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RESEARCH LETTER

# Vaccination rates and acceptance of SARS-CoV-2 vaccination among U.S. emergency department health care personnel

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus responsible for COVID-19, has infected more than 25 million Americans, leading to over 420,000 deaths.[1] The Centers for Disease Control and Prevention reports over 378,000 cases of COVID-19 in U.S. health care personnel (HCP) with 1,286 deaths.[2] By summer 2020, an estimated 4.6% of academic emergency department (ED) HCPs had contracted COVID-19.[3] In mid-December 2020 emergency use authorization COVID-19 vaccines were administered to U.S. HCPs as a priority group. The objective of this report was to describe differences in vaccination rates among various types of ED HCP at U.S. academic medical centers and reasons for declining vaccination. We hypothesized that groups of ED HCPs with differences in workplace risks might view the benefits of vaccine differently and that vaccine hesitancy would be higher in people of color.

The COVID-19 Evaluation of Risk in Emergency Departments (COVERED) project is a multicenter, prospective cohort surveillance project for SARS-CoV-2 infection among ED HCPs at 20 geographically diverse, high-volume urban U.S. academic medical centers.[4] We enrolled physicians and advanced practice providers (APPs), nurses, and nonclinical HCPs (e.g., clerks, social workers, and pharmacists) not previously diagnosed with COVID-19. The project's primary aim was to estimate the attributable risk of occupational acquisition of COVID-19 during a 20-week follow-up. At completion we surveyed participants regarding receipt of vaccines, feelings of personal safety after vaccination, personal protective equipment (PPE) use and, if applicable, reasons for declining vaccination. On January 4, 2021, approximately 3 weeks after vaccination began to be offered at all sites, we surveyed HCPs participating in the project. This project met the requirements of public health surveillance as defined in 45 CFR 46.102(l)(2). Descriptive statistics and difference in proportions with 95% confidence interval (CI) were used, and standard errors were adjusted for clustering by site. Analyses were performed using SAS version 9.4 (SAS Institute, Cary, NC).

We surveyed 1,542 participants, and 1,398 (90.7%) completed the survey. Ninety-four percent ($n$ = 1,321) had been offered COVID-19 vaccine and 1,136 of those (86.0%) had received it (four [0.3%] through a vaccine trial). Among 674 physicians/APPs offered vaccine, 37 (5.5%) declined vaccination, compared with 77 of 345 (22.3%) nurses (difference = 16.8%, 95% CI = 9.5% to 24.2%) and 71 of 302 (23.5%) nonclinical HCPs (difference = 18.0%, 95% CI = 11.7% to 24.3%). The primary reason for declining a COVID-19 vaccine was concern about vaccine safety (45.4%).

After vaccination, 980 of 1,130 (86.7%) recipients reported feeling safer and 984 (87.1%) reported that household members felt safer. Vaccinated recipients planned to use the same amount of PPE at work (1,015 [89.8%]) as well as in public (1,037 [91.8%]; Table 1). By race/ethnicity, the non-Hispanic Black HCP had the lowest vaccine acceptance rate 53 of 81 (65.4%) of all participants (Table 1).

In this report of COVID-19 vaccination rates among U.S. ED HCPs at academic U.S. medical centers at the beginning of prioritized HCP immunization, we found a high rate of COVID-19 vaccine acceptance and receipt, with physicians/APPs having the highest overall proportion. After vaccination, most recipients reported feeling safer at home and that their household members also felt safer with them. The vast majority reported that their PPE use in the ED and in public remained the same after vaccination.

While our vaccine declination rate among ED HCPs was considerably lower than recent national reports of vaccine hesitancy among the public at large,[5,6] we nevertheless found that a substantial percentage of ED HCPs declined vaccination. Since the primary reason for declining was concern over safety, efforts at educating HCPs about the safety profile of COVID-19 vaccines may be warranted, especially in groups who had the most vaccine hesitancy, that is, nonclinical, nursing, and Black HCPs.

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The members of the Project COVERED Emergency Department Network are provided in the appendix.

CDC disclaimer: The findings and conclusions in this article are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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**TABLE 1** Vaccination rates and effects of vaccine among emergency HCPs and reasons for declining vaccine

| | All HCPs (*N* = 1398) | HCP type | | |
|---|---|---|---|---|
| | | Physician/APP (*n* = 691) | Nurse (*n* = 360) | Nonclinical (*n* = 347) |
| Vaccine status | | | | |
| Offered | 1,321 (94.5) | 674 (97.5) | 345 (95.8) | 302 (87) |
| Accepted | 1,136 (86) | 637 (94.5) | 268 (77.7) | 231 (76.5) |
| Declined | 185 (14) | 37 (5.5) | 77 (22.3) | 71 (23.5) |
| Demographics vaccine acceptance[a] | | | | |
| Age (y) | | | | |
| 22–29 (*n* = 265) | 223 (84.2) | 118 (95.2) | 74 (77.1) | 31 (68.9) |
| 30–39 (*n* = 511) | 441 (86.3) | 286 (94.4) | 88 (72.7) | 67 (77) |
| 40–49 (*n* = 292) | 248 (84.9) | 131 (94.2) | 73 (83) | 44 (67.7) |
| 50–64 (*n* = 236) | 208 (88.1) | 94 (95) | 33 (82.5) | 81 (83.5) |
| ≥65 (*n* = 17) | 16 (94.1) | 8 (88.9) | 0 (0) | 8 (100) |
| Gender | | | | |
| Female (*n* = 824) | 672 (81.6) | 273 (91.6) | 217 (77) | 182 (74.6) |
| Male (*n* = 490) | 458 (93.5) | 362 (96.8) | 48 (81.4) | 48 (84.2) |
| Other (*n* = 7)[b] | 6 (85.7) | 2 (100) | 3 (75) | 1 (100) |
| Race/ethnicity[c] | | | | |
| Non-Hispanic White (*n* = 959) | 849 (88.5) | 482 (95.1) | 214 (79.3) | 153 (84.1) |
| Hispanic or Latinx, any race (*n* = 116) | 89 (76.7) | 37 (94.9) | 20 (66.7) | 32 (68.1) |
| Non-Hispanic Asian (*n* = 110) | 96 (87.3) | 62 (92.5) | 18 (81.8) | 16 (76.2) |
| Non-Hispanic Black (*n* = 81) | 53 (65.4) | 24 (88.9) | 7 (58.3) | 22 (52.4) |
| Non-Hispanic other (*n* = 36)[d] | 32 (88.9) | 21 (91.3) | 8 (100) | 3 (60) |
| Attitude/behavior after vaccination (*n* = 1,130)[e] | | | | |
| Comfort/safety | | | | |
| HCPs feel safer around household members | 980 (86.7) | 556 (87.8) | 220 (82.4) | 204 (88.7) |
| Household members feel safer around HCPs | 984 (87.1) | 557 (88) | 223 (83.5) | 204 (88.7) |
| Use of PPE at work | | | | |
| Same PPE | 1,015 (89.8) | 566 (89.4) | 239 (89.5) | 210 (91.3) |
| Less PPE | 100 (8.9) | 66 (10.4) | 24 (9) | 10 (4.4) |
| More PPE | 15 (1.3) | 1 (0.2) | 4 (1.5) | 10 (4.4) |
| Use of PPE in public | | | | |
| Same PPE | 1,037 (91.8) | 583 (92.1) | 244 (91.4) | 210 (91.3) |
| Less PPE | 76 (6.7) | 47 (7.4) | 18 (6.7) | 11 (4.8) |
| More PPE | 17 (1.5) | 3 (0.5) | 5 (1.9) | 9 (3.9) |
| Reasons for declining vaccination (*n* = 185) | | | | |
| Safety of vaccine | 84 (45.4) | 12 (32.4) | 36 (46.8) | 36 (50.7) |
| Health condition | 25 (13.5) | 8 (21.6) | 10 (13) | 7 (9.9) |
| Previous COVID-19 diagnosis | 25 (13.5) | 3 (8.1) | 16 (20.8) | 6 (8.5) |
| Pregnancy/fertility | 22 (11.9) | 8 (21.6) | 8 (10.4) | 6 (8.5) |
| Religious/ethical/personal reasons | 16 (8.6) | 1 (2.7) | 7 (9.1) | 8 (11.3) |
| Vaccine efficacy | 15 (8.1) | 2 (5.4) | 3 (3.9) | 10 (14.1) |
| Logistics/scheduling | 8 (4.3) | 0 (0) | 4 (5.2) | 4 (5.6) |
| Immune to COVID-19 | 7 (3.8) | 3 (8.1) | 2 (2.6) | 2 (2.8) |

(Continues)

TABLE 1 (Continued)

| | All HCPs (*N* = 1398) | HCP type | | |
|---|---|---|---|---|
| | | Physician/APP (*n* = 691) | Nurse (*n* = 360) | Nonclinical (*n* = 347) |
| Reserving dose for others | 5 (2.7) | 3 (8.1) | 0 (0) | 2 (2.8) |
| Other[f] | 15 (8.1) | 4 (10.8) | 6 (7.8) | 5 (7) |

*Note:* Data are reported as *n* (%).

Abbreviations: APP, advanced practice provider; HCP, health care provider; PPE, personal protective equipment.

[a]Denominator is those offered vaccination.

[b]Includes HCPs identifying as transgender, gender variant, or nonconforming or who prefer not to answer.

[c]Thirty-six missing responses to ethnicity were excluded; multiple responses were allowed (totals may exceed 100%).

[d]Includes HCPs identifying as American Indian, Alaska Native, Native Hawaiian, other Pacific Islander, or other race.

[e]Six participants excluded from this section for missing data.

[f]Other reasons for declining coded from open-response free text.

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## CONFLICT OF INTEREST

The authors have no potential conflicts to disclose.

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*Study concept and design:* all authors. *Acquisition, analysis, or interpretation of data:* Walter A. Schrading, Morgan B. Swanson, Nicholas M. Mohr, and David A. Talan. *Drafting of the manuscript:* all line authors. *Critical revision of the manuscript for important intellectual content:* all line authors. *Statistical expertise:* Morgan B. Swanson and Nicholas M. Mohr. *Acquisition of funding:* David A. Talan.

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## APPENDIX

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