


Development, Implementation, and Evaluation of Three Outreach Events to Improve COVID-19 Vaccine Uptake Among Racial and Ethnic Minority Communities in Houston, Texas, 2022

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Abstract

Objectives: Lack of access to timely, accurate, and linguistically appropriate COVID-19 information has complicated the dissemination of evidence-based information and contributed to vaccine hesitancy among racial and ethnic minority groups in the United States. We developed community events that provided outreach, education, and access to COVID-19 vaccination to overcome vaccine hesitancy in these communities.

Methods: Using spatial analysis techniques, we identified 3 communities with low vaccine uptake in Houston, Texas, in fall 2021; engaged 20 stakeholders from these communities via 4 focus groups to understand barriers to vaccination; and developed and implemented 3 COVID-19 vaccine education and outreach events tailored to the needs of these communities in January–March 2022. We used program evaluation surveys to assess attendee characteristics and satisfaction with the events. Vaccinated attendees also completed surveys on what motivated them to get vaccinated.

Results: Two communities were predominantly Hispanic, and the third had an equal number of Black and Hispanic residents. Based on community stakeholder input, the study team organized 2 health fairs and 1 community festival featuring dialogue-based COVID-19 vaccine engagement in January and March 2022. Across the 3 events, a total of 865 attendees received COVID-19 education and 205 (24.0%) attendees received a COVID-19 vaccine or booster. Of 90 attendees who completed program evaluation surveys, 81 (90%) rated the outreach event as good or excellent. Of 145 attendees who completed postvaccination surveys, 132 (91%) endorsed ≥ 1 key program feature as motivating them to either get vaccinated or vaccinate their child that day.

Conclusion: Community outreach events are important strategies for disseminating information, building trust, and facilitating COVID-19 vaccine uptake.

Keywords

COVID-19, vaccination, disparities, geomedicine, stakeholder-engaged research, community engagement

Racial and ethnic minority populations in the United States have high rates of COVID-19 transmission, morbidity, and mortality,^{1,2} which reflects health inequities rooted in the social determinants of health.³ As the COVID-19 pandemic moves toward an endemic stage,⁴ racial and ethnic disparities in COVID-19 vaccine uptake remain.⁵ As of February 2023, nearly 70% of people in the United States had completed their primary COVID-19 vaccine series and 51 million bivalent booster doses had been administered.⁶ However, a

smaller percentage of non-Hispanic Black/African American (hereinafter, Black) people (51%) have received at least 1

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COVID-19 vaccine dose as compared with Asian (73%), Hispanic (67%), and non-Hispanic White (hereinafter, White) (57%) people.⁷ Uptake of COVID-19 booster shots is also low among Asian (39%), White (28%), Hispanic (24%), and Black (18%) people.⁸ Unvaccinated people have higher mortality and infection rates than those receiving bivalent (mortality relative risk [RR]=14.1; infection RR=2.8) and monovalent (mortality RR=5.4; infection RR=2.8) doses.⁹

Barriers to vaccine uptake vary widely among racial and ethnic groups and neighborhood or community contexts.¹⁰ Some people are hesitant to get vaccinated because of historical social injustices or the increased politicization of science.¹¹⁻¹³ Other people want to get vaccinated but face structural barriers such as language, transportation, and/or the inability to take time off work.¹⁴ A systematic review found that multicomponent and dialogue-based programs directed toward racial and ethnic minority groups are effective in addressing vaccine hesitancy.¹⁵ However, few formal evaluations of strategies to address COVID-19 vaccine uptake—particularly among racial and ethnic minority groups—have been conducted.^{16,17} Tailored programs that are informed by community-engaged approaches are needed.¹⁸ At the same time, limited financial and personnel resources necessitate data-driven approaches to help local governments and organizations focus their outreach efforts.¹⁹⁻²²

With the overall goal of reducing COVID-19 disparities, we sought to (1) use a data-driven approach to identify communities with low vaccine uptake, (2) engage stakeholders from these communities to understand barriers to vaccination, and (3) develop, implement, and evaluate COVID-19 vaccine education and outreach interventions tailored to the needs of these communities.

Methods

Design Overview

The Baylor College of Medicine Institutional Review Board approved this study (H-47505), which we conducted from August 2021 through March 2022. The study comprised 3 parts. First, we used geospatial methods to identify COVID-19 neighborhoods with low vaccine uptake in Harris County, Texas, and we selected 3 neighborhoods for outreach. Next, we used the Precede–Proceed model, which provides a multistep approach for the development and implementation of health promotion programs.²³ Community stakeholders were given a cover letter and provided verbal consent to participate in focus groups to identify determinants of lack of vaccine uptake as well as predisposing, reinforcing, and enabling factors. Based on focus group feedback, we developed 3 tailored outreach events, which we implemented and evaluated using the RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance)²⁴ framework.

Study Setting

Located in Harris County, Texas, Houston is the fourth most populous and one of the most racially and ethnically diverse cities in the United States (45% Hispanic, 24% White, 23% Black, and 7% Asian).²⁵ In 2021, Harris County had 893.6 COVID-19 cases per 100 000 residents, which is high relative to other major metropolitan areas.²⁶ In addition, an estimated one-third of COVID-19–related deaths in Texas were caused by health disparities,²⁷ making Houston an ideal location in which to apply community-engaged approaches for improving COVID-19 vaccine uptake.

Community Identification

The Harris County Office of Science, Surveillance, and Technology provided the count and percentage of census tract residents who had been fully vaccinated as of August 10, 2021, based on the census tract population in the 2018 American Community Survey 1-year estimates.²⁸ To select neighborhoods in which to conduct our outreach efforts, we first identified (1) census tracts where $\leq 30\%$ of residents were fully vaccinated and (2) superneighborhoods that intersected with the census tracts in which $\leq 30\%$ of residents had been vaccinated (Figure 1A). A superneighborhood is a City of Houston–approved geographically designated area that groups contiguous communities that share common characteristics.²⁹ Next, we performed a hot-spot analysis in ArcGIS Pro (Esri) using the Getis-Ord G_i^* cluster analysis method^{30,31} to investigate spatial dependency of vaccine uptake levels in the county. The Getis Ord G_i^* is an inferential spatial pattern analysis technique grounded in probability theory. The tool calculates a z score and P value to indicate whether the null hypothesis (that observed values are randomly distributed) may be rejected. Using the P values, the tool calculates a confidence level bin for each census tract. The bin has 7 classes, ranging from -3 (99% confidence that a census tract is a cold spot) through $+3$ (99% confidence that a census tract is a hot spot), with 0 being not significant. (Figure 1B and C).

Results showed several superneighborhoods on the eastern and north-central parts of the county that intersected these hot spots (Figure 1B). We then reached out to community health workers (CHWs) and outreach organizations working in and around the identified superneighborhoods to join our scientific and community advisory board (hereinafter, advisory board). The 5-member advisory board (2 researchers and 3 community partners) selected 3 superneighborhoods for outreach on the basis of the ability of community partner organizations to facilitate our engagement with community stakeholders (Figure 1C). Two superneighborhoods were in north-central Houston (Aldine, Independence Heights), and 1 superneighborhood was in southeastern Houston (Golfcrest/Bellfort/Reveille).

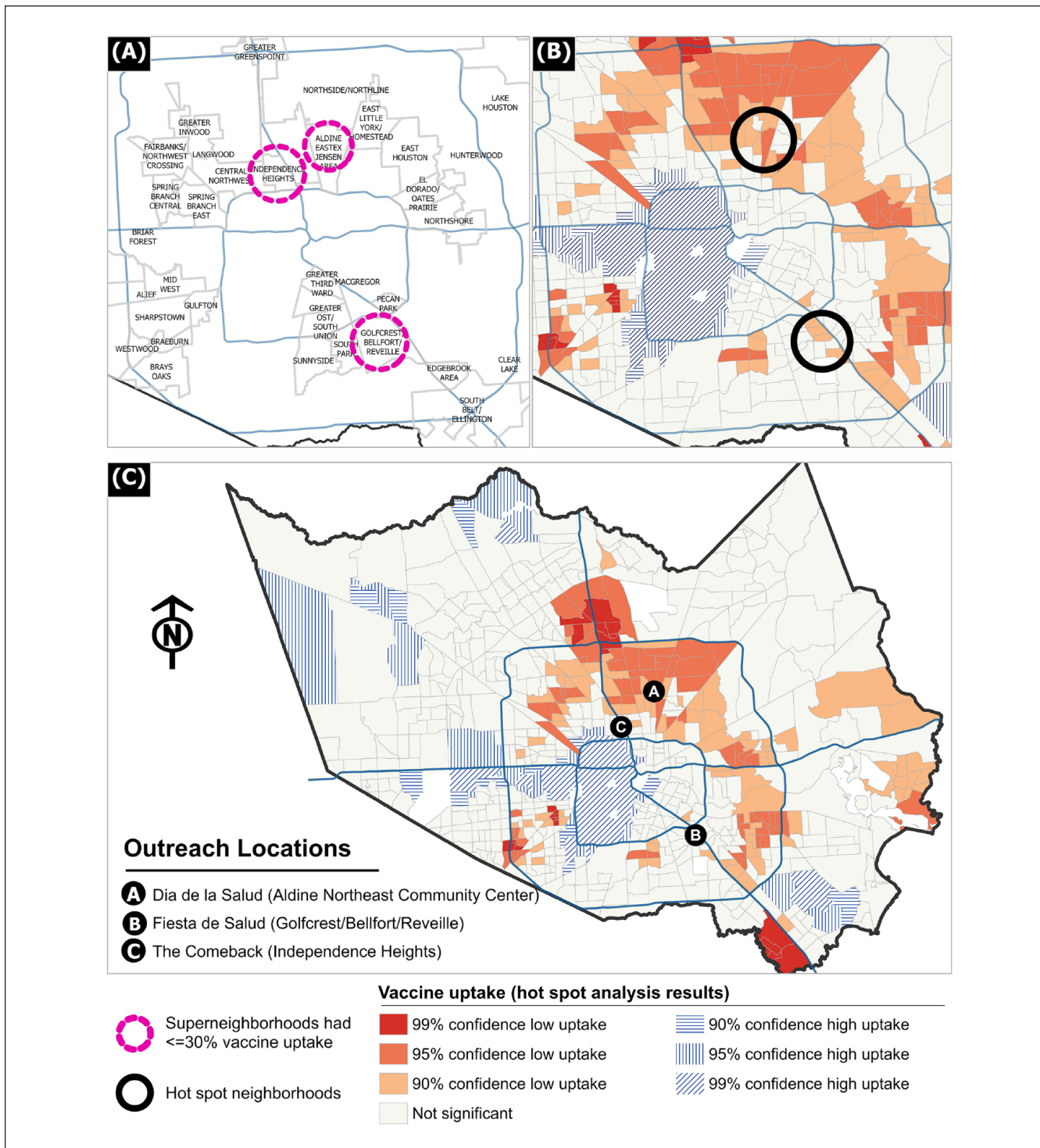


Figure 1. Superneighborhoods identified for outreach based on low COVID-19 vaccine uptake, Houston, Texas, 2022. Three iterative steps were used to identify focus neighborhoods for community outreach. (A) Identify the tracts where $\leq 30\%$ of the population was fully vaccinated as of August 10, 2021, and then identify the superneighborhoods that intersected the low-vaccine-uptake tracts. (A superneighborhood group contiguous communities that share common characteristics.²⁹) (B) Perform hot-spot analysis to identify significant spatial clusters of tracts with low vaccine uptake (ie, hot spots). Several tracts on the eastern and north-central part of the county were hot spots. (C) Reach out to known/connected community stakeholders that worked in and around neighborhoods that were identified during the first step ($\leq 30\%$ uptake) or the second step (hot spots). Three neighborhoods were chosen for outreach based on the ability of community partner organizations to facilitate engagement with key stakeholders. Vaccination data were from the Harris County Health Department. Spatial data processing was performed in ArcGIS Pro 2.8 (Esri).

Community Assessment

Four community stakeholder mini-focus groups (2 English, 2 Spanish) were conducted from September through November 2021 to assess barriers to and facilitators of vaccine uptake. Mini-focus groups (4-6 participants) offer an opportunity for all participants to speak and fully express their views and are easier to moderate than a large group is.³² Questions included: (1) How has your community been affected by COVID-19? (2) What has your community been saying (positive or negative) about COVID-19 vaccination? (3) What are the concerns? (4) Where are people getting their information? (5) What is motivating vaccination? (6) What are the barriers to vaccination? and (7) What would you recommend to address community concerns/barriers to vaccination? Focus groups lasted for 60 minutes. They were digitally recorded, transcribed, and analyzed by using rapid qualitative analysis.³³⁻³⁶ We used a templated summary table to extract focus group data based on our focus group questions.³⁷ We consolidated summaries in a data matrix to capture themes, subthemes, and supporting quotes.³⁸ The principal investigator (H.B.) and 2 trained analysts (C.M.L., N.M.B.) met to discuss resulting patterns. We defined saturation as the point at which linking concepts of 2 consecutive focus groups revealed no additional second-level categories.³⁹

Program Development, Implementation, and Evaluation

The advisory board developed broad goals that were applied across events to

1. develop academic-community partnerships to gain community trust and improve vaccination uptake,
2. provide accurate information and education about COVID-19 vaccine,
3. provide vaccination education in an accessible and linguistically and culturally appropriate manner,
4. make COVID-19 vaccination more convenient and accessible, and
5. incentivize vaccination.

Metrics for success were developed in conjunction with county public health officials and community partners and were based on their experience conducting other COVID-19 public health outreach events.

1. Reach: at least 200 attendees at each event
2. Adoption: vaccinate 20% of attendees
3. Effectiveness
 - a. 80% of outreach event attendees who complete program evaluations will rate the event as good to excellent on a 4-point scale, where 1=excellent, 2=good, 3=fair, and 4=poor

- b. 80% of outreach event attendees who complete the postvaccination survey will endorse 1 program component (ie, convenience, education, linguistic appropriateness, incentives, trust of organizers) as a motivating factor for their decision to get vaccinated or to vaccinate their children that day
4. Implementation: volunteers will rate satisfaction with logistics as 8 or higher on a 10-point scale, where 0=not at all satisfied and 10=extremely satisfied

Results

Community Characteristics

The racial and ethnic composition in the 3 superneighborhoods was 85.5% Hispanic and 9.3% Black in Golfcrest/Belfort/Reveille, 87.5% Hispanic and 6.8% Black in Aldine, and 60.0% Hispanic and 31.9% Black in Independence Heights. The percentage of households living below the federal poverty level ranged from 24.4% to 38.4%, and the percentage of uninsured residents ranged from 26.8% to 34.2% (eTable in Supplemental Material).

Community Assessment

Twenty community stakeholders (70% female, aged 31-68 y), including 6 CHWs, 12 community activists, and 2 community leaders (eg, clergy, law enforcement officials), participated in the focus groups. Focus group findings mapped onto constructs of the Precede-Proceed model showed that, across focus groups, participants cited lack of access, lack of credible information sources, and adoption of a wait-and-see attitude as reasons for lack of vaccine uptake (Figure 2). Predisposing, reinforcing, and enabling factors were also identified.

Community stakeholders differed on how to build community trust and their preferred event format. Those from Independence Heights wanted dialogue-based engagement with trusted messengers (ie, physicians who looked and talked like them). They preferred a festival format with carnival-style activities, food trucks, and live music. Community stakeholders from Golfcrest/Belfort/Reveille and Aldine wanted Spanish-speaking CHWs to provide vaccine education and a format that would address the myriad health concerns of the community, in addition to the COVID-19 pandemic. To attract attendees, a health fair with a family fiesta-style theme with free food, entertainment, raffles, door prizes, and children's activities was recommended.

Program Development

Based on community stakeholder feedback, we worked with our advisory board to develop 3 outreach events and explored 2 models of academic-community partnerships. In the first

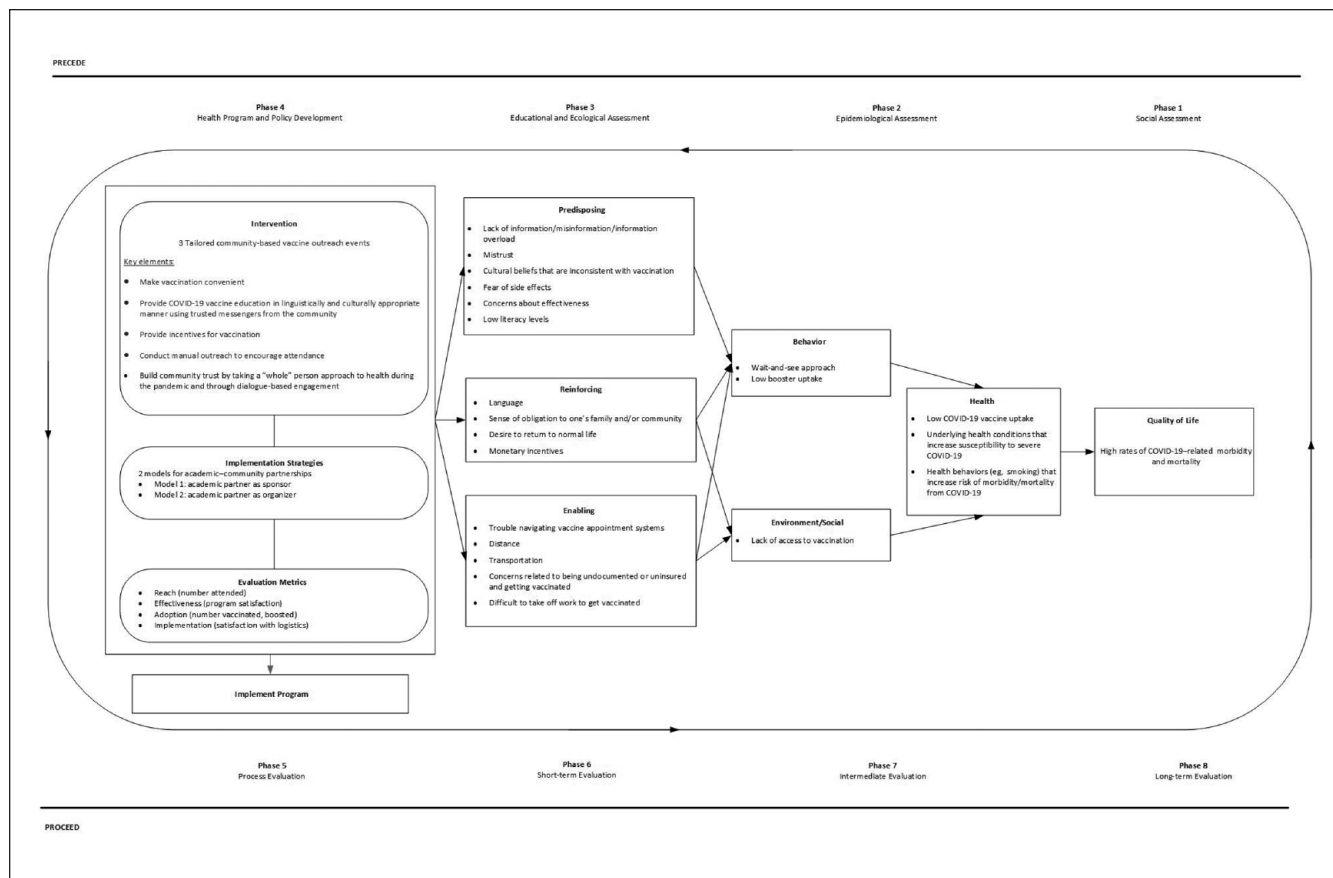


Figure 2. Summary of themes from 4 focus groups that were conducted with community stakeholders (N=20) from September through November 2021 to assess barriers and facilitators of COVID-19 vaccine uptake in Houston, Texas, mapped onto the components of the Precede–Proceed model.²³

model, our community partners, *Dia de la Mujer Latina* and CAN DO Houston, both of which have deep ties and ongoing health outreach initiatives in the Golfcrest/Bellfort/Reveille and Independence Heights superneighborhoods, respectively, preferred to be the main organizers and “face” of the events tailored for these communities. The research team served as event sponsor and provided financial support, compensation for CHWs, bilingual education and evaluation materials, and incentives for vaccination. In the second model, the research team organized the event, supported by community partners. Harris County Precinct 2 provided the venue free of charge, assisted with publicity, and facilitated on-site vaccination and connections to local organizations and federally qualified health centers. Latino Learning Center, a local nonprofit organization, provided Spanish-speaking CHWs to conduct COVID-19 vaccine education.

Program Implementation

Fiesta de Salud was designed for Golfcrest/Bellfort/Reveille and was held at St. Paul’s Episcopal Church in January 2022.

The church announced the event, and *Dia de la Mujer Latina* contacted attendees of their prior events to inform them about the health fair. Bilingual CHWs managed the crowd, conducted health screenings, and provided vaccine education. The Houston Health Department administered vaccinations. Health-screening activities included blood pressure and glucose screening, cervical cancer screening, vision acuity checks, and COVID-19 testing. Health resources and education focused on cancer prevention and cardiovascular health were also provided. The event also featured a taco truck with free lunch and live entertainment for children. Children who were vaccinated were entered into a raffle for an hourly bicycle giveaway, and adults and children who were vaccinated received \$50 gift cards. Attendees completed a brief evaluation survey at a table next to the vaccination station and received a small promotional item (eg, pen) for their time. On the evaluation survey, respondents were asked to rate their satisfaction with the event and to indicate whether any of the program components (eg, convenience, education, linguistic appropriateness, incentives, trust of organizers) was a motivating factor for getting vaccinated.

Día de la Salud was hosted at the Aldine Northeast Community Center in March 2022. It was publicized via press release to local media outlets in English and Spanish, flyers distributed to local businesses, and a neighborhood-canvassing campaign of 300 homes. Fifty-dollar gift cards for adults and children incentivized vaccination. Spanish-speaking CHWs provided vaccine education, and Harris County Public Health employees administered vaccinations. Health professionals from Baylor College of Medicine and the community provided health screenings (eg, glucose, hypertension, audiology, foot, dental) and first-aid demonstrations. Staff from the Dan L Duncan Comprehensive Cancer Center provided education about lung and liver cancer, colorectal cancer screening, and smoking cessation. Other events included fitness and cooking demonstrations, face painting and balloon artists, Zoomba, raffles and prizes, a mariachi band, and free tacos. Attendees who completed an evaluation survey were entered in a drawing for a \$10 gift card that was held every 30 minutes.

The Comeback was held outside a local event hall in Independence Heights in March 2022. The festival was publicized on neighborhood websites and via announcements at local churches. A Zydeco band, carnival games and face painting for children, and food trucks were provided. Local youth sports teams were recognized, raffles were held, and prizes were given out. The Houston Health Department provided vaccinations, and the research team provided \$50 gift cards for adults and children who got vaccinated. A Black female infectious disease physician from Baylor College of Medicine led the dialogue-based engagement segment of the program, which was called Community Conversations. A CAN DO representative moderated. The segment was divided into two 15-minute sections, with live music in between, comparable to the concept of a commercial break to keep people engaged. The physician first talked briefly about the importance of COVID-19 vaccination, and then the moderator asked questions from attendees who submitted them anonymously at a booth. A brief question-and-answer period followed. We were advised by community stakeholders and the community partner organization representative to minimize the number and type of questions asked by the research team to outreach event attendees. As a consequence, we made the decision to forego soliciting program evaluations from all attendees (as we had done in the previous 2 outreach events) and asked only those who were vaccinated to complete a modified version of the postvaccination survey, which asked whether any program components influenced their intention to get vaccinated that day.

Program Evaluation

Fiesta de Salud attracted 500 attendees and *Día de la Salud* attracted 300 attendees (Table 1), and *The Comeback* attracted 65 attendees. Ninety attendees across all 3 events completed program evaluation surveys. Health fair attendees

Table 1. Characteristics of adult attendees (N = 90) who completed program evaluation surveys at the *Fiesta de Salud* and *Día de la Salud* COVID-19 outreach events in Houston, Texas, 2022^a

Variable	<i>Fiesta de Salud</i> (n = 40), no. (%)	<i>Día de la Salud</i> (n = 50), no. (%)
Age, y		
Mean (SD)	45.9 (14.6)	54.1 (16.8)
Missing	0	1 (2.0)
Sex		
Male	12 (30.0)	11 (22.0)
Female	28 (70.0)	38 (76.0)
Missing	0	1 (2.0)
Ethnicity		
Hispanic	39 (97.5)	5 (10.0)
Not Hispanic	1 (2.5)	0
Race		
White	38 (95.0)	49 (98.0)
Black	2 (5.0)	1 (2.0)
Language spoken at home		
Spanish only	22 (55.0)	10 (20.0)
English only	2 (5.0)	8 (16.0)
Both	15 (37.5)	28 (56.0)
Neither	1 (2.5)	0
Missing	0	4 (8.0)
Employment		
Full-time	11 (27.5)	16 (32.0)
Part-time	15 (37.5)	8 (16.0)
Unemployed	14 (35.0)	20 (40.0)
Missing	0	6 (12.0)
Education		
Elementary/middle school	2 (5.0)	0
Some high school	5 (12.5)	3 (6.0)
High school	17 (42.5)	23 (46.0)
Bachelor's degree	9 (22.5)	6 (12.0)
Graduate degree	6 (15.0)	6 (12.0)
Prefer not to say	1 (2.5)	12 (24.0)
Missing	1 (2.5)	9 (18.0)
Health insurance coverage		
Yes	6 (15.0)	36 (72.0)
Already vaccinated		
Yes	36 (90.0)	45 (90.0)

^a *Fiesta de Salud* took place at a church in January 2022 and was designed for the Golfcrest/Belfort/Reveille superneighborhood in Houston.

A superneighborhood is a City of Houston–approved geographically designated area that groups contiguous communities that share common characteristics. Bilingual community health workers conducted health screenings, and COVID-19 testing and vaccine education were provided. COVID-19 vaccines were administered at the event. *Día de la Salud* took place at the Aldine Northeast Community Center in March 2022 in Houston. COVID-19 vaccine education was provided and COVID-19 vaccines were administered at the event.

were primarily middle-aged (mean [SD] age = 49.9 [15.7] y), female (73%), Hispanic (98.8%), and spoke either Spanish only or Spanish and English at home (81.8%). Most were

Table 2. COVID-19 vaccines, by manufacturer and dose, given to adults and children during the *Fiesta de Salud*, *Dia de la Salud*, and *The Comeback* outreach events in Houston, Texas (N = 205), 2022^a

Event	Pfizer			Moderna			Johnson & Johnson	
	First dose	Second dose	Booster	First dose	Second dose	Booster	First dose	Booster
<i>Fiesta de Salud</i> (N = 122)								
Adults (n = 106)	15 (14.2)	4 (3.8)	41 (38.7)	4 (3.8)	1 (0.9)	36 (34.0)	0	5 (4.7)
Children (n = 16)	15 (93.8)	1 (6.3)	0	0	0	0	0	0
<i>Dia de la Salud</i> (N = 61)								
Adults (n = 42)	3 (7.1)	3 (7.1)	20 (47.6)	3 (7.1)	3 (7.1)	9 (21.4)	0	1 (2.4)
Children (n = 19)	11 (57.9)	5 (26.3)	3 (15.8)	0	0	0	0	0
<i>The Comeback</i> (N = 22)								
Adults (n = 14)	1 (7.1)	1 (7.1)	7 (50.0)	0	2 (14.3)	3 (21.4)	0	0
Children (n = 8)	5 (62.5)	3 (37.5)	0	0	0	0	0	0

^a *Fiesta de Salud* took place at a church in January 2022 and was designed for the Golfcrest/Belfort/Reveille superneighborhood in Houston. A superneighborhood is a City of Houston–approved geographically designated area that groups contiguous communities that share common characteristics. Bilingual community health workers conducted health screenings, and COVID-19 testing and vaccine education were provided. COVID-19 vaccines were administered at the event. *Dia de la Salud* took place at the Aldine Northeast Community Center in March 2022 in Houston. COVID-19 vaccine education was provided and COVID-19 vaccines were administered at the event. *The Comeback* was a festival held in the Independence Heights neighborhood in Houston in March 2022. Vaccines were administered at the event, and a physician talked about the importance of vaccination and answered questions. All data are number (percentage).

unemployed or employed part-time (67.3%) and had ≤high school diploma (56%). Most had already received at least 1 COVID-19 vaccine dose. Only 10.0% of *Fiesta de Salud* attendees and 8.0% of *Dia de la Salud* attendees cited vaccination as their reason for attendance.

Vaccination rates were 24.0% at *Fiesta de Salud*, 20.0% at *Dia de la Salud*, and 34.0% at *The Comeback* (Table 2). Sociodemographic characteristics of those who got vaccinated at the 2 health fairs reflected characteristics of those who completed the evaluation survey (Table 1). Those who were vaccinated at *The Comeback* were middle-aged (mean [SD]=43.1 [14.0] y), female (64.3%), Black (57.1%), employed full-time (64.3%), high school graduates (92.9%), and had already received at least 1 COVID-19 vaccine dose (92.8%).

Overall, 94.9% of *Fiesta de Salud* and 98.0% of *Dia de la Salud* attendees rated the events favorably. When queried about what they liked, 37.5% and 40.0% of *Fiesta de Salud* and 32.0% and 50.0% of *Dia de la Salud* attendees endorsed the variety of health services offered and education provided by the CHWs, respectively. Attendee suggestions for improvement included holding follow-up events to build trust, doing more advertising, holding longer events, and using a local food vendor. Across events, 59 of 145 people who completed postvaccination surveys (40.7%) endorsed ≥1 key program feature as motivating them to get vaccinated or vaccinate their children that day, and 106 (73.1%) endorsed ≥2 features (Table 3). The most commonly endorsed program feature was convenience, which was endorsed by 71.4%, 59.0%, and 76.8% of adults who got vaccinated and 71.4%, 47.1%, and 80.0% of adults who vaccinated their children at *Fiesta de Salud*, *Dia de la Salud*, and *The Comeback*, respectively.

Thirty *Fiesta de Salud* volunteers rated satisfaction with logistics as a 9.0 of 10 (SD=0.9). Suggestions for improvement were to hold the event at a larger location and for a longer amount of time so that people would not be turned away. Sixty-five volunteers at *Dia de la Salud* rated it as 9.4 of 10 (SD=1.0). Their main feedback was to conduct more local outreach to attract unvaccinated people. Eleven volunteers at *The Comeback* rated satisfaction as 8.2 of 10 (SD=1.8). Their feedback was to have more tailored advertising and incentives to attract more children and young adults to the event.

Discussion

Grounded by the Precede–Proceed model, this study identified communities with low COVID-19 vaccine uptake, engaged community stakeholders to understand barriers to and facilitators of vaccination, and worked with community partners to systematically plan, implement, and evaluate 3 COVID-19 vaccine outreach events. Across communities, stakeholders agreed that lack of access and misinformation were barriers to vaccination, but they differed in what should be done to gain community trust. Based on their feedback, 2 health fairs and 1 festival were organized. During these events, 865 people from racial and ethnic minority groups received COVID-19 education, and 205 (24%) attendees were vaccinated. More than 90% of attendees who responded to an evaluation survey rated the events favorably, and 89% of those vaccinated endorsed at least 1 program feature as encouraging vaccination. Overall, findings underscore the value of tailored community outreach events and stakeholder engagement in improving vaccine uptake. They also extend

Table 3. Results of postvaccination surveys (N = 145) indicating the factors that prompted adults to get vaccinated or vaccinate their children against COVID-19 at the *Fiesta de Salud*, *Dia de la Salud*, and *The Comeback* outreach events in Houston, Texas, 2022^a

Program features	<i>Fiesta de Salud</i> (Golfcrest/Bellfort/Reveille)		<i>Dia de la Salud</i> (Aldine)		<i>The Comeback</i> (Independence Heights)	
	Adults (n = 56), no. (%)	Kids (n = 14), no. (%)	Adults (n = 39), no. (%)	Kids (n = 17), no. (%)	Adults (n = 14), no. (%)	Kids (n = 5), no. (%)
Convenience	43 (76.8)	10 (71.4)	23 (59.0)	8 (47.1)	10 (71.4)	4 (80.0)
Education	24 (42.9)	2 (14.3)	7 (17.9)	8 (47.1)	10 (71.4)	2 (40.0)
Ease of communication (language appropriate)	29 (51.8)	6 (42.9)	15 (38.5)	3 (17.6)	1 (7.1)	3 (60.0)
Incentives for vaccination	22 (39.3)	5 (35.7)	10 (25.6)	7 (41.2)	0	0
Trust of the event organizers	30 (53.6)	10 (71.4)	11 (28.2)	5 (29.4)	3 (21.4)	2 (40.0)
Worried about variants	29 (51.8)	3 (21.4)	0	4 (23.5)	0	2 (40.0)
Other	1 (1.8)	0	0	2 (11.8)	0	0

^a *Fiesta de Salud* took place at a church in January 2022 and was designed for the Golfcrest/Bellfort/Reveille superneighborhood in Houston. A superneighborhood is a City of Houston–approved geographically designated area that groups contiguous communities that share common characteristics. Bilingual community health workers conducted health screenings, and COVID-19 testing and vaccine education were provided. COVID-19 vaccines were administered at the event. *Dia de la Salud* took place at the Aldine Northeast Community Center in March 2022 in Houston. COVID-19 vaccine education was provided and COVID-19 vaccines were administered at the event. *The Comeback* was a festival held in the Independence Heights neighborhood in Houston in March 2022. Vaccines were administered at the event, and a physician talked about the importance of vaccination and answered questions.

prior work by providing a formal evaluation of strategies to improve vaccine uptake.^{40,41}

Attendance decreased over time as we implemented the 3 outreach events. Possible reasons may have been location and timing. *Fiesta de Salud* was held in a church in January, but *Dia de la Salud* and *The Comeback* were held in a community center and event hall, respectively, in late March after a citywide campaign to incentivize first-dose vaccination with \$100 gift card incentives. Consistent with previous research,⁴² our engagement of racial and ethnic minority groups in a faith-based setting may have facilitated trust. Another reason for decreased attendance over time may have been differing publicity methods. The telephone bank and neighborhood canvassing approaches appear to have been more successful than community announcements for drawing people to the events. Notably, 72.0% of children's vaccinations were first doses and 50.0% to 63.0% of adult vaccinations were boosters. Thus, while the outreach events did not appear to attract or encourage hesitant individuals to get vaccinated, they did engage people to vaccinate their children and to receive booster doses by making vaccination convenient, offering incentives, and providing linguistically appropriate education. These factors are important given the low rates of COVID-19 booster uptake among Hispanic people and the low rates of COVID-19 vaccination among children nationwide.^{8,43}

Strengths and Limitations

This study had several strengths. First, a data-driven approach for identifying the neighborhoods in which to conduct community outreach, coupled with a community

stakeholder–informed needs assessment, resulted in maximal use of resources and tailored programs. Second, we used 2 academic–community partnership models, and both were successful. Thus, the specific model used may be less important than the development of trusting partnerships, clear communication, and equitable relationships. Third, incorporation of a formal evaluation of the tailored engagement strategies used contributes to a growing body of knowledge on effective approaches to increasing COVID-19 vaccination rates in medically underserved communities.

This study also had several limitations. First, we did not collect follow-up data, so vaccination behaviors after the outreach events are not known. Second, our sample was mostly female and middle-aged and, thus, may not be representative of neighborhood residents. Future research should examine the role that tailored outreach events play in increasing vaccination knowledge and attitudes, increasing other preventive health behaviors, and promoting full-series vaccination completion. Finally, the descriptive nature of the study precluded the establishment of cause-and-effect relationships.

Conclusion

Community outreach events are useful for disseminating information, building trust, and facilitating vaccine uptake. However, one size does not fit all, and several implementation lessons were learned. First, using a data-driven approach to identify communities in which to conduct vaccine outreach can help distribute resources effectively, but, ultimately, developing trusting partnerships, clear communication, and equitable relationships with community partners are

critical to successful engagement and trust building. Second, tailored outreach strategies, informed by community stakeholder feedback, can be effective in improving vaccine uptake in medically underserved communities. Third, offering incentives and enhancing convenience may be effective strategies for increasing vaccine uptake. Possible future enhancements include collecting follow-up data to assess the impact of outreach events on attendees' vaccination behaviors, expanding outreach efforts to reach a more diverse sample of community members, and examining the role of outreach events in promoting other preventive health behaviors.

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Supplemental Material

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