Leveraging Mobile Technology and Trusted Community Partners to Address Racial Disparities in COVID-19 Vaccinations: Evaluation of Multichannel Digital Communication

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Abstract

Background: Innovative and strategic interventions are needed to address COVID-19 vaccine hesitancy among communities which have been the most heavily impacted by the pandemic. Digital interventions are a critical component of strategies to promote healthy behaviors among target populations. Furthermore, given that the communities most vulnerable to COVID-19 experience mistrust toward health care systems, health promotion programs must consider the trustworthiness of the messenger in reaching target populations. This campaign utilized digital messaging strategies and trusted community partners to inform vulnerable populations about COVID-19 prevention, vaccinations, and other social services.

Objective: This paper assesses the reach and impact of the COVID-19 messaging campaign which aimed to provide vital health information about COVID-19 prevention and vaccination to Black and Latino members of the Metro-Atlanta community by using multichannel communications through trusted community partners.

Methods: Emory's Collaborative Community Outreach and Health Disparities Group (ECCOHD) established a "connected community of care" model to disseminate health messages, resources, and linkages through trusted networks. Utilizing multichannel communications through SMS, social media, and flyers, the messaging campaign began to reach our target population in July 2020 and continued to do so until July 2021.

Results: From the beginning of the campaign in July 2020 to its end in July 2021, the Metro-Atlanta COVID-19 messaging campaign sent out 2.4 million messages to 142 000 unique individuals. These messages received nearly 97, 000 click throughs and reached females 18-39y more than any other demographic. "High-risk" zip codes in DeKalb County were the highest reach zip codes. Regarding social media outreach, the campaign's posts received more than 1.3 million impressions through ESSENCE Media's Instagram and Facebook accounts, which have a reach of nearly 100, 000 followers. Furthermore, in the five zip codes that the messaging campaign reached the most, an average decrease in vaccine hesitancy of 9.92% was recorded from the beginning to the end of the campaign.

Conclusions: Leveraging a network of messaging partners who have long-standing relationships with underserved communities was key in establishing trust with these community members and motivating them to action. Additionally, utilizing data from the COVID Community Needs Index (CCNI) as well as the COVID Community Vulnerability Index (CCVI) proved to be a vital tool for identifying zip codes with greater need and informing our campaign strategy. Additionally, mobile technology allowed for our customized messaging to reach hundreds of thousands of individuals and make millions of impressions on social media among communities with high vaccine hesitancy, such as Back and Latinx Americans.

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Introduction

The COVID-19 pandemic has had a disproportionate impact on Black and Latinx communities across the United States. According to the Centers for Disease Control and Prevention (CDC), it is estimated that Black Americans are 2.8 times more likely to be hospitalized and 1.9 times more likely to die from a COVID-19 infection.[1-2] Additionally, these communities which are most impacted by the pandemic face a disproportionate lack of vaccine access and distribution. Now, an alarming trend is emerging: while COVID-19 rates are lower than in earlier stages of the pandemic, rates of infection among unvaccinated individuals are the highest they have been since the pandemic began.[3] In cities like Atlanta, not only are Black individuals less likely to be vaccinated, but they also account for more COVID-19 deaths relative to their share of the population.[4] After more than a year, Black communities remain disproportionately vulnerable to the health and economic impacts of the pandemic.

To address the racial health disparities exacerbated by COVID-19, Emory University's Health DesignED: Acute Care Design + Innovation Center implemented digital community engagement strategies to disseminate valuable health information about infection prevention, testing, and vaccination to vulnerable communities in the Metro-Atlanta area. The team hypothesized that strategic outreach through trusted messengers, such as local clinics, minority-owned businesses, community groups, and faith-based organizations could assuage mistrust between health systems and Black communities and encourage COVID-19 preventive measures such as vaccination and testing.

i. Description of Target Population

The activities of the Metro Atlanta COVID Messaging Campaign targeted Black residents in Atlanta's two largest counties, Fulton and Dekalb. Based on Surgo Ventures COVID Vaccine Coverage Index, 82% and 74% of the Black population in Fulton and DeKalb County, respectively, are classified as high or very high in vulnerability compared to 37% and 18% of White residents in the same counties.[5] This trend is also consistent in the mortality rate, given that Black people make up 45% and 55% of the population but 62.4% and 57.7% of deaths due to COVID-19 in Fulton and DeKalb County, respectively.[6-7]

Within this vulnerability is the hesitation to interact with a healthcare system that has historically mistreated Black people. Over the pandemic, this skepticism has been further reified by the complex and constantly evolving COVID-19 guidance[8]. The lack of clarity has allowed cultural mores to undermine public health guidelines around mask adoption, testing, and vaccination. The Department of Health and Human Services' Office of the Assistant Secretary for Planning and Evaluation's Vaccine Hesitancy for COVID-19 tool was used to analyze our target counties. This tool[9] demonstrated that in DeKalb County, an estimated 18.67% of residents are hesitant or unsure and 7.45% of residents are strongly hesitant. In Fulton County, an estimated 16.51% of residents are hesitant or unsure and 6.6% of residents are strongly hesitant. COVID Vaccination rates in DeKalb and Fulton County have steadily increased from February 2021 through April 2021.

The combination of mistrust in the healthcare system and numerous barriers to care results in disproportionately low vaccine uptake among Black residents. In Dekalb and Fulton Counties respectively, 56% and 58% of all residents have had at least one dose, while only 41.3% and 40.3% of Black residents have had at least one dose as of September 15, 2021.[4(p2)]

ii. Campaign Goals

The Metro-Atlanta COVID Messaging Campaign aimed to deliver health messages and resource linkages directly to individual's mobile phones through partnerships with trusted messengers and community anchor groups in DeKalb and Fulton County, Georgia. Our goals:

1. Increase the awareness of testing sites and support the rate and flow of testing.
2. Improve the reach rate of core COVID-19 prevention strategies and promote behavior change to reduce the spread; and
3. Link message recipients to community-based programs, contact tracing, vaccines, and resources to support care delivery

iii. Public Health Theory - Information Motivation Behavioral Skills

We utilized the information-motivation-behavioral skills (IMB) theory as the conceptual basis for the intervention model given that the digital strategy revolved around communications through multiple channels. The IMB model specifies three primary constructs that influence behavior change: Information and knowledge about the behavior, an individual's motivation to perform the behavior, and the behavioral skills necessary to perform the behavior.[10] Our strategy was based on the digital communication of information that could support our target population in their efforts to get tested and vaccinated. By providing information such as nearby vaccination sites, our target population is better equipped with what they need to get vaccinated.

Additionally, our strategy acknowledges the mistrust that members of our target population may have in vaccination and health promotion initiatives launched by large healthcare systems. To overcome this mistrust, the campaign had to carefully formulate messages and choose effective messengers in whom our target population had a sense of trust and confidence in.

Methods

The research conducted for this study has been exempted through an independent review board through Emory University.

i. Creating A Community of Trusted Partners

To better serve COVID-related information needs of Black and Latino populations in Fulton and Dekalb counties, Emory's Collaborative Community Outreach and Health Disparities Group (ECCOHD) established a "connected community of care" model to disseminate health messages, resources, and linkages through trusted networks.[11] By creating a coalition of leaders across Emory University, Emory Healthcare, and the wider Atlanta ecosystem, ECCOHD was able to quickly garner institutional support and secure funding for a mobile-first initiative to support communities of color beginning in July 2020. Trusted community partners who were contacted and recruited for this project support multichannel communications include MedCura Health, Mercy Care, The Oil Bar, BLKHLTH, The Georgia Community Engagement Alliance against COVID-19, and Essence Communications.

ii. Data Assessment

After creating a network of trusted community partners, the team analyzed a body of relevant data to develop a strategic communication plan. Public data from the Georgia Department of Public Health (GDPH), county epidemiological reports, and census data were assessed to track COVID-19 cases, deaths, and vaccinations in

addition to demographic information about the target population. It was important to identify where to strategically disseminate our messaging campaign as well as quantify the level of vulnerability within the zip codes that we were targeting.

A. Identifying Need

The COVID Community Needs Index (CCNI) was developed as a tool to characterize the level of need of target areas by accounting for social vulnerability and vaccine access. CCNI was calculated by multiplying the following factors: Surgo Venture's COVID Community Vulnerability Index (CCVI), (1 - Vaccination Rate) and the % of Black of Hispanic people in the population. The higher the CCNI value for a particular area, the greater the need for COVID-19 preventive measures such as vaccinations and testing.

Using this data-driven approach, the team identified hotspots—zip codes with a high incidence of COVID infection and hospitalization—and blind spots—zip codes where the population was predominantly composed of people of color and carried a high burden of comorbidities. This layer of data helped determine the messaging strategy at a hyperlocal level and identify the zip codes in DeKalb and Fulton counties where residents are least equipped to handle the repercussions of a COVID-19 outbreak.

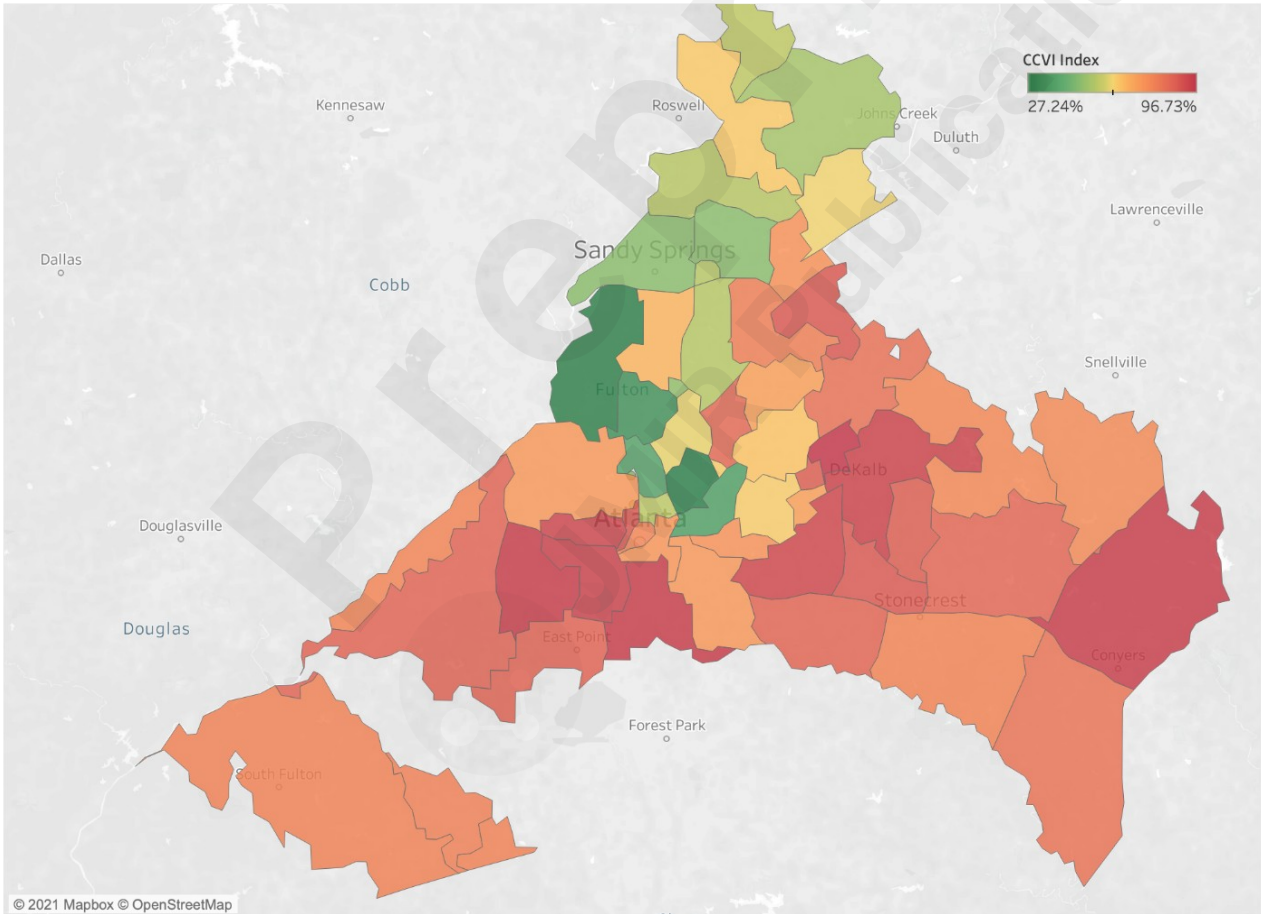

Figure 1. COVID Community Vulnerability Index in Fulton and DeKalb Counties in April 2021. Darker red = more vulnerable, darker green = less vulnerable.

B. Informing Messaging Strategy

Lastly, to develop high impact messaging styles to address high vaccine hesitancy rates, we collected data from Surgo Ventures profiles, the Assistant Secretary for Planning and Evaluation within the Department of Health and Human Services, the Kaiser Family Foundation, and the Institute for Health Metrics and Evaluation COVID Collaborative. Surgo Ventures has identified five “Vaccine Personas” to characterize the different psycho-behavioral identities of U.S. adults and their likelihood of getting vaccinated. Understanding the attitudes of values of vaccine-hesitant populations gave us a better understanding of the barriers they face and informed our communication strategy.

ii. Multichannel Communications Through Trusted Community Partners

The design and implementation of this initiative was undertaken by Health DesignED, the Acute Care Design and Innovation Center at Emory. Health DesignED, in partnership with the digital health communications company InOn Health, launched a multichannel outreach campaign utilizing text messages and social media to deliver timely COVID-19 messages through trusted, anchor institutions. A vaccine hesitancy report published by the NAACP and COVID Collaborative found that Black Americans are twice as likely to trust a message from another Black leader compared to a White one[12]. Accordingly, the team leveraged trusted channels to disseminate information on resources to drive COVID testing, vaccination, and prevention.

A. Text Messaging Campaign

The text messaging campaign was designed as a continuous informational resource with participants receiving a few messages a month from a trusted community partner. Over the first 10 months of the initiative, partners included a small minority-owned business, two trusted community health centers who serve uninsured and Medicaid eligible populations, a large healthcare system, a large payor, and a Fortune 100 company with a large segment of essential workers. Messages were available in Spanish and English and crafted to be short and easy to understand. Each distributing partner was able to select and customize messages.

The messages we designed for the campaign fall into one of three categories. First, social resources messaging provided information about various resources such as food and job support to aid those who are dealing with the indirect impacts of COVID-19. Second, COVID-related resources messaging provided information about vaccine efficacy, eligibility, side effects, as well as preventive measures to remain safe throughout the pandemic. Lastly, direct COVID services messaging provided our target population with information about vaccination and testing sites they could utilize.

B. Social Media Campaign and Digital Toolkit

In parallel, for social media outreach we partnered with ESSENCE Communications, who have a wide reach in Metro-Atlanta. ESSENCE is well trusted as the number one media, technology and commerce company dedicated to Black women. ESSENCE posted several of the key COVID-19 messages around testing and vaccination. The social media campaign involved two individually designed advertisements posted to ESSENCE Facebook and Instagram pages. The advertisements included striking catch phrases, such as “IT’S TIME” and “IT’S FAMILY TIME”, with captions that contain information to help users find a vaccine clinic.

The digital messaging toolkit contained strategically designed graphics for email, social media, and print outreach. The toolkit covered more than twenty topics including holiday safety, the three different vaccines, youth vaccinations, personal information safety, mental health, and walk-up appointments. A two-minute

vaccine informational video was also designed for a low literacy audience. Resources from the digital toolkit were shared with more than thirty community partner organizations, including Mercy Care, MedCure, BLKHLTH, Oil Bar, and the Georgia Community Engagement Alliance against COVID-19. Using the toolkit, these organizations shared resources with their patients, clients, and employees.

Results

i. Multichannel Communications

We tracked our digital communications strategies and assessed to what extent mobile messaging, social media, and the digital tool kit effectively reached our target population.

A. Text messaging campaign

The Metro-Atlanta COVID-19 messaging campaign sent out 2.4 million messages to over 142 000 unique individuals. The average household size in Atlanta is 2.3 people, so we estimate that we've reached 326 600 people, not considering word of mouth[8]. There has been significant engagement with nearly 97 000 click throughs and a low average opt-out rate at 1.4%, with actionable messages having the highest click throughs and vaccine-related messages the best overall engagement. Based on the reported demographic data from our messaging partners, females 18-39y were the most reached demographic followed by females 40-64y. Highest reached zip codes in DeKalb County were those that are at a very high risk.

B. Social media campaign and Digital Toolkit

Our targeted posts received more than 1.3 million impressions on our social media messages throughout our partnership with ESSENCE. These posts resulted in more than 1700 click throughs to vaccination booking services.

By sharing our digital toolkit, 25+ key partner organizations were able to share COVID-19 prevention resources with nearly 100 000 social media followers across Facebook and Instagram.

ii. Observed Changes in Community Health Metrics

We also measured changes in vaccination rates and vaccine hesitancy rates during the rollout of our multichannel digital communications campaign. We recorded a significant increase in cumulative vaccination rates in 11 counties during phase 2 of the campaign. Multiple factors contributed to this increase including improved access to vaccination sites and a nation-wide push for vaccinations. Our campaign may have contributed to vaccination promotion, particularly in our target population. 9 out of the 11 counties with the greatest increases are in Metro Atlanta, demonstrating great gains.

PRIMARY COUNTY	DIFFERENCE IN CUMULATIVE % OF POPULATION WITH FIRST VACCINATION (APRIL 1, 2021, vs. JULY 21, 2021)
Gwinnett County	33.8
Cobb County	33.6
Fulton County	33.2
Forsyth County	32.9
Fayette County	32.1
DeKalb County	31.2
Oconee County	30.6
Rockdale County	27.6
Cherokee County	26.3
Douglas County	26.2
Clarke County	25.2

Figure 2. Changes in cumulative vaccination rates among 11 counties in Georgia during campaign

Additionally, we measured vaccine hesitancy in the five zip codes that our campaign was able to reach the most. We found that vaccine hesitancy in these targeted areas decreased significantly from early April to late July. Decreases in vaccine hesitancy was driven by multiple factors including improved information about the vaccine and the public's increased confidence in vaccine safety. Our communication campaign may have contributed to decreases in vaccine hesitancy, particularly within our target population.

5 Most Reached Zip Codes	April 2-8 Hesitancy %	July 23-29 Hesitancy	Difference %
30083	20.09	7.4	12.69
30032	20.09	7.43	12.66
30058	20.09	16.17	3.92
30034	20.09	10.32	9.77
30088	20.09	9.56	10.53

Figure 3. Changes in vaccine hesitancy among five targeted zip codes in Metro Atlanta

C. COVID Community Needs Index (CCNI)

Another important metric used to assess the impact of our digital communications strategy is the COVID Community Needs Index (CCNI), a metric which accounts for social vulnerability and vaccine access. In early April and at the beginning of the campaign, seven of the top ten zip codes with the highest CCNI in the state of Georgia were in the Metro Atlanta area. During phase 2 of the campaign, only four of the top ten zip codes with the highest CCNI were in the Metro Atlanta area. In the five zip codes that the messaging campaign reached the most, an average decrease in vaccine hesitancy of 9.92% was recorded from the beginning to the end of the campaign.

As of April 1, 2021, at the beginning of the campaign, 8 of the 10 zip codes in Georgia with the highest CCNI were in the metro Atlanta area. During phase 2 of the campaign on July 31, only 5 of the zip codes with highest CCNI were in the metro Atlanta area. Furthermore, across the state of Georgia as of July 31, only 14 zip codes had a CCNI above 0.5 (down from 79 zip codes).

ZIP CODE	PRIMARY COUNTY	CCNI SCORE ON APRIL 1
30296	Clayton	0.79
30311	Fulton	0.79

30274	Clayton	0.77
30349	Fulton	0.76
31415	Chatham	0.74
31821	Stewart	0.74
30331	Fulton	0.72
30238	Clayton	0.72
30035	DeKalb	0.72
30310	Fulton	0.71

ZIP CODE	PRIMARY COUNTY	CCNI SCORE ON JULY 31
31821	Clayton	0.62
30296	Clayton	0.58
30274	Clayton	0.57
30349	Fulton	0.56
30901	Richmond	0.55
31206	Bibb	0.53
30238	Clayton	0.53
31415	Chatham	0.53
31323	Liberty	0.52
31815	Steward	0.52

Figure 4 and 5. Changes in CCNI before and after campaign among 10 counties in Georgia with highest CCNI. The highlighted counties are within Metro Atlanta where the campaign was targeted[4]

ii. Campaign Feedback

Community members within our target population who received our digital communication were asked to provide feedback on the campaign. Recipients have found the texting campaign useful with nearly 75% positive responses on a utility scale (N=3500).

Recipients shared many comments indicating the value of the campaign to them. We received over 1000 positive messages, including 635 which included “thanks” or “*gracias”*. Overall, feedback from the campaign indicated that participants found our messaging to be informative, helpful, and a preferred way to receive health information. Additionally, feedback demonstrated that our target population viewed the messaging as trustworthy to share with congregations, families, and friends. Quotes from participants include:

- “I use your information for our various Congregations. Thank you!”
- “I depend on these text messages because I know they are accurate.”
- “Para mi son bastantes útiles porque es la mejor manera de estar informados.”

Discussion

i. Limitations

Throughout the campaign, there were some unanticipated external and internal challenges.

A. Data Sharing

One key element of the program was to reach people through trusted messengers in the community. The team worked to make it easy for partners by providing free, clinically reviewed content that was customizable.

Messages came from the community organization with data operations through the digital health company InOn Health with HIPAA and TCPA compliance. The team assumed that organizations would be willing to leverage members' contact data (i.e., phone numbers and zip codes) given the urgency of the pandemic and their connection with community members. However, despite interest, organizations were slow to adopt. Many lacked organized data while others were concerned about privacy, and some wanted to send messages through existing vendors. The team moved forward with digital communication with those partners who were able to send messages to our target population.

B. Limitations with Community Partnerships

The program was intentionally designed with one messaging vendor to simplify the legal framework that was necessary to send messages (according to TCPA and HIPAA). Moreover, the team selected InOn Health as a messaging partner for their expertise in market segmentation and behavioral messaging. Our business and impact model had already been established with the messaging partner prior to working with community partners, and there was hesitancy to reimagine the ways that community partners could engage.

As the team better understood the role that trusted messengers were willing to play, they developed two messaging tracks: opt-in and opt-out. Opt-out track utilized the original program design, where partner organizations provided member phone numbers. Opt-in track allowed members to send a text message to a number on their phone to enroll in the campaign. Additionally, partners could elect to participate in the social media component of the campaign. In the second phase of the initiative, this element was extended to a digital messaging toolkit including graphics, email drafts, and printable assets that enabled partners to disseminate pre-crafted messages through their preferred channels.

C. Indirect Outcomes Data

This initiative was originally designed as a full system: drive people to testing, provide information on interpreting results, gather data on test results, and follow-up to connect people to resources and care. This would have improved our ability to continuously support individuals and show direct impact on preventing COVID spread. While county public health offices and private testing partners were interested in the initiative, they were slow to move. Given the needs and urgency of the messaging, the team proceeded without the integration of a direct testing partner which would have enabled more robust offerings and outcomes data.

Outcomes for this initiative were tracked through direct engagement and supporting county level results. Social media through ESSENCE was tracked in terms of impressions, reach, and clicks. However, we were unable to track if those who received our messages were tested or vaccinated and compare them to a similar subsection of those not messaged.

D. New Processes with Emory Healthcare

This was the first time the text messaging channel was deployed by multiple vendors. While Emory Healthcare's text messaging vendor traditionally provided appointment reminders, flu campaigns, and annual screenings, this was Emory Healthcare's first time deploying its communication channels (text, email) for behavior change. This created an unexpected risk from opt-outs in the COVID behavior change campaign, whereby individuals who opted out were globally opted out of all Emory communications. This meant that patients who did not want COVID messages would also no longer receive appointment reminders, instructions around how to schedule a tele-visit, pre-op guidance around COVID testing, and other important patient care information. With the increased reliance on automated communication during the pandemic to enable virtual care, this became a crucial point of risk. Ultimately, this resulted in delays as the team assessed the risk, and it required the creation of an additional workflow between the two messaging vendors to monitor the impact of

this discrepancy and ensure uniformity across the opt-out lists.

E. Georgia Senate Elections Texting Fatigue

This initiative was launched in July 2020 during the Presidential Election when political campaigns leveraged channels for outreach. Texting fatigue through the elections was built into the messaging plans with less frequent messaging through early November that would increase by the holidays. However, plans did not accommodate an extended election season in Georgia as two senate seats went into a special election in January. This meant texting volumes for politics remained high. The initiative may have seen weakened engagement and increased opt-outs due to general fatigue around politically affiliated text messages.

ii. Conclusions

At the core of this model for COVID messaging are partners who have long-standing trusted relationships with underserved communities. Aligned with the social cognitive theory, utilizing these community partners to disseminate important COVID information was key in establishing trust with vulnerable members of the community with the goal of motivating them to act. This approach requires a coalition between healthcare systems alongside less traditional partners including community anchor groups, faith-based organizations, small businesses, and industry. It is important to identify a funding source that takes the resource burden and barrier of entry away from partners while creating an easily adoptable legal partnership framework. This intersection of community mobilization and digital health have uncovered opportunities and challenges around data and privacy in trusted channels. To get started, we recommend the following steps:

- Stratify problem/outcome data by demographics (or REGAL data) and county/zip code to determine communities with highest social risk for the problem.
- Identify trusted community partners who have access to the primary demographic.
- Select the communication mechanism that works best for your audience.

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Conflicts of Interest

- Dr. Monique Smith, executive director of Health DesignED, serves as an unpaid advisor to InOn Health

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Abbreviations

CDC: Centers for Disease Control and Prevention

CCNIC: COVID Community Needs Index

CCVI: COVID Community Vulnerability Index

COVID-19: Coronavirus disease 2019

ECCOHD: Emory's Collaborative Community Outreach and Health Disparities Group

GDPH: Georgia Department of Public Health