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Acceptance of COVID-19 Vaccine Among Refugees in the United States

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Objective: Little is known about COVID-19 vaccination intentions among refugee communities in the United States. The objective of this study was to measure COVID-19 vaccination intentions among a sample of refugees in the United States and the reasons for their vaccine acceptance or hesitancy.

Methods: From December 2020 through January 2021, we emailed or text messaged anonymous online surveys to 12 bilingual leaders in the Afghan, Bhutanese, Somali, South Sudanese, and Burmese refugee communities in the United States. We asked community leaders to complete the survey and share the link with community members who met the inclusion criteria (arrived in the United States as refugees, were aged ≥18, and currently lived in the United States). We compared the characteristics of respondents who intended to receive the COVID-19 vaccine with those of respondents who did not intend to receive the vaccine or were unsure. We then conducted crude and adjusted logistic regression analysis to measure the association between employment as an essential worker and COVID-19 vaccine acceptance.

Results: Of 435 respondents, 306 (70.3%) indicated that they planned to receive a COVID-19 vaccine. Being an essential worker (adjusted odds ratio [aOR] = 2.37; 95% CI, 1.44-3.90) and male sex (aOR = 1.87; 95% CI, 1.12-3.12) were significantly associated with higher odds of intending to receive a COVID-19 vaccine. Among respondents who intended to receive a COVID-19 vaccine, wanting to protect themselves (68.6%), family members (65.0%), and other people (54.3%) were the main reasons.

Conclusion: Many refugees who responded to the survey, especially those who worked in essential industries, intended to receive a COVID-19 vaccine. Community organizations, health care providers, and public health agencies should work together to ensure that vaccine registration and vaccination sites are accessible to refugees.

Keywords

COVID-19, refugees, vaccine acceptance, vaccine hesitancy, essential workers

Immunization is a critical strategy for mitigating the transmission of SARS-CoV-2 in the United States and ending the COVID-19 pandemic globally. However, refugee communities with language barriers and barriers to health care are at risk of being left behind during the complex and rapidly evolving COVD-19 vaccine rollout in the United States.[1-3] Barriers to immunization among refugee and other newcomer communities include insufficient access to health care before the pandemic, knowledge gaps about available vaccines, and vaccine hesitancy.[4,5] These barriers are believed to be closely interrelated. For example, communities without access to vaccine information in their preferred language and from trusted messengers are less likely to accept a new vaccine than communities with accessible and reliable

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information. Communities without access to health care are less likely than communities with access to health care to have trusted health professionals from whom to receive vaccine information.[4,5]

With 3 COVID-19 vaccines (Pfizer/BioNTech, Moderna, and Johnson & Johnson) currently available in the United States, the acceptance of COVID-19 vaccines has increased substantially among the general population. According to a national survey conducted in February 2021, 69% of the public had intended to get a COVID-19 vaccine or already had gotten the vaccine, which was a substantial increase from 60% of the public who had intended to get a COVID-19 vaccine in November 2020.[6] Nearly half of the adults surveyed in January 2021 reported that they had either already been vaccinated or wanted the vaccine as soon as possible.[7] This number was up from about one-third in December 2020.[7] Furthermore, vaccination intentions were high even among some immigrant communities before initiation of vaccination campaigns in the United States. For example, a statewide survey by the Washington State Department of Health in October 2020 included 160 people who completed the survey in traditional Chinese. Among this group, 62% reported that they would "definitely" receive the vaccine once available.[8]

To date, however, research on COVID-19 vaccination intentions among refugee communities in the United States has been limited. Refugee communities play an important role in the essential workforce in the United States, and preliminary data suggest this role has led to a high risk of COVID-19 infection among refugee essential workers.[9-11] Furthermore, many refugees live in multigenerational households with limited ability to quarantine infected household members.[10] In addition, chronic conditions associated with the adverse outcomes of COVID-19—such as diabetes and obesity—are prevalent among refugee adults in the United States.[12,13] As such, many refugees were prioritized for vaccination eligibility during the early stages of the COVID-19 vaccine rollout.[14] A better understanding of vaccination intentions among refugee communities would facilitate better public health planning and resource allocation for these communities.

In this study, we partnered with the Resettled Refugee Board,[15] a subcommittee of the Research, Evaluation, and Ethics Committee of the Society of Refugee Healthcare Providers and other community partners, to investigate COVID-19 vaccination intentions among selected refugee communities in the United States. We focused on communities that comprised a high proportion of refugee arrivals in the previous decade and have existing mechanisms for public health research collaboration. We measured refugees' COVID-19 vaccination intentions and the reasons for their vaccine acceptance or hesitancy. We also explored the association between vaccination intention and the categorization of essential workers during the pandemic.

Methods

Study Design

We conducted a cross-sectional study using a snowball sampling approach. Although snowball sampling is often criticized for its potential lack of representativeness, because elements are not randomly drawn from the target population, it is a suitable method to identify and explore information about populations that are typically excluded from other data.[16] To ensure the quality of a snowball sample, the primary seeds identified from the target population are suggested to have a diverse background, have a broad network, and be trusted in the community.[17] Thus, we identified refugee leaders from various community organizations and refugee resettlement agencies as the primary seeds to recruit others in refugee communities. In December 2020, we

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emailed or messaged an anonymous online survey in English, Nepali, or Somali to 12 bilingual leaders (the primary cases) in the Afghan, Bhutanese, Somali, South Sudanese, and Burmese refugee communities identified through the study team's professional network. We asked community leaders to share the link with peers and community members who met the inclusion criteria (ie, arrived in the United States as refugees, were aged ≥18, and currently lived in the United States).

The United States admits refugees from more than 60 countries worldwide.[18] The recruited refugees in this study represent where most refugees in the United States came from during the past 2 decades.[19] Refugees speak various languages depending on their origins, and sometimes multiple languages are used even within the same refugee community. For example, Burmese refugees who came from Chin State in Myanmar/Burma speak more than 20 languages in the Chin community in the United States. Because of the importance of learning information as quickly as possible during the pandemic, the competing responsibilities of our refugee community leaders during the pandemic, the complicity of languages used in the refugee communities, and the volunteer nature of this effort, we were only able to translate the English questionnaire into Nepali and Somali. Our bilingual team members completed the translation.

We used ArcGIS version 10.8 (Esri) to visualize the distribution of survey participants. ArcGIS has been largely used in geographic studies and has the advantage of linking the location of spatial units (eg, zip code areas in our study) to their corresponding attributes (eg, the number of survey participants) to map the spatial variations of such attributes visually and to make the data distribution easy to understand. To decrease potential selection bias, the survey invitation did not describe our hypothesis nor include the introductory text featuring the hypothesized relationship between vaccination intentions and occupation. We completed data collection on January 20, 2021. The Ball State University Human Research Protection Office approved this study.

Measures

The primary outcome measure, COVID-19 vaccination intention ("If a vaccine against the COVID-19 becomes available, do you plan to get vaccinated?"), had 3 response options (yes, no, unsure). Because of the small number of people who answered "no," we recoded responses as a binary variable with yes and unsure/no. However, descriptive data showing all 3 response options are available from the authors upon request. The primary independent variable was employment as an essential worker. We categorized people as essential workers if their occupation corresponded to one described as a COVID-19 essential worker by the US Department of Homeland Security's Cybersecurity and Infrastructure Security Agency. Examples of essential services are health care/public health, food and agriculture, transportation systems, and commercial facilities.[20]

Statistical Methods

We measured the characteristics of survey participants using counts and frequencies. We then compared the characteristics of respondents who intended to receive a COVID-19 vaccine with respondents who did not intend to receive the vaccine or were unsure by using the Pearson χ^2 and Fisher exact tests. Furthermore, we conducted crude and adjusted logistic regression analyses to measure the association between employment as an essential worker and COVID-19 vaccine acceptance. We conducted the analysis using Stata/SE version 15.1 (StataCorp LLC).

We included the following covariates in the adjusted logistic regression model: sex (male, female), age group (≤30, 31-40, ≥41), country of origin (Afghanistan, Nepal, Somalia, South Sudan, Burma/Myanmar, other), education level (≤secondary degree, associate's degree, bachelor's degree, ≥master's degree), annual household income (≤$25 000, $25 001-$50 000, $50 001-$75 000, >$75 000), current marital status (not married, married), previous COVID-19 infection (yes/no), having had a family member infected with COVID-19 (yes/no), knowing people in their immediate social environment infected with COVID-19 (yes/no), and whether the survey was completed in English or another language. These covariates are believed to be associated with acceptance of vaccinations from previous studies.[7,8,21,22]

Results

A total of 435 participants responded to the survey from 32 states and Washington, DC (Figure), of whom 166 (38.2%) were from Bhutan, 113 (26.0%) were from Somalia, 68 (15.6%) were from Afghanistan, 39 (9.0%) were from South Sudan, and 34 (7.8%) were from Burma/Myanmar (Table 1). Three hundred nine (71.0%) respondents were essential workers. Fifty Somali and Bhutanese respondents completed the survey in Somali or Nepali, respectively. One hundred forty-one (32.4%) respondents were aged ≥41, 209 (48.0%) had earned ≥bachelor's degree, 156 (35.9%) had an annual household income >$50 000, and 307 (70.6%) were currently married. One hundred forty-two (32.6%) respondents had had COVID-19, 114 (26.2%) had had ≥1 family member with COVID-19, and 312 (71.7%) knew people in their immediate social environment infected with COVID-19.

When we asked about COVID-19 vaccination intentions, most participants (n = 306, 70.3%) indicated that they planned to receive a COVID-19 vaccine, 33 (7.6%) did not plan to receive a vaccine, and 96 (22.1%) were unsure (Table 1). Essential workers were significantly more likely than nonessential workers to indicate that they would receive a COVID-19 vaccine (75.1% vs 58.7%). Men were more

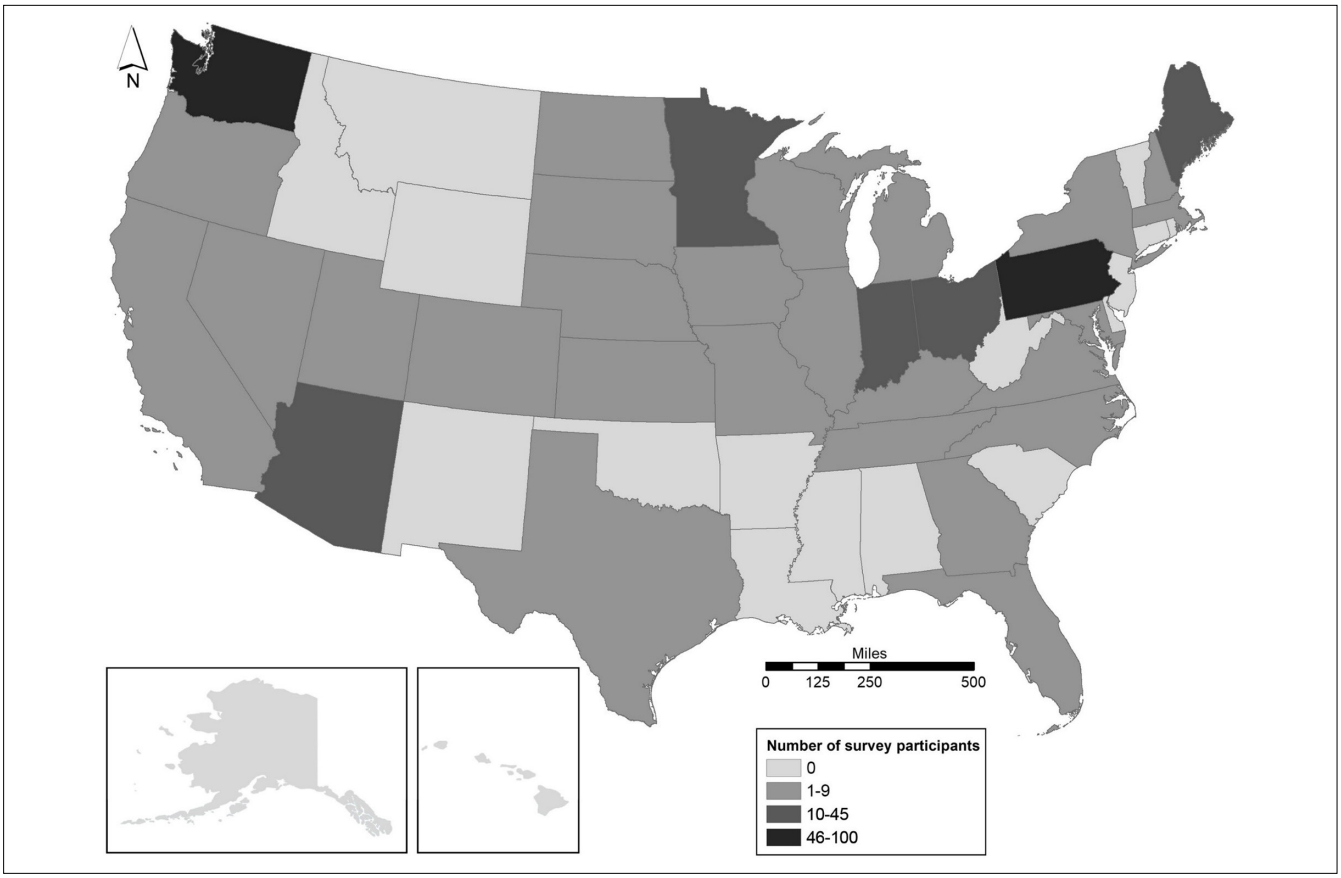

Figure. Geographic distribution of respondents (N = 435) to a survey on COVID-19 vaccination intentions among a sample of resettled refugees in the United States, 2020-2021.

willing than women to receive a COVID-19 vaccine (76.2% vs 63.5%). By country of origin, COVID-19 vaccine acceptance was highest among Bhutanese respondents (77.7%), followed by respondents from Afghanistan (70.6%), Somalia (66.4%), Burma/Myanmar (64.7%), and South Sudan (61.5%).

In logistic regression models measuring the impact of participating in the essential workforce on COVID-19 vaccination intention, being an essential worker was associated with higher odds of intending to receive a COVID-19 vaccine compared with being a nonessential worker (odds ratio [OR] = 2.12; 95% CI, 1.37-3.28) (Table 2). In the adjusted model, being an essential worker (aOR = 2.37; 95% CI, 1.44-3.90) and male sex (aOR = 1.87; 95% CI, 1.12-3.12) were associated with higher odds of intending to receive a COVID-19 vaccine. Compared with respondents from Afghanistan, respondents from Somalia (aOR = 0.28; 95% CI, 0.11-0.71), Burma/Myanmar (aOR = 0.29; 95% CI, 0.09-0.97), and South Sudan (aOR = 0.19; 95% CI, 0.06-0.57) had lower odds of intending to receive a COVID-19 vaccine.

In an examination of the reasons for participants' COVID-19 vaccine acceptance and hesitancy, among respondents who intended to receive a COVID-19 vaccine, the main reasons were wanting to protect themselves (68.6%), protect family members (65.0%), and protect others (54.3%), as well as hoping life will go back to normal (43.1%) (Table 3). Among respondents who were unsure about receiving the COVID-19 vaccine or who did not intend to receive the vaccine, most were worried about side effects (71.3%), followed by concerns about the effectiveness of a COVID-19 vaccine (12.4%) and a fear of needles (8.5%).

Discussion

Most respondents in this snowball sample of Afghan, Bhutanese, Somali, South Sudanese, and Burmese refugee adults in the United States reported that they intended to receive a COVID-19 vaccine when surveyed in December 2020 and January 2021. With 3 vaccines authorized for emergency use or approved by the US Food and Drug Administration in the United States as of August 2021 and multiple clinical studies indicating that the approved vaccines are safe and effective,[23-25] acceptance of COVID-19 vaccines has increased among the general US population.[6,7] Thus, acceptance of COVID-19 vaccines among refugees

Table 1. Demographic and COVID-19 characteristics among a sample of resettled refugees (N = 435) in the United States and their willingness to get a COVID-19 vaccine based on these characteristics, December 2020–January 2021[a]

Characteristic	Overall participants (N = 435)[b]	COVID-19 vaccine willingness		*P* value[c]
		Unsure/no (n = 129)[d]	Yes (n = 306)[d]	
Essential worker				.001[e]
No	126 (29.0)	52 (41.3)	74 (58.7)	
Yes	309 (71.3)	77 (24.9)	232 (75.1)	
Country of origin				.09[f]
Afghanistan	68 (15.6)	20 (29.4)	48 (70.6)	
Nepal	166 (38.2)	37 (22.3)	129 (77.7)	
Somalia	113 (26.0)	38 (33.6)	75 (66.4)	
South Sudan	39 (9.0)	15 (38.5)	24 (61.5)	
Burma/Myanmar	34 (7.8)	12 (35.3)	22 (64.7)	
Others	15 (3.4)	7 (46.7)	8 (53.3)	
Age, y				.13[e]
≤30	130 (29.9)	44 (33.9)	86 (66.2)	
31-40	164 (37.7)	52 (31.7)	112 (68.3)	
≥41	141 (32.4)	33 (23.4)	108 (76.6)	
Sex				.004[e]
Male	235 (54.0)	56 (23.8)	179 (76.2)	
Female	200 (46.0)	73 (36.5)	127 (63.5)	
Current marital status				.42[e]
Not married	126 (29.0)	41 (32.5)	85 (67.5)	
Married	307 (70.6)	88 (28.7)	219 (71.3)	
Education level				.24[e]
≤Secondary degree	133 (30.6)	41 (30.8)	92 (69.2)	
Associate's degree	93 (21.4)	32 (34.4)	61 (65.6)	
Bachelor's degree	143 (32.9)	43 (30.1)	100 (69.9)	
≥Master's degree	66 (15.2)	13 (19.7)	53 (80.3)	
Annual household income, $				16[e]
≤25 000	126 (29.0)	43 (34.1)	83 (65.9)	
25 001-50 000	153 (35.2)	50 (32.7)	103 (67.3)	
50 001-75 000	87 (20.0)	20 (23.0)	67 (77.0)	
>75 000	69 (15.9)	16 (23.2)	53 (76.8)	
English speaking				.55[e]
No	50 (11.5)	13 (26.0)	37 (74.0)	
Yes	385 (88.5)	116 (30.1)	269 (69.9)	
COVID-19 infection				.46[e]
No	288 (66.2)	89 (30.9)	199 (69.1)	
Yes	142 (32.6)	39 (27.5)	103 (72.5)	
Family member infected with COVID-19				.17[e]
No	318 (73.1)	100 (31.4)	218 (68.6)	
Yes	114 (26.2)	28 (24.6)	86 (75.4)	
Community member infected with COVID-19				.08[e]
No	119 (27.4)	43 (36.1)	76 (63.9)	
Yes	312 (71.7)	86 (27.6)	226 (72.4)	

[a]All values are number (percentage) unless otherwise indicated.
[b]Column percentage.
[c]$P < .05$ was considered significant.
[d]Row percentage.
[e]Pearson's χ^2 test.
[f]Fisher's exact test.

Table 2. Crude and adjusted logistic regression predicting willingness to get a COVID-19 vaccine among a sample of resettled refugees (N = 435) in the United States, December 2020–January 2021

Characteristic	Adjusted OR[a] (95% CI) [*P* value][b]
Essential worker[c]	2.37 (1.44-3.90) [.001]
Country of origin	
Afghanistan	1.00 [Reference]
Nepal	0.56 (0.24-1.29) [.17]
Somalia	0.28 (0.11-0.71) [.01]
South Sudan	0.19 (0.06-0.57) [.003]
Burma/Myanmar	0.29 (0.09-0.97) [.04]
Other	0.12 (0.03-0.47) [.002]
Age, y	
≤30	1.00 [Reference]
31-40	1.03 (0.54-1.99) [.93]
≥41	1.31 (0.65-2.62) [.45]
Sex	
Female	1.00 [Reference]
Male	1.87 (1.12-3.12) [.02]
Married	0.69 (0.35-1.36) [.28]
Education	
Secondary degree	1.00 [Reference]
Associate's degree	0.65 (0.34-1.22) [.18]
Bachelor's degree	0.68 (0.37-1.27) [.22]
≥Master's degree	1.11 (0.43-2.87) [.84]
Annual household income, $	
≤25 000	1.00 [Reference]
25 001-50 000	1.08 (0.61-1.92) [.78]
50 001-75 000	1.89 (0.89-4.02) [.10]
>75 000	1.76 (0.76-4.09) [.19]
English speaking	0.77 (0.35-1.68) [.51]
COVID-19 infection	1.21 (0.69-2.11) [.51]
Family members infected with COVID-19	0.79 (0.44-1.44) [.45]
Community members infected with COVID-19	1.22 (0.71-2.10) [.47]

Abbreviation: OR, odds ratio.
[a]The adjusted model controlled for the impact of ethnicity, age, sex, education, annual household income, marital status, English speaking, COVID-19 infection, family history of COVID-19 infection, and COVID-19 infection among community members.
[b]$P < .05$ was considered significant.
[c]Unadjusted OR = 2.12 (95% CI, 1.37-3.28); $P < .001$.

who are similar to the refugees in our sample—which included a high proportion of English-proficient essential workers—may now be even higher.

Most respondents who felt hesitant about receiving a COVID-19 vaccine were concerned about its safety. Effective communication on the safety, efficacy, and long-term side effects of the approved vaccines may help decrease these concerns. Paid sick-leave policies may reassure people who are concerned about missing work and wages because of common vaccine reactions (eg, fever, fatigue).[26] New York State has required employers to provide paid sick leave for the recovery from side effects of the COVID-19 vaccine.[27] However, this policy still excludes many workers and only allows up to 4 hours of paid leave per vaccine shot.[28]

Although most respondents to our survey planned to obtain a COVID-19 vaccine, refugees could still be left behind during the US vaccine rollout. Each state has its own COVID-19 distribution and registration policies, and these policies have been updated rapidly on state government websites that are often available only in English. Refugees, especially English-language learners with limited access to the internet and those with limited digital literacy, may struggle to stay abreast of this information, navigate registration websites, or respond to emailed vaccination invitations. Other concerns include the location of vaccination centers, whether they are accessible to people who depend on public transportation, and whether access to vaccination appointments is sufficient for people who are unable to leave work during business hours. Ironically, refugee essential workers may have limited access to vaccination because of their role in the workforce, despite having high odds of COVID-19 vaccine acceptance.

Limitations

This study had several limitations. First, although we were able to invite participants from various refugee communities, our sample does not represent all refugees residing in the United States. Most respondents completed the survey in English and reported higher household incomes and education levels than the overall refugee population in the United States.[29,30] For these reasons, our study likely overestimated the acceptance of COVID-19 vaccine among refugees.[31,32] Nonetheless, we believe this is important information for public health programs, because refugee essential workers may be thought to be leaders and role models for other refugees in their communities. Ensuring that refugee essential workers have access to COVID-19 vaccines may ultimately lead to high rates of vaccine acceptance in refugee communities. Second, people's perceptions of the COVID-19 vaccine have been changing rapidly.[7,33] Our study results can only capture the situation at a certain time based on the nature of cross-sectional study. To measure the updated COVID-19 vaccine acceptance among our target population, repeated cross-sectional studies should be considered.

Conclusion

Many refugees, especially those who work in essential industries, indicated intention to receive a COVID-19 vaccine. Community organizations, health care providers, and public health agencies should work together to ensure that

Table 3. Reasons that resettled refugees (N = 435) in the United States would or would not get a COVID-19 vaccine when it became available, December 2020–July 2021

Reasons	No. (%)
Reasons to get COVID-19 vaccine among those willing to get vaccinated (n = 306)	
I want to protect myself.	210 (68.6)
I want to protect my family.	199 (65.0)
I want to protect others.	166 (54.2)
If everybody gets the vaccine, life will go back to normal.	132 (43.1)
Physician recommended the vaccine.	28 (9.2)
Because most people will get the vaccine.	20 (6.5)
I have preexisting conditions, so it is important that I receive the COVID-19 vaccine.	18 (5.9)
Reasons not to get COVID-19 vaccine among those not willing to or hesitant to get vaccinated (n = 129)	
I would be concerned about the side effects from the vaccine.	92 (71.3)
I don't think vaccines work very well.	16 (12.4)
I don't like needles.	11 (8.5)
The COVID-19 outbreak is not as serious as some people say it is.	7 (5.4)
I believe in natural or traditional remedies.	7 (5.4)
I am allergic to vaccines.	4 (3.1)
Religious reason.	3 (2.3)
I won't have time to get vaccinated.	1 (0.8)

vaccine registration and vaccination sites are accessible to those with limited English proficiency.[34] Vaccine distribution sites should consider evening and weekend hours to accommodate various working schedules, particularly given that a high proportion of essential workers reported that they intended to obtain a COVID-19 vaccine.[26] Novel ways to deliver vaccines (eg, mobile clinics at worksites or vaccination sites near public transportation hubs) may also increase accessibility.[34] Employers should consider providing employees paid sick leave to recover from side effects of the COVID-19 vaccine, as well as incentives for vaccination. Although many states have lifted COVID-19–related restrictions, the United States had not reached herd immunity for COVID-19 as of September 2021. In addition, increased numbers of COVID-19 cases, hospitalizations, and deaths have been reported in many counties with low vaccine rates.[35] It is important to ensure vaccine access to all populations. It is also essential to establish an equitable distribution system to deliver vaccines for future outbreaks.

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Supplemental Material

Supplemental material for this article is available online.

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