**WORK-IN-PROGRESS AND LESSONS LEARNED**

# COVID-19 information sources for Black and Latine communities: A community co-created survey

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**ABSTRACT:**

**Background**: To ensure equity in COVID-19 vaccine access, it is critical that Black and Latine communities receive trustworthy COVID-19 information. **Objectives**: This study uses community-based participatory research to understand sources of COVID-19 information for Black and Latine adults, how trustworthy that information is, and relationships between information sources and COVID-19 vaccine intention. **Methods**: We co-created a survey in Spanish and English and distributed it to Black and Latine adults residing in the Pittsburgh area. Data were analyzed using descriptive statistics and multivariate logistic regression. **Result**s: 574 participants completed the survey. Participants reported accessing a variety of COVID-19 information sources, and generally trusted these sources. Few sources of information were associated with COVID-19 vaccine intention. We also review lessons learned from our community-academic collaboration. **Conclusions**: Trustworthy COVID-19 information sources may not be sufficient for increasing vaccine intention. Results can help other community-academic partnerships working to improve COVID-19 vaccine equity.

**KEYWORDS:** Community-Based Participatory Research, Medicine, Respiratory Tract Infections, Public Health, Health Care Surveys, Health Care Quality, Access, and Evaluation, COVID-19

The coronavirus 2019 (COVID-19) pandemic disproportionately impacts Black and Latine communities, who are experiencing health and economic ramifications of the pandemic at higher rates compared with non-Hispanic white communities.[1–7] Ensuring equitable access to the COVID-19 vaccine is critical to reducing these disparities and improving health. Mistrust of medical professionals, research institutions, and governmental agencies is well-documented among Black and Latine communities and impacts uptake of vaccines. [8-13] Therefore, promoting trustworthiness, acceptance, and uptake of the COVID-19 vaccine is crucial to mitigate COVID-19 related disparities.

During the pandemic, a wide array of individuals, organizations, and social media sources have been providing messaging around COVID-19. For example, a survey of Black and Latine adults found that approximately half of Black adults receive their COVID-19 information from national broadcast news, followed by social media and public television or radio. In contrast, one-quarter of Latine adults receive their COVID-19 news from public television or radio, followed by national broadcast news and social media.[14] Results examining the relationship between COVID-19 information sources among Black and Latine individuals and vaccine intention are mixed. A national survey found that associations between trusted sources of information and vaccine intention were weaker for Black participants compared with non-Black participants.[15] Likewise, a survey of adults living in Puerto Rico found that, although federal and international health organizations and healthcare professionals were the most trusted for COVID-19 information, people who did not intend to receive the COVID-19 vaccine had lower trust in all information sources.[16] Additionally, there is limited research examining trust in local sources of information, who play an important role in more personalized public health messaging.[17]

Black and Latine communities in the United States are not monolithic and it is imperative that trustworthy sources within local communities are considered.

Communities should not be retraumatized through traditional research practices that conduct studies *on* them rather than *with* them.[18] Yet few surveys on COVID-19 information sources have been co-created with community partners. The goal of this study was to use community based participatory research (CBPR) to develop and implement a co-created survey to assess the perspectives of Black and Latine adults regarding: 1) their perceptions of which COVID-19 information sources are trustworthy; and 2) associations between COVID-19 information sources and COVID-19 vaccine intention. CBPR is an approach where community partners are included throughout all phases of the research process, including building on each party's strengths and attending to power inequities, decision making, accountability and shared ownership of projects.[19-21] In this works-in-progress manuscript, we report survey results in the context of lessons learned through our community-academic partnership.

**Community Partnership: Community Vaccine Collaborative**

This study was conducted through a community-academic partnership focused on promoting vaccine equity in Southwestern Pennsylvania called the Community Vaccine Collaborative (CVC).[22] The CVC was founded in July 2021 by four community-based organizations and a group of researchers and healthcare providers including many of the authors. The CVC initially focused on inclusion of Black and Latine communities within COVID-19 vaccine clinical trials then expanded to weekly informational meetings, townhall events, community vaccine clinics, co-created studies (such as this), infographics and other tools for

community health workers. While the work has centered on Black and Latine communities, we have included partners working with refugee and rural communities. The CVC currently has over 100 members, with an average of 20-30 per meeting.

The CVC engages in principles of CBPR including co-creation of research ideas, attending to positionality, creating a safe space for communities to challenge researchers, elevating community priorities, and dismantling power inequities.[19-22] For example, the CVC is co-led by community partners and researcher representation is limited to ensure this space reflects community priorities. Researcher leads have deep expertise in community-partnered work. More information about the CVC, particularly the way we incorporate principles of CBPR, is available elsewhere.[22]

The CVC developed a workgroup focused on vaccine trustworthiness with the goal of shifting the paradigm from asking marginalized communities to trust the COVID-19 vaccine to recognizing that it is the responsibility of healthcare systems and researchers to promote themselves and the vaccine as trustworthy. In October 2020, the workgroup collectively decided to conduct this survey with Black and Latine individuals in the greater Pittsburgh area. Partners were involved in all aspects of the project, including developing the research question, survey co-creation, recruitment, data collection, data sharing, and drafting the manuscript.

## Methods

### Participants

Participants were included in this study if they identified as Black and/or Latine, were 18 years or older, lived in Pittsburgh or within 50 miles of Pittsburgh, and could complete the survey in Spanish or English. The University of Pittsburgh Institutional Review Board deemed this study exempt.

## Measures

The trustworthiness workgroup iteratively developed the survey. Our group---which includes many of the authors—first created a list of trusted information sources. One of the researchers (MR) created the initial survey draft and then had one-on-one conversations with workgroup members to revise the survey. The survey was piloted and further revisions made until all parties agreed to the final version.

*Information sources*. A list of local, state, and national COVID-19 information sources was developed based on published research and community-based expertise. Survey participants were asked to select all of the information sources they have used. They then rated the trustworthiness of each selected sources on a 5-point Likert scale (very trustworthy to very untrustworthy). A source was defined as trustworthy if participants selected it as "very trustworthy" or "trustworthy". After about 100 participants had completed the survey, the CVC recommended adding an additional question about trustworthiness of COVID-19 information sources that participants did not select as having used. The CVC noted that participants may see information from sources they are not actively using and may start using new sources so it was important to understand participants' perspectives on trustworthiness of all information sources.

**Vaccine intention**: COVID-19 vaccine intention was measured with an adapted Pew Research Center item: "If the COVID-19 vaccine was available to you now, would you get vaccinated?" with a 4-point Likert response scale (definitely, probably, probably not, definitely not). Vaccine intention was operationalized as binary, with positive intention defined as answering "definitely" or "probably."

**Demographic data**: Participants were asked to select one or more of the following options for their race and ethnicity: Black; Hispanic/Latino/a/x/e; Asian; White; Native American or Alaskan Native; or Other. Additional demographic questions assessed: 1) gender; 2) age; 3) whether a language other than English was spoken at home; and 4) whether the participant was born outside of the United States.

**Recruitment and data collection**

Participants were recruited with the support of community-based organizations. Information about the survey was disseminated through word-of-mouth, social media, and organizations' websites, and in a local newspaper for the Pittsburgh-area Black community. Participants completed the anonymous survey online between November 15, 2020 and January 15, 2021. A consent script was followed by screening items based on inclusion criteria. After completing the survey, participants were redirected to a second unlinked survey to receive a $25 gift card. Participants had the opportunity to take the survey, which was available in both Spanish or English, on their own or have the survey read out-loud to them by the research team.

**Data analysis**

It was decided *a priori* to exclude all surveys with >50% missing data or identification of race/ethnicity other than Black or Latine. Descriptive statistics were used to examine demographics, COVID-19 information sources, and trustworthiness of information sources. Multivariate logistic regression models were used to examine associations between sources of information used and COVID-19 vaccine intention. Models were adjusted for demographic variables. Post hoc bivariate analyses (Chi-square tests) were conducted to compare sources of information accessed by Black and Latine communities. The SAS software program (version 9.4) was used for data analysis.

## Results

574 participants completed the survey; 402 (70%) identified as Black and 172 (30%) identified as Latine (3 of the 172 Latine participants identified as Black and Latine). The majority were ages 30-64 (68%) and identified as female (74%). Additionally, 32% reported being born abroad and 38% reported speaking a language other than English at home (**Table 1**).

**Table 1: Demographic characteristics of participants**

| Demographic variable | Total | Black | Latine |
|---|---|---|---|
| Age | | | |
| 18-24 | 89 (16%) | 53 (13%) | 36 (21%) |
| 30-44 | 219 (38%) | 142 (36%) | 77 (45%) |
| 45-64 | 173 (30%) | 124 (31%) | 49 (29%) |
| 65-80 | 71 (12%) | 64 (16%) | 7 (4%) |
| 81 or older | 19 (3%) | 17 (4%) | 2 (1%) |
| Missing | 3 | 2 | 1 |
| Race[a] | | | |
| Black | 402 (70%) | | |
| Latinx | 172 (30%) | | |
| Gender | | | |
| Male | 146 (26%) | 310 (78%) | 58 (34%) |
| Female | 422 (74%) | 88 (72%) | 112 (66%) |
| Genderfluid | 3 (0.5%) | 2 (0.5%) | 1 (0.5%) |
| Missing | 3 | 2 | 1 |
| Born abroad | 149 (32%) | 15 (4%) | 132 (78%) |
| Missing | 7 | 4 | |
| Language other than English | 213 (38%) | 66 (17%) | 147 (91%) |
| Missing | 15 | 5 | |

a: 3 participants under the Latine category identified as Black and Latine

COVID-19 local, state, national, and social media information sources

The most frequently used sources of COVID-19 information were friends and family (64%) and the local TV news (66%), followed by national news (59%), Governor Tom Wolfe (Pennsylvania; 57%), Dr. Anthony Fauci (54%), the Centers for Disease Control and Prevention (CDC; 49%), local doctors (48%), and the county health department (45%). The remaining sources were used by fewer than 40% of participants (**Table 2**). The majority of COVID-19 information sources used by participants were considered trustworthy (>70%; **Table 2**). Overall, participants considered sources they are not using to be less trustworthy, although medical and scientific personnel remained relatively trusted.

In terms of social media, Facebook was the most frequently used source for COVID-19 information; however only 37% of people who reported using Facebook rated it as trustworthy (**Table 2**). Other social media platforms were used less frequently but were considered more trustworthy among those participants who indicated using them.

**Table 2: COVID-19 sources of information and trustworthiness of sources used and not used**

| COVID-19 information source category | COVID-19 information source | Participants reporting that they used the source | Participants who stated that a source is trustworthy for sources used | Participants who stated that a source is trustworthy for sources not used[a] |
|---|---|---|---|---|
| Press | Local TV news | 376 (66%) | 259 (70%) | 64 (41%) |
| | Local press | 179 (31%) | 142 (78%) | 141 (46%) |
| | National press | 232 (41%) | 132 (79%) | 125 (48%) |
| | National news | 339 (59%) | 227 (68%) | 67 (36%) |
| Community-based individuals | Friends and family | 349 (64%) | 278 (78%) | 67 (41%) |
| | Community-based organizations | 160 (28%) | 138 (87%) | 145 (44%) |
| | Religious leaders | 74 (13%) | 64 (89%) | 131 (33%) |
| | Local schools | 95 (17%) | 82 (85%) | 168 (44%) |
| Medical and scientific personnel | Local doctors | 274 (48%) | 258 (94%) | 184 (81%) |
| | County health department | 258 (45%) | 242 (95%) | 185 (78%) |
| | Local researchers | 73 (13%) | 67 (93%) | 267 (70%) |
| | Dr. Fauci | 310 (54%) | 290 (94%) | 99 (49%) |
| | Centers for Disease Control and Prevention | 281 (49%) | 251 (93%) | 143 (64%) |
| | World Health Organization | 203 (35%) | 176 (87%) | 174 (61%) |
| Elected officials | Local government | 200 (35%) | 156 (79%) | 154 (51%) |
| | Governor Wolf (PA) | 327 (57%) | 293 (89%) | 48 (46%) |
| | Former President Trump | 99 (17%) | 32 (33%) | 53 (14%) |
| | President Biden | 166 (29%) | 141 (85%) | 147 (46%) |
| | Congress | 55 (10%) | 41 (76%) | 117 (29%) |
| Social media | Facebook | 376 (72%) | 137 (37%) | 17 (28%) |
| | Twitter | 122 (23%) | 58 (48%) | 38 (15%) |

| | | | | |
|---|---|---|---|---|
| | TikTok | 59 (11%) | 26 (43%) | 39 (12%) |
| | Instagram | 164 (31%) | 67 (41%) | 39 (17%) |
| | WhatsApp | 81 (15%) | 37 (47%) | 32 (11%) |
| | YouTube | 177 (33%) | 92 (51%) | 35 (16%) |
| | Snapchat | 31 (6%) | 20 (64%) | 32 (10%) |
| Other | Flyers | 82 (14%) | 66 (79%) | 104 (27%) |
| | Mailing | 100 (18%) | 61 (62%) | 77 (21%) |

a: total n smaller for trustworthiness of COVID-19 sources not used because this question was added mid-way through data collection

Associations between information used and COVID-19 vaccine intention

After adjusting for demographic factors, participants who used Dr. Anthony Fauci (aOR 1.7 [1.1., 2.5]) local researchers (aOR 2.1 [1.2, 3.9]), or WhatsApp (aOR 3.1 [1.5, 6.4] for COVID-19 information were significantly more likely to report positive COVID-19 vaccine intention. Participants who used the national news (aOR 0.62 [0.4, 0.9]), former President Donald Trump (aOR 0.59, [0.36, 0.97)], or Facebook (aOR 0.55 [0.34, 0.87]) were less likely to report positive vaccine intention. No other significant associations between COVID-19 information sources and vaccine intention were found (Table 3).

**Table 3: Associations between COVID-19 information source and COVID-19 vaccine intention**

| **COVID-19 information source category** | **COVID-19 information source** | **Adjusted odds ratios[a] and confidence intervals** |
|---|---|---|
| Press | Local TV news | 0.7 (0.47, 1.1) |
| | Local press | 1.3 (0.89, 1.96) |
| | National press | 1.2 (0.85, 1.8) |
| | National news | 0.62 (0.4, 0.9)* |
| Community-based individuals | Friends and family | 0.89 (0.6, 1.3) |

| | | |
|---|---|---|
| | Community-based organizations | 0.68 (0.45, 1.1) |
| | Religious leaders | 1.3 (0.7, 2.3) |
| | Local schools | 0.8 (0.5, 1.4) |
| Medical and scientific personnel | Local doctors | 1.1 (0.74, 1.6) |
| | Local health department | 0.93 (0.64, 1.3) |
| | Local researchers | 2.1 (1.2, 3.9)** |
| | Dr. Fauci | 1.7 (1.1, 2.5)** |
| | Centers for Disease Control | 1.1 (0.74, 1.6) |
| | World Health Organization | 1.3 (0.88, 1.9) |
| Elected officials | Local government | 1.2 (0.8, 1.7) |
| | Governor Wolf (PA) | 0.86 (0.58, 1.3) |
| | Former president Donald Trump | 0.59 (0.36, 0.97)* |
| | President Biden | 1.4 (0.89, 2.1) |
| | Congress | 1.5 (0.77, 2.8) |
| Social media | Facebook | 0.55 (0.34, 0,.87)** |
| | Twitter | 1.5 (0.93, 2.4) |
| | TikTok | 1.3 (0.69, 2.3) |
| | Instagram | 0.99 (0.65, 1.5) |
| | WhatsApp | 3.1 (1.5, 6.4)** |
| | YouTube | 1.2 (0.83, 1.9) |
| | Snapchat | 2.4 (0.98, 5.7) |
| Other | Flyers | 1.3 (0.77, 2.3) |
| | Mailing | 1.2 (0.7, 1.9) |

[a] Models adjusted for demographic variables

*p<0.05; ** p<0.01, *** p<0.001Post-hoc analysis comparing Black and Latine communities

While not an original goal of our study, we conducted post-hoc analyses to compare COVID-19 information sources between Black and Latine participants. Overall, Black and Latine participants reported accessing similar information sources. Black-identifying participants were more likely than Latine identifying participants to use local TV news (p<0.0001), local

doctors (p<0.0001), the county health department (p=0.004), Dr. Fauci (p<0.0001), and the CDC (p<0.0001). Latine participants were more likely than Black participants to use local schools (p=0.02), the World Health Organization (p<0.0001), former president Donald Trump(p=0.007), Instagram (p=0.007), WhatsApp (p<0.0001), and YouTube (0.005; **Table 4**).

**Table 4: Post-hoc analysis: Comparing COVID-19 sources used between Black and Latine participants**

| | | Black | Latine | Chi square/p-value |
|---|---|---|---|---|
| Press | Local TV news | 286 (71%) | 90 (52%) | 18.9 (<0.0001)*** |
| | Local press | 125 (31%) | 54 (31%) | 0.0028 (0.96) |
| | National press | 149 (37%) | 83 (48%) | 6.2 (0.01)* |
| | National news | 247 (61%) | 92 (54%) | 3.2 (0.08) |
| Community-based individuals | Friends and family | 243 (60%) | 106 (62%) | 0.13 (0.7) |
| | Community-based organizations | 112 (28%) | 48 (28%) | 0.0001 (0.99) |
| | Religious leaders | 53 (13%) | 21 (12%) | 0.12 (0.73) |
| | Local schools | 57 (14%) | 38 (22%) | 5.46 (0.02)* |
| Medical and scientific personnel | Local doctors | 214 (53%) | 60 (35%) | 16.3 (<0.0001)*** |
| | County health department | 196 (49%) | 62 (36%) | 8.2 (0.004)** |
| | Local researchers | 52 (13%) | 21 (12%) | 0.06 (0.81) |
| | Dr. Fauci | 248 (62%) | 62 (36%) | 33 (<0.0001)*** |
| | Centers for Disease Control | 218 (54%) | 63 (37%) | 15 (<0.0001)*** |
| | World Health Organization | 118 (29%) | 85 (50%) | 21 (<0.0001)*** |
| Elected officials | Local government | 143 (36%) | 57 (33%) | 0.31 (0.58) |
| | Governor Wolfe | 238 (59%) | 89 (52%) | 2.8 (0.09) |
| | Former president Donald Trump | 58 (15%) | 41 (24%) | 7.3 (0.007)** |
| | President Biden | 127 (32%) | 39 (23%) | 4.9 (0.03) |
| | Congress | 42 (11%) | 13 (8%) | 1.2 (0.28) |
| Social media | Facebook | 248 (71%) | 128 (75%) | 1.1 (0.29) |
| | Twitter | 82 (23%) | 40 (24%) | 0.04 (0.85) |
| | TikTok | 43 (12%) | 16 (10%) | 0.75 (0.39) |
| | Instagram | 98 (27%) | 66 (39%) | 7.3 (0.007)** |
| | Whats app | 16 (4%) | 65 (38%) | 101.8 (<0.0001)*** |
| | YouTube | 106 (29%) | 71 (42%) | 7.9 (0.005)** |
| | Snapchat | 21 (6%) | 10 (6%) | 0.0005 (0.98) |

| | | | | |
|---|---|---|---|---|
| Other | Flyers | 59 (15%) | 23 (13%) | 0.16 (0.68) |
| | Mailing | 75 (19%) | 25 (15%) | 1.45 (0.23) |

*p<0.05; ** p<0.01, *** p<0.001

Lessons learned

*Co-creating survey instruments***.** We leveraged expertise from the CVC to co-create the survey, particularly to identify local sources where individuals may seek COVID-19 information. This iterative process led to inclusion of multiple important sources which have not been widely included in national surveys (i.e., religious leaders, community organizations, local researchers, local schools). Community recommendations also informed the centering of the survey on local sources, as local trusted messengers are key to ensuring communities have access to accurate information about COVID-19. Team members preferred providing feedback through one-on-one conversations rather than a large group. Additionally, the survey was launched after about two months of iterative revision because of the funder's short time frame. However, the CVC is a constantly evolving network, with new community partners and researchers joining each week; some members had ideas for the survey after it was launched. In keeping with the principles of CBPR and our desire to amplify the community priorities, we included items shared after the launch of the survey.

*Community-based recruitment***.** A unique strength of this study was we recruited through trusted community organizations. In particular, we leveraged the support of Community Health Deputies, who are trained CHWs employed by one of the main CVC partnering organizations. Another community partner was able to utilize its large social media presence for recruitment.

We were able to leverage these partnerships to reach and recruit individuals we may have missed through other sampling methods.

*Online data collection during the COVID-19 pandemic.* Due to the COVID-19 pandemic, the majority of recruitment occurred online with some in-person recruitment at federally qualified health centers, community pharmacies, and housing complexes (all in-person recruitment was terminated in December 2020 due to rising COVID-19 cases). One challenge to online recruitment was that individuals with limited technology access or lower reading literacy may not have been able to participate, so we provided the option of having the questions read out loud. Screening items preceded the survey to exclude those who did not meet inclusion criteria. Despite this, we found that several participants who lived outside of the Pittsburgh area-- indicated by their non-Pittsburgh addresses on the unlinked incentive survey-- were answering affirmatively to the screening items and thus completing the survey. Other issues were the presence of bots, or automated accounts completing the survey as well as some individuals completing only the information to receive payment. We paused data collection and subsequently required any interested participant to text, email, or call a member of the research team to obtain a personalized link. Community partners shared concerns that this process could add challenges for participants. After discussion, we decided to move forward with this strategy, while recognizing impact on individuals with limited technology access.

*Community member burden and compensating participants.* During study conceptualization, partners voiced concern that community members were being overly burdened by surveys. Conversations also centered on whether we should instead survey researchers and healthcare professionals to begin shifting trust-building responsibility from communities to healthcare

systems. Ultimately, we decided fielding this survey would be helpful, and began planning projects to query researchers, including one on researchers' understanding of past histories of abuse perpetrated against Black communities.

We decided it was imperative to compensate each participant for their time and expertise, as community members are not often compensated appropriately. Our institution uses a participant incentive system by which a debit card can be mailed or a gift card can be e-mailed. The electronic gift card option became unfeasible due to the aforementioned bots and non-Pittsburgh participants. We switched to solely mailed debit cards. This presented additional barriers, as many participants provided incomplete addresses. Because we worked with community partners, we were able to identify some individuals who did not receive their cards. Many challenges which emerged from our incentivization process could not have been addressed appropriately without strong partnerships.

*Relaying data back to community partners.* A fundamental component of CBPR is ensuring partners have access to the data.[19-21] We conducted four meetings to share our data: one with CHWs; one with the CVC; and two with our local health department. Partners asked thoughtful questions about the data and are currently planning ways to use this information within their organizations. One of the challenges with data collection during the COVID-19 pandemic was that much of our data was outdated by the time we analyzed and presented it in March 2021. Despite this, we believe these data will be useful to our partners to help create tailored messaging for communities and guide vaccine access efforts.

*Linguistic accessibility.* Community partners requested the survey be offered in multiple languages. Translating materials requires a systematic and rigorous process that attends to both linguistic and conceptual equivalence as well as health literacy,[23] which could not be expedited in the short project period. Thus, the survey was only available in Spanish, though we tried to include a Swahili version of the survey. During piloting, participants found the Swahili translation to be accurate but too complex. Although the survey was meant to be completed in 15 minutes, the pilot participants were taking over 40 minutes; many of them stated $25 did not seem like enough compensation for this time commitment. The translator noted that the Swahili speaking community may have required a different survey altogether. We realized that during survey development, we did not have any members of the Swahili-speaking community as part of the team. Due to these challenges, we decided to not include Swahili-language surveys in the study. This highlights that even well-meaning researchers can unintentionally stray from the basic tenets of CBPR, and that mission, processes, and stakeholder engagement should be continuously examined.

## Discussion

This CBPR-created survey found that Pittsburgh-area Black and Latine adults perceive a variety of COVID-19 information sources to be trustworthy, consistent with previous research.[1-3; 24] Our study found both similarities and differences between Black and Latine communities, aligned with prior work, which showed that while Black adults more often received COVID-19 information from national news and Latine adults more often received information from public television or radio, both groups accessed information from a wide variety of sources.[14] We also found that the majority of information sources were not significantly associated with COVID-19

vaccine intention, consistent with past work that has shown that among Black adults, information source alone did not predict vaccine intention.[15;25] Our study builds on previous research by including local sources, many of which were chosen specifically by community partners. We found that local researchers were seen as trustworthy and that receiving COVID-19 information from local researchers was significantly associated with positive vaccine intention. However, this group was not accessed by the majority of participants. This reaffirms the importance of developing community-academic collaborations around COVID-19 vaccines, so community members can engage with researchers in bi-directional learning, like through community town halls.[22]

Collaborating with community partners helped ensure that we included relevant information sources on the survey, and were able to recruit expeditiously. Using more iterative and flexible survey designs, which allow for editing/revising questions may be helpful for a community-partnered approach. For example, the Family Strengths Survey was an iterative weekly survey where questions were added or discarded depending on community needs in a rapid cycle assessment.[26] Such a design may be useful when seeking community guidance related to vaccine distribution.

Providing surveys in multiple languages is needed to serve growing non-English speaking communities both in the Pittsburgh region and nationally.[27, 28] Including non-English speaking communities requires intentionality and must be done systematically.[29] Our work underscores the importance of creating surveys which are linguistically and culturally informed, rather than simply translating a survey from English into another language. More support and resources are needed for research teams conducting studies in multiple languages. Funding

sources also must ensure adequate time and resources for creating surveys and other study materials in multiple languages.

Equitable healthcare access remains challenging for Black and Latine communities due to racism and other structural inequities.[30,31] These communities face significant barriers to participating in clinical trials due to mistrust, fear of unintended outcomes, lack of access to information about research opportunities, and fear of immigration-related repercussions.[32-35] Although our study focused on an individual-level factors (i.e., where individuals get information about COVID-19), vaccine access and trustworthiness is heavily rooted in community and structural factors. For example, a qualitative study with Black and Latine adults found that concerns about the historical and ongoing mistreatment of Black and Latine communities by healthcare and research, as well as inequitable vaccine distribution and access were major factors contributing to mistrust.[36] Future research should explore how individual and societal factors are interrelated and compounded in the context of COVID-19 vaccine acceptance.

Several limitations should be considered in this exploratory study. As surveys were anonymous, we cannot confirm the participants actually identify as Black and/or Latine. Additionally, many people's perspectives about COVID-19 vaccines have changed rapidly during the pandemic. This survey was a cross-sectional, convenience sample, subject to bias; future work should examine perspectives about trusted information sources and vaccine acceptance longitudinally. However, our work is strengthened by the community partnerships that enabled survey co-creation and recruitment. A strength of our study is inclusion of local sources of trusted information, as many studies consider sources at the national level. However,

we recognize that some of these data are applicable specifically to the Pittsburgh region and may not generalize to other communities. Due to the COVID-19 pandemic, the majority of our recruitment occurred online through social media and emails; this may have created challenges for individuals living without technology. Innovative solutions to including participants in online research or research during the time of a pandemic is needed.

Another limitation to this study is we present data aggregated by race and ethnicity, except for post-hoc analyses comparing sources of information between Black and Latine participants. We chose to present primarily aggregated data for this exploratory study as our sample sizes were small, particularly for Latine communities. These communities are not monolithic and there are important between-group and within-group differences. Future larger studies should consider disaggregating data to understand how to tailor messaging for different groups. Finally, our surveys were not validated in either English or Spanish as we developed surveys de novo, prioritizing questions expressed by community partners. Future studies should consider validating the measures used in this study.

## Implications and Conclusions

The results from this study—both the survey results and the lessons learned—can serve as an important foundation for community-academic partnerships seeking to understand COVID-19 vaccine access locally. A CBPR approach not only allows for a more tailored survey, but can help identify challenges early in study design. A CBPR approach leverages the rich assets within local communities, such as community organizations, trusted individuals, and long-standing community connections.

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