

Differences in Motivating Factors for SARS-CoV-2 Vaccination and Perceptions of Infection Risk among Healthcare and EMS Personnel in South Carolina

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Objectives: Although medical workers were prioritized to receive the coronavirus disease 2019 (COVID-19) vaccination, many have declined. Even though studies have investigated differences in COVID-19-related attitudes and vaccination for workers in hospitals and long-term care facilities, none have included emergency medical services (EMS) personnel. We investigated the association between type of medical worker (EMS vs healthcare worker [HCW]) and COVID-19 vaccination, vaccine beliefs, vaccine motivators, personal protection behaviors, and risk perceptions.

Methods: The data for self-identified HCWs came from surveys distributed to randomly selected residents of South Carolina and EMS personnel recruited at a targeted surveillance testing event during the South Carolina EMS Symposium. Pearson χ^2 and Fisher exact tests analyzed differences in the distribution of demographic characteristics and self-reported COVID-19 vaccination attitudes by medical workers. Multivariable logistic regression assessed the association between COVID-19 vaccination and type of medical worker, adjusting for age,

sex, race, and frontline status, and assessed the associations among vaccine beliefs, vaccine motivators, personal protection behaviors, and risk perceptions by type of medical worker, adjusting for age, sex, race, frontline status, and vaccination status.

Results: Of the 126 respondents 57.9% were EMS, 42.1% were HCWs, and 73.6% of the cohort were self-reported frontline medical workers. Approximately two-thirds of respondents received a vaccine for COVID-19, with no significant differences between EMS and HCWs; however, EMS workers were significantly less likely to receive the vaccination out of concern about exposures at work/school (adjusted odds ratio [aOR] 0.22, 95% confidence interval [CI] 0.08–0.57), concern about exposures within the community (aOR 0.18, 95% CI 0.07–0.48), or to do their part to control the pandemic (aOR 0.20, 95% CI 0.06–0.69). EMS workers also were significantly less likely to wear a mask all/most of the time when outside the home (aOR 0.04, 95% CI 0.0–0.21) and less concerned about the spread of COVID-19 in their community as compared with HCWs (aOR 0.19, 95% CI 0.06–0.56).

Conclusions: EMS personnel were significantly less concerned about the spread of COVID-19 in their community and significantly less likely to wear a mask all/most of the time while outside the home as compared with HCWs. Differences in the COVID-19-related attitudes and personal protection behaviors of EMS personnel should be used to develop targeted interventions to increase vaccine motivation and adherence to personal protection protocols.

Key Words: COVID-19, COVID-19 vaccination attitudes, emergency medical services, healthcare workers, SARS-CoV-2

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Key Points

- Emergency medical services (EMS) personnel were significantly less concerned about the spread of coronavirus disease 2019 (COVID-19) in their community compared with other healthcare workers.
- EMS personnel were also significantly less likely to wear a mask all/most of the time while outside the home as compared with healthcare workers.
- Differences in the coronavirus disease 2019 related attitudes and personal protection behaviors of EMS personnel should be used to develop targeted interventions to increase vaccine motivation and adherence to personal protection protocols.

The severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) is a rapidly transmissible and deadly virus that has claimed the lives of more than 980,000 in the United States.¹ Healthcare workers (HCWs) are at high risk for exposure to coronavirus disease 2019 (COVID-19) infection,² with studies showing a hospitalization prevalence of 15.1% and death rate of 1.5%.³ The vaccination of HCWs is critical to increase protection from acquiring severe COVID-19 infection. Although HCWs were prioritized to receive a COVID-19 vaccination,⁴ many have declined.⁵ Understanding the attitudes of HCWs toward vaccination is critical for the development of strategies aimed at increasing vaccine acceptability in this highly exposed group. Although attitudes regarding vaccination and COVID-19-related behavioral changes have been well characterized for hospital workers and staff in long-term care facilities,^{5–8} few studies have focused on emergency medical services (EMS) personnel, who predominantly serve outside the hospital.

EMS personnel are one of the most exposed medical workers groups because duties often require them to enter a patient's home and provide care within the confined patient compartment of an ambulance. These unpredictable environments may prevent proper workplace decontamination and hinder the prevention of disease transmission.⁹ First responders' rates of seropositivity for SARS-CoV-2 immunoglobulin G antibodies is greater than that seen in the general population,¹⁰ which strongly supports their priority status for inoculation, and yet vaccine hesitancy among public safety personnel is highly prevalent.^{11–13} Additional information is necessary to develop strategies for increasing vaccine acceptability among EMS personnel, but no studies have investigated attitudes regarding vaccination and the COVID-19–related personal protection behaviors of EMS personnel.

Understanding how EMS personnel may differ from HCWs in terms of COVID-19 vaccination, vaccine beliefs, vaccine motivators, personal protection behaviors, and risk perceptions may help policy makers and EMS agencies develop targeted campaigns aimed at increasing vaccination and adherence to personal protection recommendations that prevent the transmission of COVID-19 among EMS personnel. To date, no studies have investigated differences in COVID-19 vaccination and COVID-19–related attitudes toward vaccination and the personal protection behaviors of HCWs and EMS personnel. As such, we investigated the association between type of medical worker (EMS vs HCW) and COVID-19 vaccination, vaccine beliefs, vaccine motivators, personal protection behaviors and risk perceptions.

Methods

Study Design and Setting

Randomly selected HCWs responded to a surveillance survey of South Carolina residents occurring from February 1 to March 4, 2021. Methods for selecting the initial cohort can be found

elsewhere.¹⁴ Briefly, 117,563 randomly selected residents were invited to provide clinical samples for SARS-CoV-2 testing and complete a health survey at any of the 70 participating clinics. The surveillance initiative was deemed human subjects exempt public health surveillance by the institutional review board of the South Carolina Department of Health and Environmental Control. From the surveillance health survey of 1463 residents, 53 self-reported working as HCWs. Information to further delineate the exact HCW position (eg, nurse, doctor, technician) was not available. Next, a targeted surveillance testing event on March 11, 2021 recruited EMS personnel attending the 2021 South Carolina EMS Symposium in Myrtle Beach, SC. Information to delineate the EMS worker position (eg, paramedic, emergency medical technician, dispatcher) and organization affiliation (active duty, nonactive duty) was not collected.

Study Outcomes

The study outcomes assessed were self-reported COVID-19 vaccination and COVID-19-related attitudes and behaviors, which fell into four categories: COVID-19 vaccine beliefs, vaccine motivators, personal protection behaviors, and risk perceptions. COVID-19 vaccination (defined as individuals who self-reported receiving at least one dose) and corresponding details were self-reported fields in the health survey. Descriptions of the questions provided to participants are provided in Supplemental Digital Content (Appendix 1, <http://links.lww.com/SMJ/A275>).

Statistical Analysis

Descriptive statistics were provided in terms of frequency and percentages. Pearson χ^2 tests were used to determine the differences in the distribution of demographic characteristics, COVID-19 testing behaviors, COVID-19 vaccination, vaccine beliefs, vaccine motivators, personal protection behaviors, and risk perceptions, by type of medical worker (HCW vs EMS). Fisher exact tests were used in instances in which a cell count was less than five. Bivariate logistic regression was used to calculate the association between type of medical worker and COVID-19 vaccination, COVID-19 vaccine beliefs, vaccine motivators, personal protection behaviors, and risk perceptions. Multivariable logistic regression was used to assess the same associations; the association between COVID-19 vaccination and type of medical worker was adjusted for age, race, sex, and frontline worker status, and the association between vaccine beliefs, vaccine motivators, personal protection behaviors, risk perceptions, and type of medical worker were adjusted for age, race, sex, frontline worker status, and COVID-19 vaccination. Exact logistic regression was used to estimate the effect size for the association between use of masks when outside the home and type of medical worker. Statistical significance was declared when a two-sided *P* value was less

Table 1. Demographic characteristics and COVID-19 attitudes and behaviors of the SC STRONG dataset by type of medical worker, February 2021 (N = 126)

Variable	Total N = 126	HCW N = 53 (42.1%)	EMS N = 73 (57.9%)
Demographic characteristics			
Age, y			
18–39	18 (15.1)	8 (15.1)	10 (15.2)
40–59	78 (65.6)	30 (56.6)	48 (72.7)
≥60	23 (19.3)	15 (28.3)	8 (12.1)
Male sex	52 (43.7)	13 (24.5)**	39 (59.1)***
White race	107 (89.9)	46 (86.8)	61 (92.4)
I am a frontline medical worker (yes)	89 (73.6)	46 (86.8)**	43 (63.2)**
COVID-19 testing behaviors			
Ever tested for COVID-19 infection (PCR or antibody test)? ^d (yes)	90 (74.4)	42 (79.3)	48 (70.6)
How often have you been tested for COVID-19?			
Never tested	33 (27.3)	11 (20.8)	22 (32.4)
1 time	23 (19.0)	9 (17.0)	14 (20.6)
≥2 times	65 (53.7)	33 (62.3)	32 (47.1)
Ever tested positive for COVID-19 (yes)	28 (22.4)	15 (28.0)	13 (18.0)
COVID-19 vaccination			
Have you had the COVID-19 vaccine (yes)	77 (63.6)	34 (64.2)	43 (63.2)
Vaccine manufacturer			
Pfizer	67 (55.8)	29 (54.7)	38 (56.7)
Moderna	7 (5.8)	5 (9.4)	2 (3.0)
Other	2 (1.7)	0 (0)	2 (3.0)
NA/not yet vaccinated	44 (37.7)	19 (35.9)	25 (37.3)
Do you plan to get vaccinated?			
Yes	28 (23.1)	14 (26.4)	14 (20.6)
No	16 (13.2)	5 (9.4)	11 (16.2)
N/A already vaccinated	77 (63.6)	34 (64.2)	43 (63.2)
When do you plan to take the COVID-19 vaccine?			
NA/already vaccinated	77 (63.6)	34 (64.2)	43 (63.2)
As soon as eligible	12 (9.9)	4 (7.6)	8 (11.8)
Plan to wait/no plan provided ^b	32 (26.5)	15 (28.3)	17 (25.0)
Vaccine beliefs			
I think the COVID-19 vaccines are safe (agree)	81 (66.9)	36 (67.9)	45 (66.2)
I think the COVID-19 vaccines are effective (agree)	81 (66.9)	35 (66.0)	46 (67.7)
I feel confident in the research process by the pharmaceutical companies that led to the design and development of COVID-19 vaccines (agree)	77 (64.7)	37 (71.2)	40 (59.7)
I feel confident in the regulatory approval process by the US FDA that led to the currently available COVID-19 vaccines (agree)	76 (63.3)	35 (67.3)	41 (60.3)

Table 1. (Continued)

Variable	Total N = 126	HCW N = 53 (42.1%)	EMS N = 73 (57.9%)
Vaccine motivators			
Protected a family/close friend who is at high risk (yes)	80 (66.1)	37 (69.8)	43 (63.2)
Protecting myself (yes)	78 (64.5)	41 (77.4)**	37 (54.4)**
Concern about possible virus exposures at work or school (yes)	62 (51.2)	37 (69.8)***	25 (36.8)***
Concern about possible virus exposures in my community (yes)	56 (46.3)	36 (67.9)****	20 (29.4)****
Doing my part to control pandemic (yes)	80 (66.1)	44 (83.0)***	36 (52.9)***
Serving as an example to encourage others to take vaccine (yes)	61 (50.4)	30 (56.6)	31 (45.6)
Personal protection behaviors			
How often have you practiced social distancing (all/most of the time)	97 (80.2)	46 (86.8)	51 (75.0)
How often did you wear a mask when outside the house? ^c (all/most of the time)	105 (86.8)	53 (100.0)****	52 (76.5)****
Risk perceptions			
How concerned are you about you or someone getting infected with COVID-19? (very concerned/concerned)	51 (42.2)	29 (54.7)*	22 (32.4)*
How concerned about the spread of COVID-19 in your community right now? (very concerned/concerned)	72 (59.5)	45 (84.9)****	27 (39.7)****

Boldface indicates results which are statistically significant. COVID-19, coronavirus disease 2019; EMS, emergency medical services; HCW, healthcare worker; NA, nonapplicable; PCR, polymerase chain reaction; SC STRONG, South Carolina Sampling and Testing Representative Outreach for Novel coronavirus Guidance; US FDA, US Food and Drug Administration.

^aParticipant tested for a COVID-19 infection using an active COVID-19 infection (nasal or saliva) or an antibody test.

^bCombines responses for plan to wait for greater than or equal to 3 months, plan to wait until fall or winter 2021, plan to wait longer, and responses from individuals who stated that they planned to receive the vaccine but provided no time period for when they planned to receive the vaccine.

^cEstimated significance with Fisher exact test due to low cell count.

* $P < 0.05$.

** $P = 0.01$.

*** $P = 0.001$.

**** $P < 0.0001$.

than 0.05. All of the statistical analyses were conducted using SAS version 9.4 (SAS Institute, Cary, NC).

Results

Participant Characteristics

More than half of the study population were EMS personnel (57.9%), and 42.1% were HCWs (Table 1). The overall

population was predominantly female (56.3%), White (89.9%), and between the ages of 40 and 59 (65.6%; Table 1). Approximately three-fourths of the population self-reported being a frontline medical worker (73.6%). The majority of the population reported that they had previously been tested for COVID-19 infection (74.4%), and 53.7% reported being tested two or more times. Overall, 22.4% reported ever testing positive for COVID-19 infection. Approximately two-thirds of the population reported receiving a vaccine for COVID-19; of those 77 individuals, 74 (96.1%) received both doses and three (3.9%) received one dose. The majority of vaccinated individuals received Pfizer (88.2%), 9.2% received Moderna, 2.6% received an “other” vaccine, and one individual did not report the vaccine manufacturer. Of the 44 individuals not yet vaccinated, only 12 (27.3%) reported they would be vaccinated as soon as they were eligible,

whereas 32 (72.7%) reported they “planned to wait” or provided no plan for being vaccinated. Additional details regarding the vaccine beliefs, motivators, personal protection behaviors, and risk perceptions for the entire population are provided in Table 1.

COVID-19 Vaccination and Vaccine Beliefs

There were no significant differences between the two groups of medical workers for the proportions receiving COVID-19 vaccination or planning to be vaccinated. Adjusted analyses show that EMS personnel had slightly higher odds of receiving the COVID-19 vaccination; however, this relationship was not statistically significant (adjusted odds ratio [aOR] 1.13, 95% confidence interval [CI] 0.45–2.84; Table 2). In addition, the majority of both HCWs and EMS personnel believed that

Table 2. ORs for the association between type of medical worker (EMS vs HCW) and COVID-19 vaccination, vaccine beliefs, vaccine motivators, personal protection behaviors, and risk perceptions

	Unadjusted	Adjusted
Received COVID-19 vaccination ^a	0.96 (0.46–2.02)	1.13 (0.45–2.84)
Vaccine beliefs ^b		
Strongly agree/agree COVID-19 vaccines are safe ^c	0.92 (0.43–1.99)	0.81 (0.26–2.52)
Strongly agree/agree COVID-19 vaccines are effective ^c	1.08 (0.50–2.31)	1.03 (0.34–3.15)
Agree that I feel confident in the research process by the pharmaceutical companies that led to the design and development of COVID-19 vaccines ^c	0.60 (0.28–1.30)	0.35 (0.11–1.04)
Agree that I feel confident in the regulatory approval process by the US FDA that led to the currently available COVID-19 vaccines ^c	0.74 (0.35–1.57)	0.54 (0.19–1.57)
Vaccine motivators ^b		
Protect a family/close friend who is at high risk ^d	0.74 (0.35–1.60)	0.84 (0.33–2.13)
Protect myself ^d	0.35 (0.16–0.78)**	0.38 (0.13–1.11)
Concern about possible virus exposures at work or school ^d	0.25 (0.12–0.54)***	0.22 (0.08–0.57)**
Concern about possible virus exposures in my community ^d	0.20 (0.09–0.43)****	0.18 (0.07–0.48)***
Doing my part to control pandemic ^d	0.23 (0.10–0.54)***	0.20 (0.06–0.69)**
Serving as an example to encourage others to take vaccine ^d	0.64 (0.31–1.32)	0.74(0.30–1.83)
Personal protection behaviors ^b		
Practice social distancing all/most of the time ^e	0.46 (0.17–1.20)	0.79 (0.25–2.48)
Wear a mask when outside of the house all/most of the time ^{e,f}	0.05 (0.0–0.22)****	0.04 (0.0–0.21)****
Risk perceptions ^b		
Very concerned or concerned about myself or someone getting infected with COVID-19 ^g	0.40 (0.19–0.83)*	0.52 (0.22–1.25)
Very concerned or concerned about the spread of COVID-19 in your community right now ^g	0.12 (0.05–0.29)****	0.19 (0.06–0.56)**

Boldface type indicates results which are statistically significant. COVID-19, coronavirus disease 2019; EMS, emergency medical services; HCW, healthcare workers; NA, estimate not available due to low cell count; OR, odds ratio; US FDA, US Food and Drug Administration.

^aModel adjusted for age, sex, race, and frontline status.

^bModel adjusted for age, sex, race, frontline status, and vaccination status.

^cReference category, neutral/disagree.

^dReference category, no.

^eReference category, some of the time/never/rarely.

^fMedian unbiased estimate with a one-sided P value produced by exact logistic regression.

^gReference category, not concerned/a little concerned.

* $P < 0.05$.

** $P = 0.01$.

*** $P = 0.001$.

**** $P < 0.0001$.

COVID-19 vaccines were safe (67.9%, 66.2%, $P = 0.83$). EMS workers were slightly more likely to believe that the vaccines were effective (67.7% vs 66.0%, $P = 0.85$) and slightly less likely to report confidence in the research process for developing vaccines (59.7% vs 71.2%, $P = 0.19$), and the US Food and Drug Administration regulatory approval process (60.3% vs 67.3%, $P = 0.42$). None of these differences were statistically significant.

Vaccine Motivators

Compared with HCWs, EMS workers were significantly less likely to report receiving a vaccine to protect themselves (54.4% vs 77.4%, $P = 0.01$), out of concern about virus exposures at work/school (36.8% vs 69.8%, $P = 0.0003$), or out of concern about virus exposures within the community (29.4% vs 67.9%, $P \leq 0.0001$), or to do their part to control the pandemic (52.9% vs 83.0%, $P = 0.0005$). Multivariate analyses showed that these trends persisted after accounting for age, race, sex, frontline status, and vaccination status (Table 2). EMS personnel were at significantly lower odds of being motivated to receive the COVID-19 vaccination out of concern about virus exposures at work/school (aOR 0.22, 95% CI 0.08–0.57), concern about virus exposures within the community (aOR 0.18, 95% CI 0.07–0.48), or as a way to do their part to control the pandemic (aOR 0.20, 95% CI 0.06–0.69).

Personal Protection Behaviors and Risk Perceptions

EMS personnel were significantly less likely to report wearing a mask while in public all/most of the time as compared with HCWs (76.5% vs 100.0%, $P = 0.0008$), significantly less likely to report being concerned about themselves or someone they know being infected with COVID-19 (32.4% vs 54.7%, $P = 0.01$), or less likely to be concerned about the spread of COVID-19 within the community (39.7% vs 84.9%, $P \leq 0.0001$). After adjusting for age, race, sex, frontline status, and vaccination status, EMS personnel were significantly less likely to wear a mask all/most of the time when outside the house compared with HCWs (aOR 0.04, 95% CI 0.0–0.21) and 81.0% less likely to be concerned about the spread of COVID-19 in their community than HCWs (aOR 0.19, 95% CI 0.06–0.56).

Discussion

To the authors' knowledge, this is the first study to report differences in motivating factors for SARS-CoV-2 vaccination and COVID-19–related personal protection behaviors/concerns between EMS personnel and HCWs. Although two of every three EMS personnel and HCWs reported receiving the COVID-19 vaccination, there were significant differences regarding the motivating factors for becoming vaccinated and COVID-19–related personal protection behaviors. Compared with HCWs, EMS workers were significantly less motivated to receive a vaccine to protect themselves or do their part to control the pandemic and also were significantly less concerned about possible virus

exposures at work/school or in their community. In addition, 76.5% of EMS personnel reported wearing a mask all/most of the time when outside the home, compared with 100% of HCWs. By highlighting differences in the attitudes and COVID-19–related behaviors of medical workers, these findings can be used to emphasize areas in which further education is necessary to increase vaccination compliance and promote personal protection behaviors.

Two-thirds of respondents reported receipt of COVID-19 vaccination, with similar rates seen in EMS personnel and HCWs. In contrast, previous studies reported a high prevalence of vaccine hesitancy among healthcare professionals.^{5,7,15} For example, a survey in October 2020 reported 65.5% of HCWs employed by the University of California would delay vaccination, with 49.4% stating they would prefer to wait and see how the vaccine affected others first.¹⁵ Perhaps the relatively high prevalence of vaccinated individuals in the present study could be attributed to increased education on the safety and efficacy of COVID vaccines over time. Alternatively, the culture of South Carolina residents may be more favorable than other states, as two different statewide surveys found high compliance and vaccine desire in January through February 2021.¹⁴ In addition, approximately one-third of the medical workers in each group did not agree that vaccines were safe or effective and were not confident about the research and regulatory processes that led to the creation of the vaccines. This is low in comparison to estimates reported in previous studies. For example, 46.7% of the HCWs at the University of California believed that a novel coronavirus vaccine would protect them, and 65.2% expressed a lack of confidence in the scientific vetting process for vaccines.¹⁵ Similarly, a survey of US firefighters and EMS personnel in April 2020 reported that more than half were uncertain or reported low acceptability of the COVID-19 vaccine when it became available.¹¹ Although the findings of the present study may indicate improved vaccine acceptability over time, they also demonstrate that a meaningful proportion of medical workers in South Carolina remain wary of receiving a vaccination. This underscores the need for continued education to combat disinformation and increase vaccine uptake in all healthcare personnel.

EMS personnel were significantly less concerned about the about the spread of COVID-19 in their community compared with HCWs. This finding may be the result of the asymptomatic presentation of many COVID-infected patients. Whereas HCWs may have access to information that enables them to understand the amount of healthcare resources dedicated to COVID-19 patients, EMS personnel likely treat many asymptomatic COVID-19 patients without ever learning their infection status. The lack of resources for follow-up and comprehensive contact tracing likely impedes, EMS personnel from ever learning their true number of exposures, which may lead to a false sense of security. Alternatively, this decreased sense of danger may also develop among EMS personnel who have transported severely ill COVID-19 patients but never experienced symptoms of COVID-19 themselves. This lack of concern about the spread of COVID-19 may lead EMS personnel

to decrease adherence to personal protection precautions, and consequently increase their risk of infection.¹⁶ Because studies show 40% to 50% of first responders testing positive for SARS-CoV-2 antibodies reported no COVID-19–related symptoms,^{10,17} adherence to personal protection precautions is critical to prevent virus transmission to patients or colleagues while asymptomatic. Future research is necessary to determine the extent to which diminished concern about the spread of COVID-19 influences vaccine acceptability or adherence to personal protection protocols among EMS personnel.

Only three of every four EMS personnel reported always or almost always wearing a mask when outside the house, compared with 100% of HCWs. Perhaps this is the result of the initial shortage of personal protective equipment for EMS personnel.¹⁸ In one nationally representative survey, many EMS personnel reported limited access to personal protection equipment, with nearly one-third reporting having to reuse the same mask for ≥ 1 week.¹⁸ By the time mask production increased in the United States, it is possible that EMS personnel believed that they had already been exposed to the virus because of the lack of proper protective equipment in the early stages of the pandemic, ultimately decreasing over time their motivation to wear masks. The decreased use of masks by public safety personnel also was reported in a survey in July 2020, which showed that off-duty mask use was similarly low in the EMS worker population (77.0%), and even lower for law enforcement respondents (37.0%).¹⁹ One may argue that EMS personnel have a stronger obligation to wear a mask than other HCWs because their duties often lead them to enter patients' homes, enter facilities with known COVID-19 infections, and provide care within the confined patient compartment of the ambulance, all greatly increasing their opportunities for exposure. Although face masks are necessary to prevent exposure from infectious materials from other patients, they are equally important as a measure of source control, to prevent an EMS worker from releasing potentially infectious respiratory secretions when they talk, sneeze, or cough.²⁰ The US Centers for Disease Control and Prevention interim recommendations for first responders state that EMS personnel should wear a face mask at all times while they are in service, including breakrooms or other spaces where they may encounter coworkers.²⁰ Continued use of masks in breakrooms is necessary because EMS personnel are often required to work and cohabitate with colleagues in close quarters, which may not allow them to properly distance themselves, both increasing their likelihood of exposure and their likelihood of transmitting the virus to colleagues and their families. A unique aspect of EMS personnel working in 12- to 24-hour worker shifts is the deleterious effects of an entire shift becoming infected or exposed, requiring quarantine. As such, EMS personnel should continue to be encouraged to follow current Centers for Disease Control and Prevention recommendations that ask all healthcare professionals to wear masks while at work²¹—anything short of 100% compliance for this high-risk group is inadequate. These findings demonstrate a need for continued education and

targeted campaigns to promote the use of masks among EMS personnel.

These findings are subject to several limitations. The attitudes and behaviors reported in this cross-sectional survey may not be generalizable to other time periods. Social desirability bias may have led to artificially inflated estimates for wearing personal protection equipment and other COVID-19–related behaviors, and small sample sizes limited the ability to account for all of the potential confounders in adjusted analyses. Responses for HCWs were recorded approximately 1 month before the responses of EMS participants; thus, it is possible that those responses may have changed over time. Responses from EMS participants are subject to selection bias because participants made up a convenience sample of EMS conference attendees, and EMS personnel attending an in-person conference during a pandemic may reasonably be expected to be less concerned with the spread of COVID-19 than EMS personnel who chose to complete their continuing education requirements online. In addition, EMS conferences often are disproportionately populated by “nonriding” personnel (eg, supervisory staff, EMS educators, clinical staff, volunteers). Although we adjusted the final analyses to account for frontline worker status, further research in a nationally representative sample of EMS personnel may be necessary to confirm these findings. Finally, the broad definition for HCWs made it impossible to account for underlying differences in licensure and duties, and we cannot rule out the possibility that some of those identifying as HCWs were EMS personnel.

Conclusions

EMS personnel were significantly less concerned about the spread of COVID-19 in their community and significantly less likely to wear a mask all/most of the time while outside the home as compared with HCWs. Differences in the COVID-19–related attitudes and personal protection behaviors of EMS and HCWs may be used to develop in a timely way targeted interventions aimed at increasing vaccine acceptability and adherence to personal protection protocols when similar respiratory infectious disease outbreaks occur.

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