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Increases in Health-Related Workplace Absenteeism Among Workers in Essential Critical Infrastructure Occupations During the COVID-19 Pandemic — United States, March–April 2020

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During a pandemic, syndromic methods for monitoring illness outside of health care settings, such as tracking absenteeism trends in schools and workplaces, can be useful adjuncts to conventional disease reporting (*1*,*2*). Each month, CDC's National Institute for Occupational Safety and Health (NIOSH) monitors the prevalence of health-related workplace absenteeism among currently employed full-time workers in the United States, overall and by demographic and occupational subgroups, using data from the Current Population Survey (CPS).* This report describes trends in absenteeism during October 2019–April 2020, including March and April 2020, the period of rapidly accelerating transmission of SARS-CoV-2, the virus that causes coronavirus disease 2019 (COVID-19). Overall, the prevalence of health-related workplace absenteeism in March and April 2020 were similar to their 5-year baselines. However, compared with occupation-specific baselines, absenteeism among workers in several occupational groups that define or contain essential critical infrastructure workforce† categories was significantly higher than expected in April. Significant increases in absenteeism were observed in personal care and service§ (includes child care workers and personal care aides); healthcare support¶; and production** (includes meat, poultry, and fish processing workers). Although health-related workplace absenteeism remained relatively unchanged or decreased in other groups, the increase in absenteeism among workers in occupational groups less able

* https://www.cdc.gov/niosh/topics/absences/default.html.

† https://www.cisa.gov/sites/default/files/publications/Version_3.0_CISA_Guidance_on_Essential_Critical_Infrastructure_Workers_1.pdf.

§ Includes 2010 Census occupation codes 4300–4650. Examples of personal care and service occupations include childcare workers; personal and home care aides; barbers; hairstylists and cosmetologists; recreation and fitness workers; morticians; embalmers; and porters and bellhops.

¶ Includes 2010 Census occupation codes 3600–3655. Examples of healthcare support occupations include nursing, psychiatric, and home health aides; various therapy aides and assistants; medical and dental assistants; and phlebotomists.

** Includes 2010 Census occupation codes 7700–8750. Examples of production occupations include assemblers and fabricators; food processing workers; metal and plastic workers; printing workers; textile, apparel, and furnishing workers; woodworkers; and plant and system operators.

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to avoid exposure to SARS-CoV-2 (*3*) highlights the potential impact of COVID-19 on the essential critical infrastructure workforce because of the risks and concerns of occupational transmission of SARS-CoV-2. More widespread and complete collection of occupational data in COVID-19 surveillance is required to fully understand workers' occupational risks and inform intervention strategies. Employers should follow available recommendations to protect workers' health.

CPS is a monthly national survey of approximately 54,000 households conducted by the U.S. Census Bureau for the Bureau of Labor Statistics. The survey, the nation's primary source of labor force statistics, collects information on employment, demographic, and other characteristics of the civilian, noninstitutionalized population aged ≥16 years. Data on all sample household members are collected from a single respondent by trained interviewers through in-person or telephone interviews using a standardized questionnaire.[††]

Monthly point estimates and 95% confidence intervals (CIs) of the prevalence of health-related workplace absenteeism among all full-time workers during October 2019 to April 2020 were calculated and compared with an epidemic threshold defined as the upper 95% confidence limit of a historical baseline that represents the expected value and was established using data from the previous 5 years, aggregated by month.[§§] Estimates with lower 95% confidence limits that exceeded the epidemic threshold were considered significantly higher than expected; this conservative method helps account for multiple comparisons. Comparisons for which the point estimate, but not the lower 95% confidence limit, exceeds the epidemic threshold indicate possible increases and warrant further scrutiny. For such occurrences, the Z-test for independent proportions was used to further test the significance of differences in observed versus expected absenteeism. Results of these post hoc tests with a significance level of $p<0.05$ were considered equivocal evidence of increased absenteeism. Estimates were also calculated for 22 civilian occupational subgroups[¶¶] and compared with their occupation-specific epidemic thresholds.

A full-time worker was defined as an employed person aged ≥16 years who reported usually working at least 35 hours per week for all jobs combined. Health-related workplace absenteeism was defined as working <35 hours during the reference week because of the worker's own illness, injury, or other medical problem. Based on special guidance provided to CPS interviewers by the Bureau of Labor Statistics in March and April 2020, this categorization also applied to persons who indicated they were under quarantine or self-isolating because of exposure to

[††] https://www.census.gov/programs-surveys/cps.html.
[§§] https://www.cdc.gov/flu/weekly/overview.htm.

[¶¶] Occupational subgroups correspond to the CPS Detailed Occupational Group recodes, which are groupings of Census occupation codes (https://www2.census.gov/programs-surveys/cps/methodology/Occupation%20Codes.pdf). The Census occupation codes are, in turn, based on the Bureau of Labor Statistics 2010 Standard Occupational Classification codes (https://www.bls.gov/soc/2010/home.htm).

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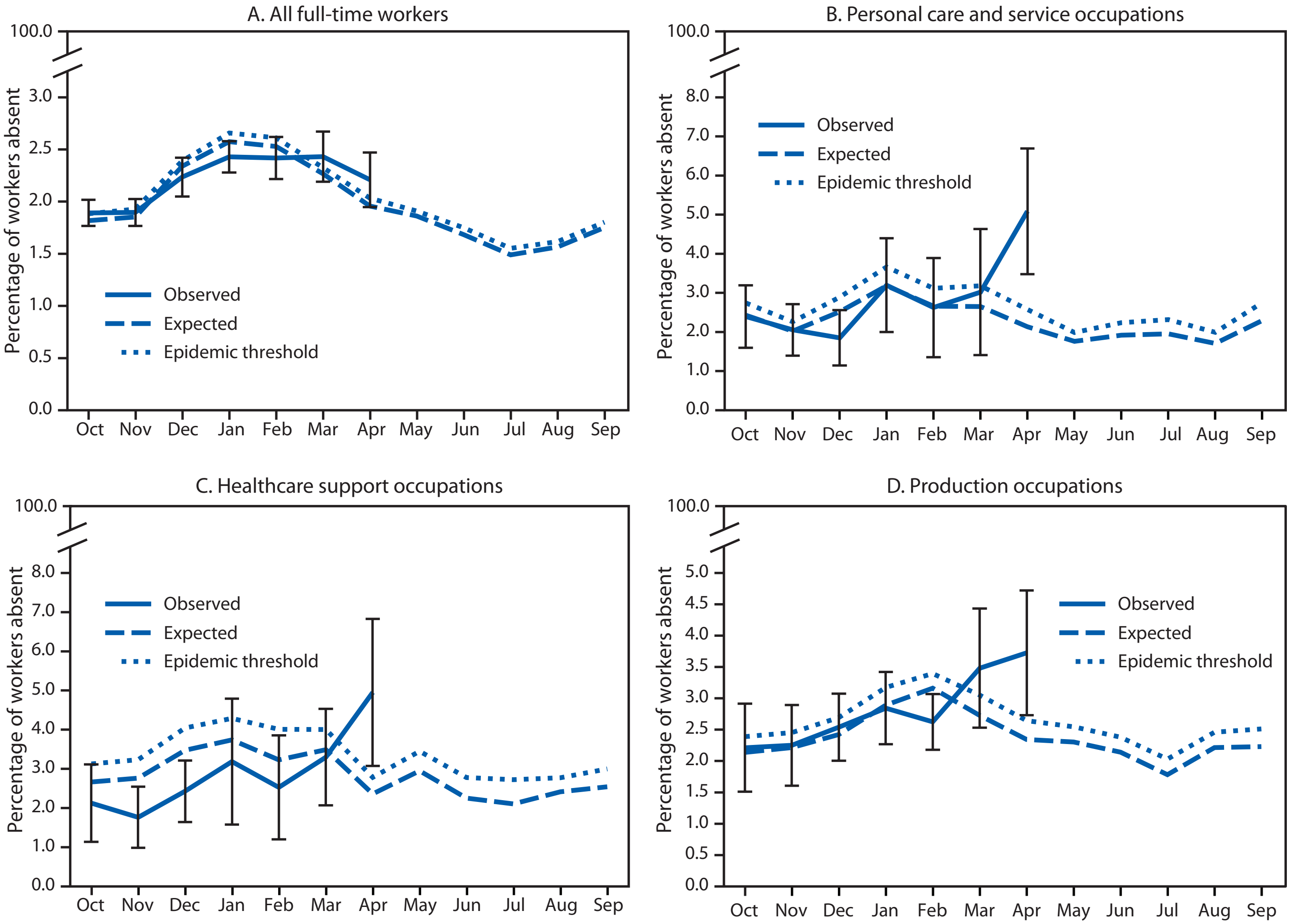
COVID-19.*** Because the CPS questions refer to 1 week of each month, absenteeism during the other weeks is not measured. These 1-week measures are intended to be representative of all weeks of the month during which they occur.

All analyses were weighted using the CPS composite weight and estimates of all standard errors were adjusted to account for the complex design of the CPS sample. Analyses were performed using SAS statistical software (version 9.4; SAS Institute).

During October 2019–February 2020, point estimates of the prevalence of health-related workplace absenteeism among all full-time workers remained at or below the epidemic threshold. In March and April 2020, these estimates exceeded the epidemic threshold, although not significantly (Figure). The Z-test for independent proportions also did not indicate a statistically significant increase in absenteeism in March (p = 0.18) or April (p = 0.06).

*** https://www.bls.gov/cps/employment-situation-covid19-faq-march-2020.pdf; https://www.bls.gov/cps/employment-situation-covid19-faq-april-2020.pdf.

FIGURE. Prevalence* of health-related workplace absenteeism† reported by full-time workers§ relative to an epidemic threshold,¶ overall (A) and by occupational subgroup (B, C, D)††,§§,¶¶ — Current Population Survey, United States, October 2019–April 2020**



* Error bars represent 95% confidence intervals for point estimates.
† Defined as working <35 hours during the reference week because of illness, injury, or other medical issue.
§ Employed persons who usually work ≥35 hours per week at all jobs combined.
¶ Epidemic threshold is the upper 95% confidence limit for expected values; expected values are based on monthly averages for the previous 5 years. The expected baseline and epidemic threshold are shown for the entire October–September surveillance period to illustrate expected seasonality.
** All occupations combined.
†† Personal care and service occupations include 2010 Census occupation codes 4300–4650.
§§ Healthcare support occupations include 2010 Census occupation codes 3600–3655.
¶¶ Production occupations include 2010 Census occupation codes 7700–8750.

In April, absenteeism among the following occupational subgroups significantly exceeded their occupation-specific epidemic thresholds based on the nonoverlapping CI criterion: personal care and service, including childcare workers and personal care aides (5.1% [95% CI = 3.5–6.7] observed, versus 2.1% [95% CI = 1.7–2.6] expected); healthcare support (5.0% [95% CI = 3.1–6.8] versus 2.4% [95% CI = 1.9–2.8]; and production, including meat, poultry, and fish processing workers (3.7% [95% CI = 2.7–4.7] versus 2.3% [95% CI = 2.0–2.6]) (Figure) (Table). Based on the Z-test for independent proportions, prevalence in April might also have been higher among transportation and material moving occupations,[†††] which include bus drivers and subway and streetcar workers (3.6% [95% CI = 2.6–4.6] versus 2.5% [95% CI = 2.2–2.9], p = 0.040), and healthcare practitioner and technical occupations[§§§] (2.8% [95% CI = 2.0–3.6] versus 1.9% [95% CI = 1.6–2.1], p = 0.017). Absenteeism prevalence either declined or remained flat for all other occupational groups. Absenteeism was not significantly higher than expected for any other group in any month during October 2019–February 2020.

Discussion

These findings indicate that although the overall impact of the COVID-19 pandemic on health-related workplace absenteeism among full-time workers in March and April 2020 was minor, during April 2020, absenteeism was significantly higher than expected among several occupational groups that

[†††] Includes 2010 Census occupation codes 9000–9750. Examples of transportations and material moving occupations include transportation workers, such as bus and taxi drivers, and material moving workers, such as crane operators and hand packers and packagers.

[§§§] Includes 2010 Census occupation codes 3000–3540. Examples of healthcare practitioners and technical occupations include health diagnosing and treating practitioners, such as physicians, dentists, pharmacists, and nurses, and health technologists and technicians, such as dental hygienists, radiologic technicians, and paramedics.

TABLE. Monthly prevalence of health-related workplace absenteeism[*] among full-time workers,[†] by occupational group — Current Population Survey, United States, October 2019–April 2020

	Weighted % (95% CI)						
	Oct–Dec 2019			Jan–Apr 2020			
Occupational group	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Total	**1.9 (1.8–2.0)[§]**	**1.9 (1.8–2.0)**	**2.2 (2.0–2.4)**	**2.4 (2.3–2.6)**	**2.4 (2.2–2.6)**	**2.4 (2.2–2.7)[§]**	**2.2 (1.9–2.5)[§]**
Personal care and service	2.4 (1.6–3.2)	2.1 (1.4–2.7)	1.9 (1.1–2.6)	3.2 (2.0–4.4)	2.6 (1.4–3.9)	3.0 (1.4–4.6)	5.1 (3.5–6.7)[¶]
Healthcare support	2.1 (1.1–3.1)	1.8 (1.0–2.5)	2.4 (1.6–3.2)	3.2 (1.6–4.8)	2.5 (1.2–3.9)	3.3 (2.1–4.5)	5.0 (3.1–6.8)[¶]
Production	2.2 (1.5–2.9)	2.2 (1.6–2.9)	2.5 (2.0–3.1)	2.8 (2.3–3.4)	2.6 (2.2–3.1)	3.5 (2.5–4.4)[§]	3.7 (2.7–4.7)[¶]
Transportation and material moving	2.9 (2.1–3.6)[§]	2.2 (1.4–3.0)	2.9 (2.4–3.5)	2.8 (1.8–3.8)	3.1 (2.4–3.8)	3.1 (2.3–3.9)	3.6 (2.6–4.6)[**]
Building and grounds cleaning and maintenance	1.9 (1.0–2.8)	1.9 (0.9–2.9)	2.9 (2.1–3.8)	2.9 (1.7–4.2)	3.4 (2.4–4.4)	3.2 (1.9–4.5)	3.3 (2.1–4.5)
Food preparation and serving related	2.1 (1.3–2.9)	2.2 (1.3–3.1)	2.7 (1.7–3.6)	2.7 (1.5–3.9)	3.0 (1.9–4.0)	2.8 (1.7–3.8)	3.1 (1.1–5.1)
Construction and extraction	1.4 (0.9–2.0)	1.6 (1.0–2.2)	2.2 (1.7–2.7)	3.1 (2.0–4.1)[§]	2.5 (1.7–3.2)	2.3 (1.4–3.1)	2.9 (1.8–4.1)[§]
Healthcare practitioner and technical	2.3 (1.8–2.8)	2.0 (1.5–2.5)	2.3 (1.7–2.9)	2.4 (1.6–3.2)	2.5 (1.9–3.0)	2.1 (1.5–2.7)	2.8 (2.0–3.6)[**]
Farming, fishing, and forestry	1.1 (0.0–2.4)	1.4 (0.0–3.5)	1.6 (0.1–3.2)	4.2 (2.1–6.2)[§]	3.7 (0.9–6.5)	2.6 (0.0–5.4)[§]	2.6 (0.0–6.5)
Office and administrative support	2.6 (2.1–3.1)[§]	2.4 (2.1–2.7)	2.7 (2.3–3.1)	3.0 (2.2–3.7)	2.5 (2.1–2.9)	3.0 (2.5–3.5)	2.5 (1.8–3.1)
Legal occupations	2.0 (0.7–3.3)	1.0 (0.1–1.9)	1.5 (0.6–2.5)	2.9 (1.5–4.3)[§]	2.7 (1.0–4.3)	0.9 (0.1–1.8)	2.3 (0.7–3.8)
Sales and related	1.7 (1.3–2.1)[§]	2.1 (1.6–2.7)[**]	2.0 (1.5–2.6)	2.0 (1.6–2.5)	2.3 (1.5–3.1)[§]	2.1 (1.7–2.6)	2.1 (1.6–2.6)
Protective service	2.7 (1.4–3.9)[§]	2.4 (1.3–3.5)[§]	2.9 (1.6–4.1)	3.3 (2.2–4.3)[§]	2.6 (1.8–3.3)[§]	2.3 (1.6–3.1)	2.1 (1.3–3.0)
Installation, maintenance and repair	2.4 (1.6–3.1)	2.4 (1.6–3.2)	1.9 (1.2–2.6)	1.8 (1.0–2.7)	2.8 (2.1–3.5)	3.5 (2.3–4.7)[§]	2.0 (1.2–2.9)
Education, training, and library	1.5 (1.1–2.0)	2.3 (1.7–2.8)[**]	2.7 (1.9–3.4)[§]	2.7 (2.1–3.2)[§]	2.5 (1.9–3.0)	2.2 (1.5–2.9)	1.5 (0.8–2.3)
Architecture and engineering	0.8 (0.0–1.7)	1.3 (0.4–2.2)	1.4 (0.6–2.2)	2.5 (1.3–3.6)	1.5 (0.7–2.4)	2.4 (1.3–3.4)[§]	1.4 (0.6–2.1)
Arts, design, entertainment, sports, and media	2.1 (0.7–3.5)	2.1 (0.9–3.3)	2.3 (0.7–3.9)	2.0 (0.7–3.3)	1.6 (0.9–2.4)	2.5 (0.6–4.4)	1.4 (0.3–2.5)
Business and financial operations	1.5 (1.1–2.0)	1.3 (0.7–1.9)	2.1 (1.5–2.6)	2.5 (1.8–3.1)	2.4 (1.9–2.8)[§]	1.6 (0.9–2.2)	1.2 (0.7–1.8)
Computer and mathematical science	1.4 (0.8–2.0)	0.8 (0.3–1.2)	1.6 (0.9–2.2)	1.6 (1.0–2.3)	2.2 (1.3–3.1)	2.0 (1.2–2.8)[§]	1.1 (0.5–1.8)
Community and social service	1.9 (0.7–3.1)	2.5 (1.4–3.6)	1.8 (1.0–2.5)	1.6 (0.8–2.4)	2.3 (1.1–3.4)	3.1 (1.9–4.2)	1.0 (0.0–2.2)
Management	1.1 (0.8–1.4)	1.3 (0.9–1.6)	1.7 (1.4–1.9)	1.3 (1.0–1.6)	1.6 (1.3–1.9)	1.6 (1.3–2.0)	0.9 (0.6–1.2)
Life, physical, and social science	1.9 (0.5–3.4)	2.8 (1.0–4.5)	2.4 (0.8–4.0)	2.9 (1.4–4.4)	2.5 (1.0–3.9)	1.2 (0.3–2.1)	0.5 (0.0–1.2)

Abbreviation: CI = confidence interval.
[*] Defined as working <35 hours during the reference week because of illness, injury or other medical issue.
[†] Defined as employed persons who usually work ≥35 hours per week at all jobs combined.
[§] Point estimate, but not its lower 95% confidence limit, exceeded an epidemic threshold defined as the upper 95% confidence limit of the expected value, based on monthly average for the previous 5 years, and p-value for post hoc observed versus expected comparison using Z-test for independent proportion ≥0.05.
[¶] Significantly exceeded the epidemic threshold (i.e., lower 95% confidence limit of the point estimate exceeded the epidemic threshold).
[**] Point estimate, but not its lower 95% confidence limit, exceeded the epidemic threshold and p-value for post hoc observed versus expected comparison using Z-test for independent proportion <0.05.

Summary

What is already known about this topic?

Syndromic methods for monitoring illness outside health care settings, such as tracking absenteeism trends in schools and workplaces, can be useful adjuncts to conventional disease reporting in the pandemic setting.

What is added by this report?

Whereas the overall impact of COVID-19 on health-related workplace absenteeism in March and April was minor, increases in absenteeism in personal care and service, healthcare support, and production occupations, groups that contain or define essential critical infrastructure workforce categories, highlight the risks and concerns surrounding occupational transmission of SARS-CoV-2.

What are the implications for public health practice?

Collection of additional occupational data in COVID-19 surveillance might help better understanding of the occupational risk and impact of COVID-19 and identify intervention opportunities.

either define or contain infrastructure workforce categories deemed essential and critical (health care support occupations, personal care and service occupations, and production occupations) based on their 5-year historical baselines. Many essential critical infrastructure jobs inherently involve prolonged close contact with patients, the general public, or coworkers (*3*). The workers in these occupational groups are also likely to have had to continue to be physically present in their workplaces during March and April and could not avoid exposure by, for example, working from home. For both reasons, workers in these essential critical infrastructure occupations are likely to be at increased risk for occupational exposure to SARS-CoV-2. Equivocal evidence of increased absenteeism in April was found for workers in the transportation and material moving and healthcare practitioner and technical occupations; these occupations are also part of the essential critical infrastructure workforce, and therefore are also likely to be at increased risk for occupational exposure to SARS-CoV-2 for the same reasons.

Health-related workplace absenteeism correlates well with the prevalence of influenza-like illness¶¶¶ (*4*), making it a useful measure of the impact of influenza pandemics or seasonal influenza epidemics on the working population (*1*,*2*). Whether this is true of COVID-19 is not yet known. Overall, absenteeism among the employed full-time workforce did not increase in conjunction with the incidence of COVID-19 in March and April; estimates for those months were similar to the 5-year baseline. This finding might be because of increased remote work or telework during these 2 months by those who could do so after implementation of the stay-at-home or shelter-in-place of residence recommendations (*5*), because of workplace control measures implemented to reduce exposures, or because the population most likely to experience symptomatic illness with COVID-19, persons aged >70 years (*6*), did not overlap substantially with the working population. However, the increase in health-related workplace absenteeism specifically among workers in certain occupational groups less able to avoid exposure to SARS-CoV-2 while such absenteeism remained relatively flat or decreased in other occupational groups highlights the potential impact of COVID-19 on the essential critical infrastructure workforce caused by the risks and concerns of occupational transmission of SARS-CoV-2.

The findings in this report are subject to at least seven limitations. First, operationalized, health-related workplace absenteeism includes absences caused by injuries, preventive care, and illnesses unrelated to COVID-19, as well as quarantine-associated absences, which could attenuate or confound absenteeism's putative relation to COVID-19 incidence. Second, data from the March and April surveys were adversely affected by the pandemic's impact on the U.S. Census Bureau's survey operations, resulting in substantial and nonrandom reductions in response rates across respondent groups. However, the Bureau of Labor Statistics was able to obtain estimates that met standards for accuracy and reliability. Third, monthly absenteeism estimates are based on 1-week measures and could have underestimated or overestimated the actual prevalence for any given month in a way that is not reflected in the 95% CIs. Fourth, the nature of the CPS data only allows for calculation of health-related absenteeism among full-time workers; patterns of absenteeism might be different among part-time workers. Fifth, the occupational subgroups analyzed include multiple occupations with heterogeneous levels of exposure to patients, clients, or members of the public with COVID-19. Sixth, prevalences of absenteeism in this report are not adjusted to control for the effect of potential sociodemographic confounders such as age, sex, race, or ethnicity. Finally, these national analyses might have failed to detect localized increases in absenteeism in specific geographic regions.

These findings are consistent with those from public health surveillance and field investigations suggesting that certain groups of workers might be at increased risk for SARS-CoV-2 infection because of their work during the pandemic, including health care personnel (*7*,*8*) and food production workers (*9*), among others (*10*). CDC and Occupational Safety and Health Administration guidance for protecting essential critical

¶¶¶ Fever (temperature of ≥100°F [37.8°C) and a cough and/or sore throat without a known cause other than influenza.

infrastructure workers is available and should be followed by their employers.**** In addition, improved surveillance is needed to monitor industry-specific and occupation-specific morbidity and mortality in this and future pandemics. In May 2020, CDC revised its COVID-19 Case Report Form to record certain health care–specific occupations, as well as limited information on suspected workplace exposures and settings for essential critical infrastructure workers.†††† Collection of additional information on work characteristics§§§§ might help better describe the occupational risk and impact of COVID-19 and inform intervention strategies.

**** https://www.cdc.gov/coronavirus/2019-ncov/community/worker-safety-support/index.html.
†††† https://www.cdc.gov/coronavirus/2019-ncov/php/reporting-pui.html.
§§§§ https://www.cdc.gov/niosh/topics/coding/.

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Provision of Pediatric Immunization Services During the COVID-19 Pandemic: an Assessment of Capacity Among Pediatric Immunization Providers Participating in the Vaccines for Children Program — United States, May 2020

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Recent reports suggest that routine childhood immunization coverage might have decreased during the coronavirus disease 2019 (COVID-19) pandemic (*1*,*2*). To assess the capacity of pediatric health care practices to provide immunization services to children during the pandemic, a survey of practices participating in the Vaccines for Children (VFC) program was conducted during May 12–20, 2020. Data were weighted to account for the sampling design; thus, all percentages reported are weighted. Among 1,933 responding practices, 1,727 (89.8%) were currently open; 1,397 (81.1%) of these reported offering immunization services to all of their patients. When asked whether the practice would likely be able to accommodate new patients to assist with provision of immunization services through August, 1,135 (59.1%) respondents answered affirmatively. These results suggest that health care providers appear to have the capacity to deliver routinely recommended childhood vaccines, allowing children to catch up on vaccines that might have been delayed as a result of COVID-19–related effects on the provision of or demand for routine well child care. Health care providers and immunization programs should educate parents on the need to return for well-child and immunization visits or refer patients to other practices, if they are unable to provide services (*3*).

The VFC program* is an entitlement program that provides federally purchased vaccines to eligible children aged ≤18 years at no cost. Approximately half of U.S. children are eligible to participate in the VFC program, mostly based on Medicaid enrollment or lack of insurance coverage, and an estimated 86% of U.S. pediatricians provide care in a VFC-enrolled practice (*4*,*5*). VFC provider practices include many types of health care providers; all serve at least some pediatric patients. Contact information for VFC program points of contact in VFC-enrolled practices and total number of federally purchased vaccine doses ordered are recorded in two CDC systems: the Provider Education and Assessment Reporting (PEAR) system† and the Vaccine Tracking System (VTrckS).§ Using information from PEAR and VTrckS, 5,144 of the 37,949 (13.6%) practices enrolled in the VFC program as of May 6, 2020, were randomly sampled, with probability of selection proportional to the number of federally purchased vaccine doses shipped to the practice. A survey invitation that contained a link to a survey programmed using Research Electronic Data Capture software (version 9.5.13; Vanderbilt University) was emailed to VFC points of contact of the randomly selected practices during May 12–20; VFC points of contacts from 1,933 of the 5,144 practices (37.6%) responded from the 50 U.S. states, the District of Columbia, and Puerto Rico. To check for response bias, a follow-up assessment that involved conducting telephone calls to determine operational status among a random sample of 199 (6.2%) nonresponding provider practices was conducted. Survey responses were summarized overall and stratified by urban/rural location¶ and U.S. Census region.** Data were weighted to account for the sampling design, thus all percentages reported are weighted. Using SAS (version 9.4; SAS institute) and SUDAAN (version 11.0.1; Research Triangle Institute), statistical comparisons were made using chi-squared tests; a p-value of <0.05 was considered statistically significant. This investigation was determined by CDC to be public health surveillance. Therefore the CDC's Institutional Review Board approval was not required.

Among 1,933 responding practices, 1,727 (89.8%) were currently open, and 206 (10.2%) were currently closed (including 197 [9.8%] that were temporarily closed; and nine [0.5%] that were permanently closed) (Table). Among open

* Children aged ≤18 years are eligible to receive vaccine through the Vaccines for Children Program if they are Medicaid-eligible, uninsured, American Indian/Alaska Native, or underinsured and vaccinated at federally qualified health centers, rural health clinics, or provider sites with an approved deputization agreement with the state public health department (https://www.cdc.gov/vaccines/programs/vfc/index.html).

† The PEAR system is an online quality assurance tool developed to improve VFC Program oversight and document compliance with VFC regulations during provider site visits.

§ VTrckS is a secure, web-based information technology system that integrates the entire publicly funded vaccine supply chain from purchasing and ordering through distribution to participating state, local, and territorial health departments (referred to as "awardees") and health care providers.

¶ Classification of urban (metropolitan) or rural (nonmetropolitan) was based on county of practice location using the 2013 National Center for Health Statistics Urban–Rural Classification Scheme for Counties (https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf).

** https://www2.census.gov/geo/docs/maps-data/maps/reg_div.txt.

TABLE. Operational status and provision of pediatric immunization services at practices, by health care provider characteristics – Vaccines for Children Provider Survey, May 2020

Characteristic	Total, no. (%)	Urban/Rural provider practice location,* no. (weighted %)			U.S. Census region,† no. (weighted %)						
		Urban, reference	Rural	p-value§	Northeast, reference	Midwest	p-value¶	South	p-value¶	West	p-value¶
Total	**1,933 (100)**	**1,413 (73.7)**	**511 (26.3)**	**—**	**404 (20.7)**	**457 (23.6)**	**—**	**663 (34.8)**	**—**	**400 (20.9)**	**—**
Current operational status of the practice in mid-May 2020 (n = 1,933)											
Open	**1,727 (89.8)**	1,253 (89.2)	465 (91.4)	0.137	339 (85.0)	399 (87.5)	0.281	621 (93.9)	0.000	359 (90.0)	0.032
Closed	**206 (10.2)**	160 (10.9)	46 (8.6)		65 (15.0)	58 (12.5)		42 (6.2)		41 (10.0)	
Among practices that are currently open, office hours for in-person visits, relative to prepandemic hours (n = 1,727)											
Reduced	**1,063 (61.7)**	798 (63.7)	257 (55.4)	0.002	263 (77.8)	256 (64.4)	0.000	333 (53.8)	0.000	203 (56.4)	0.000
Not reduced	**664 (38.3)**	455 (36.3)	208 (44.6)		76 (22.2%)	143 (35.6)		288 (46.2)		156 (43.6)	
Among practices that are currently closed, pediatric patients have been or will be referred to a new medical home (n = 170)**											
Yes	**131 (77.2)**	101 (77.1)	30 (77.6)	0.950	35 (69.6)	36 (72.5)	0.753	25 (79.9)	0.316	35 (90.3)	0.024
No	**39 (22.8)**	30 (22.9)	9 (22.4)		16 (30.4)	13 (27.5)		6 (20.1)		4 (9.8)	
Among practices that are currently open, offering routine immunization services to pediatric patients (n = 1,727)											
All patients	**1,397 (81.1)**	1,012 (81.1)	378 (81.2)	0.013	261 (77.2)	312 (78.8)	0.177	522 (84.1)	0.014	295 (82.3)	0.238
A subset of patients	**254 (14.7)**	196 (15.5)	56 (12.3)		64 (19.0)	62 (15.3)		72 (11.6)		54 (15.1)	
No patients	**76 (4.2)**	45 (3.4)	31 (6.6)		14 (3.8)	25 (6.0)		27 (4.3)		10 (2.6)	
Practice could likely provide immunization services to additional pediatric patients through the end of August (n = 1,933)											
Yes	**1,135 (59.1)**	779 (55.5)	347 (68.4)	0.000	182 (45.5)	280 (61.0)	0.000	422 (64.1)	0.000	242 (61.2)	0.000
No††	**418 (21.3)**	334 (23.4)	84 (15.9)		128 (31.2)	85 (18.8)		121 (18.0)		84 (20.5)	
Don't know/Not sure	**380 (19.6)**	300 (21.1)	80 (15.7)		94 (23.3)	92 (20.3)		120 (17.9)		74 (18.3)	

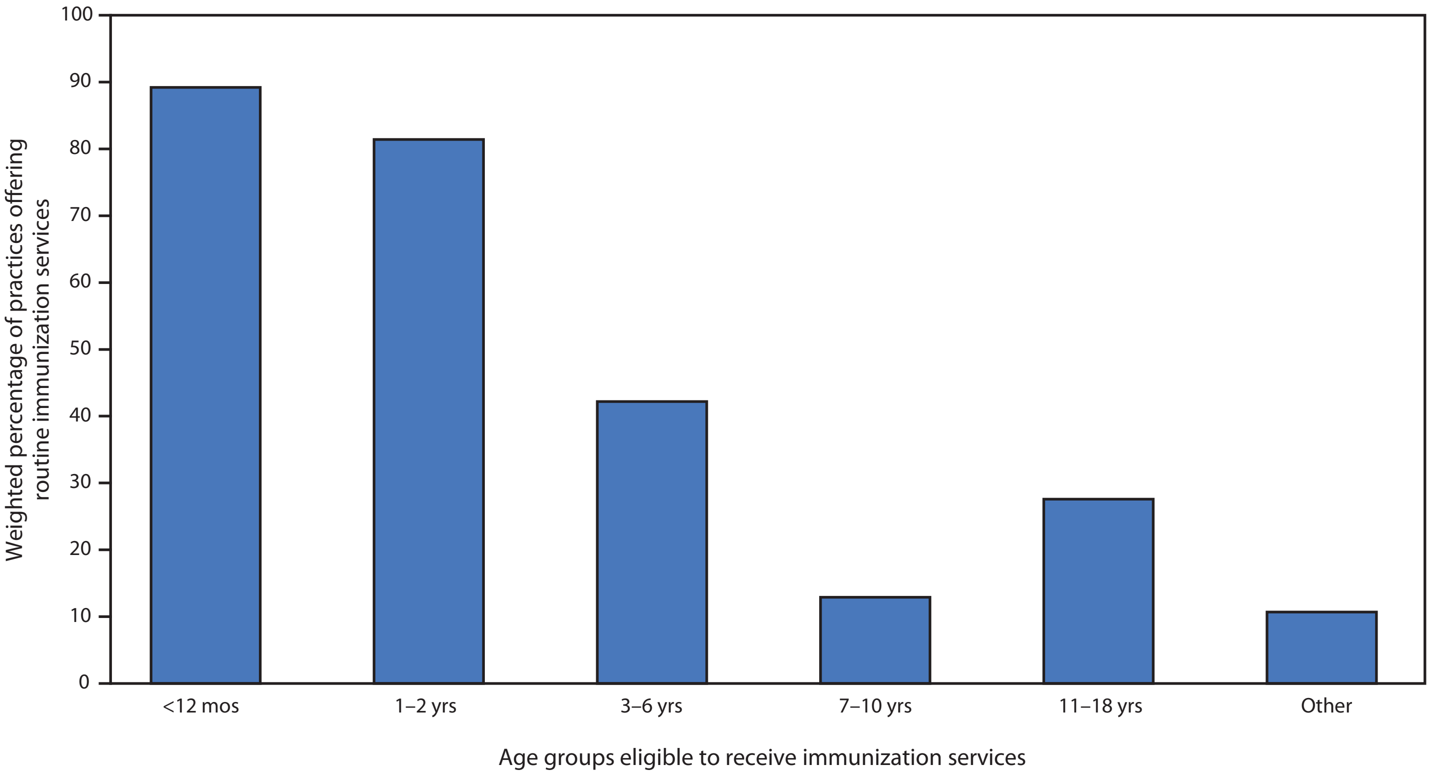
* Classification of urban (metropolitan) or rural (nonmetropolitan) was based on county of practice location using the 2013 National Center for Health Statistics Urban–Rural Classification Scheme for Counties (https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf). Practices in Puerto Rico (nine) are not shown.
† https://www2.census.gov/geo/docs/maps-data/maps/reg_div.txt. Practices in Puerto Rico (nine) are not shown.
§ Chi-squared test, compared with urban location.
¶ Chi-squared test, compared with Northeast region.
** Among 206 practices reporting currently closed, those that answered "Don't know/Not sure" to their pediatric patients having been or will be referred to a new medical home (36) are not shown.
†† Includes practices that are currently open or planning to reopen but reported not likely being able to accept additional patients (400), practices permanently closed (nine), and practices not resuming immunization services for all patients (nine).

practices, 1,063 (61.7%) were offering reduced office hours for in-person visits. Practices in the Northeast were more likely to be closed (65, 15.0%) than were those in the South (42, 6.2%) and West (41, 10.0%). Reduced office hours for in-person visits were more common among urban practices (798, 63.7%) and those in the Northeast (263, 77.8%) than among rural practices (257, 55.4%) and those in all three other regions (53.8%–64.4%), respectively. Among 170 practices that were currently closed and excluding 36 "don't know/not sure" responses, 131 (77.2%) reported that pediatric patients have been or will be referred to another medical home for immunization services.

Among 1,727 open practices, 1,397 (81.1%) reported currently offering immunization services to all their pediatric patients, 254 (14.7%) to some pediatric patients, and 76 (4.2%) to no pediatric patients. A majority of practices currently offering immunization services to some children reported offering them to children aged <12 months (224, 89.2%) and 1–2 years (204, 81.4%), whereas less than half reported offering services to children aged 3–6 years, 7–10 years, or 11–18 years (Figure).

Among all 1,933 providers participating in the survey, 1,397 (72.8%) reported currently offering immunization services to all pediatric patients; 344 (17.7%) reported that they would be offering immunizations to all children by July 1; 174 (8.7%) at some date after July 1; and 18 (0.8%) reported that the practice will not resume providing immunization services to all patients. Nine of these 18 practices reported being permanently closed, and nine would not resume immunization services to all patients for other reasons. When asked whether the practice would likely be able to accommodate new patients for immunization services through August, 1,135 (59.1%) of the 1,933 practices answered affirmatively, 418 (21.3%) either responded that this was not likely or the practice was permanently closed or not resuming immunization services for all patients, and 380 (19.6%) responded that they were unsure; urban practices and those in the Northeast were less likely to be able to accommodate new patients compared with rural practices and those in the other three regions (Table). The assessment of a random sample of 199 (6.2%) of 3,211 nonresponding practices found that 20 (10.1%) were currently closed or had unknown operational status, similar to survey respondents.

FIGURE. Pediatric age groups* eligible to receive routine immunization services at 254 practices not offering immunization services to all pediatric patients — United States, May 2020



* Categories are not mutually exclusive. "Other" includes age categories not reflected in the survey options (e.g., newborns only), patients with medical conditions or risk factors, and other scenarios such as patients behind on immunizations or parental request for vaccination.

Discussion

Ensuring that immunization services are maintained or reinitiated is essential for protecting persons and communities from vaccine-preventable diseases and outbreaks during the COVID-19 pandemic. However, notable declines in pediatric vaccine doses ordered and administered were observed beginning in March (*1*,*2*), and a survey of New York City preventive health care provider practices in April found that many have reduced or might soon reduce hours of operation, or temporarily or permanently close for a variety of reasons related to the pandemic (*6*). The results of the current national survey indicate that a majority of VFC-enrolled practices were open and offering routine immunization services to all pediatric patients in May or anticipate doing so in the near future. Further, over half of the practices were likely able to accommodate new patients over the coming months, which should help those families seeking immunization services because their routine health care provider practice is closed. In addition, after a sharp decline in VFC vaccine orders beginning in March and continuing through April (*1*), orders during the second half of May 2020 and the first 3 weeks of June were relatively comparable to those from the same period in 2019 (J Santoli, CDC, unpublished data, 2020), suggesting that the current immunization infrastructure can meet the expected need to provide vaccines that are overdue to many children.

Results from the survey did, however, raise concerns about access to routine immunization services among certain populations of children, particularly those living in urban areas and in the Northeast. Practices in these areas were more likely to report offering reduced in-person office hours and less likely to be able to accommodate new patients for immunization services through August, compared with providers in rural areas and in other regions. If the number of VFC-eligible children increases in these areas as a result of loss of health insurance because of pandemic-related unemployment (*7*), children whose medical home is not a VFC-enrolled practice will need to seek immunization services from a practice that is VFC-enrolled; a shortage of local VFC-enrolled practices willing and able to accommodate such patients could result in declines in coverage. Results also indicate that practices are prioritizing offering vaccination to younger children, consistent with CDC guidance emphasizing the importance of ongoing delivery of well child care, prioritizing children up to age 24 months, followed by young children, and then extending through adolescence (*3*). However, catch-up vaccination of school-aged children is also important throughout the summer to ensure children are fully vaccinated and able to meet school vaccination requirements before the commencement of the 2020–21 school year.

The findings in this report are subject to at least three limitations. First, the sample was limited to practices enrolled in the VFC program, and results might not be generalizable to practices that do not administer pediatric vaccines through the VFC program. Second, the survey's response rate was approximately 38%, and nonresponse could be related to operational status, because staff members in practices that are permanently or temporarily closed might not have received the survey. However, the follow-up assessment to determine operational status among a random sample of nonresponding practices indicated that this was unlikely. In addition, practice size was not collected from survey respondents, precluding an assessment of associations between practice size and operational status and capacity to provide immunization services. Finally, because the size of the pediatric population requiring catch-up vaccination is currently unknown, the impact of findings on provider practice capacity cannot be quantified.

With the number of VFC-eligible children expected to increase as a result of the COVID-19 pandemic, it is important that CDC, state, and local public health departments, as well as other immunization partners, ensure that parents of newly VFC-eligible children are aware of the availability of publicly funded vaccine through the VFC program (*8*). To facilitate catch-up vaccination, these entities must educate parents and caregivers, using culturally appropriate approaches, about the importance of resuming immunization and other well child care visits that might have been missed during the early stage of the COVID-19 pandemic, while reassuring them that these visits can be done safely during the pandemic as health care providers take steps to reduce the risk of SARS-CoV-2 transmission (*3*,*9*,*10*).[††] In addition, health care providers should consider reaching out to their patients about the importance of well-child visits and should use their systems (e.g., state immunization information system and electronic health records) to identify patients who are overdue for vaccines and conduct recall activities to schedule appointments as soon as possible.[§§] Providers might also consider applying for the CARES Act Provider Relief Fund to receive financial assistance to offset financial losses related to the pandemic.[¶¶]

[††] https://www.cdc.gov/vaccines/pandemic-guidance/.

[§§] https://www.aap.org/en-us/about-the-aap/aap-press-room/campaigns/call-your-pediatrician/Pages/default.aspx.

[¶¶] https://www.hhs.gov/coronavirus/cares-act-provider-relief-fund/index.html.

Summary

What is already known about this topic?

Declines in routine childhood immunization coverage have been reported during the COVID-19 pandemic.

What is added by this report?

A May 2020 survey of 1,933 practices participating in the Vaccines for Children program found that 1,727 (89.8%) were currently open, including 1,397 (81.1%) offering immunization services to all pediatric patients. Among responding practices, 1,135 (59.1%) were likely able to provide immunization services to new pediatric patients if necessary.

What are the implications for public health practice?

Practices appear to have the capacity to deliver routinely recommended vaccines, allowing children who have missed vaccine doses because of the pandemic to catch up. Practices that are unable to provide immunization services should refer patients to other practices.

Resumption of vaccination activities is critical to protecting children and adolescents from vaccine-preventable diseases as well as to preventing outbreaks. As considerations about reopening schools in the fall continue, state and local immunization programs should work with local health care providers to facilitate catch-up vaccination activities to ensure student compliance with state and local vaccination requirements.

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Race/Ethnicity, Underlying Medical Conditions, Homelessness, and Hospitalization Status of Adult Patients with COVID-19 at an Urban Safety-Net Medical Center — Boston, Massachusetts, 2020

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As of July 5, 2020, approximately 2.8 million coronavirus disease 2019 (COVID-19) cases and 130,000 COVID-19–associated deaths had been reported in the United States (*1*). Populations historically affected by health disparities, including certain racial and ethnic minority populations, have been disproportionally affected by and hospitalized with COVID-19 (*2*–*4*). Data also suggest a higher prevalence of infection with SARS-CoV-2, the virus that causes COVID-19, among persons experiencing homelessness (*5*). Safety-net hospitals,[†] such as Boston Medical Center (BMC), which provide health care to persons regardless of their insurance status or ability to pay, treat higher proportions of these populations and might experience challenges during the COVID-19 pandemic. This report describes the characteristics and clinical outcomes of adult patients with laboratory-confirmed COVID-19 treated at BMC during March 1–May 18, 2020. During this time, 2,729 patients with SARS-CoV-2 infection were treated at BMC and categorized into one of the following mutually exclusive clinical severity designations: exclusive outpatient management (1,543; 56.5%), non-intensive care unit (ICU) hospitalization (900; 33.0%), ICU hospitalization without invasive mechanical ventilation (69; 2.5%), ICU hospitalization with mechanical ventilation (119; 4.4%), and death (98; 3.6%). The cohort comprised 44.6% non-Hispanic black (black) patients and 30.1% Hispanic or Latino (Hispanic) patients. Persons experiencing homelessness accounted for 16.4% of patients. Most patients who died were aged ≥60 years (81.6%). Clinical severity differed by age, race/ethnicity, underlying medical conditions, and homelessness. A higher proportion of Hispanic patients were hospitalized (46.5%) than were black (39.5%) or non-Hispanic white (white) (34.4%) patients, a finding most pronounced among those aged <60 years. A higher proportion of non-ICU inpatients were experiencing homelessness (24.3%), compared with homeless patients who were admitted to the ICU without mechanical ventilation (15.9%), with mechanical ventilation (15.1%), or who died (15.3%). Patient characteristics associated with illness and clinical severity, such as age, race/ethnicity, homelessness, and underlying medical conditions can inform tailored strategies that might improve outcomes and mitigate strain on the health care system from COVID-19.

All adult patients who had a positive reverse transcription–polymerase chain reaction test result for SARS-CoV-2 in ambulatory or inpatient settings at BMC during March 1–May 18, 2020, were included in the analysis. SARS-CoV-2 testing was requisitioned by treating clinicians who were following guidance from the Massachusetts Department of Public Health[§] (*6*). Data on patient age, sex, race/ethnicity, underlying medical conditions, living situation (including homelessness or residing in a nursing home), and clinical status were extracted from BMC's electronic health records. The study was reviewed by the Boston Medical Center and Boston University Medical Campus Institutional Review Board and received a designation of nonhuman subjects research; no identifying information was extracted from the electronic health record because all data were extracted as aggregate counts. Data were collected as part of public health response activities and were determined by CDC not to constitute human subject research.[¶] Patient outcomes were assigned to one of five mutually exclusive categories designed to reflect each patient's highest level of COVID-19 clinical severity: exclusive outpatient management, non-ICU inpatient hospitalization, ICU hospitalization without mechanical ventilation, ICU with mechanical ventilation, and all-cause death that occurred in any location (inpatient or otherwise). Hospitalization status as of May 18, 2020, and the highest level of care received by those who died were also determined. All patients who died had been hospitalized; for this analysis, exclusive outpatient management and all

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[†] https://www.ncbi.nlm.nih.gov/books/NBK401306.

[§] Guidance from Massachusetts Department of Public Health (MADPH) on clinical and epidemiologic criteria for molecular SARS-CoV-2 testing evolved throughout the study period. Treating clinicians required approval from MADPH to requisition tests until March 15, 2020. In-hospital testing became available at Boston Medical Center on March 24, 2020, and routine testing of all hospitalized patients began on April 27, 2020. MADPH recommended routine molecular testing of persons identified as close contacts of patients with confirmed COVID-19 beginning on May 11, 2020.

[¶] https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=83cd09e1c0f5c6937cd9d7513160fc3f&pitd=20180719&n=pt45.1.46&r=PART&ty=HTML.

categories of hospitalization refer to cases that did not result in death. Underlying medical conditions were defined using *International Classification of Diseases, Tenth Revision* codes from patients' active condition lists or encounter diagnoses within the electronic health record. Obesity was defined as body mass index ≥30 kg/m^2. Homelessness was identified by an encounter registration screening question, use of an inpatient homeless discharge planning service, or registration address listed as a known homeless shelter. Clinical outcomes were examined by demographic characteristics, underlying medical conditions, and living situation. All analyses are descriptive, and no statistical testing was performed.

Among 2,729 patients with laboratory-confirmed COVID-19, 928 (34.0%) were aged ≥60 years, and 1,417 (51.9%) were female (Table 1). Race/ethnicity was known for 91.3% of patients, including 44.6% who identified as black, 30.1% as Hispanic, 13.5% as white, and 3.1% as another race/ethnicity. Overall, approximately one half of all patients (1,543; 56.5%) were managed exclusively as outpatients; 1,088 (39.9%) were hospitalized, including 900 (33.0%) who received non-ICU inpatient care, 69 (2.5%) who received ICU care without mechanical ventilation, 119 (4.4%) who received ICU care with mechanical ventilation, and 98 (3.6%) who died. As of May 18, 2020, among 1,088 hospitalized patients, 104 (9.6%) remained hospitalized. Among 984 patients discharged after hospitalization, 140 (14.2%) were discharged to a BMC-affiliated COVID-19 respite center which opened on April 9, 2020, for persons unable to self-isolate during the post-discharge recovery period.

Older age, male sex, and having one or more underlying medical conditions were more prevalent among patients who were hospitalized or died (Table 1). For example, patients aged ≥60 years accounted for 24.0% (371 of 1,543) of outpatients, but 81.6% (80 of 98) of deaths. In addition, whereas 63.3% of outpatients had one or more underlying medical conditions, 93.3% of those who received mechanical ventilation and 90.8% of those who died had one or more underlying conditions. A higher proportion of black patients had one or more (80.7%) or two or more (61.2%) underlying conditions than did other racial and ethnic groups, whereas a higher proportion of white patients were aged ≥80 years (13.0%) (Table 2). The prevalence of homelessness was higher among those who experienced non-ICU hospitalization (24.3%) than among those who experienced more severe clinical outcomes: prevalence of homelessness was 15.9% among ICU hospitalizations without mechanical ventilation, 15.1% among ICU hospitalizations with mechanical ventilation, and 15.3% among those who died (Table 1).

The clinical severity of illness among patients with COVID-19 varied by race/ethnicity and age. Overall, the hospitalization rate was higher among Hispanic patients (382 of 821, 46.5%) than among black (481 of 1,218; 39.5%) or white (127 of 369; 34.4%) patients (Figure). In particular, among patients aged <60 years, 43.2% (275 of 636) of Hispanic patients were hospitalized, compared with 30.8% (228 of 740) of black patients and 29.8% (61 of 205) of white patients. Although the highest number of deaths occurred among black patients, the highest percentage of deaths occurred among white patients (21 of 369; 5.7%), compared with black (48 of 1,218; 3.9%) and Hispanic (18 of 821; 2.2%) patients. Among patients aged ≥60 years, 11.0% of white, 9.0% of black, and 5.4% of Hispanic patients died.

Discussion

Among 2,729 COVID-19 patients cared for in inpatient and outpatient settings at BMC during March 1–May 18, nearly one half were black, approximately one third were Hispanic, and one in six were experiencing homelessness. Compared with black or white patients, a higher proportion of Hispanic patients were hospitalized; this finding was most notable among persons aged <60 years. Approximately one in five patients hospitalized at BMC were experiencing homelessness. The overall case-fatality rate was higher among white patients than among black or Hispanic patients; this finding is potentially explained by higher proportions of white patients in the oldest age groups, which are at highest risk for COVID-19–associated complications and death (*2*,*4*).

Long-standing systemic health, health care, and socioeconomic inequities and systemic racism, which influence life expectancy, underlying medical conditions, and health care access and utilization, as well as current work and living circumstances are all factors that can play a crucial role in risk for COVID-19 exposure, illness, and mortality (*7*,*8*). Although this report was unable to fully assess the associations between these factors and COVID-19 outcomes, the findings reflect the experience of a safety-net institution within a city that experienced a surge in COVID-19 cases during April 2020 and whose patients historically include high proportions of persons at increased risk for adverse health outcomes (including racial and ethnic minority groups and persons experiencing homelessness). At BMC, information about individual patients' living situations, family structures, and economic means factored into care teams' hospitalization and discharge decisions. For example, clinicians' concerns about patients' inability to self-isolate resulted in decisions to lengthen inpatient hospitalizations (personal communication, Christopher Manessah, MD, and Deanna Faretra, BMC, April 2020). BMC also implemented multiple strategies to help patients who were not severely ill avoid prolonged hospitalization, including transformation of a nearby vacant hospital building

TABLE 1. Clinical characteristics of patients with COVID-19 (N = 2,729) — Boston Medical Center, March 1–May 18, 2020

Characteristic†	Total (N = 2,729)	Mutually exclusive clinical severity categories: Outpatient management (n = 1,543)	Inpatient hospitalization*: Non-ICU (n = 900)	Inpatient hospitalization*: ICU without mechanical ventilation (n = 69)	Inpatient hospitalization*: ICU with mechanical ventilation (n = 119)	Deceased§ (n = 98)
	No. (%)					
Age group (yrs)						
18–29	**309 (11.3)**	244 (15.8)	53 (5.9)	3 (4.3)	9 (7.6)	0 (—)
30–39	**472 (17.3)**	325 (21.1)	125 (13.9)	6 (8.7)	11 (9.2)	5 (5.1)
40–49	**503 (18.4)**	322 (20.9)	149 (16.6)	9 (13.0)	17 (14.3)	6 (6.1)
50–59	**517 (18.9)**	281 (18.2)	187 (20.8)	14 (20.3)	28 (23.5)	7 (7.1)
60–69	**460 (16.9)**	207 (13.4)	176 (19.6)	17 (24.6)	30 (25.2)	30 (30.6)
70–79	**258 (9.5)**	82 (5.3)	126 (14.0)	11 (15.9)	19 (16.0)	20 (20.4)
≥80	**210 (7.7)**	82 (5.3)	84 (9.3)	9 (13.0)	5 (4.2)	30 (30.6)
Sex						
Female	**1,417 (51.9)**	896 (58.1)	428 (47.6)	21 (30.4)	40 (33.6)	32 (32.7)
Male	**1,312 (48.1)**	647 (41.9)	472 (52.4)	48 (69.6)	79 (66.4)	66 (67.3)
Race/Ethnicity						
Black, non-Hispanic	**1,218 (44.6)**	689 (44.7)	399 (44.3)	32 (46.4)	50 (42.0)	48 (49.0)
Hispanic or Latino	**821 (30.1)**	421 (27.3)	320 (35.6)	19 (27.5)	43 (36.1)	18 (18.4)
White, non-Hispanic	**369 (13.5)**	221 (14.3)	101 (11.2)	10 (14.5)	16 (13.4)	21 (21.4)
Other race, non-Hispanic¶	**84 (3.1)**	60 (3.9)	17 (1.9)	2 (2.9)	2 (1.7)	3 (3.1)
Unknown/Declined	**237 (8.7)**	152 (9.9)	63 (7.0)	6 (8.7)	8 (6.7)	8 (8.2)
Underlying medical conditions**						
Asthma	**360 (13.2)**	176 (11.4)	140 (15.6)	6 (8.7)	23 (19.3)	15 (15.3)
Cancer	**195 (7.1)**	67 (4.3)	90 (10.0)	10 (14.5)	10 (8.4)	18 (18.4)
Chronic kidney disease	**332 (12.2)**	115 (7.5)	149 (16.6)	13 (18.8)	20 (16.8)	35 (35.7)
Chronic kidney disease on dialysis	**106 (3.9)**	31 (2.0)	53 (5.9)	5 (7.2)	8 (6.7)	9 (9.2)
Cirrhosis	**42 (1.5)**	17 (1.1)	16 (1.8)	2 (2.9)	3 (2.5)	4 (4.1)
Congestive heart failure	**216 (7.9)**	59 (3.8)	106 (11.8)	8 (11.6)	11 (9.2)	32 (32.7)
Chronic obstructive pulmonary disease	**146 (5.3)**	35 (2.3)	78 (8.7)	6 (8.7)	11 (9.2)	16 (16.3)
Coronary artery disease	**190 (7.0)**	71 (4.6)	73 (8.1)	6 (8.7)	10 (8.4)	30 (30.6)
Diabetes	**708 (25.9)**	274 (17.8)	317 (35.2)	24 (34.8)	47 (39.5)	46 (46.9)
HIV/AIDS	**73 (2.7)**	36 (2.3)	31 (3.4)	2 (2.9)	2 (1.7)	2 (2.0)
Hypertension	**1,248 (45.7)**	556 (36.0)	516 (57.3)	39 (56.5)	66 (55.5)	71 (72.4)
Obesity (BMI >30 kg/m^2)	**1,164 (42.7)**	553 (35.8)	465 (51.7)	31 (44.9)	69 (58.0)	46 (46.9)
Serious mental illness	**219 (8.0)**	87 (5.6)	103 (11.4)	7 (10.1)	13 (10.9)	9 (9.2)
Sickle cell disease	**15 (0.5)**	5 (0.3)	8 (0.9)	0 (—)	1 (0.8)	1 (1.0)
Substance use disorder	**396 (14.5)**	161 (10.4)	178 (19.8)	14 (20.3)	24 (20.2)	19 (19.4)
≥1 of above conditions	**2,033 (74.5)**	977 (63.3)	799 (88.8)	57 (82.6)	111 (93.3)	89 (90.8)
≥2 of above conditions	**1,429 (52.4)**	606 (39.3)	613 (68.1)	44 (63.8)	89 (74.8)	77 (78.6)
Living situation††						
Homelessness	**447 (16.4)**	184 (11.9)	219 (24.3)	11 (15.9)	18 (15.1)	15 (15.3)
Residing in nursing home	**181 (6.6)**	114 (7.4)	44 (4.9)	6 (8.7)	7 (5.9)	10 (10.2)
Pregnant§§	**89 (3.3)**	42 (2.7)	42 (4.7)	1 (1.4)	4 (3.4)	0 (—)

Abbreviations: AIDS = acquired immunodeficiency syndrome; BMI = body mass index; COVID-19 = coronavirus disease 2019; HIV = human immunodeficiency virus; ICU = intensive care unit.

* Survived.

† Patient characteristics are not mutually exclusive; therefore, the counts and proportions might not sum to the totals.

§ Of the 98 patients who died, all had been hospitalized, including 27 (27.6%) who received non-ICU inpatient care, 15 (15.3%) who received ICU care without mechanical ventilation, and 56 (57.1%) who received ICU care with mechanical ventilation.

¶ Other race included persons who identified as Asian, American Indian, Middle Eastern, Native Hawaiian/Pacific Islander. These groups were consolidated due to small numbers.

** Underlying medical conditions were defined using *International Classification of Diseases, Tenth Revision* codes from patients' active condition lists or encounter diagnoses within the electronic health record. Obesity was defined by BMI ≥30 kg/m^2. Patients with substance use disorder were additionally identified via presence of orders for inpatient assessment of opiate or alcohol withdrawal symptoms, inpatient consult to an addiction medicine service, or encounters for previous outpatient substance use disorder treatment.

†† Homelessness was identified by a registration screening question, use of an inpatient homeless discharge planning service, or registration address listed as a known homeless shelter. Nursing home residence was identified by cross-referencing a list of known nursing home patients or matching registration address with known nursing home addresses.

§§ Patients were categorized as pregnant if a health care encounter for COVID-19 occurred before, or up to 7 days after, the end of pregnancy.

TABLE 2. Characteristics of patients with COVID-19 by race/ethnicity (N = 2,729) — Boston Medical Center, March 1–May 18, 2020

		Race/Ethnicity				
Characteristics*	Total (N = 2,729)	Black, non-Hispanic (n = 1,218)	Hispanic/Latino (n = 821)	White, non-Hispanic (n = 369)	Other race, non-Hispanic† (n = 84)	Unknown/Declined (n= 237)
	No. (%)					
Age group (yrs)						
18–29	**309 (11.3)**	106 (8.7)	129 (15.7)	26 (7.0)	13 (15.5)	35 (14.8)
30–39	**472 (17.3)**	198 (16.3)	152 (18.5)	67 (18.2)	13 (15.5)	42 (17.7)
40–49	**503 (18.4)**	213 (17.5)	190 (23.1)	46 (12.5)	15 (17.9)	39 (16.5)
50–59	**517 (18.9)**	223 (18.3)	165 (20.1)	66 (17.9)	15 (17.9)	48 (20.3)
60–69	**460 (16.9)**	232 (19.0)	112 (13.6)	69 (18.7)	10 (11.9)	37 (15.6)
70–79	**258 (9.5)**	137 (11.2)	46 (5.6)	47 (12.7)	8 (9.5)	20 (8.4)
≥80	**210 (7.7)**	109 (8.9)	27 (3.3)	48 (13.0)	10 (11.9)	16 (6.8)
Sex						
Female	**1,417 (51.9)**	657 (53.9)	389 (47.4)	185 (50.1)	49 (57.1)	137 (57.8)
Male	**1,312 (48.1)**	561 (46.1)	432 (52.6)	184 (49.9)	35 (41.7)	100 (42.2)
Underlying medical conditions§						
Asthma	**360 (13.2)**	188 (15.4)	102 (12.4)	43 (11.7)	6 (7.1)	21 (8.9)
Cancer	**195 (7.1)**	106 (8.7)	43 (5.2)	31 (8.4)	4 (4.8)	11 (4.6)
Chronic kidney disease	**332 (12.2)**	222 (18.2)	55 (6.7)	34 (9.2)	7 (8.3)	14 (5.9)
Chronic kidney disease on dialysis	**106 (3.9)**	64 (5.3)	22 (2.7)	10 (2.7)	3 (3.6)	7 (3.0)
Cirrhosis	**42 (1.5)**	20 (1.6)	10 (1.2)	8 (2.2)	0 (0.0)	4 (1.7)
Congestive heart failure	**216 (7.9)**	129 (10.6)	32 (3.9)	44 (11.9)	3 (3.6)	8 (3.4)
Chronic obstructive pulmonary disease	**146 (5.3)**	70 (5.7)	16 (1.9)	47 (12.7)	4 (4.8)	9 (3.8)
Coronary artery disease	**190 (7.0)**	104 (8.5)	35 (4.3)	40 (10.8)	2 (2.4)	9 (3.8)
Diabetes mellitus	**708 (25.9)**	382 (31.4)	196 (23.9)	53 (14.4)	21 (25.0)	56 (23.6)
HIV/AIDS	**73 (2.7)**	47 (3.9)	11 (1.3)	8 (2.2)	0 (0.0)	7 (3.0)
Hypertension	**1,248 (45.7)**	686 (56.3)	292 (35.6)	149 (40.4)	28 (33.3)	93 (39.2)
Obesity (BMI ≥30 kg/m^2)	**1,164 (42.7)**	576 (47.3)	388 (47.3)	102 (27.6)	11 (13.1)	87 (36.7)
Serious mental illness	**219 (8.0)**	89 (7.3)	57 (6.9)	59 (16.0)	8 (9.5)	6 (2.5)
Sickle cell disease	**15 (0.5)**	11 (0.9)	3 (0.4)	0 (0.0)	0 (0.0)	1 (0.4)
Substance use disorder	**396 (14.5)**	171 (14.0)	98 (11.9)	105 (28.5)	8 (9.5)	14 (5.9)
≥1 of above conditions	**2,033 (74.5)**	983 (80.7)	602 (73.3)	258 (69.9)	43 (51.2)	147 (62.0)
≥2 of above conditions	**1,429 (52.4)**	745 (61.2)	366 (44.6)	193 (52.3)	30 (35.7)	95 (40.1)
Living situation¶						
Homelessness	**447 (16.4)**	203 (16.7)	100 (12.2)	110 (29.8)	11 (13.1)	23 (9.7)
Residing in nursing home	**181 (6.6)**	101 (8.3)	14 (1.7)	51 (13.8)	11 (13.1)	4 (1.7)
Pregnant**	**89 (3.3)**	30 (2.5)	49 (6.0)	4 (1.1)	2 (2.4)	4 (1.7)

Abbreviations: AIDS = acquired immunodeficiency syndrome; BMI = body mass index; COVID-19 = coronavirus disease 2019; HIV = human immunodeficiency virus.

* Patient characteristics are not mutually exclusive; therefore, the counts and proportions might not sum to totals.

† Other race included persons who identified as Asian, American Indian, Middle Eastern, Native Hawaiian/Pacific Islander. These groups were consolidated because of small numbers.

§ Underlying medical conditions were defined using *International Classification of Diseases, Tenth Revision* codes from patients' active condition lists or encounter diagnoses within the electronic health record. Obesity was defined by BMI ≥30 kg/m^2. Patients with substance use disorder were additionally identified via presence of orders for inpatient assessment of opiate or alcohol withdrawal symptoms, inpatient consult to an addiction medicine service, or encounters for previous outpatient substance use disorder treatment.

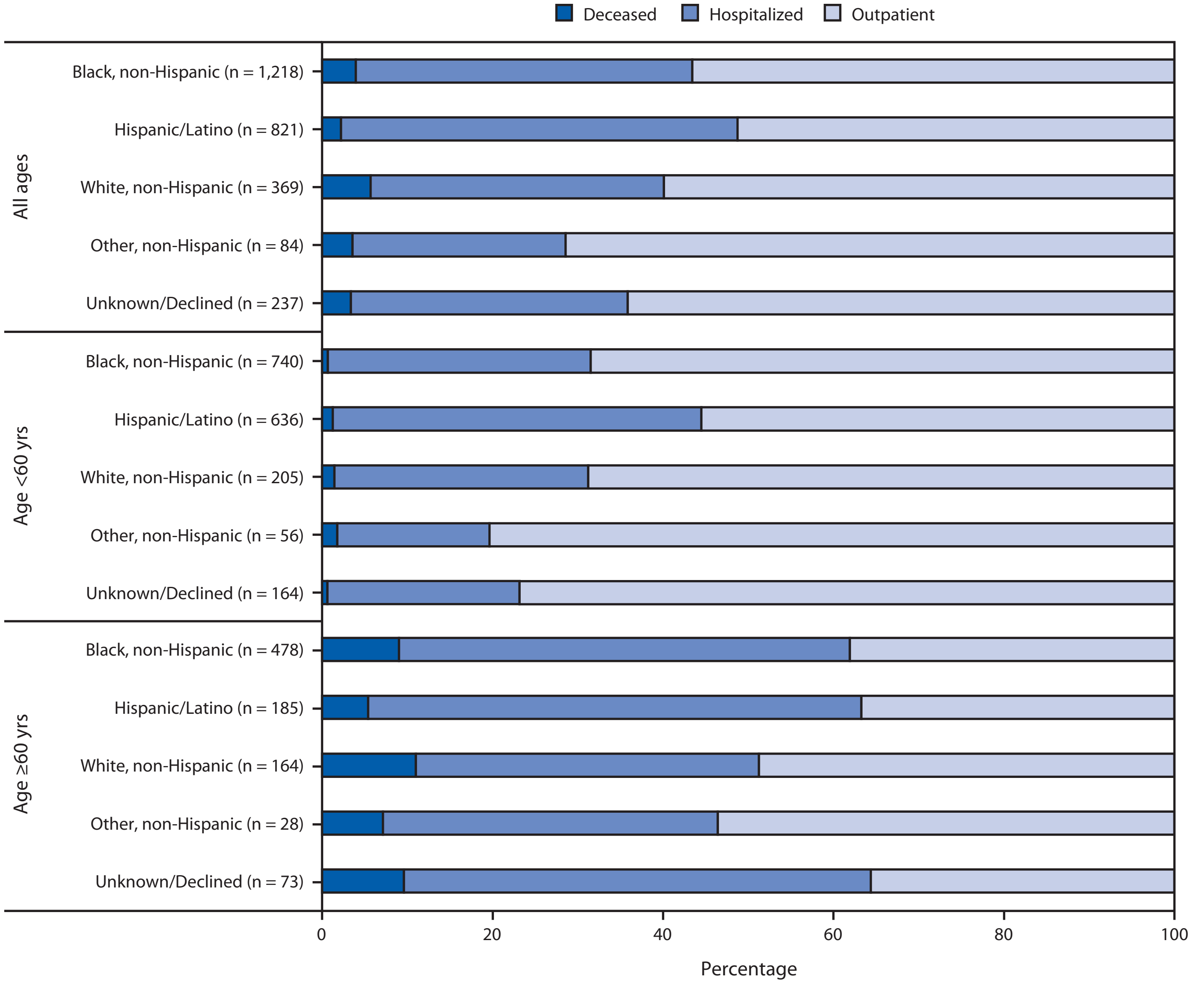
¶ Homelessness was identified by a registration screening question, use of an inpatient homeless discharge planning service, or registration address listed as a known homeless shelter. Nursing home residence was identified by cross-referencing a list of known nursing home patients or matching registration address with known nursing home addresses.

** Patients were categorized as pregnant if a health care encounter for COVID-19 occurred before, or up to 7 days after, the end of pregnancy.

into a COVID-19 recovery center for patients whose living circumstances, including homelessness, precluded their ability to self-isolate. Additional programs included home delivery of groceries or prepared meals from the BMC food pantry, provision of mobile telephones to facilitate follow-up telehealth visits, and bedside and home delivery of outpatient medications. An assessment of the effectiveness of specific strategies to support COVID-19 patients in recovery, particularly for those with health-related social needs that present barriers to hospital discharge or self-isolation, is needed.

The findings in this report are subject to at least five limitations. First, the report describes a single institution's experience and might not be generalizable to other institutions or locations. Second, because all data were extracted as aggregate counts, statistical comparisons were not performed, and associations cannot be interpreted as being statistically significant, nor can causality be inferred. Third, approximately 4% of

FIGURE. Clinical severity* of illness in patients with COVID-19, by age and race/ethnicity (N = 2,729) — Boston Medical Center, March 1–May 18, 2020



Abbreviation: COVID-19 = coronavirus disease 2019.

* Inpatients include surviving patients whose highest level of care included non–intensive care unit hospitalization or intensive care unit hospitalization with or without invasive mechanical ventilation.

patients included in this report remained hospitalized at the end of data collection; it is unknown whether these patients have meaningfully different characteristics relative to the larger study population. Comprehensive external vital statistics were unavailable; out-of-hospital deaths, although assessed, were potentially undercounted. Fourth, intermittent shortages of testing supplies introduced changes to BMC's testing criteria throughout the study period, which might have influenced whether patients were tested, particularly in outpatient settings. Finally, this report uses location of care, mechanical ventilation status, and death to categorize patients into clinical severity categories, which might discount the role of contextual factors that influence care received, including availability of critical care beds, evolving clinical practice, and patient preferences (e.g., advance directives).

Experience treating COVID-19 patients at a single safety-net institution highlighted associations between clinical outcomes and sociodemographic characteristics, including age, race/ethnicity, underlying medical conditions, and homelessness. One important strength of this report is that data on race and ethnicity, which are often incomplete in public reports (*9*), were available for 91.3% of the patients and are presented by age

Summary

What is already known about this topic?

Older adults and non-Hispanic black and Hispanic persons are overrepresented among hospitalized COVID-19 patients in the United States. High COVID-19 prevalence has been reported among residents of homeless shelters.

What is added by this report?

During March–May 2020, among 2,729 COVID-19 patients treated at an urban safety-net hospital serving predominantly low-income racial/ethnic minority populations, clinical severity differed by age, race/ethnicity, underlying medical conditions, and homelessness. Hospitalized patients were more likely to be Hispanic or to be experiencing homelessness; >80% of patients who died were aged ≥60 years.

What are the implications for public health practice?

COVID-19 patient characteristics, including age, race/ethnicity, and homelessness could inform tailored strategies that might improve patient outcomes and mitigate strain on health care systems.

category. Further study is needed to assess the impact of BMC's strategies for addressing health-related social needs of patients with COVID-19 on related health outcomes and health care utilization, and to understand how these characteristics can inform development of tailored strategies that might improve patient outcomes and alleviate strain on the health care system.

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Trends in Emergency Department Visits for Contact Sports–Related Traumatic Brain Injuries Among Children — United States, 2001–2018

Dana Waltzman, PhD[1]; Lindsay S. Womack, PhD[1]; Karen E. Thomas, MPH[1]; Kelly Sarmiento, MPH[1]

During 2010–2016, there were an average of 283,000 U.S. emergency department (ED) visits each year among children for sports and recreation–related traumatic brain injuries (SRR-TBIs); approximately 45% of these SRR-TBIs were associated with contact sports (*1*). Although most children with an SRR-TBI are asymptomatic within 4 weeks, there is growing concern about potential long-term effects on a child's developing brain (*2*). This has led to calls to reduce the risk for traumatic brain injuries (TBIs) among child athletes, resulting in the introduction of state policies and the institution of safety rules (e.g., age and contact restrictions) for some sports programs. To assess changes in the incidence of ED-related SRR-TBI among children, CDC analyzed data from the National Electronic Injury Surveillance System–All Injury Program (NEISS-AIP) for the period 2001–2018. After more than a decade of increasing rates, the rate of contact sports–related TBI ED visits declined 32% from 2012 to 2018. This reduction was primarily the result of a decline in football-related SRR-TBI ED visits during 2013–2018. Decreased participation in tackle football (*3*) and implementation of contact limitations (*4*) were likely contributing factors to this decline. Public health professionals should continue to expand efforts to address SRR-TBIs in football, which is the sport with the highest incidence of TBI, and identify effective prevention strategies for all sports to reduce TBIs among children.

NEISS-AIP is operated by the U.S. Consumer Product Safety Commission and each year houses data on approximately 500,000 initial injury-related visits for patients treated in hospital EDs. Data are drawn from a nationally representative sample of hospitals that have been selected as a stratified probability sample (*1*). Data are weighted by the inverse probability of selection to provide national estimates.

SRR-TBIs included TBIs among children aged ≤17 years that occurred during organized and unorganized SRR activities. Children were classified as having a TBI if the primary body part injured was the head and the principal diagnosis was concussion or internal organ injury. Each case was initially classified into one of 39 mutually exclusive sports and recreation–related groups on the basis of an algorithm that considered both the consumer products involved (e.g., bicycles, swing sets, and inline skating equipment) and the narrative description of the incident obtained from the medical record. SRR activities were collapsed into categories (i.e., contact sport, limited contact sport, noncontact sport, or recreation) based on previous studies (*5*). Cases were excluded if the injury was violence-related or if the person was dead on arrival or died in the ED.

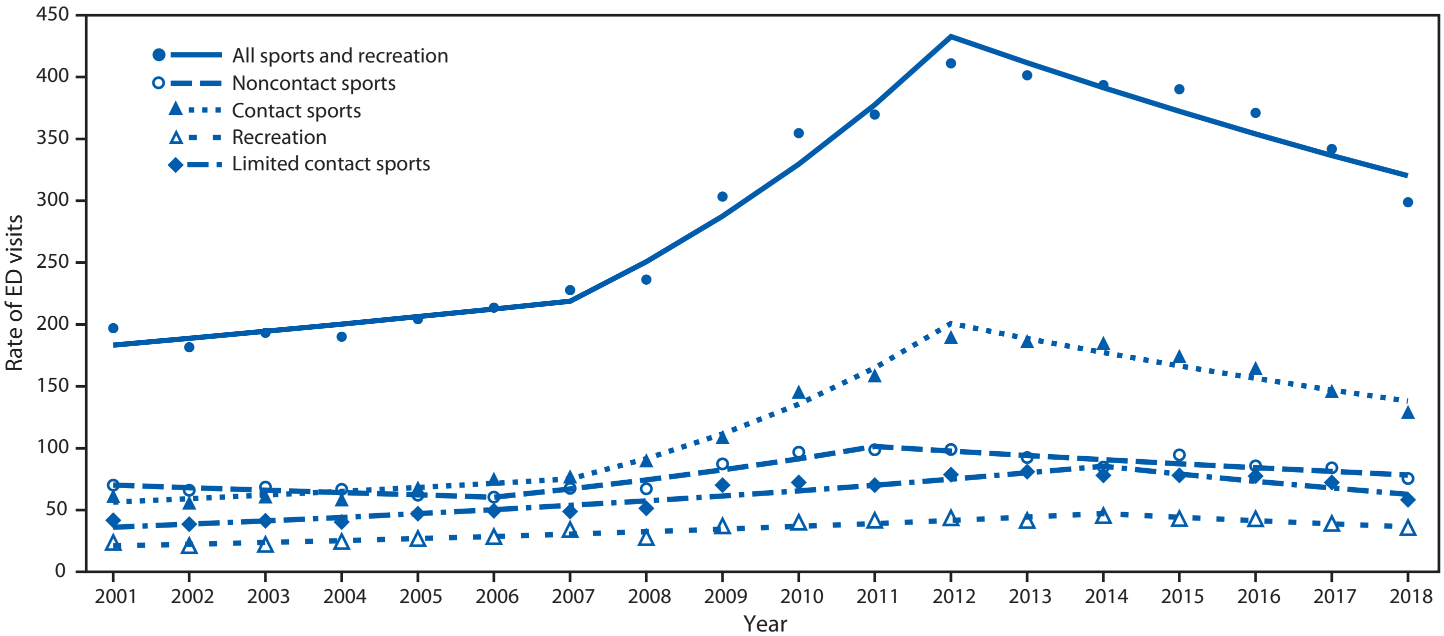
Rates of SRR-TBIs per 100,000 population per year were calculated using U.S. Census Bureau population estimates as the denominator, stratified by sex and age group. Rates and 95% confidence intervals were calculated using SAS software (version 9.4; SAS Institute), accounting for sample weights and the complex survey design. Trends in SRR-TBI ED visit rates were evaluated using Joinpoint software (version 4.7.0.0; National Cancer Institute) (https://surveillance.cancer.gov/joinpoint/).

From 2001 to 2018 an estimated 3,888,020 SRR-TBI ED visits occurred in the United States for children aged <17 years. The rate of SRR-TBI ED visits per 100,000 population aged ≤17 years declined 27% from 2012 (411.1) to 2018 (298.8), primarily driven by a 32% decline in the rate of contact sports-related TBI ED visits from 189.9 in 2012 to 129.4 in 2018 (Figure 1). In addition, the rate of noncontact sports–related TBI ED visits declined from 98.9 in 2012 to 75.5 in 2018. Among contact sports, the highest rates of TBI ED visits in 2018 in children aged 5–17 years were for injuries sustained while playing football (72.4), basketball (46.6), and soccer (32.5) (Figure 2). The rate of football-related TBI ED visits in children aged 5–17 years declined 39% from 118.8 in 2013 to 72.4 in 2018, after increasing approximately 200% from 2001 (38.7) to 2013 (118.8). TBI-ED visits for basketball and soccer, the other two leading contact sports, did not decline significantly.

The rate of contact sports-related TBI ED visits among children aged 10–14 and 15–17 years increased from 2001 to 2012 (Figure 3), then declined from 2012 to 2018. The pattern among children aged 5–9 years was similar: rates increased from 2001 to 2013 and then declined from 2013 to 2018. The estimated decline in annual percentage change from 2013 to 2018 differed by age group: declines of 8%, 5%, and 8% among children aged 5–9, 10–14, and 15–17 years, respectively.

A similar pattern of an initial increase in rate of contact sports–related TBI ED visits followed by a decline was observed by sex (Figure 3). From 2001 to 2012, the rate among males increased by approximately 200%, from 130.5 to 400.9 and among females, increased approximately 250% from 32.3 in 2001 to 113.5 in 2014. From 2012 to 2018, the rate among males declined 31%, to 277.3. From 2014 to 2018, the rate among females declined 38%, to 70.1.

FIGURE 1. Trends* in rates† of ED visits for nonfatal sports and recreation–related TBIs§ among persons aged ≤17 years, by type of activity¶ and contact level,,††,§§ — National Electronic Injury Surveillance System–All Injury Program, United States, 2001–2018**



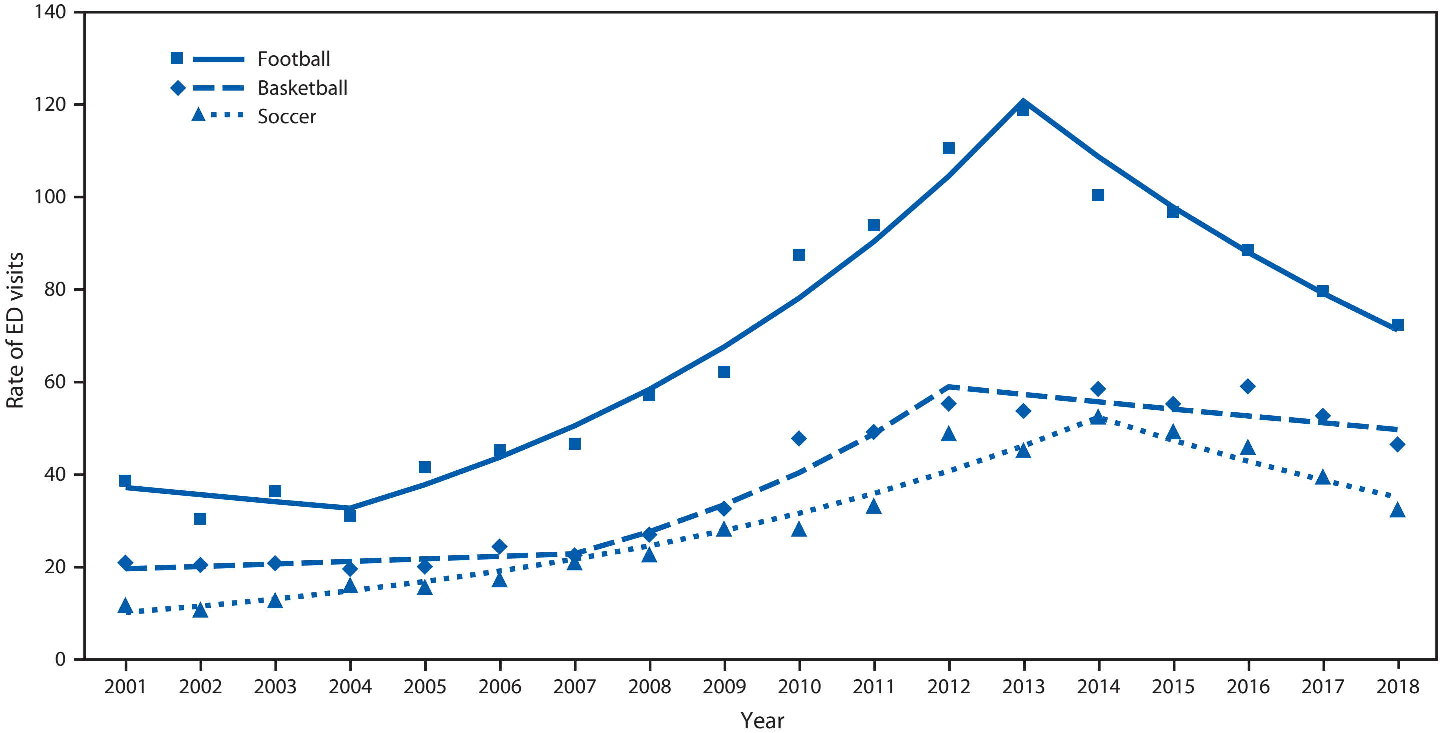
Abbreviations: ED = emergency department; TBIs = traumatic brain injuries.
* Symbols represent observed rates, and lines represent modeled rates.
† Per 100,000 population.
§ All sports and recreation includes contact sports, limited contact sports, noncontact sports, and recreation.
¶ Recreation includes scooter riding, all-terrain vehicle riding, amusement attractions (rides and water slides [not swimming pool slides]), tobogganing/sledding, moped/dirt bike riding (includes other two-wheeled, powered, off-road vehicles and dune buggies), other recreation (includes nonpowder/BB guns, go-carts, personal watercraft, snowmobiling, camping, fishing, and billiards), miscellaneous recreation ball games (tetherball, kickball, and dodgeball), and other specified (gym/physical education class, archery, darts, curling, and mountain climbing).
** Contact sports include football, basketball, soccer, hockey (ice hockey, field hockey, roller hockey, and street hockey), combative sports (including boxing, wrestling, martial arts, and fencing), miscellaneous contact ball games (including lacrosse, rugby, and handball).
†† Limited contact sports include baseball, gymnastics (including cheerleading and dancing), skateboarding, softball, trampolining, horseback riding, volleyball, ice skating, inline/roller skating, and other limited contact sports (including snow skiing, snowboarding, water skiing, and surfing).
§§ Noncontact sports include playground, bicycling, swimming, exercise, golf (including injuries related to golf carts), track and field, racquet sports (tennis, badminton, and squash), and bowling.

Discussion

This analysis found that from 2001 to 2018, approximately 3.8 million ED visits for SRR-TBIs occurred among children aged ≤17 years, with contact sports accounting for approximately 41% of these visits. After more than a decade of increasing rates, the rate of contact sports–related TBI ED visits declined 32% from 2012 to 2018. The increase in the early part of the study period might be associated with growing awareness and recognition of SRR-TBIs and therefore an increase in reporting (*6*); however, the reduction in the latter part of the study period was predominantly the result of a decline in ED visits related to football SRR-TBIs. These results highlight the importance of examining changes in sports-specific SRR-TBIs rates over time to understand the changing epidemiology of this injury.

Participation in organized youth football programs has declined 24% since 2010 (with a 12% reduction in participation from 2016 to 2017) (*3*), although it remains one of the most popular sports played by youths (*3*) and the sport with the highest rate of SRR-TBI. Approximately 25% of SRR-TBIs among children are attributed to football (*1*). Implementation of contact and tackling restrictions to reduce the risk for concussion and decreased participation in tackle football programs might also be contributing to the decline in football-related SRR-TBIs. Tackling is responsible for approximately two thirds of concussions and other TBIs among high school football players (*7*). Evidence suggests that contact restrictions and implementation of tackling techniques to reduce exposure to the head during a tackle (i.e., shoulder-style tackling) might reduce concussion risk by as much as 33% (*8*) and risk for overall head impact exposure by up to 42% (*9*). From 2012 to 2015, the National Federation of State High School Associations and its member states, as well as at least two large youth football programs, instituted guidelines

FIGURE 2. Trends* in rates† of ED visits for the three most common contact sports associated with nonfatal sports and recreation–related TBI among persons aged 5–17 years — National Electronic Injury Surveillance System–All Injury Program, United States, 2001–2018



Abbreviations: ED = emergency department; TBI = traumatic brain injury.
* Symbols represent observed rates, and lines represent modeled rates.
† Per 100,000 population.

to restrict the amount and frequency of full-contact drills during practices (*4*).

Most research on prevention of SRR-TBIs focuses on football and ice hockey and the effectiveness of sports safety equipment (e.g., helmets and mouthguards) (*2*). Studies on SRR-TBI prevention strategies for other contact sports (e.g., soccer and basketball) are limited. Although additional years of data might be needed to evaluate the trends in rates of SRR-TBI ED visits for nonfootball activities, the lack of evidence-based prevention strategies might be one reason for the absence of significant declines in the rates of SRR-TBI ED visits for nonfootball activities. Future research is also needed to identify effective prevention strategies for nonfootball activities to reduce SRR-TBIs among children.

The findings in this report are subject to at least six limitations. First, injury rates are underestimated because this study only included children treated in EDs. Many children with a TBI do not seek care in EDs (*10*) or do not seek care at all. Second, the estimates cannot be used to calculate relative risks for TBIs associated with SRR activities because there are limited data on national participation in SRR activities, especially for unorganized sports. Therefore, it is difficult to tell whether decreases in injuries result from interventions, decline in participation, or a combination of both. Third, because NEISS-AIP was not developed to identify specific diagnoses, actual TBIs might have been missed, and some

Summary

What is already known about this topic?

During 2010–2016, an average of 283,000 U.S. emergency department (ED) visits per year for sports and recreation–related traumatic brain injuries (SRR-TBIs) occurred among children. Approximately 45% of these injuries were associated with contact sports.

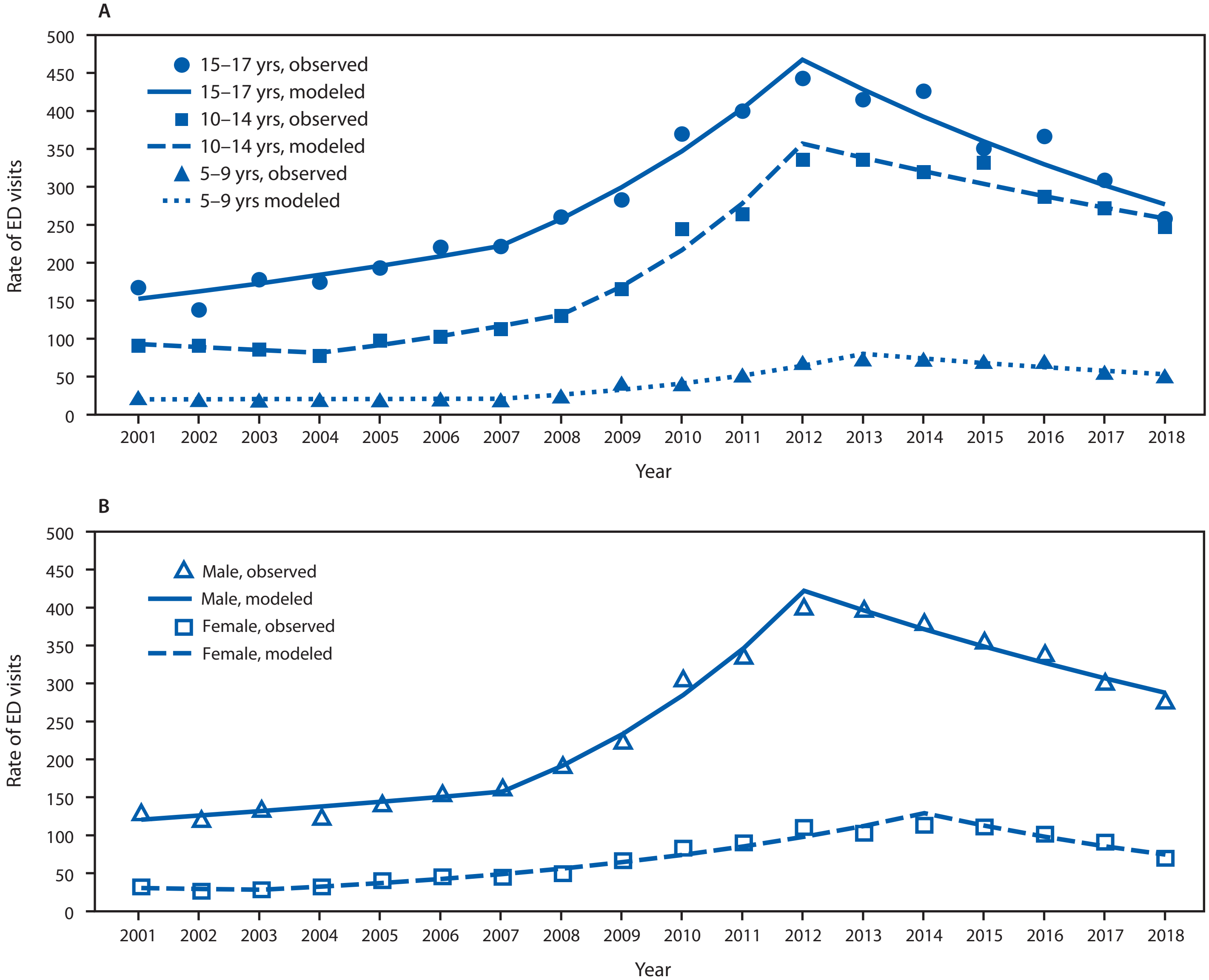
What is added by this report?

After a decade of increasing rates, contact sports–related TBI ED visits significantly declined from 2012 to 2018. This reduction resulted primarily from a 39% decline in football-related SRR-TBIs during 2013–2018.

What are the implications for public health practice?

Expanding efforts to address SRR-TBIs in football, the sport with the highest incidence of TBI, and identifying prevention strategies for other sports with high rates of SRR-TBI could reduce the prevalence of these injuries among children.

FIGURE 3. Trends* in rates† of ED visits for nonfatal sports and recreation–related TBI among persons aged 5–17 years, by age group (A) and sex (B) — National Electronic Injury Surveillance System–All Injury Program, United States, 2001–2018



Abbreviations: ED = emergency department; TBI = traumatic brain injury.
* Symbols represent observed rates, and lines represent modeled rates.
† Per 100,000 population.

injuries classified as TBIs might not have been. Fourth, because NEISS-AIP only included one diagnosis and body part injured, TBIs might be missed in cases where multiple injuries were present. NEISS-AIP did start including a second diagnosis in 2018; however, to be consistent with previous years, only the primary diagnosis was used for this study. Fifth, it cannot be determined whether the observed changes in the number of ED visits resulted from an actual change in incidence, care-seeking behaviors, or other reasons. Finally, although reported shifts in trends and corresponding annual percentage changes rely on analysis of aggregated survey data using Joinpoint software, a sensitivity analysis using case-level data in conjunction with complex survey software suggested qualitatively comparable findings.

Children participating in SRR activities are at risk for TBI. Therefore, expanding efforts to identify effective SRR-TBI prevention strategies will help ensure that children can continue to stay healthy and active.

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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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This report has been corrected. An erratum has been published.

Trends in Nonfatal Falls and Fall-Related Injuries Among Adults Aged ≥65 Years — United States, 2012–2018

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Falls are the leading cause of injury among adults aged ≥65 years (older adults) in the United States. In 2018, an estimated 3 million emergency department visits, more than 950,000 hospitalizations or transfers to another facility (e.g., trauma center), and approximately 32,000 deaths resulted from fall-related injuries among older adults.* Deaths from falls are increasing, with the largest increases occurring among persons aged ≥85 years (*1*). To describe the percentages and rates of nonfatal falls by age group and demographic characteristics and trends in falls and fall-related injuries over time, data were analyzed from the 2018 Behavioral Risk Factor Surveillance System (BRFSS) and were compared with data from 2012, 2014, and 2016. In 2018, 27.5% of older adults reported falling at least once in the past year, and 10.2% reported an injury from a fall in the past year. The percentages of older adults reporting a fall increased between 2012 and 2016 and decreased slightly between 2016 and 2018. Falls are preventable, and health care providers can help their older patients reduce their risk for falls. Screening older patients for fall risk, assessing modifiable risk factors (e.g., use of psychoactive medications or poor gait and balance), and recommending interventions to reduce this risk (e.g., medication management or referral to physical therapy) can prevent older adult falls (https://www.cdc.gov/steadi).

BRFSS is a landline and mobile telephone survey conducted annually in all 50 U.S. states, the District of Columbia (DC), and U.S. territories, with a median response rate of 49.9% in 2018. The survey collects information on health-related behavioral risk factors and chronic conditions among noninstitutionalized U.S. adults aged ≥18 years.† Information on falls and fall-related injuries is recorded every 2 years from adults aged ≥45 years by asking "In the past 12 months, how many times have you fallen?" If the response was one or more times, the respondent was asked "How many of these falls caused an injury? By an injury, we mean the fall caused you to limit your regular activities for at least a day or to go see a doctor." Responses to each of these questions ranged from 0 to 76 falls or fall-related injuries. Rates were calculated as the average number of falls and fall-related injuries per 1,000 older adults. Both questions were dichotomized to calculate the percentage of older adults who reported having at least one fall or fall-related injury.

Using 2018 BRFSS data, percentages and rates were calculated by age group for demographic (sex and race/ethnicity) and geographic (urban/rural status) characteristics. Functional characteristics (blind/difficulty seeing, difficulty dressing/bathing, difficulty walking/climbing stairs, difficulty doing errands alone, and difficulty concentrating/making decisions) also were compared, as were self-reported health status and data on taking part in any physical activity/exercise in the past month. Analysis was restricted to respondents aged ≥65 years residing in the 50 states and DC. Any respondents with missing values or responses of "Don't know/Not sure" or "Refused" for falls or fall-related injuries were excluded. Overall, 4.8% of respondents were excluded from the analysis of falls, leaving 142,834; and 4.9% were excluded from the analysis of fall-related injuries, leaving 142,591. Two-sample t-tests were used to compare percentages across characteristics. Linear trend tests were conducted for age group and self-reported health status. BRFSS data from 2012, 2014, 2016, and 2018 were used to examine trends in the percentages of adults aged ≥65 years who had fallen or had a fall-related injury and rates of falls overall and by age group. Polynomial linear regression was used to assess linearity of trends (*2*). Where nonlinear trends were detected, two-sample t-tests with Bonferroni adjustments for multiple comparisons were performed to determine differences between years (*2*). Because the BRFSS questions about falls differed in three states (Michigan, Oregon, and Wisconsin) for 2012, compared with other years, the trend analysis was limited to 47 states and DC. All results presented are weighted to represent the U.S. population. Analysis was conducted using SAS-callable SUDAAN (version 11; RTI International) to account for the complex survey design.

In 2018, 27.5% of adults aged ≥65 years reported at least one fall in the past year (Table 1), and 10.2 % of adults aged ≥65 years reported at least one fall-related injury (Table 2). In the preceding year, an average of 714 falls (Table 1) and an average of 170 fall-related injuries were reported per 1,000 older adults (Table 2), or approximately 35.6 million falls and 8.4 million fall-related injuries. The percentage of adults aged ≥65 years reporting a fall or a fall-related injury increased with age ($p<0.001$). Among adults aged ≥85 years, 33.8% reported a fall (Table 1) and 13.9% reported a fall-related injury (Table 2). Overall, a higher percentage of women reported at least one fall (29.1%; $p<0.001$) or fall-related injury (11.9%; $p<0.001$)

* www.cdc.gov/injury/wisqars.
† https://www.cdc.gov/brfss.

TABLE 1. Number of falls, percentages of adults reporting a fall, and rates* of self-reported falls in the past year among adults aged ≥65 years, by age group and selected characteristics (unweighted n = 142,834) — Behavioral Risk Factor Surveillance System, United States, 2018

Age group/ Characteristic	No.† reporting a fall	% (95% CI)§	Rate* of falls (95% CI)
Total (all aged ≥65 years)			
Overall	**13,685,662**	**27.5 (26.9–28.0)**	**714 (689–739)**
Sex			
Male	5,629,838	25.5 (24.6–26.3)	735 (694–775)
Female	8,026,432	29.1 (28.3–29.8)	695 (664–727)
Race/Ethnicity¶			
White	10,898,569	28.3 (27.8–28.9)	738 (710–765)
Black	4,260,153	22.5 (20.4–24.7)	526 (455–597)
American Indian/ Alaska Native	325,910	32.2 (27.3–37.5)	1,169 (845–1494)
Asian/Pacific Islander	237,985	15.6 (10.9–21.8)	250 (167–334)
Hispanic	1,039,618	28.1 (24.7–31.7)	677 (555–799)
Multiple/Other	193,208	29.6 (26.3–33.2)	1,333 (859–1,807)
Geography			
Urban	11,024,283	27.0 (26.4–27.7)	682 (653–710)
Rural	2,661,031	29.5 (28.5–30.4)	858 (805–910)
Self-reported health			
Excellent	974,558	16.4 (15.0–18.0)	288 (254–323)
Very good	3,201,506	21.9 (21.1–22.8)	420 (393–446)
Good	4,423,458	26.6 (25.6–27.7)	615 (573–657)
Fair	3,246,406	36.8 (35.2–38.3)	1,102 (1,030–1,173)
Poor	1,789,371	48.1 (45.8–50.5)	2,057 (1,872–2,242)
Functional characteristics			
Blind/Difficulty seeing			
Yes	16,115,80	42.1 (39.5–44.9)	1,500 (1,343–1,658)
No	12,013,980	26.2 (25.6–26.8)	646 (622–670)
Difficulty concentrating			
Yes	2,398,304	48.5 (46.1–50.9)	1,798 (1,660–1,936)
No	11,133,899	25.0 (24.5–25.6)	584 (562–607)
Difficulty walking/climbing stairs			
Yes	6,218,999	46.3 (45.0–47.6)	1,562 (1,488–1,637)
No	7,386,736	20.4 (19.9–21.0)	397 (377–418)
Difficulty performing errands alone			
Yes	2,578,010	53.0 (50.6–55.3)	1,994 (1,845–2,142)
No	11,017,965	24.6 (24.1–25.2)	573 (550–595)
Difficulty dressing/bathing			
Yes	1,584,599	58.7 (55.6–61.7)	2,496 (2,258–2,735)
No	12,068,592	25.6 (25.1–26.2)	610 (588–633)
Any physical activity in past month			
Yes	8,431,996	24.9 (24.2–25.5)	583 (555–612)
No	5,227,220	33.1 (32.0–34.2)	989 (938–1,040)
65–74 years			
Overall	**7,619,118**	**25.9 (25.2–26.6)**	**700 (668–733)**
Sex			
Male	3,224,096	23.3 (22.2–24.4)	702 (654–750)
Female	4,378,780	28.2 (27.2–29.2)	698 (654–741)
Race/Ethnicity¶			
White	5,832,525	26.3 (25.6–27.0)	721 (685–758)
Black	588,611	21.7 (19.4–24.1)	537 (437–638)
American Indian/ Alaska Native	72,207	33.9 (27.7–40.7)	1,323 (856–1,790)
Asian/Pacific Islander	182,037	17.8 (11.6–26.4)	269 (160–378)
Hispanic	685,669	28.5 (24.2–33.3)	660 (544–776)
Multiple/Other	112,714	28.2 (24.2–32.4)	1,273 (766–1,781)
Geography			
Urban	6,107,062	25.4 (24.5–26.2)	663 (627–698)
Rural	1,511,825	28.2 (27.0–29.5)	871 (798–944)
Self-reported health			
Excellent	572,626	15.2 (13.3–17.2)	260 (228–292)
Very good	1,831,360	20.3 (19.3–21.4)	391 (361–421)
Good	2,357,029	24.7 (23.4–26.0)	589 (532–647)
Fair	1,893,376	37.3 (35.2–39.4)	1,180 (1,080–1,280)
Poor	941,100	47.9 (45.1–50.8)	2,255 (2,012–2,499)
Functional characteristics			
Blind/Difficulty seeing			
Yes	828,168	42.7 (38.7–46.8)	1,548 (1,341–1,754)
No	6,758,376	24.6 (23.9–25.4)	638 (607–670)
Difficulty concentrating			
Yes	1,362,936	50.9 (47.6–54.1)	1,944 (1,773–2,115)
No	6,175,049	23.2 (22.6–23.9)	566 (536–597)
Difficulty walking/climbing stairs			
Yes	3,189,778	47.3 (45.4–49.1)	1,735 (1,626–1,844)
No	4,388,844	19.4 (18.8–20.1)	389 (364–415)
Difficulty performing errands alone			
Yes	1,258,886	56.5 (52.9–60.0)	2,366 (2,127–2,604)
No	6,313,271	23.3 (22.6–24.0)	561 (532–590)
Difficulty dressing/bathing			
Yes	855,277	59.6 (55.3–63.8)	2,689 (2,365–3,014)
No	6,749,735	24.1 (23.4–24.8)	598 (568–627)
Any physical activity in past month			
Yes	4,900,264	23.3 (22.5–24.0)	574 (538–610)
No	2,707,832	32.5 (30.8–34.1)	1,013 (946–1,079)
75–84 years			
Overall	**4,424,372**	**28.5 (27.5–29.5)**	**707 (664–750)**
Sex			
Male	1,744,922	27.3 (25.6–28.9)	748 (670–826)
Female	2,671,039	29.4 (28.1–30.8)	679 (631–728)
Race/Ethnicity¶			
White	3,660,879	29.8 (28.7–30.8)	742 (694–790)
Black	289,006	23.4 (18.7–28.8)	488 (397–579)
American Indian/ Alaska Native	24,161	29.2 (22.0–37.7)	1,022 (657–1,386)
Asian/Pacific Islander	45,914	—**	—
Hispanic	267,023	24.8 (19.7–30.6)	498 (377–619)
Multiple/Other	62,832	31.1 (24.8–38.2)	—
Geography			
Urban	3,573,520	28.2 (27.0–29.4)	683 (634–732)
Rural	850,758	29.9 (28.3–31.6)	816 (731–901)
Self-reported health			
Excellent	305,524	17.9 (15.5–20.7)	328 (234–422)
Very good	1,031,504	23.5 (21.9–25.2)	443 (385–502)
Good	1,528,297	28.8 (26.9–30.8)	625 (569–682)
Fair	959,740	34.5 (32.0–37.0)	1,017 (892–1,143)
Poor	579,025	44.9 (40.5–49.3)	1,756 (1,454–2,058)
Functional characteristics			
Blind/Difficulty seeing			
Yes	482,311	39.8 (35.9–43.8)	1,461 (1,189–1,732)
No	3,929,486	27.6 (26.5–28.6)	643 (602–683)

See table footnotes on page 877.

TABLE 1. (*Continued*) **Number of falls, percentages of adults reporting a fall, and rates* of self-reported falls in the past year among adults aged ≥65 years, by age group and selected characteristics (unweighted n = 142,834) — Behavioral Risk Factor Surveillance System, United States, 2018**

Age group/ Characteristic	No.† reporting a fall	% (95% CI)§	Rate* of falls (95% CI)
Difficulty concentrating			
Yes	681,990	44.3 (40.8–47.8)	1,672 (1,417–1,927)
No	3,705,749	26.7 (25.6–27.8)	599 (560–638)
Difficulty walking/climbing stairs			
Yes	2,134,694	45.1 (42.9–47.4)	1,435 (1,314–1,556)
No	2,264,615	21.1 (20.1–22.2)	385 (353–416)
Difficulty performing errands alone			
Yes	814,654	50.3 (46.4–54.2)	1,906 (1,642–2,169)
No	3,590,020	25.9 (24.9–26.9)	566 (529–603)
Difficulty dressing/bathing			
Yes	486,255	58.0 (52.6–63.3)	2,423 (2,018–2,828)
No	3,927,919	26.8 (25.8–27.8)	608 (569–647)
Any physical activity in past month			
Yes	2,667,197	26.3 (25.0–27.6)	571 (525–617)
No	1,746,501	32.7 (31.0–34.5)	963 (874–1,052)
≥85 years			
Overall	**1,642,172**	**33.8 (31.8–35.9)**	**816 (719–913)**
Sex			
Male	660,820	35.7 (32.3–39.2)	931 (755–1,107)
Female	976,613	32.8 (30.3–35.4)	733 (621–846)
Race/Ethnicity¶			
White	1,405,165	35.3 (33.2–37.5)	817 (737–897)
Black	79,686	26.0 (20.3–32.6)	580 (393–766)
American Indian/ Alaska Native	8,547	—	—
Asian/Pacific Islander	10,034	—	—
Hispanic	86,926	39.8 (26.6–54.7)	—
Multiple/Other	17,663	35.0 (22.3–50.2)	789 (439–1,139)
Geography			
Urban	1,343,701	33.4 (31.1–35.8)	795 (682–908)
Rural	298,448	35.7 (31.8–39.9)	916 (773–1,059)

TABLE 1. (*Continued*) **Number of falls, percentages of adults reporting a fall, and rates* of self-reported falls in the past year among adults aged ≥65 years, by age group and selected characteristics (unweighted n = 142,834) — Behavioral Risk Factor Surveillance System, United States, 2018**

Age group/ Characteristic	No.† reporting a fall	% (95% CI)§	Rate* of falls (95% CI)
Self-reported health			
Excellent	96,407	21.6 (17.1–26.9)	373 (288–459)
Very good	338,642	28.0 (24.6–31.6)	544 (462–625)
Good	538,133	30.9 (27.7–34.3)	726 (549–902)
Fair	393,290	40.5 (35.5–45.7)	934 (791–1,078)
Poor	269,246	58.1 (51.6–64.4)	2,051 (1,418–2,685)
Functional characteristics			
Blind/Difficulty seeing			
Yes	301,101	44.7 (37.8–51.8)	1,435 (974–1,897)
No	1,326,118	31.9 (29.8–34.1)	714 (628–800)
Difficulty concentrating			
Yes	353,378	48.9 (41.0–56.8)	1,527 (1,091–1,962)
No	1,253,102	30.9 (29.0–32.8)	654 (601–707)
Difficulty walking/climbing stairs			
Yes	894,527	45.8 (42.4–49.2)	1,275 (1,094–1,457)
No	733,277	25.8 (23.2–28.5)	506 (395–617)
Difficulty performing errands alone			
Yes	504,470	49.5 (44.9–54.2)	1,319 (1,073–1,565)
No	1,114,674	29.4 (27.3–31.7)	679 (575–783)
Difficulty dressing/bathing			
Yes	243,067	56.9 (49.4–64.1)	1,991 (1,314–2,668)
No	1,390,938	31.5 (29.4–33.7)	701 (617–784)
Any physical activity in past month			
Yes	864,536	31.9 (29.2–34.7)	704 (584–824)
No	772,887	36.4 (33.4–39.5)	960 (800–1,119)

Abbreviation: CI = confidence interval.
* Weighted number of falls per 1,000 adults aged ≥65 years.
† Weighted number of adults aged ≥65 years reporting at least one fall in the past year. Because of varying question-specific nonresponse, sample sizes might vary among questions.
§ Weighted percentage of adults aged ≥65 years reporting at least one fall in the past year.
¶ Whites, blacks, American Indians/Alaska Natives, Asians/Pacific Islanders, and others/unknown were non-Hispanic; Hispanics could be of any race.
** Dashes indicate sample size <50 or relative standard error >30%.

than did men in the past year (25.5% reported a fall and 7.9% reported a fall-related injury). However, when stratified by age group, the percentages of adults aged ≥85 years reporting a fall (32.8% of women and 35.7% of men; p = 0.184) or fall-related injury (14.3% of women and 13.4% of men; p = 0.553) did not differ significantly by sex. A lower percentage of blacks (22.5%; p<0.001) and Asian/Pacific Islanders (15.6%; p<0.001) reported a fall than did whites (28.3%) (Table 1), and a higher percentage of American Indian/Alaska Natives (15.2%) reported a fall-related injury than did whites (10.2%; p = 0.008) (Table 2). The percentages of older adults reporting a fall decreased as health status improved (p<0.001) (Table 1). Overall, a higher percentage of older adults living in rural areas (29.5%) reported a fall compared with those living in urban areas (27.0%; p<0.001); however, when stratified by age group, this was only true for persons aged 65–74 years (Table 1). Regardless of age group, older adults reporting difficulties with functional abilities reported a higher percentage of falls and fall-related injuries than did those without these difficulties (p<0.001). A lower percentage of older adults who reported any physical activity in the past month reported a fall (24.9%) compared with those who did not report physical activity (33.1%; p<0.001), regardless of age group.

Among states in which falls and fall injuries were consistently reported across years (excluding Michigan, Oregon, and Wisconsin where data in 2012 were reported differently than in other years), the percentage of those older adults reporting a fall increased from 27.9% in 2012 to 29.6% in 2016 (p<0.001) and decreased to 27.4% in 2018 (p<0.001) (Figure). The rates of falls and fall-related injuries and the percentages of older adults reporting a fall-related injury did not significantly change from 2012 to 2018.

TABLE 2. Number of fall-related injuries, percentage of adults reporting a fall-related injury, and rates* of self-reported fall-related injuries in the past year among adults ≥65 years by age group and select characteristics (unweighted n = 142,591) — Behavioral Risk Factor Surveillance System, United States, 2018

Age group/ Characteristic	No.† reporting a fall-related injury	% of fall-related injuries§ (95% CI)	Rate* of fall-related injuries (95% CI)
Total (all aged ≥65 years)			
Overall	**5,051,046**	**10.2 (9.8–10.6)**	**170 (160–179)**
Sex			
Male	1,753,182	7.9 (7.4–8.6)	140 (125–155)
Female	3,285,921	11.9 (11.4–12.5)	193 (181–204)
Race/Ethnicity¶			
White	3,927,593	10.2 (9.9–10.6)	170 (161–178)
Black	373,817	8.8 (7.1–10.8)	122 (99–144)
American Indian/ Alaska Native	49,235	15.2 (11.4–19.9)	360 (183–536)
Asian/Pacific Islander	107,711	—**	90 (39–142)
Hispanic	422,695	11.5 (9.2–14.1)	192 (132–251)
Multiple/Other	73,334	11.3 (9.2–13.7)	—
Geography			
Urban	4,112,951	10.1 (9.6–10.6)	167 (157–178)
Rural	937,957	10.4 (9.8–11.1)	180 (161–199)
Self-reported health			
Excellent	322,006	5.4 (4.3–6.9)	65 (51–79)
Very good	972,529	6.7 (6.1–7.3)	81 (74–89)
Good	1,518,761	9.2 (8.5–9.8)	133 (122–145)
Fair	1,294,112	14.7 (13.6–15.9)	263 (238–289)
Poor	917,291	24.9 (23.0–26.9)	624 (535–713)
Functional characteristics			
Blind/Difficulty seeing			
Yes	742,101	19.6 (17.4–21.9)	436 (354–519)
No	4,281,945	9.4 (9.0–9.8)	147 (140–155)
Difficulty concentrating			
Yes	1,104,754	22.5 (20.6–24.6)	489 (425–552)
No	3,888,940	8.7 (8.4–9.1)	133 (125–141)
Difficulty walking/climbing stairs			
Yes	2,704,665	20.3 (19.2–21.3)	407 (376–438)
No	2,315,536	6.4 (6.0–6.8)	82 (76–88)
Difficulty performing errands alone			
Yes	1,318,985	27.3 (25.1–29.7)	587 (524–651)
No	3,693,519	8.3 (7.9–8.6)	124 (116–132)
Difficulty dressing/bathing			
Yes	833,239	31.2 (28.3–34.4)	724 (619–829)
No	4,198,368	8.9 (8.6–9.3)	138 (130–145)
Any physical activity in past month			
Yes	2,918,250	8.6 (8.1–9.1)	131 (121–140)
No	2,120,902	13.5 (12.7–14.3)	253 (232–274)
65–74 years			
Overall	**2,743,633**	**9.3 (8.8–9.9)**	**160 (148–171)**
Sex			
Male	958,537	6.9 (6.3–7.6)	123 (108–138)
Female	1,775,596	11.4 (10.7–12.2)	191 (175–208)
Race/Ethnicity			
White	1,999,023	9.0 (8.6–9.5)	155 (144–166)
Black	2,263,21	8.4 (6.9–10.2)	126 (100–153)
American Indian/ Alaska Native	35,860	16.9 (11.9–23.9)	452 (191–714)
Asian/Pacific Islander	95,225	—	—
Hispanic	299,340	12.5 (9.5–16.3)	180 (136–224)
Multiple/Other	42,830	10.7 (8.6–13.3)	—

See table footnotes on page 879.

TABLE 2. (*Continued*) Number of fall-related injuries, percentage of adults reporting a fall-related injury, and rates* of self-reported fall-related injuries in the past year among adults ≥65 years by age group and select characteristics (unweighted n = 142,591) — Behavioral Risk Factor Surveillance System, United States, 2018

Age group/ Characteristic	No.† reporting a fall-related injury	% of fall-related injuries§ (95% CI)	Rate* of fall-related injuries (95% CI)
Geography			
Urban	511,500	9.3 (8.7–9.9)	160 (146–173)
Rural	2,232,054	9.6 (8.8–10.4)	161 (146–176)
Self-reported health			
Excellent	1,734,43	4.6 (3.1–6.8)	54 (35–73)
Very good	571,453	6.3 (5.6–7.1)	79 (69–89)
Good	744,975	7.8 (7.2–8.5)	116 (103–128)
Fair	765,642	15.1 (13.5–17.0)	276 (238–314)
Poor	477,503	24.5 (22.3–26.9)	649 (540–758)
Functional characteristics			
Blind/Difficulty seeing			
Yes	402,881	21.0 (17.5–24.9)	486 (366–605)
No	2,326,598	8.5 (8.0–9.0)	136 (128–145)
Difficulty concentrating			
Yes	642,512	24.2 (21.4–27.3)	529 (454–604)
No	2,064,220	7.8 (7.3–8.3)	121 (111–130)
Difficulty walking/climbing stairs			
Yes	1,408,428	21.0 (19.6–22.5)	452 (407–496)
No	1,324,451	5.9 (5.4–6.4)	73 (67–80)
Difficulty performing errands alone			
Yes	650,112	29.4 (26.0–33.0)	717 (600–834)
No	2,072,807	7.6 (7.2–8.1)	114 (106–121)
Difficulty dressing/bathing			
Yes	454,702	32.0 (28.4–35.9)	766 (633–899)
No	2,280,876	8.2 (7.7–8.7)	128 (118–138)
Any physical activity in past month			
Yes	1,620,337	7.7 (7.2–8.3)	121 (108–133)
No	1,118,474	13.4 (12.3–14.7)	258 (234–282)
75–84 years			
Overall	**1,634,953**	**10.6 (9.8–11.3)**	**170 (156–185)**
Sex			
Male	547,968	8.6 (7.4–9.9)	141 (118–164)
Female	1,085,428	12.0 (11.1–12.9)	192 (173–210)
Race/Ethnicity			
White	1,355,522	11.0 (10.3–11.8)	179 (164–195)
Black	115,601	9.3 (5.4–15.7)	112 (61–162)
American Indian/ Alaska Native	7,702	9.4 (5.6–15.4)	179 (78–280)
Asian/Pacific Islander	9,402	—	—
Hispanic	90,085	8.4 (5.9–11.8)	135 (82–187)
Multiple/Other	21,322	10.6 (7.5–14.8)	173 (99–246)
Geography			
Urban	1,338,288	10.6 (9.7–11.5)	167 (151–183)
Rural	296,606	10.4 (9.5–11.5)	185 (149–222)
Self-reported health			
Excellent	112,211	6.6 (4.8–8.9)	80 (56–103)
Very good	301,804	6.9 (5.9–8.0)	82 (69–94)
Good	538,594	10.2 (8.7–11.8)	139 (120–157)
Fair	382,369	13.8 (12.3–15.4)	260 (220–300)
Poor	286,516	22.3 (19.2–25.7)	527 (408–647)
Functional characteristics			
Blind/Difficulty seeing			
Yes	190,201	15.8 (13.4–18.5)	338 (258–419)
No	1,440,008	10.1 (9.4–10.9)	156 (142–170)

See table footnotes on page 879.

TABLE 2. (*Continued*) Number of fall-related injuries, percentage of adults reporting a fall-related injury, and rates* of self-reported fall-related injuries in the past year among adults ≥65 years by age group and select characteristics (unweighted n = 142,591) — Behavioral Risk Factor Surveillance System, United States, 2018

Age group/ Characteristic	No.† reporting a fall-related injury	% of fall-related injuries§ (95% CI)	Rate* of fall-related injuries (95% CI)
Difficulty concentrating			
Yes	294,225	19.2 (16.6–22.2)	398 (324–472)
No	1,326,930	9.6 (8.8–10.4)	145 (131–159)
Difficulty walking/Climbing stairs			
Yes	889,083	18.9 (17.1–20.8)	360 (320–401)
No	731,862	6.8 (6.2–7.5)	86 (76–96)
Difficulty performing errands alone			
Yes	404,429	25.2 (21.3–29.4)	511 (432–591)
No	1,222,743	8.8 (8.2–9.5)	130 (118–143)
Difficulty dressing/Bathing			
Yes	248,895	30.1 (24.0–37.0)	636 (524–749)
No	1,379,549	9.4 (8.8–10.1)	144 (130–157)
Any physical activity in past month			
Yes	964,611	9.5 (8.6–10.5)	141 (125–157)
No	665,922	12.5 (11.4–13.7)	226 (198–254)
≥85 years			
Overall	**672,460**	**13.9 (12.5–15.4)**	**227 (179–276)**
Sex			
Male	246,677	13.4 (11.0–16.2)	265 (148–382)
Female	424,896	14.3 (12.7–16.1)	205 (175–236)
Race/Ethnicity			
White	573,048	14.5 (13.0–16.1)	222 (186–257)
Black	31,894	10.5 (7.1–15.2)	119 (74–164)
American Indian/ Alaska Native	5,673	—	—
Asian/Pacific Islander	3,084	—	—
Hispanic	33,270	—	—
Multiple/Other	9,182	—	—
Geography			
Urban	542,610	13.6 (12.1–15.2)	216 (163–268)
Rural	129,850	15.6 (12.1–19.8)	283 (155–410)

TABLE 2. (*Continued*) Number of fall-related injuries, percentage of adults reporting a fall-related injury, and rates* of self-reported fall-related injuries in the past year among adults ≥65 years by age group and select characteristics (unweighted n = 142,591) — Behavioral Risk Factor Surveillance System, United States, 2018

Age group/ Characteristic	No.† reporting a fall-related injury	% of fall-related injuries§ (95% CI)	Rate* of fall-related injuries (95% CI)
Self-reported health			
Excellent	36,352	8.2 (5.3–12.3)	96 (59–133)
Very good	99,273	8.2 (6.5–10.4)	100 (77–123)
Good	235,192	13.6 (11.4–16.1)	216 (150–282)
Fair	146,101	15.1 (12.5–18.2)	203 (165–241)
Poor	153,272	33.4 (26.5–41.1)	788 (367–1210)
Functional characteristics			
Blind/Difficulty seeing			
Yes	149,020	22.4 (17.6–28.0)	—
No	515,339	12.5 (11.1–14.0)	187 (154–221)
Difficulty concentrating			
Yes	168,017	23.4 (17.8–30.2)	532 (234–831)
No	497,790	12.3 (11.1–13.7)	174 (150–198)
Difficulty walking/climbing stairs			
Yes	407,155	21.0 (18.5–23.7)	366 (261–470)
No	259,223	9.1 (7.6–10.9)	133 (91–174)
Difficulty performing errands alone			
Yes	264,445	26.2 (22.1–30.7)	424 (311–536)
No	397,969	10.5 (9.3–11.9)	174 (120–227)
Difficulty dressing/bathing			
Yes	129,643	30.9 (24.5–38.2)	—
No	537,943	12.2 (10.9–13.7)	176 (144–207)
Any physical activity in past month			
Yes	333,302	12.3 (10.5–14.4)	171 (142–201)
No	336,507	15.9 (13.8–18.3)	298 (194–403)

Abbreviation: CI = confidence interval.
* Weighted number of fall-related injuries per 1,000 older adults.
† Weighted number of adults aged ≥65 years reporting at least one fall-related injury in the past year. Because of varying question-specific nonresponse, sample sizes might vary among questions.
§ Weighted percentage of older adults reporting at least one fall-related injury in the past year.
¶ Whites, blacks, American Indians/Alaska Natives, Asians/Pacific Islanders, and others/unknown were non-Hispanic; Hispanics could be of any race.
** Dashes indicate sample size <50 or relative standard error >30%.

Discussion

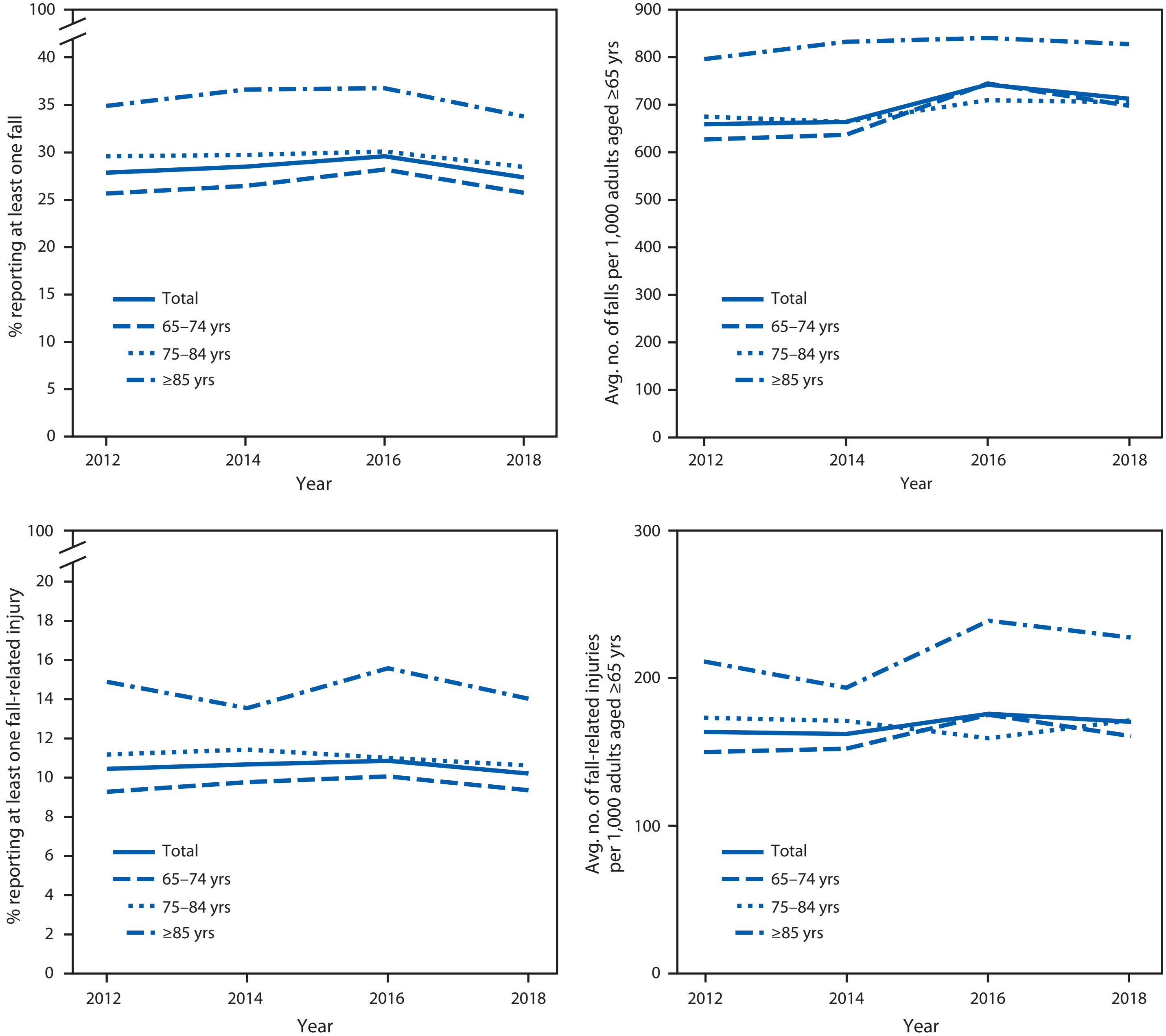
The percentage of older adults reporting a fall increased from 2012 to 2016, followed by a modest decline from 2016 to 2018. Although statistically significant, these changes were small. Even with this decrease in 2018, older adults reported 35.6 million falls. Among those falls, 8.4 million resulted in an injury that limited regular activities for at least a day or resulted in a medical visit. In the United States, health care spending on older adult falls has been approximately $50 billion annually (*3*). In 2018, approximately 52 million adults were aged ≥65 years[§] by 2030, this number will increase to approximately 73 million.[¶] Despite no significant changes in the rate of fall-related injuries from 2012 to 2018, the number of fall-related injuries and health care costs can be expected to increase as the proportion of older adults in the United States grows.

Adults aged ≥85 years were more likely to report a fall or fall-related injury in the preceding year than were those aged <85 years. Currently, adults aged ≥85 years account for <2% of the population; by 2050 this proportion is projected to increase to 5%. Many fall risk factors increase with age, including chronic health conditions related to falls, increased use of medications, and functional decline (*4*). More research is needed to determine how fall risk factors differ among persons aged ≥85 years and to identify targeted interventions that could adequately address the needs of these adults.

The findings in this report are subject to at least five limitations. First, because BRFSS data are self-reported, they are subject to recall bias, especially for falls that did not result in injury or that occurred several months before the survey (*5*).

§ https://www2.census.gov/programs-surveys/popest/tables/2010-2018/counties/asrh/PEPAGESEX.pdf.
¶ https://www.census.gov/data/tables/2017/demo/popproj/2017-summary-tables.html.

FIGURE. Percentages and rates of self-reported falls and fall-related injuries among adults aged ≥65 years, by age group — Behavioral Risk Factor Surveillance System, United States,* 2012–2018



* Data from Michigan, Oregon, and Wisconsin were omitted because of the difference in the way these states collected information about falls during 2012, compared with the rest of the states.

Second, this survey is cross-sectional. Although functional abilities, health status, and physical activity were all associated with falls and fall-related injuries, it is not possible to determine whether these factors preceded the fall or resulted from a fall. Third, BRFSS does not include older adults living in nursing homes, which might have led to an underestimation of falls and fall-related injuries, especially among adults aged ≥85 years (*6*). Fourth, the response rate (median response rate of 49.9%) could result in non-response bias, however BRFSS data are weighted to adjust for some of this bias. Finally, the results of the trend analyses were derived from only four time points. Future analyses with more time points might describe these trends with more certainty.

Summary

What is already known about this topic?

Falls are the leading cause of injury among adults aged ≥65 years, who in 2014 experienced an estimated 29 million falls, resulting in 7 million fall-related injuries.

What is added by this report?

In 2018, 27.5% of adults aged ≥65 years reported at least one fall in the past year (35.6 million falls) and 10.2% reported a fall-related injury (8.4 million fall-related injuries). From 2012 to 2016, the percentages of these adults reporting a fall increased, and from 2016 to 2018, the percentages decreased.

What are the implications for public health practice?

Falls and fall-related injuries are highly prevalent but are preventable. Health care providers play a crucial role and can help older adults reduce their risk for falls.

Regardless of age group, higher percentages of older adults who reported no physical activity in the past month or reported difficulty with one or more functional characteristics (difficulty walking up or down stairs, dressing and bathing, and performing errands alone) reported falls and fall-related injuries. These risk factors are frequently modifiable suggesting that, regardless of age, many falls might be prevented. Older adults of any age can, together with their health care providers, take steps to reduce their risk for falls. CDC created the Stopping Elderly Accidents, Deaths & Injuries (STEADI) initiative, which offers tools and resources for health care providers to screen their older patients for fall risk, assess modifiable fall risk factors, and to intervene with evidence-based fall prevention interventions (https://www.cdc.gov/steadi). These include medication management, vision screening, home modifications, referral to physical therapists who can address problems with gait, strength, and balance, and referral to effective community-based fall prevention programs. As the proportion of older adults living in the United States continues to grow, so too will the number of falls and fall-related injuries. However, many of these falls are preventable. To help keep older adults living independently and injury-free, reducing fall risk and fall-related injuries is essential.

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Initial and Repeated Point Prevalence Surveys to Inform SARS-CoV-2 Infection Prevention in 26 Skilled Nursing Facilities — Detroit, Michigan, March–May 2020

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Skilled nursing facilities (SNFs) are focal points of the coronavirus disease 2019 (COVID-19) pandemic, and asymptomatic infections with SARS-CoV-2, the virus that causes COVID-19, among SNF residents and health care personnel have been described (*1*–*3*). Repeated point prevalence surveys (serial testing of all residents and health care personnel at a health care facility irrespective of symptoms) have been used to identify asymptomatic infections and have reduced SARS-CoV-2 transmission during SNF outbreaks (*1*,*3*). During March 2020, the Detroit Health Department and area hospitals detected a sharp increase in COVID-19 diagnoses, hospitalizations, and associated deaths among SNF residents. The Detroit Health Department collaborated with local government, academic, and health care system partners and a CDC field team to rapidly expand SARS-CoV-2 testing and implement infection prevention and control (IPC) activities in all Detroit-area SNFs. During March 7–May 8, among 2,773 residents of 26 Detroit SNFs, 1,207 laboratory-confirmed cases of COVID-19 were identified during three periods: before (March 7–April 7) and after two point prevalence surveys (April 8–25 and April 30–May 8): the overall attack rate was 44%. Within 21 days of receiving their first positive test results, 446 (37%) of 1,207 COVID-19 patients were hospitalized, and 287 (24%) died. Among facilities participating in both surveys (n = 12), the percentage of positive test results declined from 35% to 18%. Repeated point prevalence surveys in SNFs identified asymptomatic COVID-19 cases, informed cohorting and IPC practices aimed at reducing transmission, and guided prioritization of health department resources for facilities experiencing high levels of SARS-CoV-2 transmission. With the increased availability of SARS-CoV-2 testing, repeated point prevalence surveys and enhanced and expanded IPC support should be standard tools for interrupting and preventing COVID-19 outbreaks in SNFs.

From mid-March through early April, rapid increases in confirmed COVID-19 cases were detected among SNF residents in Detroit. During March 7–April 7, limited SARS-CoV-2 testing capacity resulted in prioritization of symptomatic residents for testing. Expansion of the Detroit Health Department testing capacity in early April enabled testing of Detroit residents from all 26 SNFs who had not previously been tested. Any testing conducted during April 8–25 was considered part of the first point prevalence survey. After the first survey, 12 facilities were prioritized for a second survey, in which participation was determined by the proportion of positive results from the first survey and the feasibility of conducting repeat on-site testing. The second survey occurred on a single date at each facility during April 30–May 8.

A Detroit Health Department rapid-testing clinic was established on April 2, 2020, using the Abbott ID NOW molecular COVID-19 test (*4*). During the first point prevalence survey, specimens collected from residents' anterior nares were tested using the point-of-care platform in the Detroit Health Department rapid-testing clinic. Because of limited test availability for this platform, testing of specimens for the second survey was performed by an off-site reference laboratory using nasopharyngeal specimens and the SARS-CoV-2 real-time reverse transcription–polymerase chain reaction (RT-PCR) assay. At two facilities, anterior nares specimens for the second survey were collected and sent to a different reference laboratory for real-time RT-PCR testing. All specimens were collected, transported, and tested in accordance with CDC recommendations (*5*).

On-site IPC assessments and consultation were provided to facility leaders in all 26 SNFs during the first survey. Two follow-up IPC assessments were conducted for the 12 facilities participating in the second survey and included examination of cohorting practices using a facility floorplan, supply and use of personal protective equipment, hand hygiene practices, staffing mitigation planning, and other IPC activities.

Individual-level data on positive test dates, symptom status, hospitalizations, and fatalities were collected from Detroit Health Department COVID-19 case investigations, laboratory requisition forms, cases reported to the Michigan Department of Health and Human Services, and a review of death certificates. Symptom information at the time of testing was collected by oral report from facility nurse managers or from documentation of resident symptom screening. Hospitalizations included those with admission dates 2 days before through 21 days after the collection of a specimen with a positive test result for SARS-CoV-2, and deaths included those occurring within 21 days of collection of a positive specimen. To identify ongoing transmission, facility-level percentages of newly identified cases (residents with newly diagnosed SARS-CoV-2 infection divided by total number of residents tested without previous positive test results) were compared across facilities for each of the survey periods. Data were collected as part of public health response activities and were determined by CDC not to constitute human subject research.* Persons provided consent for testing and symptom screening, consistent with the policies of the facility. Analyses were conducted using SAS software (version 9.4; SAS Institute).

During March 7–May 8, among 2,773 Detroit SNF residents, 1,207 (44%) laboratory-confirmed COVID-19 cases were identified (Table). Among residents with positive test results, the median patient age was 72 years (interquartile range [IQR] = 64–82 years), 446 (37%) were hospitalized, and 287 (24%) died (Figure), including 233 (52%) hospitalized patients. Among 1,027 COVID-19 patients with symptom data available, 566 (55%) were symptomatic at the time of their first positive test result; this was highest before the first point prevalence survey (93%), decreased to 48% in the first survey, and decreased further to 4% in the second survey. Among 566 COVID-19 patients who reported symptoms, 227 (40%) died within 21 days of testing, compared with 25 (5%) among 461 patients who reported no symptoms; 35 (19%) deaths occurred among 180 patients for whom symptom status was unknown. Before the first survey, 332 residents had positive SARS-CoV-2 test results (range = 2–32 per facility). The median interval from first documented symptom onset in a facility until the first survey was 33 days (range = 20–44 days). The average facility census during the time of the first survey (April 8–25) was 96 residents (range = 38–169). During this time, 716 residents (32%) received a positive SARS-CoV-2 test result among 2,218 who had not previously received a positive test result; facilities each identified six to 77 residents with newly diagnosed infections (range = 7%–58% of residents).

Among the 12 facilities participating in the second point prevalence survey during April 30–May 8, eight had implemented cohorting of residents with positive test results in a dedicated COVID-19 unit before the first survey; the remaining four facilities initiated cohorting shortly after receiving results from the first survey. Four of 12 facilities that took part in the second survey did not dedicate health care personnel to exclusively care for residents within the COVID-19 unit, primarily because of staffing shortages.

The average census of facilities participating in the second survey was 80 residents (range = 36–147), and 373 of 1,063 (35%) residents had received positive test results during the first survey. Among 637 residents tested during the second survey who were not previously known to have COVID-19, 18% (115) had positive SARS-CoV-2 test results; including 17% (85 of 491) of residents whose test results during the first survey had been negative. The median interval between the first and second surveys was 15 days (IQR = 14–17 days). Facilities identified two to 19 new cases during the second point prevalence survey (range = 3%–31% of residents tested).

Discussion

Facility-wide testing conducted among residents living in 26 SNFs in an urban Detroit jurisdiction with high SARS-CoV-2 prevalence identified an overall attack rate of 44%, a 37% COVID-19 hospitalization rate, and a 24% fatality rate amid ongoing and widespread SARS-CoV-2 transmission. Repeated point prevalence surveys enabled early identification of COVID-19 cases (including asymptomatic patients), informed cohorting and IPC practices, and guided prioritization of health department resources.

Despite barriers to implementing rapid repeated point prevalence surveys, this assessment demonstrates benefits of conducting repeated surveys in SNFs. Among facilities participating in both surveys, the percentage of new laboratory-confirmed cases declined from 35% to 18%, suggesting that facility-wide testing and on-site IPC support might have contributed to reductions in SARS-CoV-2 transmission. Following testing and establishment of a COVID-19 care unit, IPC assessment and consultation were critical to assisting facilities in targeting interventions to mitigate suspected causes of ongoing transmission. These included incomplete resident and health care personnel cohorting, continued reintroduction of the virus (e.g., from admission of residents with unknown COVID-19 status or residents requiring routine outpatient medical treatment, such as hemodialysis), and space limitations prohibiting use of private rooms to isolate residents whose infection status was unknown. Repeated point prevalence surveys might also improve patient outcomes by enabling earlier identification and initiation of clinical patient monitoring (e.g., assessing vital signs more frequently) and, when warranted, rapid transfer to acute care facilities.

The findings in this report are subject to at least four limitations. First, although asymptomatic health care personnel with SARS-CoV-2 infection are a likely source of transmission, health care personnel were not tested on the same day as were residents, and results of health care personnel testing

* https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=83cd09e1c0f4c6937cd9d7413160fc3f&pitd=20180719&n=pt44.1.46&r=PART&ty=HTML.

TABLE. Initial and follow-up point prevalence survey test results for Detroit skilled nursing facility residents before the survey period, at the first survey, and at the second survey — Detroit, April–May 2020

					Pre-survey (March 7–April 7)		First survey (April 8–25)			Second survey (April 30–May 8)		
Facility	Total tested, no.	Total positive, no. (%)	Hospitalized,* no. (%)	Died,* no. (%)	Positive, no.	Symptomatic, %	Tested,† no.	Positive, no. (%)	Symptomatic, %	Tested,† no.	Positive, no. (%)	Symptomatic, %
All	**2,773**	**1,207 (44)**	**446 (37)**	**287 (24)**	**332**	**93**	**2,218**	**716 (32)**	**48**	**637**	**115 (18)**	**4**
A	185	91 (49)	35 (38)	20 (22)	31	97	122	39 (32)	38	80	19 (24)	5
B	166	87 (52)	37 (43)	23 (26)	32	97	108	35 (32)	60	75	19 (25)	11
C	137	61 (45)	15 (25)	6 (10)	2	100	115	46 (40)	18	68	12 (18)	0
D	118	24 (20)	18 (75)	11 (46)	16	100	87	6 (7)	83	64	2 (3)	50
E	137	75 (55)	40 (53)	24 (32)	27	100	102	29 (28)	61	59	18 (31)	0
F	97	51 (53)	11 (22)	10 (20)	14	100	76	23 (30)	22	54	13 (24)	8
G	98	31 (32)	5 (16)	3 (10)	3	100	76	20 (26)	100	51	8 (16)	0
H	175	105 (60)	31 (30)	23 (22)	22	95	139	77 (55)	47	48	5 (10)	0
I	100	52 (52)	19 (37)	14 (27)	16	88	66	29 (44)	36	48	5 (10)	0
J	121	68 (56)	18 (26)	14 (21)	26	92	80	35 (44)	41	42	7 (17)	0
K	61	26 (43)	10 (38)	6 (23)	3	100	55	19 (35)	100	29	3 (10)	0
L	51	26 (51)	8 (31)	2 (8)	7	71	37	15 (41)	20	19	4 (21)	0
M	161	34 (21)	20 (59)	14 (41)	10	90	151	24 (16)	47	—§	—	—
N	122	36 (30)	9 (25)	9 (25)	7	100	112	27 (24)	100	—	—	—
O	122	44 (36)	24 (55)	13 (30)	18	83	97	24 (25)	50	—	—	—
P	109	40 (37)	15 (38)	7 (18)	12	92	88	21 (24)	37	—	—	—
Q	106	67 (63)	16 (24)	12 (18)	15	67	85	38 (45)	73	—	—	—
R	100	29 (29)	14 (48)	12 (41)	13	92	86	16 (19)	44	—	—	—
S	87	32 (37)	16 (50)	11 (34)	16	93	66	15 (23)	36	—	—	—
T	85	14 (16)	8 (57)	3 (21)	8	Unknown	77	6 (8)	Unknown	—	—	—
U	83	55 (66)	18 (33)	12 (22)	14	86	66	38 (58)	89	—	—	—
V	79	48 (61)	24 (50)	15 (31)	5	100	73	41 (56)	72	—	—	—
W	80	36 (45)	7 (19)	6 (17)	2	50	77	34 (44)	26	—	—	—
X	75	26 (35)	13 (50)	4 (15)	4	100	68	19 (28)	42	—	—	—
Y	64	34 (53)	10 (29)	7 (21)	3	100	61	31 (51)	13	—	—	—
Z	54	15 (28)	5 (31)	6 (38)	6	100	48	9 (19)	50	—	—	—

* Hospitalizations with admission dates documented as 2 days before, through 21 days after, the specimen collection date for a positive SARS-CoV-2 test result were counted; deaths within 21 days of positive specimen collection date were counted. Missing dates were considered to be within 21 days of specimen collection.

† Total tsted refers to residents tested at any time through May 8, 2020. Tested refers to residents tested in each period who were not previously known to have SARS-CoV-2 infection.

§ Dashes indicate that facilities did not participate in the follow-up survey.

were not available for inclusion in this report. Second, the long testing interval might influence interpretation of results. The first point prevalence survey occurred approximately 1 month after SARS-CoV-2 introduction in most facilities; therefore, asymptomatic cases identified during the first survey might represent residents who recovered from illness but still had positive RT-PCR test results. Further, the 14-day interval between the two surveys might have resulted in less effective case identification than a shorter interval would have. Third, testing methods in the two surveys varied, as did test characteristics across different platforms and specimen sources (*6*). Finally, at the time of manuscript drafting, data for repeated point prevalence surveys were available for only 12 out of 26 facilities, which limited our ability to fully describe ongoing SARS-CoV-2 transmission among Detroit SNFs.

When repeated point prevalence surveys are implemented as part of COVID-19 response strategies in SNFs, testing results should inform prompt and specific actions, such as 1) using transmission-based precautions for resident care and

Summary

What is already known about this topic?

Symptom-based screening in skilled nursing facilities (SNFs) is inadequate to detect SARS-CoV-2 transmission. Repeated point prevalence surveys can identify asymptomatic cases during outbreaks.

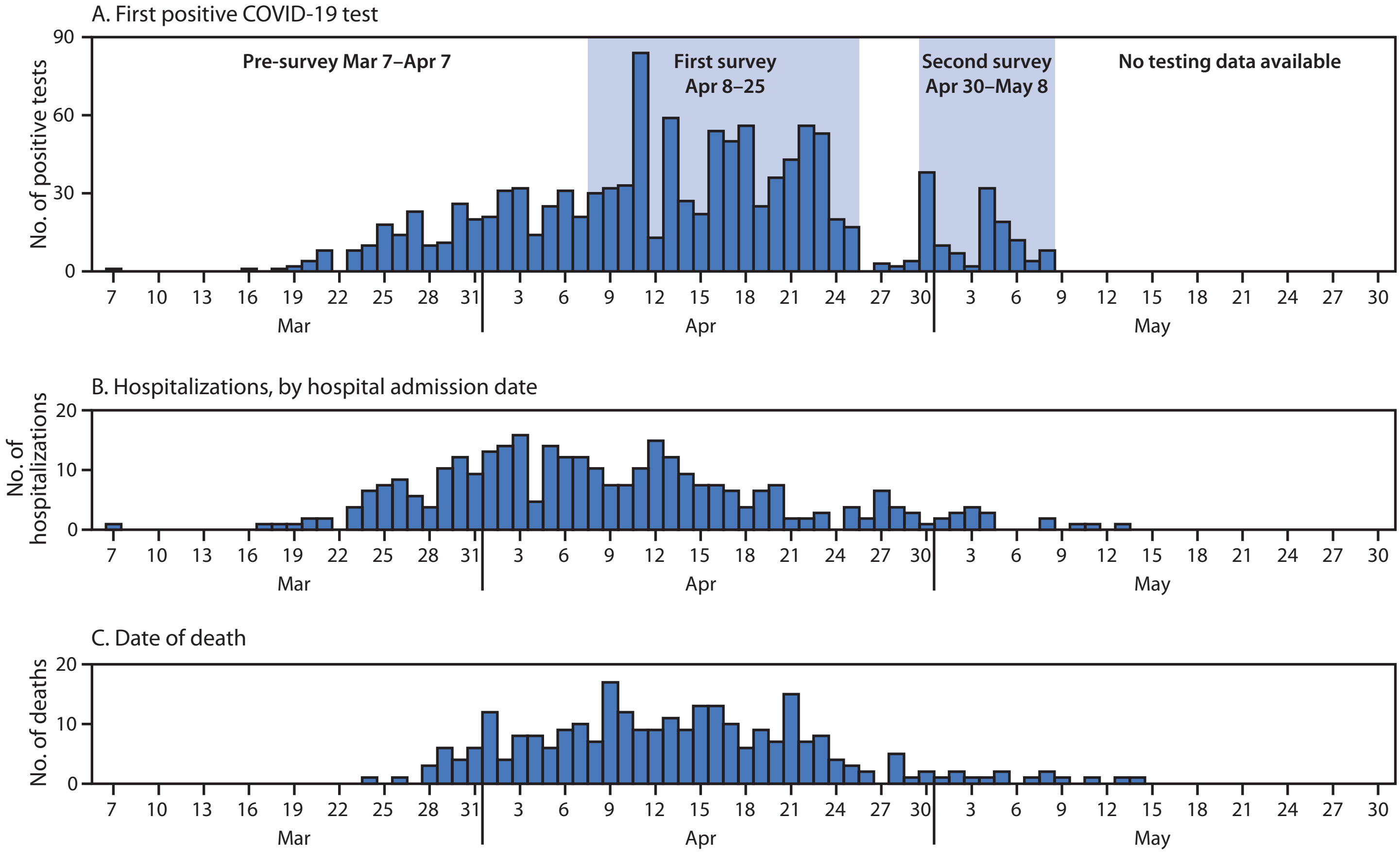
What is added by this report?

Repeated point prevalence surveys at 26 Detroit SNFs identified an attack rate of 44%; within 21 days of diagnosis, 37% of infected patients were hospitalized and 24% died. Among 12 facilities participating in a second survey and receiving on-site infection prevention and control (IPC) support, the percentage of newly identified cases decreased from 35% to 18%.

What are the implications for public health practice?

Repeated point prevalence surveys in SNFs can identify asymptomatic COVID-19 cases, inform cohorting and IPC practices, and guide prioritization of health department resources.

FIGURE. Skilled nursing facility residents with confirmed COVID-19 diagnosed by May 8, 2020, (A) by date of first positive SARS-CoV-2 test result (n = 1,190)*; (B) date of hospital admission (n = 331)†,§; and (C) date of death (n = 282)§,¶ — 26 facilities, Detroit, March 7–May 29, 2020**



Abbreviation: COVID-19 = coronavirus disease 2019.

* Seventeen dates of first positive test results are not known.

† Five residents had multiple admissions; 120 had unknown hospitalization dates.

§ Hospitalization and mortality data were current as of May 29, 2020. Hospitalizations with admission dates documented as 2 days before, through 21 days after the specimen collection date for a positive SARS-CoV-2 test were counted; deaths within 21 days of positive specimen collection date were counted.

¶ Five dates of death are not known.

** Data from all 26 facilities are displayed; only 12 facilities were tested during the second survey. COVID-19 testing data are not shown after May 8.

excluding health care personnel with positive test results from work; 2) strict cohorting of residents and health care personnel; 3) active clinical monitoring of confirmed COVID-19 cases; 4) managing safe transitions of care to and from outside facilities; and 5) discontinuing transmission-based precautions if a test-based strategy is used (*7*,*8*). In response to a confirmed case, CDC now recommends repeat testing (e.g., every 3–7 days) of all residents and health care personnel who previously had negative test results until testing identifies no new cases of COVID-19 among residents or health care personnel (*9*). Widescale testing activities should be integrated with intensified IPC support from local and state health departments.

Repeated point prevalence surveys coupled with IPC support might have reduced SARS-CoV-2 transmission in SNFs in Detroit and have the potential to improve outcomes among SNF residents. New cases continued to be identified during the second survey; however, reductions in 21-day hospitalization and mortality rates were observed throughout the implementation period. Future studies of COVID-19 in SNFs should further explore the impact of repeated point prevalence surveys on morbidity and mortality, the role of asymptomatic health care personnel in SARS-CoV-2 transmission, and the role of serologic testing in reopening SNFs following outbreaks. As the availability of SARS-CoV-2 testing increases, repeated point prevalence surveys and intensified IPC support from public health practitioners are essential components of COVID-19 IPC strategies in SNFs experiencing COVID-19 outbreaks.

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Update: COVID-19 Among Workers in Meat and Poultry Processing Facilities — United States, April–May 2020

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Meat and poultry processing facilities face distinctive challenges in the control of infectious diseases, including coronavirus disease 2019 (COVID-19) (*1*). COVID-19 outbreaks among meat and poultry processing facility workers can rapidly affect large numbers of persons. Assessment of COVID-19 cases among workers in 115 meat and poultry processing facilities through April 27, 2020, documented 4,913 cases and 20 deaths reported by 19 states (*1*). This report provides updated aggregate data from states regarding the number of meat and poultry processing facilities affected by COVID-19, the number and demographic characteristics of affected workers, and the number of COVID-19–associated deaths among workers, as well as descriptions of interventions and prevention efforts at these facilities. Aggregate data on confirmed COVID-19 cases and deaths among workers identified and reported through May 31, 2020, were obtained from 239 affected facilities (those with a laboratory-confirmed COVID-19 case in one or more workers) in 23 states.* COVID-19 was confirmed in 16,233 workers, including 86 COVID-19–related deaths. Among 14 states reporting the total number of workers in affected meat and poultry processing facilities (112,616), COVID-19 was diagnosed in 9.1% of workers. Among 9,919 (61%) cases in 21 states with reported race/ethnicity, 87% occurred among racial and ethnic minority workers. Commonly reported interventions and prevention efforts at facilities included implementing worker temperature or symptom screening and COVID-19 education, mandating face coverings, adding hand hygiene stations, and adding physical barriers between workers. Targeted workplace interventions and prevention efforts that are appropriately tailored to the groups most affected by COVID-19 are critical to reducing both COVID-19–associated occupational risk and health disparities among vulnerable populations. Implementation of these interventions and prevention efforts† across meat and poultry processing facilities nationally could help protect workers in this critical infrastructure industry.

Distinctive factors that increase meat and poultry processing workers' risk for exposure to SARS-CoV-2, the virus that causes COVID-19, include prolonged close workplace contact with coworkers (within 6 feet for ≥15 minutes) for long time periods (8–12 hour shifts), shared work spaces, shared transportation to and from the workplace, congregate housing, and frequent community contact with fellow workers. Many of these factors might also contribute to ongoing community transmission (*1*). To better understand the effect of COVID-19 on workers in these facilities nationwide, on June 6, 2020, CDC requested that state health departments report aggregate surveillance data through May 31, 2020, for workers in all meat and poultry processing facilities affected by COVID-19, including 1) the number and type of such facilities that had reported at least one confirmed COVID-19 case among workers, 2) the total number of workers in affected facilities, 3) the number of workers with laboratory-confirmed COVID-19, and 4) the number of COVID-19–related worker deaths. States reported COVID-19 cases determined by the Council of State and Territorial Epidemiologists confirmed case definition.§ States were asked to report demographic characteristics and symptom status of workers with COVID-19. Testing strategies and methods for collecting symptom data varied by workplace. Proportional distributions for demographic characteristics and symptom status were calculated for cases among workers in 21 states after excluding missing and unknown values; data were missing for sex in 25% of reports, age in 24%, race/ethnicity in 39%, and

* Arizona, Colorado, Georgia, Idaho, Illinois, Kansas, Kentucky, Maine, Maryland, Massachusetts, Missouri, Nebraska, New Mexico, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Virginia, Washington, Wisconsin, and Wyoming.

† https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/meat-poultry-processing-workers-employers.html.

§ https://wwwn.cdc.gov/nndss/conditions/coronavirus-disease-2019-covid-19/case-definition/2020/.

symptom status in 37%. States also provided information (from direct observation or from management at affected facilities) regarding specified interventions and prevention efforts that were implemented. A random-effects logistic regression model was used to obtain an estimate of the pooled proportion of asymptomatic (SARS-CoV-2 detected but symptoms never develop) or presymptomatic (SARS-CoV-2 detected before symptom onset) infections at the time of testing among workers who had positive SARS-CoV-2 test results. Five states provided prevalence data from facility-wide testing of 5,572 workers in seven facilities. Modeling was conducted and 95% confidence intervals (CIs) were calculated, with facilities treated as the random effect, using SAS software (version 9.4; SAS Institute).

Twenty-eight (56%) of 50 states responded, including 23 (82%) that reported at least one confirmed COVID-19 case among meat and poultry processing workers. Overall, 239 facilities reported 16,233 COVID-19 cases and 86 COVID-19–related deaths among workers (Table 1). The median number of affected facilities per state was seven (interquartile range = 3–14). Among 14 states reporting the total number of workers in affected facilities, 9.1% of 112,616 workers received diagnoses of COVID-19. The percentage of workers with COVID-19 ranged from 3.1% to 24.5% per facility.

Twenty-one states provided information on demographic characteristics and symptom status of workers with COVID-19. Among the 12,100 (75%) and 12,365 (76%) patients with information on sex and age, 7,288 (60%) cases occurred among males, and 5,741 (46%) were aged 40–59 years, respectively (Figure). Among the 9,919 (61%) cases with race/ethnicity reported, 5,584 (56%) were in Hispanics, 1,842 (19%) in non-Hispanic blacks (blacks), 1,332 (13%) in non-Hispanic whites (whites), and 1,161 (12%) in Asians. Symptom status was reported for 10,284 (63%) cases; among these, 9,072 (88%) workers were symptomatic, and 1,212 (12%) were asymptomatic or presymptomatic.

Among 239 facilities reporting cases, information on interventions and prevention efforts was available for 111 (46%) facilities from 14 states. Overall, 89 (80%) facilities reported screening workers on entry, 86 (77%) required all workers to wear face coverings, 72 (65%) increased the availability of hand hygiene stations, 70 (63%) educated workers on community spread, and 69 (62%) installed physical barriers between workers (Table 2). Forty-one (37%) of 111 facilities offered testing for SARS-CoV-2 to workers; 24 (22%) reported closing temporarily as an intervention measure.

Among seven facilities that implemented facility-wide testing, the crude prevalence of asymptomatic or presymptomatic infections among 5,572 workers who had positive SARS-CoV-2 test results was 14.4%. The pooled prevalence estimated from the model for the proportion of asymptomatic or presymptomatic infections among workers in meat and poultry processing facilities was 11.2% (95% CI = 0.9%–23.1%).

Discussion

The animal slaughtering and processing industry employs an estimated 525,000 workers in approximately 3,500 facilities nationwide (*2*,*3*). Combining data on workers with COVID-19 and COVID-19–related deaths identified and reported through May 31 from 23 states (16,233 cases; 86 deaths) with data from an earlier assessment through April 27 (1,125 cases; five deaths) (*1*) that included data from six states that did not contribute updated data to this report,[¶] at least 17,358 cases and 91 COVID-19–related deaths have occurred among U.S. meat and poultry processing workers.

The effects of COVID-19 on racial and ethnic minority groups are not yet fully understood; however, current data indicate a disproportionate burden of illness and death among these populations (4,5). Among animal slaughtering and processing workers from the 21 states included in this report whose race/ethnicity were known, approximately 39% were white, 30% were Hispanic, 25% were black, and 6% were Asian.[**] However, among 9,919 workers with COVID-19 with race/ethnicity reported, approximately 56% were Hispanic, 19% were black, 13% were white, and 12% were Asian, suggesting that Hispanic and Asian workers might be disproportionately affected by COVID-19 in this workplace setting. Ongoing efforts to reduce incidence and better understand the effects of COVID-19 on the health of racial and ethnic minorities are important to ensure that workplace-specific prevention strategies and intervention messages are tailored to those groups most affected by COVID-19.

The proportion of asymptomatic or presymptomatic SARS-CoV-2 infections identified in investigations of COVID-19 outbreaks in other high-density settings has ranged from 19% to 88% (*6*,*7*). Among cases in workers with known symptom status in this report, 12% of patients were asymptomatic or presymptomatic; however, not all facilities performed facility-wide testing, during which these infections are more likely to be identified. Consequently, many asymptomatic and presymptomatic infections in the overall workforce might have gone unrecognized, and the approximations for disease

¶ Delaware, Iowa, Mississippi, North Carolina, Ohio, and Texas did not contribute data to this report.

** Data produced for 21 of 23 states (Colorado and Kansas did not provide information on demographic characteristics and symptom status of cases) using the Bureau of Census American Community Survey (CMS) Public Use Microdata Sample (PUMS) query tool (https://www.census.gov/programs-surveys/acs/data/pums.html). Employment summaries were based on the American Community Survey 2014–2018 5-year PUMS estimates. Workforce estimates for Bureau of Census Industry Code 1180 (Animal Slaughtering and Processing) were tabulated by race/ethnicity using recoded detailed Hispanic origin and race.

TABLE 1. Laboratory-confirmed COVID-19 cases among workers in meat and poultry facilities — 23 states, April–May 2020*

State	Type of meat/poultry in affected facilities	No. (%) Facilities affected	Workers in affected facilities†	Confirmed COVID-19 cases among workers	COVID-19–related deaths§
Arizona	Beef	1	1,750	162 (9.3)	0 (0)
Colorado	Beef, bison, lamb, poultry	7	7,711	422 (5.5)	9 (2.1)
Georgia	Poultry	14	16,500	509 (3.1)	1 (0.2)
Idaho	Beef	2	797	72 (9.0)	0 (0)
Illinois	Beef, pork, poultry	26	N/A	1,029 (—)	10 (1.0)
Kansas	Beef, pork, poultry	10	N/A	2,670 (—)	8 (0.3)
Kentucky	Pork, poultry	7	7,633	559 (7.3)	4 (0.7)
Maine	Poultry	1	411	50 (12.2)	1 (2.0)
Maryland	Poultry	2	2,036	208 (10.2)	5 (2.4)
Massachusetts	Poultry, other	33	N/A	263 (—)	0 (0)
Missouri	Beef, pork, poultry	9	8,469	745 (8.8)	2 (0.3)
Nebraska	Beef, pork, poultry	23	26,134	3,438 (13.2)	14 (0.4)
New Mexico	Beef, pork, poultry	2	550	24 (4.4)	0 (0)
Pennsylvania	Beef, pork, poultry, other	30	15,548	1,169 (7.5)	8 (0.7)
Rhode Island	Beef, pork, poultry, other	6	N/A	78 (—)	0 (0)
South Carolina	Beef, pork, poultry, other	16	N/A	97 (—)	0 (0)
South Dakota	Beef, pork, poultry	4	6,500	1,593 (24.5)	3 (0.2)
Tennessee	Pork, poultry, other	7	N/A	640 (—)	2 (0.3)
Utah	Beef, pork, poultry	4	N/A	67 (—)	1 (1.5)
Virginia	Pork, poultry, other	14	N/A	1,109 (—)	10 (0.9)
Washington	Beef, poultry	7	4,452	468 (10.5)	4 (0.9)
Wisconsin	Beef, pork, veal	14	14,125	860 (6.1)	4 (0.5)
Wyoming	Beef	0	N/A	1 (—)	0 (0)
Total¶	**Beef, bison, lamb, pork, poultry, veal, other**	**239**	**112,616**	**16,233**	**86**
Combined total**	—	**264**	—	**17,358**	**91**

Abbreviations: COVID-19 = coronavirus disease 2019; N/A = not available.

* Data reported through May 31, 2020. Five states that responded to the data request did not report any laboratory-confirmed COVID-19 cases among workers in the animal slaughtering and processing industry; 22 states with animal slaughtering and processing facilities did not respond to the data request. The 13 states that contributed to both an earlier assessment and this update provided any updates to previously reported data, in addition to reporting new cases and facilities, through May 31, 2020.

† Among 14 of 23 states reporting the number of workers in affected workplaces, 9.1% of workers received diagnoses of COVID-19.

§ Percentage of deaths among cases.

¶ Data on workers with COVID-19 from 23 states that submitted data to this report.

** Combining data on workers with COVID-19 (1,125), COVID-19–related deaths (five), and COVID-19–affected facilities (25) through April 27 from six states that contributed to an earlier assessment of COVID-19 among meat and poultry processing workers that did not submit updated data to this report (https://www.cdc.gov/mmwr/volumes/69/wr/mm6918e3.htm?s_cid=mm6918e3_w).

prevalence in this report might underestimate SARS-CoV-2 infections. Recently derived estimates of the total proportion of asymptomatic and presymptomatic infections from data on COVID-19 investigations among cruise ship passengers and evacuees from Wuhan, China, ranged from 17.9% to 30.8%, respectively (*8*,*9*). The estimated proportion of asymptomatic and presymptomatic infections among meat and poultry processing workers (11.2%) is lower than are previously reported estimates and should be reevaluated as more comprehensive facility-wide testing data are reported.

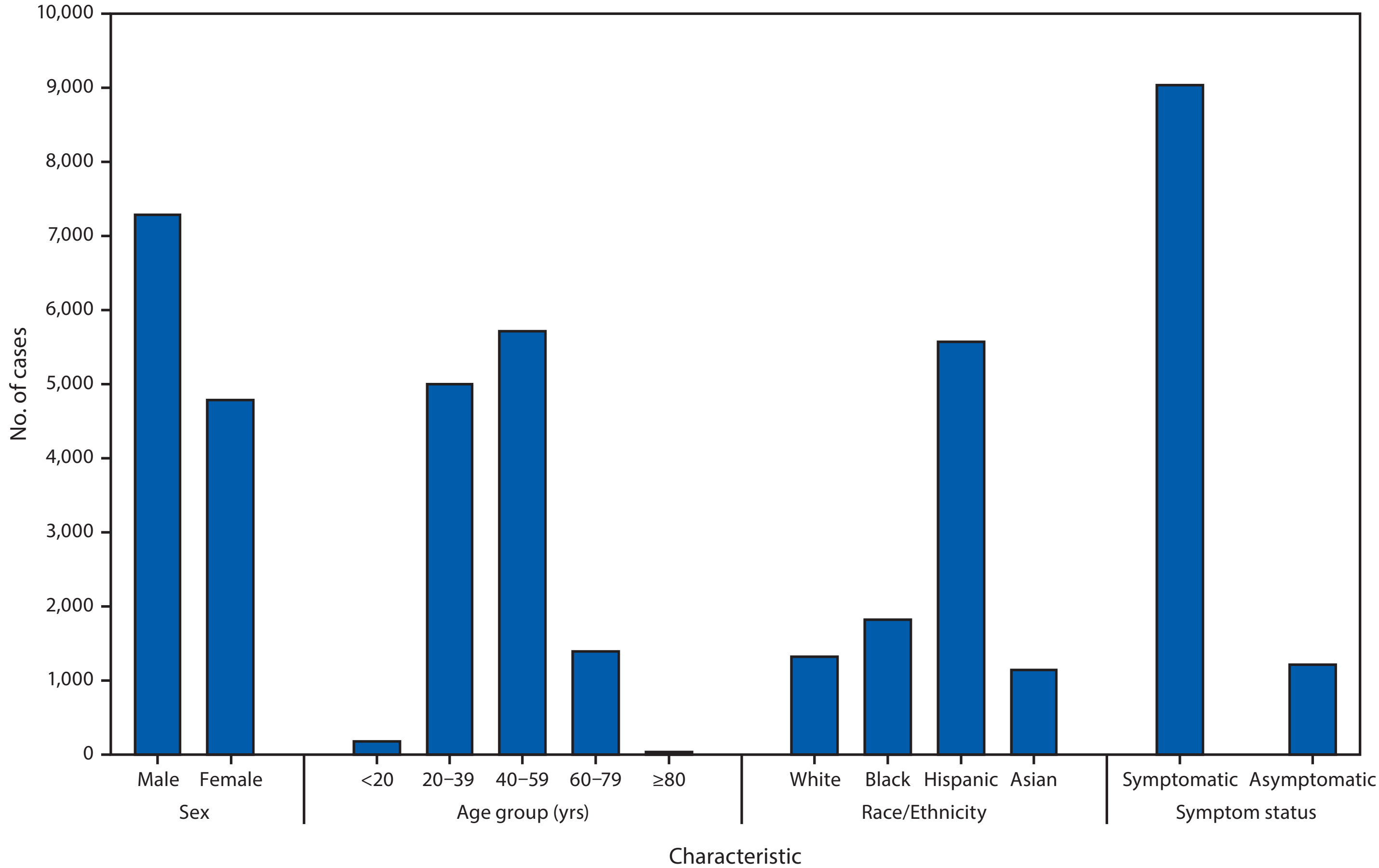
In coordination with state and local health agencies, many meat and poultry processing facilities have implemented interventions to reduce transmission or prevent ongoing exposure within the workplace, including offering testing to workers.[††] Expanding interventions across these facilities nationwide might help protect workers in this industry. Recognizing the interaction of workplace and community, many facilities have also educated workers about strategies for reducing transmission of COVID-19 outside the workplace.[§§]

The findings in this report are subject to at least seven limitations. First, only 28 of 50 states responded; 23 states with COVID-19 cases among meat and poultry processing facility workers submitted data for this report. In addition, only facilities with at least one laboratory-confirmed case of COVID-19 among workers were included. Thus, these results might not be representative of all U.S. meat and poultry processing facilities and workers. Second, delays in identifying workplace outbreaks and linking cases or deaths to outbreaks might have resulted in an underestimation of the number of affected facilities and cases among workers. Third, data were

†† https://www.cdc.gov/coronavirus/2019-ncov/community/worker-safety-support/hd-testing.html.

§§ https://www.cdc.gov/coronavirus/2019-ncov/community/community-mitigation.html.

FIGURE. Characteristics*,† of reported laboratory-confirmed COVID-19 cases among workers in meat and poultry processing facilities — 21 states, April–May 2020§



Abbreviation: COVID-19 = coronavirus disease 2019.

* The analytic dataset excludes cases reported by states that were missing information on sex (n = 4,133), age group (n = 3,868), race/ethnicity (n = 6,314), and symptom status (n = 5,949). White, black, and Asian workers were non-Hispanic; Hispanic workers could be of any race.

† Testing strategies and methods for collecting symptom data varied by workplace. Symptom status was available for a single timepoint, at the time of testing or at the time of interview.

§ Data reported through May 31, 2020.

TABLE 2. Interventions and prevention efforts implemented by facilities in response to COVID-19 among workers in 111 meat and poultry processing facilities* —14 states, April–May 2020†

	COVID-19–affected facilities, no. (%§)		
Intervention/Prevention effort	**Implemented intervention**	**Did not implement intervention**	**Intervention status unknown**
Worker screening on entry	89 (80)	5 (5)	17 (15)
Required universal face covering	86 (77)	5 (5)	20 (18)
Added hand hygiene stations	72 (65)	8 (7)	31 (28)
Educated employees on community spread	70 (63)	13 (12)	28 (25)
Installed physical barriers between workers	69 (62)	17 (15)	25 (23)
Staggered shifts	57 (51)	17 (15)	37 (33)
Offered SARS-CoV-2 testing to employees¶	41 (37)	35 (32)	35 (32)
Removed financial incentives (e.g., attendance bonuses)	33 (30)	20 (18)	58 (52)
Closed facility temporarily	24 (22)	69 (62)	18 (16)
Reduced rate of animal processing	23 (21)	14 (12)	74 (67)
Decreased crowding of transportation to worksite	17 (15)	10 (9)	84 (76)

Abbreviation: COVID-19 = coronavirus disease 2019.

* Affected facilities defined as those having one or more laboratory-confirmed COVID-19 cases among workers.

† Based on data collected through May 31, 2020.

§ Because of rounding, row percentages might not equal 100%.

¶ Testing strategies varied by facility.

Summary

What is already known about this topic?

COVID-19 outbreaks among meat and poultry processing facility workers can rapidly affect large numbers of persons.

What is added by this report?

Among 23 states reporting COVID-19 outbreaks in meat and poultry processing facilities, 16,233 cases in 239 facilities occurred, including 86 (0.5%) COVID-19–related deaths. Among cases with race/ethnicity reported, 87% occurred among racial or ethnic minorities. Commonly implemented interventions included worker screening, source control measures (universal face coverings), engineering controls (physical barriers), and infection prevention measures (additional hand hygiene stations).

What are the implications for public health practice?

Targeted workplace interventions and prevention efforts that are appropriately tailored to the groups most affected by COVID-19 are critical to reducing both COVID-19–associated occupational risk and health disparities among vulnerable populations.

not reported on variations in testing availability and practices, which might influence the number of cases reported. Fourth, industry data were used for race/ethnicity comparisons; demographic characteristics of total worker populations in affected facilities were not available, limiting the ability to quantify the degree to which some racial and ethnic minority groups might be disproportionately affected by COVID-19 in this industry. Reported frequencies of demographic and symptom data likely underestimate the actual prevalence because of missing data, which limits the conclusions that can be drawn from descriptive analyses. Fifth, information on interventions and prevention efforts was available for a subset of affected facilities and therefore might not be generalizable to all facilities. Information was subject to self-report by facility management, and all available intervention efforts might not have been captured. Further evaluation of the extent of control measures and timing of implementations is needed to assess effectiveness of control measures. Sixth, symptom data collected at facility-wide testing was self-reported and might have been influenced by the presence of employers. Finally, workers in this industry are members of their local communities, and their source of exposure and infection could not be determined; for those living in communities experiencing widespread transmission, exposure might have occurred within the surrounding community as well as at the worksite.

High population-density workplace settings such as meat and poultry processing facilities present ongoing challenges to preventing and reducing the risk for SARS-CoV-2 transmission. Collaborative implementation of interventions and prevention efforts, which might include comprehensive testing strategies, could help reduce COVID-19–associated occupational risk. Targeted, workplace-specific prevention strategies are critical to reducing COVID-19–associated health disparities among vulnerable populations Lessons learned from investigating outbreaks of COVID-19 in meat and poultry processing facilities could inform investigations in other food production and agriculture workplaces to help prevent and reduce COVID-19 transmission among all workers in these essential industries.

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Erratum

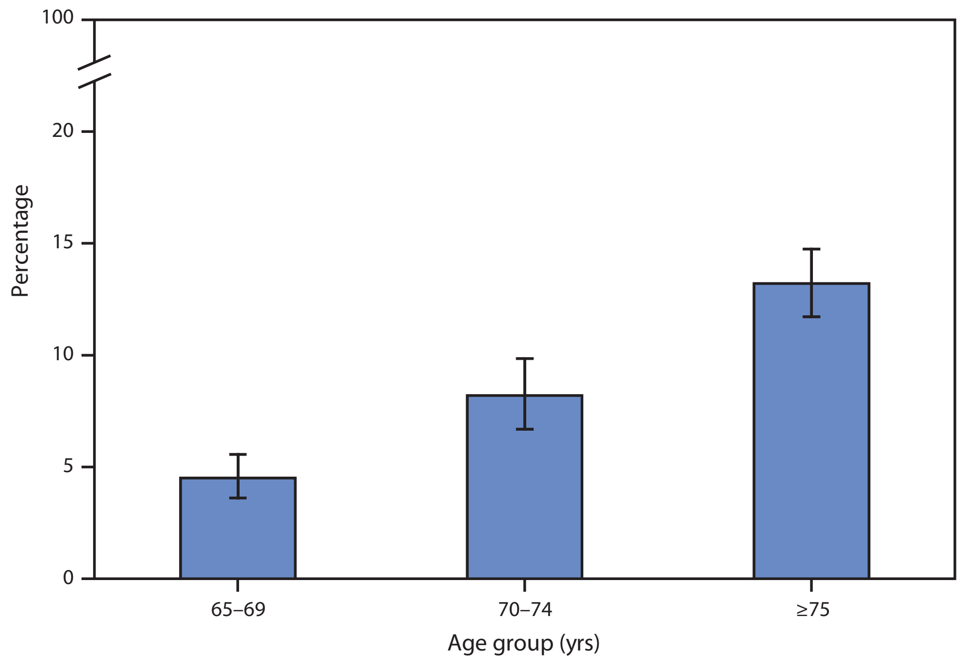
Vol. 69, No. 21

In the report "Evaluation of a Program to Improve Linkage to and Retention in Care Among Refugees with Hepatitis B Virus Infection — Three U.S. Cities, 2006–2018," on page 650, **Katherine Yun, Children's Hospital of Philadelphia** should have been listed in the Acknowledgments section.

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage* of Adults Aged ≥65 Years Who Received Care at Home From a Nurse or Other Health Care Professional During the Past 12 Months,† by Age Group — National Health Interview Survey, United States, 2018



* With 95% confidence intervals shown by error bars.
† Estimates are based on household interviews of a sample of the civilian, noninstitutionalized U.S. population and are derived from the National Health Interview Survey Sample Adult component. Based on a positive response to the question "During the past 12 months, did you receive care at home from a nurse or other health care professional?"

In 2018, the percentage of adults aged ≥65 years who received care at home from a nurse or other health care professional during the past 12 months increased with age from 4.5% for adults aged 65–69 years, to 8.2% for those aged 70–74 years and 13.2% for those aged ≥75 years.

Source: National Health Interview Survey, 2018 data. https://www.cdc.gov/nchs/nhis.htm.

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