Supplement to
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Racial Disparities in Cancer Care | Access to Care for Transgender Veterans | Hepatitis C Among US Veterans | Battling Tobacco Use at Home | [illegible] | How Might the Provision of Culturally Competent Services Be Enhanced for American Indian and Alaska Native Veterans? | Improving Trends in Gender Disparities | Suicidality Among Hispanic and African American Veterans Following Surgery

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COVER: The RADx-UP Image Bank is a collection of images of participants at their project and community events. The photographers, the site coordinators, and the participants were compensated for their time, and each person in the photographs consented to be photographed and to allow the images to be used by RADx-UP projects, their community partners, and the CDCC. Photo by Glenford Nunez/RADx-UP Image Bank.

Funding for this supplement issue of the American Journal of Public Health on RADx-UP: Community-Based COVID-19 Testing and Research in Underserved Populations was provided by the National Institutes of Health (NIH), which sponsors the RADx-UP Program.

Note. The views and opinions herein are those of the individual authors and do not necessarily represent those of the NIH.

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An NIH Response to COVID-19 That Engages Communities and Scientists



Starting in 2020, the COVID-19 pandemic swept the world, causing over 1 million deaths in the United States alone, with the highest death rates and excess deaths occurring among Black or African American, Latino/Hispanic, and American Indian or Alaska Native populations. The National Institutes of Health (NIH) recognized the disproportionate impact the COVID-19 pandemic was having on underserved and vulnerable populations who had significant barriers to health care access and lived in conditions that made self-isolation or working from home impossible. In response to this global public health emergency, NIH leadership allocated $500 million of the emergency supplemental appropriation to addressing the stark disparities in cases, hospitalizations, and deaths evident in the first months of the pandemic.

We were charged with cochairing the Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) initiative and leading staff in developing plans for a national consortium of community-engaged programs; the goal was to support research into evidence-based COVID-19 testing and interventions that would decrease these health disparities. Through the extraordinary and collaborative effort of staff across the NIH, the agency released its first funding opportunities for RADx-UP in June 2020.

The program has established a nationwide network of over 125 community-engaged implementation science research projects that leverages and expands upon established relationships between NIH-funded scientists and community leaders. A specific subset of projects focuses on the social, ethical, and behavioral implications associated with testing, data collection, and data sharing. A Coordination and Data Collection Center (CDCC) provides overall leadership as well as project and resource management, and supports data collection, harmonization, integration, and transfers in close coordination with NIH staff.

The scientists leading these projects have worked with community partners for years and were positioned to address the disparities through a community-engaged approach founded on mutual trust. Although community-engaged research is by no means a new approach for NIH studies, the scope and size of this program reflected a transformative commitment and recognition that we could not continue with "business as usual." This effort has required an unprecedented level of communication, collaboration, and coordination among hundreds of NIH staff, the CDCC, and the funded scientists. In 2020, all answered the call, recognizing that the urgency of the pandemic and the striking and persistent disparities necessitated rapid action appropriate for a given community.

Now, approximately two years since RADx-UP held the kickoff meeting for its first awardees in November 2020, this *AJPH* supplement presents findings from the RADx-UP program. The articles included herein cover an impressive array of research in a variety of populations and settings that we anticipate will provide helpful, context-specific data relevant to underserved and COVID-19–vulnerable communities across the nation. Over a short time, this unprecedented collaboration has provided two durable lessons. First, community engagement is not only a legitimate research method but an essential one to address population health. The foundation is built on sustainable trusting relationships between scientists and community leaders, with support from the NIH.

Second, leveraging the effort of 127 projects and the tens of thousands of consenting individuals must lead to scientific synergy. In that spirit, we have required use of common measures for demographics, social determinants, selected behaviors, and COVID-related variables linked to data sharing across the consortium. It is our expectation that these efforts will lead to advancing knowledge in addressing health disparities from COVID-19 and other causes for years to come. NIH leadership aims to learn from and utilize the framework developed with this initiative to set a precedent for an inclusive and community-engaged scientific method that relies on local partnerships, trusted leaders, and invested participants to make a change in public health responses. AJPH

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1 Year Ago

Best Practices for Conducting Clinical Trials With Indigenous Children in the United States

Community engagement is arguably the most important practice of doing research with Indigenous populations. Various models of community-engaged research exist, including community-based participatory research, participatory action research, and community engaged research. . . . The different models of community engagement all conceptualize research as an equitable, collaborative process between researchers and communities. Equitable research requires that all partners understand the importance of having a shared interest and emphasizes the development of meaningful, sustained relationships built on mutual trust and respect among all partners, by their own standards. Such partnerships center the unique and critical expertise of community partners, who are involved in some capacity in all aspects of the research.

From AJPH, *September 2021, p. 1647*

7 Years Ago

Enhancing Stewardship of Community-Engaged Research Through Governance

Researchers working with native communities. . ., other racial/ethnic minority communities, or other communities facing disparities that experience similar mistrust for past research issues, health inequities . . ., or both, have advocated the use of participatory research to enhance community health. Such approaches include tribal participatory research, community-based participatory research, and participatory action research and are generally grouped as community-engaged research (CEnR). . . . CEnR that involves collaborative partnership and shared leadership between community members and (academic) researchers in all phases of the research can build capacity of all partners, create research that benefits the community, and enhance translation of research findings to the community. These approaches have attraction because they can advance cocreation of the research, contribute culturally centered methods, and foster research capacity.

From AJPH, *June 2015, p. 1161*

CONFLICTS OF INTEREST

Roger Vaughan, *AJPH* Associate Editor; Michael Cohen-Wolkowiez, Guest Editor; Giselle Corbie, Guest Editor; Warren A. Kibbe, Guest Editor; and Emily M. D'Agostino, Guest Editor, served as Editors for this supplemental issue on "RADx-UP: Community-Based COVID-19 Testing and Research in Underserved Populations." Michael Cohen-Wolkowiez, Giselle Corbie, and Warren A. Kibbe also served as RADx-UP Co-Primary Investigators. Emily M. D'Agostino, Chair of the RADx-UP Publications and Dissemination Committee (PDC), oversaw the invitation of manuscripts from authors and their editing and submission to the journal, with assistance from the PDC and staff of the RADx-UP Coordination and Data Collection Center publications team. Roger Vaughan reviewed submitted manuscripts on behalf of the journal for *AJPH* criteria. Alfredo Morabia, *AJPH* Editor in Chief, made final decisions on editorials and articles selected for inclusion in the supplement.

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Roger Vaughan, DrPH, MS, has no conflicts of interest to disclose.

Michael Cohen-Wolkowiez, MD, PhD, is with the Duke Clinical Research Institute, Duke University School of Medicine. He receives support for research from the National Institutes of Health (NIH; grant 1U24-MD016258), the National Institute of Allergy and Infectious Diseases (grants HHSN272201500006I, 1K24-AI143971), the Food and Drug Administration (grant 5U18-FD006298), and industry for drug development in adults and children.

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Listening to Community Partners: Successes and Challenges in Fostering Authentic, Effective, and Trusting Partnerships in the RADx-UP Program

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Engaging community partners helps public health researchers to (1) identify meaningful questions based on their authentic knowledge and lived experience, (2) develop protocols responsive to community needs, (3) ensure that interventions are culturally and contextually relevant, and (4) disseminate findings accessible for communities.[1–3]

The Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) program, created by the National Institutes of Health, is a consortium of more than 125 research projects aiming to understand and reduce COVID-19 disparities in morbidity and mortality through community-engaged research partnerships. Ensuring community partners' voices remain central to promoting access to high-quality and low-cost testing has been fundamental to RADx-UP. Specifically, fostering community engagement in COVID-19 research is essential to incorporating community voices in implementing and disseminating findings. It ensures that testing meets their needs and promotes building community–academic trust in research. More importantly, it catalyzes the construction of healthier communities by dismantling health disparities.

Within the RADx-UP program, the Community Engagement Core (CEC) facilitates strong community involvement, alignment, and impact on addressing barriers to COVID-19 testing equity and translating research into practice. The CEC also is critical to meeting communities' social needs in the midst of the pandemic, including building social networks, promoting trust in academic partners, and fostering mutual respect. These are forms of social capital that develop within community–academic research partnerships attributable to meaningful engagement, social interaction, formation of networks, and recognition of shared goals.[4,5] To further improve our potential to build community social capital and inform strategies to leverage CEC efforts, we conducted a listening session with four community partners using a semistructured interview guide on the successes and challenges of the RADx-UP program and, more generally, potential for building community social capital.

LISTENING SESSION

Attendees consisted of an executive director of a health coalition in Garden City, Kansas (CP1); a founder and director of a Christian faith community-based organization in Shubuta, Mississippi (CP2); a community partner working with a RADx-UP study aiming to understand the effects of COVID-19 and violence within African American communities in Chicago, Illinois (CP3); and a chief executive officer of a minority health institute in Jackson, Mississippi (CP4). Attendees provided consent to record the session and include their direct quotes. The session was facilitated by a RADx-UP staff member with experience in qualitative interviewing and facilitation. The following excepts are drawn from the transcribed session:

Facilitator (F): What is your greatest success or accomplishment as a participant within the RADx-UP program?

CP4: One of the successes with this project is in the public health response. There was more community involvement. There was more listening to the

community and developing ways to get information out as well as resources out by listening and using the information we received. By doing this, I think we were able to increase access to COVID-19 testing, and we also evolved as the pandemic shifted. Whereas we were sending people to community health center health care providers, we now have self-tests, and organizations are also making it more convenient for the community to have access to testing. So, I think those are some pretty big success[es] in trying to address this pandemic.

CP2: Just the mere fact that we were funded in the timeframe that we're funded in and being able to get out into the community and be a help to those who are in need, without them leaving their homes.

CP1: I think that for us being a community coalition (not clinical or research base). The community looked at us as being [someone they were] able to trust. And going into the underserved communities and taking it to them, rather than in the clinic.

F: What strategies utilized by the RADx-UP program have promoted effective communication with your community organization?

CP1: Our approach was taking resources to them. And, even though I may not be able to speak their native tongue, . . . [sharing] something that is pictorial. Everybody can read pictures, so that is one of the things we did early on.

CP4: We became very proficient with social media and using the different mediums so we could reach different audiences. I might be good at Facebook for my age group, but I noticed that the other age groups are using different things. So, we became very efficient using social media.

CP3: When we're looking at our communities it's not a one-size-fits-all approach. Even if they share very similar demographics (our study is based on African American communities), there are still differences. We had to learn to be flexible when looking at different approaches, and we saw a large increase of participation from that.

CP2: We utilized print ads to reach out to our local community. Newspapers in the counties that we were serving aided our reach, and the first responders with the local emergency management along with the local TV stations disseminated information.

F: What strategies utilized by the RADx-UP program have built trust and mutual respect?

CP4: The main thing we learned is communities want the resources. We just have to provide the platform for communities to have access and to help them navigate through the logistics.

F: How did you engage the community organizations to tell you what they needed?

CP4: Provided them with the resource once they were able to tell us what they needed, matching them with health care providers and testing. [Providing them with] whatever they needed to get it out to their community.

CP3: We relied on our faith-based leaders within the communities, as they already have established trust with families. So we did a lot of work with them to assist with disseminating information and getting feedback from the community.

CP1: We started going to food pantries and school-district food distribution centers every day and putting information and tests in the food boxes. The pieces of paper had a QR code that they could go to [to] find out where to get tested and what to do if they tested positive.

F: What have you enjoyed or valued about your participation as a community partner in RADx-UP?

CP4: I have valued the community-based approach that was taken and the nontraditional and traditional partnerships that have been formed because of it. I think that this project really helped to elevate the community's voice. [This] especially helped us understand the importance of all partnerships. RADx-UP enabled us to make traditional and nontraditional partnerships, so that we could access COVID-19 testing, vaccination, and other resources available to communities that [they] may not have gotten otherwise.

CP2: To piggyback off of [CP4], it's about the collaboration that we would have never had a year ago. We are now able to collaborate with some members on another program that has nothing to do with COVID-19 testing. So, I think this participation has stretched us all, but in a good way.

CP3: Putting a voice to an issue, but allowing the community members to use their voice.

F: What can we do to make the partnership and/or experience of community partners in RADx-UP more efficient, effective, and rewarding?

CP4: Thinking about how we engage communities in ways that they feel is meaningful. [Letting them know] what will they get [out] of this participation. A

lot of times we say partnership, but it is not necessarily a real partnership because the community is often overlooked. So, I think that in order for us to be successful in any intervention, we have to put the community first. We have people that are trusted in the community doing the work. We also have to implement strategies in some cases that maybe we don't understand because we see life through a different lens. One example is, for a lot of our programs, we do gift cards. Some funders don't recognize the value of giving gift cards in community-based settings. But the reality is a lot of times you have to [in order to] make it beneficial for the community to even show up beyond just having a trusted partner there.

CP2: It would make it so much easier if we had one designated person. I don't even know if it's possible. But, one person to walk us through the whole grant process [would be helpful]. It would be a little bit more streamlined. . . . It [the current process] is a little bit frustrating. Like you're trying to learn a process. Having someone to walk with you would make it not so cumbersome to us.

CP1: I second that, about having more centralized communication.

CP4: I agree that it needs to be streamlined a little bit. For us the issue was the budget communication.

F: How can RADx-UP support effective communication between community partners and academic partners?

CP4: The ultimate outcome is that the academic partner is doing their part of the partnership. So just clear communication about the role of the academic partner and what they expect to come out of the partnership would be helpful. We're giving them all the data. But at the end of the day, what will the data on the academic side be used for? And how can we find out [what is in the data] and put it back into the community when this is over?

F: What advice would you give to [the National Institutes of Health] to facilitate the development of future community and academic partnerships?

CP3: In order to remain successful with those partnerships, [my advice] is to not just leave them once you receive your data. Keeping that relationship open and sharing any next steps, even after the data is collected, [is important]. A next step could be dissemination of additional resources that may not be COVID-19–based, as other critical diseases aren't going anywhere for these communities. So, sharing different resources that the communities can also use after the fact and keeping that door open [would facilitate future partnerships].

CP4: I just wanted to emphasize what she just said. I think the best way to build partnerships is not [just] when you need them. For a lot of us, what we find is that we're not invited until there's a need. That connection needs to remain even after we're done with this project. Keep them engaged. So that when you need them again, they know that you're a true partner and you're not just here because this is the next big thing or this is the public health issue of the year.

FINDINGS AND NEXT STEPS

Engaging community partners in public health research and addressing community social needs together fosters cultural relevance, improves research quality, and promotes health equity. The community partners in our listening session voiced positive experiences related to (1) promoting test access for community members with tailored culturally and contextually relevant interventions; (2) reducing barriers to effective communication with community members as facilitated with technology, media, and videos; and (3) flexibility in research and dissemination methods to support mutual respect and trust.

Interviewees also made suggestions for improving community–academic partnerships to support more efficient, effective, and rewarding experiences—specifically, (1) better tailoring of incentives to community needs, (2) improving support for navigating funding, and (3) fostering more centralized communication and clearer expectations and goal sharing. As community–academic partnerships proliferate across the RADx-UP consortium, these efforts may support social capital by fostering ties that allow trust to permeate through the community–academic partnerships and into the larger community. Community partners also emphasized the need for keeping communication and collaboration opportunities open beyond data collection and project completion. Taking this into account, funders can invest in building community social capital in ways to support sustained research partnerships, ultimately fostering civic engagement via research.

Understanding and addressing the fundamental causes of health disparities related to COVID-19 and beyond demand concerted efforts to foster alliances between community partners and academic researchers that elevate the voice of community members. Findings from this listening session can be used to strengthen community–academic research partnerships and build social

capital both within the RADx-UP program and across community–academic alliances elsewhere. Listening to community partners, recognizing power dynamics, and engaging in honest partnerships are fundamental to forging successful efforts to reduce health inequities in service of authentic community–academic partner engagement. AJPH

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E. M. D'Agostino, M. Layer, and G. Dave conceptualized and wrote the original draft of the editorial. M. Layer, J. Jean, E. M. D'Agostino, G. Dave, and K. Perreira designed the data collection instruments. M. Layer and J. Jean collected data. M. Layer, J. Jean, and E. M. D'Agostino coordinated and supervised data collection and carried out the initial analyses. K. Perreira supervised the study. All authors reviewed and edited the editorial.

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Democratizing Research With Data Dashboards: Data Visualization and Support to Promote Community Partner Engagement

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Historically marginalized populations bear a disparate burden of preventable diseases.[1,2] Health outcomes result from the interaction of multiple domains over an individual's life course (i.e., sociocultural environment, health care and government systems, built environment) and at multiple levels of influence (e.g., individual, interpersonal, community). Where we are born, live, work, and play are directly related to our health, risk, safety, prosperity, and life expectancy. Differences in these drivers of health lead to unequal access to community-based programs, directly contributing to health disparities.

The Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) program is a consortium of research projects throughout the United States funded by the National Institutes of Health. RADx-UP seeks to measure and understand factors that have led to the disproportionate burden of the COVID-19 pandemic on historically marginalized and vulnerable populations so that interventions can be designed and implemented to reduce health disparities. As part of this program, RADx-UP built a data dashboard to support research dissemination. Generally, public health dashboards are data display platforms used for health surveillance and data reporting. As noted by Dasgupta and Kapadia,[3] data dashboard priorities and dissemination products are typically decided by individuals and organizations that are external to the communities that the data represent. However, the wisdom and expertise of community organizations, community members, and stakeholders are needed to fully address health inequalities and improve population health. Community partners bring deep knowledge of the lived experiences, values, and historical legacies of their communities.

Building alliances between community partners and academic researchers can enable local communities to use and adapt data, knowledge, tools, and expertise in the design, implementation, evaluation, and dissemination of public health interventions. Furthermore, this collaboration fosters healthy communities that can close health equity gaps caused by education level, immigration status, language, income, place, race/ethnicity, gender identity, or sexual orientation inequalities. Incorporating community partners' lived experience through community–academic partnership is necessary to address health disparities.

Data dashboards serve as vital visualization tools supporting community partner engagement in research and dissemination. Dashboards enable community partners to explore results, postulate new questions, and disseminate findings based on data visualization capabilities. Providing community members access to intuitive, well-described, accurate, and informative data visualization contributes to true bidirectional communication. Community partners must be central participants in research dissemination, given longstanding barriers to information access; lack of access contributes to mistrust and the spread of misinformation and impedes cultural competence.[4] We describe the components of the RADx-UP Data Dashboard, the infrastructures established to support community partner dashboard use, and challenges and recommended steps for enabling data dashboards to bridge the information gap between researchers and communities.

DATA DASHBOARD

The RADx-UP Data Dashboard presents a set of common data

elements (CDEs): a standard set of study questions spanning multiple categories, such as sociodemographic, COVID-19 testing, and health status (Figure 1). CDEs are collected from RADx-UP participants by all RADx-UP project teams, shared with the data coordinating center, ingested, harmonized, and finally visualized on the RADx-UP Data Dashboard. Linked with the dashboard, area-level data visualizations incorporate zip code and county-level RADx-UP project data with 2019 American Community Survey public data sets, including the Child Opportunity Index, the Centers for Disease Control and Prevention Social Vulnerability Index, and the Area Deprivation Index. The visual output was designed for community partners to dynamically engage the data, form their own questions, and help answer those questions.

Facilitating community partner engagement with RADx-UP data was a key driver in the design of the RADx-UP Data Dashboard, and obtaining feedback early from community partners was crucial for incorporating the following qualities:

1. *Easy navigation*: A home page button and navigation bar on all pages and an actionable table of contents offer many ways to navigate;
2. *Easy to learn*: A consistent and uniform layout affords quick familiarization, so community partners can focus on interacting with the data rather than how to use the dashboard. Also, the RADx-UP Data Dashboard presents a teaching page at the beginning;
3. *Simple and consistent design*: Familiar graph types, such as column, line, and donut charts, and consistent colors assist interpretation;

FIGURE 1— RADx-UP Data Dashboard (a) Interactive Panels and (b) Data Filters

Note. RADx-UP = Rapid Acceleration of Diagnostics-Underserved Populations.

4. *Data visual interactivity*: Data visuals that can interact across multiple panels on a given page by clicking on the visuals, meaning more complex questions can be asked;
5. *Data visual filtering*: Data visuals are filterable via multiple filters, allowing deeper drilling down of the data;
6. *Data visual footnotes*: Footnotes for visuals provide more detailed context to help community partners better understand the data;
7. *CDE category grouping by pages*: CDE category grouping reduces the need for shifting attention back and forth among categories;
8. *CDE question grouping using multiple panels per page*: Multiple panels on a given page produce more interactivity;
9. *Data value denominators*: Either per page or per panel, visuals display value denominators to provide full context for each CDE; and
10. *Data comparing with public data sets*: Integrating RADx-UP data with public data sets provides greater data context and deeper meaning of the RADx-UP data.

Community partners' use of the RADx-UP Data Dashboard for research and dissemination was also integrated into the RADx-UP community partner engagement infrastructure (Figure A, available as a supplement to the online version of this article at http://www.ajph.org). Specifically, RADx-UP not only explicitly encourages community partners to lead articles of their own but also promotes their engagement in research and dissemination in the following ways:

1. RADx-UP staff support online collaboration sessions with authors to discuss ideas for research study concepts, analysis proposals, and writing;
2. Data science team members can assist authors in completing an analysis proposal (including assessing data availability) and statistical analysis plan, and can provide data sets via a secure platform and analysis support as needed;
3. Writing assistance at all levels is provided through writing workshops, data workshops, office hours, editorial support, and writing tools;
4. Authors' proposed research study concepts are shared via newsletters and online to promote collaboration across the consortium;
5. Transparent and early discussions of authorship are facilitated to maintain healthy and productive working relationships in research;
6. Connections are facilitated between authors and community members with relevant lived experience and expertise to serve as coauthors for research questions specific to a minoritized community; and
7. Collaboration platform options (e.g., Box, Inc.'s Box; Microsoft's SharePoint) are offered to facilitate efficient group work.

UNANSWERED QUESTIONS AND NEXT STEPS

We recently developed the discussed initiatives and are still evaluating them for effectiveness. This iterative process is key to ensuring that the dashboard is useful and usable by researchers, operational staff, and community partners. Despite efforts to build a data dashboard and support infrastructure that will promote community partner engagement, barriers to authentic engagement must be overcome.

To begin, inviting community partners to this effort is insufficient to successfully guide, inspire, and empower them to use the tool to better serve their community. Democratizing the research and dissemination process requires that we redefine who can initiate and answer research questions and who determines the validity and value of research questions to address. That is, we need to provide data and information to community partners as well as let them discuss what those data mean, what their implications are, and what steps to take next. Moreover, a culture shift is required from the start of a partnership to ensure that the community has equitable decision-making authority throughout the project. This shift needs to address historical issues of distrust that remain in communities of color for research that may not have the benefit of the community as a guiding principle. Research partnerships must ensure that the community voice is heard, valued, and protected. Moreover, sustainability in terms of relationship and partnership, funding, service delivery, public policy action, and commitment to future engagement should be addressed continuously.

If community partners are to use the RADx-UP Data Dashboard to ask and answer questions of immediate relevance to the other members of their community, we need to consider training options for those community members beyond what we have developed in the current infrastructure. Coursework, mentorship, and other formal and informal training typically benefit new and aspiring researchers; such capacity building grows trust by the community as a tangible asset which

ensures that the community leads research and that successful outcomes are achieved.

CONCLUSIONS

The RADx-UP Data Dashboard and community engagement support infrastructure aim to foster community partner leadership of research and dissemination and to allow community partners to ask and answer valuable questions for their communities. Success and sustainability of this effort require a shift in current power dynamics and honest community partner engagement. These measures have the potential to reduce health inequities and associated disparities in chronic conditions by fostering alliances between community partners and academic researchers aspiring to understand the differences between root causes and associated disparities. AJPH

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Harnessing the Power of Community-Engaged Science to Facilitate Access and Uptake of COVID-19 Testing: RADx-UP

Monica Webb Hooper, PhD, Wilson M. Compton, MD, Elizabeth R. Walsh, PhD, Richard J. Hodes, MD, and Eliseo J. Pérez-Stable, MD

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Within four weeks of the declaration of COVID-19 as a global pandemic, reports of limited access to COVID-19 diagnostic tests emerged. This—triangulated with emerging racial and ethnic disparities in cases and mortality,[1] high transmission in specific settings (e.g., nursing homes, prisons, and worksites), and infrastructure challenges in rural and tribal communities—led the National Institutes of Health (NIH) to establish the Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) initiative in April 2020. RADx-UP is one component of the NIH-wide RADx initiative.[2] As with the overall NIH response to the COVID-19 pandemic, unprecedented times combined with striking disparities called for these unprecedented measures. The NIH Office of the Director committed to RADx-UP $500 million of its congressional appropriation to support science focused on COVID-19 diagnostics—which was, indeed, the largest investment in health disparities research for a single initiative.

The uniqueness of RADx-UP is its application of community-engaged research to increase access and uptake of Food and Drug Administration–authorized (or approved or cleared) COVID-19 diagnostic tests in underserved and vulnerable populations. In this context, "underserved" refers to NIH-designated populations that experience health disparities, and "vulnerable" includes groups with medical comorbidities known to increase the risk of severe COVID-19 and persons with social vulnerabilities, including environmental exposures. We were keenly aware that simply because you build does not mean they will come—especially in a time of crisis of an unknown magnitude, changing information, and elevated distrust. Thus, community-engaged approaches, including partnerships with complementary content and context expertise, were critical to identifying effective strategies to enhance access, use, and reporting of COVID-19 testing in these diverse populations.

RADx-UP research teams were selected for funding based on such factors as having demonstrated track records of strong collaborations and trusted partnerships. These multidisciplinary research teams are working directly with communities to understand and reduce distrust, test interventions to increase testing access and uptake, and reduce health disparities from COVID-19. To date, the 127 RADx-UP projects are a nationwide community of practice (Figure 1) that includes partnerships with academic institutions, community-based organizations, federal qualified health centers, and historically Black colleges and universities (Table A, available as a supplement to the online version of this article at http://www.ajph.org). RADx-UP has the greatest diversity of target populations and research settings of any NIH science initiative to date (Table A).

SCIENTIFIC GOALS

The multiphase RADx-UP framework facilitated the emergency release of funding opportunity announcements based on emerging evidence, new testing technologies, and the availability of vaccines. The targeted areas of research supported by each RADx-UP phase matched the evolving state of the pandemic and the testing-specific needs of underserved and vulnerable groups (Table B, available as a supplement to the online version of this article at https://www.ajph.org). Phase I focused on (1) building the RADx-UP infrastructure; (2) the rapid scale-up of COVID-19 testing; (3) the in-depth examination of social, ethical, and behavioral implications

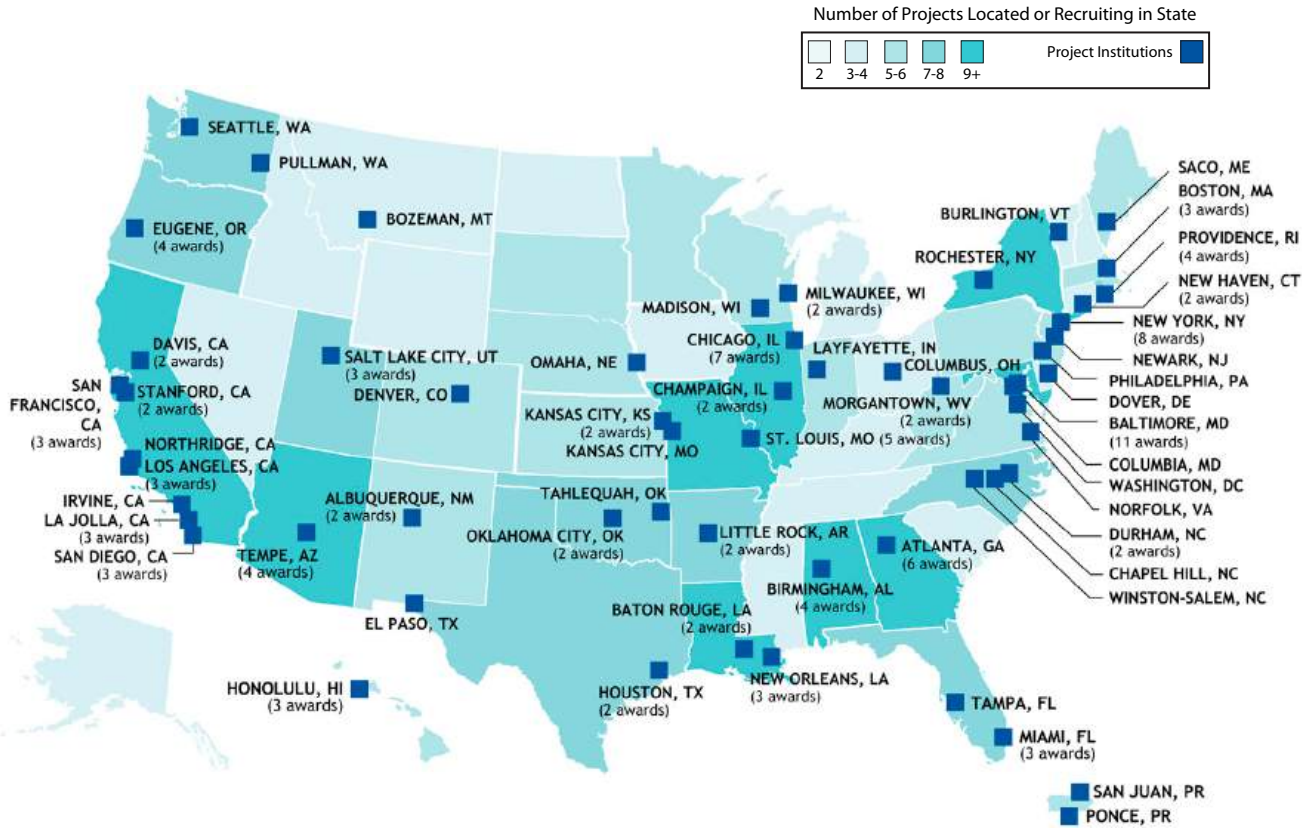

FIGURE 1— RADx-UP Project Map: United States

Note. RADx-UP = Rapid Acceleration of Diagnostics-Underserved Populations. The map illustrates the National Institutes of Health–funded RADx-UP projects, as well as Rapid Pilot Program projects. RADx-UP projects recruit participants in all 50 states as well as the District of Columbia, American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the US Virgin Islands.

related to testing; and (4) project readiness for standardized data collection and sharing.

Phase II integrated new scientific and technological advances and focused on (1) interventions to reduce disparities in COVID-19 and (2) new or more intensive approaches to increase testing access and uptake given the availability of vaccines. We also initiated the RADx-UP Return to School initiative in response to the significant need for school-based testing interventions to detect and minimize the spread of COVID-19 during the return of in-person instruction.

Phase III will study strategies to expand the reach, access, and implementation of rapid testing interventions to reduce COVID-19 disparities. This phase maintains the partnership-driven approach and social, ethical, and behavioral implications research to address the challenges associated with the chronicity of the pandemic as well as the secondary impacts of testing mandates combined with other mitigation measures. In phase III, the Return to School initiative is evolving into research on minimizing educational disruptions with Safe in School research.

DATA COLLECTION AND SHARING

The richness of RADx-UP data has the potential to enhance knowledge via standardized measurement of demographics, social determinants of health, behaviors, and testing-related outcomes. In collaboration with the RADx-UP Coordination and Data Collection Center and with input from the funded projects, RADx leadership established a set of common data elements to ensure standardized data collection and reporting and to support cross-consortium data analyses in the future. Common data element collection will increase statistical power to answer research questions overall and in small populations and compare outcomes stratified by demographics, geography, and time frames. RADx-UP data will be de-identified and deposited into the RADx Data Hub, which will create a cross-initiative repository, leading to rapid and increased learning about the pandemic and its effects.

In our attempt to administer a set of common data elements, we met with challenges raised by research teams and communities. Among them were added complexity to research protocols and the limited time to engage community partners in the full scope of data collection and sharing from the start of the projects. We continue to navigate data collection and sharing among tribal nations and American Indian/Alaska Native individuals, and the new RADx Tribal Data Repository[3] will serve as an independent research data repository governed under the principles and practices of tribal sovereignty.

The NIH applauds the efforts of funded research groups and, importantly, of the diverse populations of study participants to navigate these and other challenges and to ensure that collaborators trust and appreciate the importance of collecting much of the information—the same way—across the consortium. Among the key lessons learned from this community-engaged research initiative is the need for transparent and clear policies for data collection, submission, and sharing as early as possible.

DISCOVERIES AND LESSONS LEARNED

Previous RADx-UP research has produced a number of key findings regarding community-based testing efforts, promising interventions to increase testing uptake, the importance of testing implementation and school-based mitigation strategies, and COVID-19 vaccine hesitancy in occupational groups with high exposure risk. Bigelow et al.[4] found a 10-fold greater positivity rate among Latino/Hispanic participants relative to White participants (31.5% vs 3.4%, respectively) in a community-based testing program. Moreover, Latino/Hispanic participants who tested positive were more likely to be younger, report Spanish as their preferred language (91.6% vs 81.7%; $P < .001$), and have a larger household size.

Intervention research has also demonstrated positive effects. Cioffi et al.[5] found that contingency management increased COVID-19 testing among people who inject drugs, with 12.3% of unique clients tested before contingency management and 35.4% unique clients tested during contingency management. Boutzoukas et al.[6] demonstrated the importance of school district–level mitigation policies, as universal masking was associated with a 72% reduction in secondary transmission compared with optional masking.

Finally, qualitative findings from social, ethical, and behavioral implications research among staff members at 50 skilled nursing facilities highlighted the important roles of social networks as sources of COVID-19 vaccine–related information, hesitancy, and misinformation among frontline occupational groups.[7] This small selection of findings is consistent with the spirit of RADx-UP and underscores the importance of assessments and interventions that identify key community needs and improve outcomes among underserved and vulnerable groups across the United States.

There have also been important lessons learned that will be reinforced going forward. They include the following:

1. Community engagement and gaining trust in science are essential, because of both direct and vicarious experiences among underserved groups;
2. Culturally appropriate and community competent testing and vaccination strategies are important for increasing trust in COVID-19 messages from evidence-based information by contrast to the deluge of misinformation;
3. Active community advisory boards and representative groups are essential for progress, as they provide key recommendations and support;
4. Wraparound care and connections to resources by breaking down silos are highly valuable, as are partnerships with community clinics and clinicians everywhere; and
5. Disaggregating data, where possible, can help to elucidate the impacts in smaller populations.

CONCLUSIONS

With its scope and reach, RADx–UP is unlike any previous NIH-led effort to reduce health disparities and promote health equity. Findings from all phases are expected to guide ongoing and future COVID-19 mitigation efforts in underserved and vulnerable populations, and data serve as a learning ground for research on reducing health disparities. Unless COVID-19 is eradicated, testing will remain a critical component of prevention and control efforts.

Furthermore, by sharing data across individual studies, we will have a clearer picture of how COVID-19 affects vulnerable populations and be positioned to answer key additional questions. These data will help community leaders and policymakers identify effective strategies for reducing disparities in COVID-19 testing and addressing the other health needs of their communities in the event of future pandemics.

This special issue of *AJPH* is part of the first wave of results from the

RADx-UP consortium. Because of the impactful work of all the individuals pouring their passion, innovative scientific perspectives, and collaborative energy into this program, RADx-UP will live on in the research infrastructure, the scientific discoveries that will continue to be unearthed, and the dedication to supporting underserved and vulnerable populations. RADx-UP is an exemplar of the bold and innovative approaches that the NIH can rapidly mobilize. AJPH

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RADx-UP Coordination and Data Collection: An Infrastructure for COVID-19 Testing Disparities Research

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The COVID-19 pandemic has further exposed structural racism, inequalities, and other forms of systemic oppression that have limited opportunities for health equity and community well-being.[1–4] Research in geographic areas with a high percentage of COVID-19 morbidity and mortality provides evidence for the importance of setting and community when evaluating the differential effects of the pandemic on medically underserved populations.[3,5] Communities with high rates of COVID-19 infections and deaths often also disproportionately suffer from the economic ill effects of the pandemic, including job loss, loss of income, disruptions in schooling and childcare, loss of housing, and accompanying stress and anxiety.[3,6–9] COVID-19 has perpetuated health disparities among racial and ethnic minorities, with higher prevalence and mortality rates in communities that face barriers to health care, employment, and health insurance coverage, as well as other social and structural inequities.[10,11]

Built environment and neighborhood determinants affect the spread of infectious disease. Social and structural factors such as inequitable access to testing and preventive services, a higher proportion of essential workers in a given community, and lack of trust in health care providers further aggravate unequal disease burden.[12–14] These persistent disparities underscore the need for additional research into the effects of location on COVID-19 risk to develop successful mitigation strategies. Underserved populations need enhanced care and improved resources, education, and stakeholder-informed solutions to mitigate the spread of COVID-19, including timely access to testing and vaccination. Addressing and eliminating COVID-19 disparities calls for novel approaches that engage stakeholders from underserved communities.[15,16] The pandemic has created an opportunity to test the effects of wide-scale community-engaged research in addressing these disparities.

THE RADx-UP PROGRAM

Funded by the National Institutes of Health (NIH), the Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) program is a consortium of research projects throughout the United States. The RADx-UP program aims to understand factors that led to the disproportionate burden of the pandemic on underserved populations and implement interventions to mitigate these disparities.[17] To our knowledge, RADx-UP is the single largest health disparities research investment in the history of the NIH. As of July 2022, more than 125 projects have been funded through RADx-UP in all US states as well as American Samoa, the District of Columbia, Guam, the Northern Mariana Islands, Puerto Rico, and the US Virgin Islands, serving historically marginalized and medically vulnerable populations (Figure 1).[18] All RADx-UP projects are grounded in the principles of community-engaged research, with research and testing implemented in partnership with community leaders and organizations.

The Duke Clinical Research Institute (Durham, NC) and the University of

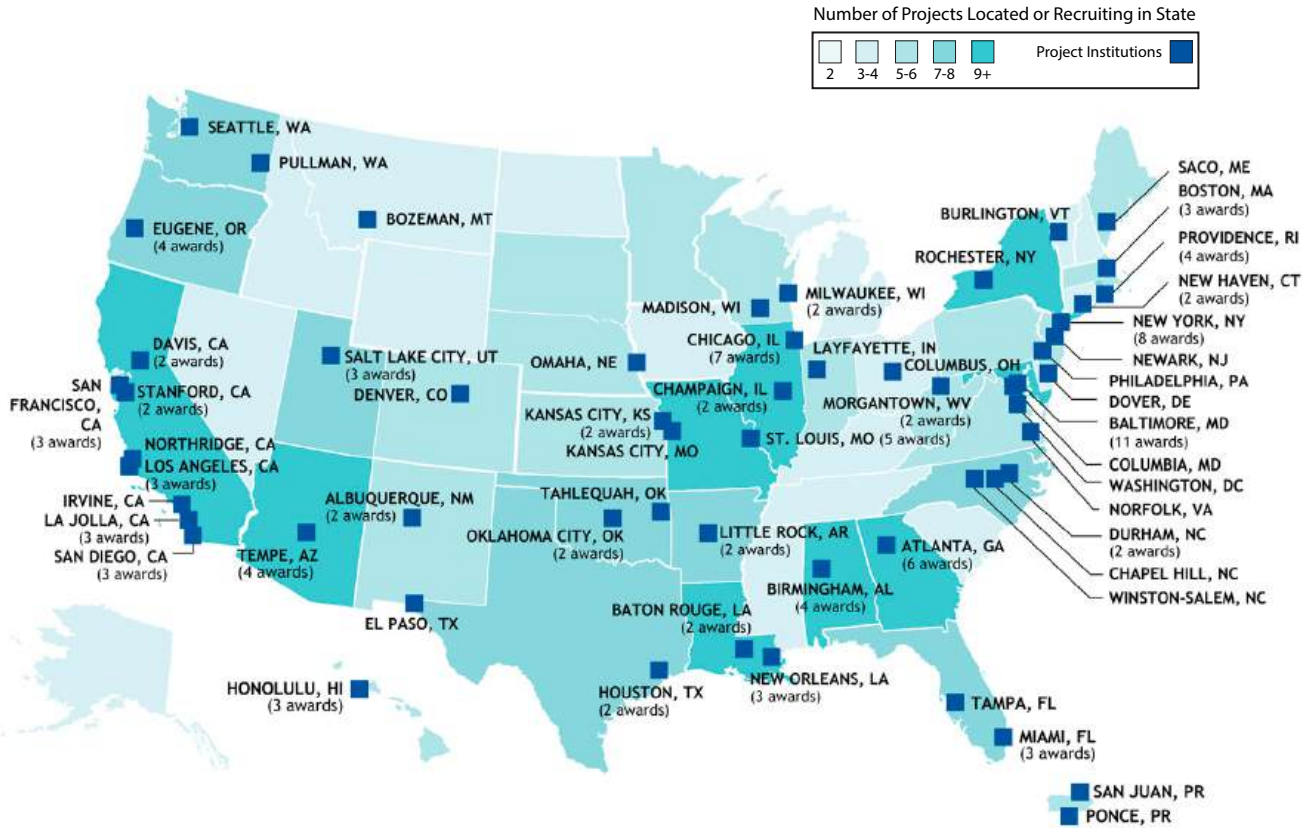

FIGURE 1— RADx-UP Project Map: United States

Note. RADx-UP = Rapid Acceleration of Diagnostics-Underserved Populations. The map illustrates the National Institutes of Health–funded RADx-UP projects, as well as Rapid Pilot Program projects. RADx-UP projects recruit participants in all 50 states as well as the District of Columbia, American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the US Virgin Islands.

North Carolina Center for Health Equity Research (Chapel Hill, NC) jointly lead the RADx-UP Coordination and Data Collection Center (CDCC) in partnership with Community–Campus Partnerships for Health (Raleigh, NC). The CDCC supports the RADx-UP consortium of funded projects in community engagement, testing strategies, data collection and integration, and colearning between the projects and the communities they serve. The CDCC comprises three connected pillars: a community engagement core, a testing core, and a data science and biostatistics core.

The CDCC's governance framework ensures that the direction and key initiatives of the RADx-UP program are responsive to community needs and priorities. The CDCC includes an external advisory board; data stewardship, publications, and steering committees; working groups; and community and health system stakeholders and partners. Addressing COVID-19 disparities in underserved populations calls for solutions that include the involvement of community partners and stakeholders. The CDCC community engagement approach is consistent with Public Health 3.0, a framework that prescribes collaboration among health care researchers and nontraditional partners.[19] According to this framework, research targeting health equity promotion must be done in partnership with community leaders and trusted representatives, community organizations, and local stakeholders so that the current research infrastructure is strengthened. The CDCC is assembling evidence from all projects on how to best nurture and strengthen relationships between communities and academic institutions to enhance our ability to serve as critical partners in health disparities research.

The goals of the CDCC are the following:

1. to accelerate COVID-19 community implementation science via an agile, flexible, participatory, transparent, and sustainable infrastructure;
2. to amplify and disseminate community best practices for successful COVID-19 testing and vaccines;
3. to support data collection, integration, and sharing while preserving necessary data protections;

4. to use the RADx-UP infrastructure to support COVID-19 research; and
5. to evaluate the impact of the RADx-UP program to update and increase access and sustainability of COVID-19 testing in underserved populations.

The composition of the CDCC is intended to reflect the historically marginalized communities that RADx-UP serves. The CDCC also performs systematic tracking and evaluation that draw from existing data to monitor systems across sites, develop novel assessment methods, and provide a platform for dialogue and decision-making. The Translational Science Benefits Model (TSBM)[20] and the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework[21] guide RADx-UP tracking and evaluation. TSBM provides measurable clinical and translational science research indicators to support patient, community, and policy outcomes. The RE-AIM framework addresses the interactions at the individual, clinic or organization, and community levels that affect the population-based health outcomes of programs or policy. These efforts serve to gauge the impact of the CDCC and RADx-UP projects, assess the extent of stakeholder engagement, and inform the direction and focus of the RADx-UP consortium to address health disparities.

Community Engagement Core

The CDCC community engagement core identifies and strengthens strategic partnerships across the RADx-UP projects to address the needs and interests of communities that disproportionately bear the burden of illness and disease[22] and to speed the translation of innovation into practice. The community engagement core's engagement impact teams provide a conduit between projects and the CDCC components, including direct technical assistance in identifying and addressing barriers to equity in COVID-19 testing and facilitating strong community involvement and impact. These teams bring together researchers, health system leaders, health care professionals, community members, and policymakers to discuss high-impact, life-saving study results ready for translation using an equity perspective. In the setting of a highly politicized pandemic where misinformation has been rampant,[23] demonstrating the trustworthiness of the scientific, medical, and research enterprise is of paramount importance.

Community stakeholders are essential to ensuring that testing meets their needs.[24] To this end, the core's Engagement Resource Center offers a publicly available knowledge repository of RADx-UP resources.[25] The core has also established workgroups to provide alignment, engage with community partners, and support projects serving particular populations (e.g., tribal nations, children) with shared common goals. The RADx-UP Community Collaboration Mini-Grant Program provides funding to community-serving groups and faith-based organizations, as well as tribal nations, to help mitigate the COVID-19 spread. In addition, considering the need for rapid acceleration of this process and the urgency in developing a research-ready system during times of public health crisis, the CDCC adopts innovative approaches to stay true to community-engaged research practices. In particular, we have observed a tension between generating much-needed information quickly and nurturing trust through thoughtful and deliberate engagement.[26] The community engagement core ensures that community partners play a critical role in the development, design, prioritization, implementation, and evaluation of research initiatives that are culturally and contextually appropriate.

Testing Core

The CDCC testing core provides technical assistance and scientific guidance on existing and emerging COVID-19 diagnostics, testing supply management, and implementation by developing, curating, and maintaining a repository of emerging technologies and disseminating diagnostic technology assessments. The testing core specifically provides technical expertise to support project teams in conducting studies or evaluations using diagnostic tests for COVID-19. This support includes (1) reviewing the protocol to match testing methods with specific project study designs and unique needs of the communities served; (2) promoting reach and access to testing sites (particularly for underserved populations); (3) navigating cost and supply chain challenges for reagents, sample collection devices, and kits; and (4) advancing and fast-tracking resources for at-home collection and shipping to increase reach to underserved communities. The core also supports a partnership with Arizona State University that offers access to an online repository (https://radx-up.org/covid-19-testing-commons) of existing and emerging COVID-19 testing technologies to help match appropriate test procedures with target populations.

Like the community engagement core, the testing core faced challenges and gained insights during start-up. These include training by faculty and

staff to remain current with updated federal guidelines and newly approved test methods as regulations change. The core is particularly sensitive to the history of unethical and inappropriate research involving underserved populations; accordingly, the CDCC has committed to an assessment of diagnostic technologies that have completed appropriate regulatory approvals. The progression of the pandemic and the development of vaccines have expanded the focus of testing to include serological assessments of disease- and vaccine-induced antibodies. As a result, vaccine availability, distribution, and associated hesitancy has shifted popular sentiment regarding testing for active viral infection, which has required deliberate messaging about why such testing remains essential.[27] This shift may affect whether projects can fully execute their testing plans, given that vaccines are available to participants and may affect future testing uptake. The community engagement and testing cores work together to foster uptake of testing in sexual and gender minority populations, communities of essential and service workers, and those facing environmental exposures.

Data Science and Biostatistics Core

The CDCC's data science and biostatistics core supports awardees' data collection, data integration into a public repository, and data-sharing activities. The core employs standardized terminology for health data domains and draws from a set of NIH-approved common data elements (CDEs)[28] that are recommended for use in clinical research to enhance data quality and support aggregated data analysis across sites and over time. This ambitious NIH effort aims to collect CDEs across a consortium of diverse projects in underserved populations. The CDCC will develop a research infrastructure to knit projects together into a unified network to facilitate data sharing and the reporting of results across projects. The data science and biostatistics core established data-sharing informed consent documents and data use agreements as research infrastructure elements to create a network with unified approaches. The core combines project data sets to create the RADx-UP data warehouse and links program data and external data sets (e.g., the American Community Survey, US Census) in an integrated data repository available to investigators, community members, and the public through a data-sharing and visualization portal. The portal enables the rapid sharing of data, collaboration, and identification of best practices and strategies for overcoming barriers across projects.

This infrastructure addresses an essential and urgent need of communities served by RADx-UP: community-level data on testing to craft appropriate policy responses to the pandemic. At the same time, community leaders and investigators have raised concerns about data sharing because of the potential for group harm inherent in research with underserved populations.[29] To promote transparency while maintaining data security, the core has implemented an innovative, cloud-based platform developed in collaboration with Microsoft (Redmond, WA) using the Azure cloud. The core also is creating processes, communications, and dissemination methods to ensure that national leaders can learn from communities and that communities in RADx-UP can learn from each other. The data collected by the RADx-UP projects and sent to the data science and biostatistics core includes CDEs from study participants, interviews, and focus groups. The core also collects process data (e.g., collected during engagement impact team and working group sessions) for the evaluation team. The core has organized and convened a data stewardship committee to (1) review the ethical and practical tensions inherent in data use, (2) ensure respect for data sovereignty with tribal nations, (3) communicate the need for standardized data at the community level, and (4) determine the best practices for sharing information back with projects and communities.

This approach fosters trust in COVID-19 research by addressing community-driven research questions, improving the quality of research by streamlining processes, and providing community members with the data they need to foster advocacy and inform future research valuable to communities. The core establishes policies for privacy, security, access, release, and publication to enable the sharing of RADx-UP data and knowledge assets to reduce the impact of COVID-19. The core complements these efforts with continued education about the benefits of CDEs and the need to collect identifiers to support data linkage with external data sets. This approach balances the selection of CDEs and the ability to generate shared data, evidence, and new knowledge with the burden on projects and participants.

EARLY INSIGHTS FROM RADx-UP

The RADx-UP CDCC's goal is to deliver a research-ready system responsive to questions that communities are asking, move evidence to action, and reduce

health inequalities related to COVID-19 and beyond. Fast-moving projects share a robust and preexisting relationship with community partners and tailored community engagement strategies to ensure access for the communities served. These strategies include the following:

1. testing that is inclusive, community-centered, and accessible (i.e., convenient locations and times, particularly for rural and minority communities);
2. programming that is culturally and linguistically responsive;
3. friendly messaging;
4. diverse and bilingual leadership and staff who reflect the communities served with access to accurate materials and information; and
5. resources and services made available mainly to underserved families.

To overcome barriers to testing, RADx-UP projects also provide rapid testing; locate testing sites in communities; share recommendations from family, friends, or trusted community members about testing sites; and offer linkages to services and support for those who test positive. Projects also strive to mitigate COVID-19 disparities, including networking with community pharmacy partners, providing significant numbers of testing personnel to ensure an efficient and nondisruptive process, offering special support for the elderly, and countering misinformation regarding test accuracy with community education. Key lessons have included ensuring that the informed consent acknowledges equity, does not ask for identification (to avoid reduced utilization among undocumented immigrants), and allows opt outs for saving specimens for future research. In addition, projects have found that a flexible approach allowing iterative adaptation incorporating community feedback (e.g., through bilingual coalitions) has the greatest potential to promote project success. These observations exemplify the ultimate purpose of RADx-UP to engage with community partners to successfully reduce COVID-19 disparities and address the social determinants of health for long-term health equity.

CONCLUSIONS

The CDCC has adopted an infrastructure that aims to center the needs and interests of underserved populations. Consistent with a precision public health approach, the RADx-UP program aims to create the foundation to minimize health inequalities and advance health equity effectively through tailored interventions in communities.[30] Furthermore, RADx-UP will highlight how community engagement approaches may vary for different populations and how understanding this may increase access to COVID-19 testing and vaccines. RADx-UP will gather and aggregate context-specific data from different communities to address questions about health disparities relevant in the heterogeneous landscape of underserved populations, while applying a framework that acknowledges social and structural factors as key drivers of health inequalities and involves collaboration with community members. AJPH

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Engaging Asian American Communities During the COVID-19 Era Tainted With Anti-Asian Hate and Distrust

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COVID-19 has created disproportionate burdens for Asian Americans,[1–4] the fastest-growing racial group by immigration in the United States.[5] "Asian American" refers to a diverse population of over 40 cultural groups with distinct languages.[6] California has the highest number of COVID-19 cases,[7] and is also home to the country's largest number of Asian Americans, constituting 16% of the state's population.[5] Structural barriers, including low health care access and undertesting, have contributed to excess COVID-related mortality and burdens among Asian Americans.[8,9] Asian Americans may face additional sociocultural challenges to fully engage in appropriate COVID-19 protective measures, including limited English proficiency, mistrust of governmental or health authorities, fear and social stigma related to COVID-19, and exposure to the misinformation infodemic.[9–13]

The COVID-19 era of mistrust and information overload creates significant challenges to empowering community members to access credible, timely, and linguistically appropriate information. With support from the National Institutes of Health–funded Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) initiative,[14] Project INFORMED (INdividual and Family Oriented Responsive Messaging Education; ClinicalTrials.gov Identifier: NCT04893265) was designed to help Chinese, Hmong, and Vietnamese Americans make well-informed decisions about safety measures, testing, and vaccination for COVID-19. Herein, we describe lessons learned from engaging Chinese, Hmong, and Vietnamese Americans during the pandemic through the implementation of INFORMED. We also provide examples of recommended strategies derived from these observations and lessons learned, which may prove valuable for engaging underserved communities in facilitating health education during the COVID-19 pandemic and beyond.

INFORMED DECISION-MAKING ON TESTING AND VACCINATION

INFORMED, an ongoing community-engaged research project, has been implemented to work with Chinese, Hmong, and Vietnamese communities in urban northern and rural central California since October 2021. INFORMED aims to provide up-to-date culturally and linguistically appropriate information about COVID-19 that is responsive to the rapidly evolving pandemic in convenient locations (e.g., homes) via video conferencing and text messaging. INFORMED project partners include

1. Three community agencies in San Francisco, Fresno, and Santa Clara counties with extensive histories of providing culturally and linguistically appropriate social services and health education for Chinese, Hmong, and Vietnamese communities;
2. Ten academic researchers with expertise in psychology, public health, health communication, clinical medicine, laboratory medicine, medical anthropology, biostatistics, and community-based participatory research;

3. Nine lay health workers (LHWs; two Chinese, four Hmong, and three Vietnamese), with cultural and linguistic backgrounds like those of the participants, who serve as trusted health messengers; and
4. Eight advisors with expertise in mass and social media, patient health education, social services, and Asian American health care as Community Advisory Board members.

Initial insights are largely drawn from observed engagement of the first 177 INFORMED COVID-19 trial participants (83 Chinese, 14 Hmong, and 80 Vietnamese) in an intervention consisting of health education sessions with LHWs, a project Web site, and text messaging. This is coupled with insights from initial analysis of in-depth interviews conducted with 17 key informants (KIs; six Chinese, six Hmong, and five Vietnamese).

ENGAGING ASIAN AMERICANS IN THE COVID-19 ERA

We synthesized initial lessons learned during study implementation (October 2021 to March 2022) and recommend three strategic foci—*culture, capacity*, and *convenience* ("the three Cs")—that played interrelated roles in engaging Chinese, Hmong, and Vietnamese community members from recruitment to participation in INFORMED (Figure A, available as a supplement to the online version of this article at http://www.ajph.org).

The First Strategic Focus of Engagement: Culture

First, we recommend embracing cultural facilitators when engaging with communities. *Culture* draws attention to cultural values and practices, specifically in utilizing trusted health messengers or culturally appropriate communication channels in delivering credible information. The rapidly evolving pandemic, ubiquity of misinformation, and confusion from information overload or scarcity have underscored the profound need to receive COVID-19 information from trusted sources. Navigation needs were especially pronounced among older community members. For example, an elderly monolingual Hmong KI relied on the few Hmong social media platforms to update him on COVID-19 information, including the proper use of masks and hand sanitizers. Similarly, Vietnamese KIs shared the importance of accessing COVID-19 testing and vaccination in familiar locations, such as local pharmacies served by Vietnamese-speaking staff. Several older Chinese KIs mentioned obtaining COVID-19 information through WeChat (popular especially among Chinese participants).[15]

Trusted health messengers. LHWs are trusted health messengers who share cultural and language backgrounds similar to those of the communities of focus.[16] LHW outreach interventions have effectively promoted health, including cancer screening and smoking cessation among Chinese, Hmong, and Vietnamese Americans.[16–19] When conducting educational sessions, LHWs built trust among their participants by presenting information from credible and recognized sources (e.g., University of California researchers and local community agencies). LHWs also shared personal anecdotes and experiences with COVID-19 testing and vaccination to engage trial participants.

Communication channels. To comply with COVID-19 safety practices, we designed study participation to be entirely remote. INFORMED utilized various channels to deliver COVID-related education, including text messaging, an in-language educational Web site, and LHW interactions with trial participants via educational sessions on Zoom and follow-up telephone calls. All trial participants received weekly text messages over the course of 12 weeks in their preferred language regardless of their group assignment; these covered topics from COVID-19 impacts to testing and vaccination resources. Half of the participants were randomly assigned to participate in small group educational sessions with their LHWs using Zoom at a mutually agreed-upon time. All trial participants had used text messaging, but about half were new to Zoom. Two trial participants joined by telephone to participate in the sessions using hard copies of the presentation handouts that they picked up before the session at a local pharmacy that was convenient to them. LHWs also conducted individual telephone calls to follow up with each participant to address questions. A Vietnamese trial participant commented on the survey that Zoom meetings were highly acceptable: "*Họp trên zoom rất sống động, rất thú vị và học hỏi nhiều điều mới lạ*" ("Meeting on Zoom was very lively, very interesting and [I] learned many new things"). Overall, using multiple culturally appropriate communication channels to engage community members across generations was essential.

The Second Strategic Focus of Engagement: Capacity

Second, we recommend integrating intervention strategies to build capacity when engaging with communities. *Capacity* relies on an individual's knowledge and

skills in transforming knowledge into action, such as adhering to COVID-19 safety measures. This involves identifying the community's evolving needs, including knowledge gaps, misinformation, and barriers to the targeted actions (e.g., getting tested or up-to-date on COVID-19 vaccination). One key objective was to craft health educational messages in the preferred language, considering cultural context to facilitate understanding and decision-making in practicing recommended COVID-19 safety measures. The following are examples of evolving community needs that guided our responsive engagement strategies.

Evolving community needs. One of the prominent evolving community needs was related to barriers to COVID-19 testing. Some Chinese LHWs reported that most of their trial participants only tested because of work regulations or symptoms. Many Chinese-speaking participants refused testing for fear of catching COVID-19 by congregating at testing sites. A Vietnamese KI shared their anxiety about having to wait several days to get tested and potentially exposing those around them to the virus. Older Hmong KIs shared that they were limited to a COVID-19 testing site with Hmong staff, which only offered testing once a week. Younger Hmong participants who were bilingual in English and Hmong, however, did not have the same challenges accessing COVID-19 testing.

Concerns about vaccination. Although most KIs were fully vaccinated, they expressed concerns about long-term side effects of the vaccines and the need for booster shots. Some Vietnamese KIs questioned the evidence supporting the fourth dose and doubted that it could prevent COVID-19 infections. KIs from all three groups expressed concerns about vaccinating children, mentioning fears that it would change DNA, lead to autism, or affect development. LHWs also noticed that their participants expressed concerns about the vaccine's effects on growth and development among children. Thus, acknowledging community members' concerns about booster vaccination and vaccination in children was important in guiding our engagement strategies.

Emerging and unmet mental health needs have become apparent in the context of the pandemic. Several KIs shared the mental health toll of practicing COVID-19 prevention strategies, such as limiting social interactions. A Chinese KI described being "imprisoned at home" for the past two years. Several Hmong KIs indicated the need to provide psychological support, including virtual mental health services for COVID-19 patients during their diagnosis and fears about quarantine. A Chinese KI provided unprompted descriptions in the interview that she was concerned about safety and anti-Asian racism.

Responsive strategies. Drivers for engagement and participation in the project include interest in the latest news, credible information, and information that is easy to comprehend. INFORMED educational content was guided by literature and input from the Community Advisory Board on evolving needs of respective communities. The project's core messages were modified in response to feedback and questions from LHWs and their participants, the ongoing and changing pandemic, and insights from in-depth interviews with KIs. Each text message provided an image with brief information on a topic; a link to the project Web site providing additional relevant, current, and credible information; and links to the Centers for Disease Control and Prevention and to state and county public health departments that address specific concerns, such as booster vaccination and vaccination in children. To accommodate the literacy levels of some Hmong trial participants who could not read, the weekly text messages were offered in both visual and audio formats. In addition, we also crafted messages with high relevance to our communities.

For example, the first weekly text message—"COVID is a serious problem among Asian Americans. Find out why here: http://covid-informed.org/en/messages/1"—was used to engage trial participants in learning and sharing their views about the impacts of COVID-19 on Asian Americans. One Chinese trial participant wrote, "Covid 病毒对我们影响极大.不敢出街.又怕被别人挨打。" ("The COVID virus has a great impact on us. We dare not go out. We are afraid of being beaten up by others"). Another participant mentioned the rampant discrimination against Chinese people, commenting, "COVID-19 对中国人在美的影响很大,歧视华人" ("COVID-19 has a great impact on Chinese people in the US, discriminating against Chinese"). As of March 2022, this first message received 68 comments from trial participants, including 37 likes, two dislikes, and 29 individual written comments. These observations supported participants' high acceptability and comfort level in utilizing the study Web site to share their concerns.

The Third Strategic Focus of Engagement: Convenience

Third, we recommend incorporating methods that would be convenient for community members when engaging them. *Convenience* focuses on facilitating

easy access to updated information and recommendations. Creating opportunities for accessing trustworthy information in a preferred language through convenient communication channels was important in engaging community members.

In-language outreach. Our Chinese LHWs, trial participants, and KIs used WeChat,[15] a social media messaging app popular among the Chinese, as a source of COVID-19 and health-related information. A Chinese KI mentioned that she needed to gather information from multiple sources because she did not trust the common narrative about vaccines and wanted to understand all sides. Hmong KIs shared that they used Google, local TV, YouTube, and social media to acquire COVID-19 information. LHWs working with Hmong and Vietnamese communities shared that texting and telephone calls remained the most frequently used and preferred methods of communication. Despite the risk, community members with limited English proficiency expressed a preference for in-person meetings for learning new information. For example, COVID-19 centers located in familiar and easily accessible locations, such as pharmacies in popular Vietnamese shopping areas with Vietnamese-speaking staff, served as a convenient source of COVID-19 testing and vaccination information. A monolingual Vietnamese-speaking KI shared that it was easy for her to get tested because the staff spoke Vietnamese and the location was convenient.

Convenient channels. Establishing a trusting relationship remains an important initial step. Although most trial participants (all Chinese and Vietnamese and a majority of Hmong) had their educational sessions online via Zoom video conferencing, some monolingual Hmong participants preferred to meet in person. Following the agency's COVID-19 safety protocol, our Hmong LHWs hosted in-person group sessions at the Fresno Center, a well-known social service agency that is in a conveniently accessible location.

Once enrolled, participants were scheduled to receive automated SMS text messages that delivered 12 weekly messages in their preferred language (English, Chinese, Hmong, or Vietnamese). Each message included a short text and an image with information about the COVID-19 topic. Clicking on links within the text message brought participants to the INFORMED Web site, where they could read more about that specific topic, find additional resources to explore, indicate like or dislike, and write comments. As of March 2022, 476 comments were made in Chinese, Vietnamese, and English by 75 unique trial participants across the 12 message boards, representing 63% of the trial participants who visited the Web site and 42% of all the enrolled participants at the time.

In addition, participants also received text message alerts about relevant COVID-19–related events or news, such as notifications of free at-home COVID-19 testing kits, community seminars, and new COVID-19 vaccination sites with language support. Alerts were also sent to participants for culturally appropriate celebrations or events, such as a greeting for Lunar New Year. A Vietnamese trial participant commented that information on the Web site was very helpful: "*Các thông tin về covid 19 rất hữu ích và thú vị, do đó xin luôn cập nhật*" ("The information about COVID is very useful and interesting, so please keep it up to date"). Another Chinese trial participant also shared appreciation for the educational contents of the program and the convenience of text messaging: "*喜爱,提供很多内容另我知道得更多关于疫苗和疫情的资信,短信传递方便!*" ("Love it. It provides a lot of content and I know more about vaccines and the pandemic information. SMS delivery is convenient!")

CONCLUSIONS

The research team benefited from the trust established by long-standing partnerships among community organizations, academic institutions, and community members to create culturally appropriate study activities to further understand evolving needs and develop potential solutions to facilitate information-seeking behavior. This was achieved by practicing humility when examining facilitators and barriers concerning COVID-19–related health for specific cultural groups and socioeconomic characteristics.

Based on our findings thus far, we strongly recommend considering the three Cs (*culture*, *capacity*, and *convenience*) in designing strategies to engage communities to stay informed and take charge of their health during a novel emergency encounter such as COVID-19. Applying the three Cs as strategic foci could be considered to promote health equity and to build the foundation for culturally and linguistically appropriate, trusted, accessible, and timely community engagement. To move beyond engagement, we recommend collaboration as early as study conceptualization. Our recommendation highlights the importance of using a responsive, multipronged approach to facilitate a colearning process for collaboration and nontransactional partnerships among researchers, community members, and community organizations.

PUBLIC HEALTH IMPLICATIONS

COVID-19 has caused significant burdens in the United States and globally. Timely and effective communication of accurate COVID-19–related information to underserved communities has become more critical than ever and has faced unprecedented challenges. This article shares insights gained from successful initial efforts to engage three Asian American communities in COVID-19 education and provides examples of core elements in engaging Asian American communities, with attention to culture; capacity to meet evolving needs, including knowledge and practical resources; and creation of convenient, accessible, and trusted channels to facilitate reach. AJPH

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

The study was approved by the institutional review board of the University of California San Francisco—Getting Asian Americans INFORMED to Facilitate COVID-19 Testing and Vaccination (study no. 20-32933).

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Paths to Improving Pandemic Preparedness in Jails and Prisons: Perspectives of Incarcerated People and Correctional Staff

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People who live and work in carceral settings are at high risk for COVID-19.[1] As of September 30, 2022, at least 622 968 people incarcerated in US prisons and 230 168 staff members had been diagnosed with COVID-19, and 3185 had died.[2] Compared with rates among the general population, average COVID-19 case rates in state and federal prisons are five times higher[3] and mortality rates are at least double.[4,5] Likewise, communities that are near correctional facilities have higher rates of COVID-19.[6]

Carceral systems, however, have not been fully integrated into public health responses to the pandemic. Few local governments have incorporated jails and prisons into their strategies for COVID-19 response and preparedness.[7] The World Health Organization's recent comprehensive framework for COVID-19 response recommends that all countries conduct a substantive equity and inclusion analysis to inform programming, which should rely on "meaningful participation, collaboration, and consultation with subpopulations experiencing poverty and social exclusion."[8] Yet, the bulk of what has been written on prisons during this pandemic has been based on an external "expert" perspective, not grounded in the perspective of people who live and work in these environments.

We report on lessons learned in the first two years of the pandemic that were gleaned from a unique partnership with three carceral systems and based on 100 interviews we conducted with incarcerated people, correctional workers, and medical staff. They point to unique structural and operational challenges that carceral facilities face in prioritizing the goal of COVID-19 mitigation and highlight strategies that may improve pandemic preparedness. The methods of our study that generated these findings can be viewed in the Appendix (available as a supplement to the online version of this article at https://ajph.org). From this work, five dominant themes emerged that provide an "on-the-ground" perspective of living through COVID-19 in carceral settings and center the voices of those incarcerated and working in carceral spaces to capture the complexity of COVID-19 prevention and mitigation.

EXTERNAL AND INTERNAL COLLABORATIONS

Prepandemic governance structures did not pivot well to the collaborative decision-making that was necessary for COVID-19 prevention and mitigation. Community COVID-19 response largely excluded carceral facilities. A correctional leader described feeling left out of response efforts:

> There was no playbook of how to deal with things [in carceral facilities] and how do you adjust things. . . . The guidance I would have expected from a higher level of a state authority and even federal authority . . . was very behind with this pandemic.

When partnerships with departments of public health were initiated or fortified, carceral systems were better able to respond. For instance, one administrator noted, "Working with the department of health, all the testing got paid for through them, so it wasn't on the Department of Corrections budget other than the overtime for nurses."

Similarly, strategies executed by leadership or medical staff alone were often difficult to operationalize and

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unsuccessful. Medical staff said, "You cannot quarantine and isolate individuals without moving them, and their movement is dictated by security . . . and so there has to be some collaboration with security." Initially, correctional leaders were at the top of the hierarchy of medical decision-making, which meant that notions of safety superseded public health. When partnerships were developed between correctional leaders and medical staff, pandemic management improved:

> We meet every week and kind of just make sure, you know, are procedures working? Are there enough isolation beds? Are there too many people in isolation, such that they're having to be housed, you know, in . . . areas that . . . [are] unsafe?

The pandemic highlighted how carceral facilities often operate in siloes, and building partnerships between carceral systems improved collective learning. Leadership in one facility convened regular meetings with other facilities:

> We started to do a . . . [leaders'] meeting every Friday where we would talk about the issues around COVID and what everybody was doing to try to make sure we were all doing what was the best practice to everyone. We relied on each other for knowledge.

POLITICAL ECONOMY OF MASS INCARCERATION

Incarcerated people and correctional staff described the public health goals of COVID-19 mitigation, especially decarceration, as in conflict with the fiscal priorities of carceral systems. In one facility, decarceration affected the bottom line, as the operating budget was based on the population. As the facility stopped incarcerating those with low-level misdemeanors, their operating budget fell, leading to staff demotions and layoffs. Although all recognized the ability to better social distance, staff were demoralized. A correctional leader explained:

> When the pandemic hit . . . we didn't want to be transferring the inmate population . . . and possibly taking that risk of spreading COVID around. So that got shut down, which of course then we lost that revenue. And because of lost revenue, positions didn't get refilled.

An incarcerated person gave this summary:

> Everything's a numbers game. . . . They've got to keep the population steady. That way . . . they don't lose their jobs. . . . 'Cause if they release too many . . . we're the ones putting food on their table and putting their kids through college. Without us, there's no them.

INTERCONNECTED HEALTH RISKS

Implementing new policies was often difficult because relationships between incarcerated people and correctional staff were positioned as adversarial. An incarcerated person described their perception of correctional officers: "They are not here for you, and they are not here to provide for you. That's not their job. Their job is just to pass the room and make sure you're still alive, and that's basically what you're told." A correctional officer explained:

> We implemented masking policy for the inmates in custody when they were outside their assigned cells. We were not given clear direction to the degree this should be enforced. Because of this, it went entirely unenforced because enforcing rules in a carceral setting leads to conflict.

The perspective of incarcerated people and correctional staff offered glimpses of a more unified approach to infection control in these ecosystems. As one incarcerated person said:

> [I was] having conversations with the correctional officer, 'cause we were all in a similar boat. They were scared. The inmate population was scared. The nursing staff was scared.

Officers too could see the frustrations of incarcerated people, with one saying, "If there's some kind of COVID-related delay, even just a supply chain delay, . . . their commissary gets delayed. There's all these things that, you know, they rely on to make their day go by."

However, policies on COVID-19 mitigation often exacerbated a mentality of difference. Educational, testing, and vaccine campaigns were separate for staff and incarcerated people, which created different expectations and a false sense of difference in risk, when in fact both groups are at higher risk for acquiring COVID-19. Interviews revealed opportunities for a more unified approach to COVID-19 that recognized the interconnectedness of the health of the two groups. Some people said joint vaccination and testing campaigns would facilitate trust in both groups; others said mental health services for correctional staff would foster professionalism in their interactions with incarcerated people.

DISPARITY IN COVID-19 RESPONSES

The lack of parity between COVID-19 responses in the facility and the community was felt by incarcerated people

and correctional staff and was mentioned across many domains. For example, when congregate settings and first responders were named as a national priority for vaccination and carceral facilities and workers were not included as prioritized populations, incarcerated people and correctional staff reported feeling disenfranchised. A correctional leader expressed frustration about vaccine scarcity:

> Clearly, I would say from the beginning, it may have been that we didn't have enough. . . . Then I often wonder is there a political arm in that. Are there people politically that don't necessarily wanna give it to incarcerated people 'cause they're incarcerated? That honestly [I] don't know because my staff—same thing. My staff members couldn't do it either.

Incarcerated people felt the disparity in access to health information, which bred distrust:

> I can't pick up my phone and do Google right here. I can't pick up the paper and read. I can't pick up my phone and read Newsbreak. I can't—you know what I'm saying? I can't find out information I wanna find out in here. That would change my mind if I could find out more information. . . . I'm not taking anyone's word from their mouth.

Perhaps the most extreme example came in the ways that isolation, quarantine, and lockdown policies took form. Isolation and quarantine often approximated the punitive conditions of solitary confinement. Lockdowns often lasted months, during which people could not leave their cell for up to 23 hours of the day, normal programming was eliminated, and cold meals were served in the cell. An incarcerated person described it as follows:

> You're locked in a cell 23 hours a day, you know, maybe even longer during the pandemic, because they weren't really letting us out of our cells. We were eating in our cells. You only got like maybe a 10-minute shower.

Furthermore, when community standards for social distancing relaxed once vaccinations were available, programming and movement in facilities continued to be restricted.

But when correctional leadership changed policies to simulate parity with community standards, mitigation efforts improved. For instance, when financial incentives for vaccination were being offered in the community, medical leadership in one carceral system advocated the same incentive for incarcerated people and eventually succeeded. A medical leader said:

> I had been talking with a colleague who I meet with pretty regularly at the State Department of Health about this and saying like, "You know, there's all these community incentives. Like, why are we not giving people in jail these same incentives that they'd otherwise get in the community?"

This approach was also applied to guide decision-making in returning to prepandemic operations. A medical leader said:

> We're always keeping in mind community standards, so recognizing that we're in a [carceral facility] but also being aware of what people just in general in our community have access to. So, when the health department here was making recommendations to open things up in our community due to the vaccination status of people . . . it makes some sense to us to try and extend that . . . for our patients here.

INCLUSION IN DECISION-MAKING

Incarcerated people and correctional staff have a unique role to play in pandemic preparedness. Incarcerated people provided ideas for improvements, including testing logistics, vaccination campaigns, best practices dissemination, and approaches to building trust between medical staff and patients. A medical staff member explained the informal role incarcerated people played in collaborating for COVID-19 testing and education:

> The public health staff were hearing from other inmates that would say, "I know how you can get so-and-so to get tested," or "Let me get so-and-so to come in, and we're gonna have a little discussion," because at that point it was like peer pressure because people didn't wanna see their friends get sick from it. A lot of them saw some very sick people.

Several people remarked on the importance of cultivating leadership among correctional officers to operationalize mitigation strategies as well. For instance, a medical worker said:

> [Security leadership] talked about wanting to make sure that a lot of the union leaders were on board and making sure that they had gotten it. Again, 'cause people respected them and felt that, you know, well, if this person is getting it and trusts it, then I can trust it.

In this study we relied on experts who live and work in carceral settings

to understand the COVID-19 response and how to facilitate public health preparedness in these settings. Existing public health structures did not adequately facilitate collaboration in facilities and across sectors. Our data support a recent policy analysis of the existing linkages between states' departments of health and departments of corrections, which revealed that only nine states had a comprehensive working relationship between corrections and health.[9]

Even in places that have preparedness plans in place, our results indicate that COVID-19 responses would be more successful if existing norms in carceral systems were challenged. First, decisions that prioritized health were possible when carceral systems moved to a collaborative process that included medical professionals in decision-making. Second, anchoring decisions and policies to mirror community trends (e.g., vaccine access and testing, quarantine and isolation, and return to prepandemic policies) was a powerful advocacy tool for leadership. Third, underscoring a unified approach to interventions for staff and incarcerated people is crucial.

These strategies require disrupting power structures to improve health and save lives. The prevailing organizational structures of most carceral settings compromise health promotion and pose challenges to effective COVID-19 mitigation strategies. Furthermore, the dominant structures of public health and community health care systems do not include carceral systems as relevant partners. Intentional maintenance of multisector partnerships, even in nonpandemic times, is vital to ensuring that carceral facilities are agile enough to respond to emerging public health crises. These efforts should include public health experts, health care providers, incarcerated people, and carceral entities.

Another important finding from these interviews is that the fiscal model of carceral institutions was at odds with public health goals. These are not novel findings, as other scholars have reported on decarceration and its political consequences in rural communities.[10] However, our study confirms that respondents who worked in carceral facilities often found decisions about COVID-19 to be in conflict with the financial realities of running a carceral system and suggests that for sustained decarceration, investment in other sectors, particularly local economies where facilities are sited, are required to avert harm to families who work in corrections.

There are some limitations to the study we conducted that led to these core themes. We conducted interviews in carceral settings that were open to research partnership and may not wholly reflect the circumstances of many people who live and work in carceral systems. Also, we were unable to conduct in-person interviews, which may have affected personal connection during interviews. Nevertheless, the themes that emerged from this work were robust and encompassed input from a wide array of people from multiple facilities.

State and federal governments should take steps now to improve the preparedness of carceral systems for future waves of COVID-19 and subsequent public health emergencies. Our study reveals the invaluable contributions that those affected by COVID-19 in carceral settings could offer in redefining carceral governance and operations so that they are aligned with the goals of public health. AJPH

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Understanding Barriers to COVID-19 Testing Among Rural and Urban Populations in Kansas

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Significant disparities in COVID-19 prevalence and related hospitalization and mortality rates are well documented. In particular, historically excluded racial and ethnic minoritized populations and rural populations have been disproportionately affected by COVID-19.[1,2] Similarly, although diagnostic testing is a standard element of infectious disease control, disparities in COVID-19 testing by race, ethnicity, and rurality have been noted.[3–5]

Urban and rural differences in COVID-19–related preventive behaviors, such as wearing a mask or sanitization procedures, have been noted.[6] Few studies have examined barriers to COVID-19 testing in both urban and rural populations. In one study, 1288 Arkansas residents responded to a qualitative question about barriers to testing, and the identified barriers included confusion about when and where to go for testing, lack of accessible testing, pain associated with testing, and delays in getting results.[7] A study of five focus groups conducted with Black residents of urban and rural Alabama communities identified multiple barriers to testing, including fear of getting the virus from testing; distrust of health care, rooted in a lengthy history of systemic racism and mistreatment; inaccessible testing; a lack of understanding around criteria for testing; and cost.[8] Neither study described similarities and differences between urban and rural respondents.

Although access to care is affected by rurality, and residents in rural communities experience higher risks for a variety of acute and chronic health conditions,[9] little is known about differences between rural and urban communities in barriers to COVID-19 testing. The purpose of this study was to identify barriers to COVID-19 testing experienced by underserved or historically excluded populations, specifically examining similarities and differences between urban and rural respondents.

The primary aim of the Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) Kansas project was to examine barriers to COVID-19 testing in rural and urban communities, and among racial and ethnic minoritized populations, and rapidly deploy interventions and strategies to increase COVID-19 testing for at-risk communities. RADx-UP Kansas was conceptualized and implemented by an academic–community partnership, which included a community member (B. C.) as a co–principal investigator. To better understand the barriers to testing that are experienced by underserved and historically excluded populations, this cross-sectional needs-assessment effort was nested within the broader RADx-UP Kansas project. A mixed-methods approach, including a community survey and key-informant interviews, was used to describe the barriers to testing and perceived assets to support testing. A full description of the methods used in this study is available in Appendix A (available as a supplement to the online version of this article at https://ajph.org).

IDENTIFIED BARRIERS TO TESTING

In total, 2196 respondents completed the survey between June and August 2021. Respondents in urban counties were more likely than those in rural counties to identify one or more

barriers to testing (38.6% vs 32.1%; $P = .001$). The specific types of barriers to COVID-19 testing identified by respondents in rural and urban counties are described in Table 1. More respondents in urban counties (6.8%) than rural counties (3.8%) noted that they did not know where or how to get tested ($P = .002$) or reported that testing did not occur at a site that was convenient (6.3% vs 4.2%; $P = .03$).

Interviews were conducted with 92 key informants. Qualitative analysis of interviews resulted in the identification of six overarching barriers: access to testing, test-related procedures, consequences of testing, cultural beliefs, misinformation and poor communication, and political beliefs and 28 subthemes shared by more than one county (Table A, available as a supplement to the online version of this article at https://ajph.org). Themes described as dominant in rural counties appeared either exclusively or in most of the rural counties but not in the urban counties, whereas the reverse was true for themes identified as dominant in urban counties. Additional information regarding themes and quotes is available in Appendix A.

The most commonly reported barrier was a subtheme of consequences of testing: "fear of lost income or employment associated with isolation or quarantine." This was illustrated by one participant who stated, "our Hispanic community has been really reluctant to test. Most of them work jobs that if they test, they lose their job if they're positive . . ." [Urban community 1 participant].

Common barriers for both rural and urban RADx-UP Kansas communities included the theme of "access to testing" and subthemes of "lack of transportation" and "lack of language supports for languages other than English."

Three subthemes appeared to be dominant in rural counties. Under the theme of "political beliefs," the subtheme "politicization of COVID-19 mitigation and response efforts" was an identified barrier for most rural counties. One participant noted,

> Sometimes it comes down to political party affiliation, which is sad, but it became a political time bomb at some point. I think you are probably going to find liberal people more likely to get tested, and some people who might be very wealthy, but more to the Republican side might not because they might feel like it is more of a sham or what have you. . . . [Rural community 4 participant]

Within the theme of "access to testing," another barrier that emerged among rural communities was the subtheme "concerns and contradictory information about the cost of testing." Within the theme of "consequences of testing," the subtheme of "documentation required and interacting with any official governing body increasing risk of deportation" was reported as a barrier in most rural communities. One participant stated,

> a family member that went and got tested and tested positive . . . the health department calls you to make sure that you have to stay home, but then I think a couple of days after, the sheriff stop by. . . . It's just checking to

TABLE 1— Factors That Would Prevent Survey Respondents From Getting a COVID-19 Test: Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) Kansas, June–August 2021

	Rural (n = 1263), No. (%)	Urban (n = 933), No. (%)	OR (95% CI)
One or more barriers to testing	405 (32.1)	360 (38.6)	1.33 (1.12, 1.59)
Tests are not accurate	93 (7.4)	71 (7.6)	1.04 (0.75, 1.43)
I don't know how or where to get tested	48 (3.8)	63 (6.8)	1.83 (1.25, 2.70)
Local testing occurs during times when I can't go	94 (7.4)	85 (9.1)	1.25 (0.92, 1.69)
Testing does not occur at a site that is convenient for me	53 (4.2)	59 (6.3)	1.54 (1.05, 2.26)
Test is too expensive	63 (5.0)	54 (5.8)	1.17 (0.81, 1.70)
I don't know the testing criteria or I get conflicting information about getting a test	67 (5.3)	39 (4.2)	0.78 (0.52, 1.17)
I have heard testing is painful	123 (9.7)	83 (8.9)	0.91 (0.68, 1.21)
I don't want others to know if I test positive	16 (1.3)	14 (1.5)	1.19 (0.58, 2.45)
COVID-19 doesn't exist, so there is no reason to get tested	10 (0.8)	13 (1.4)	1.77 (0.77, 4.05)
Other	32 (2.5)	39 (4.2)	1.68 (1.04, 2.70)

Note. CI = confidence interval; OR = odds ratio.

> make sure that they're OK, but not everybody sees it that way, and they get afraid, or they get scared. [Rural community 6 participant]

Participants from urban counties identified one barrier that was not identified by rural county participants. Within the theme of "cultural beliefs," the subtheme of "lengthy history of mistrust resulting from historic and systemic mistreatment" was identified by urban participants as a barrier to COVID-19 testing. One participant reported,

> Some of them are not going to get tested because of the Tuskegee Experiment. . . . It resonates within our community. So, there are a lot of skeptics . . . "remember what happened with Tuskegee Experiment, no, we're not going to do that." And that voice, that conversation is still going on. It's very loud and very clear. [Urban community 3 participant]

IMPLICATIONS FOR PUBLIC HEALTH RESEARCH AND PRACTICE

The aim of this study was to identify barriers to COVID-19 testing experienced by underserved or historically excluded populations, specifically examining similarities and differences between urban and rural Kansas residents. This study's results suggest that many barriers to COVID-19 testing for underserved or historically excluded populations are similar in urban and rural counties. For example, regardless of population density, access to testing appears to be a barrier, including perceptions of cost, a lack of transportation, lack of non-English language supports, lack of understanding the criteria for testing, and testing facilities not being available at times when people are available. Although these barriers are noted in rural and urban communities, data from the current study's qualitative interviews suggest that they may manifest differently. Consider, for example, the lack of transportation barrier. Key informants from rural counties suggested that public transportation to towns that offered testing being located miles away was a problem, whereas urban participants noted challenges with getting to sites within the same community.

There were key points of divergence, which may have implications for the ability of communities to advance testing to mitigate COVID-19. For example, key informants from rural counties reported that Hispanic residents' fears related to lack of documentation and potential deportation served as critical barriers to COVID-19 testing. Conversely, key informants from urban counties noted that a lengthy history of mistrust because of systemic racism and mistreatment from the medical community inhibited COVID-19 testing, often referencing the US Public Health Service's Syphilis Study at Tuskegee, which unethically and inappropriately targeted Black or African American men.[10]

Some differences in identified barriers may be, in part, attributable to where various ethnic and racial populations reside in the state. In Kansas, although Hispanic populations are prevalent in urban communities, there are substantial concentrations of Hispanic populations in rural areas of the state associated with the meatpacking industry, whereas Black or African American populations are concentrated in urban areas.[11]

The identification of barriers to COVID-19 testing as perceived by underserved or historically excluded populations residing in rural or urban counties offers implications for practice and research. Identification and measurement of these barriers can allow practitioners to develop interventions and communication strategies specifically designed to address these barriers. Further research to better understand how barriers vary by population, particularly among populations that are underserved and historically excluded, may aid in the development of approaches for designing and promoting COVID-19 testing opportunities that are truly accessible to all populations. AJPH

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All authors contributed to the final article. V. L. Collie-Akers, E. Ablah, S. Landry, A. Honn, and L. Mussulman were engaged in all aspects of study design, data collection, analysis, and reporting. M. Ricketts, T. Carter, C. Watson, and U. Wright supported the development of study instruments and design of data collection plans. They also reviewed findings. B. Liu supported the analysis of all data. B. Crawford and K. A. Greiner reviewed data collection instruments and provided guidance on data collection plans. E. F. Ellerbeck supported the development of study instruments and related data collection plans and reviewed findings from the study.

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CONFLICTS OF INTEREST

The authors declare that they have no known conflict of interest that could have appeared to influence the work reported in this article.

HUMAN PARTICIPANT PROTECTION

The University of Kansas Medical Center institutional review board approved all data collection procedures described here (study 00146321).

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In-Home COVID-19 Testing for Children With Medical Complexity: Feasibility and Association With School Attendance and Safety Perceptions

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The REstarting Safe Education and Testing program for children with medical complexity was implemented in May 2021 at the University of Wisconsin to evaluate the feasibility of in-home rapid antigen COVID-19 testing among neurocognitively affected children. Parents or guardians administered BinaxNOW rapid antigen self-tests twice weekly for three months and changed to symptom and exposure testing or continued surveillance. In-home testing was feasible: nearly all (92.5%) expected tests were conducted. Symptomatic testing identified seven of nine COVID-19 cases. School safety perceptions were higher among those opting for symptom testing. Clinical Trials.gov identifier: NCT04895085. (*Am J Public Health*. 2022;112(S9):S878–S882. https://doi.org/10.2105/AJPH.2022.306971)

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Children with medical complexity (CMC)—a vulnerable population with multiple chronic conditions, functional limitations, and health services utilization[1,2]—have a high risk of COVID-19 morbidity and mortality.[3] Regular access to in-home COVID-19 rapid antigen testing could be a valuable component of long-term pandemic management and may improve CMC's health by facilitating earlier detection and symptom monitoring, implementation of clinical action plans (e.g., for respiratory illness), and consideration of COVID-19–directed therapies. Similarly, testing may influence CMC's family perceptions regarding school attendance[4] and has been identified as a key priority for safe return to school.[5] Timely identification of a positive COVID-19 status in CMC may also benefit communities by ensuring that individuals caring for them in school and community settings take appropriate precautions.

INTERVENTION AND IMPLEMENTATION

We sought to establish the feasibility of an in-home COVID-19 surveillance and symptomatic testing program for CMC and identify associations with school safety perceptions. The testing program, REstarting Safe Education and Testing for CMC (ReSET),[6] used the BinaxNOW rapid antigen system (Abbot Labs, Chicago, IL), a point-of-care lateral flow immunoassay used for the qualitative detection of SARS-CoV-2 nucleocapsid antigen from anterior nasal swabs. This test is approved for use in children aged two years and older when performed by an adult under a US Food and Drug Administration emergency use authorization. During a virtual enrollment visit with a standard checklist, study personnel trained caregivers (i.e., parents or guardians) to administer BinaxNOW rapid antigen self-tests to their CMC. ReSET staff provided families with self-test kits and mailed additional kits when families requested them.

During the first three months, we instructed all caregiver participants to conduct surveillance testing twice weekly (i.e., two tests over three days at least 24–48 hours apart, per package insert instructions). We encouraged participants to conduct additional tests when there were any concerning COVID-19 symptoms or exposures. After three months of surveillance, we asked participants to choose to either continue surveillance testing (plus as-

needed testing for COVID-19 symptoms or exposures) or switch to symptom or exposure testing only (subsequently referred to as "symptom testing"). For positive BinaxNOW rapid antigen self-tests, we instructed participants to obtain polymerase chain reaction (PCR) confirmation through their community or health care providers and to follow public health isolation recommendations. We also recommended PCR confirmation for symptomatic negative BinaxNOW tests.

PLACE, TIME, AND PERSONS

Enrollment and testing began May 3, 2021, and we report data through January 31, 2022. We recruited a convenience sample of English-speaking caregivers (typically parents) of CMC aged 5 to 17 years who attended school before the pandemic. Recruitment occurred at a pediatric complex care program in the Midwest, a clinical program for CMC having three or more organ systems affected by chronic conditions, care from three or more specialists, and either five or more hospital days or ten or more specialty clinic visits in the previous year. Chronic neurologic, cardiovascular, or genetic conditions were present in 90%, 41%, and 41% of ReSET-enrolled CMC, respectively. Most CMC (73%) were assisted by enteral tubes, many (39%) received home oxygen, and 14% had tracheostomies (Table A, available as a supplement to the online version of this article at https://www.ajph.org).

PURPOSE

This study was part of the National Institutes of Health Rapid Acceleration of Diagnostics-Underserved Populations consortium, which aimed to use COVID-19 testing to support return to school for vulnerable populations. Although in-home testing may plausibly reassure families of CMC and promote safer in-person education,[5,7] unknown real-world feasibility of in-home rapid antigen testing, particularly among neurocognitively affected pediatric populations, could uncover poor uptake. Yet clinicians and families depend on reliable COVID-19 testing for CMC because their baseline health can always include symptoms consistent with COVID-19 (e.g., cough, variable vital signs, oxygen needs),[8] and limited communication can conceal new symptoms.[9] Understanding feasibility of ReSET's surveillance and symptom-based strategies could guide the design, implementation, and evaluation of large-scale testing programs for vulnerable child populations and inform the response of schools and public health agencies to future pandemics.

EVALUATION AND ADVERSE EFFECTS

We have no adverse effects to report.

ReSET's in-home COVID-19 testing program resulted in 2121 BinaxNOW tests being conducted, representing 92.5% of the tests expected among the 51 CMC enrolled during the study period. The mean ±SD number of tests per child per week was 2 ±0.18 (range = 0–6). Most tests (87.1%) were conducted without symptoms. After three months, 63% chose to continue surveillance testing, and 37% chose symptom-only testing. No caregiver or child characteristics predicted the choice for surveillance or symptom testing. Test problems were rare (3.7% of tests) and included limited child cooperation (1.3%) or the child being too ill or hospitalized (0.7%).

We plotted participants who reported that testing was "very" or "extremely" important to them each week (Figure 1). The proportion decreased from about 90% in early May 2021 to about 65% in January 2022. Throughout the study, participants choosing symptom testing had lower weekly ratings of importance to continue testing than did those choosing surveillance testing; however, importance ratings were similar in both groups during September 2021, when the SARS-CoV-2 delta variant cases were rising and school began. Ratings of importance to continue testing did not appreciably increase as SARS-CoV-2 omicron variant cases increased.

Among nine positive tests during the study period, seven were from symptomatic children, and eight of the nine positive tests occurred in the period after the first three months of surveillance. All positive tests had positive confirmatory PCR tests (0% false-positive rate). Although PCR confirmation for negative BinaxNOW tests was not required, no families reported positive PCRs following negative BinaxNOW tests (i.e., there were no known false-negative tests).

Only 57% of CMC were attending school in person at enrollment. Between enrollment and six-month follow-up, several differences existed among those choosing surveillance versus symptom testing (Figure 2). For example, CMC of caregivers selecting surveillance testing attended school in person less often than those selecting symptomatic testing (64% vs 94%, respectively; $P = .03$). Similarly, those selecting surveillance testing less often thought the school could follow recommendations to keep their child safe (29% surveillance vs 67% symptom; $P = .01$).

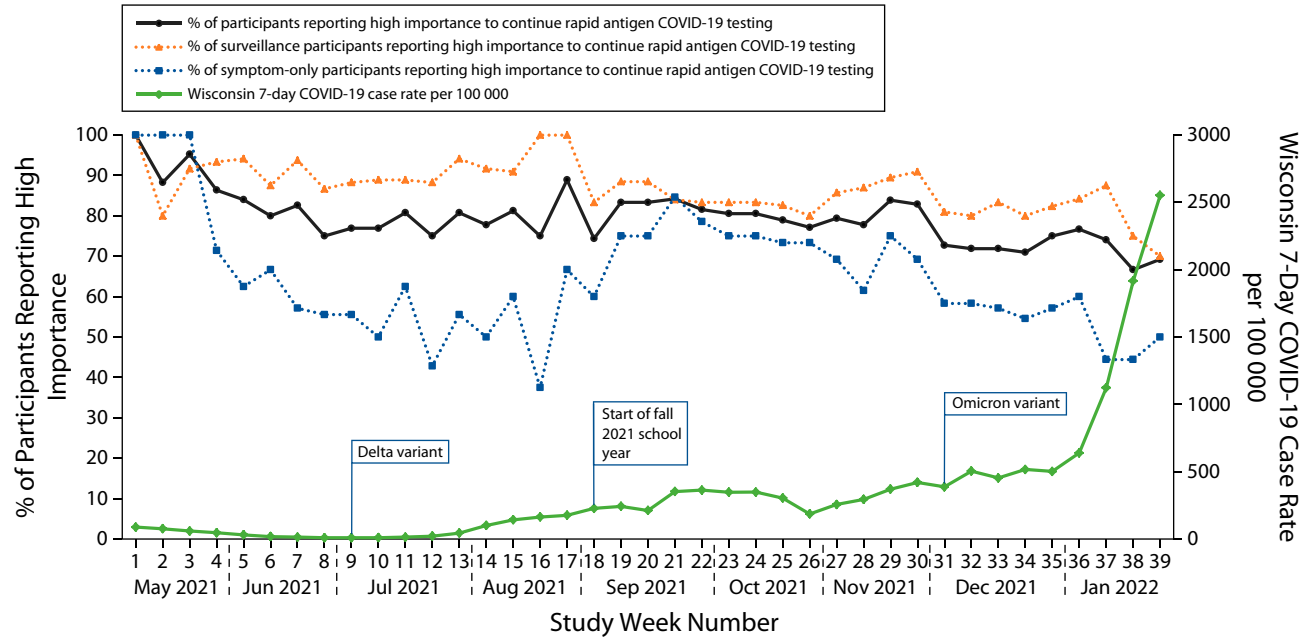

FIGURE 1— Weekly Perceived Importance of Continuing In-Home COVID-19 Rapid Antigen Testing: Wisconsin, May 2021–January 2022

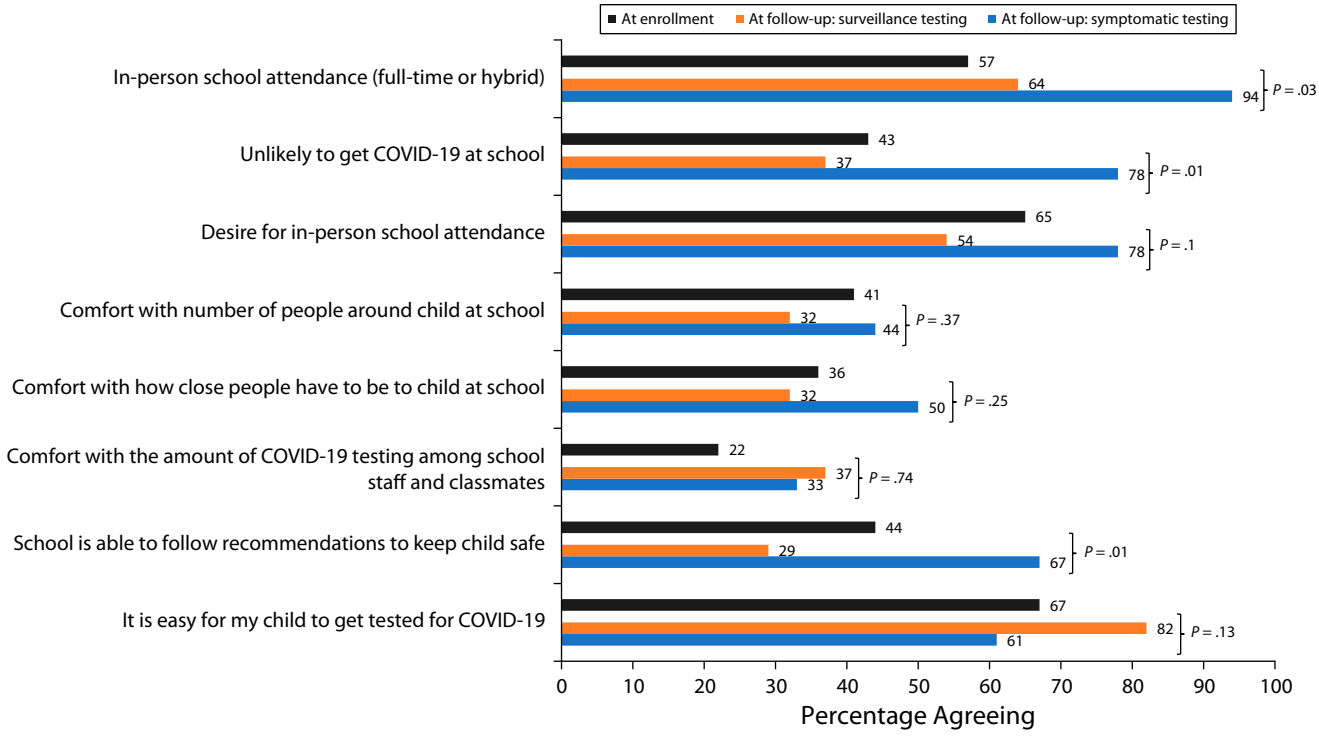

FIGURE 2— Caregivers' School Attendance Perceptions Before and After Enrollment in an In-Home COVID-19 Rapid Antigen Testing Program: Wisconsin, May 2021–January 2022

SUSTAINABILITY

In a pediatric cohort with neurologic impairment and chronic respiratory failure, the combination of high fidelity to testing frequency, test tolerability, and no attrition confirmed the feasibility of regular in-home COVID-19 testing through the ReSET program. Limitations included the single-center design and a relatively small convenience sample. False positives were rare, consistent with published BinaxNOW rapid antigen specificity greater than 99%[10,11]; however, confirmation in our real-world high-risk population is a valuable contribution.

Because nearly all positive tests occurred in symptomatic CMC (whether in the surveillance- or symptom-testing cohort), continuing the program with symptom testing only may be the most efficient strategy to sustainably identify cases. Quantifying false negatives is an important step: data suggest that lower sensitivity may occur when testing is conducted by non–health care professionals.[10]

PUBLIC HEALTH SIGNIFICANCE

The prominent role that in-home COVID-19 rapid antigen testing has in long-term pandemic mitigation was underscored by the December 2021 federal announcement that 500 million rapid tests would be freely distributed to US households.[12] Although testing enthusiasm waned with time even in a high-risk population, contextual factors likely influenced enthusiasm as much as, or more than, community transmission rates. Public health professionals seeking to motivate test uptake during periods of high community transmission likely need to identify and incorporate contextual factors (e.g., new school year, virulence) in messaging to sustain enthusiasm in communities. Finally, access to in-home testing appears to have complicated relationships with school safety perceptions (e.g., perceptions were improved only among those opting for symptomatic testing). Interventions should address the concerning proportion of CMC who have not yet returned to school. AJPH

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R. J. Coller conceptualized and designed the study, interpreted data analyses, and drafted the article. M. M. Kelly, S. M. Butteris, and M. L. Ehlenbach provided school medical adviser and clinical and medical complexity perspectives during data analyses and interpretation. M. M. Kelly, S. M. Butteris, M. L. Ehlenbach, B. Katz, S. Koval, J. A. McBride, and G. P. DeMuri contributed to study conceptualization. K. D. Howell, G. Warner, N. Werner, and M. Kieren contributed to study design. K. D. Howell, G. Warner, and M. Kieren identified and recruited study participants, collected study data, and conducted primary analyses. N. Werner contributed to data analyses. B. Katz and S. Koval provided family and school perspectives during analyses and interpretation. J. A. McBride and G. P. DeMuri provided infectious disease and severe acute respiratory syndrome coronavirus 2 testing oversight and interpreted data. All authors critically reviewed and revised the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

The study was approved by the University of Wisconsin-Madison institutional review board, and participants received $250 per quarter for participation.

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Development of an At-Home COVID-19 Test Results–Reporting System for a School District Primarily Serving Underrepresented Minority Groups, San Diego, CA, 2021–2022

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School-sponsored at-home COVID-19 testing benefits users, school administrators, and surveillance efforts, although reporting results remains challenging. Users require simple systems with tailored posttest guidance, and administrators need timely positive test information. We built a system to serve these needs and to collect data for our Rapid Acceleration of Diagnostics-Underserved Populations Return to School Program study in San Diego County, California, from October 2021 through January 2022. We describe this system and our participant outreach strategies and outline a replicable model for at-home results reporting. (*Am J Public Health*. 2022;112(S9):S883–S886. https://doi.org/10.2105/AJPH.2022.307073)

Communities Fighting COVID! Returning Our Kids Back to School Safely, funded by the National Institutes of Health (NIH) Rapid Acceleration of Diagnostics-Underserved Populations initiative (RADx-UP), is a collaboration between San Diego State University and the Sweetwater Union High School District to develop, test, and scale-up a program providing equitable access to simple, convenient, regular COVID-19 screening testing for middle school students, staff, and their families who are most affected by the COVID pandemic to reduce household, school, and community transmission.

INTERVENTION AND IMPLEMENTATION

We developed an at-home COVID-19 antigen test–reporting system for users to provide weekly screening results and receive tailored follow-up information. The system used an algorithm that followed evolving COVID-19 testing guidelines[1] for the K–12 setting from the local departments of health and education as well as Centers for Disease Control (CDC) antigen testing recommendations.[2] These include when follow-up testing is recommended, promptly notifying school administration of positive test results, reporting test results to the local health department, and collecting data for our NIH-funded RADx-UP Return to School Program study. This multisector Public Health 3.0 partnership[3] was effective because of the attentiveness to stakeholder needs and the centering of community voices as relayed by frontline study staff.

As originally developed, the system involved the following:

- was available in English and Spanish;
- provided registration and results reporting through a Qualtrics (Seattle, WA) user interface;
- used an application programming interface from Qualtrics to a customized application reporting system;
- linked weekly results reporting to enrollment data through study IDs;
- generated weekly e-mailed testing reminders with a unique link to access the results-reporting survey without requiring participant study IDs;
- provided generic QR (quick response) codes on study materials,

allowing participants to scan and access the results-reporting survey, although this required study IDs to be entered;
- generated daily test results reports in an application reporting system using data received through the previously described application programming interface, which we securely submitted to the county health department;
- facilitated daily test results reports sent through encrypted e-mail to school officials;
- used an algorithm based on local health department K–12 guidelines and CDC antigen testing recommendations, provided participant vaccination history, and reported symptoms, previous positive COVID-19 test history, and current test result to determine suggested next steps (e.g., PCR [polymerase chain reaction] test required or second antigen test 24–36 hours later); and
- enabled results letters sent via encrypted e-mail to the participant's or parent's or guardian's e-mail address.

Subsequent modifications to the system included the following:

- providing participants with personalized QR codes for study materials that linked to their individual results–reporting survey, as e-mail was not an effective reminder strategy in this population; and
- offering participants the option to receive automated results letters e-mailed through Qualtrics rather than manually sent through encrypted e-mail by study staff to reduce time to receipt.

As shown in Figure 1, as enrollment increased, results reporting decreased in December 2021. Together with the district, our team implemented iterative modifications to improve weekly test results reporting. We began targeted telephone outreach to participants (or parents of student participants) who had not submitted test results. Lists of

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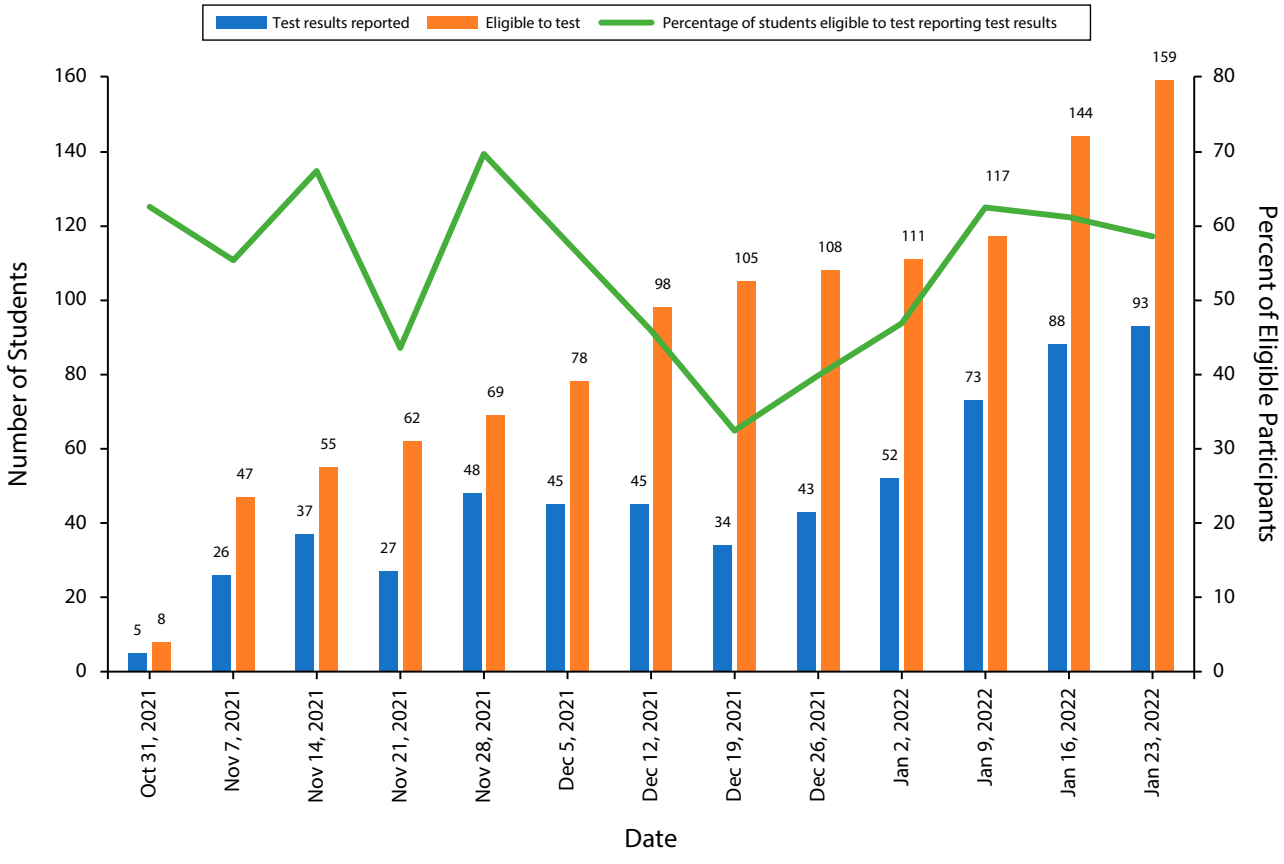

FIGURE 1— Number and Percentage of Weekly At-Home COVID-19 Screening Test Results Reporting Among Middle School Student Participants Who Picked Up At-Home Testing Kits: South San Diego County, CA, October 30, 2021–January 22, 2022

Note. "Eligible to test" includes student participants who enrolled and picked up at-home COVID-19 test kits.

enrolled participants that had picked up tests but not yet submitted test results were generated and shared among study and school district outreach staff. Participants with more recent pickup dates were prioritized for calls to discuss any questions and to confirm that they understood how to report.

Telephone calls were placed from school telephones and study telephones. Study staff asked about any challenges, reviewed how to report results (including clarifying which study IDs were required), reminded the participants that negative results needed to be reported, and provided step-by-step real-time reporting assistance. Study staff recorded detailed notes in the shared file to track issues and facilitate teamwork.

We created and modified instructional materials, such as an infographic about the study and a "how-to" document for test reporting placed in test bags. We modified the individualized participant testing cards to include messages about weekly testing and a personal QR code to eliminate the need to enter study IDs (which often confused participants). Lastly, our team made the instructions in the reminder e-mail clearer based on participant feedback.

Another modification was more intensive outreach and instruction at the time of test pickup, which staff described as the most helpful. This capitalized on rare in-person interaction, allowing the provision of clear instructions, including walking participants through the QR code scanning and reviewing the results-reporting survey on the participants' devices. Staff also began to show participants their own results-reporting data, helping them to understand that results were not being recorded. Lastly, our team made enhancements to the online reporting system described earlier (still images are shown in Figure A, available as a supplement to the online version of this article at https://ajph.org).

PLACE, TIME, AND PERSONS

Communities Fighting COVID! Returning Our Kids Back to School Safely is a research partnership between San Diego State University and Sweetwater Union High School District, a large, public independent school district serving the predominantly Hispanic/Latino community of south San Diego County, California. The county, which borders the Pacific Ocean and the US-Mexico border, is the fifth largest by population in the United States.

Students, staff, and household members from a single middle school participated in this initial phase of the study from October 2021 through January 2022. Effective interventions were later implemented at scale throughout the district.

PURPOSE

In partnership with school district staff, these enhancements were made to improve weekly screening results reporting by simplifying the process for participants and implementing modifications proposed by frontline staff. School officials used results for isolation guidance, exposure notification, and initiation of test-to-stay protocols.

EVALUATION AND ADVERSE EVENTS

Together, these interventions increased participant test reporting from a downward trend in late 2021 to a steady recovery through January 2022, despite a simultaneous increase in enrolled participants.

We noted benefits and challenges to each intervention. Staff informed us that after targeted telephone outreach, participants would often report results within 24 hours. Staff also found that text messages were sometimes preferred by both parties, as they facilitated communication at different times (because of work schedules). Staff reported that they appreciated the opportunity to review study protocols one-on-one with participants, that these calls felt more personalized and private, and that participants seemed more open to asking questions over the telephone when they had more time to focus. Challenges included disconnected or wrong numbers, although this provided the opportunity to correct telephone numbers in the study database.

The creation and modification of instructional materials resulted in clearer instructions and fewer questions from participants. Challenges remained in that students sometimes misplaced materials and parents often did not read materials, although staff were able to coach parents about where to find these materials and review them by telephone.

The intensive outreach at the time of test pickup was often difficult because of time constraints, long lines during COVID-19 surges, and students not relaying information to their parents (telephone calls did help in this regard).

SUSTAINABILITY

The results-reporting system is sustainable and replicable in congregant settings (e.g., schools and workplaces) where COVID-19 screening programs

are desired. The system is acceptable to participants, school administrators, study personnel, and surveillance programs. The modifications we have detailed were based on feedback and recommendations from frontline staff who interacted with participants. Although these modifications require an investment in human resources, the subsequent increases in results reporting justify these costs. It is critical that community and frontline staff feedback be prioritized when modifying systems.

PUBLIC HEALTH SIGNIFICANCE

This Public Health 3.0 cross-sector partnership of university researchers, school officials, and a county health department demonstrates that innovative solutions to COVID-19 testing access and reporting in underserved communities are possible, particularly when the community voice is incorporated. These interventions are being scaled up to 11 district middle schools, with strong participant adherence to test results–reporting protocols. AJPH

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CONFLICTS OF INTEREST

C. McDaniels-Davidson has received compensation as a consultant for Gilead Scientific. In addition, her spouse is employed by QuidelOrtho Corporation and participates in their employee stock purchase program. All other authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

This study was reviewed and approved by the San Diego State University institutional review board. Written informed consent and assent were provided for participation and sharing test results with the school district as appropriate.

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COVID-19 Testing in African American Churches Using a Faith–Health–Academic Partnership

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Increasing access to COVID-19 testing in influential, accessible community settings is needed to address COVID-19 disparities among African Americans. We describe COVID-19 testing intervention approaches conducted in Kansas City, Missouri, African American churches via a faith–health–academic partnership. Trained faith leaders promoted COVID-19 testing with church and community members by implementing multilevel interventions using a tailored toolkit and standard education information. The local health department conducted more than 300 COVID-19 tests during or after Sunday church services and outreach ministry activities. (*Am J Public Health*. 2022;112(S9):S887–S891. https://doi.org/10.2105/AJPH.2022.306981)

During the COVID-19 pandemic, African Americans have experienced disproportionate rates of COVID-19 cases, hospitalizations, and deaths compared to White individuals.[1–3] These disparities have been exacerbated by multilevel social determinants, including reduced access to community resources and COVID-19 information from trusted sources.[4] With a long history of influence and extensive reach with African American populations,[5] the Black Church may serve as a highly accessible setting in which to provide trusted COVID-19 information, testing, and linkage to care services.

INTERVENTION AND IMPLEMENTATION

A tailored intervention called A Faithful Response to COVID-19 (Faithful Response) is a Rapid Acceleration of Diagnostics-Underserved Populations faith community engagement project aimed at increasing access to COVID-19 testing among African American church populations. Using a community-based participatory research approach, African American faith leaders and local health department staff were engaged in the conceptualization, design, implementation, and evaluation of the project to ensure appropriate cultural and religious tailoring for the church context.[6] They also provided information on alternate strategies for intervention delivery, as shown in Table 1, to mitigate pandemic-related changes in public health practices and restrictions (e.g., social distancing, limits on size of gatherings, shutdowns) by engaging congregants through multiple church communication outlets. Additionally, trained church health workers coordinated intervention delivery during existing, multilevel church activities using a culturally and religiously tailored COVID-19 testing toolkit.

Participating churches were matched on size and randomly assigned to intervention (Faithful Response) or comparison conditions (standard COVID-19 education information). Church health workers delivered the four-month Faithful Response intervention during existing, multilevel church activities using a culturally and religiously tailored COVID-19 toolkit that included digital tools and consisted of (1) individual self-help materials, (2) COVID-19 educational materials delivered in ministry groups, (3) virtual or in-person church services with COVID-19–related materials and activities (e.g., sermons, pastors modeling receipt of COVID-19 testing, testimonials, church bulletins), and (4) church- and community-level automated tailored text messages and COVID-19 testing events. At the church and community levels, contact tracers

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TABLE 1— Alternative Modes of Church Activities and Communications During the COVID-19 Pandemic to Reach Congregants and Community Members With Faithful Response Intervention Components: Kansas City, MO, August 2021–January 2022

Mode	Alternative Modes	Mode Description	Adaptation for Study Delivery
Sunday/midweek church worship services and outreach ministry activities			
In-person	Outdoor services and events	Services were held in church parking lots with members remaining in cars. Services were held in tents with social distancing. Drive-through prayer events with prayers and blessings were delivered through car windows. Parking lot entertainment events were held (e.g., movies shown on jumbo screens, gospel concerts, summer fests) with limited capacity. Fairs (e.g., back-to-school, health fairs) were held with limited capacity. Drive-through social service events were held (e.g., food pop-ups, masks and hand sanitizer distribution).	Faithful Response toolkit materials and activities were available in print and electronic format for implementation during in-person delivery. Faithful Response toolkit materials were handed out through car windows or on resource tables. To model COVID-19 testing, pastors were tested from the pulpit during church services. COVID-19 testing was conducted in cars in parking lots and fellowship halls with social distancing during/after Sunday church services and outreach ministry events. Lists of persons attending church services and outreach events during project implementation were maintained, especially during COVID-19 surges. Electronic tablets and QR codes were used during onsite COVID-19 testing to assist the registration process. Electronic tablets and pens were sanitized after each use. Medical students assisted with completion of onsite COVID-19 registration and testing. Contact tracers were introduced onsite during COVID-19 testing events and distributed booklets with their bios, and COVID-19 testing and contact-tracing information.
	Indoor services	To limit sanctuary capacity, Sunday service admittance was assigned by alternating first letter of last names. To support contact tracing, registries of members attending church services were maintained as required by local COVID-19 orders. To enhance social distancing, only one family per pew or every other pew was allowed. To limit contact with ushers, QR (quick response) codes with church order of services and announcements were shown on church video screens.	
	Small groups	To limit number of persons congregating and ease ability to social distance, sermon messages and Bible study were delivered in small group settings.	
Technology-based (non–in-person) church communication outlets			
Internet-based communications	Zoom and live streaming	Zoom and live streaming were used to deliver Sunday and midweek worship services.	Faithful Response toolkit materials were available for delivery using electronic format. Web site and social media platforms were used to increase awareness about COVID-19 and promote testing events. E-mail, telephone, and text messages were used to communicate church COVID-19 policy and education, prevention, and testing information, and promote testing events. An automated text-messaging platform was used to deliver one to two text messages per day on COVID-19 information, health-related behaviors (e.g., physical activity, prayers and meditation, connecting with others), and testing. Word of mouth was used by church health workers to promote COVID-19 awareness and testing.
	Web site	Church Web sites were used to post recorded worship and other church services.	
	Social media	Facebook, Twitter, and Instagram were used to post sermons and messages and distribute church announcements.	
	E-mail	E-mail was used to share information about special church events and church COVID-19 policies.	
Telephone and text messages	Telephone and text-messaging systems	Telephone and texts were used as communication outlets, especially for members not using social media.	
	Each one reach one	Members were encouraged to call and check in on one to two members weekly. Automated text/e-mail systems were used to contact church members and community members using church outreach ministries.	

from the Kansas City Missouri Health Department (KCMOHD) participated in the church-based COVID-19 testing events to assist with registering persons seeking testing, introduce themselves to build rapport with persons getting tested, and provide tailored information on COVID-19 testing, receipt of test results, and the contact-tracing process. Trained church health workers in comparison churches distributed nontailored, standard COVID-19 educational brochures and made general announcements about the availability of testing during church services.

All intervention and comparison churches hosted two COVID-19 testing events—one during or after Sunday church services and one during their outreach ministry activities. Church-based testing took place in church parking lots as drive-through events and in church fellowship halls. Persons seeking COVID-19 testing could preregister online, drive up, or walk in and register to receive their test. The KCMOHD conducted nasal anterior PCR (polymerase chain reaction) tests onsite at participating churches with assistance from university medical students. Test results were typically returned within 24 hours. Persons who tested positive for COVID-19 received contact-tracing and referral services for health-related or community resource needs.

PLACE, TIME, AND PERSONS

Eight churches that primarily serve African Americans in urban Kansas City, Missouri, in socially vulnerable zip codes participated in the intervention project between August 2021 and January 2022.

The African American church population participating in the project included adult church members and community members using church outreach ministries (e.g., food and clothing pantries, social services) coordinated by the participating churches. Free COVID-19 testing services were available to persons enrolled in the Faithful Response study and to nonstudy persons seeking testing. Individuals did not need to have COVID-19 symptoms or known previous exposure to receive testing.

PURPOSE

Increasing access to COVID-19 testing in influential, accessible community settings is needed to address COVID-19 disparities among African Americans. Past African American church–based studies have demonstrated that multilevel health promotion interventions that use religiously tailored toolkits are feasible, acceptable, and effective when delivered by trained church members.[7,8] African American churches have many characteristic strengths that could be tapped into to promote and offer COVID-19 testing, including high church attendance, infrastructure (e.g., fellowship halls, telephone messaging systems, in-person and virtual formats, volunteers), highly active health ministries, and highly influential pastors.[5,9,10] They also have contact with underserved community members, who may be at great risk for COVID-19, through outreach ministry services. Additionally, studies have reported the influence of African American pastors on the health behaviors of their members.[11] These and other strengths of African American churches may uniquely position them to increase reach and access to COVID-19 testing with church members and community members using outreach services. We describe collaborative faith–health–academic approaches for enhancing access to COVID-19 testing along with testing outcomes in African American churches.

EVALUATION AND ADVERSE EFFECTS

Before the launch of the intervention phase, meetings were conducted with the participating churches' senior pastor and assigned church health workers to understand church characteristics (e.g., membership size, health ministry activities). The churches ranged in membership size from 75 to 400, with a mean size of 200 members (Table 2). All had functioning outreach ministries. Social vulnerability was measured using the Centers for Disease Control and Prevention Social Vulnerability Index.[12] Church addresses were geocoded and linked to Centers for Disease Control and Prevention data by census tract. Churches were exclusively in high-vulnerability areas with Social Vulnerability Index scores ranging from 0.66 to 0.99.

Using an online registration and tracking system, the KCMOHD collected demographic and zip code data on all persons who received a COVID-19 test. These de-identified data were analyzed via a data-sharing agreement between the university and the KCMOHD.

Overall, 308 persons were tested for COVID-19 (mean age = 51.6; SD = 17.8); six tested positive. Most of those tested were African Americans, females, and aged 50 years and older (Table 2). Most were Kansas City residents, and a large majority lived in socially vulnerable zip codes within the city. Persons tested were more likely to be older in the intervention churches than in the comparison churches. More persons were tested in the intervention churches than in the comparison churches.

TABLE 2— Characteristics of Participating Churches and Persons Who Received a COVID-19 Test at a Participating Church: Kansas City, MO, August 2021–January 2022

Characteristic	Overall	Intervention Churches	Comparison Churches
Churches, no.	8	4	4
Denomination, no. (%)			
Baptist	2 (25.0)	0	2 (50.0)
Church of God in Christ	1 (12.5)	0	1 (25.0)
Methodist	2 (25.0)	2 (50.0)	0
Nondenominational	2 (25.0)	1 (25.0)	1 (25.0)
Pentecostal	1 (12.5)	1 (25.0)	0
Membership size, mean ±SD	200 ±114	201 ±98	199 ±133
Social Vulnerability Index, mean	86.7	86.8	86.5
Persons tested for COVID-19, no.	308	180	128
Race, no. (%)			
African American/Black	280 (90.9)	164 (91.1)	116 (90.6)
White	15 (4.9)	11 (6.1)	4 (3.1)
Other	13 (4.2)	5 (2.8)	8 (6.3)
Age, y, no. (%)			
≤19	18 (5.8)	8 (4.4)	10 (7.9)
20–29	24 (7.8)	16 (8.9)	8 (6.3)
30–49	84 (27.4)	44 (24.4)	40 (31.5)
50–69	137 (44.6)	76 (42.2)	61 (48.0)
≥70	44 (14.3)	36 (20.0)	8 (6.3)
Sex at birth, no. (%)			
Female	213 (69.2)	119 (66.1)	94 (73.4)
Male	95 (30.8)	61 (33.9)	34 (26.6)
Kansas City, MO resident, no. (%)	229 (74.4)	135 (75.0)	94 (73.4)
COVID-19 positive, no. (%)	6 (2.0)	3 (1.7)	3 (2.3)

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We are not aware of any adverse effects associated with this project. Those who tested positive for or believed that they had been exposed to COVID-19 received immediate contact-tracing services, which included guidance on isolation and quarantine practices to mitigate COVID-19 transmission. They also received linkage to care services, which included referrals to community resources.

Limitations of this study are related to the limited number of religions and urban Kansas City churches represented. Therefore, findings may not be generalizable.

SUSTAINABILITY

Church-based health promotion interventions that have been designed to be embedded in the natural functioning of the church context have been shown to increase uptake of congregants' health behaviors, especially when delivered by trained church leaders using supportive, religiously tailored tools.[7,8] Similarly, the Faithful Response project has great promise for adaptability of its religiously and culturally tailored materials and procedures in African American churches that have existing infrastructure (e.g., committed pastors, meeting spaces, multiple communication outlets with church and community members) for multilevel intervention delivery.

PUBLIC HEALTH SIGNIFICANCE

The Faithful Response intervention approach has the potential to provide a multilevel model for delivering scalable, wide-reaching COVID-19 testing as well as linkage to care services by supporting African American faith leaders with culturally appropriate, easy-to-use tools and health agency partnerships. AJPH

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Note. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

CONFLICTS OF INTEREST

There are no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

Study procedures were approved by the University of Missouri–Kansas City institutional review board.

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Novel Strategies to Increase COVID-19 Testing Among Underserved and Vulnerable Populations in West Virginia

Stacey Whanger, MPH, Sherri K. Davis, MA, Emily Kemper, MS, Jada Heath-Granger, MPH, and Sally L. Hodder, MD

This project addressed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing barriers in rural West Virginia by providing testing enhancements that included (1) a flexible testing staff, (2) mobile testing, (3) essential supplies, and (4) specialized testing in communities of color. A total of 142 775 polymerase chain reaction tests were performed from December 2021 through February 2022; positivity rates were 21% and 17% in clinics and mobile testing venues, respectively. The project results showed that, within a statewide network of health care clinics, administrators quickly identified and distributed enhancements and thus reduced testing barriers. (*Am J Public Health*. 2022;112(S9): S892–S895. https://doi.org/10.2105/AJPH.2022.307004)

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The novel coronavirus (severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) led to many difficulties and much distress for clinics, communities, and individuals in West Virginia (WV). The project described here identified sources of strain on these entities with respect to provision of SARS-CoV-2 testing and developed an intervention that directly addressed improving testing capacity in WV communities.

INTERVENTION AND IMPLEMENTATION

The SARS-CoV-2 pandemic has swept the globe, posing many significant diagnostic testing challenges, particularly for medically underserved and rural populations such as those residing in WV. WV's population is the third oldest in the nation and ranks at or near the bottom in most US chronic disease categories, including those related to increased COVID-19 mortality.[1,2] The WV Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) project was implemented to rapidly increase testing for SARS-CoV-2 in underserved WV communities in which multiple groups are at risk for severe COVID-19 disease and death.

In 2020, focus groups held among rural WV health care providers identified barriers to testing in clinical and community settings. Rural clinics reported limited amounts of testing swabs, viral transport media, and personal protective equipment. Sites noted strain on staff time and budget available to obtain supplies. Rural clinic staff members expressed strain as they worked to manage normal care duties combined with increased testing. Limited space in rural clinics reduced the capacity to provide safe testing environments during high-volume testing. Once patients were tested, clinics voiced concerns over perceived long wait times for laboratory analyses and difficulties in transportation to testing sites among rural and underserved populations.

On the basis of these findings, the WV RADx-UP project enacted targeted interventions starting in December 2020 to increase SARS-CoV-2 testing in WV communities by partnering with the WV Practice-Based Research Network (WVPBRN), the WV National Guard, and the WV Department of Health and Human Resources. The following interventions were implemented:

- Hiring and training of 11 regionally located personnel ("flex agents"), made available to expand testing capacity across the state.
- Procurement and distribution of testing swabs, viral transport media, and personal protective equipment throughout the state to protect testing staff and alleviate supply chain concerns.
- Provision of outside shelter facilities (e.g., tents) for drive-through testing to protect staff and maintain services during high-volume test times.
- Provision of convenient testing in remote rural areas by staffing and deploying mobile vans throughout the state.

- Hiring and training of culturally competent personnel who provided on-site testing in African American communities.

PLACE, TIME, AND PERSONS

The WVPBRN is a 129-site clinical research network composed predominantly of primary care clinics in rural WV. Although a step-wedge, cluster randomized study was initially planned, the 51 participating clinics were in urgent need of the planned interventions, and we concluded that it would be unethical to withhold interventions from any clinic. Therefore, all interventions were implemented in December 2020.

Mobile van units were deployed to provide testing in counties with anticipated near-term (approximately seven days) increases in SARS-CoV-2 incidence and with limited or no testing venues. Near-term (one-week) increases in SARS-CoV-2 cases were predicted with a machine learning approach involving a long short-term memory network and epidemiological statistics such as the instantaneous reproductive number, county population information, and time series trends, including information on major holidays as well as statewide COVID-19 trends across counties.[3] Testing events were advertised with flyers and on local health department dissemination platforms, including Web sites. One mobile unit with culturally competent staff was deployed to WV African American communities.

PURPOSE

As noted, the purpose of the RADx-UP project was to rapidly increase SARS-CoV-2 testing in underserved WV communities where multiple groups are at risk for severe COVID-19 disease and death.[1,2]

EVALUATION AND ADVERSE EFFECTS

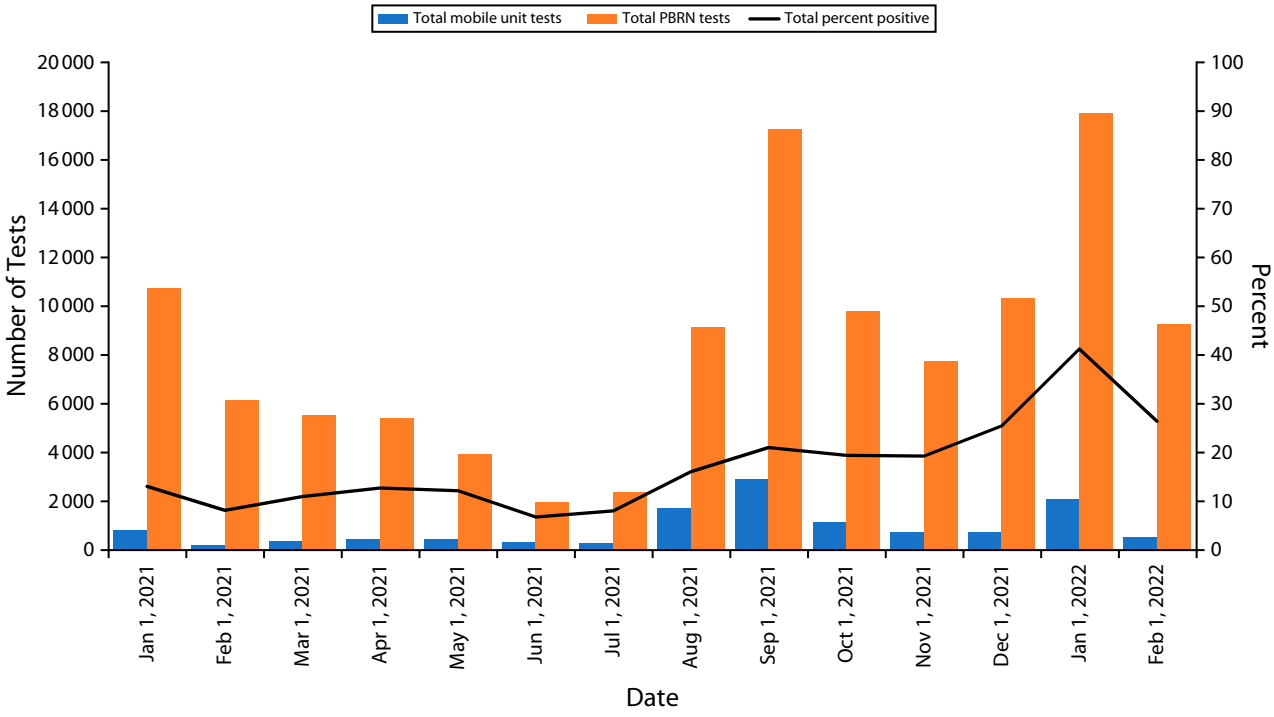
Flex agents were placed in 20 of the 51 clinic sites, and 12 770 personal protective equipment items, four building or tent structures, and an unspecified amount of testing equipment (e.g., swabs) were provided. In the first two intervention months, 23 685 SARS-CoV-2 polymerase chain reaction tests were conducted, an increase of 8454 tests from the two months before the intervention. From December 2020 through February 28, 2022, 130 206 SARS-CoV-2 polymerase chain reaction tests were procured by participating WVPBRN clinics; in 21% of these tests, the results were positive (Figure 1). Sixteen WVPBRN sites (36%) enacted RADx-UP practice changes to enhance SARS-CoV-2 testing, including implementing outdoor testing structures, designating specific testing times, and incorporating flex agents who completed required paperwork, prepared testing kits, and supported drive-through testing, thereby minimizing clinic staff time.

Additionally, 10 803 SARS-CoV-2 polymerase chain reaction tests (17% positive) were performed at more than 540 mobile test events in 33 counties. The communities of color van performed 1766 tests (3% positive) in eight counties, collaborating with 12 partner organizations including churches, barber shops, and private businesses (Figure 1).

Individuals aged 18 years or older who were able to read and understand English and had a SARS-CoV-2 test at a WV RADx-UP site were asked to complete a Web-based testing satisfaction survey and questions pertaining to general health status. A $30 gift card was provided electronically for a completed survey. Survey information was submitted by 633 participants (60% women, average age of 36 years, 89% White, 6% Black; Table A, available as a supplement to the online version of this article at http://www.ajph.org). Twenty individuals (3%) reported their health as poor, 15% had no health insurance, and 57% had received at least one dose of a SARS-CoV-2 vaccine. Participants' satisfaction was high; 87% were satisfied or very satisfied with their testing experience.

Fifty-two of WV's 55 counties received RADx-UP services. Locations of testing sites were prioritized on the basis of a predictive near-term model of increasing COVID-19 incidence and limited availability of other testing options. Both clinic- and mobile van-based testing demonstrated high positivity rates (21% and 17%, respectively), which may have resulted in part from the prioritization strategy.

Engaging with clinical partners during project development and addressing needs they identified resulted in a quick and effective response at a very stressful time for both caregivers and state health officials. We used practice facilitation methods in each clinical site to identify project interventions needed to increase testing rates. Flexibility and adaptability were essential to effectively address changing demands. For example, when vaccine rollout redirected staff away from testing, flex agents mitigated the barrier of limited testing staff within clinical sites. In the case of community testing, health departments identified areas that were found to have low testing rates. Use of mobile testing units in these locations increased testing rates and prompted health departments to continually schedule visits from the mobile units to maintain these higher rates.



Total Tests	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021	Dec 2021	Jan 2022	Feb 2022
Mobile units	792	185	363	440	415	302	284	1 725	2 909	1 139	704	739	2 066	506
PBRN	10 705	6 137	5 518	5 393	3 899	1 934	2 354	9 112	17 217	9 786	7 716	10 327	17 890	9 238
Percent positive	13	8	11	13	12	7	8	16	21	19	19	25	41	26

FIGURE 1— West Virginia Practice-Based Research Network Clinic Sites, Mobile Unit Tests by Month, and Percentages of Tests With Positive Results, 2020–2022

Note. PBRN = Practice-Based Research Network

SUSTAINABILITY

This project employed SARS-CoV-2 testing strategies to meet the testing demand in various locations until technologies and supplies were available to all communities in WV. By early 2022, COVID-19 testing, including home testing, had become readily accessible in WV, decreasing the need to support testing in some locations. More than one third of participating clinics enacted practice changes to enhance testing efficiency, contributing to the sustainability of SARS-CoV-2 testing availability in WV. Testing availability in underrepresented minority communities is essential, and testing must continue to be provided by trusted organizations.

PUBLIC HEALTH SIGNIFICANCE

Identifying barriers to testing, effectively responding to those barriers, and building relationships with multiple partners have effectively driven COVID-19 testing in WV and resulted in practice changes that will sustain testing capacity. Mobile van testing was essential in providing testing to the locations with the greatest need (i.e., few testing options and predicted increases in SARS-CoV-2 incidence). Emergent disease response in rural areas must focus specifically on community needs and must be nimble to effectively address changes in those needs. Lessons learned during the RADx-UP project can inform responses in rural areas to the next epidemic. AJPH

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CONTRIBUTORS

S. Whanger and S. L. Hodder conceptualized the study. S. Whanger, E. Kemper, and J. Heath-Granger contributed to the background and methods sections and drafted the article. S. K. Davis performed the analyses. All of the authors contributed to data interpretation and revisions of the article.

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CONFLICTS OF INTEREST

The project team does not have any potential conflicts of interest.

HUMAN PARTICIPANT PROTECTION

This project was reviewed by the West Virginia University institutional review board. Written informed consent was obtained from all participants enrolled in the home testing component.

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Vaccine-Associated Shifts in SARS-CoV-2 Infectivity Among the Native Hawaiian and Other Pacific Islander Population in Hawaii

Ruben Juarez, PhD, Krit Phankitnirundorn, PhD, Aaron Ramirez, Rafael Peres, PhD, Alika K. Maunakea, PhD, and May Okihiro, MD

Native Hawaiians and other Pacific Islanders (NHPIs) across the country have experienced significant disparities because of the COVID-19 pandemic. The Pacific Alliance Against COVID-19 used a community-based participatory approach involving academic and community partners to expand sustainable COVID-19 testing capacity and mitigate the severe consequences among NHPI communities in Hawaii. We describe the approach of this one-year study, some of the results, and how the data are being used to inform next steps for the communities. Clinical Trials.gov identifier: NCT04766333. (*Am J Public Health*. 2022;112(S9):S896–S899. https://doi.org/10.2105/AJPH.2022.306973)

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Communities nationwide are experiencing a resurgence in COVID-19. The stagnating COVID-19 vaccination rates, emergence of new variants, reversal of prevention mandates, and overall pandemic fatigue contribute to this resurgence, especially in vaccine-hesitant populations.[1] For Native Hawaiians and other Pacific Islanders (NHPIs) and Filipinos across the country, the pandemic has had a profound impact.[2–4] In Hawaii from March 2020 to October 2021, NHPIs and Filipinos made up the majority of COVID-19 cases in Hawaii.[5] Currently, hospitalization and death rates remain significantly higher among NHPIs and Filipinos, suggesting that these communities avoid testing and vaccination.

INTERVENTION AND IMPLEMENTATION

To address these disparities, we assembled a multidisciplinary team of academic and community investigators, along with long-standing community partners across Hawaii, to form a collaborative called the Pacific Alliance Against COVID-19 (PAAC) to participate in the National Institutes of Health Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) Initiative.[6] Partners included the Accountable Healthcare Alliance of Rural Oahu (AHARO), a consortium of five federally qualified community health centers (FQHCs), and public K-12 schools (kindergarten through grade 12) that serve communities on three islands with large proportions of NHPIs. Our objectives were to (1) increase COVID-19 testing in communities across Hawaii and (2) collect and analyze data to inform the development of public health policies.

Once funded, the budget was divided equally between academic and community partners. Each FQHC hired and trained community members to implement the study and build on community engagement and COVID-19 mitigation already being implemented. Participants who were enrolled in our ongoing COVID-19 testing program consented to participate in the RADx-UP survey, which queries demographics, vaccination status, trust in sources of COVID-19 information, and attitudes toward COVID-19 vaccination. Participants then completed rapid COVID-19 antigen tests (BinaxNow, Abbott, ME) administered by trained PAAC staff.

PLACE, TIME, AND PERSONS

The study was implemented from March 2021 through March 2022 in communities served by the AHARO FQHCs. In 2021, these FQHCs served 71 698 patients, the majority of whom were economically disadvantaged NHPIs and Asians, primarily Filipino.

TABLE 1— COVID-19 Testing and Positivity, by Racial/Ethnic Status and Vaccination Status: Hawaii, March 2021–March 2022

COVID-19 Antigen Tests	Overall, No. (%)	Predominant Variant Period, No. (%)		*P*
		Delta	Omicron	
Total	2893	1595	1298	
Racial/ethnic group				
White	292 (10)	176 (11)	116 (9)	.3
NHPI	1927 (67)	1049 (66)	878 (67)	
Asian	503 (17)	272 (17)	231 (18)	
Other	171 (6)	98 (6.1)	73 (5.6)	
COVID-19 positivity by racial/ethnic group				< .001
Overall	256 (8.8)	33 (2.1)	223 (17)	
White	20 (7)	2 (1.1)	18 (16)	
NHPI	180 (9.3)	26 (2.5)	154 (18)	
Asian	42 (8.4)	4 (1.5)	38 (16)	
Other	14 (8.2)	1 (1.0)	13 (18)	
COVID-19 vaccination status				< .001
Less recently vaccinated	430 (15)	232 (15)	198 (15)	
More recently vaccinated	850 (29)	294 (18)	556 (43)	
Never vaccinated	1613 (56)	1069 (67)	544 (42)	
COVID-19 positivity by vaccination status				< .001
Less recently vaccinated	61 (14)	0 (0)	61 (31)	
More recently vaccinated	95 (11)	3 (1.0)	92 (17)	
Never vaccinated	100 (6.2)	30 (2.8)	70 (13)	

Note. NHPI = Native Hawaiian and other Pacific Islander; PAAC = Pacific Alliance Against COVID-19. The PAAC testing program facilitated 16 064 tests. This table reflects COVID-19 tests, positivity rate, and vaccination status by racial/ethnic group for 18% of the tests (n = 2893) from participants who completed all elective survey questions. The percentages shown for racial/ethnic group and vaccination status are computed among such groups for the overall, Delta, and Omicron periods, respectively. The percentages shown for COVID-19 positivity are the positivity rate for the specific racial/ethnic or vaccination status group for the overall, Delta, and Omicron periods, respectively. The *P* values shown are from tests of differences in population proportions between the Delta and Omicron periods using the χ^2 test.

PURPOSE

The primary goal of this study was to strengthen Hawaii community–academic partnerships, building on preexisting networks and relationships, to create a sustainable research program that enables data-driven strategies to reduce COVID-19 health disparities.

EVALUATION AND ADVERSE EFFECTS

Over the study period, PAAC trained more than 45 community members across the five sites to implement the study and provide bidirectional feedback to both researchers and FQHC administrators. In total, PAAC implemented 310 testing events, facilitating 16 064 COVID-19 antigen and reverse transcription polymerase chain reaction (RT-PCR) tests among 5662 individuals. We also disseminated an elective survey among these participants, 23% of whom returned completed responses. The rate of COVID-19 positivity tracked closely with that of the state, peaking at 4% during the Delta variant period and 20% during the Omicron variant period. Our PAAC program engaged a high percentage of NHPIs. Although NHs and PIs make up 21% and 4% of the population, respectively, 54% and 13% of tests were among individuals of NH or PI ancestry, respectively.

To examine changes in attitudes and behaviors related to COVID-19 over time, we further characterized our cohort of 1304 individuals from whom we tested and received complete survey information. Notably, we observed a significantly higher proportion of vaccinated individuals during the Omicron

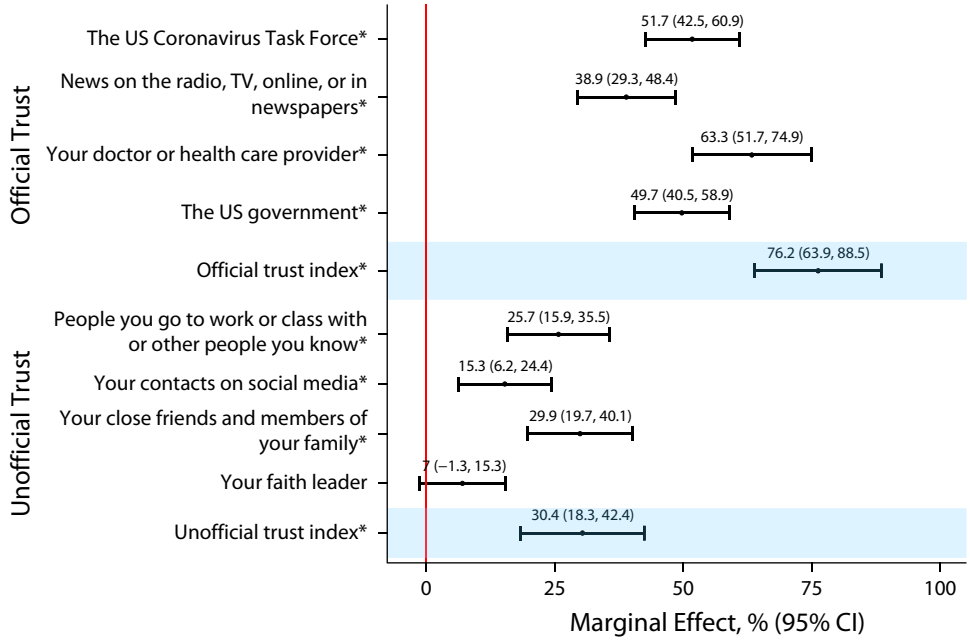

FIGURE 1— Marginal Effects (Probability Changes) in Vaccination Uptake for Different Sources of COVID-19 Information: Hawaii, March 2021–March 2022

Note. CI = confidence interval. Although trust in almost all types of information sources evaluated is significantly positively associated with vaccine uptake, trust in official sources of information—such as the US Coronavirus Task Force, doctors, and health care providers—exhibits larger marginal effects than that of unofficial sources such as friends and family members and contacts in social media.
*$P < .01$.

compared with the Delta period (74% vs 30%, respectively). However, even during the Omicron period, NHPIs had the lowest percentage of vaccinated individuals (69%) compared with all other ethnic groups (74%–89%).

Despite increased vaccinations, there was an increase in COVID-19 positivity during the Omicron period compared with the Delta period (29% vs 7.8%, respectively). To better understand this, we further stratified individuals based on timing of vaccination, comparing those more recently vaccinated (≤ 6 months from study entry) with those less recently vaccinated (> 6 months from study entry). We observed that 31% of individuals less recently vaccinated tested positive for SARS-CoV-2 (the causative agent of COVID-19) during the Omicron period, compared with only 17% of those more recently vaccinated (Table 1).

Given the lower vaccine coverage within the NHPI population, we examined the extent to which trust might be associated with vaccine uptake. Data on perceptions of trust of a variety of COVID-19 information sources were collected using the standardized RADx-UP Likert Scale ranging from "not at all" to "a little," "somewhat," or "a great deal." We compared trust in "official" sources of information—which included the US government, health care providers, the US Coronavirus Task Force, and news on radio, TV, online, and newspaper—with trust in "unofficial" sources, which included coworkers or other acquaintances, social media contacts, close friends and family, and faith leaders. We observed that trust in each "official" source independently increased the probability of vaccination significantly higher than trust in each "unofficial" source (Figure 1). The association between trust in faith leaders and vaccine uptake was not significant.

For many, shifting levels of trust during the study were associated with the probability of receiving vaccination (Figure 1). For instance, individuals who increased their trust in COVID-19 information from their health care provider from "not at all" to "a great deal" increased their probability of vaccination by 63% ($P < .001$; 95% confidence interval [CI] = 52%, 75%). We note that trust in each source of official information had a larger marginal effect on vaccine uptake than each source of unofficial information.

Additionally, composite indexes of trust were computed by averaging the values of the four official and four unofficial sources of COVID-19 information. Individuals whose trust shifted from "not at all" to "a great deal" in all four

official information sources increased their probability of vaccination by 76% ($P < .001$; 95% CI = 64%, 89%; Figure 1). In comparison, individuals who increased their trust from "not at all" to "a great deal" in all four unofficial sources of information increased their probability of vaccination by 30% ($P < .001$; 95% CI = 18%, 42%). These results suggest that official sources of information have a larger effect on vaccine uptake than unofficial sources of information.

SUSTAINABILITY

Academic and FQHC partners have found the partnership to be productive and beneficial to their communities. As such, the partners have agreed to continue their collaborative work. To date, they have received two additional federal grants to directly inform ongoing COVID-19 mitigation programs at the FQHC communities.

PUBLIC HEALTH SIGNIFICANCE

Academic–community partnerships can provide actionable data effectively deployed to inform community strategies that mitigate the impact of the COVID-19 pandemic. The significant association between trust in official sources of COVID-19 information that we observed underscores the crucial influence that the health care sector has on individual-level decision-making among vaccine-hesitant populations, including NHPIs. Fostering trust in official sources of information may be essential to promoting vaccine uptake. This study provides an example of the application of the granular RADx-UP common data elements, collected from an understudied population, to guide community-relevant and culturally relevant interventions that reduce COVID-19 disparities.

We recognize that our major findings are largely driven by understudied NHPIs, with more limited representation of Hawaii's other major race/ethnic groups. Another limitation is that the strong association between trust in official sources of COVID-19 information and vaccine uptake observed (Figure 1) was derived from cross-sectional data analysis. Thus, the degree to which trust in these sources of information might serve as mediators or modifiers of vaccine uptake requires further examination, including change over time. Such longitudinal assessments remain especially important considering changes in COVID-19 public health policy and lifting of many pandemic restrictions. AJPH

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CONTRIBUTORS

R. Juarez, A. K. Maunakea, and M. Okihiro obtained funding for the study, conceptualized and designed the study, and wrote the first version of the manuscript; they share equal credit as senior authors. K. Phankitnirundorn, A. Ramirez, and R. Peres led the data collection, processing of samples, and data analysis. All authors contributed to the writing and analysis, and approved the final version of the manuscript.

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Note. The contents are solely the responsibility of the authors and do not represent the official view of the NIMHD, NICHD, or NIH.

CONFLICTS OF INTEREST

All authors declare no conflicts of interests.

HUMAN PARTICIPANT PROTECTION

This study was approved by the Waianae Coast Comprehensive Health Center institutional review board.

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A Culturally Competent Vaccine Hesitancy Educational Model for Community Pharmacists to Increase Vaccine Uptake, Louisiana, 2021–2022

Christopher J. Gillard, PharmD, Sara Al-Dahir, PharmD, PhD, Martha Earls, PharmD, and Brittany Singleton, PharmD

In February 2022, an educational model was launched to train Louisiana pharmacists to become positive influencers of vaccination decisions via targeted, culturally competent interventions, with the objective of improving COVID-19 vaccine uptake in communities. A total of 47 pharmacists completed the course, and more than 90% noted that the education would help them optimize vaccine acceptance in their community practice settings. The pharmacists will participate in vaccine surveillance to assess the success of the educational model intervention and predictors of vaccine uptake. (*Am J Public Health*. 2022;112(S9):S900–S903. https://doi.org/10.2105/AJPH.2022.307070)

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Before the release of the COVID-19 vaccine, initial nationwide polls estimated low vaccine acceptance. This was particularly the case among African Americans and other underrepresented groups, with only about 45% of individuals potentially open to vaccination.[1] Several factors have been identified that lead to hesitancy to receive the COVID-19 vaccine, such as historical mistrust in the government and the health care system, vaccine safety concerns, and perceptions of low risk of illness.[2] Health care workers who provide vaccinations need strategies to address COVID-19 vaccine hesitancy. Pharmacists have consistently been rated by US residents as among the most trusted health care professionals.[3] Community pharmacists are uniquely positioned as health care responders in local areas and are essential in expanding access to vaccines. All 50 states have allowed pharmacists to administer vaccinations for more than a decade.

INTERVENTION AND IMPLEMENTATION

In this mixed-methods, longitudinal study, pharmacists were included in a baseline survey, focus groups, and a follow-up survey nine months after the baseline. The intervention involved interdisciplinary cross collaboration that culminated in 15 continuing education hours for pharmacists. The domains of the intervention (Figure 1) included education and collaborative development of best practice models for patient strategies to address vaccine concerns and increase COVID-19 vaccine uptake in community pharmacies. After completion of the education portion, pharmacists discussed several point-of-care patient intervention techniques in addition to novel community outreach approaches to increase vaccine uptake.

The education modules were developed with external input and contributions from COVID-19 vaccine researchers, international experts on vaccine hesitancy and vaccine safety, infectious disease physicians, psychologists who had experience in communities with historical trauma, and pharmacy faculty with clinical expertise in delivering vaccine interventions and patient care. The educational series was developed to prepare pharmacists to address vaccine hesitancy in communities, especially among the groups most vulnerable to COVID-19. Therefore, education on cultural competence, existing vaccine health disparities, and factors that affect the health decisions of culturally marginalized patients was a central component. Data on statewide COVID-19 vaccination trends by race as well as research

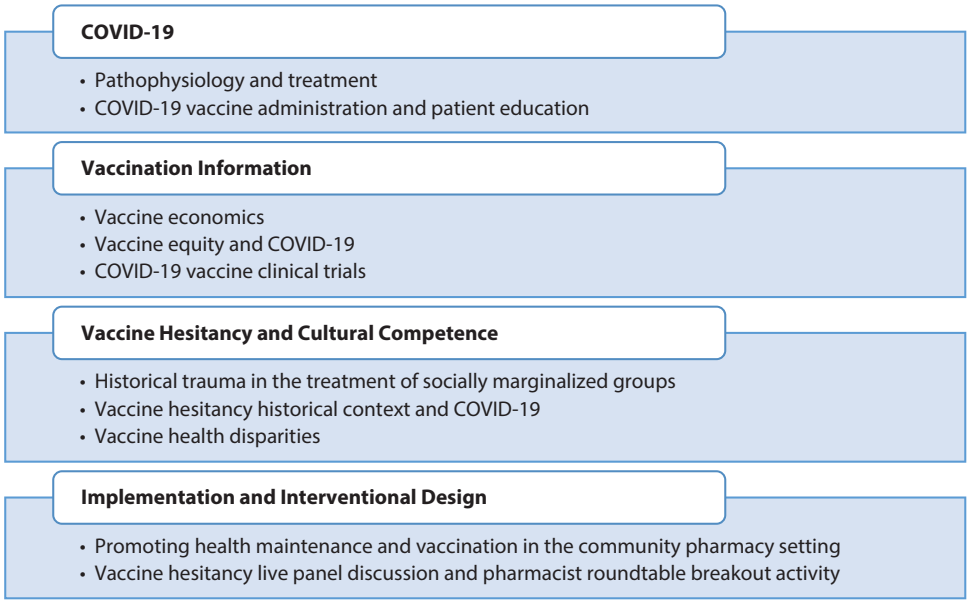

FIGURE 1— Design of Vaccine Hesitancy Educational Model for Community Pharmacists

on vaccine hesitancy and acceptance of the COVID-19 vaccine among the African American community in southeastern Louisiana were presented to enrolled pharmacists. Completion of the 10-module (15-credit-hour) series culminated in a vaccine education certificate awarded by Xavier University of Louisiana.

All education modules were approved for continuing education credit by the Accreditation Council for Pharmacy Education. Participants accessed the modules from March through May 2022. Each module included a quiz, practice case, and discussion board, as applicable. Of the 78 initial pharmacists who completed the baseline survey, 47 (60%) completed the module series. Reasons for lack of completion included changes in employment and decreased outreach around the COVID-19 vaccine at participants' place of employment. There was some attrition because of the time commitment, likely as a result of pharmacists' work schedules. The pharmacists who completed the module series participated in a final session in which ongoing barriers to and best practices for vaccine uptake were discussed.

PLACE, TIME, AND PERSONS

This longitudinal study was initiated in the summer of 2021 with education and follow-up through May 2022. Community pharmacies served as frontline venues for vaccine introduction in the early phase of the rollout and remained a mainstay of vaccination efforts throughout the United States after other venues, such as community centers and hospitals, discontinued vaccination efforts. Louisiana pharmacists serve communities, particularly communities of color, that experience structural barriers to COVID-19 vaccination and long-standing disparities in health care and outcomes. Community pharmacies were chosen for implementation of the model because most US residents live within five miles of a pharmacy and pharmacies remain among the most accessible health care centers.[4]

Community pharmacists who provide COVID-19 vaccinations in their daily practice were recruited for the study. An announcement about the educational model was sent to Louisiana pharmacists affiliated with Xavier University of Louisiana who provide experiential education to pharmacy students. Also, pharmacies in various areas of the state were sent the announcement and targeted for recruitment on the basis of Louisiana Department of Health designated health regions. There was an effort to target community pharmacies in Louisiana regions with lower overall COVID-19 vaccination rates. Pharmacists who expressed interest were invited to complete a baseline survey before enrollment in the educational model. All pharmacists were vaccinators and served in pharmacies that provided COVID-19 vaccines (as well as other vaccines) as part of routine care. Baseline information on participants can be found in Table 1. Most of the

TABLE 1— Baseline Characteristics of Participating Pharmacists and Pharmacies: Louisiana, August 2021

Characteristic	No. (%) or Median (Range)
Female gender	53 (70.0)
Doctor of pharmacy degree highest education achieved	62 (79.4)
Primary practice setting	
Chain pharmacy	31 (39.7)
Independent pharmacy	32 (41.0)
Clinic/pharmacy combined	15 (19.2)
Geographic area (or areas) served	
Suburban	41 (52.6)
Urban	33 (42.3)
Rural	16 (20.5)
Attitudes toward vaccination and health disparities (agree or strongly agree)	
I have a professional obligation to treat vulnerable communities	76 (97.4)
I have a professional obligation to encourage patients to receive vaccinations	74 (94.9)
I have a professional obligation to mitigate vaccine hesitancy	75 (96.1)
Practice experience and COVID-19 vaccination information	
Years in practice	7 (0.8–42.0)
COVID-19 vaccines offered per day at pharmacy in May 2021	20 (1.0–280.0)
COVID-19 vaccines offered per day at pharmacy in August and September 2021	20 (0.0–250.0)

Note. The sample size was 78.

pharmacists were female and practiced in chain or independent community pharmacies in suburban areas, thus constituting a representative sample of the majority of pharmacists in the state.

PURPOSE

As of June 2022, Louisiana had seen more than 17,000 direct COVID-19 deaths since the start of the pandemic.[5] Only 56% of residents have received the COVID-19 vaccine, making it the fourth lowest vaccinated state in the nation.[6] In regard to COVID-19 health disparities, more than 70% of Louisiana residents who died from COVID-19 were African American, although this group makes up only 32% of the state population.[7] Determinants of COVID-19 vaccination intent may differ according to socioeconomic status, ethnicity, and cultural background.[2] Health care providers who offer vaccinations should be prepared to encounter and address vaccine hesitancy among diverse communities. The purpose of this project was to train pharmacists to become positive influencers of vaccination decisions by creating targeted, culturally competent interventions to improve COVID-19 vaccine uptake among Louisiana residents.

EVALUATION AND ADVERSE EFFECTS

Pharmacists' feedback on the educational module was generally positive. More than 90% of pharmacists who completed the model believed that it enhanced their knowledge and that the education would likely change their community pharmacy practice. Pharmacists who completed the course discussed strategies they would potentially implement to improve vaccine uptake through online discussion boards and during a live educational panel. Pharmacists who completed the model also were invited to participate in weekly vaccine surveillance to monitor vaccine uptake in their community pharmacies.

We are unaware of adverse effects from the implementation of this pharmacist educational model. Community pharmacists were enrolled in the model on the basis of eligibility and voluntary participation. The enrolled pharmacists were allowed to complete the educational series at a reasonable pace over a course of two months on an online platform. Those who completed the vaccine surveillance component between June and September 2022 received a monetary incentive.

SUSTAINABILITY

Frontline health care workers who provide vaccinations should continue to develop strategies to address COVID-19 vaccine hesitancy. The pharmacist educational model is sustainable because it can be offered to more pharmacists who provide COVID-19 vaccinations and routine immunizations. Treatment recommendations for COVID-19 are changing frequently, so course content would have to be regularly updated.

PUBLIC HEALTH SIGNIFICANCE

Pharmacists are trusted and widely accessible health care providers in

communities across the country.[3] The self-paced model described here provides education for community pharmacists with the intent that these health care providers will be empowered to develop interventional strategies to increase vaccine uptake. Groups targeted for pharmacist-delivered interventions may fluctuate according to many factors, including changing health care attitudes and health-seeking behaviors within populations. However, such interventions, delivered both locally and nationally, have the potential to decrease vaccine health disparities and improve COVID-19-related public health outcomes. AJPH

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C. J. Gillard led the aspects of article preparation. S. Al-Dahir analyzed the data. All of the authors contributed to conceptualization, methodology, data curation, and writing.

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HUMAN PARTICIPANT PROTECTION

This study was approved by the Xavier University of Louisiana institutional review board. The study data were anonymous, and all participants provided informed consent.

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Rapid Community Engagement in Response to SARS-CoV-2 Funding Opportunities: New York City, 2020–2021

Natasha J. Williams, EdD, MPH, MSW, Emily Gill, MPH, Malcolm A. Punter, EdD, MBA, Jeremy Reiss, MSc, Melody Goodman, PhD, Donna Shelley, MD, MPH, and Lorna E. Thorpe, MPH, PhD

In response to fast-turnaround funding opportunities, collaborations have been forming across the country to address severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) disparities. Here we describe the process, notes from the field, and evaluation results from a new collaboration involving multiple partners, formed in October 2020 in New York City as part of the Rapid Acceleration of Diagnostics initiative. We used the validated Research Engagement Survey Tool to evaluate the partnership. Results can inform future research and improve engagement efforts aimed at reducing SARS-CoV-2 disparities. (*Am J Public Health*. 2022;112(S9):S904–S908. https://doi.org/10.2105/AJPH.2022.307072)

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Despite important discussions around health equity, partnership, and trustworthiness, strategies to rapidly engage communities in the context of public health emergencies in the United States are limited.

INTERVENTION AND IMPLEMENTATION

The National Institutes of Health launched the Rapid Acceleration of Diagnostics (RADx) initiative to speed innovation in the development, commercialization, and implementation of technologies for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing. The initiative focused on four programs, one of which included improving access to rapid, accurate diagnostics for SARS-CoV-2 in underserved populations (RADx-UP) with an emphasis on community engagement. Our study focused on New York City Housing Authority (NYCHA), the largest public housing authority in the United States, accounting for 15% of the nation's public housing units and comprising 400 000 residents, most of whom are Black or Latinx.[1]

To implement our approach, we relied on well-delineated methods for partnership engagement with community and academic partners.[2] We also borrowed from models of community organizations that have a focus on justice, fairness, and empowerment, including those born from racial equity demonstrations unfolding concurrently in the United States, such as Black Lives Matter.[1,3] To create a sustainable community engagement structure, we chose to convene the Community Steering Committee (CSC), with the goal of sharing resources and information, and providing evidence-based COVID-19 testing options while giving residents a voice in shaping these initiatives. A summary of the CSC's principles and structure is outlined in Box 1.

PLACE, TIME, AND PERSONS

In October 2020, we launched the CSC, which comprises more than 30 diverse organizations and residents in New York City (NYC). We relied on our existing, longstanding relationships with NYCHA and the NYC Department of Health and Mental Hygiene to identify community-based organizations (CBOs) providing services to residents in three neighborhoods, selected based on high concentrations of SARS-CoV-2 infection: Central Harlem, Lower East Side, and East New York. Once identified, we approached these organizations through common trusted collaborators. To determine the structure

BOX 1— Examples of Successful Practices to Create a Sustainable Community Engagement Structure

Principle	Description
Create a space of meaningful listening and co-learning	Limit the number of representatives from the academic research partner. Set agendas and make project decisions in partnership with CBOs, such as naming the CSC (i.e., NYCHA Resident COVID-19 Response initiative). Allot time for partners to provide updates about their work related to SARS-CoV-2 and share information, ideas, and communities' perspectives on the pandemic.
Establish trustworthiness and respect	Co-chairs of CSC are from the community, not an academic medical center. Communicate late-breaking information about the pandemic to community partners early and often. Address misinformation and disinformation by serving as scientific experts at virtual town halls, Facebook Live sessions, and other events organized by our partners.
Acknowledge inequities and justified mistrust	Engage in deep discussions during meetings, including history of medical mistrust and abuse in research and implications of our research protocols in the community.
Engage in bidirectional communication and transparency	Establish biweekly meetings with CBO partners, frequent e-mail communication, and community–partner mediations as needed. Report research updates, challenges and barriers to the study, grant funding announcements, new developments about SARS-CoV-2, and planned projects (e.g., RADx-UP phase 2).
Ensure transparency of information and data	Partner with the NYC Department of Health and Mental Hygiene for weekly data on COVID-19 testing and infection rates in NYCHA. Identify uptake of testing and infection rates in the NYC public housing population. Summarize and report data in plain language to the CSC and members of the CSC. Assist with forming recommendations to the municipal agency partners on where city mobile testing vans and pop-up clinics should be placed.

Note. CBO = community-based organization; CSC = Community Steering Committee; NYCHA = New York City Housing Authority; RADx-UP = Rapid Acceleration of Diagnostics-Underserved Populations; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

and function of the CSC, we held several one-on-one and small-group meetings between study investigators, potential CBO partners, NYCHA leadership, and residents living in NYC public housing. All members of the CSC were aged 18 years or older and received compensation to acknowledge their time and contribution to the project.

PURPOSE

Our motivation for this initiative was to expand and strengthen existing community partnerships, with the aim of addressing SARS-CoV-2 testing disparities.

EVALUATION AND ADVERSE EFFECTS

In April 2021 (six months into the partnership), we applied the validated Research Engagement Survey Tool (REST).[4] The REST is a process measure designed to understand how engagement occurred and is meant to be completed by partners and other stakeholders involved in the engagement activities. The tool consists of 32 items and assesses eight engagement principles, with two scales asking partners to rate the items on both quality and quantity. An anonymous link to the REST was circulated to all CSC voting members (n = 20) and yielded a 70% response rate.

Results indicated very high levels of satisfaction with the engagement process across all engagement principles (Table 1). For the quality scale items, the mean score was 4.3, indicating an overall score between "very good" and "excellent." The quantity scale items also yielded a mean score of 4.3, indicating an overall score between "often" and "always." Using these results, we coordinated a discussion led by author M. G., who is not directly involved in the engagement activities, involving members of the CSC to ensure that partners felt their needs and the needs of their community were being met in the partnership.

Our sample consists only of a small number of partners and, thus, their observations may not be representative of other academic partnerships. In addition, we conducted our evaluation at six months and cannot address the sustainability of participation and maintaining trust among partners over the course of the study.

SUSTAINABILITY

The CSC has convened for nearly two years (all virtually) with a relatively high rate of participation, and members were prepared to continue to meet after funding concluded. Over the duration, we learned our community partners have a strong interest in addressing social determinants of health including food insecurity, access to care, and

TABLE 1— Community Steering Committee Research Engagement Survey Tool Results: New York City, April 2021

Engagement Principles and Scale	No.	Likert Response,[a] %					Mean Score (95% CI)
		1	2	3	4	5	
Focus on community perspectives and determinants of health							
Quality	14	1.8	5.4	16.1	25.0	51.8	4.2 (3.7, 4.7)
Quantity	12	0.0	0.0	6.3	50.0	43.8	4.4 (4.1, 4.6)
Partner input							
Quality	14	0.0	1.8	17.9	21.4	58.9	4.4 (3.9, 4.8)
Quantity	12	0.0	0.0	17.0	38.3	44.7	4.3 (3.9, 4.7)
Partnership sustainability to meet goals and objectives							
Quality	14	1.4	7.1	12.9	27.1	48.6	4.2 (3.7, 4.8)
Quantity	12	1.7	1.7	23.3	25.0	45.0	4.2 (3.7, 4.7)
Colearning, capacity building, and cobenefit for all partners							
Quality	13	1.9	1.9	13.5	28.8	53.8	4.3 (3.8, 4.8)
Quantity	11	0.0	4.5	9.1	29.5	56.8	4.4 (3.9, 4.9)
Building on strengths and resources within the community or patient population							
Quality	13	0.0	5.1	15.4	20.5	59.0	4.3 (3.8, 4.8)
Quantity	11	0.0	0.0	21.2	12.1	66.7	4.5 (3.9, 5.0)
Facilitating collaborative, equitable partnerships							
Quality	12	0.0	4.3	0.0	38.3	55.3	4.5 (4.2, 4.8)
Quantity	10	0.0	0.0	7.7	38.5	51.3	4.6 (4.1, 4.9)
Involving all partners in the dissemination process							
Quality	12	0.0	0.0	2.8	47.2	44.4	4.5 (4.2, 4.8)
Quantity	10	0.0	0.0	10.0	40.0	46.7	4.4 (4.0, 4.9)
Building and maintaining trust in the partnership							
Quality	12	0.0	0.0	1.7	33.3	65.0	4.6 (4.3, 4.9)
Quantity	10	0.0	0.0	8.0	42.0	50.0	4.4 (4.0, 4.8)
Overall							
Quality	13	0.7	3.4	10.3	29.6	54.8	4.3 (3.9, 4.8)
Quantity	11	0.3	0.9	13.1	34.8	49.9	4.3 (4.0, 4.7)

Note. CI = confidence interval.
[a]For Likert responses, the scores indicate the following: quality: (1) poor, (2) fair, (3) good, (4) very good, (5) excellent; quantity: (1) never, (2) rarely, (3) sometimes, (4) often, (5) always.

transportation. SARS-CoV-2–related programs, including for those who experience long-term symptoms of COVID-19, may benefit from engagement with community partners. We hope to continue programs that address social determinants of health in subsequent phases of our study. The REST results and subsequent discussion, which was aimed specifically at sustainability and emphasizing community needs and perspectives, have informed conversations with the CSC about how to continue and expand the project beyond its current scope. The CSC agreed that there is an important opportunity to leverage existing resources and identify gaps. For example, the project may benefit from including local government officials to pool resources and funding that are aligned with the goals of the CSC.

We connected CBO partners with funding opportunities including the National Institutes of Health Community Engagement Alliance Against COVID-19.[5] The collaboration has also led to partners applying for other federal and nonfederal funding opportunities, for which investigators provided letters of support and other technical assistance with grant applications, which, in turn, sustain their own engagement work. Flexibility of funding has been key for partners in addressing vaccine uptake, as many have successfully shifted and expanded their

work to include education and outreach about the vaccine. We quickly co-organized a town hall meeting around vaccine safety and access that was available to our partners and community health workers and moderated by public health officials and a vaccine trial scientist. We received more than 600 registrants, illustrating the timeliness of the topic and the need for information. We continue to provide guidance on messaging and disseminate information for communities to use in communicating with residents. CSC members reported feeling satisfied and understood the need to maintain momentum and engagement, including in low- or no-funding contexts.

PUBLIC HEALTH SIGNIFICANCE

Although the RADx-UP initiative was not intended to introduce new partnerships, we illustrate how bringing together multiple longstanding and new partners in a rapid timeframe can lead to meaningful collaboration. Though the science of engagement is still evolving,[6] researchers agree on a few key best practices for establishing trustworthiness, involvement of local leaders and other partners, and consistent and ongoing communication.[7] Most best practices focus on in-person engagement activities, and very few are implemented during a public health crisis. Though community–academic partnerships have convened during or immediately following other public health crises,[8] the COVID-19 pandemic is different. The current pandemic covers multiple communities simultaneously with limited protocols in place. As such, this pandemic has tested engagement strategies and required "out-of-the-box" thinking. Though others have described engagement with online platforms, those studies have focused on prioritizing health conditions.[9]

By critically reflecting on partnership engagement and insights on how to implement engagement, specifically in the context of fast-moving funding opportunities to address COVID-19 health inequities among low-income populations, we have contributed to advancing the important work of engaging community partners and focusing on inequities within underserved populations. AJPH

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HUMAN PARTICIPANT PROTECTION

The survey referenced in our article was anonymous and distributed for quality improvement purposes and is exempt from institutional review board approval.

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Lessons Learned From Community Workers Beat the Virus, a Multimedia Campaign Cocreated With Trusted Community Leaders

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Communicating effectively with racial and ethnic minorities who are disproportionally impacted by COVID-19 continues to challenge health communication professionals. Racism, historical traumas, and systematic discrimination have long deteriorated African Americans' and Latinos' trust toward the government and medical community.[1] The spread of misinformation about vaccination and testing further augments these challenges.[2]

Despite these obstacles, health communication strategies that are leveraged to better engage with underresourced populations hold promise. These strategies include involving community members to share their perceptions, presenting trusted influencers' experiences through appropriate media channels, designing tailored messages for diverse populations, and adopting an empathic and compassionate style in messages.[3] Indeed, communication with these strategies in mind continues to drive the core of public health actions.[4]

The Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) Kansas project is an academic–community partnership with the goal of improving COVID-19 testing and vaccination rates in underresourced communities in 10 rural and urban Kansas counties. Our team identified a gap in communicating and engaging these communities. We worked with community leaders and community consultants (n = 26) to codevelop, codisseminate, and evaluate the multilingual, multimedia campaign Community Workers Beat the Virus with the goal of debunking myths vis-à-vis COVID-19 testing and vaccination, providing reliable information, and promoting COVID-19 mitigating behaviors. The motivation behind the campaign first emerged organically from a town hall in early 2020 attended by community health workers, local coalition leaders, and RADx-UP Kansas team members. At the town hall, community health workers—most of whom were personally impacted by the pandemic—expressed their frustration over a lack of credible culturally and linguistically tailored health messaging that directly spoke to the needs of the underresourced populations they served. Here we describe the campaign and provide a roadmap for engaging with community stakeholders to codevelop health messaging in response to future public health emergencies and crises.

CAMPAIGN GUIDED BY A COMMUNITY-ENGAGED FRAMEWORK

This campaign used an audience-centered approach[4] and a community-driven framework including (1) community engagement principles,[5] (2) communication infrastructure theory,[6] and (3) McGuire's persuasion matrix.[7] These informed the codevelopment process, which emphasized community-based, culturally sensitive approaches to implementation. Using community engagement principles, we worked with local community members to identify critical communication sources and resources. Communication infrastructure theory provided a framework for linking our academic–community partners and audiences from underresourced communities together in a coordinated effort to shape the content of the campaign and how it was spread.[6] Furthermore, McGuire's persuasion

matrix[7] helped us define the who, what, and how for developing persuasive COVID-19 messages that would be beneficial among the targeted populations. Together, these frameworks allowed us to leverage existing community collaborations, draw from existing community resources, identify misinformation rampant in the communities, and develop effective approaches to counter misinformation.

BARRIERS AND FACILITATORS

The concept of the campaign was informed by community-level surveys, focus groups, and listening tours that identified structural and attitudinal communication barriers to testing and vaccination in the targeted Kansas counties. In addition to structural barriers (e.g., access to a testing site, availability of the test), preliminary results from this formative research identified communication-related barriers and facilitators that informed the design and development of our health communication campaign. Barriers included a distrust toward the government, a lack of culturally and linguistically responsive and empathic information, and misinformation.

Our research also unveiled facilitators that we capitalized upon, including trusted community leaders who are empathic and nonjudgmental communicators. As trusted members in their communities, community health workers and leaders are uniquely positioned, especially in a public health crisis, to relate to and provide support to members who have historically distrusted the government and medical communities. They also have been shown to be effective messengers of public health information.[8] These insights allowed us to garner support from community health workers and community consultants to initiate the campaign process.

CONTENT IDEATION AND REFINEMENT PROCESS

Community leaders and community health workers (n = 26) featured in the campaign were recommended by community partners. They represented racially and ethnically diverse populations from both rural and urban communities, including representatives with lower socioeconomic status and those who have experience working with immigrants and migrant workers.

These community representatives participated in a series of videoconferences to develop, refine, and rehearse video scripts that narrated the lived experiences of their clients during the pandemic and described their own experience with COVID-19 testing and vaccination. They helped develop culturally and linguistically appropriate messages and topics, ranging from debunking the myths of vaccination (e.g., microchips in vaccines, fertility issues) to emphasizing the importance of getting tested, engaging in safe behaviors, and sharing community leaders' lived experiences (e.g., supporting those who were evicted because of their inability to pay their rent; Box 1). They also selected the sites for video recording, taking into consideration cultural aspects (e.g., murals, neighborhoods, faith-based buildings). We then traveled to each county and recorded every community leader in a video-recording session lasting from 15 to 45 minutes.

Ultimately, the campaign produced 46 video clips (30 seconds each) in 7 languages spoken in the immigrant and minority communities (i.e., English, Spanish, Swahili, Portuguese, Hindi, Nepali, and Dzongkha). In addition, per recommendation from community leaders, we designed 52 Facebook, Twitter, LinkedIn, and Instagram posts in Spanish and English; 2 print ads

BOX 1— Sample Topics Featured in the Community Workers Beat the Virus Multimedia Campaign: Rapid Acceleration of Diagnostics-Underserved Populations, Kansas, 2021

Lived Experience	COVID-19 Topic	Language	Intended Audience
Food assistance	COVID-19 symptoms	Nepali	Low-income individuals
Loss of a loved one	Testing and travel	Spanish	Latinos, immigrants
Parenting	Fertility issues	Portuguese	Women
Social isolation	COVID-19 symptoms	Spanish	Latinos, immigrants
Economic impact of COVID-19	Test before social gatherings	Spanish	Unemployed individuals
Stress of long-distance care during COVID-19	Testing and travel	Swahili	Immigrants, migrant workers
Community health worker	Safe behaviors	English	African Americans
Vaccine side effects	Myth: Microchip in vaccine	English	African Americans
Vaccine development	Myth: Vaccine creates zombies	Spanish	Latinos, immigrants

published in multiple local newspapers; and 27 thirty-second radio spots (Selected videos from the campaign are posted here: https://tinyurl.com/4wb48yxr; Social media posts are here: https://tinyurl.com/2x8awty9).

CAMPAIGN DISSEMINATION

From July to August 2021, the Community Workers Beat the Virus campaign was disseminated through a mix of owned and paid media specifically focusing on immigrants and minority populations in 6 of the 10 participating rural (i.e., Lyon, Finney, and Seward) and urban (i.e., Sedgwick, Wyandotte, and Johnson) counties. For owned media distributions, community leaders and coalitions from each county posted the campaign materials on their own social media platforms. Community leaders provided guidance on use of paid local media channels most appealing to underresourced populations in their counties. Based on their insight, both traditional (e.g., Telemundo, Univision, La Mega 1160 AM, *Dos Mundos* newspaper, 107.3 FM KC's R&B and HipHop) and digital media (e.g., geographically targeted Facebook, Twitter, LinkedIn, and Instagram posts) became part of the paid media effort with a budget of roughly $30 000.

CAMPAIGN EVALUATION THROUGH COST AND MEDIA MONITORING

The production cost of the campaign was $18 330, which included 317 hours of script development, recording, editing, graphic design, and coordination. We also monitored media impressions from each platform to track whether the campaign was delivered to the intended target audiences. Media impressions, which are a measure of advertising exposure,[9] have been used to measure exposure to prohealth media campaigns.[10] It is considered an important metric in the early part of a communications campaign because attitudinal and behavior changes are predicated upon exposure. Overall, the campaign had nearly 170 000 social media and connected TV impressions, more than 600 000 print impressions, and more than 1.1 million impressions via radio. With a combined media production and media buy budget of $48 330, on average, each impression cost $0.03.

LESSONS LEARNED FOR FUTURE PUBLIC HEALTH CAMPAIGNS

The academic–community partnership to codevelop COVID-19 public health communication serves as a model for responding to information needs in public health crises. Engaging community health workers and leaders took a considerable amount of coordinated effort but showed significant potential to reach diverse groups (via media monitoring of impression), aid in debunking myths, and address misinformation to respond to the impact of COVID-19 in underresourced communities. Capitalizing on the community health workers' lived experiences and working knowledge of their communities offers a sustainable resource for the development of public health communication strategies that resonate with underresourced groups. Furthermore, their familiarity with the intended audiences of the campaign played a crucial role in determining appropriate traditional and digital media channels to reach these communities, thus helping to generate a high level of impressions (1.8 million combined media impressions) despite a limited budget in media production and buy. Health communication with a community-engaged approach could become a template for addressing future public health emergencies and crises. AJPH

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M. Ramírez and Y. Chen share equal first authorship. M. Ramírez, C. Y. Lumpkins, and Y. Chen contributed to the conceptualization, development, and production of the Community Workers Beat the Virus multilingual multimedia campaign. M. Ramírez contributed to the data analysis. M. Ramírez, C. Y. Lumpkins, Y. Chen, K. A. Greiner, and E. Ellerbeck contributed to the article write-up. B. Crawford, K. A. Greiner, and E. Ellerbeck conceptualized the underlying Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) Kansas project and procured funding.

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CONFLICTS OF INTEREST

The authors declare that they have no relevant or material financial interests that relate to the research described in this article.

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Coalition of Faith Leaders, Community Organizations, and Governmental Organizations to Implement a COVID-19 Campaign in a Latino Neighborhood, Baltimore, Maryland, 2020–2021

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The disproportionate impact of COVID-19 on low-income Latinos with limited access to health care services prompted the expansion of community-based COVID-19 services. From June 25, 2020, to May 20, 2021, we established a coalition of faith leaders, community organizations, and governmental organizations to implement a Spanish-language hotline and social media campaign that linked people to a COVID-19 testing site at a local church in a high-density Latino neighborhood in Baltimore, Maryland. This retrospective analysis compared the characteristics of Latinos accessing testing in community versus health care facility–based settings. (*Am J Public Health*. 2022;112(S9):S913–S917. https://doi.org/10.2105/AJPH.2022.307074)

Latinos are twice as likely as non-Hispanic Whites to be hospitalized or die of COVID-19.[1] Evidence suggests that this risk is heightened among undocumented immigrants and Latinos with limited English proficiency because of ineligibility for unemployment benefits or stimulus checks, high-risk essential worker status, and crowded housing conditions.[2,3] For many low-income immigrant Latinos ineligible for health care coverage through the Affordable Care Act, access to conventional health care facility–based testing has been hampered by a lack of health insurance or of a primary care doctor.[2,4] In addition, difficulty in navigating the health system, immigration status, language barriers, stigma, and lack of trust in health care institutions are barriers to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing and COVID-19 care.[2,5]

INTERVENTION AND IMPLEMENTATION

As part of the Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) initiative, we established a coalition of faith leaders (Baltimoreans United in Leadership Development), community organizations (Esperanza Center), and governmental organizations (Mayor's Office of Immigrant Affairs) to implement a social media campaign that encouraged testing at an outdoor free SARS-CoV-2 testing site at a local church in a high-density Latino neighborhood (Sacred Heart Church testing site).[6,7] In addition, we established a COVID-19 Spanish-language hotline hosted at a local organization (Esperanza Center) that linked people to testing at the Sacred Heart Church testing site or, when community testing was unavailable, to the Johns Hopkins Health System (JHHS) COVID-19 testing facilities. The Esperanza Center hotline number was disseminated through our social marketing materials. People could preregister for testing at the Sacred Heart Church site, but walk-ins were also encouraged. All patients with a positive test result tested at Sacred Heart Church or referred to JHHS testing through the Esperanza hotline were contacted by bilingual community health workers and referred to clinical and social services, such as cash and food assistance or referral to isolation

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hotel, as needed. In addition, patients could request letters for their employers (isolation and return to work letters).

PLACE, TIME, AND PERSONS

We conducted 42 free testing events at the Sacred Heart of Jesus Church in Highlandtown, Baltimore, Maryland, between June 25, 2020, and May 20, 2021. Testing events were staffed with Spanish–English bilingual health workers and designed to serve Latinos with limited English proficiency. However, testing was offered to anyone who sought services at this site without restrictions. Analysis was restricted to Latino adults (18 years and older).

PURPOSE

This program aimed to improve access to SARS-CoV-2 testing and support services for Latinos with limited access to health care or difficulty navigating the traditional medical system.

EVALUATION AND ADVERSE EFFECTS

To assess whether the Sacred Heart Church testing site improved access to SARS-CoV-2 testing for Latinos, we conducted a retrospective study comparing the characteristics of Latinos tested for SARS-CoV-2 at the Sacred Heart Church testing site or referred for testing to JHHS through the Esperanza hotline to those tested at the Johns Hopkins Bayview Medical Center (JHBMC), which is located in the catchment area of our project. We extracted data on patient demographics and testing from the JHHS electronic medical record system and a Research Electronic Data Capture database. We compared characteristics of patients tested at JHBMC or Sacred Heart Church and referred to JHHS through the Esperanza hotline using the *t* test or χ^2 test (Table 1). From June 25, 2020, through May 20, 2021, 3982 Latinos, of whom 3117 (78.3%) had limited English proficiency, were tested at these sites. Among them, 1791 (45%) were tested at the RADx-UP community site, 164 (4.1%) were referred to JHHS through the Esperanza hotline, and 2027

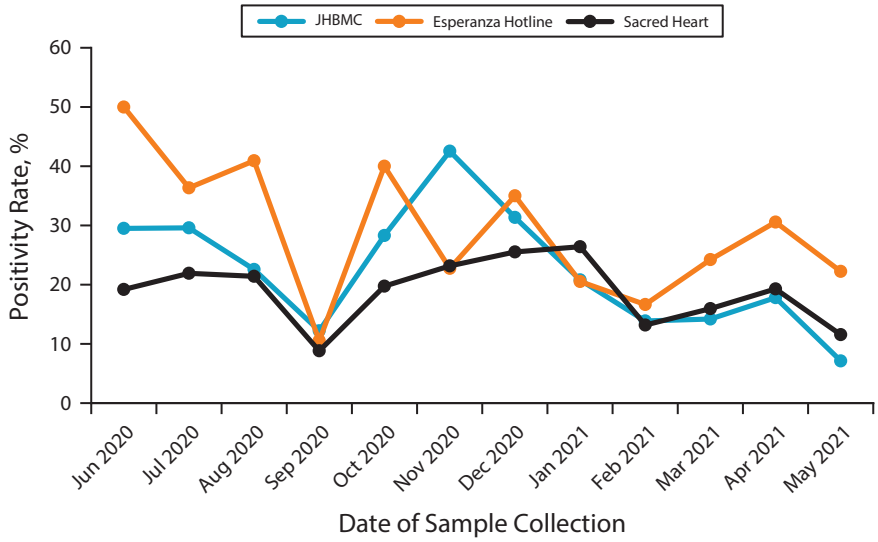
TABLE 1— Characteristics of Latino Patients Tested for SARS-CoV-2 at JHMBC Versus Those Tested at the RADx-UP Community Initiatives: Baltimore, MD, June 25, 2020–May 20, 2021

Characteristic	JHBMC (n = 2027), No. (%) or Mean ±SD	Sacred Heart Church (n = 1791), No. (%) or Mean ±SD	P[a]	Esperanza Hotline (n = 164), No. (%) or Mean ±SD	P[a]
Female	1225 (60.4)	944 (52.7)	<.01	101 (61.6)	.88
Age, y	37.3 ±15.2	34.0 ±16.3	<.01	42.5 ±12.2	<.01
Language preference[b]					
English	582 (28.7)	198 (11.5)	<.01	11 (6.7)	<.01
Spanish	1433 (70.7)	1517 (88.2)	<.01	153 (93.3)	<.01
Other	12 (0.6)	2 (0.1)	.03		
Interpreter needed	1417 (69.9)			151 (92.1)	<.01
PCP					
Has a PCP	777 (38.3)	154 (8.4)	<.01	7 (4.3)	<.01
No PCP	1030 (50.8)	717 (40.0)	<.01	151 (92.1)	<.01
Unsure/missing	220 (10.1)	920 (51.4)	<.01	6 (3.7)	<.01
Insurance group					
Private	570 (28.1)			3 (1.9)	<.01
Medicaid	185 (9.1)			4 (2.4)	<.01
Medicare	86 (4.3)			2 (1.2)	.06
No insurance	1186 (58.5)			155 (94.5)	<.01
SARS-CoV-2 positive	878 (43.3)	575 (32.1)	<.01	82 (50.0)	<.01

Notes. JHBMC = Johns Hopkins Bayview Medical Center; PCP = primary care provider; RADx-UP = Rapid Acceleration of Diagnostics-Underserved Populations; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

[a]We calculated *P* values from the Student *t* test, the Pearson χ^2 test, and the Fisher exact test for small sample sizes using the JHBMC testing site as reference for each pairwise comparison.

[b]Self-reported language preference at Sacred Heart Church information was missing from 74 individuals (denominator is 1719).



	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021
JHBMC	30	30	23	12	28	43	31	21	14	14	18	7
Esperanza Hotline	50	36	41	11	40	23	35	21	17	24	31	22
Sacred Heart	19	22	21	9	20	23	26	26	13	16	19	12

FIGURE 1— SARS-CoV-2 Positivity Rate by Site: RADx-UP Initiative, Baltimore, MD, June 25, 2020–May 20, 2021

Note. JHBMC = Johns Hopkins Bayview Medical Center; RADx-UP = Rapid Acceleration of Diagnostics-Underserved Populations; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2. Monthly positivity rates are shown as solid lines by site. Statistically significant differences ($P < .05$) in monthly positivity rates were evaluated across sites with one-way analysis of variance. This included an omnibus analysis of variance comparison with significance ($P < .05$) resulting in correction for multiple pairwise comparisons using the JHBMC site as reference. Multiple post hoc pairwise comparisons (Tukey test) of each group (Sacred Heart Church, Hotline/Esperanza Center) to the JHBMC reference group also demonstrated significant differences ($P < .05$ for each pairwise comparison).

(50.9%) were tested at JHBMC-based facilities. Patients tested at the Sacred Heart Church community site were more likely to be male (47.3% vs 39.6%; $P < .01$) and speak Spanish (88.2% vs 70.7%; $P < .01$) than were those tested at JHBMC. Patients referred to JHHS testing from the Esperanza hotline were most likely to speak Spanish (93.3%), be uninsured (94.5%), or not have a primary care doctor (92.1%). Insurance and primary care doctor information were not routinely collected at the Sacred Heart Church testing site, but based on existing data in the electronic medical record, we found that only 8.4% of patients had a primary care doctor. SARS-CoV-2 positivity rates were lower among patients tested at the Sacred Heart Church (32.1%) than those tested at JHBMC (43.3%) or referred to JHHS testing from the Esperanza hotline (50%; Figure 1). Positivity rates declined slightly over time as testing volume increased (Figure A, available as a supplement to the online version of this article at https://ajph.org).

SUSTAINABILITY

Community testing at the Sacred Heart Church was implemented early in the pandemic, when access to testing was very limited, especially for individuals without a primary care home. Testing costs were covered through the Coronavirus Aid, Relief, and Economic Security Act, which has now expired. Once COVID-19 vaccinations were approved, the infrastructure established for testing (i.e., hotline, social marketing, staff) was used to expand access to COVID-19 vaccination for low-income Latinos, and the Maryland Department of Health supported it through the Health Services Cost Review Commission.

PUBLIC HEALTH SIGNIFICANCE

The overall success of the US COVID-19 pandemic response strategy relies on an inclusive approach to all people living in the United States, regardless of immigration status. This study demonstrates that SARS-CoV-2 testing beyond conventional health care settings and paired with a community engagement strategy increased access to testing for

Spanish-speaking Latinos and provides essential insights for programs aiming to improve SARS-CoV-2 testing equity. Despite having a well-resourced hospital in the catchment area of our study, almost half (45%) of testing during this period was performed at the Sacred Heart Church community testing site.

SARS-CoV-2 positivity rates were much higher than the Maryland SARS-CoV-2 positivity rate (state seven-day average ranged from 2.07% to 9.47% during this period) in all sites, underscoring the disproportionate impact of COVID-19 among Latinos.[8] However, the lower positivity at the Sacred Heart Church suggests that this site expanded access to testing for people who may not have sought facility-based testing. High positivity rates reflect ongoing transmission and undetected cases. Our approach, with close community health worker follow-up, facilitated testing contacts, which is critical for epidemic control. More men were tested at the Sacred Heart Church than at facility-based testing; it is significant that Latino men are more disenfranchised from the health system.[9]

Pairing the social marketing campaign with a bilingual hotline was especially important for Spanish speakers without health insurance or usual source of care and may have mitigated the digital divide. Finally, low insurance rates and not having a source of primary care at all sites underscore structural challenges that low-income Latinos face, especially immigrants ineligible for health care coverage under the Affordable Care Act. Access to care is one of many critical factors that must be addressed to reduce health disparities in this population.

Our model relied heavily on trusted bilingual and bicultural community health workers, volunteers, flexible appointment scheduling, and community organizations; it used a high-touch and low-tech approach (i.e., in-person outreach, hotline, Spanish-language media, and word of mouth). Partnering with trusted community leaders and organizations is crucial for reaching immigrants, especially those who are undocumented, as concerns about deportation can dampen health care utilization.[10] Street outreach and word-of-mouth referrals helped identify Latinos at high risk for COVID-19 with limited access to health care. Community-based COVID-19 initiatives with bilingual and bicultural capacity are critical for addressing health disparities. Such initiatives are labor intensive and require adequate funding, including institutional and governmental support. AJPH

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B. F. Bigelow, D. A. Martínez, C. Yang, and K. R. Page conceptualized the study design. B. F. Bigelow, K. H. Phillips, and K. R. Page operationalized implementation of the community testing program. D. A. Martínez, C. Parent, and R. E. Saxton developed the analytic plan. C. Parent and R. E. Saxton managed the data. K. R. Page wrote the initial draft of the article. All authors reviewed, contributed, and approved the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

This study was reviewed and approved by the Johns Hopkins University institutional review board (IRB00318866).

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Community- Versus Health Care Organization–Based Approaches to Expanding At-Home COVID-19 Testing in Black and Latino Communities, New Jersey, 2021

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At-home COVID-19 testing offers convenience and safety advantages. We evaluated at-home testing in Black and Latino communities through an intervention comparing community-based organization (CBO) and health care organization (HCO) outreach. From May through December 2021, 1100 participants were recruited, 94% through CBOs. The odds of COVID-19 test requests and completions were significantly higher in the HCO arm. The results showed disparities in test requests and completions related to age, race, language, insurance, comorbidities, and pandemic-related challenges. Despite the popularity of at-home testing, barriers exist in underresourced communities. (*Am J Public Health*. 2022;112(S9): S918–S922. https://doi.org/10.2105/AJPH.2022.306989)

Although free COVID-19 testing has been widely embraced in some settings, access to testing has remained challenging throughout the pandemic for many people. Limited testing sites and long lines present barriers to testing, particularly among lower-income individuals with reduced control over their schedules or limited access to transportation.[1–3] Despite that, little research has evaluated strategies to enhance testing in underserved populations, and to our knowledge no previous research has examined this issue in the context of at-home testing, an increasingly popular option given its potential convenience and safety advantages.[4,5]

INTERVENTION AND IMPLEMENTATION

Recognizing the risks to health care workers (HCWs) during the pandemic, we developed the New Jersey Healthcare Essential Worker OutReach and Education Study-Testing Overlooked Occupations (NJ HEROES TOO) intervention as part of the National Institutes of Health Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) initiative.[6] NJ HEROES TOO engaged Black and Latino HCWs to constitute a health care organization (HCO) arm as "ambassadors" promoting at-home COVID-19 testing in their households and communities, and testing uptake in that arm was compared with uptake in a second study arm involving a traditional community-based organization (CBO) approach. Our aims were to compare the odds of at-home COVID-19 test requests and completions across study arms and examine sociodemographic factors associated with requests and completions.

The NJ HEROES TOO study was a partnership between a Rutgers University academic research team and local HCOs (n = 4) and CBOs (n = 18; Figure A, available as a supplement to the online version of this article at http://www.ajph.org). Partner organizations advertised the NJ HEROES TOO study through their

preferred outreach channels, including e-mails, social media, and flyers. Hyperlinks, QR codes, and URLs provided access to the study Web site, where a screener (in English or Spanish) queried age, race and ethnicity, and NJ county residence. Respondents meeting the eligibility criteria were invited to provide informed consent and complete a study questionnaire in REDCap. Upon completion, they were e-mailed an access code to order a free COVID-19 test kit by Vault Health, a major provider of at-home COVID-19 tests.[7]

Once the kit was received, participants answered questions regarding COVID-19 symptoms and collected saliva samples under videoconference supervision by Vault Health staff. Participants mailed saliva samples in prepaid express envelopes to the analytic lab (with free pick-up available). Polymerase chain reaction test results were returned to participants by Vault Health clinical providers. NJ HEROES TOO staff followed up with participants who did not complete the testing process to remind them about the testing opportunity and troubleshoot challenges.

The questionnaire, developed with input from the partner organizations, included RADx-UP-required common data elements and NJ HEROES TOO–specific items focusing on demographics, lifestyle, social factors, health and health care access, pandemic-related issues, previous COVID-19 testing, and vaccine intent (see the Appendix, available as a supplement to the online version of this article at http://www.ajph.org). Parents completed abbreviated versions for participants 17 years or younger.

Logistic regression was used to assess the odds that (1) an eligible participant requested a COVID-19 test and (2) a participant who requested a test completed the testing process. Complete data were available for 40% of participants. Multiple imputation with chained equations was used to estimate a set of plausible values for the missing data. Sixty simulated data sets were generated in which each variable with missing data was regressed on covariates, including the dependent variable and variables with complete data (study arm, age, race/ethnicity, language preference, and presence of comorbidities) based on the specific distribution of the dependent variable.

Best-fit models were adjusted for covariates that were significantly related to the outcome or that improved the overall model fit, including demographic variables, the presence of chronic comorbidities, postponement of medical care during the pandemic, access to and history of COVID-19 testing, pandemic challenge score, discrimination score, and trust score (see the Appendix). Statistical analyses were performed in Stata version 17 (StataCorp LP, College Station, TX 2022).

PLACE, TIME, AND PERSONS

From May through December 2021, eligible NJ residents completed a single online questionnaire (including items on sociodemographic characteristics as well as COVID-19-related perceptions, behaviors, and challenges), after which they were able to order a free at-home saliva COVID-19 polymerase chain reaction test.

Eligibility criteria included the following: Black or Latino race/ethnicity;

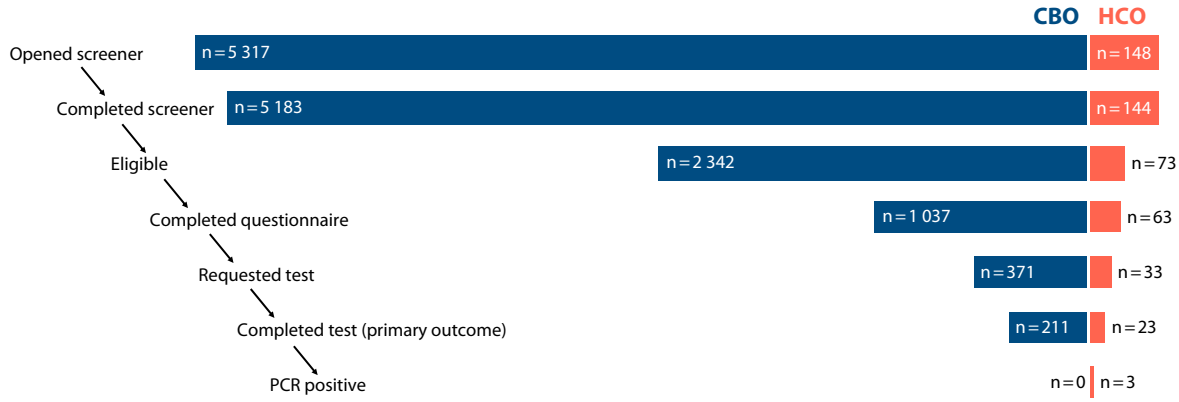

FIGURE 1— Recruitment and Participant Flow in the Community-Based Organization (CBO) and Health Care Organization (HCO) Arms of the NJ HEROES TOO Study: New Jersey, 2021

Note. NJ HEROES TOO = New Jersey Healthcare Essential Worker OutReach and Education Study-Testing Overlooked Occupations; PCR = polymerase chain reaction.

ability to provide informed consent or assent; ability to speak, understand, or read English or Spanish; and residence in the NJ county of Union, Passaic, Middlesex, or Essex. Participating counties were selected on the basis of high concentrations of Black and Latino residents, urbanicity, poverty rates, COVID-19 burden, proximity to participating health care sites, and extant CBO and HCO outreach infrastructure.

PURPOSE

The purpose of this intervention was to promote at-home COVID-19 testing through a nontraditional approach engaging HCWs and compare that with a traditional approach operating through CBOs. We also evaluated factors influencing engagement in the testing process across both study arms. Our focus on HCWs as ambassadors to underserved communities emerged as a result of their high level of engagement in ongoing studies of HCWs in NJ during the pandemic,[8–10] the high rates of COVID-19 infection among Black and Latino hospital workers in health care support roles (e.g., hospital maintenance, housekeeping, security, food service, and facility services),[9] and the high rates of COVID-19 infection and death in NJ during the pandemic.[11]

EVALUATION AND ADVERSE EFFECTS

In total, 97% of individuals (5327 of 5465) who started the online screener completed it, of whom 45% (n = 2415) were eligible (ineligibility was most often due to residency outside of the participating NJ counties). Questionnaires were completed by 1100 participants, representing 46% of eligible screeners. Of these participants, 404

TABLE 1— Best-Fit Logistic Regression Models Examining Odds of COVID-19 Test Requests and Completions as Part of the NJ HEROES TOO Study (Among Participants Who Completed a Questionnaire): New Jersey, 2021

Covariate	Requested Test[a] (n = 1 099), OR (95% CI)	Completed Test[b] (n = 403), OR (95% CI)
CBO (ref: HCO)	0.58 (0.31, 1.09)	0.45 (0.17, 1.23)
Age group, y (ref: 17–39)		
< 17	1.55 (1.03, 2.32)	0.50 (0.22, 1.15)
40–59	1.86 (1.14, 3.00)	1.17 (0.56, 2.43)
≥ 60	2.03 (1.11, 3.78)	3.36 (1.35, 8.38)
Race (ref: Latino, non-Black)		
Black, non-Latino	1.82 (1.28, 2.56)	2.65 (1.47, 4.79)
Latino and Black	0.64 (0.39, 1.04)	1.76 (0.67, 4.63)
Survey materials in Spanish (ref: in English)		3.02 (1.17, 7.81)
Male (ref: not male)	0.70 (0.51, 0.96)	
Income, $ (ref: 0–25 000)		
26 000–50 000	0.77 (0.48, 1.22)	0.88 (0.42, 1.85)
51 000–75 000	0.45 (0.27, 0.76)	0.70 (0.26, 1.91)
76 000–99 999	0.41 (0.2, 0.82)	0.45 (0.15, 1.32)
≥ 100 000	0.45 (0.22, 0.93)	0.56 (0.18, 1.76)
Education (adults; ref: ≤ high school)		
Some college	1.02 (0.63, 1.63)	1.53 (0.69, 3.37)
Bachelor's degree	0.88 (0.52, 1.48)	2.04 (0.88, 4.71)
Master's/professional degree	1.46 (0.78, 2.77)	1.86 (0.63, 5.52)
Insurance (adults; ref: private)		
None	2.25 (1.09, 4.62)	1.42 (0.37, 5.40)
Public	1.60 (1.09, 2.36)	3.27 (1.50, 7.04)
Employment status (adults; ref: essential worker)		
Nonessential worker	1.31 (0.84, 2.05)	
Unemployed	1.05 (0.58, 1.90)	
Not in labor force	1.93 (1.14, 3.29)	
Body mass index (adults; ref: ≤ 25 kg/m^2)		
25–≤ 30 (overweight)	1.58 (0.99, 2.53)	
≥ 30 (obese)	2.32 (1.38, 3.94)	
Pandemic challenges (ref: none)		
1–4 (moderate problems)	0.63 (0.42, 0.92)	1.06 (0.55, 2.03)
5–12 (major problems)	0.37 (0.22, 0.61)	0.39 (0.16, 0.99)
Wants to be vaccinated when available (ref: no)	0.67 (0.44, 1.02)	0.42 (0.22, 0.81)
Any chronic comorbidities (ref: no comorbidities)	1.08 (0.79, 1.51)	0.57 (0.33, 0.97)
Strongly agree/agree that it is easy to get tested for COVID-19 (ref: strongly disagree/disagree)	1.52 (1.03, 2.27)	
COVID-19 testing history (ref: never tested)		
Tested negative previously	2.41 (1.62, 3.56)	
Tested positive previously	1.92 (1.17, 3.13)	

Continued

TABLE 1— Continued

Covariate	Requested Test[a] (n = 1 099), OR (95% CI)	Completed Test[b] (n = 403), OR (95% CI)
Discrimination index score (ref: 0–9 [low])		
10–18		0.48 (0.25, 0.91)
19–27		0.43 (0.18, 1.00)
28–45 (high)		0.36 (0.07, 1.96)
Trust index score (ref: 0–8 [low])		
9–16 (moderate)		2.16 (0.79, 5.87)
17–32 (high)		1.39 (0.47, 4.14)
Postponed medical care during pandemic (ref: did not postpone care)		1.09 (0.54, 2.17)

Note. CBO = community-based organization; CI = confidence interval; HCO = health care organization; NJ HEROES TOO = New Jersey Healthcare Essential Worker OutReach and Education Study-Testing Overlooked Occupations; OR = odds ratio. Estimates from the best-fitting logistic regression models are displayed for each outcome. Variables were included in the best-fit model if they were significantly associated with the outcome, improved the model fit, or were selected for inclusion on the basis of model selection techniques, including elastic net regression and model fit parameters. Missing values were estimated via multiple imputation chained equations.
[a]The denominator is all eligible participants who completed a questionnaire.
[b]The denominator is all eligible participants who completed a questionnaire and requested a COVID-19 test through NJ HEROES TOO.

(37%) requested COVID-19 tests, of which 234 (58%) were completed. More participants were recruited through CBOs than HCOs at every stage in the process, including 97% (n = 5183) of screener completions, 97% (n = 2342) of informed consents, 94% (n = 1037) of questionnaire completions, 92% (n = 371) of tests requested, and 90% (n = 211) of tests completed (Figure 1; Table A, available as a supplement to the online version of this article at http://www.ajph.org).

The median age of participants who completed a questionnaire was 29 years; 54% were female, 47% were Latino (non-Black), 36% were Black (non-Latino), and 17% were Black/Latino (Table B, available as a supplement to the online version of this article at http://www.ajph.org). In the adjusted models, the odds of test requests and completions were nonsignificantly lower among CBO versus HCO participants (Table 1).

Across study arms, the odds of test requests were significantly higher for children (odds ratio [OR] = 1.55; 95% confidence interval [CI] = 1.03, 2.32), middle-aged adults (OR = 1.86; 95% CI = 1.14, 3.00), and older adults (OR = 2.03; 95% CI = 1.11, 3.78) than for younger adults (Table 1). Similarly, the odds were higher among Black participants than Latino participants (OR = 1.82; 95% CI = 1.28, 2.56).

Additional factors associated with higher odds of test requests included lower income, public (OR = 1.60; 95% CI = 1.09, 2.36) or no (OR = 2.25; 95% CI = 1.09, 4.62) insurance (vs private insurance), being outside the labor force (vs being an essential worker; OR = 1.93; 95% CI = 1.14, 3.29), and higher body mass index. Test requests were also associated with having had a prior COVID-19 test, whether with a negative (OR = 2.41; 95% CI = 1.62, 3.56) or positive (OR = 1.92; 95% CI = 1.17, 3.13) result, and self-reported ease of test access (OR = 1.52; 95% CI = 1.03, 2.27). The odds of test requests were lower among participants who experienced COVID-19-related life challenges that were either moderate (OR = 0.63; 95% CI = 0.42, 0.92) or major (OR = 0.37; 95% CI = 0.22, 0.61).

The odds of test completion were higher among adults 60 years or older (OR = 3.36; 95% CI = 1.35, 8.38; Table 1) and among Black participants (vs Latino participants; OR = 2.65; 95% CI = 1.47, 4.79). Also, participants accessing materials in Spanish (OR = 3.02; 95% CI = 1.17, 7.81) and participants with public insurance (vs private; OR = 3.27; 95% CI = 1.52, 7.04) were more likely to complete testing. Test completion rates were lower among participants reporting chronic comorbidities (OR = 0.57; 95% CI = 0.33, 0.97), those reporting major pandemic-related life challenges (OR = 0.39; 95% CI = 0.16, 0.99), and those with higher discrimination scores. Results were similar in models limited to individuals with complete case data (Table C, available as a supplement to the online version of this article at http://www.ajph.org).

Several key limitations should be noted. First, the total number of potential participants reached through each study arm cannot be quantified given the many outreach channels used by partner organizations. In addition, we observed considerable attrition at every step in the study process. This attrition, which is of central interest to our project and is relevant to understanding barriers to COVID-19 testing in vulnerable communities, also raises the possibility of bias, and thus there is the possibility that the results from our sample cannot be extrapolated to the participating counties, NJ, and the United States as a whole.

No adverse effects associated with the intervention were observed.

SUSTAINABILITY

Although the odds of completing at-home COVID-19 testing were higher among HCW study arm participants, overall engagement was much higher in the CBO arm, reinforcing the value of traditional approaches of working with community partners. At the same time, numerous barriers were identified that may limit the utility of at-home polymerase chain reaction testing in underserved communities in the absence of additional supportive measures.

PUBLIC HEALTH SIGNIFICANCE

Community-based approaches to expanding at-home COVID-19 testing among Black and Latino NJ residents were more successful than HCO-based approaches, but many sociodemographic disparities in testing uptake were observed. AJPH

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CONTRIBUTORS

E. S. Barrett led the conceptualization and drafting of the article. T. R. Andrews, J. Roy, and P. Greenberg designed and performed the statistical analyses. J. M. Ferrante, M. Gordon, Z. Rivera-Núñez, M. B. Pellerano, A. F. Tallia, D. Reed, B, Lynn, R. Rosati, M. Castañeda, F. Dixon, C. Pernell, D. Hill, M. E. Jimenez and S. V. Hudson led outreach and implementation. All of the authors contributed to the study design and reviewed and revised the article.

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CONFLICTS OF INTEREST

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HUMAN PARTICIPANT PROTECTION

The Rutgers University institutional review board approved the study activities, and all participants provided informed consent/assent.

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Effects of a Health Education Intervention for COVID-19 Prevention in Latinx Communities: A Cluster-Randomized Controlled Trial

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To promote COVID-19 preventive attitudes and behaviors among Latinx individuals, researchers and community partners implemented a culturally tailored health education intervention across 12 Oregon counties from February 2021 through April 2022. We did not identify any significant intervention effects on preventive attitudes and behaviors but did observe significant decreases in psychological distress. Although Latinx individuals' preventive attitudes and behaviors were not associated with the health education intervention, findings suggest the intervention has value in promoting their well-being (ClinicalTrials.gov Identifier: NCT04793464). (*Am J Public Health*. 2022;112(S9):S923–S927. https://doi.org/10.2105/AJPH.2022.307129)

Latinx communities are more likely to face COVID-19 illness and death than are their non-Latinx White counterparts in the United States.[1] In Oregon, Latinx residents made up 14% of the state's population but comprised 31.7% of COVID-19 cases in May 2020.[2] To address these health disparities, there was a need to increase access to preventive services among Latinx communities, such as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing and culturally tailored, evidence-informed COVID-19 health education in Latinx community networks.[3,4]

INTERVENTION AND IMPLEMENTATION

We implemented the Promotores de Salud intervention across Oregon,[5] which included two culturally and trauma-informed components with a focus on the Latinx community: (1) outreach, and (2) COVID-19 health education. The randomized controlled trial evaluation of the outreach component showed Promotores de Salud was effective at engaging more Latinx individuals in SARS-CoV-2 testing, with nearly four times as many Latinx individuals tested per event in the intervention condition than in outreach as usual (OAU).[6]

We evaluated the COVID-19 health education intervention component. The primary hypothesized outcome was greater endorsement of COVID-19 preventive attitudes and behaviors among those who received health education than among those who did not. For the secondary outcome, psychological well-being, we expected less psychological distress in attendees at intervention relative to OAU sites, given the trauma-informed and cultural tailoring of the health education intervention. We also examined whether intervention effects differed among Latinx versus non-Latinx individuals and as a function of Spanish language use at home.

PLACE, TIME, AND PERSONS

The Promotores de Salud intervention was implemented between February 2021 and April 2022 (data collection began March 2021) in 12 Oregon counties. Community members who were aged 15 years or older, had proficiency in English or Spanish, and visited one of the project's 43 SARS-CoV-2 testing sites were eligible to complete baseline and follow-up surveys.

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PURPOSE

The health education promoted COVID-19 preventive behaviors, knowledge, and receptive attitudes among Latinx individuals. The collaborative intervention development details appear elsewhere.[5] Promotores, akin to community health workers,[7] delivered the health education. Promotores (n = 21) were bicultural, bilingual (English and Spanish), and hired by Latinx-serving community-based organizations.

When community members arrived at a test site, promotores provided a five-minute overview of why and how to practice social distancing, mask wearing, hand washing, repeated testing, and (after April 2021) vaccination. The health education and print materials were available in Spanish and English. Messages focused on engaging in preventive behaviors to protect family and community, reflecting Latinx cultural values related to collective responsibility.[8] Promotores were trained in trauma-informed practices and motivational interviewing to address community members' questions and concerns, and they supported access to resources.[8] OAU sites served as controls and did not have promotores.

EVALUATION AND ADVERSE EFFECTS

We collected data before respondents received the health education via an onsite survey offered in Spanish and English and then again approximately one to two months after respondents received the health education via an online follow-up survey (median [Quartile 1 (Q1), Quartile 3 (Q3)] = 47 [36, 188] days later). Measures assessing mitigating attitudes and behaviors were from Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) common data elements and the PhenX Toolkit.[9,10] We evaluated six scores:

1. a six-item Likert mean scale of safety attitudes about preventive behaviors,
2. a five-item Likert mean scale of exposure attitudes about risky behaviors,
3. a vaccine attitude item,
4. a six-item sum index of risky health behaviors,
5. a 12-item sum score of preventive behaviors, and
6. a two-item scale score of psychological distress (PhenX Broadband depression and anxiety; see Table A for details [available as a supplement to the online version of this article at http://www.ajph.org]).

Two registered items about transmission knowledge did not exhibit adequate variance, so we omitted them.

At baseline, we collected 1443 surveys from 287 testing events (198 intervention; 87 OAU; 2 missing; median [Q1, Q3] = 3 [1, 6] surveys per event). Of these, 787 (54.5%) respondents were lost to follow-up and 44 (3.0%) had incomplete baseline data. The analysis sample included the remaining 608 respondents with follow-up data (390 intervention; 218 OAU; Table 1 provides descriptors and Figure A [available as a supplement to the online version of this article at http://www.ajph.org] depicts participant flow). Community members were permitted to participate in the survey no more than once at baseline and once at follow-up. The study was a clustered randomized trial. Randomization occurred at the event level (rather than at the individual level) and included collaboration with community partners and county health agencies to identify up to six optimized sites, which we then randomized within county to minimize threats to internal validity.

Participants attended events that were randomly assigned as either intervention or control. Control sites received the intervention after a waitlist period.[6] The total analysis sample was from 197 SARS-CoV-2 testing events at which 2405 COVID-19 tests were performed. Most respondents self-identified as Latinx (64.1%), female (66.3%), and non-White (61.7%) and spoke Spanish at home (59.9%). The median (Q1, Q3) age was 40 (29, 50) years.

Educational attainment varied (44.9% completed high school or less, and 55.1% completed some college or more). Almost half of the respondents were essential workers (44.2%). Loss to follow-up did not differ significantly by group (odds ratio [OR] = 0.80; 95% confidence interval [CI] = 0.56, 1.04; $P = .07$), although those in the intervention group had a lower rate of study dropout. Respondents who completed follow-up were more likely to identify as female, White, and not Latinx and were more likely to have private health insurance, use only English at home, and have US-born parents compared with those not retained.

For generalizability to the state of Oregon, we calculated propensity scores and inverse probability weights using social disparity indices from the RADx-UP common data elements[10]: the child opportunity index, the social vulnerability index, area health and research quality, pandemic vulnerability, and the pandemic vulnerability–vaccine model. Multilevel models adjusted for the nonindependence of participants clustered in randomized testing events by appropriately estimating SEs. Specifically, negative binomial generalized linear mixed models were specified for count data with fewer than seven categories and linear mixed models for continuous scale scores. We adjusted models for sex,

TABLE 1— Description of SARS-CoV-2 Testing Participants in Promotores de Salud Intervention: Oregon, March 2021–April 2022

Variable	Overall (n = 680), Count (%) or Median (Q1, Q3)	Intervention (n = 390), Count (%) or Median (Q1, Q3)	OAU (n = 218), Count (%) or Median (Q1, Q3)	SMD[a]
Female	403 (66)	259 (66)	144 (66)	0.01
Age, y	40 (29, 50)	40 (30, 51)	39 (28, 49)	0.15
Race/ethnicity[b]				
Latinx	390 (64)	248 (64)	142 (65)	0.03
American Indian/Alaska Native	90 (15)	49 (13)	41 (19)	0.17
Asian	18 (3.0)	9 (2.3)	9 (4.1)	0.10
Black/African American	13 (2.1)	7 (1.8)	6 (2.8)	0.06
Middle Eastern/North African	5 (0.8)	5 (1.3)	0 (0.0)	0.16
Native Hawaiian/other Pacific Islander	1 (0.2)	0 (0.0)	1 (0.5)	0.10
White	233 (38)	151 (39)	82 (38)	0.02
Spanish spoken at home	364 (60)	233 (60)	131 (60)	0.01
Employed	401 (66)	254 (66)	147 (67)	0.04
Essential worker	269 (44)	171 (44)	98 (45)	0.02
Education[c]				0.15
< high school diploma	147 (24)	97 (25)	50 (23)	
High school diploma or GED	126 (21)	72 (18)	54 (25)	
≥ some college	335 (55)	221 (57)	114 (52)	

Note. GED = general equivalency diploma; OAU = outreach as usual; Q1 = Quartile 1; Q3 = Quartile 3; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2; SMD = standardized mean difference.

[a]The SMD is a data type agnostic comparison between the intervention and OAU groups. Values given are mean differences in units of SDs. Education is presented as a single nominal variable and thus one SMD is presented.
[b]Race/ethnicity were collected as a single question in which participants could endorse any number of options. All participants endorsed at least one option.
[c]Education was collected as an eight-point scale with choices ranging from "I have never gone to school" to "other advanced degree."

race, ethnicity, age, education, essential worker status, time to follow-up, and the National Institutes of Health pandemic vulnerability index.[11]

Results supported neither the hypothesized main effects nor the moderators (Latinx ethnicity and Spanish language use at home) of the intervention on COVID-19 preventive attitudes and behaviors (Table 2). The intervention was, however, associated with pre–post reductions in psychological distress ($b = -0.14$; 95% CI = −0.29, −0.02; $P < .05$), yielding a small effect size ($d = 0.15$; see Figure B [available as a supplement to the online version of this article at http://www.ajph.org]). Relative to the control condition, the promotores group was −0.15 lower in psychological distress after the intervention, controlling for baseline. Overall, at follow-up Latinx respondents in both conditions exhibited greater safety ($b = 0.2$; 95% CI = 0.01, 0.39; $P < .05$) and exposure attitudes ($b = 0.33$; 95% CI = 0.09, 0.57; $P < .05$). That is, compared with non-Latinx participants, Latinx respondents' attitudes about safety and exposure were b = 0.2 and 0.33 higher after the intervention, controlling for baseline.

Latinx respondents also reported less engagement in risky behaviors (incident rate ratio = 0.74; 95% CI = 0.57, 0.96; $P < .05$) and more engagement in preventive behaviors ($b = 0.73$; 95% CI = 0.05, 1.40; $P < .05$) than did non-Latinx respondents. Latinx participants had b = 0.73 higher engagement than did non-Latinx respondents in COVID-19 prevention behaviors, controlling for baseline. Limitations of the study were related to the urgency of implementation despite the nascent literature base at the start of the COVID-19 pandemic. Stronger outcome measures are needed, as are more effective follow-up procedures to mitigate demographic shifts from baseline. There were no adverse or other unintended consequences of the intervention.

SUSTAINABILITY

Several factors indicate favorable sustainability, including the flexibility of the health education in responding to

TABLE 2— Sample Weighted Tests of Effectiveness Hypotheses for Health Behaviors, Attitudes, Psychological Distress, and Vaccine Acceptance Among SARS-CoV-2 Testing Participants: Promotores de Salud Intervention, Oregon, March 2021–April 2022

	Safety Attitudes (n = 509),[a] b (95% CI)	Exposure Attitudes (n = 539),[a] b (95% CI)	Psychological Distress (n = 591),[a] b (95% CI)	Preventive Behaviors (n = 504),[a] b (95% CI)	Risky Behaviors (n = 608),[b] IRR (95% CI)	Vaccine Attitude (n = 377),[b] IRR (95% CI)
Intercept	3.63 (3.34, 3.93)	3.19 (2.84, 3.53)	1.60 (1.31, 1.89)	3.60 (2.60, 4.70)	0.66 (0.438, 1.001)	1.02 (0.66, 1.58)
Intervention (ITT)	0.03 (−0.09, 0.14)	0.05 (−0.08, 0.19)	−0.14 (−0.26, −0.02)	−0.05 (−0.44, 0.34)	0.97 (0.82, 1.15)	1.04 (0.87, 1.25)
BL score	0.40 (0.32, 0.48)	0.28 (0.21, 0.36)	0.58 (0.51, 0.64)	0.33 (0.26, 0.41)	1.42 (1.34, 1.51)	1.36 (1.25, 1.47)
Time since BL	−0.003 (−0.007, 0.001)	0.001 (−0.004, 0.006)	−0.002 (−0.006, 0.002)	−0.03 (−0.04, −0.02)	1.008 (1.003, 1.014)	1.002 (0.996, 1.009)
Latinx	0.197 (0.002, 0.393)	0.33 (0.09, 0.57)	−0.05 (−0.25, 0.16)	0.73 (0.05, 1.40)	0.74 (0.57, 0.96)	0.94 (0.70, 1.25)
Female	0.16 (0.04, 0.28)	0.04 (−0.10, 0.19)	0.13 (0.01, 0.25)	0.09 (−0.31, 0.50)	0.92 (0.79, 1.09)	0.97 (0.81, 1.17)
White	0.09 (−0.10, 0.28)	0.07 (−0.16, 0.31)	0.11 (−0.09, 0.30)	−0.30 (−0.90, 0.40)	0.89 (0.70, 1.15)	0.97 (0.73, 1.29)
Age	0.002 (−0.002, 0.006)	−0.001 (−0.006, 0.003)	−0.005 (−0.010, −0.001)	0.01 (−0.01, 0.02)	0.997 (0.992, 1.003)	1.0003 (0.99, 1.007)
Education	0.03 (−0.01, 0.07)	0.04 (−0.01, 0.08)	0.03 (−0.01, 0.07)	−0.06 (−0.19, 0.06)	1.06 (1.002, 1.120)	0.97 (0.92, 1.03)
Essential worker	0.05 (−0.06, 0.16)	−0.132 (−0.268, 0.004)	0.11 (−0.01, 0.22)	−0.17 (−0.55, 0.21)	1.12 (0.96, 1.31)	1.02 (0.85, 1.21)
County PVI	−0.50 (−2.30, 1.20)	−0.60 (−2.60, 1.40)	2.10 (0.20, 4.00)	−5.40 (−11.10, 0.20)	7.40 (0.40, 141.70)	0.6 (0.2, 2.1)
Latinx[c]	0.28 (0.04, 0.53)	0.21 (−0.09, 0.52)	−0.02 (−0.27, 0.23)	0.70 (−0.20, 1.50)	0.77 (0.55, 1.07)	0.89 (0.63, 1.27)
Latinx × ITT[c]	−0.15 (−0.40, 0.11)	0.20 (−0.11, 0.50)	−0.04 (−0.29, 0.21)	0.10 (−0.80, 1.00)	0.95 (0.68, 1.34)	1.09 (0.74, 1.59)
Spanish[d]	−0.01 (−0.28, 0.26)	0.13 (−0.20, 0.45)	−0.31 (−0.59, −0.03)	0.70 (−0.20, 1.70)	1.18 (0.79, 1.76)	1.12 (0.73, 1.72)
Spanish × ITT[d]	−0.06 (−0.31, 0.18)	0.13 (−0.16, 0.43)	0.05 (−0.19, 0.29)	0.20 (−0.60, 1.00)	0.83 (0.59, 1.16)	1.13 (0.77, 1.64)

Note. BL = preintervention baseline; IRR = incident rate ratio; ITT = intent to treat; PVI = pandemic vulnerability index; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2. Multilevel models are generalized linear negative binomial for count and categorical data and multilevel linear models for scale score data. Multilevel models adjust for the nonindependence of participants clustered in randomized testing events by appropriately estimating SEs.

[a]Outcome modeled using a normal distribution.
[b]Outcome modeled using a negative binomial distribution.
[c]Moderator analysis conducted separately from main effects.
[d]Moderator analysis conducted separately from main effects; Latinx removed from model because of multicollinearity with Spanish language.

evolving COVID-19 prevention understanding, the collaborative intervention development and implementation with Latinx community-based organizations, and the state public health department's adoption of project test sites. A formal evaluation of sustainability is under way.

PUBLIC HEALTH SIGNIFICANCE

Psychological well-being is associated with reduced risk of COVID-19 hospitalization.[12] Thus, the finding that our promotores-delivered intervention decreases psychological distress is notable. Promotores may lessen psychological distress by improving access to reliable information, promoting confidence in navigating challenges, and affirming engagement in preventive behaviors. However, given the relatively small effect size for a secondary outcome, the intervention must be developed further and coupled with other approaches to minimize barriers and maximize health efficacy. For the Latinx community, specific improvements in COVID-19 preventive attitudes and behaviors were not associated with the intervention. Findings across studies suggest that promotores are ideal for improving access to SARS-CoV-2 testing and outreach provided in Spanish by bicultural staff.[6] AJPH

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

All study activities were approved by the University of Oregon institutional review board. All study participants provided written or digital informed consent.

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