

# Letters

## RESEARCH LETTER

### Prevalence of SARS-CoV-2 Infection in Residents of a Large Homeless Shelter in Boston

In the United States, 567 715 people were homeless on a single night in January 2019.<sup>1</sup> The congregate nature and hygienic challenges of shelter life create the potential for rapid transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in this vulnerable population.

On March 13, 2020, the Boston Health Care for the Homeless Program (BHCHP), in partnership with city and state public health agencies and community partners, rolled out a coronavirus disease 2019 (COVID-19) response strategy that included respiratory symptom screening at shelter

front doors, expedited referrals for SARS-CoV-2 testing and isolation for those with respiratory symptoms, dedicated treatment settings for individuals with positive test results, and contact tracing of confirmed COVID-19 cases.

Between March 28, 2020, and April 1, 2020, BHCHP identified an increasing number of COVID-19 cases from a single large homeless shelter in Boston, prompting SARS-CoV-2 testing of all remaining shelter residents. We describe the results of this investigation.

**Methods** | Participants were adults aged at least 18 years residing in a large homeless shelter in Boston on April 2, 2020, and April 3, 2020. Residents diagnosed with COVID-19 prior to April 2, 2020 (n = 16), or concurrently diagnosed with

**Table. Characteristics of Participants in a Study of the Prevalence of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Infection in a Homeless Shelter in Boston**

Characteristics	No. (%)		
	All participants (N = 408)	Positive SARS-CoV-2 PCR test result (n = 147)	Negative SARS-CoV-2 PCR test result (n = 261)
<b>Demographic</b>			
Age, mean (SD), y	51.6 (12.8)	53.1 (12.8)	50.8 (12.7)
Age group, y			
18-34	44 (10.8)	11 (7.5)	33 (12.6)
35-49	119 (29.2)	40 (27.2)	79 (30.3)
≥50	245 (60.1)	96 (65.3)	149 (57.1)
<b>Sex</b>			
Men	292 (71.6)	124 (84.4)	168 (64.4)
Women	115 (28.2)	22 (15.0)	93 (35.6)
Other	1 (0.3)	1 (0.7)	0
<b>Race<sup>a</sup></b>			
White	184 (46.5)	68 (47.2)	116 (46.0)
Black/African American	131 (33.1)	46 (31.9)	85 (33.7)
Asian	8 (2.0)	4 (2.8)	4 (1.6)
American Indian/Alaskan Native	4 (1.0)	2 (1.4)	2 (0.8)
Other	58 (14.7)	21 (14.6)	37 (14.7)
Multiple	11 (2.8)	3 (2.1)	8 (3.2)
Hispanic/Latino <sup>a</sup>	71 (18.6)	22 (16.1)	49 (20.0)
<b>Clinical</b>			
Body temperature ≥100 °F (37.8 °C)	4 (1.0)	1 (0.7)	3 (1.2)
<b>Symptoms</b>			
Any	47 (11.5)	18 (12.2)	29 (11.1)
Cough	33 (8.1)	11 (7.5)	22 (8.4)
Shortness of breath	3 (0.7)	2 (1.4)	1 (0.4)
Other	24 (5.9)	10 (6.8)	14 (5.4)
Nasal/sinus symptoms	6 (1.5)	2 (1.4)	4 (1.5)
Diarrhea	5 (1.2)	2 (1.4)	3 (1.2)
Subjective fever/chills	4 (1.0)	3 (2.0)	1 (0.4)
Miscellaneous	9 (2.2)	3 (2.0)	6 (2.3)

Abbreviation: PCR, polymerase chain reaction.

<sup>a</sup> Race and ethnicity were self-reported by participants based on fixed response options provided by the Massachusetts Department of Public Health. Individuals who selected more than 1 race were categorized by the investigators as "multiple," resulting in the mutually exclusive race categories presented.

COVID-19 at outside facilities on April 2, 2020, or April 3, 2020 (n = 6), had been removed from the shelter population and were excluded from this study.

Participants were asked to report their age, sex, race, ethnicity, and history of cough and shortness of breath and were given the option to report other symptoms. Race and ethnicity were based on fixed response categories. Other reported symptoms were grouped into categories by the investigators. Body temperature measurements were obtained using oral thermometers, with fever defined as a body temperature of at least 100 °F (37.8 °C). Nasopharyngeal specimens were collected by BHCHP clinical staff using a polyester swab and sent to the Massachusetts Department of Public Health State Public Health Laboratory for SARS-CoV-2 polymerase chain reaction (PCR) testing.

We used descriptive statistics to characterize the study sample, the percentage of positive PCR test results, and the symptom profile of individuals with PCR-confirmed infections. This study was exempted by the Partners HealthCare Human Research Committee with a waiver of informed consent.

**Results** | All individuals residing in the shelter (N = 408) underwent symptom assessment and SARS-CoV-2 PCR testing. There were no known refusals. The mean age of the participants was 51.6 years; 71.6% of participants were men, 33.1% were black or African American, and 18.6% were Hispanic or Latino (Table). Among all participants, 1.0% had fever; 8.1% reported cough; 0.7% reported shortness of breath; and 5.9% reported other symptoms, including 1.5% with nasal or sinus symptoms and 1.2% with diarrhea. Overall, 361 individuals (88.5%) reported no symptoms.

A total of 147 participants (36.0%) had PCR test results positive for SARS-CoV-2. Men constituted 84.4% of individuals with PCR-positive results and 64.4% of individuals with PCR-negative results. Among individuals with PCR test results positive for SARS-CoV-2, cough (7.5%), shortness of breath (1.4%), and fever (0.7%) were all uncommon, and 87.8% were asymptomatic.

**Discussion** | Universal SARS-CoV-2 PCR testing of an adult homeless shelter population in Boston shortly after the identification of a COVID-19 case cluster yielded a 36% positivity rate. The majority of individuals with newly identified infections had no symptoms and no fever at the time of diagnosis, suggesting that symptom screening in homeless shelters<sup>2</sup> may not adequately capture the extent of disease transmission in this high-risk setting. Limitations of this study include the cross-sectional nature of the study at a single shelter in Boston where several symptomatic individuals had been removed through prior symptom screening or self-referrals to outside care. These results support PCR testing of asymptomatic shelter residents if a symptomatic individual with COVID-19 is identified in the same shelter.

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*Concept and design:* Baggett, Gaeta.

*Acquisition, analysis, or interpretation of data:* All authors.

*Drafting of the manuscript:* Baggett.

*Critical revision of the manuscript for important intellectual content:* All authors.

*Statistical analysis:* Baggett.

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1. Henry M, Watt R, Mahathey A, Ouellette J, Sitler A. *The 2019 Annual Homeless Assessment Report (AHAR) to Congress. Part 1: Point-in-Time Estimates of Homelessness*. US Department of Housing and Urban Development; 2020.

2. Interim guidance for homeless service providers to plan and respond to coronavirus disease 2019 (COVID-19). Centers for Disease Control and Prevention. Accessed April 2, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/community/homeless-shelters/plan-prepare-respond.html>

## Variation in COVID-19 Hospitalizations and Deaths Across New York City Boroughs

In the US, New York City has emerged as the epicenter of the coronavirus disease 2019 (COVID-19) outbreak.<sup>1</sup> As of April 25, 2020, more than 150 000 cases had been reported, which is approximately 17% of total cases in the US.<sup>2,3</sup> New York City is composed of 5 boroughs (the Bronx, Brooklyn, Manhattan, Queens, and Staten Island), each with unique demographic, socioeconomic, and community characteristics.

Prior analyses have shown health inequities across these boroughs, but whether similar patterns have also emerged amid the COVID-19 pandemic is unknown.<sup>4</sup> Understanding the patterns could inform public health and policy strategies to mitigate the ongoing spread of COVID-19, and future approaches to address a possible resurgence of the disease. Therefore, in this study, we aimed to examine population characteristics and hospital bed capacities across the 5 boroughs and evaluate whether differences in the rates of COVID-19 testing, hospitalizations, and deaths have emerged in these communities.



Audio and Video