Per capita income††	Ref	1.15 (1.04–1.26)	1.31 (1.09–1.59)
Percentage of persons aged ≥25 yrs with no HS diploma	Ref	1.20 (1.08–1.32)	1.43 (1.18–1.74)
Household composition and disability status	Ref	1.02 (0.93–1.12)	1.05 (0.86–1.26)
Percentage of persons aged ≥65 yrs	Ref	0.89 (0.81–0.98)	0.80 (0.66–0.97)
Percentage of persons aged <18 yrs	Ref	1.07 (0.97–1.18)	1.14 (0.94–1.39)
Percentage of persons living with a disability	Ref	1.10 (0.99–1.21)	1.20 (0.99–1.46)
Percentage of households with single parents and children	Ref	1.18 (1.07–1.29)	1.39 (1.15–1.67)
Racial and ethnic minority status and language proficiency	Ref	1.08 (0.97–1.20)	1.17 (0.94–1.44)
Percentage of racial and ethnic minority residents	Ref	1.25 (1.13–1.37)	1.55 (1.28–1.89)
Percentage of persons with limited English proficiency	Ref	0.97 (0.88–1.08)	0.94 (0.77–1.16)
Housing type and transportation	Ref	1.32 (1.21–1.45)	1.75 (1.45–2.11)
Percentage of housing structures with ≥10 units	Ref	1.00 (0.91–1.11)	1.00 (0.82–1.22)
Percentage of housing units that are mobile home units	Ref	0.92 (0.83–1.01)	0.84 (0.70–1.03)
Percentage of households with more persons than rooms	Ref	1.06 (0.96–1.17)	1.12 (0.92–1.37)
Percentage of households with no vehicle access	Ref	1.10 (1.01–1.20)	1.21 (1.01–1.45)
Percentage of persons living in group quarters	Ref	1.20 (1.09–1.32)	1.45 (1.20–1.75)

Abbreviations: ATSDR = Agency for Toxic Substances and Disease Registry; ED = emergency department; FASTER = Firearm Injury Surveillance Through Emergency Rooms; HS = high school; NSSP = National Syndromic Surveillance Program; Ref = referent group; RR = rate ratio; SVI = social vulnerability index.

* Defined using CDC's syndrome definition based on a combination of discharge diagnosis codes and chief complaint terms identifying initial encounters for a firearm injury, including those classified as unintentional, intentional self-harm, assault, legal intervention, terrorism, and undetermined intent.

† County-level social vulnerability data were obtained from the 2018 CDC/ATSDR SVI. Counties were categorized into groups (low, medium, high) of social vulnerability for the overall SVI, its four themes, and the individual indicators comprising each SVI theme based on tertile distributions across the counties. Higher values of the overall SVI, SVI themes, and SVI indicators represent greater levels of social vulnerability.

§ The 10 FASTER-funded jurisdictions were District of Columbia, Florida, Georgia, New Mexico, North Carolina, Oregon, Utah, Virginia, Washington, and West Virginia. Data from these jurisdictions were shared with CDC's NSSP (accessed March 16, 2022). Among 652 counties with facilities sharing data with NSSP in the 10 jurisdictions, 647 (99%) had data on the SVI and at least one ED visit and were included in rate calculations.

¶ Rates of firearm injury ED visits (number of ED visits for firearm injuries per 100,000 ED visits) for each level of county social vulnerability were calculated. Negative binomial regression models including fixed effects for jurisdictions were fit to estimate RRs and associated 95% CIs comparing rates among high and medium social vulnerability counties with those in low social vulnerability counties across the overall SVI, separate SVI themes, and individual SVI indicators.

** Referent group was low social vulnerability areas.

†† Per capita income was reverse-coded.

Summary

What is already known about this topic?

At least 100,000 persons in the United States experience a fatal or nonfatal firearm injury each year.

What is added by this report?

During 2018–2021, among 10 jurisdictions participating in CDC's Firearm Injury Surveillance Through Emergency Rooms program, counties with higher overall social vulnerability experienced higher proportions of emergency department visits for firearm injuries.

What are the implications for public health practice?

Monitoring firearm injury emergency department visits by county-level social vulnerability can help guide tailored prevention efforts that address inequities in social and structural conditions that contribute to risk for violence, including creating protective community environments, strengthening economic supports, and intervening to reduce harms and prevent future risk.

In this analysis, among all ED visits, higher proportions of firearm injury ED visits occurred in low socioeconomic status communities. An index of neighborhood disadvantage, including poverty and unemployment, has been previously associated with higher numbers of firearm injuries (*5*), and surrounding poverty and higher income inequality have been linked to higher firearm homicide rates (*6*,*7*). In the present analysis, rates of firearm injury visits were also associated with additional indicators, including proportion of racial and ethnic minority persons. Current and historical inequities that marginalize some racial and ethnic minority groups in the United States might contribute to elevated rates of firearm injuries in these communities (*8*). For example, structural racism, in the form of redlining, a discriminatory practice of systematic disinvestment of neighborhoods and denial of service provision (including financial services) to residents of neighborhoods that include substantial numbers of racial and ethnic minority and low-income residents, has been associated with higher rates of firearm injuries in an urban setting (*9*); evidence indicates that racial residential segregation has also been predictive of racial disparities in firearm-related homicides (*10*). Patterns of firearm injury visit rates also varied by age, vehicle accessibility, housing density, and single-parent household status. Together with additional context and understanding of historical and structural factors affecting specific communities, these data can help guide tailored prevention efforts and partnerships to reduce inequities in risk for firearm injuries.

The findings in this report are subject to at least five limitations. First, data are limited to 10 U.S. jurisdictions and are not nationally representative. Second, the syndrome definition used in this study to identify firearm injury ED visits does not distinguish the injury intent; the distribution of firearm injuries across levels of social vulnerability might be different for specific intents. In addition, the definition might under- or overestimate ED visits related to firearm injuries because of possible variation in coding practices and reporting of visit-level data across facilities. Third, the number of facilities sharing data with NSSP can vary over time. Potential fluctuations in facility participation were accounted for by calculating a rate indicating the proportion of the total number of ED visits for firearm injuries. However, rates, and thereby, comparisons, across SVI tertiles could be influenced by changes in the denominator or characteristics of the populations usually served by participating facilities. Fourth, the smallest geographic level at which these firearm injury data were available at the time of this report is at the county level, which limits the ability to examine the distribution of firearm injuries across smaller geographic levels (e.g., census tract). Finally, the SVI is based on 5-year estimates during 2014–2018, and ED visits during 2018–2021 were analyzed. The timing of the data and ecological design limit the ability to draw causal conclusions and examine current or historical determinants of firearm injuries.

Timelier ED data can help health departments and clinical and community partners collaboratively identify communities disproportionately experiencing firearm injuries. SVI data can help focus prevention efforts on reducing and addressing the effects of the underlying drivers of inequities using strategies with the best available evidence, including creating protective community environments, strengthening economic supports, and intervening to reduce harms and prevent future risk (e.g., with hospital-based violence intervention programs) (*1*,*2*).

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Factors Associated with Severe Outcomes Among Immunocompromised Adults Hospitalized for COVID-19 — COVID-NET, 10 States, March 2020–February 2022

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Immunocompromised persons are at increased risk for severe COVID-19–related outcomes, including intensive care unit (ICU) admission and death (*1*). Data on adults aged ≥18 years hospitalized with laboratory-confirmed COVID-19 from 10 U.S. states in the COVID-19–Associated Hospitalization Surveillance Network (COVID-NET) were analyzed to assess associations between immunocompromise and ICU admission and in-hospital death during March 1, 2020–February 28, 2022. Associations of COVID-19 vaccination status with ICU admission and in-hospital death were also examined during March 1, 2021–February 28, 2022. During March 1, 2020–February 28, 2022, among a sample of 22,345 adults hospitalized for COVID-19, 12.2% were immunocompromised. Among unvaccinated patients, those with immunocompromise had higher odds of ICU admission (adjusted odds ratio [aOR] = 1.26; 95% CI = 1.08–1.49) and in-hospital death (aOR = 1.34; 95% CI = 1.05–1.70) than did nonimmunocompromised patients. Among vaccinated patients,* those with immunocompromise had higher odds of ICU admission (aOR = 1.40; 95% CI = 1.01–1.92) and in-hospital death (aOR = 1.87; 95% CI = 1.28–2.75) than did nonimmunocompromised patients. During March 1, 2021–February 28, 2022, among nonimmunocompromised patients, patients who were vaccinated had lower odds of death (aOR = 0.58; 95% CI = 0.39–0.86) than did unvaccinated patients; among immunocompromised patients, odds of death between vaccinated and unvaccinated patients did not differ. Immunocompromised persons need additional protection from COVID-19 and using multiple known COVID-19 prevention strategies,† including nonpharmaceutical interventions, up-to-date vaccination of immunocompromised persons and their close contacts,§ early testing, and COVID-19 prophylactic (Evusheld) and early antiviral treatment,¶ can help prevent hospitalization and subsequent severe COVID-19 outcomes among immunocompromised persons.

COVID-NET is a CDC-funded collaboration for population-based surveillance of laboratory-confirmed COVID-19–associated hospitalization in 99 U.S. counties in 14 states. A COVID-NET case is defined as a positive real-time reverse transcription–polymerase chain reaction or rapid antigen test result for SARS-CoV-2 (the virus that causes COVID-19) within 14 days before or during hospitalization in a person who lived in the surveillance catchment area. Medical chart abstraction and representative sampling methods have been described previously (*2*). Data collected on sampled adults hospitalized during March 1, 2020–February 28, 2022, across 10 participating states** were examined. Patients whose hospitalization was not likely related to COVID-19†† and those without a completed chart review were excluded. Immunocompromised patients were defined as those having one or more predefined immunocompromising conditions.§§ COVID-19 vaccination definitions for immunocompromised persons changed during the study period¶¶; in this analysis, a vaccinated patient was defined as one who had received both doses of a 2-dose COVID-19 vaccination series or 1 dose of a single-dose COVID-19 vaccine with or without additional

* Vaccinated patients were defined as those with a positive SARS-CoV-2 test result from a specimen collected ≥14 days after either the second dose of a 2-dose vaccination series or after 1 dose of a single-dose vaccine. When not otherwise specified, vaccinated patients include those who might have received additional or booster doses. Vaccinated patients without additional or booster doses include both those eligible and those not yet eligible for an additional or booster dose. Vaccinated patients with additional booster doses received additional or booster doses on or after August 13, 2021, with a positive SARS-CoV-2 test result from a specimen collected ≥14 days after receipt of additional or booster doses.

† https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html

§ https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations/immuno.html

¶ https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html; https://www.covid19treatmentguidelines.nih.gov/overview/prioritization-of-therapeutics/

** California, Colorado, Connecticut, Georgia, Michigan, Minnesota, New Mexico, New York, Oregon, and Tennessee. Data from four other states in COVID-NET were not available for this analysis.

†† Excluded admissions for labor/obstetrics, trauma, psychiatric conditions, or inpatient surgery.

§§ Standardized COVID-NET medical chart abstraction identified the following immunocompromising conditions: AIDS or CD4+ count <200, complement deficiency, graft versus host disease, HIV infection, immunoglobulin deficiency/immunodeficiency, immunosuppressive therapy (within 12 months before admission), leukemia, Hodgkin or non-Hodgkin lymphoma, metastatic cancer, multiple myeloma, solid organ malignancy, steroid therapy (within 2 weeks of admission), and transplant history involving hematopoietic stem cells or solid organs.

¶¶ https://www.cdc.gov/media/releases/2021/s0813-additional-mRNA-mrna-dose.html

or booster doses ≥14 days before their positive SARS-CoV-2 test result, per state immunization information system records. Vaccinated patients with additional or booster doses were not analyzed separately. Patients were considered unvaccinated if no COVID-19 vaccination was recorded before the positive test result; patients who were documented to have received only the first dose of a 2-dose series or their last vaccination series dose <14 days before receiving a positive SARS-CoV-2 test result were excluded.

Demographic and clinical characteristics of hospitalized patients were assessed; Pearson's chi-square tests were used to compare differences between immunocompromised and nonimmunocompromised patients. Bivariate and multivariable logistic regression analyses were used to assess associations between immunocompromise and both ICU admission and in-hospital death among vaccinated and unvaccinated patients in separate models. Associations between each individual immunocompromising condition and death were assessed using multivariable analyses, adjusting only for age and sex to improve model convergence. Bivariate and multivariable analyses were used to assess the association between vaccination status and both ICU admission and in-hospital death among immunocompromised and nonimmunocompromised patients in separate models, using data beginning March 1, 2021, when immunocompromised patients first reported receiving vaccine doses, through February 28, 2022. Multivariable analyses were adjusted for age, sex, site (entered as a fixed effect), SARS-CoV-2 variant–predominant period,*** and other factors with documented or potential association and a p-value <0.10 in bivariate analyses. Statistical analyses used SAS (version 9.4; SAS Institute) survey procedures to account for sampling weights, with statistical significance set at alpha = 0.05. This activity was reviewed by CDC and conducted consistent with applicable federal law and CDC policy.†††

During March 1, 2020–February 28, 2022, a representative sample of 24,625 (11.0%, unweighted) of 223,069 COVID-NET cases had complete chart review, including 22,345§§§ (90.7%, unweighted) that met inclusion criteria. Among the 22,345 patients included, 12.2% were immunocompromised, including 11.1%, 10.9%, and 17.3% of patients hospitalized during the pre-Delta, Delta, and Omicron variant–predominant periods, respectively. Overall, immunocompromised patients were more likely to be older and to be non-Hispanic White (Table 1). Compared with nonimmunocompromised patients, those with immunocompromise had a statistically significantly higher prevalence of all underlying medical conditions except diabetes and neurologic disease.

Among unvaccinated patients, those who were immunocompromised had higher odds of ICU admission (aOR = 1.26) and death (aOR = 1.34) than did nonimmunocompromised patients¶¶¶ (Table 2). Similarly, among vaccinated patients, those who were immunocompromised also had higher odds of ICU admission (aOR = 1.40) and in-hospital death (aOR = 1.87) compared with nonimmunocompromised patients.**** Among patients with a specific immunocompromising condition compared with patients without that condition (irrespective of immunocompromise status), the odds of in-hospital death were higher for those with AIDS or low CD4+ count (aOR = 2.03), immunosuppressive therapy use (aOR = 1.65), multiple myeloma (aOR = 5.28), or solid organ transplant (aOR = 2.12) and lower for patients with immunoglobulin deficiency (aOR = 0.16) (Supplementary Table 1, https://stacks.cdc.gov/view/cdc/118606).

Among immunocompromised patients, those who were vaccinated did not have statistically significantly different odds of ICU admission or in-hospital death†††† compared with unvaccinated patients (Table 3). Among nonimmunocompromised patients, those who were vaccinated had lower odds of death (aOR = 0.58) than did unvaccinated patients.§§§§

During the pre-Delta and Delta variant–predominant periods, immunocompromised patients generally had higher odds of death, irrespective of vaccination status compared with nonimmunocompromised patients, and nonimmunocompromised

*** Pre-Delta variant–predominant period = March 1, 2020–June 26, 2021; Delta variant–predominant period = June 27–December 18, 2021; Omicron variant–predominant period = December 19, 2021–February 28, 2022. https://www.cdc.gov/mmwr/volumes/71/wr/mm7116e1.htm

††† 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.

§§§ A total of 2,280 patients were excluded: 80 (3.5%) had incomplete chart review, 107 (4.7%) had missing discharge date, 1,441 (63.2%) had a non–COVID-19 related admission (labor/obstetrics [15], inpatient surgery [376], psychiatric condition [509], and trauma [541]), and 652 (28.6%) whose vaccination status did not meet the study's vaccinated or unvaccinated definition.

¶¶¶ ICU admission among unvaccinated patients was adjusted for age, sex, site, variant predominant period, race/ethnicity, hypertension, diabetes, chronic lung disease, cardiovascular disease, renal disease, and obesity. Death among unvaccinated patients was adjusted for age, sex, site, variant predominant period, race/ethnicity, long-term care facility, hypertension, diabetes, chronic lung disease, cardiovascular disease, renal disease, blood disorders, neurologic disease, and rheumatologic/autoimmune condition.

**** ICU admission among vaccinated patients was adjusted for age, sex, site, variant predominant period, race/ethnicity (American Indian or Alaska Native and Asian or Pacific Islander were reclassified to other/unknown because of small numbers), chronic metabolic disease, liver disease, and rheumatologic/autoimmune condition. Death among vaccinated patients was adjusted for age, sex, site, variant predominant period, race/ethnicity, cardiovascular disease, renal disease, and rheumatologic/autoimmune condition.

†††† ICU admission among immunocompromised patients was adjusted for age, sex, site, variant predominant period, rheumatologic/autoimmune condition, and obesity. Death among immunocompromised patients was adjusted for age, sex, site, variant predominant period, hypertension, renal disease, and rheumatologic/autoimmune condition.

§§§§ Death among nonimmunocompromised patients was adjusted for age, sex, site, variant predominant period, hypertension, diabetes mellitus, chronic metabolic disease, cardiovascular disease, renal disease, and neurologic disease.

TABLE 1. Demographic and clinical characteristics of adults hospitalized for laboratory-confirmed COVID-19 (N = 22,345), by immunocompromise status and vaccination status* — COVID-NET, 10 states,† March 1, 2020–February 28, 2022

	Immunocompromised, no. (weighted %)§								
	Overall			Unvaccinated			Vaccinated†		
Characteristic	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value
Total	**2,209 (100.0)**	**20,136 (100.0)**	—	**1,855 (100.0)**	**18,825 (100.0)**	—	**354 (100.0)**	**1,311 (100.0)**	—
Age group, yrs									
18–49	492 (17.3)	6,509 (24.9)	<0.01	447 (18.1)	6,336 (26.9)	<0.01	45 (15.5)	173 (12.1)	0.09
50–64	717 (28.2)	6,298 (29.4)		625 (31.7)	5,932 (30.3)		92 (20.1)	366 (23.7)	
65–74	472 (25.8)	3,192 (19.5)		377 (24.5)	2,915 (18.9)		95 (28.6)	277 (23.6)	
75–84	378 (20.8)	2,501 (15.6)		296 (18.5)	2,213 (14.1)		82 (26.3)	288 (25.2)	
≥85	150 (7.9)	1,636 (10.6)		110 (7.2)	1,429 (9.8)		40 (9.5)	207 (15.5)	
Race or ethnicity¶									
White	1,219 (52.4)	9,587 (47.7)	<0.01	987 (52.7)	8,711 (45.7)	<0.01	232 (51.7)	876 (60.0)	0.46
Black	496 (25.5)	4,340 (23.2)		440 (26.5)	4,142 (24.1)		56 (23.1)	198 (18.2)	
AI/AN	34 (1.1)**	452 (2.0)**		30 (1.2)**	431 (2.0)**		4 (1.1)**	21 (1.7)**	
A/PI	91 (4.8)	1,201 (5.1)		81 (4.3)**	1159 (5.4)		10 (6.1)**	42 (3.6)**	
Hispanic	301 (12.7)	3,803 (16.5)		264 (13.0)	3,678 (17.6)		37 (12.0)	125 (10.1)	
Other/Unknown††	68 (3.4)	753 (5.5)		53 (2.3)	704 (5.4)		15 (6.1)**	49 (6.4)	
Sex									
Male	1,121 (54.3)	10,819 (52.3)	0.25	931 (52.4)	10,145 (52.4)	0.98	190 (58.7)	674 (51.6)	0.17
Female	1,088 (45.7)	9,317 (47.7)		924 (47.5)	8,680 (47.6)		164 (41.3)	637 (48.4)	
Resident of long-term care facility	172 (8.7)	1,652 (10.1)	0.16	150 (9.4)	1448 (9.4)	0.99	22 (7.1)	204 (14.6)	0.06
Variant predominance§§									
Pre-Delta	1,730 (54.2)	16,654 (60.3)	<0.01	1,646 (74.2)	16,350 (69.1)	<0.01	84 (7.1)	304 (5.8)	0.20
Delta	318 (20.0)	2,683 (22.6)		154 (14.3)	2,047 (20.1)		164 (33.4)	636 (38.3)	
Omicron	161 (25.8)	799 (17.1)		55 (11.4)	428 (10.8)		106 (59.5)	371 (55.9)	
Vaccination status†									
Unvaccinated	1,855 (70.1)	18,825 (86.1)	<0.01	1,855 (100.0)	18,825 (100.0)	NA	NA	NA	NA
Vaccinated, without booster or additional doses	298 (21.3)	1,186 (11.6)		NA	NA		298 (71.4)	1,186 (83.3)	<0.01
Vaccinated, with booster or additional doses	56 (8.5)	125 (2.3)		NA	NA		56 (28.6)	125 (16.7)	
Type of immunocompromising condition									
AIDS or CD4+ count <200	37 (1.3)	NA	NA	33 (1.4)	NA	NA	4 (0.9)**	NA	NA
Complement deficiency	4 (0.1)**	NA	NA	4 (0.2)**	NA	NA	NA	NA	NA
Graft versus host disease	7 (0.3)**	NA	NA	7 (0.4)**	NA	NA	NA	NA	NA
HIV infection	177 (6.7)	NA	NA	159 (7.7)	NA	NA	18 (4.2)	NA	NA
Immunoglobulin deficiency/ Immunodeficiency	48 (1.8)	NA	NA	44 (1.6)	NA	NA	4 (2.4)**	NA	NA
Immunosuppressive therapy	664 (32.2)	NA	NA	529 (28.3)	NA	NA	135 (41.4)	NA	NA
Leukemia	135 (6.6)	NA	NA	111 (6.9)	NA	NA	24 (5.8)**	NA	NA
Lymphoma (Hodgkin or non-Hodgkin)	125 (5.9)	NA	NA	96 (5.5)	NA	NA	29 (6.9)	NA	NA
Metastatic cancer	212 (11.0)	NA	NA	172 (11.1)	NA	NA	40 (10.6)	NA	NA
Multiple myeloma	52 (2.7)	NA	NA	37 (2.1)	NA	NA	15 (3.9)**	NA	NA
Solid organ malignancy	791 (37.2)	NA	NA	649 (34.2)	NA	NA	142 (44.2)	NA	NA
Steroid therapy	610 (26.5)	NA	NA	533 (30.4)	NA	NA	77(17.2)	NA	NA
Transplant, hematopoietic stem cell	26 (1.3)**	NA	NA	20 (0.8)**	NA	NA	6 (2.7)**	NA	NA
Transplant, solid organ	253 (14.1)	NA	NA	195 (10.6)	NA	NA	58 (22.2)	NA	NA
Underlying medical condition									
Any underlying medical condition†††	2,097 (94.5)	17,888 (90.3)	<0.01	1,758 (94.2)	16,643 (89.5)	<0.01	339 (95.4)	1245 (95.1)	0.87
Hypertension	1,374 (67.0)	10,649 (58.2)	<0.01	1,125 (64.1)	9,732 (56.2)	<0.01	249 (74.0)	917 (70.6)	0.30
Diabetes mellitus	738 (37.5)	6,745 (35.2)	0.05	599 (35.5)	6,212 (34.4)	0.39	139 (42.0)	533 (40.2)	0.66
Chronic lung disease	868 (39.1)	5,674 (29.0)	<0.01	726 (40.2)	5,146 (27.1)	<0.01	142 (36.4)	528 (41.1)	0.15
Chronic metabolic (except diabetes)	380 (18.1)	2,469 (13.9)	<0.01	307 (16.9)	2,212 (13.3)	<0.01	73 (20.8)	257 (17.3)	0.11
Cardiovascular disease	1,043 (52.1)	6,629 (38.8)	<0.01	838 (52.8)	5,894 (35.8)	<0.01	205 (50.5)	735 (57.4)	0.13
Liver disease	253 (11.5)	1,082 (5.6)	<0.01	200 (10.2)	966 (5.1)	<0.01	53 (14.5)	116 (8.2)	<0.01
Renal disease	575 (30.6)	2,816 (16.3)	<0.01	458 (26.7)	2,462 (14.6)	<0.01	117 (39.8)	354 (27.1)	<0.01
Blood disorder	195 (10.1)	555 (3.0)	<0.01	151 (9.0)	489 (2.6)	<0.01	44 (12.5)	66 (5.3) **	0.04
Neurologic disease	475 (22.5)	3,917 (20.2)	0.14	381 (19.8)	3,514 (18.4)	0.31	94 (29.0)	403 (31.8)	0.53
Rheumatologic/Autoimmune condition	542 (27.1)	707 (4.7)	<0.01	432 (25.1)	617 (4.1)	<0.01	110 (31.9)	90 (8.0)	<0.01
Obesity	951 (38.4)	9,823 (45.3)	<0.01	811 (40.2)	9276 (46.4)	<0.01	140 (34.1)	547 (38.5)	0.19

See table footnotes on the next page.

TABLE 1 (*Continued*). Demographic and clinical characteristics of adults hospitalized for laboratory-confirmed COVID-19 (N = 22,345), by immunocompromise status and vaccination status* — COVID-NET, 10 states,† March 1, 2020–February 28, 2022

	Immunocompromised, no. (weighted %)§								
	Overall			Unvaccinated			Vaccinated†		
Characteristic	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value
No. of underlying conditions									
0	112 (5.5)	2,248 (9.7)	<0.01	97 (5.8)	2,182 (10.5)	<0.01	15 (4.6)**	66 (4.9)	0.17
1	252 (9.3)	3,630 (15.9)		227 (11.3)	3,500 (17.1)		25 (4.8)	130 (8.5)	
2	371 (15.8)	4,356 (21.2)		323 (15.6)	4,149 (21.9)		48 (16.4)	207 (17.0)	
≥3	1,474 (69.3)	9,902 (53.2)		1,208 (67.3)	8,994 (50.6)		266 (74.2)	908 (69.7)	

Abbreviations: A/PI = Asian or Pacific Islander; AI/AN = American Indian or Alaska Native; COVID-NET = COVID-19–Associated Hospitalization Surveillance Network; NA = not applicable.

* Vaccinated patients were defined as those with a positive SARS-CoV-2 test result from a specimen collected ≥14 days after either the second dose of a 2-dose vaccination series or after 1 dose of a single dose vaccine. When not otherwise specified, vaccinated patients include those who might have received additional or booster doses. Vaccinated patients without additional or booster doses include both those eligible and not yet eligible for an additional or booster dose. Vaccinated patients with additional booster doses received additional or booster doses on or after August 13, 2021, with a positive SARS-CoV-2 test result from a specimen collected ≥14 days after receipt of the additional or booster dose.

† Selected counties in California, Colorado, Connecticut, Georgia, Michigan, Minnesota, New Mexico, New York, Oregon, and Tennessee.

§ Representative sample of all cases reported to COVID-NET, stratified by patient age and COVID-NET site. Percentages were weighted to account for the probability of selection for sampled cases.

¶ White, Black, AI/AN, and A/PI persons were non-Hispanic; Hispanic persons could be of any race.

** Relative SE >30. Estimates might be unstable; results should be interpreted with caution.

†† Includes patients who were classified as multiracial, non-Hispanic. Non-Hispanic ethnicity was assumed for patients with unknown ethnicity.

§§ Pre-Delta variant–predominant period = March 1, 2020–June 26, 2021; Delta variant–predominant period = June 27–December 18, 2021; Omicron variant–predominant period = December 19, 2021–February 28, 2022. https://www.cdc.gov/mmwr/volumes/71/wr/mm7116e1.htm

††† Defined as one or more of the following: chronic lung disease (including asthma), chronic metabolic disease, diabetes mellitus, blood disorder/hemoglobinopathy, cardiovascular disease, neurologic disease, renal disease, gastrointestinal/liver disease, rheumatologic/autoimmune condition, obesity, feeding tube dependence, or wheelchair dependence.

TABLE 2. Association of immunocompromise status with intensive care unit admission and in-hospital death among patients hospitalized for COVID-19, by vaccination status* — COVID-NET, 10 states,† March 1, 2020–February 28, 2022

	No. (weighted %)§											
	Unvaccinated¶						Vaccinated*,**					
	ICU admission			Death			ICU admission			Death		
Immunocompromised	Yes	No	aOR (95% CI)	Yes	No	aOR (95% CI)	Yes	No	aOR (95% CI)	Yes	No	aOR (95% CI)
Yes	533 (26.6)	1,322 (73.4)	1.26 (1.08–1.49)††	272 (14.5)	1,582 (85.5)	1.34 (1.05–1.70)§§	85 (25.0)	269 (75.0)	1.40 (1.01–1.92)§§	55 (16.5)	298 (83.5)	1.87 (1.28–2.75)††
No	4,884 (22.8)	13,875 (77.2)	Ref	1,881 (11.0)	16,906 (89.0)	Ref	257 (18.7)	1,047 (81.3)	Ref	114 (9.6)	1,190 (90.4)	Ref

Abbreviations: aOR = adjusted odds ratio; COVID-NET = COVID-19–Associated Hospitalization Surveillance Network; ICU = intensive care unit; Ref = referent group.

* Vaccinated patients were defined as those with a positive SARS-CoV-2 test result from a specimen collected ≥14 days after the second dose of a 2-dose vaccination series or after 1 dose of a single dose vaccine. When not otherwise specified, vaccinated patients include those who might have received additional or booster doses.

† Selected counties in California, Colorado, Connecticut, Georgia, Michigan, Minnesota, New Mexico, New York, Oregon, and Tennessee.

§ Representative sample of all cases reported to COVID-NET, stratified by age and COVID-NET site. Percentages were weighted to account for the probability of selection for sampled cases.

¶ ICU admission model among unvaccinated patients was adjusted for age, sex, site, variant predominant period, race/ethnicity, hypertension, diabetes, chronic lung disease, cardiovascular disease, renal disease, and obesity. ICU status was not known for 66 nonimmunocompromised patients. Death model among unvaccinated patients was adjusted for age, sex, site, variant predominant period, race/ethnicity, long-term care facility, hypertension, diabetes, chronic lung disease, cardiovascular disease, renal disease, blood disorders, neurologic disease, and rheumatologic/autoimmune condition. Death outcome was unknown for one immunocompromised patient and 38 nonimmunocompromised patients.

** ICU admission model among vaccinated patients was adjusted for age, sex, site, variant predominant period, race/ethnicity (American Indian or Alaska Native and Asian or Pacific Islander were reclassified as other/unknown because of small numbers as well as patients who identified as multiracial or unknown race), chronic metabolic disease, liver disease, and rheumatologic/autoimmune condition. ICU status was not known for seven nonimmunocompromised patients. Death model among vaccinated patients was adjusted for age, sex, site, variant predominant period, race/ethnicity, cardiovascular disease, renal disease, and rheumatologic/autoimmune condition. Death outcome was unknown for one immunocompromised patient and seven nonimmunocompromised patients.

†† p-value <0.01.

§§ p-value <0.05.

TABLE 3. Association of vaccination status* with intensive care unit admission and in-hospital death among patients hospitalized for COVID-19, by immunocompromise status—COVID-NET, 10 states,† March 1, 2021–February 28, 2022

	No. (weighted %)§											
	Immunocompromised¶						Not immunocompromised**					
	ICU admission			Death			ICU admission			Death		
Vaccination status*	Yes	No	aOR (95% CI)	Yes	No	aOR (95% CI)	Yes	No	aOR (95% CI)	Yes	No	aOR (95% CI)
Vaccinated	85 (25.0)	269 (75.0)	1.01 (0.64–1.58)	55 (16.5)	298 (83.5)	1.34 (0.71–2.51)	257 (18.7)	1,044 (81.3)	0.85 (0.60–1.12)	113 (9.5)	1,188 (90.5)	0.58 (0.39–0.86)††
Unvaccinated	129 (25.5)	351 (74.5)	Ref	66 (12.9)	413 (87.1)	Ref	1,121 (21.6)	3,771 (78.4)	Ref	488 (10.1)	4,409 (89.9)	Ref

Abbreviations: aOR = adjusted odds ratio; COVID-NET = COVID-19–Associated Hospitalization Surveillance Network; ICU = intensive care unit; Ref = referent group.

* Vaccinated patients were defined as those with a positive SARS-CoV-2 test result from a specimen collected ≥14 days after either the second dose of a 2-dose vaccination series or after 1 dose of a single dose vaccine. When not otherwise specified, vaccinated patients include those who might have received additional or booster doses.

† Selected counties in California, Colorado, Connecticut, Georgia, Michigan, Minnesota, New Mexico, New York, Oregon, and Tennessee.

§ Representative sample of all cases reported to COVID-NET, stratified by age and COVID-NET site. Percentages were weighted to account for the probability of selection for sampled cases.

¶ ICU admission model among immunocompromise patients was adjusted for age, sex, site, variant predominant period, rheumatologic/autoimmune condition, and obesity. Death model among immunocompromised patients was adjusted for age, sex, site, variant predominant period hypertension, renal disease, and rheumatologic/autoimmune condition. Death outcome among immunocompromised patients was not known for one unvaccinated patient and one vaccinated patient without additional or booster doses.

** ICU admission model among nonimmunocompromised patients was adjusted for age, sex, site, variant predominant period, diabetes, and obesity. Death model among nonimmunocompromised patients was adjusted for age, sex, site, variant predominant period, long-term care facility residence, hypertension, diabetes mellitus, chronic metabolic disease, cardiovascular disease, renal disease, and neurologic disease. Death outcome among nonimmunocompromised patients was not known for 11 unvaccinated patients, three patients vaccinated without additional or booster doses, and three patients vaccinated with additional or booster doses.

†† p-value <0.05.

patients who were vaccinated had lower odds of death compared with unvaccinated patients (Supplementary Table 2, https://stacks.cdc.gov/view/cdc/118607). However, in the Omicron variant–predominant period, odds of death, irrespective of immunocompromise or vaccination status, were not statistically significantly different.

Discussion

Once hospitalized, immunocompromised patients with COVID-19 had increased odds of ICU admission or in-hospital death, irrespective of vaccination status, compared with nonimmunocompromised patients, after adjusting for differences in demographic and clinical characteristics. The generally consistent association of individual immunocompromising conditions with increased odds of death suggests that immunocompromise itself was likely associated with severe outcomes.

COVID-19 vaccination among immunocompromised persons is highly protective against COVID-19–associated hospitalization (*3*), leading to fewer hospitalized patients who are then admitted to the ICU or die in-hospital. Once patients were hospitalized, however, vaccination status was not associated with ICU admission or death among immunocompromised patients in these analyses; patients with more medical conditions likely had closer medical follow-up and were strongly advised to be vaccinated, biasing vaccinated patients to be those at higher risk for severe outcomes, potentially contributing to the absence of observed differences. In addition, vaccine effectiveness against severe outcomes in immunocompromised persons is known to be lower than that in nonimmunocompromised persons (*3*,*4*). In comparison, nonimmunocompromised hospitalized patients who were vaccinated had reduced odds of death compared with those who were unvaccinated, consistent with the known protective effect of vaccination against severe outcomes in persons who can mount a robust immune response after vaccination. During the Omicron variant–predominant period, however, the effects of immunocompromise and vaccination on odds of death were attenuated in all patients, potentially due to the lower proportion of severe outcomes during hospitalization associated with this variant,¶¶¶¶ as well as the increased prevalence of previous infection-conferred immunity resulting in a decreased risk for infection across all groups and waning of vaccine-derived protection among those who received vaccine doses earlier in the COVID-19 pandemic. Because of these attenuated effects and the inability to further stratify by receipt of additional or booster doses because stratification generated unstable estimates (relative SE >30) in the analysis, the effect of additional or booster doses on death among immunocompromised patients was not able to be assessed.

Data from population-based, active surveillance suggest that immunocompromised adults are overrepresented among patients hospitalized with COVID-19 in the United States, accounting for 12.2% of adult hospitalizations in COVID-NET compared with an estimated 2.7% of the U.S. adult population (*5*). However, immunocompromised patients in COVID-NET

¶¶¶¶ https://www.cdc.gov/mmwr/volumes/71/wr/mm7112e2.htm

Summary

What is already known about this topic?

Immunocompromise is associated with increased risk for intensive care unit (ICU) admission and in-hospital death after SARS-CoV-2 infection. Population-based descriptions of immunocompromised hospitalized patients and their outcomes are limited.

What is added by this report?

Immunocompromised patients accounted for 12.2% of all adult COVID-19 hospitalizations among 10 states and had increased odds of ICU admission and in-hospital death compared with nonimmunocompromised patients, irrespective of vaccination status.

What are the implications for public health practice?

Known multilayered prevention measures, including nonpharmaceutical interventions, up-to-date COVID-19 vaccination, and therapeutics, can prevent hospitalization and subsequent severe COVID-19 outcomes among immunocompromised persons.

shared similar demographic characteristics with the underlying U.S. noninstitutionalized immunocompromised population. The age ranges with the highest percentages of immunocompromised patients were similar (COVID-NET: 50–74 years; U.S. population: 50–69 years) (*5*). The older age distribution among immunocompromised patients likely contributed to their higher prevalences of underlying conditions known to be associated with poor COVID-19 outcomes, including chronic lung disease, renal disease, and obesity, which would increase the likelihood of severe COVID-19, hospitalization, and inclusion in this analysis (*6*).

The findings in this report are subject to at least four limitations. First, the analyses did not control for time since vaccination; earlier eligibility for and receipt of vaccines by immunocompromised patients might have resulted in earlier waning of protection, complicating identification of associations between vaccination and severe outcomes. Second, whereas the active, population-based nature of COVID-NET data minimizes the risk for capturing a nonrepresentative sample of hospitalized patients, clinicians might have admitted immunocompromised patients who were less ill than were nonimmunocompromised patients, leading to smaller observed differences in severe outcomes. Third, the number of immunocompromised persons within COVID-NET catchment areas is unknown; therefore, population-based rates of severe outcomes by immunocompromise and vaccination status not conditioned on hospitalization could not be calculated. Finally, changing recommendations and absence of data on prehospitalization prophylactic or treatment medications for COVID-19 limited the ability to account for treatments; severe outcomes might have been mitigated in patients who received these medications.

Given the increased odds of severe COVID-19 outcomes among immunocompromised hospitalized patients, multilayered prevention strategies for immunocompromised persons are critical to preventing hospitalization for COVID-19 and subsequent severe outcomes, especially when community levels indicate increased transmission and disease severity (*7*,*8*).***** These strategies include implementing nonpharmaceutical interventions; ensuring that immunocompromised persons and their close contacts are up to date with COVID-19 vaccination; urging immunocompromised persons to use effective preexposure prophylactic therapeutics, such as Evusheld; early testing, such as at-home tests; and early disease treatments, such as antiviral medications. Improved access to and use of these measures with considerations for socioeconomically disadvantaged and historically underserved racial and ethnic groups will help ensure health equity (*9*,*10*).†††††

***** https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/indicators-monitoring-community-levels.html

††††† https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/race-ethnicity.html

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Erratum

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In the report, "Pediatric Melatonin Ingestions — United States, 2012–2021," on page 726 in the first full paragraph, the third sentence should have read, "Most children (**84.4%**) were asymptomatic."

On page 727, the Table contained multiple errors: rows 18 and 19 (with the headings "Asymptomatic" and "Symptomatic") should have been deleted, the final original footnote should have read, "**Cases confirmed as nonexposures and exposures deemed not responsible for the effect,**" two additional footnotes should have been included, and all footnotes should have been reordered. In addition, the abbreviation "**RCF = relative contribution to fatality**" should have been included. The Table has been updated accordingly.

On page 727, in Figure 2, the y-axis was incorrectly formatted to demonstrate stacked values. Figure 2 has been updated accordingly.

TABLE. Demographics and clinical characteristics of pediatric melatonin ingestions reported to poison control centers (N = 260,435) — United States, 2012–2021

Characteristic	Ingestions, no.(%)
Age group, yrs	
≤5	218,136 (83.8)
6–12	28,606 (11.0)
13–19	13,693 (5.2)
Sex	
Male	141,301 (54.3)
Female	117,872 (45.2)
Unknown	1,262 (0.5)
Reason for ingestion	
Unintentional	245,596 (94.3)
Intentional	13,722 (5.3)
Other	1,117 (0.4)
Exposure site	
Residence	257,761 (99.0)
School	561 (0.2)
Other	2,113 (0.8)
Clinical effects*	
CNS	37,164 (81.4)
Gastrointestinal	4,655 (10.2)
Cardiovascular	1,147 (2.5)
Metabolic	346 (0.8)
Other	2,335 (5.1)
Outcome	
No effect†	78,423 (30.1)
Minor effect§	176,435 (67.8)
More serious outcomes¶	3,211 (1.2)
Death**	2
Other††	2,366 (0.9)
Management site	
Managed on-site (non-HCF)	230,032 (88.3)
Managed at HCF	27,795 (10.7)
Unknown	2,608 (1.0)

TABLE (*Continued*). Demographics and clinical characteristics of pediatric melatonin ingestions reported to poison control centers (N = 260,435) — United States, 2012–2021

Characteristic	Ingestions, no.(%)
Disposition of patients managed at HCF (n = 27,795)	
Hospitalized	4,097 (14.7)
ICU	287 (1.0)
Treated and released	19,892 (71.6)
Other	3,806 (13.7)

Abbreviations: CNS = central nervous system; HCF = health care facility; ICU = intensive care unit; RCF = relative contribution to fatality.

* Number of clinical effects (n = 45,647) is greater than the number of symptomatic ingestions (n = 40,665), as some children had more than one symptom.

† No signs or symptoms.

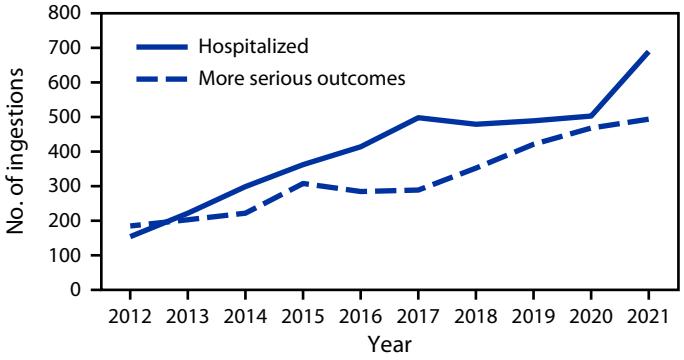
§ Minimally bothersome symptoms, self-limited, and resolved without intervention (e.g., self-limited gastrointestinal symptoms).

¶ More serious outcomes included moderate effect (systemic symptoms requiring intervention; not life-threatening [e.g., brief seizure readily resolved with treatment, or high fever]), major effect (life-threatening symptoms [e.g., status epilepticus or respiratory failure requiring intubation]), and death.

** RCF: Unknown. A case is classified as RCF "unknown" in the National Poison Data System if the Clinical Case Evidence is not sufficient to rule in or rule out the exposure as the cause of death.

†† Cases confirmed as nonexposures and exposures deemed not responsible for the effect.

FIGURE 2. Number of pediatric* melatonin ingestions reported† to poison control centers, by outcome and year — United States, 2012–2021



* Aged ≤19 years.

† More serious outcomes include moderate or major effect or death, as defined by the National Poison Data System Coding Manual. Disposition (including hospitalization) and medical outcome (including more serious outcomes) are not mutually exclusive because persons with more serious outcomes are likely to be hospitalized.

Erratum

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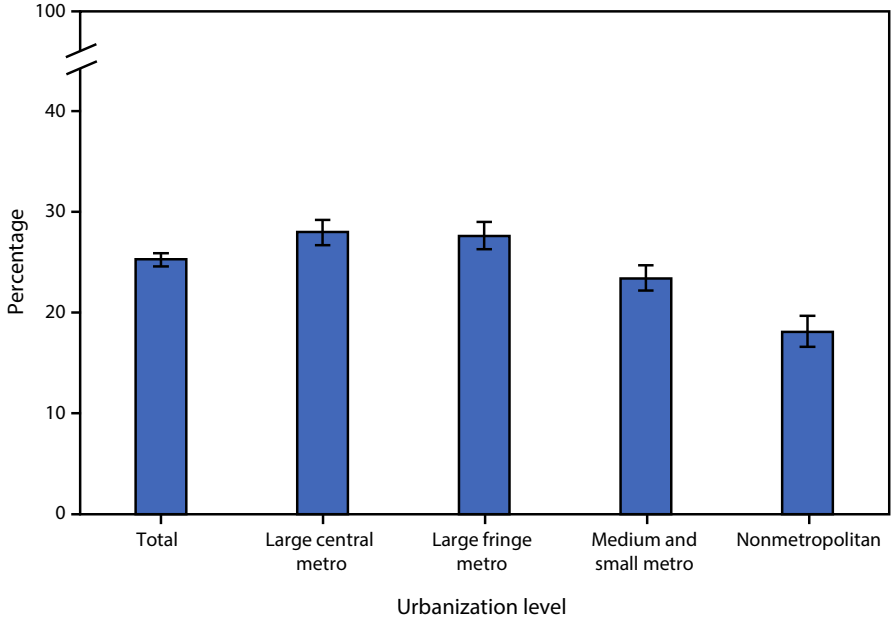
In the report, "Use of JYNNEOS (Smallpox and Monkeypox Vaccine, Live, Nonreplicating) for Preexposure Vaccination of Persons at Risk for Occupational Exposure to Orthopoxviruses: Recommendations of the Advisory Committee on Immunization Practices — United States, 2022," on page 738, in Table 1, the first footnote should have read, "* **Research laboratory personnel working with orthopoxviruses, clinical laboratory personnel performing diagnostic testing for orthopoxviruses, and orthopoxvirus and health care worker response teams designated by appropriate public health and antiterror authorities.**"

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Age-Adjusted Percentage* of Adults Aged ≥18 Years Who Met the 2018 Federal Physical Activity Guidelines for Both Muscle-Strengthening and Aerobic Physical Activity,† by Urbanization Level§ — National Health Interview Survey, United States, 2020¶



* Age-adjusted percentages are based on the 2000 U.S. Census Bureau standard population, using age groups 18–34, 35–49, 50–64, and ≥65 years, with 95% CIs indicated by error bars.

† Per U.S. Department of Health and Human Services 2018 Physical Activity Guidelines for Americans, 2nd edition (https://health.gov/paguidelines). The aerobic physical activity guideline was met if the respondent reported engaging in ≥150 minutes per week of moderate-intensity aerobic physical activity or ≥75 minutes per week of vigorous-intensity aerobic physical activity, or an equivalent combination. The muscle-strengthening guideline was met if the respondent reported performing muscle-strengthening activities on ≥2 days per week.

§ Urbanization level is based on county of residence using the National Center for Health Statistics Urban-Rural Classification Scheme for Counties. https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf

¶ Estimates are based on household interviews of a sample of the civilian, noninstitutionalized U.S. population.

In 2020, 25.3% of adults aged ≥18 years met the 2018 federal physical activity guidelines for both muscle-strengthening and aerobic physical activity. The percentage meeting both guidelines was highest in adults living in large central metropolitan (28.0%) and large fringe metropolitan areas (27.6%), followed by those living in medium and small metropolitan areas (23.4%) and lowest in those living in nonmetropolitan areas (18.1%).

Source: National Center for Health Statistics, National Health Interview Survey, 2020. https://www.cdc.gov/nchs/nhis.htm

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