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Earlier and widespread screening for SARS-CoV-2 is needed for first responders

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1. Background

First responders are at high risk of repeated severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) exposure, work in close proximity with team members, and interface with vulnerable populations. Individuals working in a firehouse are often sharing living and dining quarters, making risk levels comparable to that of household contacts. While several hospitals have offered testing to first responders, the extent of transmission in this population and the adequacy of passive outreach is unclear.

2. Methods

We tested 9 individuals from a single firehouse within 2 days of an index case and subsequently tested 33 additional fire/emergency medical services (EMS) personnel around Maryland. All individuals were screened over phone for COVID-19-associated symptoms (fever, cough, sore throat, myalgias, dyspnea on exertion, diarrhea, headache, loss of taste/smell, shortness of breath at rest, chest pain, new onset confusion/irritability, and cyanosis), risk factors (older age, heart disease, diabetes, lung disease, and pregnancy), and knowledge of a close contact with a confirmed COVID-19 case. Drive-through testing using nasopharyngeal swabs and a SARS-CoV-2 RT-PCR test was conducted at Johns Hopkins.

3. Results

Of the 9 fire/EMS personnel tested from the initial firehouse, 4 tested positive (44.4%). Overall, of the 42 individuals tested, 10 (23.8%) tested positive for SARS-CoV-2. All reported symptoms, with cough and headache being the most common, regardless of test result (Table 1). No one reported any shortness of breath, chest pain, confusion/irritability, or cyanosis. Most of those tested were able to identify a close contact with a COVID-19 positive individual, the most common being work exposure with a coworker or transport of a COVID-19 positive patient. Among those who tested positive, the median symptom duration prior to calling was 1.0 days, and ranged from 0 to 18 days (Fig. 1).

4. Discussion

The high prevalence (44%) of positive tests at a single firehouse following identification of an index case, and the overall prevalence of 23.8%, suggests uncaptured transmission among first responders. Only symptomatic first responders reached out to Johns Hopkins Ambulatory Care; thus the number of true SARS-CoV-2 cases are likely higher, given the documented rates of infection among asymptomatic or pre-symptomatic individuals [1].

There is growing recognition of the insufficiency of symptom-based screening in higher risk population given the possibility of pre-symptomatic transmission [2]. While most personnel were screened within a day or two of overt symptom onset, there were a substantial proportion of individuals with symptoms starting up to weeks prior to testing. This suggests more active efforts in screening and testing of first responders may be warranted.

A single paramedic team in Maryland responded to up to 4450 calls in 2018 [3]; these first responders are in constant and repeated exposure, and have significant contact with vulnerable communities. Active monitoring of first responders [4] will be an important component in the control of this pandemic.

Table 1
Demographics and symptoms reported by emergency services personnel tested, $N = 42$.

Emergency services role	Fire/EMS	Fire/EMS
SARS-CoV-2 RT-PCR result	Negative	Positive
N	32	10
Age, mean (SD)	35.7 (11.7)	39.5 (14.1)
Male	50%	70%
Screening symptoms		
Fever	16%	20%
Cough	66%	80%
Sore throat	53%	50%
Myalgia/muscle pain	47%	50%
Dyspnea on exertion	59%	70%
Diarrhea	41%	30%
Headache	91%	90%
Loss of taste or smell	9%	10%
Shortness of breath at rest	0%	0%
Chest pain	0%	0%
Confusion/irritability	0%	0%
Cyanosis	0%	0%
Medical history risk factors		
Older age (≥60 years)	0%	0%
Heart disease	9%	0%
Diabetes	97%	100%
Lung disease	3%	0%
Pregnancy	0%	0%
Known close contact	88%	60%
Days since symptom onset[a], median (Q1, Q3)	1.0 (1.0, 2.0)	1.0 (1.0, 3.0)

[a] 3 missing values.

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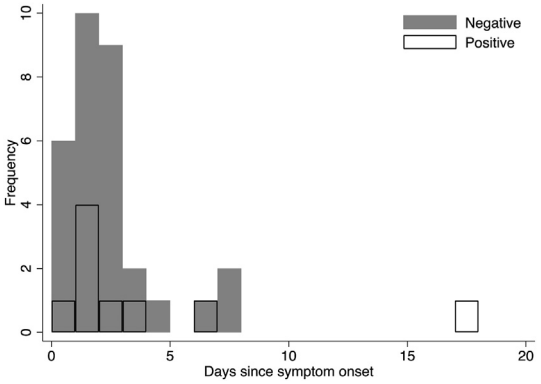

Fig. 1. Time since symptom onset among fire/EMS personnel tested.

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