High Uptake and Series Completion of COVID-19 Vaccine at Community-Based Vaccination for Latinos With Limited English Proficiency

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ABSTRACT
Background: Despite the disproportionate impact of COVID-19 on Latinos, there were disparities in vaccination, especially during the early phase of COVID-19 immunization rollout. Methods: Leveraging a community-academic partnership established to expand access to SARS-CoV2 testing, we implemented community vaccination clinics with multifaceted outreach strategies and flexible appointments for limited English proficiency Latinos. Results: Between February 26 and May 7, 2021, 2250 individuals received the first dose of COVID-19 vaccination during 18 free community events. Among them, 92.4% (95% confidence interval [CI], 91.2%-93.4%) self-identified as Hispanic, 88.7% (95% CI, 87.2%-89.9%) were limited English proficiency Spanish speakers, 23.1% (95% CI, 20.9%-25.2%) reported prior COVID-19 infection, 19.4% (95% CI, 16.9%-22.5%) had a body mass index of more than 35, 35.0% (95% CI, 32.2%-37.8%) had cardiovascular disease, and 21.6% (95% CI, 19.2%-24.0%) had diabetes. The timely second-dose completion rate was high (98.7%; 95% CI, 97.6%-99.2%) and did not vary by outreach method. Conclusion: A free community-based vaccination initiative expanded access for Latinos with limited English proficiency at high risk for COVID-19 during the early phase of the immunization program in the US.

KEY WORDS: COVID-19 vaccination, disparities, Latinos
or stimulus checks, the need to work in high-risk essential jobs, and crowded housing conditions.\textsuperscript{8,13} Language barriers, concerns about immigration status, and lack of familiarity navigating the US health care system tragically delayed lifesaving care for many.\textsuperscript{8,11} Similar issues have hampered access to vaccines in this community. In the early stages of COVID-19 vaccination rollout in the United States, almost 60\% of undocumented Latinos reported uncertainty about their eligibility, 58\% worried about social security or government ID requirements, and 43\% did not know where to go.\textsuperscript{14}

Baltimore City has an emergent Latino community, including undocumented immigrants and mixed-status families with lower educational attainment, income, and insurance coverage than the general Latino population in the United States.\textsuperscript{15-17} Early in the pandemic, a coalition was established between the Johns Hopkins Health System, religious leaders, and community organizations to open a bilingual COVID-19 hotline and implement free SARS-CoV2 community-based testing.\textsuperscript{18,19} Once COVID-19 vaccinations received Emergency Use Authorization, the coalition participated in more than 40 Spanish language community informational forums, and the clinical director was designated a bilingual Maryland GoVAX COVID-19 vaccine ambassador.\textsuperscript{20} In February 2021, the coalition partnered with the Maryland Vaccine Equity Taskforce\textsuperscript{21} to expand access to the COVID-19 vaccine for low-income Latino immigrants.

This article describes the preliminary findings from this initiative in early vaccine rollout, including characteristics of vaccinees. Results from the current study can inform future vaccine equity initiatives for marginalized communities.

**Methods**

**Event description**

Eighteen free community vaccination events with bilingual staff were conducted between February 26, 2021, and May 7, 2021. Of these, 13 were first-dose vaccination clinics (10 with Moderna, 1 with Johnson \& Johnson, and 2 with Pfizer/BioNTech COVID-19 vaccines based on allocation by the Maryland Department of Health), and 5 were second-dose vaccination clinics. Between 150 and 200 first doses per week were allocated for this initiative.

Outreach to identify candidates for vaccination followed Maryland’s phased distribution plan and evolved over time.\textsuperscript{22} Initially, vaccine candidates were identified through probabilistic linkage of 2 databases from community testing and the bilingual hotline associated with this project (see Supplemental Digital Content Appendix, available at http://links.lww.com/JPHMP/B41). The candidates were ranked by age and comorbid conditions and contacted by bilingual community health workers (CHW) to offer a vaccine appointment (active phone outreach). The number of the bilingual COVID-19 hotline was distributed to vaccinated individuals to share with their networks and advertised through Spanish language local media outlets and community partners (passive outreach). In addition, the CHWs canvased Latino neighborhoods and laborer sites to offer appointments for vaccination (Street outreach). On April 12, vaccine became available to any individual 16 years of age and older in Maryland, and walk-up appointments were allowed (Walk-up).

Clinics were mostly conducted after hours. Staff and volunteers included bilingual navigators, registrars, prevaccination consenters and screeners, and clinical lead (K.R.P.);\textsuperscript{23} a site lead (B.F.B.); a pharmacist; vaccinators (n = 5-8); a postvaccination observer; and Spanish language interpreters (n = 2-3). The CHWs sent, called, or sent text messages to remind patients of their second-dose appointment and facilitated rescheduling, if necessary.

**Data sources**

Individuals were preregistered for appointments using a Research Electronic Data Capture database (REDCaP), capturing basic demographics, occupation, and comorbid conditions. No identification, health insurance, or proof of occupation was required. Vaccine administration was recorded in the Johns Hopkins Health System electronic health record system and reported to the state of Maryland. Patients who walked up without preregistering did not have data recorded in REDCaP.

**Analysis**

Data on patient demographics and vaccination status were extracted from the electronic health record system and REDCaP. Descriptive vaccinee characteristics by outreach method were calculated with 95\% confidence intervals using the Wilson score method without continuity correction. All comparisons were made using Stata 16 software (StataCorp 2019. Stata Statistical Software: Release 16. College Station, Texas: StataCorp LLC.)

All participants provided written informed consent for vaccination. This analysis was deemed quality improvement and exempt by the Johns Hopkins Institutional Review Board (CIR00066868)

**Results**

A total of 2250 individuals received the first dose of COVID-19 vaccination at these events. The majority
### TABLE 1
Characteristics of N = 2250 Patients at Community Vaccination Events Tailored for Latinx Communities Occurring February 26 Through May 8, 2021

| Total | Active Phone Outreach | Passive Outreach (Hotline Callers) | Street Outreach | Walk-upsa |
|-------|-----------------------|-----------------------------------|----------------|------------|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| Total | 2250 | 100.0% | ... | 588 | 100.0% | ... | 606 | 100.0% | ... | 335 | 100.0% | ... | 721 | 100.0% | ... |
| Age | | | | | | | | | | | | | | | |
| Age in years, mean (SD) | ... | 47.1 | (13.82) | ... | 54.6 | (11.51) | ... | 47.4 | (12.82) | ... | 41.9 | (12.38) | ... | 43.0 | (14.32) |
| < 18 | 26 | 1.2% | 0.7%-1.6% | 0 | 0.0% | 0.0%-0.6% | 6 | 1.0% | 0.4%-2.1% | 3 | 0.9% | 0.3%-2.5% | 17 | 2.4% | 1.4%-3.7% |
| 18-29 | 187 | 8.3% | 7.2%-9.5% | 7 | 1.2% | 0.5%-2.4% | 33 | 5.4% | 3.9%-7.5% | 48 | 14.3% | 10.9%-18.4% | 99 | 13.7% | 11.4%-16.4% |
| 30-44 | 795 | 35.3% | 33.3%-37.3% | 97 | 16.5% | 13.7%-19.7% | 277 | 37.5% | 33.6%-41.3% | 157 | 46.9% | 41.5%-52.2% | 314 | 43.6% | 39.9%-47.1% |
| 45-64 | 1009 | 44.6% | 42.7%-46.9% | 373 | 63.4% | 59.4%-67.2% | 285 | 47.0% | 43.0%-51.0% | 113 | 33.7% | 28.8%-38.9% | 258 | 33.0% | 29.6%-36.5% |
| 65-74 | 175 | 7.8% | 6.7%-9.9% | 81 | 13.8% | 11.2%-16.7% | 41 | 6.8% | 5.0%-9.0% | 13 | 3.9% | 2.2%-6.5% | 40 | 5.5% | 4.1%-7.4% |
| > 74 | 58 | 2.6% | 1.9%-3.3% | 30 | 5.1% | 3.3%-7.1% | 14 | 2.3% | 1.3%-3.8% | 1 | 0.3% | 0.0%-1.6% | 13 | 1.8% | 1.0%-3.0% |
| Gender | | | | | | | | | | | | | | | |
| Female | 1134 | 50.4% | 48.3%-52.4% | 318 | 54.1% | 50%-58.0% | 312 | 51.5% | 47.5%-55.4% | 171 | 51.0% | 45.7%-56.3% | 333 | 46.2% | 42.5%-49.8% |
| Male | 1116 | 49.6% | 47.5%-51.6% | 270 | 45.9% | 41.9%-49.9% | 294 | 48.5% | 44.5%-52.4% | 164 | 48.0% | 43.6%-54.2% | 388 | 53.8% | 50.1%-57.4% |
| Race | | | | | | | | | | | | | | | |
| White | 119 | 5.3% | 4.4%-6.2% | 26 | 4.4% | 3.0%-6.4% | 24 | 4.0% | 2.6%-5.8% | 21 | 6.3% | 4.1%-9.3% | 48 | 6.7% | 5.0%-8.7% |
| Black or African American | 103 | 4.6% | 3.7%-5.5% | 7 | 1.2% | 0.5%-2.4% | 3 | 0.5% | 0.1%-1.4% | 13 | 3.9% | 2.2%-6.5% | 80 | 11.1% | 9.0%-13.5% |
| Asian | 8 | 0.4% | 0.1%-0.7% | 4 | 0.7% | 0.2%-1.7% | 1 | 0.2% | 0.02%-0.9% | 2 | 0.6% | 0.1%-2.1% | 1 | 0.1% | 0.02%-0.7% |
| Other | 1913 | 85.0% | 83.4%-86.4% | 495 | 84.2% | 81.0%-86.9% | 550 | 90.0% | 88.1%-92.8% | 287 | 85.7% | 81.5%-89.0% | 581 | 80.6% | 77.5%-83.3% |
| Multiple | 102 | 4.5% | 3.7%-5.4% | 56 | 9.5% | 7.4%-12.1% | 28 | 4.6% | 3.2%-6.5% | 12 | 3.6% | 2.0%-6.1% | 6 | 0.8% | 0.3%-1.8% |
| Unknown | 5 | 0.2% | 0.1%-0.5% | 0 | 0.0% | 0.0%-0.6% | 0 | 0.0% | 0.0%-0.6% | 0 | 0.0% | 0.0%-0.6% | 5 | 0.7% | 0.2%-1.6% |
| Ethnicity | | | | | | | | | | | | | | | |
| Non-Hispanic | 171 | 7.6% | 6.5%-8.7% | 16 | 2.7% | 1.6%-4.3% | 7 | 1.2% | 0.5%-2.3% | 30 | 9.0% | 6.3%-12.4% | 118 | 16.4% | 13.8%-19.2% |
| Hispanic | 2079 | 92.4% | 91.2%-93.4% | 572 | 97.3% | 95.6%-98.3% | 599 | 98.8% | 97.6%-99.4% | 305 | 91.0% | 87.5%-93.6% | 603 | 83.6% | 80.7%-86.1% |
| Preferred language | | | | | | | | | | | | | | | |
| English | 236 | 10.5% | 9.2%-11.8% | 39 | 6.6% | 4.8%-8.9% | 9 | 1.5% | 0.7%-2.7% | 29 | 8.7% | 6.0%-12.1% | 159 | 22.1% | 19.1%-25.2% |
| Spanish | 1985 | 88.7% | 87.2%-89.9% | 546 | 92.9% | 90.4%-94.6% | 595 | 98.2% | 96.7%-99.8% | 304 | 90.7% | 87.1%-93.4% | 550 | 76.3% | 73.0%-79.2% |
| Unknown | 7 | 0.3% | 0.1%-0.6% | 3 | 0.5% | 0.1%-1.4% | 2 | 0.3% | 0.09%-1.1% | 2 | 0.6% | 0.1%-2.1% | 0 | 0.0% | 0.0%-0.5% |
| Medical history | | | | | | | | | | | | | | | |
| Prior COVID-19 | 351 | 23.1% | 20.9%-25.2% | 128 | 21.9% | 18.7%-25.4% | 198 | 35.1% | 22.7%-29.7% | 65 | 18.6% | 15.7%-24.2% | ... | ... | ... |
| Obesity | | | | | | | | | | | | | | | |
| BMI >35 | 167 | 19.4% | 16.9%-22.2% | 71 | 18.3% | 14.8%-22.5% | 41 | 17.3% | 13.0%-22.6% | 55 | 23.4% | 18.4%-29.2% | ... | ... | ... |
| BMI >40 | 63 | 7.3% | 5.7%-9.2% | 30 | 7.8% | 5.4%-10.8% | 13 | 5.5% | 3.2%-9.1% | 20 | 8.5% | 5.5%-12.7% | ... | ... | ... |

(continues)
### TABLE 1
Characteristics of N = 2250 Patients at Community Vaccination Events Tailored for Latinx Communities Occurring February 26 Through May 8, 2021 (Continued)

| Characteristic | Total | Active Phone Outreach | Passive Outreach (Hotline Callers) | Street Outreach | Walk-ups* |
|----------------|-------|-----------------------|------------------------------------|----------------|-----------|
|                | n     | % 95% CI              | n       | % 95% CI              | n       | % 95% CI              | n       | % 95% CI              | n       | % 95% CI              |
| Comorbidities* |       |                       |         |                      |         |                      |         |                      |         |                      |
| Cardiovascular disease | 399 | 35.0% 32.2%-37.8% | 234 | 55.3% 50.5%-59.9% | 108 | 23.3% 19.7%-27.3% | 57 | 22.4% 17.7%-27.9% | 96 | 22.4% 17.7%-27.9% |
| Diabetic mellitus | 246 | 21.6% 19.2%-24.0% | 137 | 32.4% 28.1%-36.9% | 76 | 16.4% 13.3%-20.0% | 33 | 13.0% 9.4%-17.6% | 8 | 13.0% 9.4%-17.6% |
| Chronic pulmonary disease/asthma | 84 | 7.4% 5.9%-9.0% | 39 | 9.2% 6.8%-12.3% | 26 | 5.6% 3.8%-8.1% | 19 | 7.5% 4.8%-11.3% | 19 | 7.5% 4.8%-11.3% |
| Cancer within ≤12 mo | 17 | 1.5% 0.9%-2.3% | 9 | 2.1% 1.1%-3.9% | 5 | 1.1% 0.4%-2.5% | 3 | 1.2% 0.4%-3.4% | 14 | 2.4% 1.1%-4.6% |
| Chronic kidney disease | 15 | 1.3% 0.7%-2.1% | 7 | 1.7% 0.8%-3.3% | 6 | 1.3% 0.5%-2.7% | 2 | 0.8% 0.2%-2.8% | 11 | 2.4% 1.1%-4.6% |
| Other | 125 | 11.0% 9.2%-12.9% | 73 | 17.3% 13.9%-21.1% | 41 | 8.9% 6.5%-11.7% | 11 | 4.3% 2.4%-7.5% | 8 | 1.8% 0.6%-3.0% |
| Occupations* |       |                       |         |                      |         |                      |         |                      |         |                      |
| Construction | 345 | 23.1% 21.1%-25.3% | 133 | 19.7% 16.6%-23.1% | 51 | 27.0% 19.9%-33.8% | 25 | 22.2% 18.0%-26.9% | 58 | 27.0% 19.9%-33.8% |
| Janitorial/cleaning | 281 | 18.8% 16.9%-20.8% | 113 | 19.7% 16.6%-23.1% | 45 | 21.7% 15.1%-30.9% | 39 | 22.2% 18.0%-26.9% | 8 | 22.2% 18.0%-26.9% |
| Restaurant | 181 | 12.1% 10.5%-13.8% | 61 | 10.6% 8.3%-13.4% | 35 | 12.7% 9.2%-18.2% | 25 | 15.7% 10.9%-21.7% | 25 | 15.7% 10.9%-21.7% |
| Manufacturing | 149 | 9.9% 8.5%-11.5% | 34 | 5.9% 4.2%-8.1% | 14 | 7.0% 3.9%-12.9% | 10 | 6.7% 3.4%-10.4% | 9 | 6.7% 3.4%-10.4% |
| Grocery | 81 | 5.4% 4.3%-6.6% | 28 | 4.9% 3.4%-6.9% | 10 | 5.3% 3.2%-8.4% | 7 | 4.4% 2.3%-7.3% | 12 | 4.4% 2.3%-7.3% |
| Childcare | 62 | 4.2% 3.2%-5.2% | 39 | 6.8% 5.0%-9.1% | 11 | 1.9% 0.8%-3.2% | 12 | 3.6% 2.0%-5.2% | 9 | 3.6% 2.0%-5.2% |
| Transportation | 42 | 2.8% 2.0%-3.7% | 18 | 3.1% 1.9%-4.9% | 11 | 2.7% 1.6%-4.3% | 8 | 2.4% 1.4%-4.7% | 11 | 2.4% 1.4%-4.7% |
| Painting | 34 | 2.3% 1.6%-3.1% | 13 | 3.3% 1.7%-4.9% | 10 | 3.1% 1.9%-4.7% | 9 | 3.1% 1.9%-4.7% | 11 | 2.4% 1.4%-4.7% |
| Health care | 15 | 1.0% 0.6%-1.5% | 6 | 1.0% 0.4%-2.2% | 2 | 0.3% 0.0%-1.2% | 7 | 2.1% 1.0%-4.3% | 9 | 2.1% 1.0%-4.3% |
| Education | 10 | 0.7% 0.3%-1.2% | 2 | 0.3% 0.0%-1.2% | 1 | 0.2% 0.0%-0.9% | 7 | 2.1% 1.0%-4.3% | 9 | 2.1% 1.0%-4.3% |
| Agriculture | 7 | 0.5% 0.2%-0.9% | 3 | 0.5% 0.1%-1.5% | 1 | 0.2% 0.0%-0.9% | 3 | 0.9% 0.3%-2.6% | 3 | 0.9% 0.3%-2.6% |
| Other | 91 | 6.1% 4.9%-7.4% | 25 | 4.4% 2.9%-6.3% | 21 | 4.6% 3.1%-6.5% | 39 | 11.9% 8.7%-15.7% | 12 | 4.4% 2.3%-7.3% |
| Unemployed | 269 | 18.0% 16.1%-20.0% | 133 | 23.2% 19.9%-26.8% | 56 | 22.4% 18.0%-26.9% | 58 | 27.0% 19.9%-33.8% | 8 | 22.2% 18.0%-26.9% |

Second-dose completion among patients requiring (Moderna or Pfizer) and due for second dose before May 8, 2021:

| Completed second dose | 884 | 98.7% 97.5%-99.2% | 473 | 99.4% 98.1%-99.7% | 189 | 97.9% 94.7%-99.1% | 126 | 96.9% 92.3%-98.7% | 96 | 99.0% 94.3%-99.8% |
| Missing second dose | 12 | 1.3% 0.7%-2.3% | 3 | 0.6% 0.2%-1.8% | 4 | 2.1% 0.8%-5.2% | 4 | 3.1% 1.2%-7.6% | 1 | 1.0% 0.1%-5.6% |

Abbreviations: BMI, body mass index; CI, confidence interval.

aData on medical history, obesity comorbidities, and occupation not collected for walk-ups.

b95% Confidence interval calculated using Wilson score method without continuity correction.

*Medical history total n = 1522 (588 active phone outreach, 606 passive outreach, and 335 street outreach).

Obesity total n = 859 (387 active phone outreach, 237 passive outreach, and 235 street outreach).

©Comorbidities counts are not mutually exclusive.

Occupation total n = 1491 (573 active phone outreach, 589 passive outreach, and 329 street outreach); occupation counts are not mutually exclusive.

Dose 2 completion among those requiring and due for second dose total n = 896 (476 active phone outreach, 193 passive outreach, 130 street outreach, and 97 walk-ups).
The differences in vaccinee characteristics by outreach method largely mirrored evolving eligibility criteria, but findings can inform future vaccine initiatives for marginalized communities. A nimble and adaptive approach responsive to evolving community needs was needed. Initial phone outreach was labor-intensive as many people did not answer unknown calls. A key strategy to increase awareness, demand, and access was to advertise the bilingual hotline number through Spanish language local media outlets and distribute it to vaccinated individuals to share with their social networks. Street outreach helped identify essential workers at high risk with limited access to health care. Walk-up appointments were advertised in Spanish and English and attracted a more racially diverse population.

Despite concerns about hesitancy, uptake and vaccine series completion was high. Nationally, vaccine hesitancy has declined. As of May 3, 2021, 64% of Latinos reported that they had been vaccinated or planned to get vaccinated (up from 26% in December 2020)—only 9% said that they would not get vaccinated under any circumstance. Improving access and normalizing vaccination can promote confidence in the vaccine. Second-dose reminder by trusted CHWs was labor intensive but likely contributed to high completion rate. As pent-up demand for vaccination has subsided, community-based initiatives that can leverage social networks and build community trust to reach marginalized or vaccine-hesitant individuals have become more critical. A recent Centers for Disease Control and Prevention report documented lower coverage among Latinos than non-Hispanic Whites for all recommended adult vaccinations, with the lowest coverage among adults with LEP or without health insurance or a primary care provider.

### Implications for Policy & Practice

The overall success of the US vaccination effort and recovery from the COVID-19 pandemic relies on an inclusive approach to all people living in the United States, regardless of immigration status. Organizations seeking to expand equitable access to LEP immigrants at high risk of COVID-19 should consider the following key findings:

- **Community-based vaccination initiatives with bilingual and bicultural capacity and a good communication strategy are critical to establish trust.**
- **These initiatives must be nimble and flexible to adequately respond to the rapidly changing COVID-19 landscape.**
- **Multifaceted outreach efforts are labor intensive and require adequate funding and institutional and governmental support.**
Although the focus of this study was COVID-19 vaccination, knowledge gained may be relevant to future vaccine equity initiatives.

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