

# Vaccine Confidence Fund Insights Report

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# CONTENTS

<b>Foreword</b>	<b>4</b>
<b>Executive Summary</b>	<b>6</b>
<b>Background</b>	<b>8</b>
<b>Grantee snapshot</b>	<b>10</b>
<b>VCF Results</b>	<b>10</b>
<b>Key Findings</b>	<b>13</b>
<b>Detailed Findings</b>	<b>15</b>
<b>The Way Forward</b>	<b>39</b>
<b>Individual Grantee Reports</b>	<b>45</b>
<b>Appendices</b>	<b>127</b>
Appendix 1: Project details	128
Appendix 2: Advisory Council	130
Appendix 3: The Fund's Principles	131

# FOREWORD

Understanding the drivers of vaccine confidence and, ultimately, increasing uptake, have been a focus of scientists, governments, and healthcare providers alike, dating all the way back to the first smallpox vaccines. Social media has become a valuable tool for the global health community to listen, understand, and more uniquely address the drivers of vaccine confidence at a scale not previously seen. If properly leveraged, we believe that online platforms can play an increasingly meaningful role in improving access to information, both for COVID-19 and beyond. Realizing this opportunity will require a whole-of-society approach, both by platforms and by other health and media stakeholders. It also requires us to effectively learn from what is working, so that we can replicate and scale these approaches, as well as learn what is not working, so that we can further innovate and improve.

This new pathway to building trust and increasing vaccine confidence is the focus of Advancing Health Online (AHO). As the first initiative of the AHO, the Vaccine Confidence Fund (VCF) and its report seeks to share insights from the 33 grantees, to rapidly increase knowledge in the global health community and beyond. We feel it is important to share the findings from this report widely so that marginalized and underserved populations, and the world at large, can benefit from this research.



Heidi Larson, PhD, Head of the Vaccine Confidence Project at the London School of Hygiene and Tropical Medicine

## FUNDERS NOTE

by Kang-Xing Jin, Head of Health, Meta Platforms Inc. and Michael D. Fornwall, Associate Vice President, Vaccination Confidence, Merck & Co. Inc., Rahway NJ, USA (known as MSD outside the United States and Canada) ("MSD")

When Meta and MSD announced Advancing Health Online (AHO) last June, we were excited to come together with key global health partners and stakeholders around the world with a mutual goal of leveraging social media to advance health outcomes. Today, we are delighted to see results from some of the Vaccine Confidence Fund's grantees. We are excited to learn from these results in our continued effort to better understand how social media and digital platforms can be used to positively impact people and communities around the world.

VCF is playing a crucial role in leveraging innovative research to demonstrate new ways in which social media platforms can play a positive role in societal health. It is about listening and understanding, engaging and educating, and then measuring impact. This new medium presents a multitude of opportunities, as well as challenges. As we still have much to learn, it also demands new science and novel approaches. Overall, VCF seeks to expand our collective knowledge of the role that social media can play in increasing vaccine confidence, and it comes not a minute too soon.

*The Vaccine Confidence Fund is managed by Global Impact and financially supported by Meta and Merck & Co. Inc., Rahway NJ, USA (known as MSD outside the United States and Canada) ("MSD"). Meta and MSD did not participate in the selection of grant recipients.*



▲ **VAXXED AND PROUD**

Participant shows off their vaccination card at a promotional event held by Mali Health 22/2/2022 in the community of Sabalibougou in Bamako, Mali.

## EXECUTIVE SUMMARY

It has been more than two years since the World Health Organization (WHO) officially declared COVID-19 as a global pandemic. Two years in, we have more information about COVID-19, its effects, and how to combat it (especially through highly effective vaccines), but the world is still at risk as new and more transmissible variants continue to emerge and the prevalence of conflicting information and uncertainty about the future continues to pervade our societal consciousness. Omicron took the world by surprise in November 2021 and now its BA.2 subvariant is rapidly spreading around the globe.

The pandemic has had a huge impact on global health—and not just because of the direct effects of COVID-19. People have now experienced two years of [lessened physical activity](#) due to extended lockdowns and larger numbers working from home. People have missed annual check-ups with their general physicians or [ignored worrisome symptoms](#) because of limited access to health services or the fear of contracting COVID-19 at the doctor’s office. The world’s overall health, both physical and [mental](#), has suffered tremendously because of the pandemic and its many ripple [effects](#).

The biggest tool in our toolbox to fight COVID-19 and regain some semblances of normalcy are the many vaccines that have been developed and distributed around the world (albeit in a widely inequitable manner). Large populations still lack access to those vaccines and there are hundreds of millions of people who doubt the science and refuse to get vaccinated due to the prevalence of conflicting information.

There are many issues currently impacting [vaccine confidence](#), including continued debates on infection-induced versus vaccine-induced immunity; the public perception that COVID-19 is “over” and people are ready to start living normally; and a myth about “Vaccine Acquired Immune Deficiency Syndrome”.

One way to address issues associated with vaccine confidence and uptake is the use of social media.

“Social media is a powerful, constantly evolving tool that is shaping opinions and behaviors across the globe,” said Heidi Larson, PhD, Head of the Vaccine Confidence Project at the London School of Hygiene and Tropical Medicine, and Advancing Health Online (AHO) collaborator.

**“Social media is a powerful, constantly evolving tool that is shaping opinions and behaviors across the globe.”**

–Heidi Larson, PhD, Head of the Vaccine Confidence Project at the London School of Hygiene and Tropical Medicine

Just under half of the world population, or 3.47 billion people, use social networks<sup>1</sup>. Millennials and Gen Zers are [“the most active online... averaging five digital platforms daily.”](#) Because the global population spends so much time online, it’s only natural that people seek out health information, and COVID-19 information, in the digital spaces they frequent. In fact, [“nearly 90% of all adults in the USA search for health information on Facebook, Twitter, YouTube, and other social media sites.”](#)

With the above in mind, Advancing Health Online (AHO) formed as an initiative to advance public understanding of how social media and behavioral sciences, can be leveraged to improve the health of communities around the world.

AHO launched the [Vaccine Confidence Fund](#)<sup>2</sup> (VCF) its inaugural initiative, in June 2021. VCF’s goal is to support targeted research that addresses the primary research question of how best to utilize social media and online platforms to better understand and increase vaccination confidence and uptake both in the context of the current pandemic and beyond.

VCF is focused on supporting research that increases access and equity regarding vaccination confidence and uptake, particularly among historically marginalized or excluded communities globally.

The Fund’s key principles ([see Appendix 3](#)) are equity, community engagement, interdisciplinary collaboration, external validity, actionable focus, and transparency and information sharing.

VCF sought applicants from interdisciplinary teams and cross-sectoral partnerships to develop truly transformative proposals that would address critical research gaps with creative solutions. Thirty-three teams received grants averaging around US\$220,000 for a total of over US\$7 million disbursed. Advancing Health Online is excited to share the VCF’s report that provides an overview of the 33 grantees’ projects, key findings, and more detailed results.

## AHO’s Mission

AHO’s mission is to bring together actors from the technology, health, global development, and academic sectors to advance understanding of how social media and online engagement can best be utilized to better understand and increase health and resiliency of communities around the world. Given the urgency COVID-19 created, the first area of focus is on vaccine confidence, but longer-term, the AHO will be looking across health topics more broadly with a stated goal of driving positive health action offline.



1 “44.6% of the total world population uses social networks.” eMarketer, November 2021. *Social Network Users Worldwide, 2021–2025 Forecast*

2 Meta and Merck & Co., Inc., Rahway NJ, USA (known as MSD outside the United States and Canada) are financially sponsoring the Fund, which is independently managed by [Global Impact](#).

## BACKGROUND

The past two years have brought an unprecedented shift in the way we see the world and engage with others. The global COVID-19 pandemic has caused a reduction in face-to-face communication and an increased reliance on social media for sharing memes, news, and information about health and politics. Nowhere have we seen this more than in the conversation around COVID-19 and the vaccines that have been produced to combat its spread<sup>3</sup>. The pandemic has had a huge impact on global health—and not just because of the direct effects of COVID-19. People have experienced more than two years of lessened physical activity due to extended lockdowns and larger numbers of people working from home. People have missed routine immunizations and annual check-ups with their general physicians or ignored worrisome symptoms because of limited access to health services or the fear of contracting COVID-19 at the doctor's office. The world's overall health has suffered tremendously because of the pandemic and its many ripple effects.

The biggest tool in our toolbox to fight COVID-19 and regain some semblances of normalcy are the many vaccines that have been developed and

distributed around the world (albeit in an inequitable manner). Large populations still lack access to those vaccines and there are hundreds of millions of people who have doubts or anxieties and refuse to get vaccinated due to the prevalence of conflicting information<sup>4</sup>. So, what role does social media play? And, what insights can we derive from a more detailed exploration into data points and trends that can help individuals, researchers, healthcare practitioners, and governments make better choices about their own personal health, support decision making for others and better understand concerns?

VCF is the first initiative of Advancing Health Online (AHO). Guided by the principles of equity, interdisciplinary collaboration, actionable focus, community engagement, external validity, and transparency and information sharing, it sought to explore the primary research question:

**“How can social media<sup>5</sup> be best utilized to understand and increase vaccination confidence and uptake?”**

- 
- 3 Molla, Rani. “How Coronavirus Took Over Social Media: The Pandemic Quickly Became One of the Most Talked-About Things on the Internet” Recode, 12, March 2020”, <https://www.vox.com/recode/2020/3/12/21175570/coronavirus-covid-19-social-media-twitter-face-book-google>. “Sprinklr counted a record nearly 20 million mentions of coronavirus-related terms on March 11 [2020]. For context on just how big that number is, mentions of the newly canceled NBA games were under 2 million and mentions of Trump were about 4 million on that day.”
  - 4 Hannah Ritchie, Edouard Mathieu, Lucas Rodés-Guirao, Cameron Appel, Charlie Giattino, Esteban Ortiz-Ospina, Joe Hasell, Bobbie Macdonald, Diana Beltekian and Max Roser (2020)—“Coronavirus Pandemic (COVID-19)”. Published online at [OurWorldInData.org](https://ourworldindata.org/coronavirus). Retrieved from: <https://ourworldindata.org/coronavirus>: “As of 1:46 PM on 4/14/22, 11.4 billion doses of COVID vaccines have been given, 4.6 billion people are “fully vaccinated,” and 59% of the world is “fully vaccinated.” **64.8%** of the world population has received at least one dose of a COVID-19 vaccine. **11.42 billion** doses have been administered globally, and **12.23 million** are now administered each day. Only **14.8%** of people in low-income countries have received at least one dose.”
  - 5 The Fund’s definition of social media is meant to be broad and inclusive. Our social media definition includes: traditional social media, (e.g., Facebook, Instagram, Twitter, LinkedIn, YouTube, TikTok, SnapChat); search engines (e.g., Google, Bing, etc.) and other online platforms that gather user data and micro-target users; and online chatbots. This Fund recognizes that social network data analyses and other big data analytical techniques may also be leveraged as analytical methods in prospective research proposals.

## VACCINE CONFIDENCE FUND OVERVIEW



### EQUITY

Focus on **historically marginalized or excluded populations globally** given the significant barriers those populations experience



### COMMUNITY ENGAGEMENT

Proactively and **authentically partner with communities they are working on** throughout project/research life cycle



### INTERDISCIPLINARY COLLABORATION

Encourages **interdisciplinary collaboration and cross-fertilization of ideas** from non-traditional disciplines



### EXTERNAL VALIDITY

Surface insights that are more **universally valid and potentially scalable**



### ACTIONABLE FOCUS

**Immediately actionable and valuable** for the global health community



### TRANSPARENCY AND INFORMATION SHARING

Rapidly **disseminating insights, data, and learning as public goods** to contribute to ongoing or future vaccination campaigns and to advance the global agenda

With nearly 300 applications, the interest in exploring this new and growing area of research was clear. More and more communities are relying on social media as a significant source of information about COVID-19 vaccines. With the scale of these digital and online platforms, it is vital that we improve our understanding of the role these platforms can play and effectively harness their capabilities to increase vaccination confidence and contribute to vaccine decision-making. The VCF is focused on supporting research to effectively increase vaccination confidence, particularly among historically marginalized or excluded communities globally.



### ▲ CAPTURING COMMUNITY VOICES

A Mayan health researcher interviews a study participant for the UCSF project exploring trusted messengers and social networks in indigenous communities in Guatemala.

# VCF RESULTS

## VCF DEVELOPMENT AND SELECTION

To identify a robust and diverse cohort of grantees to receive support through the VCF, the fund launched an open application process in the summer of 2021. The [VCF RFP](#) was open for eight weeks from June 10 to August 6, 2021, and in that time, received 281 applications from 48 countries across six continents.

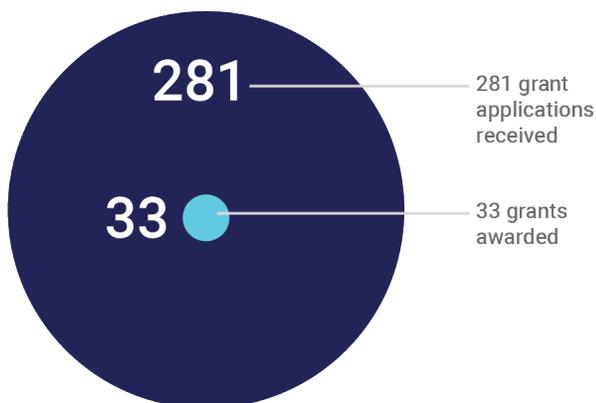
Each of the 281 applications received was reviewed in a preliminary screening by the Fund Manager. The top third advanced to one of thirteen Advisory Council members based on their respective expertise for a second round of review, in addition to further review by the Fund Manager.

Finally, of those applications, 33 grantees (11.7% of total applications) were chosen based on the defined criteria by an independent panel of expert reviews from the VCF Advisory Council and the Fund Manager.

Each application was scored against twelve criteria and received a score of 1, 3, or 5 in each category with a maximum total score of 60. Criteria included:

- Importance
- Alignment
- Equity
- Experience
- Feasibility
- Novelty
- Engagement
- Urgency
- Collaborative partnerships
- Applicability
- Impact
- Budget

## GRANTEE SNAPSHOT



NUMBER OF GRANTEES

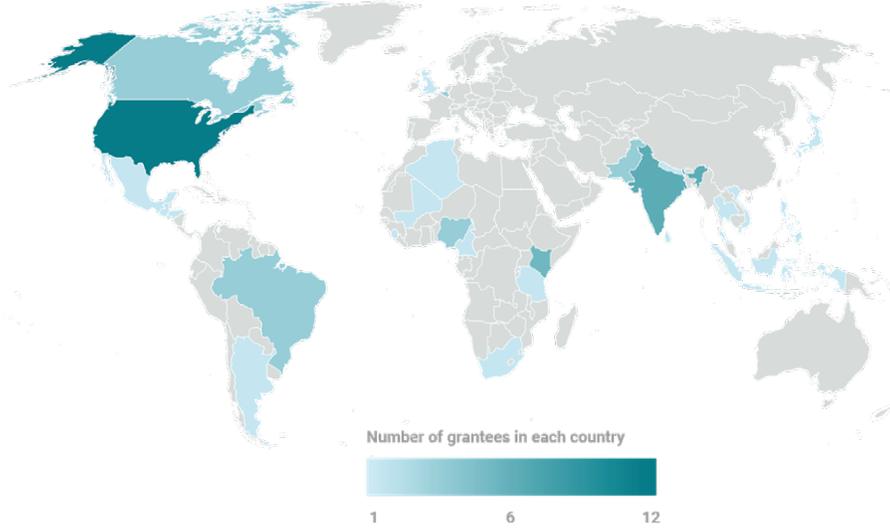
## AMOUNT AWARDED

Over

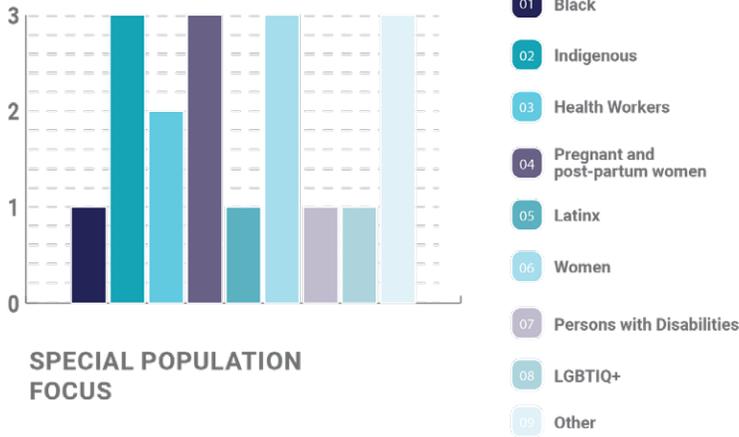
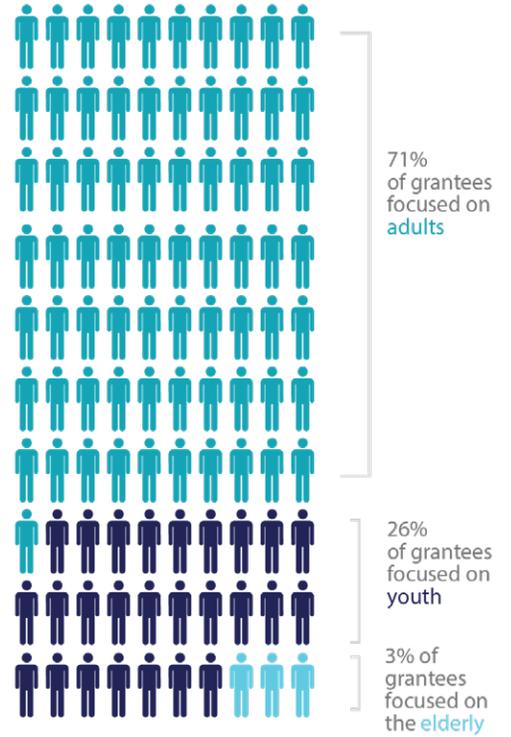
**\$7.3 million**

disbursed to the  
33 grantees

## GEOGRAPHICAL DISTRIBUTION



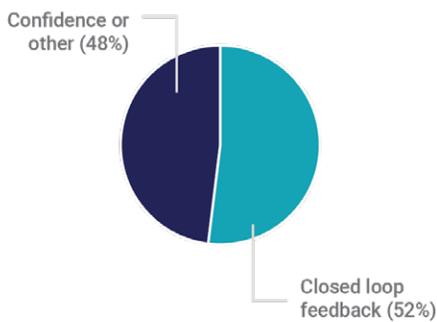
## AGE



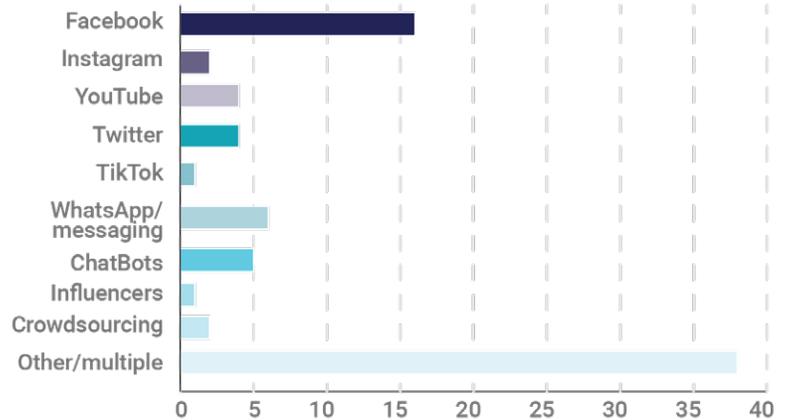
## ECONOMY



## MEASUREMENT



## TECH PLATFORMS



CONTENT	<ul style="list-style-type: none"> <li>✓ <b>Importance:</b> Does the proposal contain a coherent and compelling problem statement?</li> <li>✓ <b>Alignment:</b> Do the proposal's research question(s) and research methods align with the Fund's primary research question?</li> <li>✓ <b>Equity:</b> Does the proposal aim to support focus communities, or address underlying drivers of disparities, especially in trying to achieve health equity?</li> <li>✓ <b>Experience:</b> Does the proposed research team have a proven track record of expertise in the proposed fields of study?</li> </ul>
APPROACH	<ul style="list-style-type: none"> <li>✓ <b>Feasibility:</b> Are the proposed research methods technically and methodologically feasible given time and cost constraints (see more details below)? Do the proposed research methods adequately and appropriately consider privacy – specifically do the methods design for user consent?</li> <li>✓ <b>Novelty:</b> Is the proposed line of inquiry novel and does it have the potential to fill an important knowledge gap?</li> <li>✓ <b>Engagement:</b> Does the proposed research incorporate engagement with the focus community before, during, and after the research?</li> <li>✓ <b>Urgency:</b> Does the approach reflect the immediate circumstances of the targeted community? Are there any risks that those circumstances may change in the immediate future?</li> <li>✓ <b>Collaborative partnerships:</b> Does the proposed research team reflect interdisciplinary areas of expertise? Does the proposed research team pursue partnerships across sectors/disciplines to generate bold and innovative solutions?</li> <li>✓ <b>Applicability:</b> Can the anticipated research results be used to shape and inform practical public health and technology interventions in the short-term? How can the results of this research be applied in communities beyond those studied?</li> </ul>
MEASUREMENT	<ul style="list-style-type: none"> <li>✓ <b>Impact:</b> Does this proposal articulate clear measures and their pathway to immediate or potential impact (i.e., vaccine uptake)? If impact data is not available (due to the project timeline), are there interim results that can be tracked?</li> </ul>
BUDGET	<ul style="list-style-type: none"> <li>✓ <b>Budget:</b> Does the proposal include a budget and clear justification for key budget items?</li> </ul>

### ▲ SELECTION CRITERIA

Each application was scored against 12 criteria and received a score of 1, 3, or 5 in each category with a maximum total score of 60.

Grantees were informed of their selection in September 2021 and began work on their research projects shortly thereafter. Mid-term reports were submitted in December 2021 and presented to the Advisory Council, and final reports (for the majority of grantees) were submitted in March and April 2022. The limited window of time for grantees to implement their projects (less than six months) was by design, with the intention to get information out to the broader community as quickly as possible and to continue to iterate and build on the work. This report represents findings from all 33 grantees.

# KEY FINDINGS

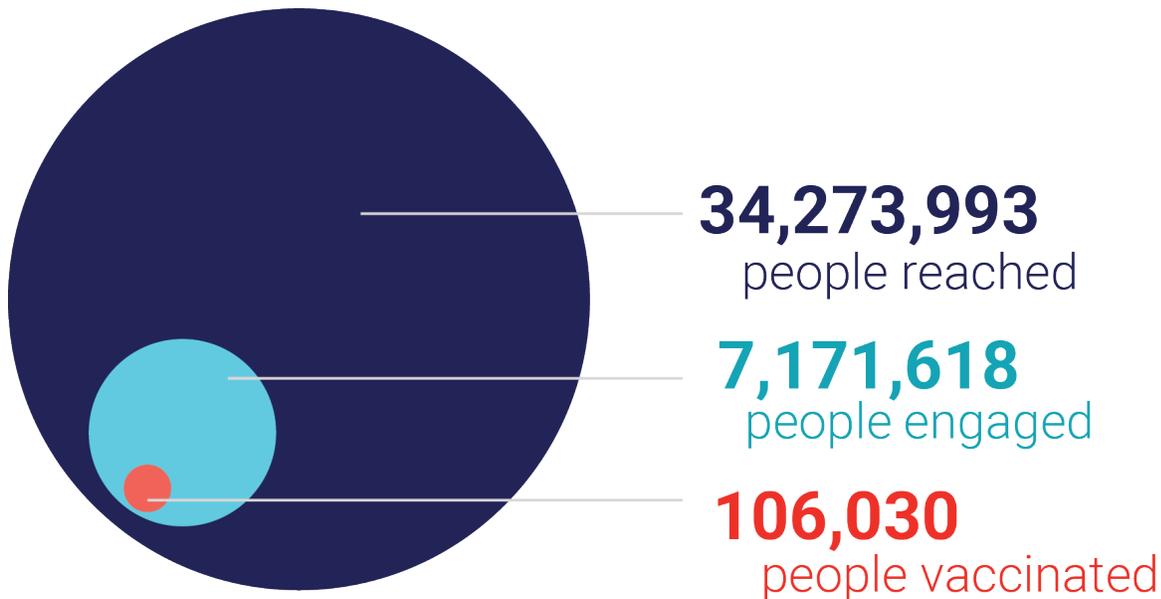
The sections below highlight common key findings shared across multiple studies. Further insights and findings can be found in the detailed findings section.

## COMMON KEY FINDINGS

- **Customizing messaging:** Messages tailored to the intended audience have a higher chance of resonating. Larger mass information campaigns that focus on general information may be less effective than engagement activities and messages tailored for specific geographies and communities (e.g., language and cultural context). This finding has the potential to impact how government and healthcare providers fund and share information intended to increase vaccine confidence and decrease vaccine hesitancy.
- **Successfully reaching populations:** It is an exciting new way to engage many people for the betterment of their health. Social media presents a key opportunity to share tailored information, provide a neutral platform to discuss and engage around vaccines and vaccinations, and tap into the social power of influencers and trusted members of the community. As noted, these factors are key to impacting perceptions and behaviors around vaccines. At the same time, recruiting study participants and reaching the specific populations can sometimes be tricky. Continuing to expand our understanding of how best to harness social media for global health will be key when delivering appropriate messages to marginalized and underserved communities.

### ▼ SCOPE OF THE VCF IMPACT REPORT

Total numbers of people reached (viewed or interacted with social media), engaged (participated in survey activity, etc.) and vaccinated as reported by grantees



- **Providing safe spaces:** Many of the demographics studied, especially those who are vaccine hesitant, or in a position of responsibility (i.e., parents and healthcare workers), are more likely to engage in online conversations in small, trusted groups. Many of the studies in this report noted that either providing a “safe” online space to discuss concerns among the vaccine hesitant, gaining access to trusted physicians or medical professional who could answers specific questions, or being able to engage on platforms with other individuals from similar demographic backgrounds (i.e., mothers) often had significant impact in increasing vaccine confidence.
- **Engaging trusted voices:** A key finding was the importance of trusted community members. Hearing representations of themselves in communications was key for many communities. For many of the communities participating in the studies, there was mistrust of the government and health organizations. However, what the research does highlight is that while there was not necessarily consistency in who those trusted sources were, identifying them and having them play a role in sharing information and engaging the community was likely to have a positive impact on vaccine confidence. Finally, the influence of families, as well as concern for their health and wellbeing were common drivers both for and against vaccination.

**“In the context of polarization and vaccine mandates, discussing COVID-vaccination has become problematic among healthcare workers in Belgium. Creating safe spaces for dialogue among healthcare workers is a multi-faceted effort that requires adapting to the changing pandemic context, offering multiple modes of communication, having active dialogue moderation, preventing an echo chamber of misinformation, and putting aside the aim of increasing vaccination uptake to promote trust.”**

– [ITM Antwerp](#)

# DETAILED FINDINGS

This section provides a more detailed look into some of the insights coming out of the 33 research projects conducted under the Vaccine Confidence Fund (VCF). It explores findings by types of vaccinations, key population groups, and by methodology type. Further information on the studies mentioned can be found in the Appendix and links in the footnotes.

## VACCINATIONS

### VACCINE UPTAKE

Insights on what drives vaccine uptake is one of the key areas the VCF, and the global health community, are eager to share and understand. However, obtaining data can be complex and restricted in many countries, even with self-reported approaches.

- In one study, conducted by the International Longevity Centre, click through rates for vaccine appointments were used as a proxy to measure uptake following engagement with their social media campaign.<sup>6</sup> The study found that “(s)ocial media campaigns targeting older adults in deprived areas directly have significant potential to increase vaccine uptake – especially for less well-known vaccines.” This is potentially a cost-effective way to improve vaccination rates, especially for older generations in underserved communities.
- Another study, by Mali Health<sup>7</sup>, that looked at vaccine uptake noted great success in increasing confidence and trust in the COVID vaccine, but they did run into some issues with access and availability of appointments. While 252 of 354 users pledged to get the vaccine only 18 of 354 received a vaccine during the period of study. It is quite likely that this number would have been higher with a longer timeline<sup>8</sup>

**“I am not against vaccination in general, but in relation to vaccination against Covid-19, I received a lot of contradictory information from my friends or through social networks; which created doubts and uncertainties that led to hesitation and even fear of the Covid-19 vaccine on my part. My fear started to dissipate when I installed Kènèya Blon in my phone and received the correct information. I then made the decision to get vaccinated after discussions that I had the opportunity to have with the health staff through the application. I have already gone to the health center to register for the vaccination when it is available. I am just waiting for the health center to call me for an appointment to get vaccinated.”**

– Comments from Mme. Bathily, shared with Mali Health (22 February 2022)

6 International Longevity Centre – UK, “Leveraging intergenerational relations to increase uptake of immunization in older Black communities.” The cost per view of other healthcare adverts (2021): 1-15 cents compared to 0.5 cents (ILC’s campaign). In addition, test campaigns generated 1,179 unique booking clicks, across all audience ages and vaccination types.

7 Mali Health, “Use of voice-based social media messages to improve vaccination knowledge and confidence in underserved peri-urban communities.”

8 The study ran from 23 September 2021 – 28 February 2022.

## ROUTINE VACCINATION

Several projects funded by the VCF looked at the role of social media in vaccinations beyond COVID-19.

- One of these studies, conducted by ORB International, examined perspectives of mothers and daughters on the HPV vaccination in Brazil. The study found that lack of awareness, both for the vaccine and the potential health impact of HPV, was the largest barrier to vaccination. Because there are several doses that need to be received within a certain time frame, the process and availability of the vaccine was another issue the study noted. The study also found that cancer prevention was one of the most motivating messages to mothers. As with several studies, seeing themselves reflected in communications was also noted as important to the mother and daughter participants.
- Another study by the International Longevity Centre found, somewhat surprisingly, that “(d)espite popular stereotypes to the contrary, targeting older users directly on social media is a more effective way of encouraging them to get their jabs than engaging them indirectly through younger people.”<sup>10</sup> The study focused on older generations and looked at the pneumococcal vaccine in underserved and marginalized communities (particularly focusing on individuals of African and Black Caribbean backgrounds). It also found that social media was a more cost-effective way of encouraging marginalized older adults to get vaccinated. “Cost per view of other healthcare adverts (2021): 1-15 cents compared to 0.5 cents (our campaign)”.<sup>11</sup> Key recommendations directed to the NHS focused on investing more funding in targeted social media campaigns to improve uptake in those most at risk and least likely to get vaccinated.
- Rising concerns about the COVID-19 vaccine are also impacting parental confidence in all vaccines according to interviews, online discussions and focus groups, conducted as part of a study conducted by Unity Consortium,<sup>12</sup> which looked at how to better understand the elements necessary to engage and educate parents through social media about adolescent and young adult vaccination. The study also noted that the conflicting information has increased stress and uncertainty, and it increased the amount of research parents are doing to feel confident in their decision making.

**“Despite popular stereotypes to the contrary, targeting older users directly on social media is a more effective way of encouraging them to get their jabs than engaging them indirectly through younger people.”<sup>10</sup>**

9 ORB International, with Twist MKTG Ltd, dbs Real Chemistry, Fiocruz/NIESP, VCP, “A Spread on Two Fronts: Informing HPV Inoculations in the Time of COVID-19 Misinformation.”

10 International Longevity Centre – UK, “Leveraging intergenerational relations to increase uptake of immunization in older Black communities.”

11 International Longevity Centre – UK, “Leveraging intergenerational relations to increase uptake of immunization in older Black communities.”

12 Unity Consortium, “Activating Vaccine Supportive Parents of Adolescents and Young Adults as Trusted Voices on Social Media”

## COVID-19 VACCINATION

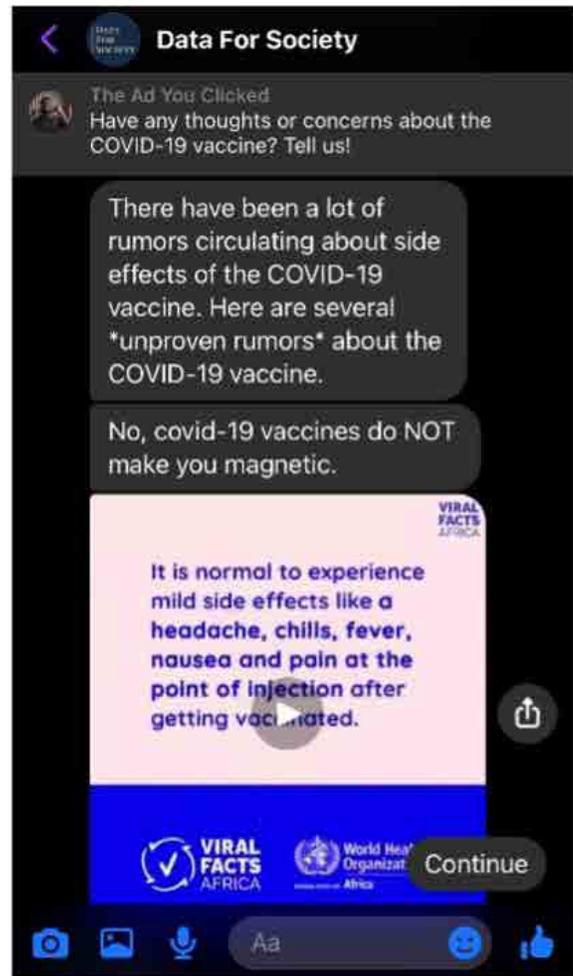
Grantees who focused their research on COVID-19 vaccination specifically identified several key themes.

**Importance of a tailored approach:** The studies conducted under the VCF grant showed that there are different reasons for vaccine hesitancy across different communities, but addressing specific concerns and questions was key. This diversity of concern and need speaks to the necessity for government and healthcare providers to share information and provide resources in a more tailored approach.

**Concerns around vaccine safety and lack of trust:** Throughout many of these groups, concerns about vaccine safety were a major issue for many, and the issue of trust in healthcare providers or governments was another commonly seen finding.

**Specific messaging found to be most effective:** Several studies also showed that the way in which information is communicated can be key in persuading those who may be hesitant.

- A study by the University of Washington (Department of Human Centered Design & Engineering), showed that “communicating the risks of COVID-19 vaccine side effects using verbal probability descriptors (e.g., common, rare) was associated with higher, less accurate, and more variable perceptions of risk than using numerical probability descriptors (e.g., 4%, 0.0035%).”<sup>13</sup> The same study also was able to show that sharing the amount and consistency of scientific research on COVID-19 vaccines increased awareness and, with a transparent approach, people were more likely to trust this information than the general information available on government websites.
- In fact, several VCF studies<sup>14</sup> have showed that more specific information on the medical impact of COVID-19 was more effective than general or non-specific statements. We also saw that “although we often think more concise messages or research summaries may be better, our findings suggest that providing more transparent and complete information about each study—including studies with divergent findings—can lead to a more trustworthy, informative, and compelling message.”<sup>15</sup>



### ▲ UNPROVEN RUMORS

University of Chicago, Testing interventions to address vaccine hesitancy on Facebook in East and West Africa

13 University of Washington (Department of Human Centered Design & Engineering), “Large-scale Studies to Advance Public’s Access and Trust of COVID-19 Vaccine Research on Social Media.”

14 The George Washington University, “Empathic Engagement with the Vaccine Hesitant in Online Spaces.”

15 The George Washington University, “Empathic Engagement with the Vaccine Hesitant in Online Spaces.”

## KEY POPULATIONS

### HEALTH CARE WORKERS

Several grantees focused their research specifically on health care workers (HCW) and how their perspectives on vaccine confidence influenced hesitancy and uptake in the communities where they worked. As trusted sources of information for vaccines, understanding hesitancy in this community is especially important so that HCW can receive the information and space they need to feel comfortable with vaccination, and share that information with their patients. Healthcare workers often play a key role as trusted sources of information in the community and are often sought as the first source of advice. They can also provide information on how and where to obtain vaccines and address any specific issues patients may have. Therefore, increasing vaccine confidence amongst HCW potentially has exponential impact on increasing vaccine confidence and uptake.

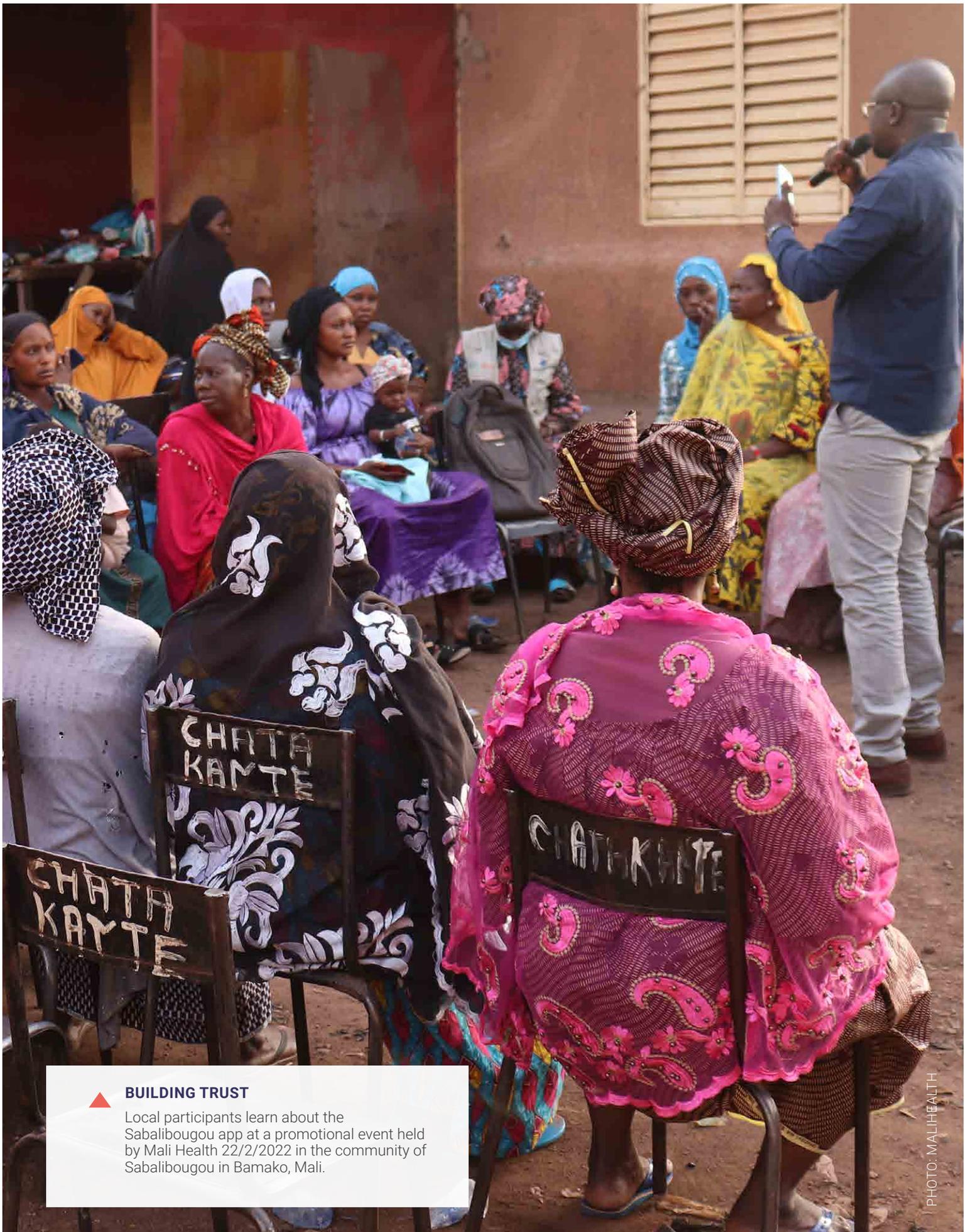
The below excerpt from an article external to the VCF, “The Vaccine-Hesitant Moment”, published in the *New England Journal of Medicine*, highlights the key trust that people have in health care workers on a global scale and also their potential impact:

*“Physicians and other health care providers are still among the most trusted persons when it comes to health care advice. The Wellcome Global Monitor surveyed people in 140 countries and found that 73% of the respondents said that they would trust a doctor or a nurse more than others; the percentage was 90% in the higher-income countries. Vaccine acceptance can increase, but health care providers need to offer support and encouragement and listen to what matters from the patient’s perspective. Equipping physicians with information on the nature and scope of circulating concerns in their communities may help them address such concerns in the clinic, while also informing appropriate interventions at the community level.”<sup>16</sup>*

- A study looking at the vaccine confidence of healthcare workers in Belgium, conducted by the Institute of Tropical Medicine, Antwerp,<sup>17</sup> sought to explore the role of safe spaces for dialogue. HCW occupy a particular space as they face COVID-19 care and prevention due to efforts to vaccinate more directly through their employment. HCW often experience difficulties talking about COVID-19 candidly, especially those who may be vaccine hesitant. Exploring the scale of HCW from very confident to more vaccine hesitant, researchers found frustrations, mistrust, and preconceptions amongst HCW from these two different camps. “Vaccine confident participants felt unvaccinated colleagues were quite defensive or that it was a lost cause trying to convince them. On the contrary, vaccine skeptical participants felt they were often considered egocentric, and their concerns not taken seriously.” The study found that while confidence was important, providing a safe space online for virtual face-to-face dialogue helped to relieve frustrations (especially for vaccine hesitant HCW) and was preferred to text-based engagement. The study also found that “(c)reating safe spaces for dialogue among healthcare workers is a multi-faceted effort that requires adapting to the changing

16 Heidi J. Larson, Ph.D., Emmanuela Gakidou, Ph.D., and Christopher J.L. Murray, M.D., Ph.D.. (2022). The Vaccine-Hesitant Moment. *The New England Journal of Medicine*. 387;1, 58-65. <https://www.nejm.org/doi/pdf/10.1056/NEJMr2106441>

17 Institute of Tropical Medicine Antwerp, “Cultivating Online Safe Spaces: Addressing unspoken hesitancy to build vaccine confidence in healthcare workers in Belgium.”



**BUILDING TRUST**

Local participants learn about the Sabalibougou app at a promotional event held by Mali Health 22/2/2022 in the community of Sabalibougou in Bamako, Mali.

pandemic context, offering multiple modes of communication, having active dialogue moderation, preventing an echo chamber of misinformation, and putting aside the aim of increasing vaccination uptake to promote trust.” The study calls for leveraging online media to foster greater “vaccine dialogue, trust in democratic science-making and vaccine confidence by listening to vaccine narratives and addressing vaccine concerns and information deficits and creating venues for dialogue and peer support.”

## VACCINE CONFIDENCE AMONGST HISTORICALLY EXCLUDED AND MARGINALIZED COMMUNITIES

Members of historically excluded and marginalized communities, who have been denied access to systems in the past, faced that same exclusion in the context of the pandemic. One of the unsurprising key findings is that understanding the community, its history, and current concerns is key in increasing uptake and confidence, as well as taking language into account. Furthermore, engaging trusted community figures and influencers identified by the community proved to be useful in increasing vaccine confidence.

- Looking at minority populations in 4 countries<sup>18</sup>, the Minority Rights Group found that there were significant and deep rooted differences between minority and majority populations and “thus treating diverse populations as homogenous in a misguided attempt to save time or money or to promote efficiency entails a high risk of back-firing and can mean efforts do not reach their intended targets.”<sup>19</sup> Working closely with trusted local minority organizations, researchers found that when data is “disaggregated by ethnicity, language and religion, findings help explain issues such as residual pockets of non-vaccination in Sri Lanka, or the fivefold difference in vaccination rates between different areas of Kenya.” The research emphasizes the ethnic, religious, and linguistic barriers to vaccine access and uptake. This likely means more locally relevant information, in local languages and through trusted community figures, will have a greater impact than general, centrally broadcasted information. The study also showed that while social media findings can be very useful for areas with high levels of usage, for those in more remote areas, social media may not have the reach needed to impact the community, both in terms of actual signal and in terms of a presence of trusted community figures engaging online.
- Another study, conducted by Oklahoma State University, looked at the disproportionate impact of COVID-19 among marginalized Hispanic immigrant populations in the US, as well as the lack of research on vaccine confidence among these populations. The study found that “sourcing culturally specific narratives enhance message persuasiveness; here confidence in the COVID-19 vaccine among Hispanic survey participants is increased when exposed to culturally specific expressions of vaccine confidence derived from Hispanic communities.”<sup>20</sup> The study also highlighted the importance of amplifying “organic community narratives with key mutually understood cultural nuances.” It also found that in addition to a preference for images that looked like themselves, themes focused on Hispanic cultural themes of collectivism and community were more preferred.

18 See Minority Rights Group, with Grand Synergy Development Initiative (GSDI), Verite Research Pvt Limited, Bytes for All, “Diversity: Impact on Vaccine Equality (DIVE).” Algeria - focus on Amazigh/Tamazight speakers, Kenya - focus on Somali population, Pakistan - focus on religious minorities, and Sri Lanka - focus on Tamils and Muslims.

19 Minority Rights Group, with Grand Synergy Development Initiative (GSDI), Verite Research Pvt Limited, Bytes for All, “Diversity: Impact on Vaccine Equality (DIVE).”

20 Oklahoma State University, with the MESA Group, “Modeling Vaccine Confidence Interventions for Marginalized Migrant Communities: A Mixed Method Approach to Leveraging Social Media Narratives.”

A study conducted by the Indiana University Observatory on Social Media pointed to the potential and need for grassroots online campaigns to reach young urban Black Americans:

*“Participants would be most likely to share messages that have content related to personal experiences of ordinary people about vaccines. Interestingly, the least shareable messages contained images designed to provoke fear of the consequences of COVID-19 infection. We also tested neutral messages with simple pictures of vaccines, and interactive messages that were designed to stimulate discussion about vaccines. A second part of our study looked at other factors why people might be willing to share vaccine-positive messages. Unsurprisingly, we found that individuals with higher levels of vaccine confidence are more likely to share our messages. However, when we account for vaccine confidence, we also found that people with more open-minded thinking styles and more confidence in social media are more likely to share our messages. We also studied focus group data, provided by our partner, The New George Project, to try to understand how best to design campaigns to promote vaccines among Black Americans. We found three factors related to low vaccination rates among Black people: (1) concern about safety and efficacy of the shot; (2) distrust of the public health system, coupled with; (3) fatigue from exposure to its campaigns.”<sup>21</sup>*



**Center for Media Engagement** Sponsored · 

Black Americans are urged to get vaccinated to prevent the spread of diseases. This is an act of loyalty to your community.

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**Defend Our Community Together** [LEARN MORE](#)

 Like  Comment  Share

### ▲ COMMUNITY LOYALTY

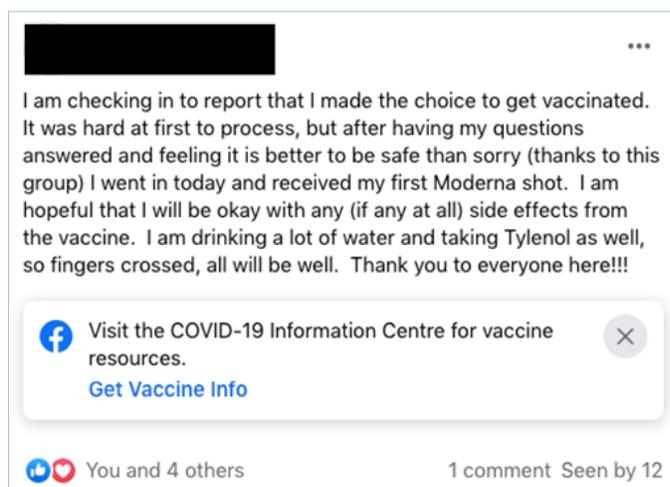
For public-health campaigns to be effective in driving demonstrable reductions in vaccine hesitancy among Black people, social media messaging should be framed in a way that addresses variations in moral values, culture, and communities. Center for Media Engagement at the University of Austin Texas

21 The Indiana University Observatory on Social Media, “The Black and Thriving Project”: The use of message framing and social contagion to promote vaccines in African American communities.”

## VACCINE HESITANT POPULATIONS

Several studies focused on various types of vaccine hesitant populations. Overall, while the groups shared higher levels of hesitancy, the reasons for hesitancy and their views on the vaccine differed quite significantly by geographic area, culture, and demographics.

- In a study looking at hesitancy by zip code in the US conducted by the University of Washington, Institute for Health Metrics and Evaluation, researchers found that there was a stark difference demographically for those whose reason for hesitancy was that they felt there was no need for the COVID-19 vaccine: “Non-Hispanic White males aged 18-24 had a 46% probability of selecting this answer while Non-Hispanic and Asian females aged 35-44, in contrast, only had a 12% probability.”<sup>22</sup> Another study, looking at intervention via small private social media groups of unvaccinated individuals in the US, found that communicating in concrete terms the “bottom-line meaning of COVID infection, i.e., the serious health risks posed by COVID” was potentially more effective than discussing terms in the abstract.<sup>23</sup>
- Meanwhile, a randomized trial study looking at unvaccinated and vaccine hesitant populations in Japan, conducted by Corowa-kun, also found that while both interactive and live question and answer webinars – provided by health care professionals and chatbots – had little impact on vaccine intention, the webinars that allowed participants to engage and have their specific questions answered had a greater impact and increased the Vaccine Confidence Index.<sup>24</sup> The study saw an increase in the importance and the effectiveness of COVID-19 vaccines significantly increased with the webinar intervention. Using the Vaccine Confidence Index<sup>25</sup> the study examined importance of COVID-19 vaccine (-2.2 in the control group, -0.8 in the chatbot group, 8.7 in the webinar group) and effectiveness of the COVID-19 vaccine (-8.1 in the control group, -3.4 in the chatbot group, 5.3 in the webinar group).



### ▲ CHOOSING TO GET VACCINATED

“This post from a participant in trial 1 indicates that the participant chose to get vaccinated directly as a result of being part of the group and having their questions answered.” The George Washington University

22 University of Washington, Institute for Health Metrics and Evaluation, “Using social media to identify drivers of COVID-19 vaccine hesitancy in the US by county and ZIP code.”

23 The George Washington University, “Empathic Engagement with the Vaccine Hesitant in Online Spaces.”

24 General Incorporated Association of Corowa-kun Supporters, “Impact of a LINE chatbot and a webinar on COVID-19 vaccine intention and vaccine confidence: a Randomized Controlled Trial among Japanese.”

25 General Incorporated Association of Corowa-kun Supporters, “Impact of a LINE chatbot and a webinar on COVID-19 vaccine intention and vaccine confidence: a Randomized Controlled Trial among Japanese.” “(Changes in VCI were assessed by mixed-effects logistic regression model. the difference in % (post-intervention – pre-intervention) of those who have responded strongly agree or tend to agree)”

- Another study, still underway, conducted by The George Washington University, also saw preliminary data suggesting that “sharing information about vaccines with unvaccinated individuals in private Facebook groups may improve vaccine confidence and may be sufficient to convince a small number to vaccinate, even among some of the most resistant individuals.” They did note that widespread distrust remained a barrier to vaccination and issues such as personal experience, and pandemic fatigue, were among reasons noted to refuse vaccination.”<sup>26</sup>

## PARENTS AND CHILDREN

While adolescents and parents recognize the importance of vaccines for teens, COVID-19 has increased anxiety and impacted parents’ vaccine confidence. Studies found that engaging parents (through interviews, bulletin board discussions, and focus groups), and especially children and teens, was an effective way to share information encouraging greater confidence in vaccines, in some cases leading to uptake.

- In a study conducted by Unity Consortium<sup>27</sup>, parents reported feeling anxious and uncertain about so much contradicting vaccine information and were unsure who to trust. The study also noted that given the controversies and polarization around the topic of COVID-19 vaccination they were more likely to share posts from unbiased sources in smaller, more familiar social groups, rather than public groups where they felt the subject was taboo and feared backlash. Parents also appreciated straight forward and relevant communication, as some have become wary of sources with potential hidden agendas, so sources

highlighting their unbiased nature were seen as more credible. As with many studies, the more relevant to their specific situation the better.

- In another study, conducted by Shujaaz Inc.<sup>28</sup>, Natural Language Processing (NLP) and sentiment analysis was used with a qualitative exploration of the conversations to compare changes to vaccine sentiment and inspire dynamic conversations on vaccines. The project found that using explicit and relevant words was able to drive more focused and thematic conversations. It also found that a mix of real-life and fictional stories helped Shujaaz fans discuss sensitive topics. The project saw self-reported data that participants not only shared information with friends and family, but that they also were inspired to get vaccinated.

## PREGNANT AND LACTATING WOMEN

Vaccine concerns often remain higher than that of the average population in many countries for pregnant and lactating women. Fears that the vaccine may have a negative effect on the mother and child are a key source of hesitancy. Several studies, not focused on this population, also noted lower levels of trust or higher prevalence of fertility related rumors impacting hesitancy.<sup>29</sup> Engaging mothers as well as communities, and sharing information in ways that helped to answer culturally specific questions, while addressing local rumors or fears seemed to prove effective in increasing confidence.

- A study conducted by the University of California, San Francisco<sup>30</sup> found Chatbots in WhatsApp groups are feasible, acceptable, and

26 The George Washington University, “Empathic Engagement with the Vaccine Hesitant in Online Spaces.”

27 Unity Consortium, “Activating Vaccine Supportive Parents of Adolescents and Young Adults as Trusted Voices on Social Media”

28 Shujaaz Inc., “Tunajengana: Using social media to mobilise young East Africans to champion community uptake of COVID-19 vaccines”

29 Grameen Foundation India Private Limited, “D-VACSI: Driving Vaccination Confidence through Social Media Innovations.”

30 University of California, San Francisco, “WhatsApp Bots for Overcoming Vaccine Misinformation and Increasing Vaccine Confidence

may effectively address COVID-19 vaccination concerns among pregnant and breastfeeding women in rural North India. Despite most pregnant and breastfeeding women wanting to be vaccinated in this community, COVID-19 vaccinations remain low. The study identified several key barriers, including “fetal/infant safety concerns, health provider refusal, and gender.” The chatbot provided a simple yet effective way to overcome gender related barriers and provide clear and specific information. The study also incorporated ongoing feedback, including new answers to questions that remained unanswered. While overall changes in vaccine uptake and confidence were not high, 88.9% indicated the chatbot improved their COVID-19 knowledge a lot, 71.7% recommended it to others, and 88.3% shared information from the chatbot with others. This highlights the feasibility of using chatbots as a resource for a population which often faces gender-related barriers to health information and care. “Chatbots held potential for impact across social networks; this tool could be used to help empower women to educate families, including household decision-makers. Chatbots, linked to trusted sources, expanded community health education.”

- Another study, still underway, looked at pregnant and lactating women in Europe and found “40% of messages about COVID-19 vaccination and pregnancy found on the investigated social platforms are hesitant towards vaccines. According to literature and our field work, the main concern about getting vaccinated during pregnancy (or shortly after/before) is whether the vaccine is safe. Concretely, people worry about whether the vaccine damages mother and/or child, distorts the menstruation cycle or lactation, alters the child’s DNA or causes disease or even death. Vaccine-skeptics also believe that the development period of the COVID-19 vaccines was too short and that there is a lack of tests on pregnant women and their children that investigate the long-term effects.”<sup>31</sup>

## OLDER ADULTS

While social media is considered by many to be something for the young, one of the VCF studies showed that social media campaigns targeting older adults in lower income areas had “significant potential to increase vaccine uptake – especially for less well-known vaccines.”<sup>32</sup> “The study, conducted focusing on Black populations in the UK, noted that this may be an area of underinvestment. It also showed that addressing some simple barriers to uptake had significant impact. The campaign revealed a number of quick-win opportunities for health practices/systems to address common barriers to uptake among older users in deprived communities.” These quick wins include targeting older adults with social media and ensuring that booking appointments to see GPs or vaccination appointments are easy.

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among Pregnant Women in Northern India: Development and Impact Assessment.”

31 University of Antwerp, “Research to increase confidence in maternal vaccination by digital communication interventions.”

32 International Longevity Centre – UK, “Leveraging intergenerational relations to increase uptake of immunization in older Black communities.”

## PEOPLE WITH DISABILITIES

It is important that greater considerations are given to people with disabilities – who often face additional barriers to access and often more complex health concerns – when it comes to vaccination.

- A study conducted by RMIT University<sup>33</sup> found that there is often a significant barrier to vaccinations and vaccine information for people with disabilities in Vietnam and Indonesia. Greater accessibility to both information and to vaccination sites, as well as more specific guidance on the side effects and safety for those with disabilities were some of the key needs the study identified. The information that was available, was not accessible, particularly to the hearing and sight impaired communities. The study also found that in Vietnam, Facebook, and Zalo (a messaging app and second most used social media platform in Vietnam) were among the key platforms hearing impaired individuals “perceived to be useful for seeking vaccine-related information from other people with disabilities (PwDs). Those who live in rural areas or locations with an unstable Internet connection relied on opinion leaders and traditional communication means.” Other issues were lack of ramps, inaccessible signage, and a lack of sign language interpreters. Noting pre-existing conditions was not often supported on the forms and was also difficult to communicate due to a lack of sign language interpretation. At the local level, support was lacking, despite the fact that people with disabilities were considered part of the priority list in the national vaccination program. The study benefitted from strong engagement with people with disabilities, from initial design to implementation, and also built on existing local organization support rather than creating new infrastructure. This approach, the study recommends, is one governments should ideally pursue and is part of their policy brief laying out an accessible approach based on inclusive rights during a pandemic.



**GOOD TO GO**  
 ▲ A person with disabilities getting vaccinated.  
 RMIT University

<sup>33</sup> RMIT University, with Independent Living Center, funded by SSRC USA, “Modeling vaccine-related information to create hybrid information hubs for people with disabilities in Vietnam and Indonesia.”

## METHODOLOGICAL FINDINGS

### RHETORICAL STRATEGIES

Many of the studies examined how individuals' trust were impacted by language, cultural considerations, and the way in which information is shared and presented. One project looked instead at how rhetoric around a public health institution—the CDC—impacted trust in that institution.

*“The preliminary results of this project highlight the potentially outsized role that rhetoric related to the politicization of the CDC may have played in driving CDC trustworthiness and credibility concerns, even relative to other concerns such as CDC ties to pharmaceutical companies, which are commonly cited as drivers of CDC distrust. Further research is required to elucidate causal pathways linking politicizing rhetoric to public distrust of the CDC; however, the large relative prevalence of this type of rhetoric on Twitter seen in this analysis suggests that public health institutions would be wise to think carefully about how it can communicate with the public in a way that affirms that its public health recommendations are based purely on scientific evidence as opposed to political concerns. More broadly, these findings add to increasing concerns that worsening political polarization is threatening the ability of public institutions to effectively guide and govern the public through crises.<sup>34</sup> The first aim of this project was to shed light on public beliefs about trust in the CDC by evaluating rhetoric related to trust in the CDC found on Twitter during the COVID-19 epidemic. – the study applied an unsupervised, machine learning-based topic modeling algorithm to Twitter data in order to categorize the types of rhetoric related to trust in the CDC that Twitter users are posting and being exposed to. Results show that rhetorical categories both undermining and bolstering trust in the CDC appear to fall in line with prevailing theories about the major components of perceptions of credibility and trustworthiness, which include beliefs that an entity has the (1) necessary competence and expertise, and (2) benevolent and ethical intentions to behave in a way that meets the normative expectations placed upon it.”*

**“Engaging with a concern-eliciting chatbot leads Facebook users in Kenya and Nigeria to be more likely to report willingness to get the vaccine if it were available today, and more likely to report higher levels of enthusiasm about getting vaccinated, as compared to users in a public service announcement chatbot or control condition.”**

University of Chicago

### CHATBOTS

Exploring the role of chatbots to share information and answer questions, several studies found promising results in their ability to increase vaccine confidence and contribute to uptake. This was particularly the case when there was strong community engagement to understand the underlying factors and concerns, as well as to continuously update the Chatbots to be able to respond to the latest trends and concerns.

34 Jonathan Yong Lee, Stanford University, “Evaluating the Frequency and Effectiveness of Common Rhetorical Strategies Used to Attack and Defend the Trustworthiness of Public Health Institutions.”

- A study conducted by the Laboratory of Data Discovery for Health (D24H) in Hong Kong, Singapore, and Thailand, found that “the chatbot was able to disseminate accurate COVID-19 vaccine-related information to the public in an easily accessible format from a credible source. Chatbots allowed instantaneous responses to pressing questions, which might not be feasible with other forms of health communication.” Also, “vaccine chatbots could complement existing tools and offer an invaluable information source that can supplement other forms of health communication and engage users who might otherwise feel judged when asking vaccine-related questions. Additionally, social listening is critical for keeping a finger on the pulse of real-time changes in sentiment, concerns, rumors, and misinformation, as this monitoring allows chatbots to evolve and remain relevant.”<sup>35</sup>

## ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Several studies made use of artificial intelligence or machine learning to evaluate their role in increasing vaccine confidence via social media. This showed some promising results and encouragement to further exploration around the role that this technology might play.

- A study examining social media communicators “should test artificial intelligence (AI). Our quasi-experimental study found that messaging deployed on Facebook that has been enhanced using AI can outperform human-generated communication. The results from our pilot study found that there was a statistically significant difference in impact of click-through-rate in the AI-mediated communication (AI-MC), which means that as more people were shown the ads with AI-MC, more people behaved with our goal in mind to click through and “learn more.” Machine learning-based topic modeling technology has made incredible progress in recent years, and over the course of this project, various older and newer algorithms were trialed, including latent dirichlet analysis (LDA) and the use of jointly embedded topic, document, and word vectors. In the end, the use of jointly embedded vectors appeared to strike a better balance between having too many topics with sufficient specificity vs. too few topics with diluted/insufficient specificity.”<sup>36</sup>

**QUESTIONS ABOUT VACCINES** ►  
Thailand Chatbot Platform. Laboratory of Data  
Discovery for Health (D24H)



35 Laboratory of Data Discovery for Health (D24H), “Development and impact assessment of a conversational AI service (chatbot) on Covid-19 vaccine confidence and uptake.”

36 Jonathan Yong Lee, Stanford University, “Evaluating the Frequency and Effectiveness of Common Rhetorical Strategies Used to Attack and Defend the Trustworthiness of Public Health Institutions.”

- A study conducted by the Center for Media Engagement at the University of Texas at Austin found that AI enhanced media outperformed human generated communication. social media communicators should test artificial intelligence (AI). “Our quasi-experimental study found that messaging deployed on Facebook that has been enhanced using AI can outperform human-generated communication. The results from our pilot study found that there was a statistically significant difference in impact of click-through-rate in the AI-mediated communication (AI-MC), which means that as more people were shown the ads with AI-MC, more people behaved with our goal in mind to click through and “learn more.”<sup>37</sup>

	HUMAN GENERATED	AI-GENERATED
CARE/ HARM	When you get the COVID-19 vaccine, you help <b>care</b> for other people, keep them <b>safe</b> , and <b>prevent others from being harmed</b> .	Black Americans are vaccinated to prevent diseases. This is an act of love and care for others in your community.
LOYALTY/ BETRAYAL	When you are vaccinated, you <b>unite with others and join forces</b> against COVID-19 and <b>defend our community members from getting</b> the disease.	Black Americans are urged to get vaccinated to prevent the spread of diseases. This is an act of loyalty to your community.
PURITY/ DEGRADATION	When you get the COVID-19 vaccine, you slow the spread of <b>germs</b> , stop <b>contamination</b> , and help prevent <b>infection</b> .	Black Americans are urged to get vaccinated to prevent the spread of diseases. This is an act of purity and keeping your community healthy.

#### ▲ HUMAN VS. MACHINE

AI content outperformed human generated content.  
Center for Media Engagement at the University of Texas at Austin

- Another study conducted by 19 to Zero, looking at COVID-19 vaccine rhetoric on Twitter in hesitant marginalized communities found that “(a) mixed-method approach of social network analysis and machine learning methods were applied to study COVID-19 vaccine rhetoric on Twitter. Machine learning models identified vaccine confident and hesitant tweets within marginalized communities (Black, Indigenous, Latinx, and LGBTQ+) in North America. This data was analyzed to elicit themes of discussion, emotions, and sentiments surrounding COVID-19 vaccines.... This work highlights how machine learning can identify social media trends in vaccines and improve efforts to drive vaccine confidence and access.”<sup>38</sup>

37 UAT

38 19 to Zero Inc., “Novel Use of Natural Language Processing to Analyze Vaccine Attitudes on Social Media and Create Vaccine Confidence Messaging for Vulnerable Communities.”

## CROWD SOURCING

- One study<sup>39</sup>, looking at the impact of crowdsourcing, found that it was challenging, but possible, to generate local science-based media content to address vaccine hesitancy and misinformation. The study found that of “4,400 social media users who submitted a test video, around 450 people uploaded a persuasive video to help get people vaccinated.” While video content improves when instructional infographics are provided, “people who submit videos come up with creative and intuitive strategies to persuade people that are consistent with behavioral theory, for example, highlighting social norms, downplaying risks, emphasizing social benefits and economic effects, peace of mind and stress reduction. Storytelling (e.g., people who were affected by Covid) was also used as a common motivator.” The study did find that the success of the campaigns and sourcing “local content is possible but challenging and varies significantly by context. To further test the utility of crowdsourcing requires resources, time, and patience for experimentation and adaptation. We had to play around with ad spend, incentives, and treatment instructions before seeing outputs in terms of videos and surveys. This exploratory process was repeated in each country’s context to varying results. A comparable small-scale campaign run across countries was more successful in Kenya and the Philippines, and less so in Nepal.”



### ▲ CROWD SOURCED MESSAGES

Crowd Sourcing Campaign for Facebook in Kenya, Philippines and Nepal. Busara Center for Behavioral Economics.

39 Busara Center for Behavioral Economics, “Crowdsourcing content to combat misinformation in the Global South.”

## PHYGITAL VS. DIGITAL

A study conducted by Grameen found “(s)ocial Media experiment leads to 7.6% lesser vaccine hesitancy and 1.7% higher vaccine adoption in rural India. The study explored “the impact across the digital and phygital arms and revealed that Digital-model was more efficient and impactful than Phygital-model in resolving information asymmetry, vaccine hesitancy and vaccination confidence. The digital model was able to reduce greater proportion of vaccine hesitant persons (by 17%) than the phygital beneficiaries (16%). Similarly, the incremental increase in vaccine uptake in the digital model was by 2%. Moreover, digital-model required fewer resources to implement since it eliminated physical contact requirements and is more convenient and scalable. However, low-penetration of internet and internet-enabled devices is a challenge that is being addressed by the government’s telecom policies at a steadily fast pace.”<sup>40</sup>

**Social Media experiment leads to 7.6% lesser vaccine hesitancy and 1.7% higher vaccine adoption in rural India**

## SUCCESSFULLY REACHING POPULATIONS

While social media can provide an exciting new source of information for public health, barriers still exist, such as internet penetration or the inclusion of community specific languages and considerations.

- One grantee, Institute for Global Health Sciences, UCSF, explored the impact of indigenous languages on confidence and uptake. They “first conducted a Brand Lift study which showed that videos in Mayan languages appear to improve the perceived safety of COVID-19 vaccines, while Spanish videos may have improved perceived acceptability of COVID-19 vaccines for Spanish speakers. Finally, we conducted an evaluation using in-person surveys with members of indigenous communities before and after deploying the social media video campaign and found increased odds (1.83 times the odds) of getting vaccinated among those who saw our videos over social media compared to those who did not, adjusted by age, community, sex and language spoken at home. Findings from this study can help key stakeholders at the national and local level consider optimal practices for development of vaccine education content and how to leverage this content over social media to increase COVID-19 vaccine uptake in other regions of the country...” We completed 1,681 pre and post intervention surveys, the mean age of participants was 32 years, 63% (N=998) identified as women and 36% spoke an indigenous language (K’iche or Kaqchikel) at home. Twenty-one percent of the participants (N=327) reported having watched the pre-created content. From those who saw the videos 98% reported to have learnt something new about the vaccines from them. At baseline, 89% (N=1402) of participants reported having been vaccinated against COVID-19 with at least one dose compared to 97% (N=1507) in the follow-up.”<sup>41</sup>

40 Grameen Foundation India Private Limited, “D-VACSI: Driving Vaccination Confidence through Social Media Innovations.”

41 Institute for Global Health Sciences, UCSF, “Who to trust: combating COVID-19 vaccine misinformation through trusted messengers and social networks in indigenous communities in Guatemala.”

- Another study, conducted by Purpose Campaigns LLC, demonstrated that messaging can be shared across platforms, increasing reach and while yield rates were relatively low, using automation had the potential to increase ease of access and reach. “Open WhatsApp group channels provide rich territories for seeding pro-vaccine content. 28% of groups engaged with a pro-vaccine content link. Over 5% of the content links initiated in public group channels were re-shared within WhatsApp to other WhatsApp channels one or more times. Seeding content into WhatsApp can generate clicks and shares to public social media platforms such as Facebook. A high volume of WhatsApp users can be reached at scale. Our research teams were able to identify over fifty thousand open WhatsApp group channels in four specific countries, targeting groups associated with a range of specific interests from politics to football and alumni groups that all provide opportunities to both learn about and develop content for audiences with clear associative ties. Nevertheless, the process of joining these groups is time consuming and challenging. Yield rates of viable groups are relatively low (roughly 1%) and manual group joining can be cumbersome. However, automation tools can provide capacity to reach large numbers of WhatsApp users at scale by automating the group joining and evaluation process. At least 20 percent of links that were initially shared on WhatsApp via our researchers appear to have been re-shared to other WhatsApp groups or individuals. In India, 9.8% of links were reshared, in Nigeria 4.7% were reshared and in South Africa 31.8% were reshared. These do not include additional sharing via in app forwards, which could not be directly observed.”<sup>42</sup>



#### **CONTENT WITH CTA**

Automation of messages like this one generated by Purpose Campaigns was found to increase ease of access and reach.

<sup>42</sup> Purpose Campaigns LLC, “Harnessing virality for vaccine confidence: testing tactics to optimize sharing of pro vaccine content between WhatsApp and traditional social media platforms.”

## ENGAGING TRUSTED VOICES

Anyone looking to promote vaccine confidence within Indigenous communities in Canada should first look to support self-determination and community-driven solutions. Communities have expertise and local cultural and social knowledge that are crucial for effective vaccination promotion.

Supporting community, however, is not the first step in promoting Indigenous vaccine confidence. Before being able to support community, mutually beneficial and authentic relationships must exist between community members and healthcare workers or health researchers. Forming and strengthening these relationships should be a priority so that they are in place before the next major public health crisis emerges.<sup>43</sup>

- A study conducted by the University of North Carolina at Chapel Hill explored the impact of trusted political voices by testing the impact of sharing positive messages by trusted leaders, in this case Donald Trump, in over 1,000 low vaccination counties along with another set of 1,000 plus similar counties that would not receive it. They saw an increase in vaccinations in those who saw the PSA. “The average county that got the ad recorded an increase of 103 vaccinations more than the counties we did not treat. With over 1000 counties getting the Trump endorsement, that translates into better than 100,000 more vaccines. Our ad budget was slightly less than \$100,000 dollars, which means that the cost of each new vaccine was less than a dollar. That is far more efficient than other efforts that states tried to increase vaccine uptake such as lotteries.”<sup>44</sup>

*“Hesitancy in the U.S. proved especially high, with rates of vaccination barely among the top 50 countries in February 2022 (25). As many have observed, a tragedy of the COVID-19 pandemic is the extent to which protective measures became tangled in Americans’ political identities, which led to deaths and suffering that could have been avoided. But if politics characterizes one aspect of the problem, it might also point to part of a solution. We find that positioning Donald Trump and Fox News as counterintuitive messenger is a cost-effective way to overcome hesitancy among people who still had not been vaccinated, months after the vaccines became widely available. Are our findings scalable? We believe they are. As long as Americans on the political right are a significant bastion of hesitancy, support from Donald Trump and other party leaders for vaccinations will represent a potent tool that public health messengers can use. Leveraging his recent endorsement of COVID-19 boosters is an obvious extension of this work. So, too, with seasonal flu vaccines and immunization attitudes generally, which are starting to show signs of increased partisan schism (6). Insofar as vaccinations continue to be politicized, this research provides a model for political messaging as an important public health tool in future pandemics. Whether the dividing line is politics or something else, we encourage public health proponents to reflect on messengers whose voices might carry special weight among target populations. For example, other research finds a pro-masking message from a military general increases support for masking among political conservatives (26). The results we report herein help corroborate this theme. We think it represents a promising route to overcome resistance and, in turn, save lives.”<sup>45</sup>*

43 Morning Star Lodge, “Where Past Meets Present: Understanding COVID-19 Vaccine Hesitancy among Indigenous Peoples in Saskatchewan.”

44 University of North Carolina at Chapel Hill, Rahsaan Daniel Maxwell, “Targeted Vaccine PSAs Based on Political Science and Economic Insights.”

45 University of North Carolina at Chapel Hill. (6) A. Fridman, R. Gershon, A. Gneezy, COVID-19 and vaccine hesitancy: A longitudinal study. PLoS ONE 16(4): e0250123, (26) S. Greene, M.J. Hetherington, R. Maxwell, T.J. Ryan, Public service announcements and promoting face masks during the COVID-19 pandemic, PS Polit. Sci. Polit., 55, 7–12 (2021)

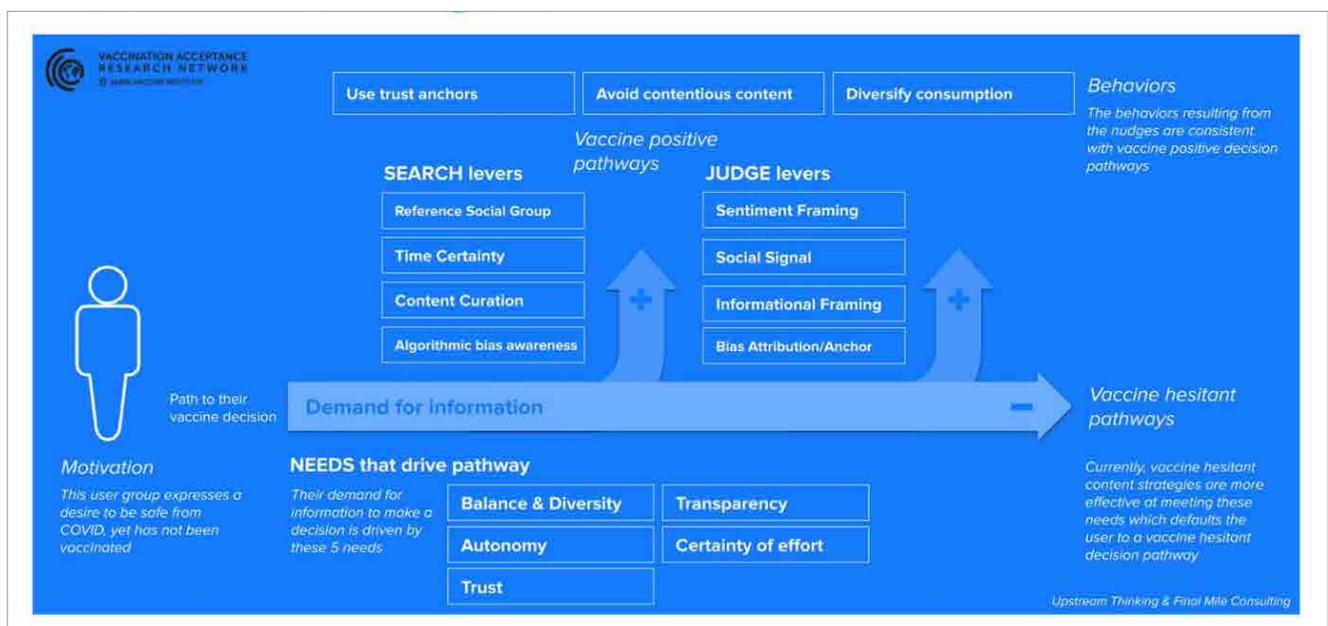
## BEHAVIORAL BARRIERS

- A study conducted by the Behavioral Insights Team found three key behavioral barriers that might impact uptake: 1) pro-vaccine messaging may work better when risks are perceived to be higher; 2) friction costs, small details that can make vaccination appear more effortful, may impact the likelihood of getting a shot; and 3) research showed that people are good at visualizing goals, but not the steps it takes to achieve them.<sup>46</sup>

## BEHAVIORAL NUDGE

- A project conducted by Mali Health had significant impact in increasing confidence in peri-urban communities in Bamako, Mali through participatory methods and tools to develop and disseminate voice-based social media messages to improve vaccination

knowledge and confidence.<sup>47</sup> The project incorporated end-users in every step of the program, from developing the platform to understanding the needs and behaviors of the target population and the norms which govern them. While 95% of women reported not trusting COVID-19 vaccines at the start of the project, 100% demonstrated improved knowledge about the benefit of vaccination, 75% of the women who used the application expressed confidence in vaccination against COVID-19, and 60% felt better equipped to convince others to get vaccinated against COVID-19. The primary concern, at the start of the project, was a lack of trust in the COVID-19 vaccine and the lack of access to trusted health personnel to address their concerns. The Kènèya Blon application was able to remove barriers by providing access to health care personal to address their concerns.



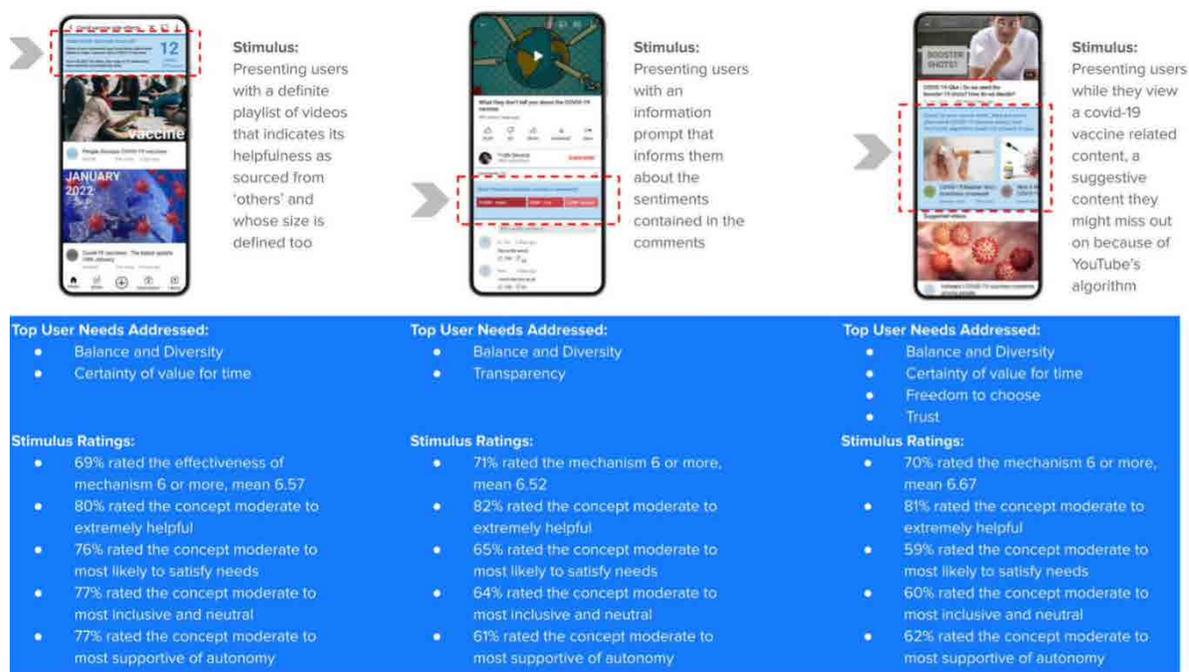
### EFFECTIVE NUDGES

A graphic looking at how vaccine positive pathways could be more successful at meeting the demand for information.

46 The Behavioural Insights Team, "Designing and testing a WhatsApp chatbot to increase Covid-19 vaccination bookings in Argentina."

47 Mali Health, "Use of voice-based social media messages to improve vaccination knowledge and confidence in underserved peri-urban communities."

- Another study conducted by Upstream Thinking, LLC, looking at identifying online behavioral nudge interventions, also noted the unexpected and at times inconsistent behavior in unvaccinated African American populations in the rural South.<sup>48</sup> In contrast to the findings noted above by Mali Health, Upstream Thinking, LLC, found that their target population was less inclined to defer to the decisions of medical and public health experts, and instead motivated to arrive at their own conclusions. This is in contrast to a historical precedent of vaccination, where trust in doctors and uptake of vaccinations was more widespread in this community. The study noted five key drivers of demand that can be leveraged to direct demand towards vaccine positive interpretations. These key drivers were individuals seeking balance and diversity in narratives, freedom to choose (looking for information rather than instruction), trust (from firsthand sources rather than from institutions), transparency, and certainty about value (not spending time on information that does not fit their needs). When social media concepts were aligned with these needs, the quantitative results indicate a nudge towards more vaccine positive content.



**▲ SOLUTION CONCEPTS AND RESULTS**

Screen captures from YouTube demonstrating the various stimulus.

48 Upstream Thinking, LLC, with Final Mile Consulting, "Redirecting existing demand for information towards vaccine confident interpretation by identifying online behavioral nudge interventions."

## PROCEDURAL INSIGHTS

A key purpose of the Fund was to identify and share learnings from the process side from those who were conducting the research to help expedite and hone future projects. The procedural insights detailed below are some of the common learnings from research teams. For more detailed insights see the individual grantee overviews.

### COLLABORATING WITH TRUSTED SOURCES

Whether engaging with local organizations that already have connections in the community, or using familiar platforms, researchers found they had greater success in engaging communities when community representatives were on the research team. This was particularly relevant given the expedited timeframe of the research. Several studies also noted that participants were more receptive to information with transparent sources. Unbiased information was seen as particularly valuable, as hidden agendas were a common concern and cause for distrust.

“Communities are dynamic, and this includes their priorities. Something identified as high priority when funding is applied for may not remain so when funding is approved, and research begins. Furthermore, the piloting of any solutions must include what community intends to do. Many have argued that the solutions to Indigenous health inequities lie within Indigenous communities, Knowledges, and cultures. Therefore, funding proposals for health research with Indigenous communities should be written such that research can pivot from seeking for solutions, to supporting and seeking to understand Indigenous-led self-determined solutions”.<sup>49</sup> “Indigenous vaccine hesitancy does not necessarily mean low vaccination rates. Assuming that Indigenous vaccine hesitancy will result in low vaccination rates is deficit-based and undermines the strengths, abilities, and expertise within a community. In the complex space of Indigenous vaccine confidence, many

factors, such as culture, can be used to overcome vaccine hesitancy or justify refusal. Furthermore, the community members engaged in this research do not perceive empathy to be a consistent component of vaccine confidence promotion. Vaccination-promoting social media posts that are entirely developed by community appear to perform better than those that are, partially or entirely, developed externally. While the sample size small, the six posts developed, and piloted, during this research had a mean of 0.(66) 🗳️ likes and 46.1(66) 🗳️ views. The six community-developed posts that most closely preceded this research had a mean of 2.(33) 🗳️ likes and 64.(66) views.”

### ENGAGE COMMUNITIES EARLY

An initial phase of engaging communities directly and gathering input from the target population helped to ensure the later success of the project. In particular, this phase helped to avoid the extractive nature and ensured that they were relevant and took local socio-cultural factors into account. Identifying key narratives trusted community members or motivations as well as defining specific concerns and fears around vaccination were key in many projects. It also helped to identify specific unmet needs or barriers in these communities. Collecting this early information also helped researchers to better assess how the interventions were received. “Building trusting relationships and encouraging stakeholders’ ownership over a project early on is crucial for successful collaboration.”<sup>50</sup>

49 Morning Star Lodge, “Where Past Meets Present: Understanding COVID-19 Vaccine Hesitancy among Indigenous Peoples in Saskatchewan.”

50 The Behavioural Insights Team, “Designing and testing a WhatsApp chatbot to increase Covid-19 vaccination bookings in Argentina.”

## MIXED-METHOD RESEARCH PROVIDED RICH FINDINGS

Many projects took a mixed method approach, combining qualitative interviews, human-centered design solution development, quantitative solutions, and lever testing. This combination of approaches and research provided a much richer and holistic view of the challenge of vaccine hesitancy.<sup>51</sup> It also allowed researchers to create more persuasive narratives and demonstrate the effectiveness of identifying culturally situated discourses to amplify organic community narratives to boost vaccine confidence.

Another study had significant results in increasing vaccine uptake through a mixed methods approach. “IRD initiated project Boost in three high-risk districts in Karachi, Pakistan, employing participatory engagement to build user informed social media campaigns around COVID-19 vaccine confidence. From October 2021 to June 2022, the project leveraged six online platforms (WhatsApp, Facebook, Instagram, Twitter, TikTok, and Snack Video) to capture diverse audiences from the identified districts and ran multiple online campaigns, utilizing user-informed content, based on social barriers faced by communities during the pandemic. The project supplemented these online efforts via immersive on-ground activities, including Theatre of the Oppressed performances, health

education, and various Below-The-Line (BTL) activations. Six online groups were developed (mixed gender on Facebook and women-only on WhatsApp) with 1,425 members, stimulating dialogue and dissemination. Moreover, the on-ground team engaged over 5,700 people across the catchment areas through on ground sessions and BTL activities. Through these efforts, 1,039 people availed COVID-19 vaccines through mobile camps held in the selected districts. It was noted that a strategy bridging online engagement with on-ground activities highlighting the efficacy of vaccines to restore normalcy in a post-pandemic world garnered public interest and uptake of vaccines. Thus, participatory approaches embedded in outreach efforts ensure inclusion of otherwise neglected narratives in-person and through various social media.”<sup>52</sup>

**“Through these efforts, 1,039 people availed COVID-19 vaccines through mobile camps held in the selected districts.”**

51 Upstream Thinking, LLC, with Final Mile Consulting, “Redirecting existing demand for information towards vaccine confident interpretation by identifying online behavioral nudge interventions,” and Oklahoma State University, with the MESA Group, “Modeling Vaccine Confidence Interventions for Marginalized Migrant Communities: A Mixed Method Approach to Leveraging Social Media Narratives.”

52 IRD Global, “Boost: Building vibrant online communities to support COVID-19 vaccine uptake through participatory engagement principles.”

## LOW INTERNET PENETRATION

While social media is a key tool for those who have access to technology and bandwidth, some communities remain hard to reach. When data in these communities were limited, researchers combined findings with additional, more traditional sources of non-digital information that helped to validate or expand findings. As one grantee noted, “though access to technology is increasing, it will continue to be a limiting factor for millions, especially for women with limited literacy and numeracy skills.”<sup>53</sup> “Due to low mobile network coverage and low infrastructure development with telecommunications in Cameroon, the internet remains very expensive and limited so in-person interviews were required for data collection. Interview fieldwork in Cameroon had to overcome more difficulties related to training, research delays, and travel restrictions due to safety concerns. The geographical characteristics led to long-distance travel for the data collection team to reach the selected communes in the regions.”<sup>54</sup>

## GROUP MODERATION

As a further grantee noted, “moderating large groups is a full-time job. Not every comment requires a response and may be counterproductive.”<sup>55</sup> Several grantees noted the difficulty of striking the right balance between listening and sharing information, as well as when to ignore or even remove participants that may be introducing controversial or extreme viewpoints. Bringing in a professional facilitator was another approach to ensuring conversations were productive and a positive experience for participants.

## ENGAGING AND RECRUITING PARTICIPANTS

The area of health-focused research in social media is a fairly new one, and our researchers encountered a few issues around social media accounts, blocked ads, data protection laws, ethics requirements, and navigating recruitment. Partnering with an organization that has experience in these areas, or creating multi-disciplinary teams is a useful approach to be able to include a variety of expertise. Reaching the right audience within the confines of social media platforms and social media advertising was also a learning process. For example, focusing on zip codes rather than demographics was a necessity given the tools available. Actual engagement that was relevant and motivating to those suffering from “COVID fatigue” was a key factor in participation. Finally, relevant narratives and understanding what drives local communities was an important way to surmount this issue.

“The importance of collaborative solution design should not be underestimated. Co-designing with local partners and citizens through joint working sessions, focus groups, and user testing, led to significant improvements in the chatbot design. Using WhatsApp as a means to send official communications from a Ministry of Health comes with the challenge of creating trust in the service. Fear of scams and distrust in digital communication pose implementation risks that should be mitigated.”<sup>56</sup> Developing and hosting a WhatsApp chatbot using government IT systems may present technical challenges and requires local partners to be dedicated to the success of the project.

53 Minority Rights Group, with Grand Synergy Development Initiative (GSDI), Verite Research Pvt Limited, Bytes for All, “Diversity: Impact on Vaccine Equality (DIVE).”

54 Center for Media Engagement at the University of Texas at Austin, “Leveraging moral values and social media to boost vaccine confidence and overcome medical mistrust and historical racism among Black populations in the U.S. and Cameroon.”

55 David A. Broniatowski and Lorien C. Abrams, “Empathetic Engagement with the Vaccine Hesitant in Online Spaces”

56 The Behavioural Insights Team, “Designing and testing a WhatsApp chatbot to increase Covid-19 vaccination bookings in Argentina.”

## RESPONDING TO CHANGING CIRCUMSTANCES

“Given the quickly-changing nature of the pandemic, modifications to local COVID-19 vaccination protocols are to be expected and affect intervention design. Staying informed about planned changes and allowing for flexibility in the intervention design is key to success.” Furthermore, “People’s health-related perceptions and behaviors change rapidly as the pandemic evolves. Research and intervention design must be updated to the changing circumstances. Using non-standard qualitative research techniques (e.g., reviewing comment sections of vaccine clinic Google listings) can generate rapid insights, which can later be validated through in-person field research activities.”<sup>57</sup>



PHOTO: SHUJAAZ

### ▲ INFLUENCERS INFLUENCING

Posing at a ShujaaZ event for the social media vaccination campaign, young influencers show off their vaccination status.

57 The Behavioural Insights Team, “Designing and testing a WhatsApp chatbot to increase Covid-19 vaccination bookings in Argentina.”

# THE WAY FORWARD

## WHAT CAN STAKEHOLDERS DO?

Aligning vaccine interventions with the needs of the vaccine hesitant and unvaccinated is key in increasing vaccine confidence and uptake. Governments, health authorities, researchers, and other stakeholders can play a key role in increasing vaccine confidence through social media.

### COMMUNITY ENGAGEMENT

- Involve communities, or local organizations, particularly those in hard-to-reach or marginalized communities, at every step, including in the study or technology design as well as implementation. To be most effective, these should be adapted to the realities of each community or population it is trying to serve. This should include the language and images used, but also the social-cultural and gender norms, the kinds of misinformation circulating, and the specific concerns of the community.
- Researchers can also pair with policymakers from the beginning of their projects to ensure that their findings get translated into policy and become actionable at the local, state, and if appropriate, national level.
- Partner with local organizations to help plan, understand, and implement programming.
- Consider amplifying existing expressions of vaccine confidence from within the community as hearing from individuals trusted in the community can have a more significant impact.

### LISTENING TO NEEDS

- Provide information to help individuals make their own decisions rather than seeking to instruct. This can mean sharing positive and negatives in an unbiased fashion that is still supportive of vaccines.
- Where possible, provide a platform for small group dialogues and peer support for targeted communities and provide relevant moderation.
- Where distrust exists between local populations and health authorities or government, extra efforts should be made to involve trusted figures to convey key information and rebuild trust.
- Seek to understand social and accessibility barriers to vaccination.

#### PEER CONFIDENCE

Targeting Older Generations? Screen capture from a social media campaign from the International Longevity Center exploring intergenerational relations in increasing routine vaccinations.



**Have You Discussed The Jab Yet?**

## GOVERNMENTS

Governments play a key role in health campaigns, creating access to vaccines and shaping the political environment for or against vaccinations. As can be seen in the results from the study conducted by the University of North Carolina at Chapel Hill, sharing content with politicians endorsing vaccines resulted in an uptick in vaccinations in those counties that received the messaging.<sup>58</sup>

- Another study conducted by Macro-Eyes, Inc., noted the key role that governments and health officials can play and the importance of monitoring. “(T)he use of social media to monitor and respond to public sentiment around vaccines is a valuable tool for health officials and allows health officials to get an accurate picture of public sentiment surrounding vaccines. This information can help precision allocation of resources during vaccination campaigns, including how and when to roll out vaccinations to specific populations. In addition, we have discovered that using specific platforms (such as Facebook) for this purpose is more effective than others (such as Twitter). This information could be used by public health officials to develop targeted outreach campaigns in order to improve vaccination rates among at-risk populations.”<sup>59</sup>

*“(O)ver 1,000 low vaccination counties to receive the “Trump treatment” along with another set of 1,000 plus similar counties that would not receive it. We ran the PSA for three weeks, and then compared whether vaccinations increased in the counties that got the Trump vaccine endorsement PSA compared with those that did not.” ... “They did. By a lot. The average county that got the ad recorded an increase of 103 vaccinations more than the counties we did not treat. With over 1000 counties getting the Trump endorsement, that translates into better than 100,000 more vaccines. Our ad budget was slightly less than \$100,000 dollars, which means that the cost of each new vaccine was less than a dollar. That is far more efficient than other efforts that states tried to increase vaccine uptake such as lotteries.”*

University of North Carolina at Chapel Hill, Rahsaan Daniel Maxwell,  
Targeted Vaccine PSAs Based on Political Science and Economic Insights

*“Effective health communication balances the old and the new: sound conceptual ideas that have guided research and practice for many years with rapidly evolving and algorithm-driven information landscape that can greatly enhance reach and outreach. Health communicators have known for a long time that effective communication requires understanding the audience; tailoring messages according to audience members’ needs and expectations; using credible and trustworthy sources to disseminate messages; and being sensitive to cultural nuances that affect message interpretation. These considerations remain as important as ever.”*

John Hopkins University, A Social Media Approach to Young People  
in India Serving as COVID-19 Vaccine Advocates

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58 University of North Carolina at Chapel Hill, Rahsaan Daniel Maxwell, “Targeted Vaccine PSAs Based on Political Science and Economic Insights.”

59 Macro-Eyes, Inc., “Predicting vaccine hesitancy among eligible communities in Western Cape Province, South Africa.”

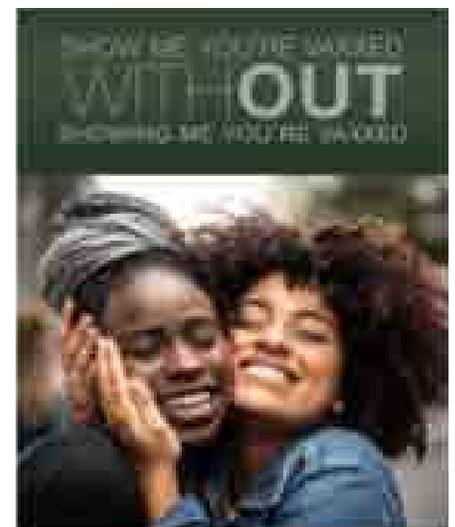
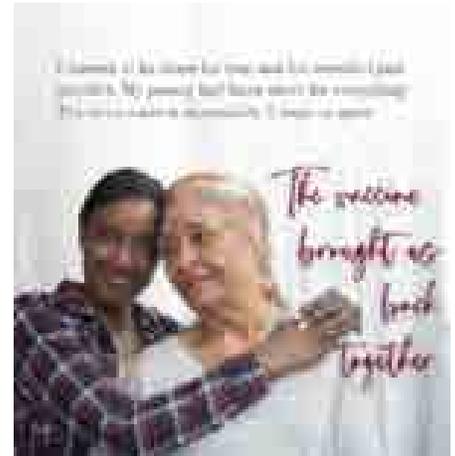
## HEALTH ORGANIZATIONS

Health organizations, both governmental, medical or advocacy in nature have a large role to play in vaccinations. It is clear that the more investment is made in understanding the particular attributes of a community and their particular hesitancy, as well as monitoring and adjusting to changes, the more effective and efficient the roll out.

*“Learning sentiment through leveraging of public social media data can also help identify any areas where there may be opposition or hesitancy towards getting vaccinated, so that these issues can be addressed directly by health officials. Additionally, tracking social media chatter provides a way for health officials to quickly address any concerns or misinformation that may arise online about vaccines. Doing so helps ensure that people are accurately informed about the safety and benefits of vaccinating themselves and their families. Our analysis found that both sentiment analysis (measuring public confidence) and spatial accessibility (measuring ease of access) are important indicators for understanding why some communities may be hesitant about getting vaccinated.”<sup>60</sup>*

*“A key reason for vaccine hesitancy within Black communities is the distrust of medical advice from the government and the public health system. Health campaigns in the future should make it a high priority to address this issue. Our results indicate that grass-roots campaigns on social media have good potential for reaching many Black Americans. Those campaigns should target social networks in which Black Americans have a strong level of trust. We note that while Twitter is currently trusted, this may change over the next year due to its change of ownership. We have a number of recommendations about the types of content which would work best in grassroots campaigns. 1. We found that campaigns that are personally relatable work best. For example, those that use images of people and tell personal stories. 2. Avoid campaigns intended to leverage fear responses. For instance, images that contain portrayals of ill or dead people.”<sup>61</sup>*

*“It is clear that as policy makers and health institutions look towards increasing vaccine efforts, it will be important to examine and understand the specific drivers of vaccine hesitancy for each group and tailor the approaches to address the level of hesitancy and the reason for it.”<sup>62</sup> Providing small online groups or webinars, where concerns can be addressed in real time and information is tailored and focus on the bottom line impact of COVID-19, may be a useful tool to increase vaccine confidence. Finally, when working to increase vaccine demand, it is vital that the supply side is also considered. Increased demand, without increased or adequate supply may do more damage by eroding trust in the healthcare system. Creating greater demand increases vaccinations, as long as there are vaccines available.*



### ▲ VACCINE PROMOTION VIA TWITTER

The Indiana University Observatory on Social Media.

60 Macro-Eyes, Inc., “Predicting vaccine hesitancy among eligible communities in Western Cape Province, South Africa.”

61 The Indiana University Observatory on Social Media, “The Black and Thriving Project”: The use of message framing and social contagion to promote vaccines in African American communities.”

62 University of Washington, Institute for Health Metrics and Evaluation, “Using social media to identify drivers of COVID-19 vaccine hesitancy in the US by county and ZIP code.”

## NGOS

For several studies, the role of community organization and local NGOs played a key role as community ambassadors. NGOs also can play a key role at a local, national, and international level via advocacy and engagement to increase vaccine confidence.

A study conducted by UCSF Guatemala provided some very useful recommendations for community organizations:

1. **Community based organizations have pre-existing priorities and projects that may compete for time and human resources.** Thus, any project under development must be designed to ensure the research, and potential implementation project developed from that research, serves the organization's purpose and mission from the beginning.
2. **Research-informed interventions can increase activity effectiveness.** Research can help guide CBOs towards more efficient and effective targeting of interventions.
3. **Trust is critical.** Numerous interviews and focus groups indicated that local healthcare workers, including community health workers, and local councils, were trusted sources of information. Understanding local dynamics around who is trusted and why, can allow for better targeting of resources. Trusted community organizations and leaders can likely have an outsized impact on lives when trust in central government is low.
4. **Technology and social media can be leveraged to change behaviors.** As social media use increases in historically marginalized communities, it can be used as a platform for community organizations and leaders to communicate and influence health decision making.

"The Black and Thriving Project": The use of message framing and social contagion to promote vaccines in African American communities

5. **Community voices MUST be front and central in dissemination activities.** Ensuring community partners are leading the way on podcasts, interviews with press, and are active members and authors on journal article writing teams is critical for appropriate recognition, capacity building, and continuity."<sup>63</sup>

## RESEARCHERS

- **Invest in the technical infrastructure necessary to run complex campaigns and multi-stage surveys in developing country contexts.** The rationale for our target geographies was the paucity of rigorous online experiments in these contexts. As a result, we also had to build the online campaigns and experiments infrastructure from scratch in parallel with implementing an ambitious multi-country study. A key hurdle was figuring how to process thousands of small survey payments and incentives across geographies with different policies in a cost-effective way. Investment in infrastructure will continue to serve and expand for future studies, but it was a big challenge to build out and required dedicated engineering, technical resources, time, and changes to our study protocol.<sup>64</sup>
- **Including studies on specific populations and their needs.** As recommended by the University of Antwerp: "including pregnant and lactating women in pre-marketing clinical trials should be encouraged since lack of testing on this target group is one of the reasons why women doubt or refuse to get vaccinated during pregnancy or lactation."<sup>65</sup>

63 Institute for Global Health Sciences, UCSF, "Who to trust: combating COVID-19 vaccine misinformation through trusted messengers and social networks in indigenous communities in Guatemala."

64 Busara Center for Behavioral Economics, "Crowdsourcing content to combat misinformation in the Global South."

65 University of Antwerp, "Research to increase confidence in maternal vaccination by digital communication interventions."

## AREAS OF NEEDED RESEARCH

VCF represented a first step for much of this research, but further exploration is needed. Advancing Health Online (AHO) disseminated a survey to grantees and valued partners to collect external input to help sharpen the second research program. Areas of needed research, as identified by survey respondents, have been detailed below.

- Two primary research themes emerged when respondents were asked what research focus would be most conducive to advancing AHO's goal of increasing the understanding of the impact social media has on health outcomes and resilient communities:
  - » Influencing social norms, and
  - » Driving community and health care provider engagement.
- Furthermore, two additional underpinning priorities were articulated and should be considered across all research:
  - » Equity – better target and measure impact related to reaching and impacting under-served groups and ethnic minorities, and
  - » Closed-loop feedback – vaccine message exposure should be causally linked with actual vaccine uptake.
- Respondents were split roughly 50/50 on whether the next research program should focus on idea generation or implementation science, with several emphasizing that there is a strong need for both. Respondents agreed that the next round of research should support closed-loop feedback. To ensure closed-loop feedback can be collected and measured, participants recommend:
  - » Rigid requirement for causal identification strategies,
  - » Real-time involvement and engagement of key stakeholders and experts, Agreements with local or central governments or entities to integrate or share data in order to help validate uptake and/or vaccinations from research, and
  - » More time to run focus groups before and after campaigns, such as representative samples, quick surveys to ask about action, and better links to book vaccinations.

## PATH FORWARD FOR ADVANCING HEALTH ONLINE

The Vaccine Confidence Fund was AHO's first program to meet the urgency of the COVID-19 pandemic. Our goal with the VCF was to help accelerate a body of research and insights that would inform mass vaccination campaigns and seek to address vaccine confidence amid the need to vaccinate the global population. We were also committed to moving quickly and simultaneously working with key partners to disseminate evidence and insights on this topic to ensure vaccination campaigns were more impactful. This commitment further assists in increasing vaccine confidence within underserved and underrepresented communities.

Looking forward, AHO is announcing a new call to action with another round of funding to support research on vaccine confidence with a strong emphasis on routine immunizations. The call for proposals will focus on two target populations, healthcare workers and local communities, and will seek to improve understanding on how they can be supported to drive positive health actions via social media engagement and build vaccine confidence around COVID-19 vaccines and routine immunizations.



▲ **VACCINATING YOUTH CHAMPIONS**

A vaccination is given by a Kenyan Ministry of Health nurse at a vaccination drive by Shujaaz.

# INDIVIDUAL GRANTEE REPORTS

Each grantee was asked to share a high-level update on the status of their respective research. These updates can be found below.

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*Emphatic Engagement with the Vaccine Hesitant in Online Spaces*

**48**

**19 To Zero Inc.**

*Novel Use of Natural Language Processing to Analyze Vaccine Attitudes on Social Media and Create Vaccine Confidence Messaging for Vulnerable Communities*

**51**

**Busara Center for Behavioral Economics**

*Crowdsourcing content to combat misinformation in the Global South*

**53**

**Center for Media Engagement at the University of Texas at Austin**

*Leveraging moral values and social media to boost vaccine confidence and overcome medical mistrust and historical racism among Black populations in the U.S. and Cameroon*

**57**

**Corowa-kun**

*Impact of a LINE chatbot and a webinar on COVID-19 vaccine intention and vaccine confidence in Japan: a Randomized Controlled Trial*

**59**

**Grameen Foundation India Pvt Limited**

*D-VACSI: Driving Vaccination Confidence through Social Media Innovations*

**62**

**Institute for Global Health Sciences, University of California, San Francisco**

*Who to trust: combating COVID-19 vaccine misinformation through trusted messengers and social networks in indigenous communities in Guatemala*

**64**

**Institute of Tropical Medicine Antwerp**

*Cultivating Online Safe Spaces: Addressing unspoken hesitancy to build vaccine confidence in healthcare workers in Belgium*

**66**

**International Longevity Centre**

*Generation Vax – Leveraging intergenerational relations to increase vaccination uptake*

**68**

**IRD Global**

*Boost: Building vibrant online communities to support COVID-19 vaccine uptake through participatory engagement principles*

**71**

**Johns Hopkins University**

*A Social Media Approach to Young People in India Serving as COVID-19 Vaccine Advocates*

**74**

**Jonathan Yong Lee (Individual) - Stanford University**

*Evaluating the Frequency and Effectiveness of Common Rhetorical Strategies Used to Attack and Defend the Trustworthiness of Public Health Institutions*

**76**

**Laboratory of Data Discovery for Health (D24H)**

*Development and impact assessment of a conversational AI service (chatbot) on Covid-19 vaccine confidence and uptake*

**78**

**Macro-Eyes, Inc.**

*Predicting vaccine hesitancy among eligible communities in Western Cape Province, South Africa*

**81**

**Mali Health**

*Use of voice-based social media messages to improve vaccination knowledge and confidence in underserved peri-urban communities*

**83**

**Minority Rights Group**

*Diversity: Impact on Vaccine Equality (DIVE)*

**85**

**Morning Star Lodge**

*Where Past Meets Present: Understanding COVID-19 Vaccine Hesitancy among Indigenous Peoples in Saskatchewan*

**88**

**Oklahoma State University**

*Modeling Vaccine Confidence Interventions for Marginalized Migrant Communities: A Mixed Method Approach to Leveraging Social Media Narratives*

**90****ORB International**

*Exploring drivers of HPV vaccine confidence and community-led solutions leveraging the experiences of mothers, daughters, and health-care providers in Brazil*

**92****Purpose Campaigns LLC**

*Harnessing virality for vaccine confidence: testing tactics to optimize sharing of pro vaccine content between WhatsApp and traditional social media platform*

**94****RMIT University**

*Modeling vaccine-related information to create hybrid information hubs for people with disabilities in Vietnam and Indonesia*

**97****Shujaaz Inc.**

*TUNAJENGANA: Using Social Media to Mobilize Young East Africans to Champion Community Uptake of Covid-19 Vaccines*

**100****The Behavioural Insights Team**

*Designing and testing a WhatsApp chatbot to increase Covid-19 vaccination bookings in Argentina*

**103****The Indiana University Observatory on Social Media**

*"The Black and Thriving Project": The use of message framing and social contagion to promote vaccines in African American communities*

**105****Unity Consortium**

*Study on Activating Vaccine Supportive Parents of Adolescents and Young Adults as Trusted Voices on social media*

**107****University of Antwerp**

*Research to increase confidence in maternal vaccination by digital communication interventions*

**109****University of California, San Francisco**

*WhatsApp Bots for Overcoming Vaccine Misinformation and Increasing Vaccine Confidence among Pregnant Women in Northern India: Development and Impact Assessment*

**111****University of Chicago**

*Testing interventions to address vaccine hesitancy on Facebook in East and West Africa*

**114****University of Chicago, Department of Economics**

*Positive reinforcement of online and offline social signaling to accelerate COVID vaccine Uptake*

**116****University of North Carolina at Chapel Hill**

*Targeted Vaccine PSAs Based on Political Science and Economic Insights*

**118****University of Washington (Department of Human Centered Design & Engineering)**

*Large-scale Studies to Advance Public's Access and Trust of COVID-19 Vaccine Research on social media*

**120****University of Washington (Institute for Health Metrics and Evaluation)**

*Using social media to identify drivers of COVID-19 vaccine hesitancy in the US by county and ZIP code*

**122****Upstream Thinking**

*Redirecting Existing Demand for Information Towards Vaccine Confident Interpretation by Identifying Online Behavioral Nudge Interventions*

**124**

# EMPATHETIC ENGAGEMENT WITH THE VACCINE HESITANT IN ONLINE SPACES

## ORGANIZATION NAME

The George Washington University

David A. Broniatowski, Associate Professor of Engineering Management and Systems Engineering, and Lorien C. Abrams, Professor of Prevention and Community Health

## GEOGRAPHY

USA

## FOCUS POPULATION

Unvaccinated individuals

## METHODOLOGY TYPE

Randomized Controlled Trial



## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

We propose to reduce vaccine hesitancy online using the microtargeting abilities and community structure of social media platforms to better understand the concerns of the vaccine hesitant. We hypothesize that effective communication builds trust by addressing the gist of their concerns. Here, we propose to deploy the GW Health Communication Volunteer Corps — a trained service group for disseminating evidence-based health information to test this hypothesis.

## KEY FINDINGS

We hypothesized that participants randomized to the intervention group would develop attitudes more in favor of COVID-19 vaccination, have greater intentions to get vaccinated, and would be more likely to be vaccinated at the end of the study compared to the control group. Analysis of data from our trials is ongoing.

Preliminary data suggests sharing information about vaccines with unvaccinated individuals in private Facebook groups may improve vaccine confidence and may be sufficient to convince a small number to vaccinate, even among some of the most resistant individuals. Nevertheless, widespread distrust remains

**Private vaccine education groups on Facebook may help unvaccinated individuals increase their intentions to get vaccinated.**

a key barrier: personal experiences, and pandemic fatigue led some to continue to refuse vaccination. For example, we encountered several people suffering from long-COVID symptoms who nevertheless stood by their decision to remain unvaccinated and others who stated there was nothing that could be said to change their vaccination position. For people who fall into this category, pro-vaccine content is often viewed as an attempt to push a political agenda and dismissed as propaganda.

Beyond increasing vaccine trust and confidence, improving vaccine uptake may rely on communicating the bottom-line consequences (gist) of not vaccinating in a manner that helps them to contextualize the decision in terms of their values (which must be determined through a sustained process of listening to their concerns). This is especially important when communicating to those who have already recovered from past infections and thus believe COVID to be a low-risk illness. In particular, we encountered many people who were misinformed or unaware of a variety of topics (e.g., long-COVID symptoms, long-term vaccination side effects, the inherent variability of natural immunity). Addressing these misconceptions led several people to vaccinate due to the knowledge they gained through our program. Others ended the program with higher levels of trust and confidence in the vaccine.

## KEY PROCESS INSIGHTS

Key insights from this pilot are that it is feasible to conduct vaccine education groups on Facebook; that it is feasible to recruit for these groups via Amazon Mechanical Turk, randomize participants to intervention and control, have participants join groups, and complete follow-up surveys with high follow up rates (e.g., <80%). Participants remained engaged for the duration of the intervention (1 month).

Contrary to our expectations, we found that group members supported Facebook group moderation policies to limit political commentary and ban strident anti-vaccine comments perceived as uncivil. Most group members took appropriate corrective actions in response to moderation actions (i.e., they followed the community rules after being corrected), but a small number did not. Removing these individuals from the group was necessary to maintain a nonjudgmental space where people felt comfortable asking questions and sharing their viewpoints.

Moderating large groups is a full-time job. Not every comment requires a response and may be counter-productive. As the study progressed, we settled on the middle-ground approach of not replying to every comment and creating separate discussion threads on commonly expressed concerns. From the moderation perspective, there is also the challenge of striking the right balance between deciding when to bring up vaccination and simply listening to concerns and expressing empathy.

Question	Baseline	2-week	4-week	6-week
How likely are you to get a COVID-19 vaccine in the next month?	Not at all likely			
Since joining this study, have you been vaccinated for COVID-19?		Yes; 1 dose	Yes; 1 dose	Yes; 2 doses
How much do you trust the COVID-19 vaccine?	1 – Not at all	4	5 - Completely	
Do you think the COVID-19 vaccine is safe?	1 - Not at all	4	5 - Completely	
Do you think the COVID-19 vaccine is effective?	2	5	5 - Completely	
Overall, for you, which of the following best describes the RISKS of getting COVID-19?	Low	High	High	High
Excerpts from free text responses		I liked that no one was judgmental and that there was plenty of helpful information to help the people that are on the fence.	Through the group I found out that I was misinformed about a lot of the information that had me on the fence about the vaccination.	I was on the fence about the safety of the covid vaccination, this group helped me pick a side. I was concerned about side affects. The moderators showed me that the vaccination is safe.

### ▲ VACCINATION PROGRESSION, SURVEY RESPONSES

Baseline, 2-, 4-, and 6-week survey responses demonstrating the progression of one subjects' vaccination perspective.

## RECOMMENDATIONS

We found that a strategy of first looking for areas of agreement was far more effective than trying to “win arguments”. As predicted, we found that we made more progress when we didn’t “take the bait” of arguing numbers and verbatim details, but rather emphasized the *gist*, or bottom-line takeaway, of the risks of COVID and the benefits of vaccination.

Future research may investigate a similar methodology with a larger number of participants. Additionally, future research may investigate message frames used in groups (e.g., gist vs. fact-checking) to assess the hypothesis that gist-based messages will outperform fact-based messages, group size (e.g., 50 vs. 150 participants/group) to assess the hypothesis that smaller groups are more effective than larger ones, participant access to Facebook features (e.g., participants can post and comment vs. comment only) to assess the hypothesis that more control for moderators is more effective than less control, and composition of groups (e.g., unvaccinated only vs. mix of vaccinated/partially vaccinated and unvaccinated) to assess the hypothesis that a mix of vaccination statuses is more effective than a homogenous unvaccinated group.

## FEEDBACK ON INFORMATIVE CIVIL FORUM

A civil forum provided participants the opportunity to share and receive information about COVID-19 vaccines.



## VALUE IN PRIVATE VACCINE EDUCATION GROUPS

Participants of private vaccine education groups on Facebook found value in the information provided.



# NOVEL USE OF NATURAL LANGUAGE PROCESSING TO ANALYZE VACCINE ATTITUDES ON SOCIAL MEDIA AND CREATE VACCINE CONFIDENCE MESSAGING FOR VULNERABLE COMMUNITIES

## ORGANIZATION NAME

19 to Zero Inc.

## GEOGRAPHY

Canada, USA

## FOCUS POPULATION

Black, Indigenous, Latinx, and LGBTQ+ communities

## METHODOLOGY TYPE

Supervised machine learning to identify marginalized community Twitter accounts and Tweets; unsupervised clustering model and topic analysis.



## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

Understanding and tackling social media sentiment is critical to increasing vaccine uptake, particularly in vulnerable populations. In conjunction with community partners, we will use Natural Language Processing algorithms to systematically analyze sentiment in specific vulnerable populations and work to develop effective messaging to promote vaccination.

## KEY FINDINGS

From the supervised machine learning model, we identified 2156 Black, 5198 Indigenous, 10123 Latinx, 14454 LGBTQ+ Twitter accounts and 10958 Black, 17674 Indigenous, 38476 Latinx, and 56195 LGBTQ+ tweets. First, among Black, Indigenous, and Latinx groups, mistrust in institutions and elites was the prominent theme in the vaccine hesitant conversations, which may be rooted in historical mistrust and systemic racism. Second, the topic analysis showed that the LGBTQ+ community also expressed concerns for vaccine safety and mistrust in institutions within the vaccine hesitant discussions. Third, contrary to vaccine hesitant individuals, vaccine confident members within marginalized communities were predominantly concerned about vaccine access, reflecting inequities in vaccine distribution.

Overall, machine learning can be used to identify attitudes towards COVID-19 vaccines among marginalized populations on Twitter. By leveraging the computational power of machine learning, large volumes of social media datasets can be analyzed to inform public health decision making, empower policy makers, and enhance vaccine confidence among marginalized groups.

**Our research used machine learning to identify themes surrounding COVID-19 vaccines on social media among marginalized communities, which can be used to enhance vaccine confidence and access.**

## KEY PROCESS INSIGHTS

To effectively use machine learning insights to guide decision making, one key principle is the concept of algorithm literacy. Often, artificial intelligence can be perceived as a “black box” by stakeholders unfamiliar with the technology. Although decision makers do not need to be experts in data analytics, insights should nevertheless be communicated in a way that is easily understood. Suggestions include using diagrams to highlight the inputs and outputs of the machine learning model, graphs to visualize the data, and annotations to highlight key insights behind the analysis. As the use of artificial intelligence continues to expand in the world of public health, it is integral that technical jargon is minimized to improve the effectiveness of AI in improving population health.

Due to the shifting nature of public health guidelines, community members have often expressed fatigue when it came to discussing COVID-19. However, we took measures to engage them in ways that emphasize the unique methodology of this project (i.e., AI-generated insights) and how it has wider implications for other health challenges. When it came to the principles of vaccine confidence messaging, we recognized that simply providing information was insufficient for behavioral change. Instead, actively listening to the voices of community members was key to building understanding and addressing their concerns. Furthermore, this feedback

from community members has allowed us to shift the way we approach our community engagement efforts: focusing on topics they care about first, considering their broader social and psychosocial supports and meeting them where they are.

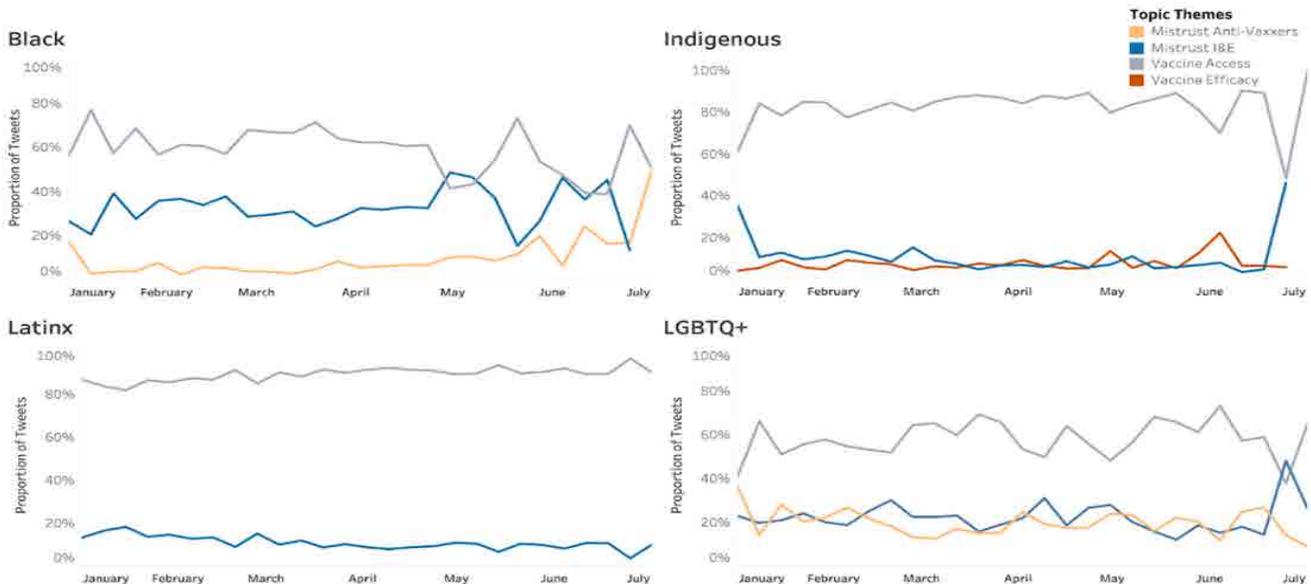
## RECOMMENDATIONS

Advocate for open-access data from social media companies (e.g., Twitter, Facebook) to enhance volume of inputs for machine learning. This can help improve accuracy of insights generated from natural language processing models. Increasing access (e.g., by reducing costs) for supplementary data points such as geolocation data for public health / prosocial initiatives can also help advance research efforts aimed at addressing inequities and improving health.

Establish and promote a Community of Practice among a wide set of stakeholders (governments, NGOs, healthcare providers) to support community partners in sharing/developing/tailoring materials for engaging with their members. Often, the rapidly changing nature of COVID-19, vaccines and therapeutics can be challenging for any one organization to overcome on their own. While there have been pockets of collaboration across the board, continuing to break down silos and enhance networks of support will be essential to reducing the burden that all stakeholders feel in building vaccine confidence.

## SENTIMENT ANALYSIS VACCINE CONFIDENCE

Sentiments around mistrust, access, and efficacy.



# CROWDSOURCING CONTENT TO IMPROVE VACCINE CONFIDENCE AND UPTAKE IN THE GLOBAL SOUTH

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## GEOGRAPHY

Kenya (primary), Nepal, Philippines



## FOCUS POPULATION

Social media users

## METHODOLOGY TYPE

Crowdsourcing videos and surveys; online news feed experiment and surveys

## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

We use a novel approach in crowdsourcing original content from social media users in Kenya, Nepal, and the Philippines to build and test locally-driven COVID-19 vaccine campaigns. First, it crowdsources social media content for different types of vaccine messaging. Second, it uses survey experiments to test which types of messaging are the most effective across country contexts. Third, it uses news feed experiments to evaluate the extent to which top messaging strategies are effective within a competitive information environment for each country. We use survey measures to track vaccine confidence and behavioral measures to track vaccine uptake.

## KEY FINDINGS

The study had two main research objectives: 1) Feasibility of crowdsourcing COVID-19 video content from social media users; 2) Test if local vs. international COVID-19 video content is more effective across contexts to increase vaccine willingness and misinformation.

**Crowdsourcing local science-based video content to address vaccine hesitancy and misinformation is challenging but possible.**

The first objective was tested rigorously in Kenya, our primary country context, with the following high-level results:

- **Social media users watch videos and can answer questions on the content** (a proxy measure for if people watch videos and pay attention). In a survey of 12,000 users, a majority of video watchers (90%) correctly answered a content question on the video.
- **It is possible to run targeted campaigns on social media where you get random people to create a video focused on a specific issue.** Of 4,400 social media users who submitted a test video, around ~450 people uploaded a persuasive video to help get people vaccinated.
- **Crowdsourced video content improves when instructional infographics are provided** about how to film a good video, including tips on lighting, sound, framing, and eye-contact.
- **A survey of people who produce videos suggests that this group have strong beliefs about what messaging they think will be persuasive.** For instance, they think positive videos are more convincing (75%) than negative videos, and that videos of women are better at convincing men and that men are better at convincing women.
- Perhaps unsurprisingly, **people who submit videos come up with creative and intuitive strategies to persuade people** that are consistent with behavioral theory. For example, highlighting social norms, downplaying risks, emphasizing social benefits and economic effects, peace of mind and stress reduction were all strategies that were used. Storytelling (e.g., people who were affected by COVID-19) was also used as a common motivator.

**1. LIGHTING:**  
MAKE SURE YOUR SURROUNDINGS ARE WELL LIT.

**2. AUDIO:**  
TAKE THE VIDEO IN A PLACE WHICH DOESN'T HAVE TOO MUCH BACKGROUND NOISE. ALSO ENSURE THAT YOU'RE NOT TALKING TOO QUIETLY.

**3. EYE CONTACT:**  
MAINTAIN EYE CONTACT WITH THE CAMERA, OR AT LEAST LOOK IN THE DIRECTION OF IT.

**4. FRAMING:**  
CHECK THAT YOUR HEAD IS FULLY IN THE FRAME, AND YOU'RE HOLDING THE PHONE A BIT HIGHER THAN YOUR EYE LEVEL.

**5. SHAKINESS:**  
HOLD THE CAMERA AS STILL AS YOU CAN, AND TRY TO AVOID WALKING AROUND.

**6. MULTIPLE TAKES:**  
SHOOT YOUR VIDEO MULTIPLE TIMES IF YOU NEED TO. MAKING SMALL ADJUSTMENTS TO ANGLES, LIGHTING, YOUR WORDS, AND SO ON. THIS WAY.

**ENSURING HIGH-QUALITY VIDEOS**

Providing infographics on capturing videos helped to ensure high-quality results.

Sourcing local content videos across contexts:

- **Replicating a smaller version of an online contest to source local content videos across Kenya, Nepal and the Philippines proved more challenging.** For example, spending the same in advertising across a set period (2-3 weeks) produced a few videos in Kenya and the Philippines, but no results in Nepal. Doubling the contest reward in Nepal also failed to produce more video content. As a result, we had to send individual messages to get locally produced videos in Nepal, as opposed to randomly through social media advertising. More on this in key process insights below.

For the second research objective on the effectiveness of local content against international content from the World Health Organization (WHO), we include below initial pilot baseline measures from Kenya. These measures are based on a small sample size and may change with additional data collection.

- With the current pilot sample, there is no treatment effect, so we can't compare across videos. We will need to complete the full study to see if these results hold or if the sample size is too small.
- We do have some findings about specific groups and individual videos. For example, initial results suggest that WHO content can be most effective.  
1) **Individuals who trust science are more likely to pledge to get a COVID-19 vaccine after seeing WHO content;** 2) **Individuals who know where to get a vaccine are more likely to agree with statements that they would go and get vaccinated for their friends and family after seeing WHO content.**

Additional follow ups and analysis are underway to further unpack these initial results, and we are also gaining input from stakeholder organizations to interpret these findings.

## KEY PROCESS INSIGHTS

Below we include key process lessons learned on the technical and the substantive side of running online video contests and surveys in our selected geographies:

- **Invest in the technical infrastructure necessary to run complex campaigns and multi-stage surveys in developing country contexts.** The rationale for our target geographies was the paucity of rigorous online experiments in these contexts. As a result, we also had to build the online campaigns and experiments infrastructure from scratch in parallel with implementing an ambitious multi-country study. A key hurdle was figuring how to process thousands of small survey payments and incentives across geographies with different policies in a cost-effective way. Investment in infrastructure will continue to serve and expand for future studies, but it was a big challenge to build out, and required dedicated engineering, technical resources, time, and changes to our study protocol.
- **Balancing the timeliness of crowd-sourced treatments with research timelines and processes.** The benefit of crowd-sourced content is its relevance and timeliness, but it took time between getting the videos and implementing the surveys. This reality, combined with the rapidly changing COVID-19 information ecosystem, made us question if the content was still appropriate and relevant (for example, the WHO treatment video on “herd immunity” may have lost persuasiveness over time). Our process here may have been too methodical or slow to capture the spirit and usefulness of crowdsourced content.
- **Adapting across contexts took experimentation, time, and did not always yield results.** Though social media usage numbers are comparable across Kenya and Nepal, with the Philippines leading in numbers, in practice it was much more challenging to replicate our process to obtain crowdsourced videos and build survey pools in each country. For example, despite contextualizing online advertisements in local languages, the same amount of money spent on ads in Kenya and the Philippines resulted in very little uptake in Nepal. Even doubling the compensation for video submissions did not impact engagement numbers. These contextual differences were important learnings and required iterative experimentation and adaptation of the study protocol. They also served as a justification for the country selection and replication, to build knowledge in and across these understudied contexts.

## RECOMMENDATIONS

We are currently in the process of getting feedback from various stakeholders and partners in-country on our initial results to further refine specific recommendations and messaging for health implementers. These early recommendations are preliminary and may undergo additional iterations. We welcome input or suggestions on their utility and applicability across contexts.

High-level:

- **To gather better insights into attitudes and behavior and to close the research gap, we need to invest heavily in online research infrastructure.**

Online social media and information campaigns will continue to be an increasingly important medium for public health outreach. To gain insights on effective public health messaging and compliance with health measures and policies, we need to invest in online infrastructure to better test messaging and behavioral outcomes. Technically, this requires better integration across social media, pixel tracking, survey platforms (e.g., Facebook and Qualtrics), and cost-efficient infrastructure for incentives and payments to respondents.

- **Sourcing local content is possible but challenging, and varies significantly by context.** To further test the utility of crowdsourcing requires resources, time, and patience for experimentation and adaptation. We had to play around with ad spend, incentives, and treatment instructions before seeing outputs in terms of videos and surveys. This exploratory process was repeated in each country's context to varying results. A comparable small-scale campaign run across countries was more successful in Kenya and the Philippines, and less so in Nepal. We were limited here because we could not find a cost-effective way to make survey payment for incentives across countries.

Substantive:

- **Build capacity to enable rapid testing for public health campaigns on social media with timeliness and relevance as priorities.** Social media and information ecosystems change rapidly, especially in the context of COVID-19 variants and pandemic developments, requiring flexibility and creativity. What we thought would be relevant and useful in the proposal stage changed significantly throughout the study period as international and local movements and variants led to rapid policy change around mask-wearing, lockdowns, curfews and travel, and resources (as well as attitudes) for vaccination. Crowdsourced content, which is timely and perhaps short-lived by nature, requires a shorter test horizon.
- **In Kenya, social media users watch and pay attention to videos online; they have strong beliefs of what makes for persuasive content.** In our primary study context of Kenya, a survey of people who produce videos for Facebook felt strongly that video content can persuade, that positive videos are more persuasive than negative ones, and that people of the opposite gender are more convincing messengers (i.e., women are better at convincing men).
- **To effectively target content-specific messages, we need to understand people's baseline beliefs.** Initial baseline pilot results show that some video campaigns might be more effective for certain subsets of the populations. We need to know more about people's baseline beliefs to effectively target content-specific messaging, requiring additional infrastructure and data.

# LEVERAGING MORAL VALUES AND SOCIAL MEDIA TO BOOST VACCINE CONFIDENCE AND OVERCOME MEDICAL MISTRUST AND HISTORICAL RACISM AMONG BLACK POPULATIONS IN THE U.S. AND CAMEROON

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## GEOGRAPHY

USA and Cameroon



## KEY PARTNERS

Viamo and YouGov

## FOCUS POPULATION

Black Americans and Cameroonians

## METHODOLOGY TYPE

Mixed methods: Survey and quasi-experimental

## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

For public-health campaigns to drive demonstrable reductions in vaccine hesitancy, messages must do more than fill a lack of knowledge - they must focus on the audience's deeply held beliefs. Our project addresses vaccine hesitancy among Black Americans and Black Africans. We assert that medical mistrust, doubts about vaccine efficacy, and perceived racism in health care are major sources of hesitancy. Informed by Moral Foundations Theory, we will collect panel survey data in the U.S. and Cameroon to explore vaccine hesitancy and medical mistrust. We will then develop and deliver morally resonant, historically sensitive social media interventions to reduce COVID-19 vaccine hesitancy and bolster vaccine uptake.

## KEY FINDINGS

Our preliminary results suggest three key findings for health communicators. First, COVID-19 is less of a concern in Cameroon. According to our survey results that were conducted in April 2022, about one in 20 (about 5%) Cameroonians believed they have had COVID-19, whereas one in five Black Americans (about 20%) believes that they've had COVID-19. Our sense is that this goes beyond the general lack of vaccine availability and relates to more deeply rooted between-country differences in culture and COVID-19 epidemiology.

Second, our survey results show that vaccine hesitancy and race-based medical mistrust vary between Black Americans and Cameroonians. Further, moral foundations theory subscales were inconsistent in reliability in the U.S. Black American samples. Specifically, in the U.S. the care/harm, fairness/cheating, purity/degradation foundations maintained a good reliability standard above 70%, but loyalty/betrayal ( $\alpha = .55$ ) and authority/subversion ( $\alpha = .67$ ) foundations did not. For the Cameroonian samples, however, the foundation

**For public-health campaigns to be effective in driving demonstrable reductions in vaccine hesitancy among Black people, social media messaging should be framed in a way that addresses variations in moral values, culture, and communities.**

subscales resulted in low reliability on all subscales, which ranged in alpha between 29% and 47%. This suggests that morally framed appeals may not work as intended in Cameroon.

Third, social media communicators should test artificial intelligence (AI). Our quasi-experimental study found that messaging deployed on Facebook that has been enhanced using AI can outperform human-generated communication. The results from our pilot study found that there was a statistically significant difference in impact of click-through-rate in the AI-mediated communication (AI-MC), which means that as more people were shown the ads with AI-MC, more people behaved with our goal in mind to click through and “learn more.”

### KEY PROCESS INSIGHTS

Our work uncovered insights related to key challenges of conducting our research in Africa. Some of these challenges were highlighted by our attempt to conduct and compare survey collections in both the U.S. and Cameroon. Due to low mobile network coverage and low infrastructure development with telecommunications in Cameroon, the internet remains very expensive and limited, so in-person interviews were required for data collection. Interview fieldwork in Cameroon had to overcome more difficulties related to training, research delays, and travel restrictions due to safety concerns. The geographical characteristics led to long-distance travel for the data collection team to reach the selected communes in the regions. Additionally, with a restricted mode of transport, interview teams often had to wait for a specific day of the week to travel to a particular

community. Two days of traveling was required most of the time to reach a locality. Security also was a concern, particularly in the northern portion of the nation, where insurgents are present. As a result, a state of emergency has been declared in the areas, prohibiting the data team from leaving at a specific hour of the day. For example, two nights are required before reaching the destination when traveling inside these localities, since night travel by bus or motorcycle is not safe. These are important realities when conducting comparative (between-country) research.

### RECOMMENDATIONS

Social media allows for detailed targeting, but interpreting and translating these insights into the targeting is crucial. Specifically, what are the beliefs and experiences that contribute to Black people’s psychological attributes, how do they vary across nations and communities, and what messaging will best resonate to encourage vaccine uptake? Vaccination rates in Black Americans are on the rise and are accelerating faster when compared to White Americans. However, in Cameroon, fewer people think they’ve had it, fewer people are vaccinated against it, and fewer people plan to get vaccinated. Health communicators have a bigger challenge in accelerating vaccine rates in Cameroon. Interestingly, of the moral foundation questions used in our survey, “vulnerability of others” seemed to perform similarly across CM/US suggesting that Cameroonians do express similar concern when people’s weaknesses are taken advantage of. Communicators could consider using a moral foundations of care framework in vaccine messaging that address our vulnerability to injury or inevitable dependencies (Miller, 2020).



**Medical mistrust, doubts about COVID-19 vaccine efficacy, and perceived racism in healthcare are the source of vaccine hesitancy (Bogart et al., 2021; Dinga, Sinda, & Titanji, 2021; Seydou, 2021).**



**Black Americans are especially accessible on social media, and use it in higher numbers than white Americans, with 74% of Black Americans on Facebook and 49% on Instagram (Auxier & Anderson, 2021).**



**Vaccine rates in Black Americans have accelerated suggesting that vaccine hesitancy is malleable, at least in the context of COVID-19 (Padamse et al., 2022).**



### BACKGROUND ON COVID-19 VACCINE RATES

Key factors for vaccine hesitancy in Black Americans.

# IMPACT OF A LINE CHATBOT AND A WEBINAR ON COVID-19 VACCINE INTENTION AND VACCINE CONFIDENCE IN JAPAN: A RANDOMIZED CONTROLLED TRIAL

## ORGANIZATION NAME

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## KEY PARTNERS

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## FOCUS POPULATION

Japanese persons who did not receive any COVID-19 vaccine and did not intend to receive it in the future

## GEOGRAPHY

Japan



## METHODOLOGY TYPE

3-arm randomized trial (control group vs. chatbot group vs. webinar group)

## SOCIAL MEDIA PLATFORM/S USED



Messenger app "LINE" for chatbot



"Zoom" for interactive webinars

## PROJECT SUMMARY

We conducted a three-arm randomized controlled trial. The study period was between 5 November 2021 and 9 January 2022. Japanese who were aged  $\geq 20$  and who had not received any COVID-19 vaccine and did not intend to be vaccinated against COVID-19 in the future were recruited and randomly assigned to one of the following three groups: (i) a control group (with no intervention), (ii) a group with a free chatbot in a popular messenger app called 'LINE', which provided general information on COVID-19 vaccines and (iii) a group with free webinars where health professionals interactively provided participants with the information on COVID-19 vaccines. The format of each webinar was the combination with a 10-minute presentation and a 20-minute live Q and A (up to a total of 60 minutes if 30 minutes were not enough to answer all questions).

We performed pre- and post-intervention cross-sectional surveys on all three groups to compare the change in the vaccine intention and Vaccine Confidence Index (VCI) before and after interventions between the control group vs. the chatbot group and the control group vs. the webinar group.

## KEY FINDINGS

A total of 1,158 persons who had not received COVID-19 vaccines and not intended to be vaccinated in the future were randomly assigned to three different groups: 386 participants in the control group, 386 in the chatbot, and 386 in the webinar group. The baseline characteristics and demographics were balanced across three groups for most variables measured.

**Interactive webinars with live Q and A provided by health professionals could have a role in increasing COVID-19 vaccine confidence.**

Among 386 persons assigned to the chatbot group, 237(61.4%) accessed and used the chatbot at least once during the study period. Of them, 231 (97.5%) answered the post-survey.359/386 (93.0%) in the control group answered the post-survey. There was no difference in the vaccine intention (the willingness to be vaccinated against COVID-19) in the post-survey between the chatbot and the control group (14.7% in the chatbot group and 18.7% in the control group). There was also no difference in VCI for the importance, safety, or effectiveness between the two groups.

Among 386 persons assigned to the webinar group, 215(55.7%) attended the webinars at least once. Of them, 207 (96.3%) answered the post-survey and compared to the control group. There was no difference in the vaccine intention in the post-survey between the webinar group and control group. (18.8% in the webinar group and 18.7% in the control group). The VCI for the importance and the effectiveness significantly increased in the webinar group compared to the control group. However, there was no difference in VCI for the safety between the two groups.

VCI for the importance and the effectiveness in the control group decreased without any intervention during the study period.

### KEY PROCESS INSIGHTS

Our randomized control trial demonstrated that neither the chatbot nor the webinar changed the vaccine intention (the willingness to be vaccinated against COVID-19) among those with COVID-19 vaccine hesitancy in Japan. However, VCI for the importance and the effectiveness significantly increased with the webinar intervention, whereas VCI for the safety did not change. The chatbot did not increase VCI. On the other hand, the more frequent use of the chatbot was associated with increased vaccine intention. In addition, VCI for the importance and effectiveness naturally decreased in the control group during the study period. It might suggest that the degree of vaccine hesitancy might worsen as time goes on in those who did not intend to be vaccinated against COVID-19.

Interactive webinars with live Q and A provided by professionals could have a role in increasing COVID-19 vaccine confidence.

### RECOMMENDATIONS

Our study revealed that webinars increased the Vaccine Confidence Index (VCI) for the importance and effectiveness of the COVID-19 vaccine. There are currently many webinars available for COVID-19 general information and vaccinations worldwide. However, most webinars are just presentations by professionals and have no opportunities for the audience to ask questions and get answers in a timely manner (mostly, webinars are just one-way communication [presenters -> audience]). We hypothesize that the interactive and relatively small-group webinar (with live Q and A between professionals and audience during the webinar) might effectively increase vaccine confidence. Local public health agencies and healthcare associations should consider more interactive webinars using local professionals, especially in areas with the low COVID-19 vaccine uptake.

### ▼ VACCINE INTENTION AND CONFIDENCE AFTER INTERVENTIONS

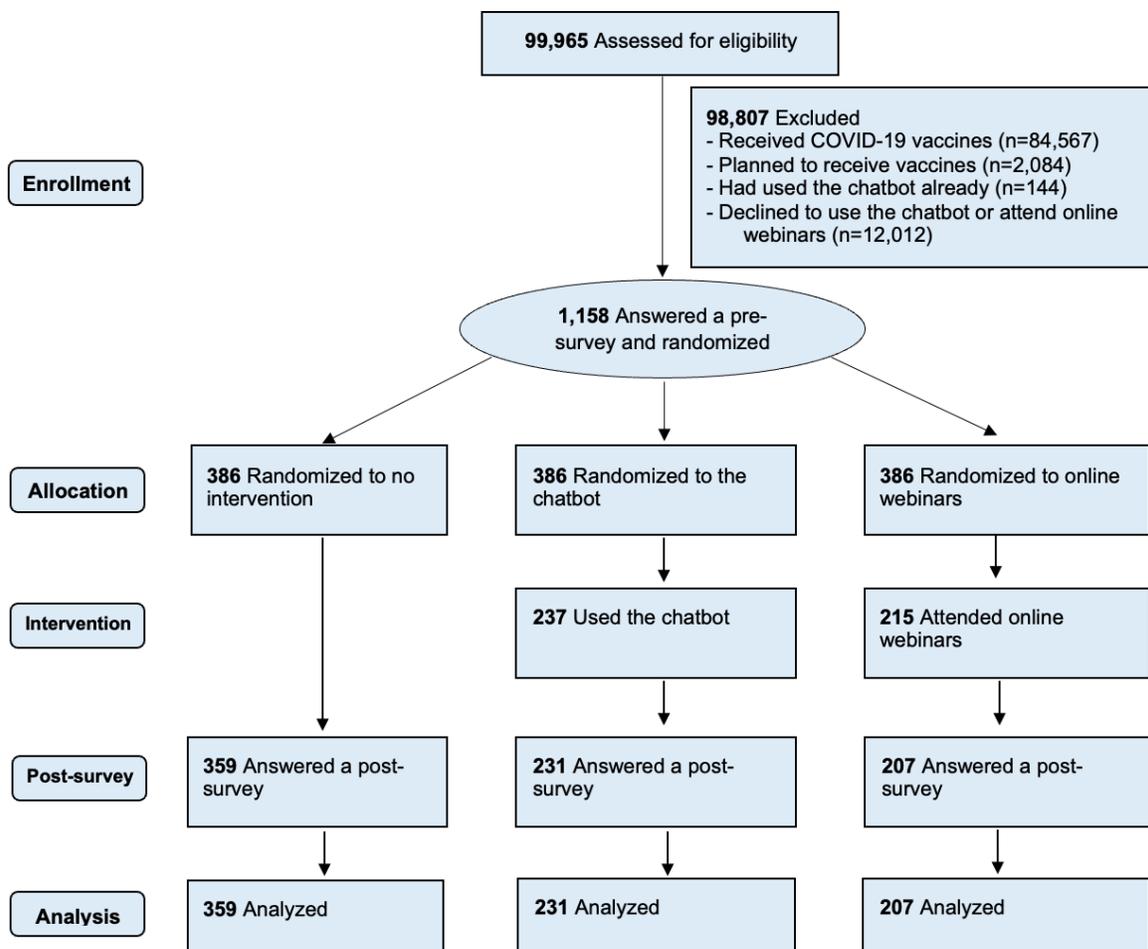
All participants n=797	Group 1 (control) n=359	Group2 (chatbot) n=231	Group3 (webinar) n=207	Group 1 vs 2, P-value <sup>a</sup>	Group 1 vs 3, P-value <sup>a</sup>
Willing to be vaccinated <sup>b</sup> , %	18.7	14.7	18.8	0.259	1.000
Change in vaccine confidence <sup>c</sup>					
COVID-19 vaccines are important, %	-2.2	-0.8	8.7	0.729	0.009
COVID-19 vaccines are safe, %	1.9	1.8	4.8	0.865	0.303
COVID-19 vaccines are effective, %	-8.1	-3.4	5.3	0.249	0.002

<sup>a</sup> Difference in willingness to be vaccinated was assessed by Chi-square test; changes in vaccine confidence index were assessed by mixed effects logistic regression model.

<sup>b</sup> Including those who have received COVID-19 vaccine or have not taken COVID-19 vaccine but are willing to receive

<sup>c</sup> difference in % (post-intervention – pre-intervention) of those who have responded “strongly agree” or “tend to agree.” (Other responses are “do not know,” “tend to disagree,” “strongly disagree”)

Though a chatbot did not change the vaccine intention or VCI in our study, the more frequent use of chatbot was associated with increased vaccine intention. If we improve the contents and format of our chatbot so people will be more likely to access and use it, it could significantly impact vaccine hesitancy. For example, our current chatbot is not supported by the natural language process where people can enter free text; currently chatbot users can access pre-defined Q and A only. Therefore, some users might not be able to find the individualized answers that they want to know for their specific situation or status. However, given that a chatbot can be relatively easily created, local agencies can consider implementing it to disseminate accurate COVID-19 vaccines information. The chatbot has the possibility of increasing vaccine intention depending on its accessibility and usability.



### STUDY FLOW DIAGRAM

Methodology and process showing the number of participants engaged in Corowan-kun Supporters' project.

# D-VACSI: DRIVING VACCINATION CONFIDENCE THROUGH SOCIAL MEDIA INNOVATIONS

## ORGANIZATION NAME

Grameen Foundation India Pvt Limited

## FOCUS POPULATION

Rural low-income households in India

## METHODOLOGY TYPE

Quasi-experimental

## GEOGRAPHY

India



## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

The objective of the project is to assess the role of social media in resolving information asymmetry and driving COVID-19 vaccination confidence & uptake amongst low-income households in rural India. The experiments will compare and contrast the efficacy of social media channels in resolving vaccination hesitancy and driving vaccine uptake through phygital model and digital model. Focus areas for the intervention are Uttar Pradesh, Maharashtra, Haryana & Tamil Nadu in India.

## KEY FINDINGS

As a result of these experiments, the vaccine hesitancy (7.6%) and information asymmetry (6%) amongst the rural low-income households in the intervention area was reduced and significant improvement in vaccination confidence and uptake was reported. The program increased confidence in vaccines among 7.6% of beneficiaries and filled the gap in accessible and accurate information on COVID-19 vaccines for 5.7% of beneficiaries. There was an incremental increase (7%) in the trust level on social media channels for COVID-19 related information amongst the program beneficiaries. The comparison of the impact across the digital and phygital arms revealed that the digital model was more efficient and impactful than the phygital model in resolving information asymmetry, vaccine hesitancy, and vaccination confidence. The digital model was able to reduce a greater proportion of vaccine hesitant persons (by 17%) than the phygital beneficiaries (16%). Similarly, the incremental increase in vaccine uptake in the digital model was by 2%. Moreover, the digital model required fewer resources to implement since it eliminated physical contact requirements and was more convenient and scalable. However, low penetration of internet and internet-enabled devices is a challenge that is being addressed by the government's telecom policies at a steadily fast pace.

**Social media experiment leads to 7.6% lesser vaccine hesitancy and 1.7% higher vaccine adoption in rural India.**

## KEY PROCESS INSIGHTS

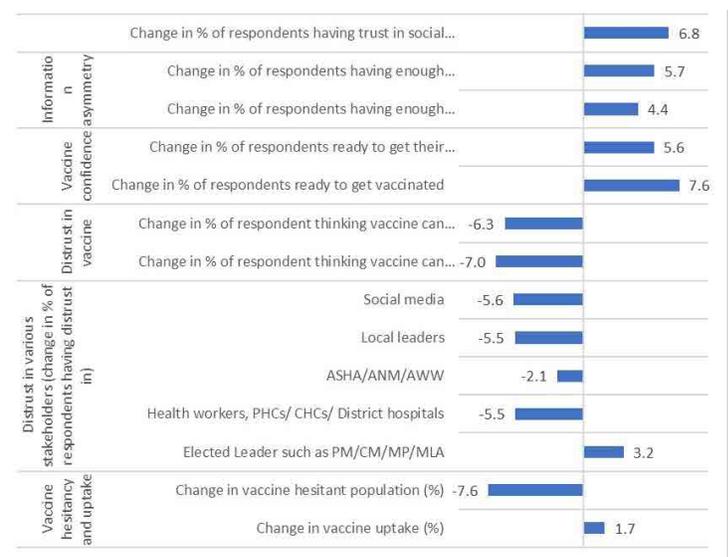
1. The development of the educational videos was informed by the baseline survey, FGDs, and the on-field interactions of implementing partners with the intended beneficiaries of the program. The need for curated information was identified, taking into account all the myths and misconceptions that were floating around in the local communities, and videos were crafted to address all of these issues by making use of Cialdini's principles of influence. For example, amidst the complex network of myths about potential deadly side-effects of COVID-19 vaccinations, most lactating mothers and pregnant women decided not to get the vaccine, as it might affect the children through the breast milk or inside the womb. This resulted in significantly lower vaccination rates, specifically for women with children. So, a video to educate these women about the benefits of the vaccine was prepared, leveraging the social proof and liking principles of Cialdini. Hence, generating insights and evidence from the ground, and then developing the educational content, has proved a dependable strategy for the program.
2. Engagement of local community persons and influencers has proved to be another big strength of the D-VACSI program. The on-boarding of beneficiaries and building of their trust in the program was achieved through engaging local influencers like Grameen Mittras, ASHA/ ANM, frontline health workers, and local leaders in reaching out to the beneficiaries.
3. The digital content (videos) for awareness generation under the D-VACSI program were created to give the beneficiaries exposure to certain key messages. These key messages were designed and drafted using Cialdini's principles of persuasion. It was observed that a lot of people were motivated by the content and, hence, efficacy of Cialdini's principle in social interventions was established.
4. In spite of COVID-19's second wave, beneficiaries attended the training, as trainings were imparted digitally/online where beneficiaries could attend trainings from their respective homes and adhere to COVID-19 protocols.
5. Physical meetings with government officials and frontline workers facilitated in getting the list of non-vaccinated and vaccinated persons, and they supported in the execution of the project.

## RECOMMENDATIONS

1. Rural people have very high faith in local health workers, especially ASHA workers. Implementing any health intervention through them increases the likelihood of success of the intervention significantly.
2. Cialdini's principles of influence have been found to be effective in increasing people's faith in vaccines and decreasing their vaccine hesitancy. Any key messages intended to reach masses may leverage these principles, especially messages which have elements of social proofing, authority, and liking.
3. Pregnant women and lactating mothers are found to have the highest level of vaccine hesitancy. Any intervention keeping them at focus may increase the overall impact of the program significantly.
4. Results from the study also provided insights for the curation and development of messages for driving health seeking behavior, especially messaging. High uptake and retention of messages, following the principles of social proofing, liking, and authority, can inform future programming and communication strategies that target health-seeking behavior changes for low-income households.

### ▼ D-VACSI PROGRAM IMPACT

Changes in respondents confidence and trust.



# WHO TO TRUST: COMBATING COVID-19 VACCINE MISINFORMATION THROUGH TRUSTED MESSENGERS AND SOCIAL NETWORKS IN INDIGENOUS COMMUNITIES IN GUATEMALA

## ORGANIZATION NAME

Institute for Global Health Sciences,  
University of California, San Francisco

## GEOGRAPHY

Guatemala

## KEY PARTNERS

Wuqu' Kawoq| Maya Health Alliance  
Digital Medic, Stanford University  
Upwell

## FOCUS POPULATION

Guatemalan Indigenous communities

## METHODOLOGY TYPE

Formative qualitative  
Brand Lift  
Pre/post surveys in communities



## SOCIAL MEDIA PLATFORM/S USED



Browser ads

## PROJECT SUMMARY

Our team, comprised of public health researchers and epidemiologists, digital behavior change experts, and an organization working to improve the health of indigenous communities in rural Guatemala, aims to refine already ongoing messaging about vaccine hesitancy by combining insight from communities with expertise gained from previous social media messaging campaigns. We will then roll out our social media campaign and test the impact on vaccine uptake at local health centers, as well as on vaccine hesitancy and other beliefs.

## KEY FINDINGS

Brief, culturally and linguistically tailored videos addressing COVID-19 vaccine misinformation and knowledge deployed over social media may improve vaccine rates in rural, hard to reach, indigenous populations in Guatemala. To test this hypothesis, our team conducted formative research, developed a social media campaign, and tested it in two ways: via Brand Lift and via in-person pre/post surveys. Our formative qualitative interviews aimed to understand common barriers to vaccination and found a general dearth of information for indigenous communities, mis- and dis-information, general fears, and access and supply barriers. Following this, we designed informational videos in local languages to deploy over social media. To evaluate these, we first conducted a Brand Lift study which showed that videos in Mayan languages appear to improve the perceived safety of COVID-19 vaccines, while Spanish videos may have improved perceived acceptability of COVID-19 vaccines for Spanish speakers. Finally, we conducted an evaluation using

**A culturally and linguistically concordant community informed campaign using social media increased vaccination rates in a predominantly indigenous population in rural Guatemala.**

in-person surveys with members of indigenous communities before and after deploying the social media video campaign and found increased odds (1.83 times the odds) of getting vaccinated among those who saw our videos over social media compared to those who did not, adjusted by age, community, sex and language spoken at home. Findings from this study can help key stakeholders at the national and local level consider optimal practices for development of vaccine education content and how to leverage this content over social media to increase COVID-19 vaccine uptake in other regions of the country.

### KEY PROCESS INSIGHTS

- Working with a community organization deeply trusted by the community who has significant experience in conducting research allowed us to design our research methods around the needs of the community.
- It also facilitated rapid implementation of research on the ground once approvals had been received.
- In-person surveys followed by telephone surveys to measure the on the ground impact of our intervention allowed us to minimize in-person contact thus decreasing risk of COVID-19 transmission to research staff and participants.
- We aimed to strike a balance between creating animated content that could be quickly and cost-effectively adapted for multiple contexts through minimal visual edits, but also contextualized to specific community needs through translation and local language voice over.
- Applying the principles of human centered design allowed us to successfully gather nuanced feedback from members of indigenous communities to develop content that directly addressed concerns and misinformation circulating in communities.
- We had methodologic challenges with the Brand Lift study given the small population of Maya language speakers in Guatemala and the fact that these languages do not exist on Facebook.
- A limitation of the Brand Lift tool is that two studies cannot run in the same geographic regions without overlap. To avoid contamination (i.e., users being shown ads from two different Brand Lift studies), we geographically separated the two studies based on region.

### RECOMMENDATIONS

1. Community based organizations (CBOs) have pre-existing priorities and projects that may compete for time and human resources. Thus, any project under development must be designed to ensure the research, and potential implementation project developed from that research, serves the organization's purpose and mission from the beginning.
2. Research-informed interventions can increase activity effectiveness. Research can help guide CBOs towards more efficient and effective targeting of interventions.
3. Trust is critical. Numerous interviews and focus groups indicated that local healthcare workers, including community health workers and local councils, were trusted sources of information. Understanding local dynamics around who is trusted and why can allow for better targeting of resources. Trusted community organizations and leaders can likely have an outsized impact on lives when trust in central government is low.
4. Technology and social media can be leveraged to change behaviors. As social media use increases in historically marginalized communities, it can be used as a platform for community organizations and leaders to communicate and influence health decision making.
5. Community voices MUST be front and central in dissemination activities. Ensuring community partners are leading the way on podcasts, interviews with press, and are active members and authors on journal article writing teams is critical for appropriate recognition, capacity building, and continuity.

# CULTIVATING ONLINE SAFE SPACES: ADDRESSING UNSPOKEN HESITANCY TO BUILD VACCINE CONFIDENCE IN HEALTHCARE WORKERS IN BELGIUM

## ORGANIZATION NAME

Institute of Tropical Medicine Antwerp

## GEOGRAPHY

Belgium: Flanders and Brussels Capital Region

## KEY PARTNERS

KU Leuven, Institut Pasteur, London School of Hygiene and Tropical Medicine (Vaccine Confidence Project)

## FOCUS POPULATION

Healthcare workers (including students in healthcare)

## METHODOLOGY TYPE

Mixed method design: in-depth interviews, focus group discussions, social media analysis and online surveys

## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

Healthcare workers (HCW) are a priority group for COVID-19 vaccination and important sources for lay vaccine decisions. Yet, considerable vaccine hesitancy exists among HCW whilst experiencing pressure to vaccinate, leading to unspoken hesitancy. We strive to restore Belgian HCW vaccine confidence by listening to concerns using hybrid social listening and by building an online safe space to enable an engaging, empathic dialogue.

## KEY FINDINGS

Our study confirmed healthcare workers (HCW) often experience difficulties talking about COVID-vaccination with peers and patients. Vaccine confident participants felt unvaccinated colleagues were quite defensive or that it was a lost cause trying to convince them. On the contrary, vaccine skeptical participants felt they were often considered egocentric, and their concerns not taken seriously. Hesitant healthcare workers also noticed that vaccine confident colleagues would sometimes speak harshly about unvaccinated patients, which made them reluctant and fearful to disclose their own vaccination concerns.

**In the context of polarization and vaccine mandates, discussing COVID-vaccination has become problematic among healthcare workers in Belgium. Creating safe spaces for dialogue among healthcare workers is a multi-faceted effort that requires adapting to the changing pandemic context, offering multiple modes of communication, having active dialogue moderation, preventing an echo chamber of misinformation, and putting aside the aim of increasing vaccination uptake to promote trust.**

Most participants regretted the strong polarization in society (especially among HCW) regarding COVID-vaccination and appreciated our project's idea to develop a safe space for dialogue. Despite many participants claiming it was "too late" for dialogue, most participating HCW preferred to speak to peers face-to-face rather than on a text-based social media platform. While anonymity was confirmed to be important, the ability to see each other offers more authentic dialogue.

Unexpectedly, several participants perceived the research project itself to be an effective venue for dialogue. The opportunity to express vaccine-related concerns to peers or to researchers during any of the research activities helped them overcome frustrations. Vaccine confident participants mentioned they enjoyed participating but felt less need to be in dialogue with other HCW to alleviate frustrations.

### KEY PROCESS INSIGHTS

The project was impacted by two important factors: (1) the Belgian COVID-epidemic and (2) the positionality of the researchers.

After almost two pandemic years and considerable pandemic and vaccination fatigue, it was difficult to motivate HCWs to participate in our project. In addition, the project took place during the fourth (Delta) and fifth (Omicron) wave in Belgium and HCWs were burdened with yet another challenging and busy time at work. The team had to act fast and be innovative in finding new ways to recruit participants, such as through Facebook ads, labor organizations and universities.

Our position as researchers in public health institutions also impacted our ability to co-create an online safe space with hesitant HCW. It was a challenge to find the right balance between openly sharing our personal and professional vaccine-related thoughts with participants while maintaining neutrality, both of which were important to establish trust between researcher and participant. We also struggled finding the right balance between letting people openly voice their concerns and avoiding creating anti-vaccination echo chambers, which had the risk of increasing vaccine hesitancy in HCW. As some participants hijacked focus group discussions to voice their opinions (e.g. monopolizing speech, consistently interrupting others, being rude or threatening towards those with different opinions), the research team was confronted with the difficult trade-off between encouraging open dialogue and minimizing

exposure to potential misinformation. Based on that experience, the research team decided to bring in a professional facilitator to moderate the live dialogue sessions, which turned out to be an overwhelmingly positive experience for participants.

### RECOMMENDATIONS

Leverage social media to foster vaccine dialogue, trust in democratic science-making and vaccine confidence by:

#### Listening to vaccine narratives and addressing vaccine concerns & information deficits

- Passive social listening: use qualitative and data science methods to continuously characterize online vaccine sentiments, identify vaccine and vaccination concerns & information deficits
- Conduct / support active research (surveys, interviews, FGDs):
- Share listening results with public health stakeholders for adapted communications and interventions

#### Creating venues for dialogue and peer support

- Scaling up knowledge of the impact of dialogue on vaccination confidence building and wellbeing
- Creating a dialogue facilitation workforce (dialogue is a craft that cannot be fully automated):
- Creating vaccine dialogue venues that would cater to different needs:
- Organize live vaccine-related interaction sessions
- Create a text-based venue to interact on vaccination, with different channels:
- Creating peer experience support groups

As soon as the hesitant participant expressed her doubt, the flow of the dialogue changed drastically. Other participants congratulated her for being courageous enough to express her doubt here. They then began sharing about how they had doubts themselves and how they too did not always agree with all the policy decisions surrounding the vaccination campaign. At the end of the focus group discussion, the vaccine hesitant participant expressed that she had "regained her faith in humanity" thanks to this dialogue.

# GENERATION VAX – LEVERAGING INTERGENERATIONAL RELATIONS TO INCREASE VACCINATION UPTAKE

## ORGANIZATION NAME

International Longevity Centre

Lead Researcher: Sophia Dimitriadis, Senior Economist, ILC

## KEY PARTNERS

Digital Willow

Vision One

Forster Communications

Open Age

Panelbase

YouGov

The Coalition for Life-Course Immunisation

## FOCUS POPULATION

Our target groups included those less likely to take up routine vaccination, older people living in deprived areas of the UK, and older people from certain ethnic minorities (particularly people with Black African and Black Caribbean backgrounds). We also explored whether younger people could influence older people's vaccine uptake through social media.

## GEOGRAPHY

UK



## METHODOLOGY TYPE

Desk research, focus group interviews, online survey and test campaigns.

## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

This project explored whether younger generations can encourage older people to get vaccinated. Specifically, ILC created and tested social media content to explore whether engaging younger people on social media increases uptake of the flu and pneumococcal vaccines among older people living in socioeconomically deprived areas. ILC also explored whether results differ among people from Black-African and Black-Caribbean communities within these areas.

## KEY FINDINGS

Our social media advertising campaigns may have cost effectively improved flu vaccination rates among deprived communities – and the pneumococcal adverts generated vaccine booking link clicks at a cheaper rate than flu adverts.

**New research from the International Longevity Centre-UK (ILC) finds that social media advertising can be a cost-effective way of engaging older people in deprived communities with vaccination.**

Our campaigns received significant engagement. Engagement metrics were far higher than average for healthcare adverts: over 75% of users who saw the advert engaged, and the reactions and survey responses indicate that most users perceived them positively.

Targeting older users directly on social media gave better trackable results than targeting younger audiences – but we can't rule out the effectiveness of engaging younger audiences for offline conversations.

Younger people were more likely to click on the adverts to learn more than older users, but were then less likely to act – although we couldn't track all potential follow-up actions.

Although most advert reactions were positive, the majority of comments on the adverts were negative, indicating that our campaigns resonated more with the undecided than antivaxxers—but these negative comments may have increased engagement.

Our target communities claim to struggle to see their General Practitioner (GP) or book a vaccination appointment – health practices can make this easier

### KEY PROCESS INSIGHTS

As more older people, including those from marginalised groups, take to social media, this channel offers a real opportunity to address these inequalities.

But younger people are still more likely to use social media and to engage with its content. As evidence suggests that they can influence the health behaviour of older relatives – and as we know that older people tend to use social media to keep up with friends and family – these younger users could be part of the solution.

But this hasn't been tested before on social media, our study sought to try this out.

We found that targeting older users directly on social media gave better trackable results than targeting younger audiences. Despite stereotypes to the contrary, social media campaigns appear to be able to effectively engage marginalised older adults with vaccination and increase uptake.

Our findings also suggest that younger generations were engaged with our campaign, and by some measures, more engaged than older adults. Our findings suggest they may have generated impact offline— we just could not completely track this. As younger generations are less expensive to reach on social media compared to older generations, there is clearly scope for future research to dig into this question further.



PHOTO: INTERNATIONAL LONGEVITY CENTRE

## Have You Discussed The Jab Yet?

### ▲ INCREASING JABS

Screen capture from a social media campaign from the International Longevity Center exploring intergenerational relations in increasing routine vaccinations.

## RECOMMENDATIONS

### Build the evidence base and scale up findings

The Department for Health and Social Care and the NHS should:

- Increase investment in social media campaigns to increase the uptake of routine vaccination (especially less well-known vaccines, such as the pneumococcal and shingles vaccines) among older people living in deprived areas in the UK.

### Measure the impact and cost-effectiveness of future social health campaigns

The Department for Health and Social Care and the NHS should:

- Analyse and publish the results of future social campaigns on vaccination and collaborate where relevant, to maximise learnings/impact and prevent under-investment.

### Address knowledge and accessibility barriers to vaccination

The NHS and the Department for Health and Social Care should:

- Offer the NHS pneumococcal vaccine in community pharmacies.
- Ensure that all GP practices send reminders and consistently discuss pneumococcal vaccination with eligible patients.
- Create a single online hub where people can book all routine vaccination appointments and display these options prominently on the NHS website.

### Explore further ways to use data gathered by social media for public good

Policy makers should:

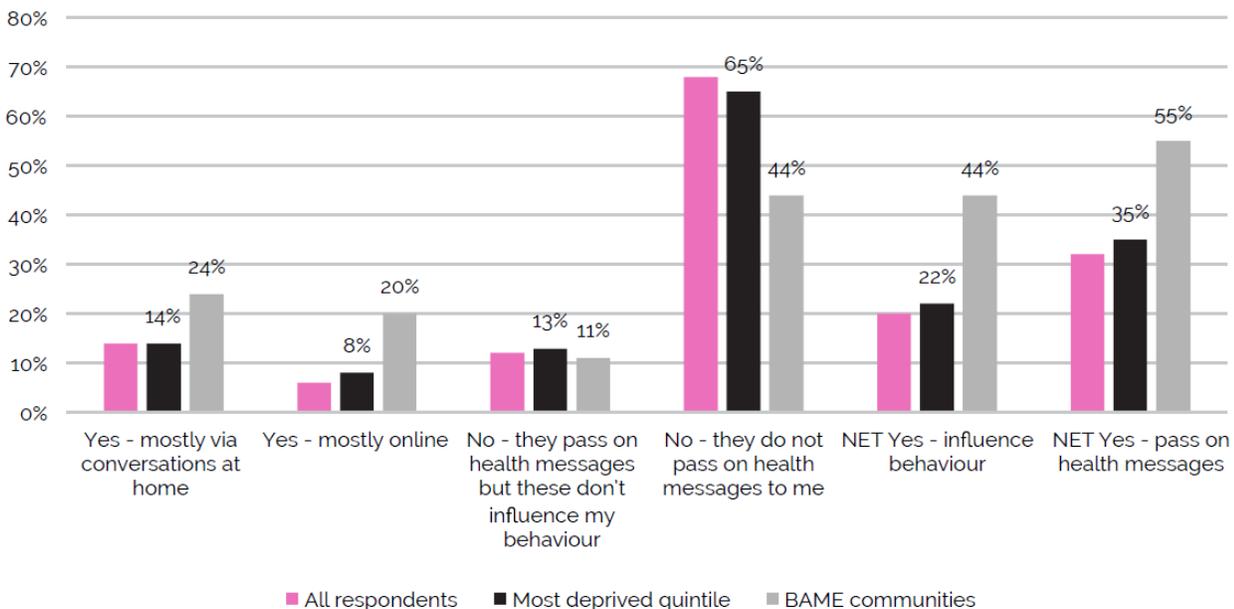
- Explore ways to encourage social media owners to share data with government health systems or researchers while mitigating the risk of negative consequences – including the data being exploited.

### Test unanswered questions from our study

Health policy makers should:

- Explore whether using social media to engage younger family members is a cost-effective way to increase vaccination uptake among older family members.

### DO YOUNGER RELATIVES PASS ON HEALTH INFORMATION? IF SO, HOW?



# BOOST: BUILDING VIBRANT ONLINE COMMUNITIES TO SUPPORT COVID-19 VACCINE UPTAKE THROUGH PARTICIPATORY ENGAGEMENT PRINCIPALS

## ORGANIZATION NAME

IRD Global

## GEOGRAPHY

Districts East, South, and Korangi - Karachi, Pakistan

## KEY PARTNERS

Government of Sindh's Expanded Program on Immunization

## FOCUS POPULATION

Low-income communities in three high-risk districts in Karachi, Pakistan

## METHODOLOGY TYPE

Participatory Mixed Methods Research

## SOCIAL MEDIA PLATFORM/S USED



TikTok Snack Video



## PROJECT SUMMARY

Pakistan has faced multifaceted challenges with respect to the COVID-19 pandemic and its vaccines. Misinformation, conspiracy theories, lack of awareness, disbelief in possible health ramifications, and limited access to equitable services have been identified as impediments in vaccine confidence.

Our program is a community-led behaviour change campaign that utilizes participatory action research for user-informed social media engagement to improve COVID-19 vaccine confidence and promote vaccine uptake in three high-risk districts of Karachi, Pakistan. We developed six online groups across two social media platforms, supplemented through interactive community engagement enabling communities to co-create content for digital campaigns addressing social barriers around COVID-19 and its vaccine. Vaccine camps were also held in these districts in collaboration with the Government of Sindh to provide equitable COVID-19 vaccine services coupled with routine immunization.

**In low resource settings, bridging online engagement with participatory on-ground activities amplifies community voices and experiences resulting in increased public interest in health topics and an uptake in vaccines.**

## KEY FINDINGS

IRD initiated project Boost employed participatory engagement in three high-risk districts in Karachi, Pakistan, to build user-informed social media campaigns around COVID-19 vaccine confidence. From October 2021 to June 2022, the project leveraged six online platforms (WhatsApp, Facebook, Instagram, Twitter, TikTok, and Snack Video) to capture diverse audiences from the identified districts and ran multiple online campaigns, utilizing user-informed content, based on social barriers faced by communities during the pandemic. The project supplemented these online efforts via immersive on-ground activities, such as through Theatre of the Oppressed performances, health education, and various below-the-line activations, via trained Field Officers and a cohort of volunteer grassroots leaders.

Six online groups were developed (mixed gender on Facebook and women-only on WhatsApp) with 1,425 members, stimulating dialogue and dissemination. Moreover, the on-ground team engaged 5,756 people across the catchment areas. Through these efforts, 1,039 people availed COVID-19 vaccines through mobile camps held in the selected districts. It was noted that a strategy which bridged online engagement with on-ground activities highlighting the efficacy of vaccines to restore normalcy in a post-pandemic world garnered immense public interest and uptake of vaccines. Thus, participatory approaches embedded in outreach efforts ensure inclusion and reach of otherwise neglected voices and narratives in-person and through various social media.

## KEY PROCESS INSIGHTS

COVID-19 fatigue, parallel vaccine roll-outs, and relaxations in restrictions dominated the contextual landscape for the duration of our project. In light of changing public mood, we shifted our primary strategy from vaccine science communication to lifestyle-based narratives focused on social barriers caused by the pandemic.

The rhythm of urban life also pushed us to pivot our on-ground strategy from repeated engagement with grassroots leaders to increasing awareness via health education sessions. Our identified grassroots leaders

became our focal point and our bridge to communicate effectively with the target communities. These grassroots leaders proved extremely helpful in the execution of on-ground activities, including mobilization efforts for the vaccination camps. They also emerged as opinion leaders of the projects' digital community groups.

The use of macro-influencers in the initial phase of the campaign proved less fruitful in comparison to local micro-level content creators in the latter phases. This shift was also made possible by timely feedback gauged through participatory community engagement. An inclusive collaborative approach made it possible to iterate the project implementation strategies in a timely fashion. Continuous community feedback aided in creating a momentum in engagement levels both online and on-ground.

Provision of COVID-19 vaccines along with routine childhood immunization via mobile camps was an effective outreach and access strategy, as it enabled reaching difficult-to-engage populations. By integrating services, we offered a one-stop-shop for people's vaccination needs. In addition, collaborating with the government in camp execution also added legitimacy to the online and on-ground campaigning.

## RECOMMENDATIONS

We recommend acknowledging local communities' experiences around COVID-19 and developing communication strategies that a) address gaps made by public health specialists during the pandemic, b) take into consideration the role of on-ground community networks in supporting digital dissemination, and c) utilise participatory approaches in online and on-ground engagement.

Women are key agents for influencing behavior change at homes, but have limited access to social media and public spaces. The utilization of on-ground engagement and development of women-only local WhatsApp groups signify how strategies can easily be made inclusive and equitable.

Traditional data collection methods, such as surveys, and in-depth interviews may not yield honest results in politically-charged and controversial areas such as COVID-19 where government mandates were used as means to ensure vaccine uptake. This may have

in fact done more harm towards vaccine confidence; while communities may take up the vaccine, they will not trust public health experts if information is not shared transparently. It was noted in this project that while being recorded, participants often answered questions in a positive light, but revealed hesitations when the recorder was off. Therefore, it is important to incorporate alternative sources of data collection methods such as narrative field reports, observation rubrics, and other qualitative metrics.

Moreover, it is important to note that developing online communities organically in low-resourced environments takes time. To expedite this, having offline activities that are tangible, such as theatre performances, art installations, and on-ground mobilization, linked to online platforms is an effective strategy.



◀ **PROMOTION OF VACCINE UPTAKE IN KARACHI**

Participants promoting vaccine uptake via social media.

# A SOCIAL MEDIA APPROACH TO YOUNG PEOPLE IN INDIA SERVING AS COVID-19 VACCINE ADVOCATES

## ORGANIZATION NAME

Johns Hopkins University  
Rajiv N. Rimal, Professor, Johns Hopkins Bloomberg  
School of Public Health

## GEOGRAPHY

Odisha, India

## KEY PARTNERS

Johns Hopkins University  
Loyola University  
D-COR Consulting  
Swasthya Plus  
George Washington University



## FOCUS POPULATION

Young Adults (18-35) in Odisha, India

## SOCIAL MEDIA PLATFORM/S USED



## METHODOLOGY TYPE

Mixed Methods:

- Online experiments
- Qualitative interviews
- Social network analysis
- A/B testing on Facebook

## PROJECT SUMMARY

This project had five components. First, with the help of Indian actors, eight short videos (differing on collectivistic or individualistic appeal, humor, and protagonist gender) were created and their effectiveness tested online. While vaccine skepticism increased, use of humor appeals stemmed this tide most successfully. Second, using social network analysis methods, comments on the vaccine videos on YouTube were analyzed based on the polarity of sentiment. Visualizations indicated that YouTube videos do not exist in a vacuum; rather they are part of a subscriber and recommender network, which is important in understanding how videos are disseminated to audiences. Third, qualitative interviews revealed that the quality of characters' acting abilities can also spill over to the message they advocate; thus, actors who provoke audiences with anti-vaccine messages should be chosen with care. A fourth component laid out the issues media production interventions should consider when projects require a balance between the rigors of scientific control, on the one hand, and artistic creativity, on the other. Finally, media made for television were adapted for social media platforms in various ways (truncating the beginning, adding subtitles, converting the rectangular aspect ratios to square dimensions, etc.) and then were subject to A/B testing on Facebook. Adapted media garnered more views and greater engagement overall, thus highlighting their value.

## KEY FINDINGS

Vaccine messages garner skepticism while vaccination messages are found to be more acceptable. Focusing on the benefits of actually getting the vaccines appears to be more effective than focusing on the vaccines themselves. When done correctly, humor-based appeals appear to confer two tangible benefits: they garner attention by raising the message

**Vaccine messages can increase skepticism among viewers, but well executed storylines, with the use of humor, can reduce skepticism. While the use of humor in a pandemic may be tricky, it can also increase attention and diffuse tension to boost engagement.**

above the clutter of other health messages in the information ecosystem, and they reduce defensiveness by diffusing the tension.

For vaccine messaging, it is important to consider the creative approach and the dissemination platform, as the platform's algorithm determines who is likely to receive the message. Effective search engine optimization can mitigate the limitations of recommended systems, ensuring that content does not get caught in exclusionary algorithms.

In this research, we have developed an approach that makes algorithmic outputs visible and offers a means to describe them through visual analysis and content analysis of the comments posted by viewers. Through this approach, we conclude that effective message design can facilitate communication of health-oriented information beyond the "home" channel to be "seeded" into other channels extending the reach of the messaging.

Understanding how platform algorithms work is an important takeaway for health communicators designing social media campaigns for vaccine acceptance.

## KEY PROCESS INSIGHTS

This research created eight videos similar in all ways except one, with videos either having a male or a female lead, being serious or humorous, and with a collective safety appeal or an individual safety appeal. Achieving similarity across videos while also ensuring stark contrast in manipulated attributes required collaborative engagement across languages and contexts, with the video language being Odia, and targeting rural audiences in Odisha, India. Scientific and artistic partners had to rethink their processes and orient the cast, crew, and other stakeholders with the distinct research needs.

This process included the involvement of members of a Community Advisory Board that provided feedback on the script development process. To do this, professional audio versions of the scripts were developed to test their effectiveness and appropriateness, and feedback was incorporated before developing the final videos. Involving the community – in a process that selected people from diverse walks of life – provided constant and meaningful feedback for the creative and research team.

Much of public health videos produced by Indian health agencies are created for traditional media. To make them more appealing on social media, a number of measures

need to be taken, as revealed through A/B testing conducted on Facebook for this project. These include shortening the length, including subtitles throughout, and changing the rectangular aspect ratio to a square (to accommodate viewing on cellphones). Doing so may be tedious, but they garner greater engagement.

## RECOMMENDATIONS

Effective health communication balances the old and the new: sound conceptual ideas that have guided research and practice for many years with rapidly-evolving and algorithm-driven information landscape that can greatly enhance reach and outreach. Health communicators have known for a long time that effective communication requires understanding the audience; tailoring messages according to audience members' needs and expectations; using credible and trustworthy sources to disseminate messages; and being sensitive to cultural nuances that affect message interpretation. These considerations remain as important as ever.

In recent times, thrown into this mix have been technology-driven algorithms that take into account audience members' prior behaviors, affiliations, and viewing habits to shape who is served which information. Although much of this is shaped by audience members' trace on the Internet, a good portion of it is also shaped by how messages are titled, which keywords are invoked, and how channel characteristics are optimized for maximum engagement. Not paying adequate attention to these factors will almost certainly constrain the reach and impact of health communication efforts.

Our research shows that it is possible to deliver high-caliber videos created according to the cultural and cognitive background of the message recipients. In addition, the study sheds light on when and how to use humor in vaccine messaging, and it illustrates that audiences make clear distinctions between how they view vaccines, on the one hand (with suspicion and skepticism), and how they view vaccination, on the other (with much positivity). Careful use of humor can greatly improve attention and message receptivity.

# EVALUATING THE FREQUENCY AND EFFECTIVENESS OF COMMON RHETORICAL STRATEGIES USED TO ATTACK AND DEFEND THE TRUSTWORTHINESS OF PUBLIC HEALTH INSTITUTIONS

## ORGANIZATION NAME

Jonathan Yong Lee (Individual) - Stanford University

## GEOGRAPHY

USA

## FOCUS POPULATION

Twitter users

## METHODOLOGY TYPE

Machine learning-based topic modeling



## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

The CDC faces a growing challenge of maintaining public trust in the face of constant attacks on their trustworthiness from a variety of sources across all relevant media channels. Yet, little is known about the specific types of rhetorical strategies aimed at supporting or undermining trust in the CDC. This project takes a step towards characterizing such rhetorical strategies by applying an unsupervised, machine learning-based topic modeling algorithm on a corpus of Twitter posts (i.e., “tweets”) related to trust in the CDC. The corpus of tweets was filtered based on keywords that include variants of the word “CDC” (e.g., CDC, CDCgov, @CDCgov, etc.), “trust” (e.g., trust, trustworthiness, trusted, etc.), and “credibility” (e.g., credibility, credible). Using the topic modeling algorithm, the corpus of approximately 230,000 tweets were categorized into “subtopics,” each referring to a particular content matter (e.g., tweets about the COVID vaccine, tweets about Biden, etc.). Drawing on interdisciplinary theoretical frameworks which broadly define perceptions of trustworthiness and credibility as being composed of perceptions of (1) expertise/competence and (2) integrity/benevolence, subtopics of tweets specifically relevant to these components of trustworthiness were further categorized into broader topics. The relative changes in prevalence of these broader topics were evaluated over a period of time spanning the advent of Twitter to the date of the collection of the corpus of tweets (March 21, 2022).

**Rhetoric related to the politicization of the CDC may have played the biggest role in driving distrust in the CDC early in the pandemic.**

## KEY FINDINGS

“Subtopics” of tweets related to the two theoretical components of trustworthiness and credibility (expertise/competence & benevolence/integrity) were grouped into broader “topics.” As seen in Table 1, “Ambiguous” are tweets that provide a reason to trust or not trust the CDC; however, the reasons given generally fail to specify whether it relates to the CDC’s expertise/competence or benevolence/integrity. For instance, flip-flopping is one of its contained subtopics; however, accusations of flip-flopping do not clearly relate to expertise/competence or benevolence/integrity. The topic of “Expertise/competence” refers, as expected, to tweets that specifically argue the CDC is or is not trustworthy on the basis of expertise/competence. Of note, the vast majority of these tweets are in support of the CDC – suggestive of evidence that the CDC’s trustworthiness is rarely attacked for lacking expertise/competence. The “Benevolence/integrity” topic refers to arguments for/against CDC benevolence/integrity. This topic is further divided into ambiguous, nonpolitical, and political – respectively referring to whether the tweets suggest the CDC has nonpolitical ulterior motives (e.g., ties to pharma, profit, patent exploitation), political ulterior motives, or unspecified, ambiguous motives.

Evaluating the relative prevalence of these broader topics before and during the COVID-19 pandemic, Figure 1 shows evidence that the relative prevalence of “Benevolence/integrity (political)” tweets dramatically increased at the beginning of the pandemic compared to the year prior to the pandemic. Indeed, nonpolitical concerns (e.g., pharma ties) significantly decreased relative to political concerns. This suggests that the significant drop in CDC trust early in the pandemic may have been especially driven by concerns about the CDC having been politicized and other political partisan concerns. Meanwhile, concerns about CDC expertise/competence remained relatively small in comparison to benevolence/integrity concerns before and after the start of the pandemic.

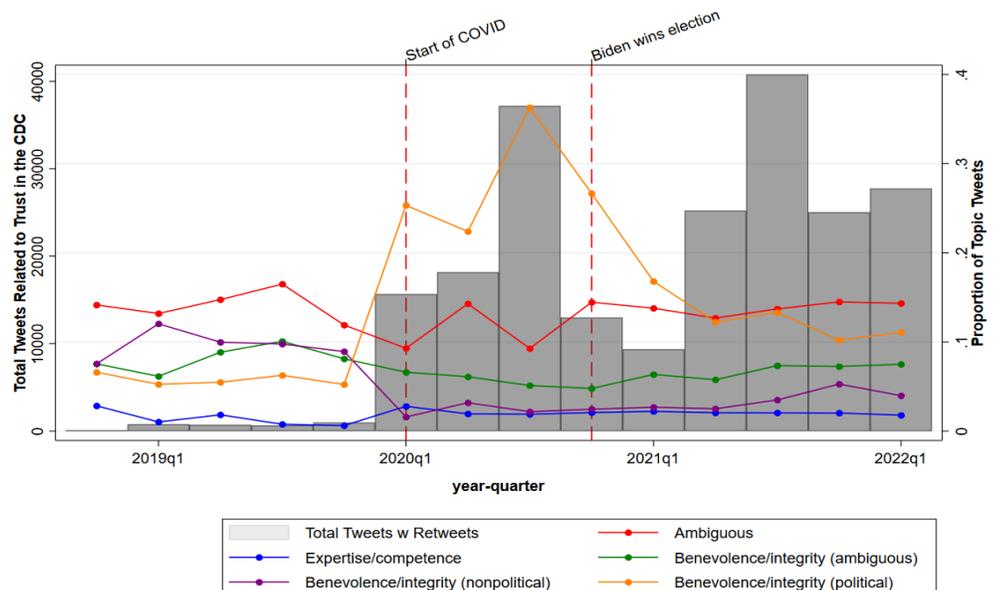
## KEY PROCESS INSIGHTS

Machine learning-based topic modeling technology has made incredible progress in recent years, and over the course of this project, various older and newer algorithms were trialed, including latent dirichlet analysis (LDA) and the use of jointly embedded topic, document and word vectors. In the end, the use of jointly embedded vectors appeared to strike a better balance between having too many topics with sufficient specificity vs. too few topics with diluted/insufficient specificity.

## RECOMMENDATIONS

The preliminary results of this project highlight the potentially outsized role that rhetoric related to the politicization of the CDC may have played in driving CDC trustworthiness and credibility concerns, even relative to other concerns such as CDC ties to pharmaceutical companies, which are commonly cited as drivers of CDC distrust. Further research is required to elucidate causal pathways linking politicizing rhetoric to public distrust of the CDC; however, the large relative prevalence of this type of rhetoric on Twitter seen in this analysis suggests that public health institutions would be wise to think carefully about how it can communicate with the public in a way that affirms that its public health recommendations are based purely on scientific evidence as opposed to political concerns. More broadly, these findings add to increasing concerns that worsening political polarization is threatening the ability of public institutions to effectively guide and govern the public through crises.

▼ **RELATIVE PREVALENCE OF TOPIC'S TWEETS OVER TIME**  
Timeline of levels of trust in the CDC by sentiment.



# DEVELOPMENT AND IMPACT ASSESSMENT OF A CONVERSATIONAL AI SERVICE (CHATBOT) ON COVID-19 VACCINE CONFIDENCE AND UPTAKE

## ORGANIZATION NAME

Laboratory of Data Discovery for Health (D24H)

## KEY PARTNERS

The University of Hong Kong

Saw Swee Hock School of Public Health, National University of Singapore and National University Health System

Health Intervention and Technology Assessment Program, Ministry of Public Health, Thailand

Department of Infectious Disease Epidemiology, London School of Hygiene and Tropical Medicine

Department of Digital Health and Innovation, World Health Organization, Switzerland

## GEOGRAPHY

Hong Kong Special Administrative Region, China

Singapore

Thailand



## FOCUS POPULATION

Vaccine hesitant parents of children younger than 12 years old in Hong Kong, Singapore, and Thailand.

Children of vaccine hesitant senior citizens over 60 years old in Hong Kong and Thailand.



## SOCIAL MEDIA PLATFORM/S USED

Facebook Messenger

## METHODOLOGY TYPE

Randomized Controlled Trial

## PROJECT SUMMARY

The primary objective of this project is to develop and evaluate a conversational AI service on communication platforms for users to obtain accurate vaccine information and to assess the veracity of vaccine information in Hong Kong (China), Singapore, and Bangkok (Thailand).

Randomized controlled trials (RCTs), social listening analytics, and the RE-AIM framework will be employed for formative, impact, and process evaluation of the intervention.

This project will be conducted by a consortium of partners including Hong Kong University, Vaccine Confidence Project™ (VCP), National University of Singapore, and the Thai Ministry of Public Health, Health Intervention and Technology Assessment Program (HITAP).

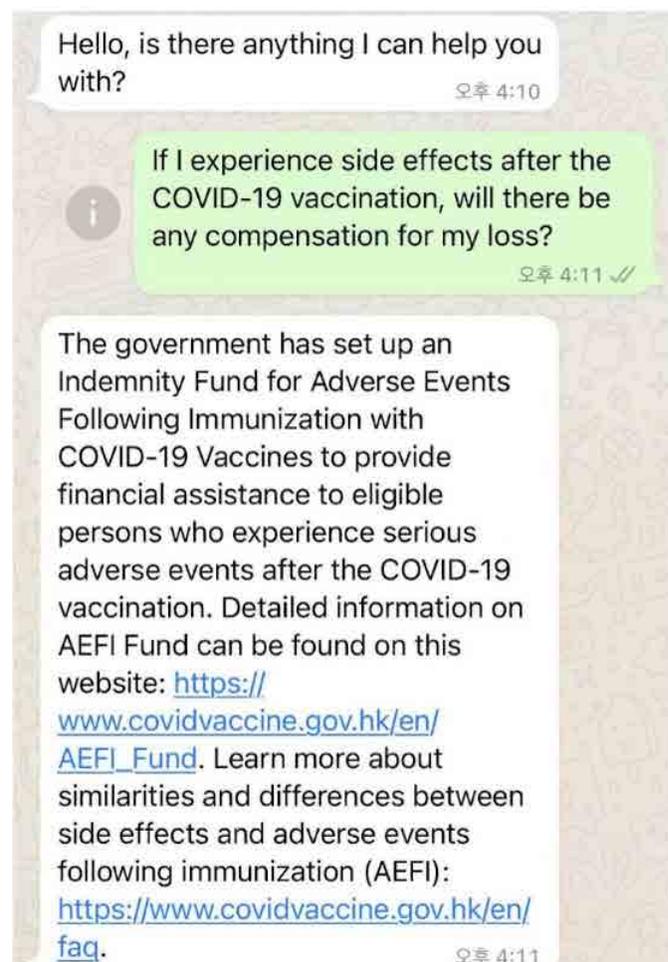
**This first multi-site RCT on the impact of conversational AI services (chatbots) on attitudes towards vaccination suggests that deploying vaccine chatbot might offer a promising intervention option that is feasible and effective in improving vaccine confidence and acceptance, while also improving access to vaccine-related information.**

## KEY FINDINGS

From Hong Kong, Singapore, and Thailand, a total of 616 persons completed the pre- and post-intervention evaluations, of whom 255 persons (41.4%) were assigned to the intervention group and used the chatbot. In terms of pre- and post-intervention responses, compared with the control groups, Hong Kong chatbot-users reported a greater improvement in their access to “information about COVID-19 vaccine on children” (control group vs. chatbot-users: 14.9% vs 27.6%). However, in Singapore, chatbot-using parents reported a higher increase in the perceived susceptibility of “COVID-19 infection for their children in the next 6 months” (20.8% vs. 48.3%) and a greater decrease in the perceived vaccine safety: “Overall, I think COVID-19 vaccines are safe for children” (6.3% vs. 31.0%). In Thailand, a higher proportion of chatbot-users reported a significant improvement in their perception on “COVID-19 vaccine effectiveness for children against all variants” (21.7% vs. 30.4%) and “COVID-19 vaccine effectiveness for children regardless of the manufacturer of the vaccine” (21.7% vs. 28.6%). We did not detect association between chatbot use and the likelihood of being influenced by misinformation about COVID-19 vaccines. However, in view of meaningful findings such as statistically significant improvements in chatbot users’ perceptions of vaccine effectiveness and vaccine information accessibility across study sites, we saw the positive potential of vaccine chatbots as public health interventions in the vaccine-hesitant populations.

## KEY PROCESS INSIGHTS

Key issues revolving around vaccine hesitancy can emerge, re-emerge, and spread in any population for a myriad of complex reasons including complacency against the threat of vaccine preventable diseases (VPDs), lack of confidence in vaccine safety and effectiveness, distrust in health authorities or political leadership, inconvenient access to vaccine information and vaccines, and exposure to vaccine misinformation.



### ▲ AUTOMATED WHATSAPP RESPONSE

Conversational chatbot on WhatsApp for users to obtain accurate vaccine information and to assess the veracity of vaccine information in Hong Kong (China), Singapore, and Bangkok (Thailand).

To mitigate COVID-19 vaccine hesitancy, the novel chatbot solution was developed through social listening findings and formative consultations with existing COVID-19 chatbot developers, and was aimed to enhance infodemic management and vaccine confidence and uptake.

In the process of conducting this research, the chatbot was continuously adapted based on participant

feedback and real-time monitoring of COVID-19 vaccine-related news, mandates, misinformation, rumors, and concerns. For example, vaccination of children was on the horizon during the study period, and this policy meant changing or adding another group to the target population. This continuous monitoring and evolution allowed the chatbot to remain timely and relevant. The chatbot was also able to disseminate accurate COVID-19 vaccine-related information to the public in an easily accessible format from a credible source. Chatbots allowed instantaneous responses to pressing questions, which might not be feasible with other forms of health communication (e.g., conversations with a healthcare worker).

## RECOMMENDATIONS

This is the first multi-site RCT on the impact of vaccine chatbots on attitudes towards vaccination. It was conducted during Omicron outbreaks, when governments were ramping up local vaccine campaigns and targeted the most hesitant people, whose dependent family members had rejected or delayed COVID-19 vaccination until after January 2022.

Given the prevalent use of social media in Asia and across the world, and the rising issue of infodemics, this study suggests that deploying conversational

AI services (chatbots) as an intervention might offer a promising option that is feasible and effective in improving vaccine confidence and acceptance while improving access to vaccine-related information.

Vaccine chatbots could complement existing tools and offer an invaluable information source that can supplement other forms of health communication and engage users who might otherwise feel judged when asking vaccine-related questions. Additionally, social listening is critical for keeping a finger on the pulse of real-time changes in sentiment, concerns, rumors, and misinformation, as this monitoring allows chatbots to evolve and remain relevant.

This study targeted the most hesitant population, who had delayed or refused COVID-19 vaccines for months. Chatbots might help identify the main reasons for postponing or rejecting the vaccines, and a targeted communication and engagement strategy will be needed to address the issues. More evidence is encouraged to assess if chatbots can effectively respond to concerns, rumors, and misinformation before they gain traction and can be utilized as a communication channel complementary to current public health strategies.

# A MODEL FOR ESTIMATING AND PREDICTING VACCINE HESITANCY WITH SOCIAL MEDIA

## ORGANIZATION NAME

Macro-Eyes, Inc.  
Monika Obrocka  
Megan Rogers  
Jean Githae  
Mesay Bejiga  
Jeni Stockman

## GEOGRAPHY

Western Cape, South Africa



## FOCUS POPULATION

All (population of Western Cape Province)

## METHODOLOGY TYPE

Machine Learning model

## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

With the knowledge, tools, and technology we have developed working on predicting demand for health services such as immunisation, we have learned that health seeking behaviors change depending on what is required to access services, and available supply. Drawing data from social media, we will build and test a machine learning system to predict local vaccine hesitancy. These predictions will equip the health system with actionable insights on where to prioritize allocation of vaccines and target resources to communities where behavioral interventions are needed before doses are sent.

## KEY FINDINGS

Through this research, we have found that the use of social media to monitor and respond to public sentiment around vaccines is a valuable tool for health officials and allows health officials to get an accurate picture of public sentiment surrounding vaccines. This information can help precise allocation of resources during vaccination campaigns, including how and when to roll out vaccinations to specific populations. In addition, we have discovered that using specific platforms (such as Facebook) for this purpose is more effective than others (such as Twitter). This information could be used by public health officials to develop targeted outreach campaigns in order to improve vaccination rates among at-risk populations.

Learning sentiment through leveraging of public social media data can also help identify any areas where there may be opposition or hesitancy towards getting vaccinated, so that these issues can be addressed directly by health officials. Additionally, tracking

**Investigating the connection between social media and vaccine uptake is important to help organizations and leaders understand how social media platforms can be leveraged to increase the health and resiliency of communities around the world.**

social media chatter provides a way for health officials to quickly address any concerns or misinformation that may arise online about vaccines. Doing so helps ensure that people are accurately informed about the safety and benefits of vaccinating themselves and their families.

Our analysis found that both sentiment analysis (measuring public confidence) and spatial accessibility (measuring ease of access) are important indicators for understanding why some communities may be hesitant about getting vaccinated.

### KEY PROCESS INSIGHTS

Over 6 months (January – June 2022) we developed a model using sentiment analysis and incorporating derived data on access to infrastructure to assign numerical hesitancy scores to geographical areas.

To better understand individual intent to get vaccinated, we considered practical and logistical barriers to vaccination. More specifically, ease of access to vaccines and vaccination sites which play a role in vaccine hesitancy. For example, if people do not have easy access to a vaccination site, they may be more likely to hesitate or refuse vaccinations. This approach considers factors such as capacity of facilities; the cost of the clinical visit and vaccine; and physical access including geographic and functional proximity to vaccines. The approach also has the added benefit of identifying areas with low accessibility and potential intervention points.

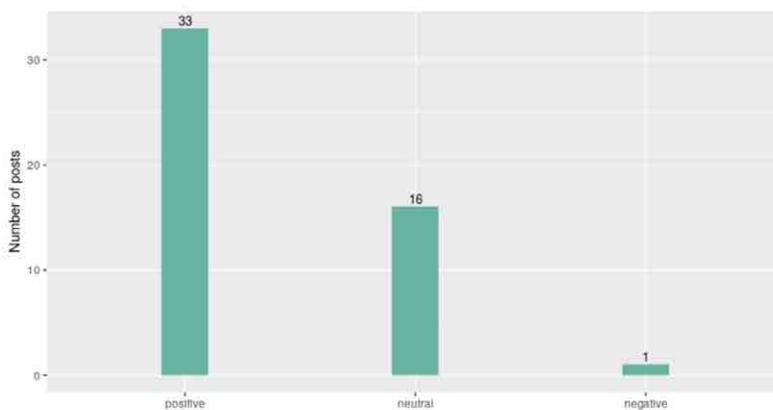
We have developed a model framework that combines two approaches, namely sentiment analysis and access to infrastructure, to assign numerical scores representing vaccine hesitancy to geographical areas.

We combined sentiment analysis and data on access to infrastructure to ensure that the outputs distinguish between low vaccination rates due to hesitancy and due to limited access to vaccination sites.

### RECOMMENDATIONS

The use of social media to monitor and respond to public sentiment around vaccines is a valuable tool for health officials. This methodology needs to be applied and run-in real time during the roll out of vaccines, or during specific vaccine campaigns, specifically when there is more likely to be social media engagement. The main COVID-19 vaccination programs in South Africa have passed their peak in terms of rollout and implementation. However, this methodology has potential for future, routine vaccination programs, whether COVID-related or other, as well as being implemented from the start during future pandemics.

Presented methodology allows health officials to get an accurate picture of public sentiment surrounding vaccines. This information can help them make decisions about how and when to roll out vaccination campaigns. It can also help identify any areas where there may be opposition or hesitancy towards getting vaccinated, so that these issues can be addressed directly by health officials. Additionally, tracking social media chatter provides a way for health officials to quickly address any concerns or misinformation that may arise online about vaccines. Doing so helps ensure that people are accurately informed about the safety and benefits of vaccinating themselves and their families.



Source : Sentiment analysis of vaccine relevant Facebook posts

### ◀ BREAKDOWN OF SENTIMENT IN FACEBOOK POSTS

Among the posts identified as being relevant, the majority were of positive sentiment, as shown in the figure below. We hypothesized that as this is a retrospective scrape, looking back several months to when the vaccine roll out was actively taking place, the negative or very polarizing posts may have been removed by group moderators or taken down by the poster themselves. Additionally, we only scraped public pages and groups. We recognize that more emotive and polarizing posts could be taking place in private groups which we do not have access to. This will remain a constraint.

# USE OF VOICE-BASED SOCIAL MEDIA MESSAGES TO IMPROVE VACCINATION KNOWLEDGE AND CONFIDENCE IN UNDERSERVED PERI-URBAN COMMUNITIES

## ORGANIZATION NAME

Mali Health

## GEOGRAPHY

Bamako, Mali

## KEY PARTNERS

OSI Tech

## FOCUS POPULATION

Women living in peri-urban communities with limited reading and writing skills

## METHODOLOGY TYPE

This project used a mix of qualitative and quantitative evaluation methods, including individual interviews and focus group discussions. The project relied and built on a participatory evaluation of social and gender norms conducted in the target community conducted before the project.



## SOCIAL MEDIA PLATFORM/S USED

Kènèya Blon

## PROJECT SUMMARY

Kènèya Blon is a voice-based platform developed with women living in peri-urban communities in Bamako, Mali, for delivering health information in low-connectivity and limited-resource settings. This project aims to test the ability of Kènèya Blon to improve vaccination knowledge and confidence in marginalized communities.

## KEY FINDINGS

The key results of this project include:

- 100% of women who used the application demonstrated improved knowledge about the benefits of vaccination against COVID-19
- 75% of women who used the application expressed confidence in vaccination against COVID-19
- 73% of women who used the application shared the information they learned with others
- 60% of women who used the application felt better equipped to convince others to get vaccinated against COVID-19

**This project demonstrated that the use of participatory methods and tools to develop and disseminate voice-based social media messages improved both knowledge of, and confidence in, vaccination against COVID-19 in underserved peri-urban communities in Bamako, Mali.**

## KEY PROCESS INSIGHTS

Using participatory methods to understand the needs and behaviors of the target population, and the norms which govern them, was essential to the ability of the project to have an impact on vaccine confidence. The end users were involved in every step of developing the original platform; when assessing how to use it to address vaccine confidence as a part of this project, their participation was necessary.

At the beginning of the project, 95% of those surveyed in peri-urban communities in Bamako did not trust COVID-19 vaccines and had no intention of getting vaccinated. According to the same survey, the primary reason given was a lack of access to trusted health sources that could provide accurate information, or correct misinformation. A lack of access to health professionals and reliable health information was a key factor in acting on misinformation and the adoption of positive behavior changes.

The Kènèya Blon application was able to remove this primary barrier. Users were able to access health personnel for the management of their concerns related to COVID-19 vaccination, which is why despite the short duration of the intervention of this project it obtained significant results.

## RECOMMENDATIONS

- Technology and digital interventions must be adapted to the realities of each community or population it is trying to serve; this adaptation can be based on the very design of the application, the language used, the images used, but also the social/gender norms, the kinds of misinformation circulating, etc.
- When coordinating with offline health services, ensure the quality and availability of a respondent for interactions with users, as well as the quality and availability of the vaccination service at the health center level; when possible, train these providers in the use of digital tools/messages being used in their communities
- The dissemination of messages relating to COVID-19 must be ongoing
- Integrate the use of relevant, local digital tools into

mobilization strategies around vaccination against COVID-19

- Promote the use of digital tools within target communities with on-the-ground and face-to-face strategies to build trust
- Though access to technology is increasing, it will continue to be a limiting resource for millions, especially for women with limited literacy and numeracy skills: continue the search for strategies that can share voice-based messages on the types of phone and technologies that are available

**“I am not against vaccination in general, but in relation to vaccination against COVID-19, I received a lot of contradictory information from my friends or through social networks; which created doubts and uncertainties that led to hesitation and even fear of the COVID-19 vaccine on my part.**

**My fear started to dissipate when I installed Kènèya Blon in my phone and received the correct information. I then made the decision to get vaccinated after discussions that I had the opportunity to have with the health staff through the application. I have already gone to the health center to register for the vaccination when it is available. I am just waiting for the health center to call me for an appointment to get vaccinated.”**

– Mme. Bathily, Sabalibougou, Mali



### ▲ BUILDING TRUST

Local participants learn about the Sabalibougou app at a promotional event held by Mali Health 22/2/2022 in the community of Sabalibougou in Bamako, Mali.

# DIVERSITY: IMPACT ON VACCINE EQUALITY (DIVE)

## ORGANIZATION NAME

Minority Rights Group

## KEY PARTNERS

Bytes for All

Verité Research Pvt Limited

Grand Synergy Development Initiative (GSDI)

## FOCUS POPULATION

Minority and marginalized communities in the target countries.

Algeria—focus on [Amazigh/Tamazight](#) speakers.

Kenya—focus on [Somali](#) population.

Pakistan—focus on [religious minorities](#).

Sri Lanka—focus on [Tamils](#) and [Muslims](#).

## GEOGRAPHY

Algeria, Kenya, Pakistan, Sri Lanka



## SOCIAL MEDIA PLATFORM/S USED

MRG



BFA



Verité  
Research



GSDI



## METHODOLOGY TYPE

**Partnership:** MRG signed an MOU with three partners with existing strong relationships of trust and acceptance in target communities. Each partner led on the work in their respective country with MRG leading in Algeria. Furthermore, B4A led on the social media monitoring technical aspects and MRG coordinated the overall and extracted lessons from each bulletin to share with international policy makers, media and influencer audiences.

**Theory of Change:** Considering social media content analysis can surface variations in vaccine confidence and access between minority and majority communities. Social media content based on these findings and created with participation can address confidence sappers and differential allocation of resources for vaccination provision.

**Research:** The project evaluates information gathered in each context with two methods. The first method involved the use of social media listening and monitoring tools, CrowdTangle and Brandwatch. The second method served to triangulate the findings from monitoring social media and was different for each setting: a largescale face-to-face survey in Sri Lanka involving 2479 participants, 30 radio talk shows in various locations in Kenya, thirteen citizen journalism pieces from different parts of Pakistan, and four focus group discussions (FGDs) with participants inside Algeria or involving diaspora representatives.

The findings of this study are the result of social media monitoring (Facebook & Twitter) and analysis, covering a period of more than 12 months starting from each countries' vaccination rollout or kick-off vaccination campaigns and to date (around January 2021 – March 2022). Each country had its own timeframe of analysis: Sri Lanka January: January – October 2021, Algeria, and Kenya: January 2021 – March 2022, Pakistan: February – March 2022.

Overall, a sample of 2,727 Facebook comments (and tweets only in Sri Lanka), were analyzed with respect to four sentiments: COVID-19 vaccine confidence, reservations towards the vaccine, access to vaccines; and distrust in health and other government authorities regarding the administration and dissemination of information related to the vaccine.

Data was compiled and analyzed to create [two bulletins x target country](#). All bulletins were produced in multiple language versions (Tamazight + French/Arabic, English + Somali, English + Sinhala + Tamil, English and Urdu) to ensure that all the relevant communities could have access to it.

To address lower confidence in minority communities the team established participatory processes to investigate media messaging to address confidence sapping rumors or beliefs (e.g., in Sri Lanka and Kenya). In both cases, messages were disseminated and promoted to reach target audiences, in Pakistan, a meeting with government representatives was planned, and in Algeria, a webinar to address the findings.

**Equity:** This project actively targeted marginalised communities known to be at risk of lower rates of vaccination to address inequity. Marginalised communities are not homogenous and discrimination affects women, people living with a disability, the elderly as well as other vulnerable sub-groups of the target communities were considered wherever possible.

## PROJECT SUMMARY

This project will use Brandwatch and CrowdTangle social media monitoring to track and understand online sharing across diverse ethnic, religious and linguistic communities about COVID-19 vaccine confidence, uptake and access in Algeria, Kenya, Pakistan and Sri Lanka. Due to partial penetration of social media use among some poor/remote communities, the social media data will be triangulated using one other method in Algeria, Sri Lanka and Pakistan. In each context, uptake is affected by supply, access and vaccine confidence. The social media monitoring will search for sentiments relating to frustration concerning lack of supply as well as expressed grievances concerning disparities in supply or selection of vaccines. Based on the findings, the research team will publish [quarterly briefings](#) and will generate locally relevant social media materials in minority languages to address rumors, disinformation, mistrust and/or problems in access or supply of vaccinations. The ongoing social media monitoring will continue to ascertain the impact of those materials and their dissemination and sharing across the community in question. The project will focus on indigenous Tamazigh speakers in Algeria, Muslim Somalis in Kenya, religious minorities in Pakistan and Tamil, Muslim, and Sinhala Buddhist ethno-religious groups in Sri Lanka. Each of these contexts involves communities whose members are politically, socially, and economically marginalised, and other than Pakistan, living in remote and rural locations. The research will use MRG's and partners' unrivalled knowledge of, access to and trust of these excluded communities to understand and report on their vaccination confidence, uptake, and access.

## KEY FINDINGS

- When data is disaggregated by ethnicity, language and religion, findings help explain issues such as residual pockets of non-vaccination in Sri Lanka, or the fivefold difference in vaccination rates between different areas of Kenya.
- Tamil and Muslim social media users were more likely to display low to no confidence, and based on the survey, three times more likely to remain unvaccinated in comparison to members of the majority Sinhala community.
- Amazigh social media users in Algeria were more likely to express no confidence in COVID-19 vaccines than the general population (28 per cent compared to 18 per cent).

**When data is disaggregated potentially significant differences emerge which may help to explain residual pockets of non-vaccination in Sri Lanka, or the fivefold difference in vaccination rates in different areas of Kenya, thus treating diverse populations as homogenous in a misguided attempt to save time or money or to promote efficiency which can create a high risk of back-firing and can mean efforts do not reach the intended targets.**

- Muslims in Kenya were significantly more likely to express that the vaccine was not a real vaccine (17 per cent versus 4 per cent among Christians and Somali), a reservation unique to Kenya and not mentioned in the other three countries.
- Among the Amazigh community in Algeria, conspiracy theories were the most frequently mentioned reservation: 25.3 per cent versus only 13 per cent of social media users from the general population.
- Access to information in all languages in Algeria demonstrated some limitations, as official online sources did not provide information on COVID-19 vaccines in Tamazight, an official language in Algeria, but made it equally available in Arabic and French, the latter not being an official language.
- Data captured via social media did overall display differences compared to triangulation methods, which we consider are likely due to the bias in the sample of the population (smart phone owning and active on social media) as well as differences in frankness and openness between online and real-world expression settings.

## KEY PROCESS INSIGHTS

Having minority representatives working on the research was crucial for the success of our project. As a way of example, the recruitment of Amazigh researchers provided a strong knowledge of the context, necessary language skills and access to the community, which is significant in a context where security concerns are high.

Our methodology can be adapted to various contexts, yet social media research can be challenging due to local factors. This was the case in Algeria, where the use of Tamazight in social media is not widespread, especially

in the context of health crisis and this limits chances of collecting comments from the Amazigh community based on language. Besides, some Amazigh people have Arabic names, and this means some members of the Amazigh community were not identified in the data by name.

In Pakistan, the unavailability of sufficient data on our topic may be due to the low proportion of religious minorities within the overall population and the fact that they may be less likely to own and regularly use a mobile phone. Therefore, having it complemented with on ground data from the survey and citizen journalism pieces was a valuable part of the research.

It was essential to shift the research from posts on social media to comments. Most posts were from official sources and did not indicate any sentiments towards COVID-19 vaccines, whereas comments to posts revealed a wide array of sentiments.

Focusing solely on social media findings is not representative in settings that have partial internet penetration, and thus such data should always be supported with additional sources of information from non-digital sources as our project tested and achieved.

### RECOMMENDATIONS

- Everyone involved in rolling out COVID-19 vaccinations should be aware of ethnic, religious, and linguistic barriers to vaccine access and take up.

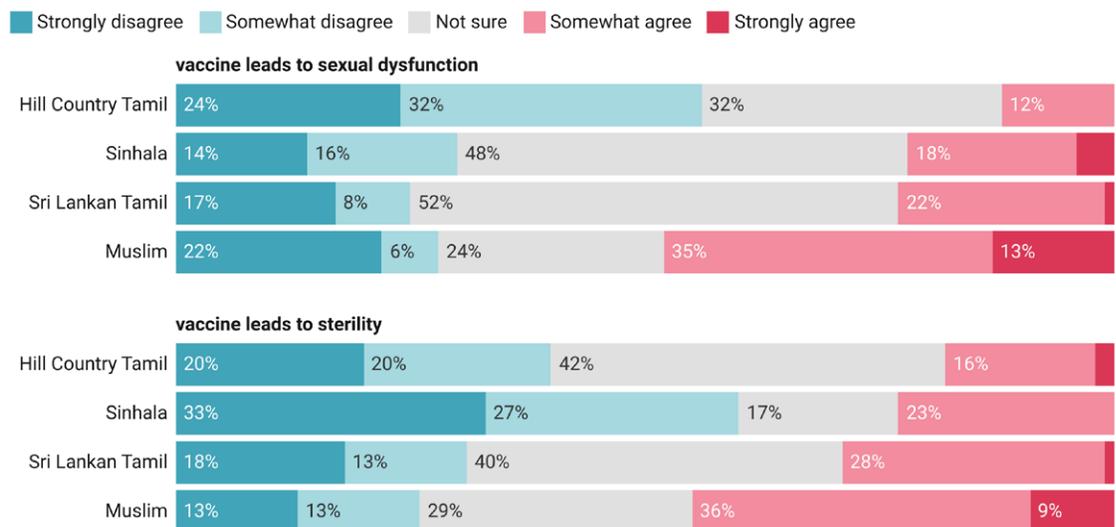
**“It is very discouraging waking up in the morning with an intention of saving the population from the pandemic through administering vaccines but returning with almost 60% of our daily target completed and unused doses.”**

–Nurse at a government health facility on Marsabit County, northeast Kenya

- To ensure reach to all groups, the benefits, risks, and modalities of vaccinations should be communicated in all languages spoken in a territory, via multiple media outlets, via multiple formats (online, offline, written, audio), and through means that can reach areas not served by phone signals or internet access, and for those who are not literate.
- Where distrust exists between local populations and health authorities, extra efforts should be made to involve trusted figures to convey key information and help rebuild trust.
- Availability and take up of vaccinations should be monitored and tracked by a wide range of characteristics including geography, ethnicity, gender, age, and disability.
- Provision of community sympathetic online reporting systems concerning clinics not functioning, stock outs or other health access or health dignity problems that don't depend on individuals owning a mobile phone.

### BELIEFS AND MISCONCEPTIONS ABOUT REPRODUCTIVE AND SEXUAL SIDE EFFECTS CAUSED BY COVID-19 VACCINES

Breakdown by ethnicity/religion in Sri Lanka based on survey data



# WHERE PAST MEETS PRESENT: UNDERSTANDING INDIGENOUS COVID-19 VACCINE HESITANCY

## ORGANIZATION NAME

Morning Star Lodge

## KEY PARTNERS

Star Blanket Cree Nation  
Kihew Kawaskasit Health Services

## FOCUS POPULATION

Reserve-residing and urban members of Star Blanket Cree Nation.

## METHODOLOGY TYPE

Indigenous community-based participatory research.

## GEOGRAPHY

Implemented virtually within Star Blanket Cree Nation, 18 kilometers Northeast of Balcarres, Saskatchewan.



## SOCIAL MEDIA PLATFORM/S USED

Community-run information page on Facebook.

## PROJECT SUMMARY

This project will pilot two social media interventions that are informed by historical and contemporary sources of hesitancy. One intervention will address the narrative tactics used by conspiracy theories while the other employs behavioural insights. Social media analytics will provide intermediate measures of effectiveness. Established Indigenous Community Research Advisory Committees will guide all aspects of research and provide assessments and recommendations.

## KEY FINDINGS

Indigenous vaccine hesitancy does not necessarily mean low vaccination rates. Assuming that Indigenous vaccine hesitancy will result in low vaccination rates is deficit-based and undermines the strengths, abilities, and expertise within a community.

In the complex space of Indigenous vaccine confidence, many factors, such as culture, can be used to overcome vaccine hesitancy or justify refusal. Furthermore, the community members engaged in this research do not perceive empathy to be a consistent component of vaccine confidence promotion.

Vaccination-promoting social media posts that are entirely developed by community appear to perform better than those that are, partially or entirely, developed externally. While the sample size was small, the six posts developed, and piloted, during this research had a mean of 0.66 likes and 46.166 views. The six community-developed posts that most closely preceded this research had a mean of 2.33 likes and 64.66 views.

**In Canada, Indigenous vaccine hesitancy is complex; however, as is often the case, solutions may be more likely found within the community rather than within the Academy.**

Finally, history does contribute to Indigenous vaccine hesitancy; however, Indigenous Peoples exist within modern Canada and are exposed to, and influenced by, many of the same factors leading non-Indigenous Peoples to be COVID-19 vaccine hesitant. A failure to account for these modern factors leaves our understanding of Indigenous vaccine hesitancy incomplete.

### KEY PROCESS INSIGHTS

Communities are dynamic, and this includes their priorities. Something identified as high priority when funding is applied for may not remain so when funding is approved and research begins. Furthermore, the piloting of any solutions must include what the community intends to do. Many have argued that the solutions to Indigenous health inequities lie within Indigenous communities, knowledges, and cultures. Therefore, funding proposals for health research with Indigenous communities should be written such that research can pivot from seeking for solutions, to supporting and seeking to understand Indigenous-led self-determined solutions.

Finally, it is well known that research with Indigenous Peoples needs to be self-determining. That being said, self-determination and research feasibility exist on a spectrum with research becoming less feasible with

increased self-determination. Researchers need to be aware of this and select, and accurately report, exactly where their research sits on this spectrum.

### RECOMMENDATIONS

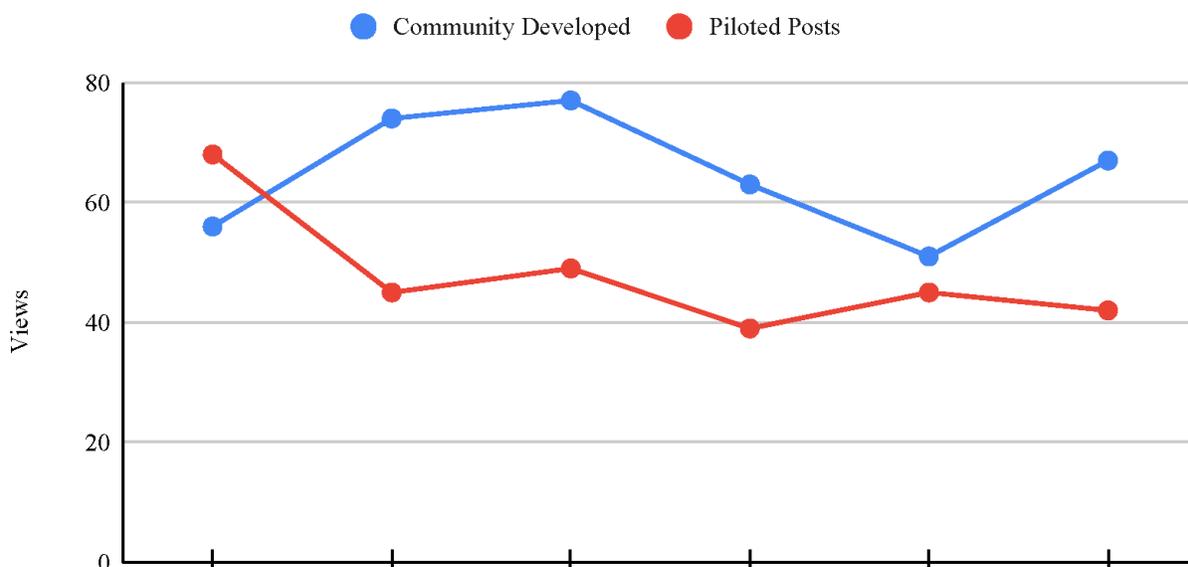
Anyone looking to promote vaccine confidence within Indigenous communities in Canada should first look to support self-determination and community-driven solutions. Communities have expertise and local cultural and social knowledge that are crucial for effective vaccination promotion.

Supporting community, however, is not the first step in promoting Indigenous vaccine confidence. Before being able to support community, mutually beneficial and authentic relationships must exist between community members and healthcare workers or health researchers. Forming and strengthening these relationships should be a priority so that they are in place before the next major public health crisis emerges.

Finally, an academic understanding of vaccine confidence and Indigenous vaccine hesitancy can be useful; however, what is actually happening in community can differ greatly from academic reporting. Ultimately, observations and comments emerging from community appear more useful and accurate than those that are found in academic literature.

#### ▼ COMMUNITY DEVELOPED POSTS OUT PERFORMED PILOTED POSTS

A chart depicting the performance (views) of community developed posts in comparison to piloted posts.



# MODELING VACCINE CONFIDENCE INTERVENTIONS FOR MARGINALIZED MIGRANT COMMUNITIES: A MIXED METHOD APPROACH TO LEVERAGING SOCIAL MEDIA NARRATIVES

## ORGANIZATION NAME

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Dr. Juwon Hwang, Oklahoma State University  
Dr. Asya Cooley, Oklahoma State University  
Dr. Robert Hinck, Air University  
Dr. Jared Johnson, Oklahoma State University  
Pablo Aguirre, AV8 Analytics

## GEOGRAPHY

USA



## FOCUS POPULATION

Hispanics in the United States

## METHODOLOGY TYPE

Mixed-method (depth interview, thematic and computational social media analyses, experimental survey)

## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

The goal of this research project was to address the disproportionate impact of COVID-19 among marginalized migrant populations, as well as the lack of research on vaccine confidence among these populations. This novel interdisciplinary mixed-methods study design sought to identify, model, analyze, design, and validate narratives of vaccine confidence among marginalized migrants in the US.

The initial phase of the project featured in-depth interviews with marginalized migrants in the Stillwater, Oklahoma area, and surrounding region, to qualitatively explore the themes of vaccine confidence.

The second phase included qualitative data analysis of social media comments expressive of vaccine confidence as well as a quantitative narrative analysis, identifying the specific features and story structures migrants use when expressing vaccine confidence.

Finally, the third phase used the previous analyses to design narratives expressing vaccine confidence. These narratives were post-tested through a nation-wide survey.

**This study demonstrates how sourcing culturally specific narratives enhances message persuasiveness; here, confidence in the COVID-19 vaccine among Hispanic survey participants is increased when participants are exposed to culturally specific expressions of vaccine confidence derived from Hispanic communities.**

## KEY FINDINGS

The findings show the importance of narrative theory when crafting persuasive messages and validate that culturally specific narratives and imagery are more persuasive than generic messaging to target audiences. An important consideration in communicating to vulnerable Hispanic migrant populations is allowing them to see and hear representations of themselves in the messaging. Particularly in messaging concerning public health. Here cultural specificity is not merely adopting the symbolic aspects of culture and layering them into messaging, rather it is an amplification of organic community narratives with key mutually understood cultural nuances. While preference is also given for messages with images that look like self, that more persuasive narratives accentuated Hispanic cultural themes of collectivism and community concern is the study's key finding. These themes were consistent drivers in expressions of vaccine confidence among Hispanics in data collected across the project. The study also shows those at high risk, and thus perhaps more likely to be seeking out information concerning the vaccine, responded most favorably to culturally specific narratives. Overall the study shows the significant impact culturally tailored messaging can have in increasing confidence in the vaccine to those seeking information in Hispanic communities.

## KEY PROCESS INSIGHTS

The study highlights the value of mixed methodology approaches to crafting persuasive narratives, as well as further validates the value of narrative theory. Our novel methodology and empirical findings demonstrate the effectiveness of identifying culturally situated discourses as a means to amplify organic community narratives to boost vaccine confidence.

Given the barriers to access the Hispanic migrant community in the US face concerning COVID-19 vaccination, this study shows that amplifying organic cultural narratives and providing representation of Hispanics in messaging can enhance vaccine confidence; particularly among those who see themselves at higher risk to COVID-19.

## RECOMMENDATIONS

Our study shows that messaging toward Hispanics concerning vaccination should consider amplifying organic cultural expressions of vaccine confidence from within the community. Having access to medical information outlining the benefits and risks of vaccination and hearing from individuals trusted in the community such as nurses is important to Hispanics. The responsibility to family and community members resonates. We would recommend COVID-19 messaging directed toward Hispanics take into account existing community expressions of vaccine confidence and amplify those as a priority, as well as to meet Hispanic community members where they are with easily accessible information.

# EXPLORING DRIVERS OF HPV VACCINE CONFIDENCE AND COMMUNITY-LED SOLUTIONS LEVERAGING THE EXPERIENCES OF MOTHERS, DAUGHTERS, AND HEALTH-CARE PROVIDERS IN BRAZIL

## ORGANIZATION NAME

### ORB International:

Johnny Heald  
Richard Hooper  
Michael Gibson  
Rohan Puri

### Vaccine Confidence Project at the London School of Hygiene and Tropical Medicine:

Sarah Malycha  
Clarissa Simas  
Elliot Grainger  
Ana Bolio  
Felipe Pires Dias

### Real Chemistry:

Eleanor Dickinson  
Henri Ghosn

## FOCUS POPULATION

Mothers of daughters who are eligible for a HPV vaccine

## METHODOLOGY TYPE

Quantitative survey of 1,000 interviews with mothers through focus groups, discussions with mothers, in-depth interviews with HCPs, and co-recreation of workshops with mothers and their daughters.

## GEOGRAPHY

Brazil



## PROJECT SUMMARY

Quantitative research project seeking to develop recommendations and insights on how to improve HPV vaccine uptake. Focused on Brazil for its large population, high rates of HPV among sexually active, unvaccinated women (Wendland et al., 2020), and its struggle to contain COVID-19 online misinformation; though the approach and findings will be designed to be replicable for other markets. Our project utilized methodology was designed to provide rich actionable insight through four research phases. Each research phase has provided a new perspective on the challenges to HPV vaccination uptake and provides insight into the development of solutions to overcome them.

**The biggest challenge we encountered in research is not hesitancy or rejection. It is a lack of broad awareness about HPV vaccination.**

## KEY FINDINGS

The key barrier identified to HPV take-up is a lack of clear information not hesitancy. Brazil has a strong vaccination tradition that has somewhat insulated the population from any spikes in anti-vaccine sentiment or vaccine hesitancy. Post COVID-19 there is also a greater interest in vaccines and demand for more information. Trust in the health system and health care providers (HCPs) is high, HCPs are the most trusted source of information on vaccination. There is a lack of clarity around HPV vaccination, our research participants were unclear on availability and benefits of vaccination. Information on HPV vaccination, particularly concerning the immunization window and vaccination timings, is patchy and inconsistent. The journey to jab is unclear and inconsistent, depending on your local health provider, access to vaccination and information can vary wildly. Though social networks are a vital source of information for our audience there is suspicion over information received through these sources. To counter this mistrust the right people should be used to deliver the messages. HCPs were seen as ideal for this task. Cancer prevention is the most motivating messaging for mothers. Mothers and their daughters want to see themselves reflected in communications.

## KEY PROCESS INSIGHTS

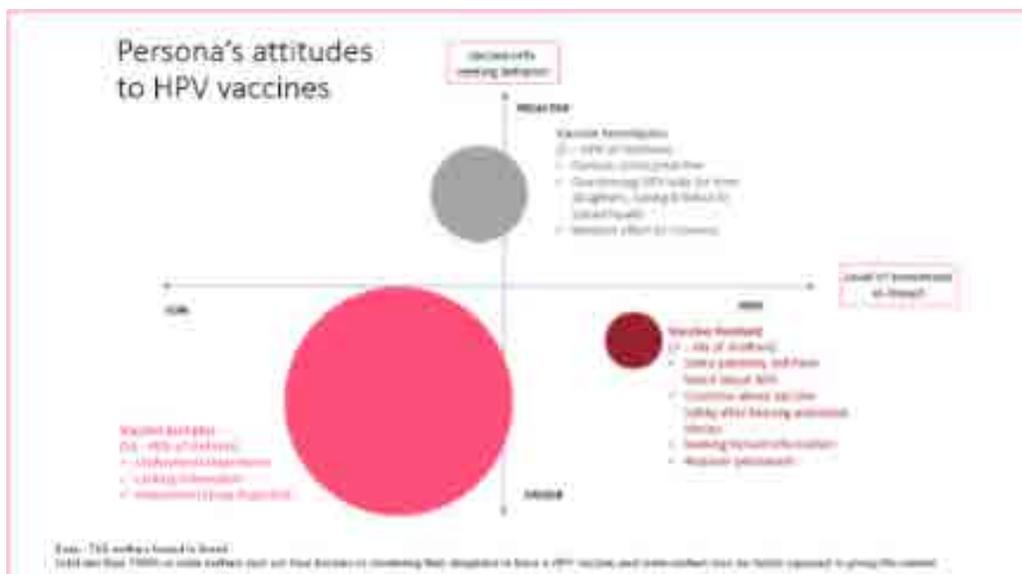
- Collaborating with our cross-disciplinary team of partners has worked well in the design and

implementation of our initial phases of research, learning from each other's fields of expertise.

- Data protection law in Brazil (LGPD) meant we were unable to collect social media handles of research participants and for them to share screen shots prior to the focus groups as planned. We addressed this situation by asking participants to send screenshots of online material they saw in the run up to the focus groups to our local fieldwork partner. The screenshots were then collated and sent to us, without any identifying information, to inform our research and analysis.

## RECOMMENDATIONS

- Increasing HPV vaccination rates in Brazil will not be easy but the communications challenges we face are relatively simple to overcome.
- To win we need to get the fundamentals of communication right, before we consider innovation, we need to create a framework for communications.
- We need to grow awareness around the HPV vaccination to a wide audience.
- We need to provide clear, concise and credible information to help our audience understand why vaccination is vital.
- We need to reinforce messaging with timely and relevant reminders of when, where, and how to access vaccination.



## WILLINGNESS TO SEEK HELP ON SOCIAL MEDIA

A comparison of willingness to get help from social media pages featuring Hispanic image and Spanish, Hispanic image and English, non-Hispanic image and Spanish, and non-Hispanic image and English by participants' ethnicity.

# HARNESSING VIRALITY FOR VACCINE CONFIDENCE: TESTING TACTICS TO OPTIMIZE SHARING OF PRO-VACCINE CONTENT BETWEEN WHATSAPP

## ORGANIZATION NAME

Purpose Campaigns LLC

## GEOGRAPHY

Nigeria, South Africa, India

## KEY PARTNERS

Mythos  
SBM

## FOCUS POPULATION

Members of Public WhatsApp Groups in Nigeria, South Africa and India  
Members of private civil society WhatsApp Groups in Nigeria

## METHODOLOGY TYPE

The study was conducted between the 17th of February and the 3rd of March 2022 by posting specifically designed pro-vaccine content into open WhatsApp group channels in India, Nigeria and South Africa, and evaluating the impact of that content on both WhatsApp group behavior, cross-channel behavior within WhatsApp, and cross-platform sharing behaviors. This approach was compared to other communication strategies including posting in closed WhatsApp group channels as well as email and paid media dissemination.



## SOCIAL MEDIA PLATFORM/S USED



We also used email.

## PROJECT SUMMARY

This work was conducted in India, Nigeria, and South Africa in February and March 2022, and used an open WhatsApp group channel approach with adapted methods. In addition to open WhatsApp groups, this study used closed WhatsApp groups, paid media, and owned email lists. The purpose of this experiment was to test approaches to encourage sharing of pro-vaccine content pieces - both sharing cross-channel (between open and closed channels within WhatsApp), and sharing cross-platform (between email, paid media, and WhatsApp).

## KEY FINDINGS

Public WhatsApp groups provide rich territories for seeding pro-vaccine content, however the platform is used in distinct ways in different contexts and content must be adapted for the platform.

- Open WhatsApp group channels provide rich territories for seeding pro-vaccine content. 28% of groups engaged with a pro-vaccine content link. Over 5% of the content links initiated in public group channels were re-shared within WhatsApp to other WhatsApp channels one or more times. Seeding content into WhatsApp can generate clicks and shares to public social media platforms such as Facebook.

**Public WhatsApp groups provide rich territories for seeding pro-vaccine content, however the platform is used in distinct ways in different contexts and content must be adapted for the platform.**

- Links that were initially shared on WhatsApp were also more likely to be reshared on WhatsApp than other origin platforms.
- Paid media and email lists can also generate content sharing into WhatsApp. However, the rate of cross-platform sharing was lower than sharing within WhatsApp.
- Funny pro-vaccine content was more likely to be clicked-through, engaged with, and shared than more 'official' pro-vaccine content via paid media and email platforms. This was particularly true in South Africa and Nigeria.
- Indicative results suggest that audiences were more likely to share the meme style pro-vaccine content on the paid media platform, however, once users reached the more formal Sharer Tool page from the Meta platform. Nigerian and South African users were more likely to share the official content.
- Content in email or WhatsApp performs better with a CTA. Indicative findings suggested that on these platforms, content with a CTA is more likely to be shared from these channels, particularly in India. This was also true in Nigeria, but not in South Africa.
- On paid media, share rates were typically higher on platform channels for content without a CTA.

## KEY PROCESS INSIGHTS

A high volume of WhatsApp users can be reached at scale. Our research teams were able to identify over fifty thousand open WhatsApp group channels in four specific countries, targeting groups associated with a range of specific interests from politics to football and alumni groups that all provide opportunities to both learn about and develop content for audiences with clear associative ties.

Nevertheless, the process of joining these groups is time consuming and challenging. Yield rates of viable groups are relatively low (roughly 1%) and manual group joining can be cumbersome. However, automation tools can provide capacity to reach large numbers of WhatsApp users at scale by automating the group joining and evaluation process.

Another challenge to highlight is the attrition of WhatsApp groups over time, as they may change names, become administrator only, or remove the researcher account. Any programme relying on interventions in WhatsApp groups must continuously identify and join new groups to mitigate against this challenge.

Because of challenges related to group joining, more long-term research is needed to confirm our findings as only a small number of groups were included.

A high proportion of Nigerian WhatsApp groups were excluded from our sample because of our strict research protocols that removed any groups where explicit material was exchanged. Campaigners could utilize less restrictive screening protocols to enable access to a higher volume of users.

		Counts		Re-share rate			
		Links	Shares	Overall	India	Nigeria	South Africa
		349	18	5.16%	9.80%	4.76%	0.65%
Funny	No CTA	90	2	2.22%	5.71%	0%	0%
Funny	CTA	99	6	6.06%	10.20%	0%	2.27%
Official	No CTA	78	0	0%	0%	0%	0%
Official	CTA	82	10	12.20%	22.86%	15.39%	0%

### SHARES FROM WHATSAPP CHANNEL TO WHATSAPP CHANNEL

Re-shares on call to action (CTA), funny and official posts.

## RECOMMENDATIONS

- **Utilizing open WhatsApp group channels is a key modality for interventions targeting closed WhatsApp group channels.** If a campaign aims to tackle misinformation or engage audiences within WhatsApp, it is beneficial to seed content within the platform itself.
- **Campaigners targeting Indian audiences should prioritize WhatsApp as a key platform.** On WhatsApp, Indian users were the most frequent sharers of pro-vaccine content. On other platforms, Indian users were the least frequent sharers compared to Nigerian and South African users. This is particularly pertinent given the finding that misinformation levels were the highest in open Indian WhatsApp groups when compared to Nigerian and South African groups.
- **Campaigners targeting Nigerian audiences should also prioritize WhatsApp and funny content.** Whilst click-through, engagement, and share rates were lower among Nigerian audiences compared to those in India, they did demonstrate significant engagement on WhatsApp and when funny, meme style content was used.
- **Campaigners targeting South African audiences can expect significant click-through and engagement on paid media platforms as well as via email.** Our study found that South African users were the most likely to click-through both from the Meta platform to our Sharer Tool landing page and from the email campaign to a share post on their app. However, South African users who clicked through from the Meta platform became less likely to share than Nigerian and Indian users. This result could indicate a preference for less official/more informal spaces among South African Meta users, though further investigation is required.

# MODELING VACCINE-RELATED INFORMATION TO CREATE HYBRID INFORMATION HUBS FOR PEOPLE WITH DISABILITIES IN VIETNAM AND INDONESIA

## ORGANIZATION NAME

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Erlina Erlina, PhD. Gajah Mada University Indonesia  
Duy Dang, PhD. RMIT U Vietnam  
Ade Prastyani, MD, MCHM. Independent researcher

## GEOGRAPHY

Primary: Vietnam  
Secondary: Indonesia



## FOCUS POPULATION

People with Disabilities

## METHODOLOGY TYPE

Participatory, action research.

## SOCIAL MEDIA PLATFORM/S USED

The research was conducted remotely using Facebook and Zoom



## PROJECT SUMMARY

Our project is a direct response to the limited availability of vaccine-related information for people with disabilities (PWD) during the COVID-19 pandemic in Vietnam and Indonesia. Through action, participatory research, the project in particular advocates for more equitable vaccination programs. Through a series of online and offline information sessions and interviews, the expected research findings have the potential for creating equitable hybrid information hubs for groups who have been historically marginalized and to mainstream the need for a more inclusive pandemic preparedness, response, and recovery plans in the Global South.

**Although confident about the vaccine, many people with disabilities still face systemic barriers to vaccinations; more equitable information materials and dissemination is needed to promote vaccinations for people with disabilities within pandemic responses.**

## KEY FINDINGS

The following findings are based on a preliminary understanding on 150 interview data collected through a participatory action research from September 2021 to February 2022 in Vietnam and Indonesia:

- The limited availability of specific vaccine-related information deprives PwD of lacking information pertaining to side effects and the safety of the vaccines. If the information is available, its presentation was inequitable, primarily to the Deaf and Blind communities. The vaccination registration form was not designed for diverse users. No columns provided for PwD to state their disability type.
- Social media platforms in general were not the main information source about vaccines. But, in Vietnam Facebook and Zalo were among the platforms that the Deaf community perceived to be useful for seeking vaccine-related information from other PwDs. Those who live in rural areas or locations with an unstable Internet connection relied on opinion leaders and traditional communication means.
- Inequitable vaccination sites became a barrier to vaccinations.
- The wheelchair users found the vaccination sites in their neighborhood did not have ramps or were in places with multiple stairsteps. The Blind found it hard to navigate the vaccination sites as there was no accessible signage. The Deaf often faced difficulties in communicating their pre-existing health conditions due to the absence of sign language interpreters at the vaccination site.
- Inconsistent support at the local level was another challenge PwD faced. Due to their health conditions, doctors were reluctant to vaccinate them at the neighborhood vaccination site. PwD were often to get vaccinated at a referred hospital, therefore. During the strict lockdown where many public transportation services were halted, going to the hospital was arduous. Despite that, zero to limited support was given by the local authorities although PwD was considered as a priority list in the national vaccination program.

### GOOD TO GO

A person with Disabilities receiving a vaccination.

## KEY PROCESS INSIGHTS

Working with members of communities with disabilities have created opportunities to better engage the groups who have been historically marginalized and gather insiders' perspectives. We engaged the communities from the proposal development, implementation, to evaluation stage of the project. This practice mitigates the extractive tendency of researchers, preference to top-down interventions, and ableism in research intersecting technologies and disabilities. In diverse but digitally divided environments such as Vietnam and Indonesia, this practice gives a more nuanced view as to what digital and social media platforms are useful for communicating the intervention, what information sources fit the worldviews of the communities we are focusing on, and how to create equitable information.

In a context where the intervention is given to communities live in a highly centralized government role, working with stakeholders affiliated with government bodies is crucial. In Vietnam, we worked with two medical experts affiliated with a national vaccine institute and the ministry of health for direct information sharing about the country's vaccination programs.

In places where the implementation of disability rights is inconsistent, working with organizations of PwD allows for embedding the intervention into the existing infrastructures. Rather than creating a brand-new infrastructure, our project embedded the intervention to six partnered community organizations with adequate abilities to reach PwD living in both urban and rural areas with different Internet access and affordability. In small towns and rural areas, the information sessions, as a part of the action research, we had organized were the only intervention dedicated to providing vaccine-related information for people with disabilities (PwD).



## RECOMMENDATIONS

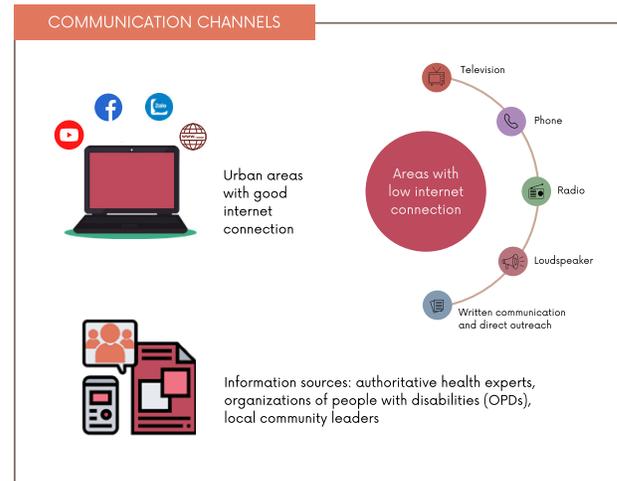
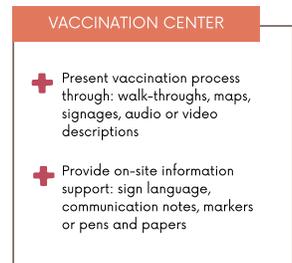
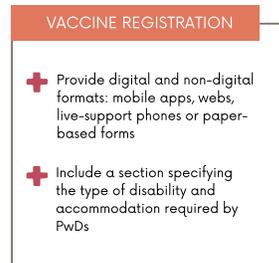
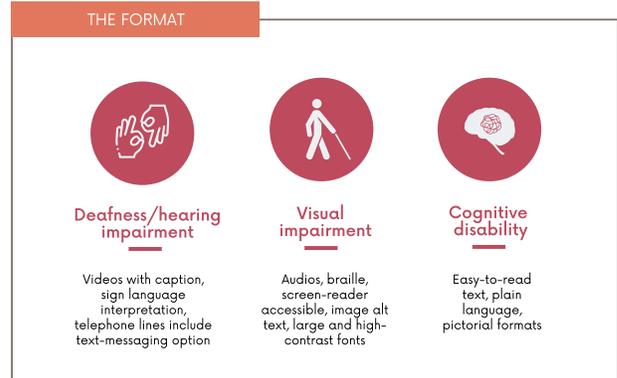
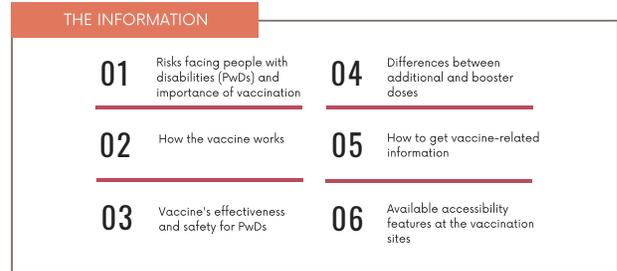
Vaccinations, from vaccine information to vaccination registration, should be equitable to people from all walks of life, including people with disabilities (PwDs), whom the WHO classifies as being at a higher risk of severe disease and death if contracted COVID-19.

Ideally, the government should collaborate with local organizations such as organizations of people with disabilities and services involved in the vaccination rollout to identify hurdles inhibiting PwDs from getting a vaccine, as well as devising effective approaches to addressing hindrances. Messages about vaccinations should entail vaccine disability-and-morbidity-specific safety and efficacy details, instructions for COVID-19 self-treatments; in addition to the importance of disability rights during the pandemic. The information must be presented in a range of accessible formats, e.g., sign language, braille, pictorial illustrations, and through diverse channels, e.g., social media, traditional means of communication, such that to accommodate all types of disabilities or those residing in rural areas.

Physical accessibility is a cardinal principle in choosing vaccination centers, apart from the informational role. There should be numerous vaccination locations readily available. Sites should be furnished with accessible facilities, e.g., ramps, handrails, and ensure that health and vaccination staff are armed and trained to assist PwDs walking through the immunization procedure. With the aforementioned solutions, vaccine confidence and uptake within the disabled communities are likely to increase substantially.

### DISABILITY-INCLUSIVE COVID-19 VACCINE INFORMATION

Vaccine-related information must be accessible and communicated through equitable communication approaches to reach individuals with a range of disabilities.



# TUNAJENGANA: USING SOCIAL MEDIA TO MOBILIZE YOUNG EAST AFRICANS TO CHAMPION COMMUNITY UPTAKE OF COVID-19 VACCINES

## ORGANIZATION NAME

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Winnie Nyato, Independent Consultant

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Leyla Mchawe, Independent Consultant

Dr. Anastasia Mirzoyants, Mirzoyants Management Consulting

Dr. Matti Pohjonen, Oy Agrofor Consulting

Drew Bernard, Upswell

vaccinated and are now advocating for COVID-19 vaccination in their families and/or communities.

- Collect real-life stories about young people's experience with COVID-19 and vaccination.
- The formative study informed design of the Shujaaz digital media Social and Behavior Change campaign.
- The performance and the early impact of the campaign were tracked via a combination of the following activities:
- Panel SMS survey with followers of four Facebook pages, where the campaign took place: DJ Boyie and Maria Kim in Kenya and DJ Timamu and Pendo in Tanzania. Four questions out of 10 in the SMS survey were the same as approved BrandLift Survey questions for COVID-19 surveys. Baseline survey was conducted in December 2021, and endline survey was conducted in February 2022.
- BrandLift Survey was run by Upswell team from December 2021 through to the end of February 2022.
- Natural Language Processing (NLP) and Machine Learning (ML) were used to track and analyze shifts in sentiment related to COVID-19 vaccination.
- Traditional Facebook metrics for reach, engagement and deep engagement were also collected and assessed by the Shujaaz-Media Team.
- Wrap-up Focus Group Discussion with members of Facebook audience on their overall experiences with the campaign, tactics that did and did not work, overall learnings.

## FOCUS POPULATION

Young people aged 15-24 in each country, who had access to the internet and were using Facebook and/or Instagram

## GEOGRAPHY

Kenya and Tanzania, nationwide in each country

## METHODOLOGY

At the beginning of the project, Shujaaz in-house Knowledge and Learning team conducted a formative study to:

- Understand key barriers and motivators in young people's decision about vaccination.
- Segment young people by knowledge, attitudes and practices related to vaccination.
- Identify and describe positive outliers – young people who got



## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

We are Shujaaz Inc, a network of social ventures based in Kenya and Tanzania. We believe this generation of young people can transform our global society for the better – that's why we work to break down barriers so that young people can take control of the future.

Our multi-media youth platform Shujaaz, is a unique digital and real-world community that gives young people the self-belief to succeed; through a dedicated campaign we are connecting our 4.4 million social media followers with the information, insights and confidence they need to champion community uptake of the coronavirus vaccine at a national scale. Shujaaz media campaign, conducted as an action-research, used two persuasive strategies in parallel to understand key barriers and motivators in young people's decision about vaccination:

- Shujaaz “in-house” campaign using core Shujaaz characters Facebook-pages: DJ Boyie and Maria Kim (Kenya) and DJ Timamu and Pendo (Tanzania); amplifying ‘survivor stories’, the characters getting vaccinated, sharing FACTS on the virus & vaccines and creating a feedback-loop for fans reporting their getting vaccinated.
- Micro-influencer campaign aimed at engaging social media personas popular in Kenya and Tanzania.

## KEY FINDINGS

The overall achievements of the campaign are:

- 2M+ Shujaaz audience across East Africa of the #LindaFam and #Wachanjo social media campaigns.
- Shujaaz campaign inspired a dynamic social media conversation on vaccination – e.g., in the average comments generated per post—DJ Tee 137; Maria Kim 105; DJ Boyie 45; and Pendo 26.
- Even in this short campaign, Shujaaz created a positive shift in sentiment towards vaccination; albeit less pronounced in Tanzania where the national COVID-19 narrative is more negative than in Kenya.
- The campaign inspired young people to get vaccinated – the main proof of the power of #Wachanjo was delivered during the February vaccination drive, when in one day 246 people showed up and got vaccinated.
- Young people reinforced their role as change agents in their communities. A key campaign goal was to persuade young people in the Shujaaz audience to talk to peers and family about the importance of vaccination. Across the two countries, almost 9 in 10 young people did that, and of those, 8 in 10 reported that people, whom they told about vaccination, got vaccinated as well.

## KEY PROCESS INSIGHTS

The use of exact, relevant words resulted in more focused thematic conversations – the posts and comments that contained vaccine words received significantly more engagement. It appears important to be direct in conversations about vaccination.

People react differently to fictional stories and real-life testimonies – people are supportive and empathetic, when it comes to the testimonies, if they do not give

**Shujaaz Media (the largest youth brand in East Africa used by more than 9million people) designed and implemented a Social and Behavior Change media campaign in Kenya and Tanzania to motivate young people to discuss, take up, and promote the COVID-19 vaccination. The campaign inspired a dynamic Facebook conversation on COVID-19 vaccination among 2million+ young East Africans, which resulted in high usage of #LindaFam or #Waichanjo campaign tags; increased confidence in and positive sentiment towards COVID-19 vaccination; as well as youth getting and endorsing the vaccine.**

themselves permission to say how they truly feel about the topic because of fear of appearing insensitive/offensive. When reacting to fictional stories, Shujaaz fans were honestly discussing their attitudes and beliefs towards vaccination. *A campaign on a sensitive topic should have a mix of real-life and fictional stories.*

People use different languages to express different sentiment—In both countries, comments in Swahili were significantly more negative than those in English. Especially in the Tanzanian pages the differences are quite high between posts that use Swahili or English together with vaccine words.

People with different sentiments towards vaccination appear online at different times of the day – There are a number of interesting patterns related to the days/times when people are active and the types of comments they post during specific time frames, e.g., time of the day (Tanzania) or day of the week (Kenya).

Not all micro-influencers were helpful in running the campaign – some micro-influencers were able to truly inspire and guide their followers, while others posted content that was only remotely relevant to the Shujaaz campaign. It is important to align with the micro-influencers beforehand on the expectations.

## RECOMMENDATIONS

- Work with young people and get their buy-in because they can be powerful change agents in their communities.
- Ensure young people have ownership of the program and are included as designers/developers/promoters, ensure they have an active participatory and leadership role not passive/recipient roles
- Ensure full transparency of how the outcomes of the work are going to be used to benefit other young people.
- Use exact positive words in communication on vaccine. Not instructive but using “survivor” and “hero” narratives and personal stories, focused on COVID-19 to avoid confusion.
- Use a combination of facts, personal narratives, micro-influencers, and fiction to talk about norms and behaviors associated with vaccination.
- Be careful about how you use native languages (e.g., Swahili or mother-tongues) in this communication to ensure that the use of a specific language does not reinforce stereotypes, myths, and misconceptions discussed by the users of the language.
- Be mindful of the larger context/narrative affecting the target audience – e.g., because of the specifics of how COVID-19 was/is discussed in Tanzania, it was more difficult to bring up and openly discuss the issue of vaccination there.
- If you are working with micro-influencers or other activists, who are not part of your team, make sure to train them and align with them on the type of the content and standards expected.

**“I have been reading Shujaaz since chapter 96. That’s the first copy I ever came across when I was in Embu. It was around 2010. I love Maria Kim’s story and I ended up following her on Facebook. So, I saw her post about vaccination and followed peoples’ comments. The posts were engaging but people’s comments were mostly negative, and people did not want to get the covid vaccine. They were saying it is like going for other diseases. But I did not let that stop me from taking it because I travel a lot and there was this time, they said you could not travel without the vaccine certificate. That is when I went to Oloitoktok hospital and took the Johnson’s Vaccine. I did not find a long queue like a while back when people were going and finding the vaccines are over. The only side effect I got was a headache but when I slept and relaxed the next day it was gone. My friends were laughing at me that I would die very fast and leave them enjoying life. That scared me a little. I later overcame the fear three months after since I was not experiencing anything out of the ordinary. My life and health were normal.”**

-Paul Kirimi, 22-year old from Kajiado County, Kenya

# DESIGNING AND EVALUATING A WHATSAPP CHATBOT TO INCREASE COVID-19 VACCINATION RATES

## ORGANIZATION NAME

The Behavioural Insights Team

## GEOGRAPHY

Chaco province, Argentina

## KEY PARTNERS

Government of Argentina Behavioural Sciences and Public Policy Unit

Chaco Province Ministry of Public Health

## FOCUS POPULATION

Adults age 18+ who have received at least one dose of a COVID-19 vaccine, but who have not completed their full course.

## METHODOLOGY TYPE

Formative phase: Mixed methods exploratory research (data analysis, semi-structured focus groups and interviews)

Impact evaluation: Quantitative research (randomized control trial)



## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

We have developed and are evaluating the impact of a WhatsApp chatbot that aims to increase COVID-19 vaccination rates in Chaco, Argentina. The message content and functionalities offered through the chat are informed by our fieldwork and the behavioural science literature.

The chatbot aims to address the behavioural barriers to vaccination, including the friction costs of figuring out how to get vaccinated, and prompt people to act on their intentions to get vaccinated. It does so by (1) sending personalized messages informing users of their eligibility for the next dose of the vaccine, (2) providing practical information on vaccine centres based on the user's location, (3) prompting users to plan when and where they will get their next shot and (4) sending a personalized reminder the day before the user's chosen date to visit the health centre.

This tool will be evaluated through a randomized control trial - the gold standard in impact evaluations - with vaccination outcomes measured at the individual level.

## KEY FINDINGS

According to Argentina's Federal Ministry of Health, around 83% of people have received their first COVID-19 vaccine in the province of Chaco. Despite high vaccine acceptance, only 69.6% of people had received all their primary doses and less than 35% had received a booster. According to our fieldwork, supply does not seem to be the challenge. Instead, we identified some behavioural barriers that might affect uptake:

**Can a WhatsApp chatbot informed by the behavioural science literature increase COVID-19 vaccination rates? An RCT currently in progress in Chaco, Argentina.**

- **Perception of risks** from COVID-19 has changed throughout the pandemic; our field research indicated that risk perception was low among our target population, as infection rates were very low in the province at the time. Pro-vaccine messaging that was previously shown to be effective may be less impactful at this stage of the pandemic, e.g. prosocial messages (“getting the vaccine helps protect others”).
- **People face friction costs** i.e., small details that can make vaccination appear more effortful and may impact the likelihood of getting a shot. While the Ministry of Health in Chaco assigned individual appointments and strategically located pop-up vaccination stands for first-doses, for subsequent shots people must actively seek information, find a convenient health centre, and decide when to go.
- **Intention-behaviour gaps** research shows that people are good at visualizing their goals, but not the steps it takes to achieve them. Our field research showed there are people who got their first doses, and are willing to get a third one, but have repeatedly postponed the task of visiting their health centre.

## KEY PROCESS INSIGHTS

### Insights from working with local partners

- The commitment of our partners at the Chaco Ministry of Health and the Behavioural Science and Public Policy Unit of Argentina has been fundamental for this project. Building trusting relationships and encouraging stakeholders’ ownership over a project early on is crucial for successful collaboration.
- Given the quickly changing nature of the pandemic, modifications to local COVID-19 vaccination protocols are to be expected and affect intervention design. Staying informed about planned changes and allowing for flexibility in the intervention design is key to success.

### Insights from field research

- People’s health-related perceptions and behaviours change rapidly as the pandemic evolves. Research and intervention design must be updated to the changing circumstances. Using non-standard qualitative research techniques (e.g., reviewing

comment sections of vaccine clinic Google listings) can generate rapid insights, which can later be validated through in-person field research activities.

- The importance of collaborative solution design should not be underestimated. Co-designing with local partners and citizens through joint working sessions, focus groups, and user testing, led to significant improvements in the chatbot design.

### Insights from designing a WhatsApp chatbot

- Using WhatsApp to send official communications from a Ministry of Health comes with the challenge of creating trust in the service. Fear of scams and distrust in digital communication pose implementation risks that should be mitigated.
- Developing and hosting a WhatsApp chatbot using government IT systems may present technical challenges and requires local partners to be dedicated to the success of the project.

## RECOMMENDATIONS

Our research is currently underway. Recommendations will be made based on rigorous evaluation findings, available in Q3 2022.



### ▲ FOCUS GROUP TESTING THE CHATBOT

Co-designing with local partners and citizens through joint working sessions, focus groups, and user testing, led to significant improvements in the chatbot design in Argentina.

# "THE BLACK AND THRIVING PROJECT": THE USE OF MESSAGE FRAMING AND SOCIAL CONTAGION TO PROMOTE VACCINES IN AFRICAN AMERICAN COMMUNITIES

## ORGANIZATION NAME

The Indiana University Observatory on Social Media

## GEOGRAPHY

USA

## KEY PARTNERS

New Georgia Project; Reality Team

## FOCUS POPULATION

Urban Black American Twitter Users, aged 18-40

## METHODOLOGY TYPE

Experiment and social media intervention

## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

We intend to raise vaccine confidence by generating an online intervention among young Black Americans. We will first test messages and messaging strategies by surveying our study group. Then, we will try to create a viral process of the best messages on Twitter, using advanced network theory. Finally, we will assess the impact of our intervention on vaccine uptake statistics.

## KEY FINDINGS

We used an experiment to understand which types of positive messages about vaccines have the greatest potential to be spread by our participants. We found that our participants would be most likely to share messages that have content related to personal experiences of ordinary people about vaccines. Interestingly, the least shareable messages contained images designed to provoke fear of the consequences of COVID-19 infection. We also tested neutral messages with simple pictures of vaccines, and interactive messages that were designed to stimulate discussion about vaccines. A second part of our study looked at other factors regarding why people might be willing to share vaccine-positive messages. Unsurprisingly, we found that individuals with higher levels of vaccine confidence are more likely to share our messages. However, when we account for vaccine confidence, we also found that people with more open-minded thinking styles and more confidence in social media are more likely to share our messages. We also studied focus group data, provided by our partner, The New George Project, to try to understand how best to design campaigns to promote vaccines among

**Our study points to the potential and need for grassroots online campaigns to reach young urban Black Americans.**

Black Americans. We found three factors related to low vaccination rates among Black people: (1) concern about safety and efficacy of the shot; (2) distrust of the public health system, coupled with; (3) fatigue from exposure to its campaigns.

### KEY PROCESS INSIGHTS

An important part of our process was working with members of the Black community. We received many invaluable insights, guidance, and data from our project partners. This enabled us to understand key reasons for vaccine hesitancy among the community and tailor our work to address these. We also received valuable guidance on ways to present grass-roots campaigns to members of the community. It is important to build a trustworthy online identity for an organization releasing information to members of the community, but to refrain from falsely assuming a Black identity for the site through its graphic design. Using this approach we developed the identity of our Twitter page for participants in the project - <https://twitter.com/bandtproject>. The Twitter account now has approximately 1,500 followers and is still growing quickly.

### RECOMMENDATIONS

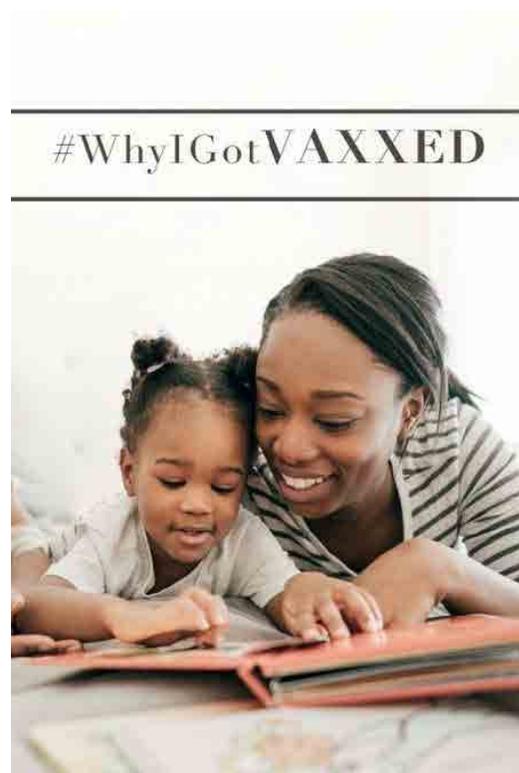
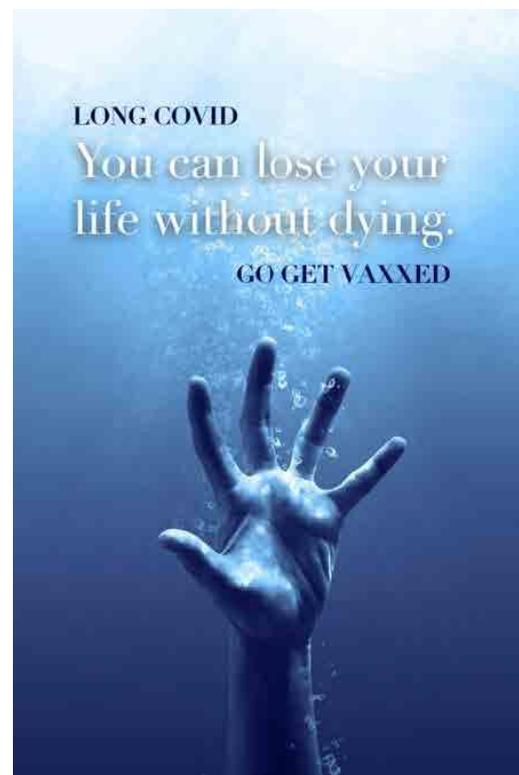
A key reason for vaccine hesitancy within Black communities is the distrust of medical advice from the government and the public health system. Health campaigns in the future should make it a high priority to address this issue. Our results indicate that grass-roots campaigns on social media have good potential for reaching many Black Americans. Those campaigns should target social networks in which Black Americans have a strong level of trust. We note that while Twitter is currently trusted, this may change over the next year due to its change of ownership.

We have a number of recommendations about the types of content which would work best in grassroots campaigns.

1. We found that campaigns that are personally relatable work best. For example, those that use images of people and tell personal stories.
2. Avoid campaigns intended to leverage fear responses. For instance, images that contain portrayals of ill or dead people.

### ▼ VACCINE PROMOTION ON TWITTER

Examples of images tweeted from the campaign.



# STUDY ON ACTIVATING VACCINE SUPPORTIVE PARENTS OF ADOLESCENTS AND YOUNG ADULTS AS TRUSTED VOICES ON SOCIAL MEDIA

## ORGANIZATION NAME

Unity Consortium

## GEOGRAPHY

National

## FOCUS POPULATION

Parents of adolescents and young adults

## METHODOLOGY TYPE

Qualitative Research



## SOCIAL MEDIA PLATFORM/S USED

Online boards were used for phase 2 of research (requesting participants to share posts or content created)



## PROJECT SUMMARY

Unity will use novel research techniques to understand the elements necessary to engage and educate parents through social media about adolescent and young adult (AYA) vaccination, ensuring AYA protection from vaccine-preventable diseases. This will inform a Unity-driven social media capacity-building intervention to amplify parents' voices and increase vaccine confidence amongst their peers.

## KEY FINDINGS

Parents are wary about sharing vaccine information on social media, with a high fear of backlash. Additionally, any vaccine posts feel affiliated with the COVID-19 vaccine, which is seen as a taboo topic. Parents are more willing to share posts from sources they consider unbiased, in small, familiar social media groups, or anonymously. It is preferred that the post not be associated with political or financially benefiting sources (e.g., for-profit companies) and possess a suggestive/helpful tone vs. a commanding one. Source credibility also matters. Parents take healthcare provider's opinions into consideration the most, however a small minority of parents question the integrity of government affiliated organizations such as the CDC, and a small number of vocal parents find no sources to be truly credible. Most of these parents live in rural areas. Parents are more likely to share communications that are relevant to them and their peers, families, and friends, for example, simple infographics that educate on vaccine recommendations by adolescent age groups. Furthermore, quick reminders and

**Parents are very hesitant to share vaccine-related information on social media, however, they are more willing to share in closed, like-minded online communities and if the vaccine information is simple, relevant, straightforward, and not directive.**

messages about overall health should be interwoven into messages about vaccines.

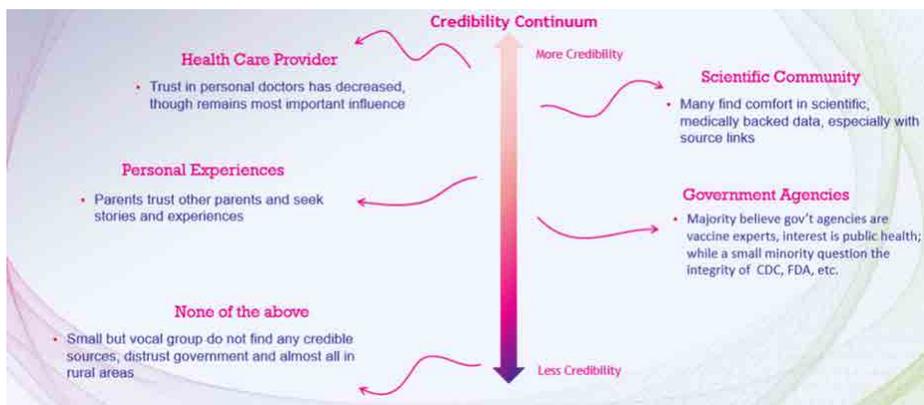
### KEY PROCESS INSIGHTS

Most parents of adolescents and young adults recognize the importance of vaccines for AYAs. However, vaccine safety concerns are on the rise, with parents acknowledging the impact of social media on their beliefs. Furthermore, we found that parents seek information from sources they believe to be trusted, with 2/3 of parents seeking information from their doctor or healthcare provider. Parents are very hesitant to share vaccine-related information on social media, however, they are more willing to share in closed, like-minded online communities and vaccine information that is simple, relevant, and not directive. Finally, parents of adolescents are more willing to share engaging graphics and simple messages shared from trusted sources. As such, access to healthcare provider/health organization created and shared vaccine information and graphics is an important enabler of parent-to-parent online vaccine messaging.

### RECOMMENDATIONS

We recommend stakeholders:

- Focus communications on the historical success of vaccines
- Empower parents by acknowledging and addressing the reasons they are vaccine hesitant
- Provide communications that emphasize peace of mind to help parents feel more in control by countering misinformation while remaining unbiased
- Include hyperlinks to increase credibility and allow parents to control how much information they take in without being overwhelmed
- Prepare parents for potential backlash online through education
- Provide anonymity when necessary to boost likelihood of sharing publicly
- Provide data that shows positives and negatives, while still being supportive of vaccines
- Make communications relevant by breaking down information by age, region, or vaccine feelings
- Quick reminders and messages about overall health should be interwoven into messages about vaccines



### CREATING TRUST AND CREDIBILITY

These tables highlight the key factors in found to be most effective in encouraging vaccine supportive parents to share their experiences via social media.



# THE INFLUENCE OF THE COVID-19 PANDEMIC AND SOCIAL MEDIA ON VACCINATION CONFIDENCE DURING PREGNANCY AND LACTATION

## ORGANIZATION NAME

University of Antwerp

## FOCUS POPULATION

Pregnant and lactating women and women of childbearing age

## SOCIAL MEDIA PLATFORM/S USED



Reddit

## GEOGRAPHY

Europe



## METHODOLOGY TYPE

In this study, several multi-disciplinarian methods were combined to gain insight from different perspectives and factors influencing vaccine uptake in pregnant and lactating women.

A scoping review of literature was written to determine specific gaps according to our research question.

To detect vaccine hesitancy during pregnancy on social media messages, Dutch data from Twitter and English data from Twitter and Reddit were collected. Adapted and fine-tuned Bidirectional Encoder Representations from Transformers (BERT) models were used to identify, and establish reasons for, vaccine hesitancy.

To describe factors influencing vaccine uptake in the target group, desk research and a limited number of semi-structured interviews were performed to gather a broad overview. Loop diagrams were used to bring the variables together in a system map, creating an overview of the inter-linkages between the different variables.

To evaluate potential communication strategies about maternal vaccination, the effect of narrative strategies to debunk mis- and disinformation were tested via an online Prolific experiment in women in the target group. The effectiveness of a pregnancy-focused vaccine-safety label on social media channels was tested via a co-creation session with women in the target group.

To detect differences across borders, a survey questioning attitudes towards maternal vaccination was performed online in 11 European countries. Per country, 25 participants were included. All participants were pregnant or gave birth in the last two years.

## PROJECT SUMMARY

Since pregnant women, fetuses, and neonates are vulnerable to infectious diseases related morbidity and mortality, it is important to understand barriers in the uptake of maternal vaccines to decrease vaccine hesitancy and increase vaccination coverage in fertile, pregnant, and lactating women. Therefore, different aspects and interventions of social media communication and its impact on vaccine confidence, acceptance, and coverage in fertile, pregnant, and lactating women will be investigated.

## KEY FINDINGS

The results are preliminary since not all the study parts are closed.

The main findings of this study are that approximately 40% of messages about COVID-19 vaccinations and pregnancy found on the investigated social platforms are hesitant towards vaccines. According to literature and our field work, the main concern about getting vaccinated during pregnancy (or shortly after/before) is whether the vaccine is safe. Concretely, people worry about whether the vaccine damages the mother and/or child, distorts the menstruation cycle or lactation, alters the child's DNA, or causes disease or even death. Vaccine-skeptics also believe that the development period of the COVID-19 vaccines was too short, and that there is a lack of tests that investigate the long-term effects on pregnant women and their children.

The results of the Prolific experiment, the co-creation session testing the effectiveness of a pregnancy-vaccine-safety label for social media, and the results of the survey are being analyzed.

## KEY PROCESS INSIGHTS

The taboo of maternal vaccination is still vividly present. After reviewing literature and conducting research in Belgium and ten other European countries, we see that overall women are more hesitant about vaccination during pregnancy and lactation than vaccination in general.

With the COVID-19 pandemic, the word ‘vaccine’ was all over the internet. Social media does have a certain role in providing information and sharing opinions about vaccines. By screening Twitter and Reddit during the first wave of the pandemic, we found that approximately 40% of the messages about vaccination and pregnancy were hesitant towards vaccination. The most important reason to doubt maternal COVID-19 vaccination was the concern about safety for the fetus/ baby, fed by the fact that pregnant and lactating women were initially excluded from clinical trials.

We identified other factors for unwillingness to get vaccinated during pregnancy or lactation by performing a debunking study in our target group. Faith in intuition, pre-vax attitude, and distrust in health system are factors that are significantly and negatively related to vaccine confidence. Also, participants with religious affiliation were more likely to be skeptical towards a vaccine and to believe in vaccine conspiracy theories.

Social media channels should be aware of the power they have to balance the way information reaches the individuals. By creating an effective misinformation label, we want to positively contribute to vaccine confidence via social media. These sorts of interventions are necessary to improve vaccine confidence in pregnant and lactating women, a hard-to-reach group, worldwide.

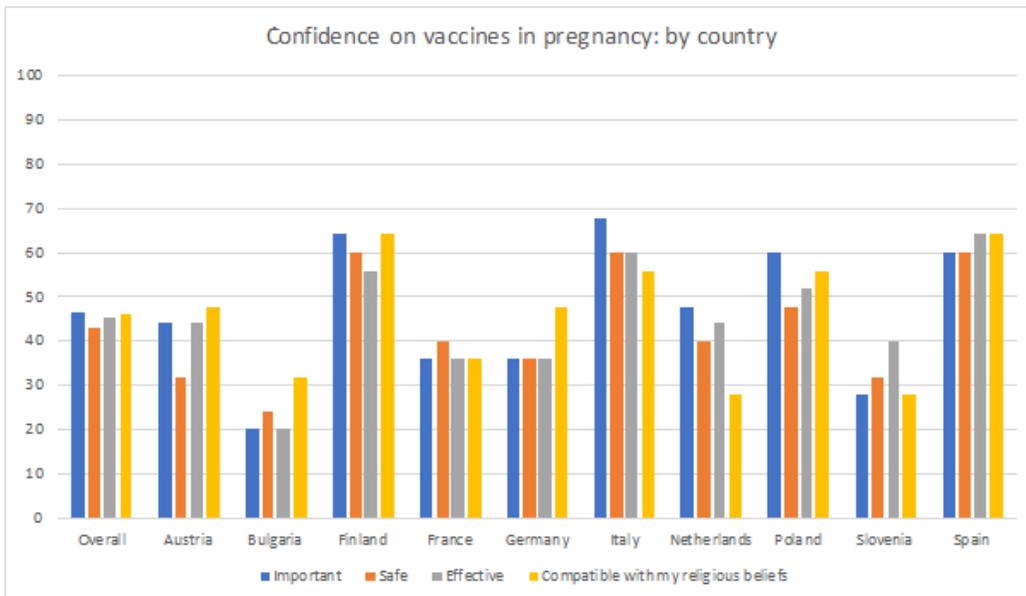
## RECOMMENDATIONS

This study indicates the importance of the provision of correct information and clear communication about vaccines. Medical and governmental organizations together with physicians, pharmacists, and other healthcare professionals play an essential role in these matters. Health care providers should give the right information about maternal vaccination and should encourage pregnant and lactating women to critically read social media messages. By showing the way to scientifically-based websites and to reliable sources, women should be able to make a well-informed choice about vaccination during pregnancy or lactation.

Furthermore, including pregnant and lactating women in pre-marketing clinical trials should be encouraged, since lack of testing on this target group is one of the reasons why women doubt or refuse to get vaccinated during pregnancy or lactation.

### SURVEY ABOUT MATERNAL VACCINE CONFIDENCE IN EUROPEAN COUNTRIES

To compare our Belgian findings with the vaccine attitude of pregnant and lactating women in other countries, we set up a survey distributed in ten other European countries. The overall findings show a wide variety in vaccine confidence between the countries. Additionally, the confidence in maternal vaccines was presented lower than in vaccines in general when asking about the importance, safety, effectiveness, and compatible with religious beliefs.



# IMPACT OF WHATSAPP BOTS ON COVID VACCINE ACCEPTANCE AMONG PREGNANT WOMEN IN NORTHERN INDIA

## KEY PARTNERS

University of California, San Francisco  
Post graduate Institute for Medical Education and Research, Chandigarh (PGIMER)  
Survival of Women and Children Foundation (SWACH)  
Indraprastha Institute of Information Technology, Delhi (IIIT, D)

## GEOGRAPHY

Haryana, India



## FOCUS POPULATION

Pregnant and breastfeeding women

## METHODOLOGY TYPE

Formative surveys and qualitative interviews; community surveys implemented before and after intervention

## SOCIAL MEDIA PLATFORM/S USED

Chatbots



## PROJECT SUMMARY

Expanding high quality vaccine education is critical for pregnant women, yet uptake in India is low due to fears and misconceptions. Bots offer an innovative opportunity for automating responsive and efficient education. Using a human-centered design approach we will develop and test a behavior change communication Bot for COVID-19 vaccination education in collaboration with Indraprastha Institute for Information Technology, Delhi; the Post-Graduate Institute for Medical Education and Research and the Survival for Women and Children Foundation. We will test the impact and acceptability of Bot deployment on vaccine hesitancy and acceptance among pregnant women.

## KEY FINDINGS

COVID-19 vaccination remains low among pregnant and breastfeeding women in northern India; however, most want to be vaccinated. Our team developed a chatbot to efficiently address COVID-19 vaccination concerns, which we deployed over existing WhatsApp groups for pregnant, postpartum and parenting women. Formative research revealed barriers to COVID-19 vaccination include fetal and infant safety concerns, health provider refusal, and gender norms. The chatbot addressed key misconceptions and concerns and provided evidence-based guidance. Promoting chatbot engagement required time and human resources. During initial deployment, research team members answered questions regarding chatbot technology and function, and users shared experiences. Group members shared the chatbot with family and friends, which increased engagement. The chatbot was easy to engage with (78.8%), provided easy-to-understand information (91.4%) and met all information needs (96.7%). 88.9% reported the chatbot improved their COVID-19 knowledge a lot, 71.7% recommended it to others and 88.3% shared information from the chatbot with others. No negative feedback was received, and few technical issues occurred.

**Chatbots in WhatsApp groups are feasible, acceptable and effectively address COVID-19 vaccination concerns among pregnant and breastfeeding women in rural North India**

During intervention effectiveness assessment, most community survey respondents had received at least one COVID-19 vaccination dose (86.2% pre-intervention vs. 87.7% post-intervention). Full vaccination (2 doses) increased from 54.6% pre-intervention to 61.1% post-intervention. Increases observed in vaccination from pre to post-intervention were marginal for any vaccination (OR 1.15, 95% CI 0.99-1.36,  $p=0.06$ ) but met the threshold for statistical significance for full vaccination (OR 1.21, 95% CI 1.09-1.34,  $p<0.001$ ). No differences were identified in level of vaccine hesitancy from pre- to post-survey; few unvaccinated study participants reported not having tried to access COVID vaccination. Major vaccination barriers included being considered ineligible for vaccination due to pregnancy or breastfeeding status (70.7% and 63.5%, pre and post- intervention respectively). Major reasons for non-vaccination included being pregnant or breastfeeding, with fewer reporting family or health care providers as barriers. Many unvaccinated participants were very likely to get COVID-19 vaccination if offered (52.4% and 58.5%, respectively); few would not consider vaccination (12.2% and 17.0%, respectively).

### KEY PROCESS INSIGHTS

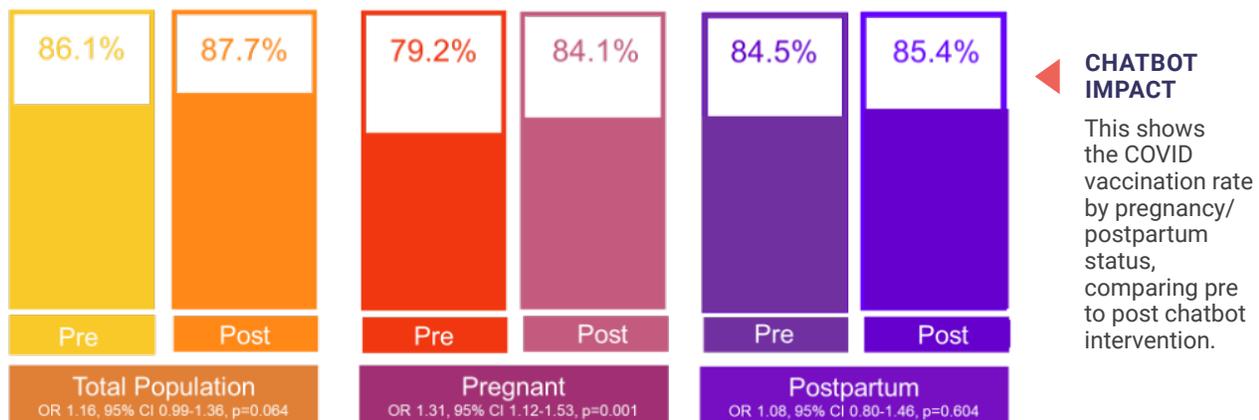
Developing a chatbot to address vaccine hesitancy among pregnant and breastfeeding women in northern India was straightforward, particularly given the early stage of our project, and inclusion of a formative research component to identify key barriers and concerns to address. However, chatbot deployment was more complicated. We learned that it takes time and human resources to constantly motivate potential participants to engage with the chatbot. The lack of familiarity with

chatbot technology among our study participants resulted in some queries and concerns, and our team plus early adopters helped allay any fears. Our project's situation within an existing health education structure was a benefit to this study, given the trusted information source, and understanding how to best scale this technology will involve considering how to capitalize on networks and trusted health information structures.

### RECOMMENDATIONS

Chatbots, deployed over existing WhatsApp groups, were highly acceptable and feasible amongst a population of women who often face barriers to obtaining information due to gender norms restricting women's mobility outside the home. Participants requested more chatbots on other topics—suggesting that future implementors or program and policy makers could use this approach to provide information about a variety of health topics to this population. We recommend that chatbots such as this be expanded and that future researchers test different ways of reaching people with chatbots, outside of existing WhatsApp groups, such as Facebook or other social media outlets.

We also found that Chatbots held potential for social network effects, where participants could share with their family and friends. Thus, we recommend that this type of tool could be used to help empower women to share information with their families, who may ultimately be the decision-makers in this context. Providing information to family members, who are often not targeted with health information, is key, and chatbots that were provided by trusted sources of health information allowed family members to access information in a way they might not otherwise be able to.



▼ COVID VACCINATION, VACCINATION INTENT, AND HESITANCY AMONG PREGNANT AND POSTPARTUM WOMEN, HARYANA, INDIA

	Total Population			
	Pre-intervention n=609		Post-intervention n=434	
	n	%	n	%
<b>COVID Vaccination</b>				
Vaccinated against COVID-19				
No	84	13.9%	53	12.3%
Yes, 1 dose	194	32.1%	116	27.0%
Yes, 2 doses	327	54.0%	261	60.7%
Months since latest vaccination <sup>a</sup>				
Median, IQR	2.0 (1.0-4.0)		2.0 (1.0-4.0)	
Min, Max	0-10		0-12	
<b>Vaccination Intent</b>				
Unsuccessfully tried to get vaccinated <sup>b</sup>				
No	11	13.4%	7	13.5%
Yes, told could not be vaccinated because of pregnancy or breastfeeding	58	70.7%	33	63.5%
Yes, told could not be vaccinated for another reason	13	15.9%	12	23.1%
Likelihood of getting COVID-19 vaccine if offered at no cost <sup>b</sup>				
Very likely	43	52.4%	31	58.5%
Somewhat likely	20	24.4%	7	13.2%
I am not sure	7	8.5%	5	9.4%
Somewhat unlikely	1	1.2%	0	0.0%
Very unlikely	1	1.2%	1	1.9%
No, but would consider for future	10	12.2%	9	17.0%
<b>Vaccine hesitancy</b>				
Reason for non-vaccination <sup>b</sup>				
Waiting until no longer pregnant	28	34.1%	20	37.7%
I am waiting until I am not breastfeeding	32	39.0%	21	39.6%
Health care worker said I could not	6	7.3%	3	5.7%
Family said I could not	8	9.8%	3	5.7%
I am scared	2	2.4%	2	3.8%
Other	6	7.3%	4	7.5%
<b>Vaccine communication</b>				
Recent communication with friends/family re COVID-19 vaccine				
No	186	30.8%	169	39.2%
Yes	359	59.4%	230	53.4%
Not sure	59	9.8%	32	7.4%

<sup>a</sup>if vaccinated 1-2 doses; <sup>b</sup>if unvaccinated

# TESTING INTERVENTIONS TO ADDRESS VACCINE HESITANCY ON FACEBOOK IN EAST AND WEST AFRICA

## ORGANIZATION NAME

University of Chicago  
Molly Offer-Westort, Assistant Professor, University of Chicago  
Leah Rosenzweig, Director, Development Innovation Lab,  
University of Chicago

## GEOGRAPHY

Kenya and Nigeria

## KEY PARTNERS

Busara Center for Behavioral Economics

## FOCUS POPULATION

Facebook users

## METHODOLOGY TYPE

Stage 1: multi-arm adaptive experiment  
Stage 2: standard balanced randomized control trial



## SOCIAL MEDIA PLATFORM/S USED



Facebook Messenger

## PROJECT SUMMARY

During mass vaccination campaigns, social media platforms can facilitate broader access to public health information, but they may also engender vaccine hesitancy through the spread of false or misleading information. We deploy a Facebook Messenger chatbot to test interventions designed to target sources of vaccine hesitancy among social media users in Kenya and Nigeria.

## KEY FINDINGS

We set out to determine whether using a chatbot to deliver targeted messages to people who are hesitant to get vaccinated could improve COVID-19 vaccine acceptance in Kenya and Nigeria. Prior to initiation of our quantitative research, we conducted focus group discussions to understand relevant concerns about the vaccine and possible messages to address these concerns. We then created a Facebook page for our study, and recruited Facebook users in these countries who had not yet been vaccinated to engage with our page on Messenger. Responses from our page were delivered by a chatbot. In the first stage of the study, we asked respondents about their concerns related to the vaccine and used an adaptive algorithm to learn which messages were most effective at addressing specific concerns. In the second stage, we compared the concern-responding version of the chatbot, with optimized messages, to a public service announcement condition and a control condition. Users who engaged with the concern-responding chatbot were more likely to report willingness to get the vaccine if it were available today, and

**Engaging with a concern-eliciting chatbot leads Facebook users in Kenya and Nigeria to be more likely to report willingness to get the vaccine if it were available today, and more likely to report higher levels of enthusiasm about getting vaccinated, as compared to users in a public service announcement chatbot or control condition.**

more likely to report higher levels of enthusiasm about getting vaccinated, as compared to the public service announcement condition or pure control condition. These differences are large and highly statistically significant. The PSA condition also has higher levels than the pure control condition on these metrics, and, when controlling for pre-treatment responses, is statistically distinguishable from the control. However, the magnitude of the difference is much smaller.

### KEY PROCESS INSIGHTS

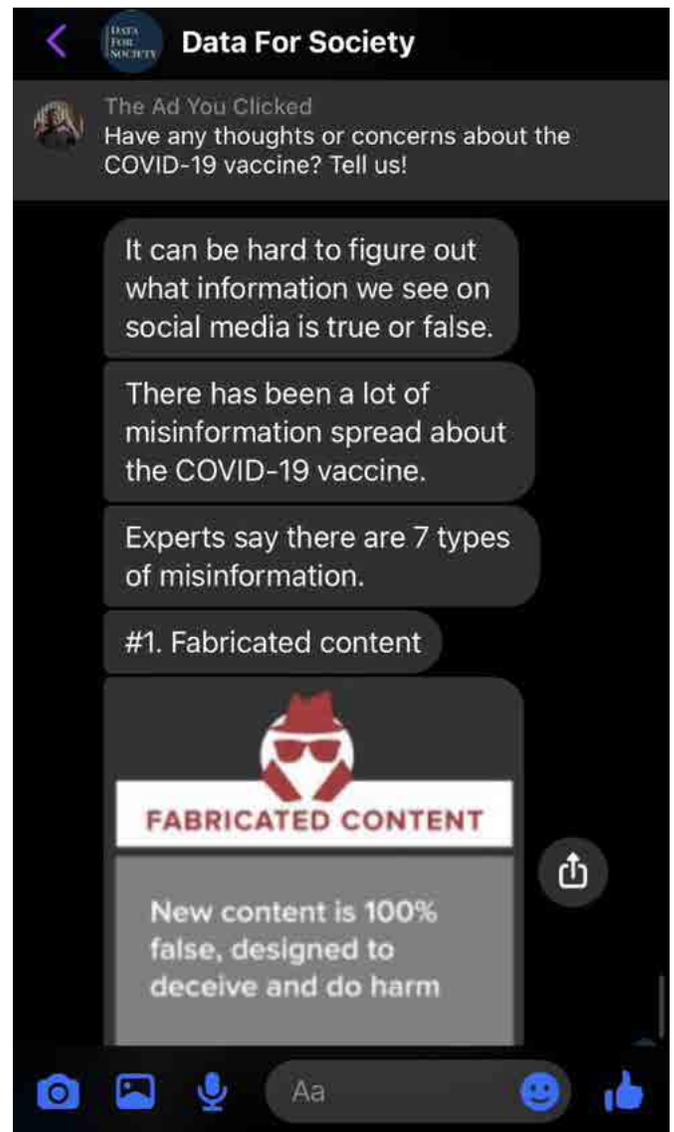
Focus group discussions were key to ensuring we understood concerns of people who were hesitant about the vaccine in our study contexts, and that we were able to develop messaging relevant to those concerns. Our focus group discussions included respondents across different social/demographic groups (men, women, older, younger, urban, rural) in both Kenya and Nigeria.

When we moved to our online sample, we also targeted our Facebook advertisements to obtain respondents across these groups. To do so, implementation took a bit longer and we spent more money on advertising to reach "harder to reach" populations on social media (for instance, older women in Kenya and Nigeria), but this was necessary to get a balanced and diverse sample. However, our respondents were, on average, younger, more likely to live in urban areas, and higher educated than the overall populations in Kenya and Nigeria.

By advertising on Facebook, we can reach social media users where they are across both Kenya and Nigeria. To the extent that people get information and respond to it on social media, we are able to send messaging interventions related to the vaccine very close to users' online behavior and media environment. However, we know that not all Kenyans and Nigerians are online/on Facebook so in terms of external validity, this study is limited to findings that can apply to social media users in these countries.

### RECOMMENDATIONS

Our findings suggest that 1. chatbots can be effective channels to deliver targeted information related to health and policy interventions; and 2. chatbots that engage people and ask them questions may be more effective than generic, non-interactive messaging.



▲ **CONCERNS ABOUT VACCINES**  
Screenshot from chatbot sharing 7 types of misinformation.

# POSITIVE REINFORCEMENT OF ONLINE AND OFFLINE SOCIAL SIGNALING TO ACCELERATE COVID-19 VACCINE UPTAKE IN SIERRA LEONE

## ORGANIZATION NAME

University of Chicago, Department of Economics

Fatu Conteh (RAMLabs), Rachel Glennerster (University of Chicago), Samantha Horn (Carnegie Mellon University), Anne Karing (University of Chicago), Tom Sesay (Expanded Programme for Immunization)

## GEOGRAPHY

Freetown, Sierra Leone

## KEY PARTNERS

RAMLabs; Ministry of Health and Sanitation of Sierra Leone; UNICEF

## FOCUS POPULATION

Adults, WhatsApp users, Urban

## METHODOLOGY TYPE

Randomized Experiment, Misinformation Listening



## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

COVID-19 vaccination rates in Africa lag behind other continents, at 22% compared to 67% in the rest of the world. Vaccine supply is no longer a limiting factor in many Sub-Saharan African countries, however rumors and misinformation about the vaccine's safety and efficacy hinder demand. Our project aims to harness the power of social media and a proven strategy to boost immunization: social signaling. Specifically, we offer people living in Freetown, Sierra Leone, the opportunity to share their vaccination status via a credible and personalized WhatsApp image and a colorful bracelet that shows a person is fully immunized against COVID-19. We hypothesize that these online and offline signaling interventions enable individuals to show their friends, family, colleagues, and other social contacts that they took the vaccine, thus providing positive counterexamples to vaccine misinformation. We evaluate our interventions' impact on participants' decisions to share WhatsApp messages about the COVID-19 vaccine with their social network, and vaccine uptake within the social network. To do so, we conducted a randomized field experiment in which individuals who had just taken the vaccine received either i) an offer to share their vaccine status on WhatsApp through a credible and personalized image (Vaccine Status Image), ii) intervention and a colored bracelet showing that they are vaccinated (Vaccine Status Image and Bracelet), or iii) an opportunity to send any message on WhatsApp about the vaccine to their contact (Control). We collected information to map participants' WhatsApp (online) and in-person (offline) social networks, and captured their decision to share a message with each of their network contacts. Through a novel UNICEF crowdsourcing platform, we also collected data on word-of-mouth and social media messages about the COVID-19 vaccine from social mobilizers and social media listeners. This allows us to assess the spread of different rumors and misinformation in communities where we implemented our interventions.

**There is untapped potential for leveraging social networks in vaccine mobilization campaigns: vaccinated individuals frequently interact with people who do not know about their vaccine status and are not vaccinated themselves.**

## KEY FINDINGS

Participants' social networks are composed of family members (32%), friends (40%), and more distanced connections (23%) such as colleagues and acquaintances. Importantly, participants only know the vaccine status of 56% of their contacts, and of those, 47% are not vaccinated. Overall, 70% of participants share vaccine-related messages with their network. The main reasons for not sharing are time constraints, privacy concerns, and fear of backlash.

The vaccine status image treatment significantly reduced the proportion of contacts participants shared with by 5 percentage points compared to control; which may be explained by participants' preference not to disclose/highlight their vaccine status. First, we see that it is the proportion of friends participants shared with and not the proportion of who shared with at least one driving the reduction in sharing. Secondly, we observe that 60% of messages sent in the control group where participants wrote their own message, do not disclose their vaccine status.

Adding a bracelet to the vaccine status image counteracted this decline, significantly increasing the percentage of participants who shared by 10 percentage points compared to control. Because the bracelet was introduced as a lottery, participants experienced a positive reward in the bracelet group and a disappointment in the other groups. This likely influenced participants' willingness to invest efforts into sharing, leading to more sharing with people they wouldn't normally share with (e.g., more socially distant contact). The 12 percentage points increase in sharing with spouses suggests that participants may have also anticipated some of their contacts to see their bracelet in person, and decided to inform them via WhatsApp beforehand.

## KEY PROCESS INSIGHTS

### **Social media and communication medium in urban Sierra Leone**

While the most commonly used social media in urban Sierra Leone is WhatsApp, the population using WhatsApp is still somewhat limited: 37% of people we approached were ineligible to enter our study because they do not use the application. In most cases, it is because they do not have a smartphone or do not have access to internet on their phone. We piloted the same interventions with button phone users, and found that people we interviewed do not seem to use SMS to communicate with their social network.

### **Working closely with vaccine teams**

A relevant insight for any other research or implementing organization working on vaccines is that working in partnership with vaccine teams at health centers and building good relationships with them was very important to build respondents' trust and make them feel comfortable speaking to our field staff. Our partnership with the Expanded Programme for Immunization made this possible, and helped us design vaccine status images that were credible via the inclusion of the Ministry of Health's logo.

### **Social network research and interventions**

Finally, we learned that people feel comfortable sharing information about their social networks, and recent conversations on WhatsApp offer a mix of different types of relationships people may have. This novel social network elicitation method has potential to improve the evaluation of interventions designed to directly target or leverage social networks.

## RECOMMENDATIONS

Our study suggests that there is untapped potential for leveraging social networks in vaccine mobilization campaigns: vaccinated individuals frequently interact with family, friends, and more socially distant contacts on WhatsApp or in person who do not know about their vaccine status and are not vaccinated themselves. Governments and other implementers should consider ways to encourage vaccinated individuals to share private messages about the vaccine within their social network. This could be done either through giving them a small reward for getting vaccinated, creating positive association with their action, and increasing the likelihood that they want to tell people about it. It could also take the form of an information intervention that tackles current barriers to sharing by highlighting its positive returns and limited backlash.

Restricting people to share that they got vaccinated as opposed to their own message reduced by 20% the extent to which people shared within their network. However, it increased the sharing of messages disclosing vaccine status as opposed to general information/encouragement. This highlights an important trade off implementers need to take into account when encouraging individuals to share any message and their vaccine status more specifically. Because sharing of vaccine status increases visibility on vaccine take-up within social networks and communities, we expect the former to have a larger influence on others' decision to vaccinate. Data on vaccination outcomes among respondents' social networks is still being analyzed to test this hypothesis.

# TARGETED VACCINE PSAS BASED ON POLITICAL SCIENCE AND ECONOMIC INSIGHTS

## ORGANIZATION NAME

University of North Carolina at Chapel Hill

## GEOGRAPHY

USA

## KEY PARTNERS

North Carolina State University, Stanford University, University of California, Berkeley, National Bureau of Economic Research

## FOCUS POPULATION

People in counties with low vaccination rates

## METHODOLOGY TYPE

Randomized control trial

## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

In October 2021, Republicans were three times as likely as Democrats to be unvaccinated against COVID-19. It turns out that a problem caused by politics also has a political solution. We conducted a large scale randomized controlled trial last fall to try to increase vaccination uptake among Republicans. We used Donald Trump, a vaccinated Republican, as our messenger. In our 27-second public service announcement, viewers see a news report from March 2021 that says Trump received the vaccine paired with his actual endorsement of it on Maria Bartiromo's FOX News show. We ran the PSA for three weeks on YouTube, and then compared whether vaccinations increased in the counties that got the Trump vaccine endorsement PSA compared with those that did not.

**Our public service announcement caused an increase in COVID-19 vaccinations.**

## KEY FINDINGS

After winning a grant from the Vaccine Confidence Fund to buy ad time on YouTube, we selected at random over 1,000 low vaccination counties to receive the "Trump treatment" along with another set of 1,000 plus similar counties that would not receive it. We ran the PSA for three weeks, and then compared whether vaccinations increased in the counties that got the Trump vaccine endorsement PSA compared with those that did not.

They did. By a lot. The average county that got the ad recorded an increase of 103 vaccinations more than the counties we did not treat. With over 1,000 counties getting the Trump endorsement, that translates into better than 100,000 more vaccines. Our ad budget was slightly less than \$100,000 dollars, which means that the cost of each new vaccine was less than a dollar. That is far more efficient than other efforts that states tried to increase vaccine uptake such as lotteries.

## RECOMMENDATIONS

The key recommendation is that politics should be part of the solution to problems caused by politics. In the United States, vaccination efforts have been hindered by politicization and a series of anti-vaccine messages from prominent Republican politicians. Therefore, we reasoned that messages from trusted Republican politicians (e.g., Trump) could help persuade skeptical members of the public to get vaccinated.

Those insights can be applied to future cases, although the specifics of the message and the messenger

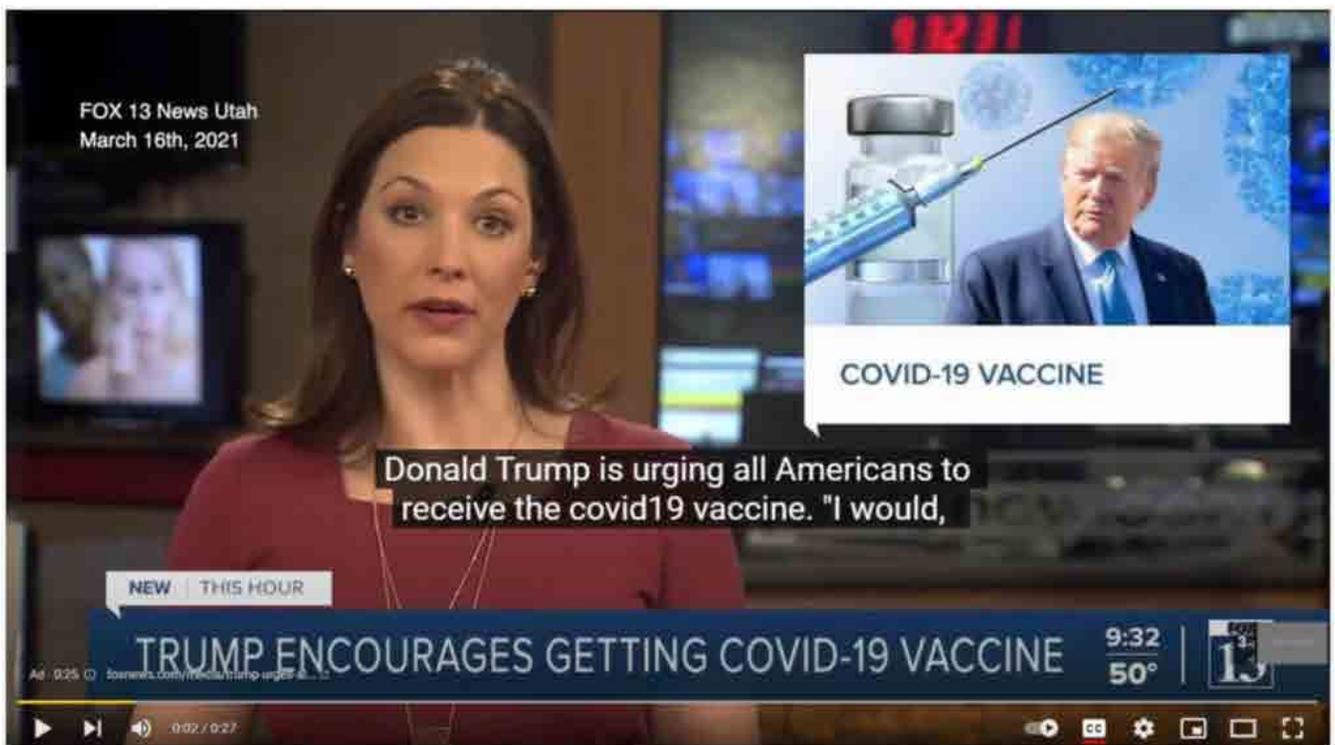
may vary. But there is no doubt that new vaccination challenges await. Before the pandemic, surveys found no partisan differences when it came to getting the flu vaccine or supporting childhood or adult vaccinations. However, a survey UNC-Chapel Hill researchers fielded in spring 2022 reveals that anti-COVID 19 vaccine sentiment among Republicans appears to be leaking into their opinions about other vaccines.

We found that Democrats were consistently 10 to 15 points more likely than Republicans to say they 1) had gotten the seasonal flu vaccine this year, 2) thought that it was important for children to get all childhood vaccines, and 3) tended to get new adult vaccines, such as for shingles and pneumonia, when they become available.

Public health professionals, then, will likely have to grapple with how best to confront a political fault line in vaccine attitudes beyond COVID-19. If the success of the Trump vaccine endorsement is any indication, politics is likely to be part of the solution.

## ▼ VACCINES AND POLITICS

Clip from PSA encouraging COVID-19 vaccinations.



# LARGE-SCALE STUDIES TO ADVANCE PUBLIC'S ACCESS AND TRUST OF COVID-19 VACCINE RESEARCH ON SOCIAL MEDIA

## ORGANIZATION NAME

University of Washington (Department of Human-Centered Design & Engineering)

Gary Hsieh, Associate Professor

Katharina Reinecke, Associate Professor

Joshua Liao, Associate Professor

Spencer Williams, PhD Student

Joy Lee, Program Manager

## GEOGRAPHY

US-Based Online Participants



## FOCUS POPULATION

US-Based Online Participants

## METHODOLOGY TYPE

Co-design, interview, survey, experiment

## SOCIAL MEDIA PLATFORM/S USED

Mechanical Turk

Prolific

LabintheWild

## PROJECT SUMMARY

Scientific findings demonstrating COVID vaccine efficacy could most directly answer people's questions about the vaccines, boost vaccine confidence, and increase vaccination rates. However, these findings are difficult to communicate to audiences who may have a lack of trust in, and/or experience with, science. Through codesign sessions and large-scale online studies, we seek to develop guidelines for integrating and visualizing science-backed vaccine knowledge into social media posts. Our results will improve access to, understanding of, and confidence in vaccine research for diverse people.

## KEY FINDINGS

Our findings help advance our understanding of vaccine hesitancy, as well as strategies to help improve awareness and trust in vaccine research.

First, our results showed that there are different types of vaccine hesitant individuals with different concerns and needs. We identified three broad groups: deferrers, who were waiting for more information before deciding to get vaccinated; unconcerned, who did not think COVID-19 was dangerous enough to warrant the risk/cost of vaccination; and rejecters, who strongly opposed the vaccine, and didn't trust institutions like the government, pharmaceutical companies, or researchers. Though each group had different informational needs, concerns about COVID-19 vaccine safety were a major issue for all these groups.

Second, we found that communicating the risks of COVID-19 vaccine side effects using verbal probability descriptors (e.g., common, rare) was associated with higher, less accurate, and more variable perceptions of risk than using numerical probability descriptors (e.g., 4%, 0.0035%). This could ultimately impact how people make vaccination decisions, particularly

**Infographics showing the amount and consistency of Covid vaccine research helped improve awareness of published research and belief that the evidence shows vaccines are safe.**

for lower probability and more serious events such as myocarditis or cerebral venous sinus thrombosis (CVST). For serious complications such as myocarditis and CVST, we found that participants who greatly overestimated the risk (by three orders of magnitude) were more likely to report that social media was the strongest influence on their beliefs of COVID-19 vaccines.

Third, communicating the amount and consistency of scientific research on COVID-19 vaccines helped improve people’s awareness of how much research was done, perception of research consensus, and agreement that research showed consistently low rates of adverse reaction. Furthermore, with this more transparent approach, people were more likely to trust the accuracy and honesty of the infographic, compared to the CDC web page.

### KEY PROCESS INSIGHTS

We found that using co-design as a strategy to develop an intervention worked well. Technology-focused co-design stresses the importance of co-making (e.g., brainstorming, prototyping), instead of simply soliciting feedback. By framing the sessions as a way of building tools suited to the needs of our participants, our participants were very open with us about what information they might find useful, what might help them decide to get vaccinated, and the pros and cons of our early designs.

We also found it was helpful to iterate on our intervention with smaller pilot studies. Originally, we used a quick round of pilot studies to adjust the amount of information to be shown, to reduce information overload. Moreover, some participants seemed concerned about bias or manipulation of the data. We addressed these challenges by reducing to only the most relevant information, explaining how we systematically sampled studies, and reminding participants they are free to use the information however they want, which appeared to strengthen our intervention.

### RECOMMENDATIONS

Our work demonstrated that with appropriately designed infographics, we can improve awareness of COVID-19 scientific research, highlighting vaccine safety in a believable way. Although we often think more concise messages or research summaries may be better, our findings suggest that providing more transparent and complete information about each study—including studies with divergent findings—can lead to a more trustworthy, informative, and compelling message.

In addition, while getting people to change their vaccination behaviors is hard, our findings suggest one positive outcome of these efforts: We found that providing this information also helps provide those who are vaccinated to use the provided information to talk about the vaccine within their own social network.

Condition	Vaccine hesitancy due to safety (pre, 1-5 likert)	Vaccine hesitancy due to safety (post, 1-5 likert)	Science credibility (pre, 1-5 likert)	Science credibility (post, 1-5 likert)	Increased vaccination intention? (n)
CDC Baseline	2.89 (1.50)	2.79 (1.53)	3.48 (1.25)	3.53 (1.07)	22/305
Intervention	2.76 (1.41)	2.58 (1.46)	3.65 (1.19)	3.72 (0.86)	25/289
Intervention + Efficacy Info	2.74 (1.45)	2.64 (1.44)	3.53 (1.30)	3.65 (0.84)	19/269

### PRE/POST MEASURES AND OUTCOMES

Table 1: Related metrics from our experiment, showing pre/post measures of vaccine hesitancy, science credibility, and any increases in vaccine intention.

Condition	Change in perceived quantity of research (5-point likert, 3=neutral)	Change in perceived research consensus (5-point likert, 3=neutral)	Change in perceived consistency of low vaccine risk (5-point likert, 3=neutral)
CDC Baseline	2.83 (1.31)	2.89 (1.34)	2.91 (1.27)
Intervention	3.18 (1.36)	3.35 (1.34)	3.46 (1.25)
Intervention + Efficacy Info	3.08 (1.37)	3.22 (1.26)	3.36 (1.33)

Table 2: Related metrics from our experiment, showing changes in outcome measures: perceived research quantity, consensus, and consistency in low vaccine risk.

# USING SOCIAL MEDIA TO IDENTIFY DRIVERS OF COVID-19 VACCINE HESITANCY IN THE US BY COUNTY AND ZIP CODE

## ORGANIZATION NAME

University of Washington (Institute for Health Metrics and Evaluation)

## KEY PARTNERS

IHME, COVID Collaborative

## FOCUS POPULATION

Residents of all counties and ZIP codes across the US who were respondents of The Delphi Group at Carnegie Mellon University U.S. COVID-19 Trends and Impact Survey, in partnership with Facebook.

## METHODOLOGY TYPE

Surveys, social media listening, and local knowledge gathering

## GEOGRAPHY

United States of America. The visualization tool for COVID-19 vaccine hesitancy shows results at the ZIP code and county level, and the analyses of reasons behind hesitancy and associated demographic trends was conducted at the individual level, with consideration for clustering within states.



## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

Minimizing and preventing further surges of COVID-19 is contingent on overcoming vaccine hesitancy. To achieve that, policy makers need to be equipped with granular information on what type of interventions can improve acceptance, in order to strategically invest resources in communities with greatest potential to increase vaccination rates. The Institute for Health Metrics and Evaluation, in partnership with the COVID Collaborative, developed a data visualization tool that maps vaccine hesitancy in the US at the ZIP code and county-level using survey data collected via social media.

This project sought to utilize social media to track community-level trends in hesitancy and understand how and why hesitancy varies among US communities. Data collected from surveys implemented on social media was used in combination with methods to monitor social media channels and gather community-level knowledge about reasons for hesitancy and the factors that could improve vaccine acceptance. Given the rapidly changing dynamics of the pandemic, our approach of providing regular updates on community-level vaccine hesitancy via the online visualization tool, paired with a social media campaign in real time has provided timely support to state and local policy makers. This project has demonstrated the nature of guidance that can be generated from bringing together a mix of methodologies including surveys, social media listening, and local knowledge gathering, and which could be applied to settings around the world.

**Our analysis of COVID-19 vaccine hesitancy in the United States has continually suggested strong geographic and demographic heterogeneities.**

## KEY FINDINGS

Our analysis of COVID-19 vaccine hesitancy by zip code in the United States has continually suggested strong geographic heterogeneities. While overall hesitancy decreased substantially over time across the majority of the country, there are notable persistent counties where hesitancy has remained high. Exploration of hesitancy at such a fine resolution has provided tools for policy makers to implement location-specific strategies for combatting vaccine hesitancy.

In addition to understanding geographic differences in hesitancy, we aimed to quantify demographic and individual characteristics that were most associated with COVID-19 hesitancy for targeted action. We found that not all demographic groups were equally hesitant about COVID-19 vaccination. In general, older age groups had less vaccine hesitancy compared to 18-24 year olds as did those with more education, compared to those with less than a high school degree.

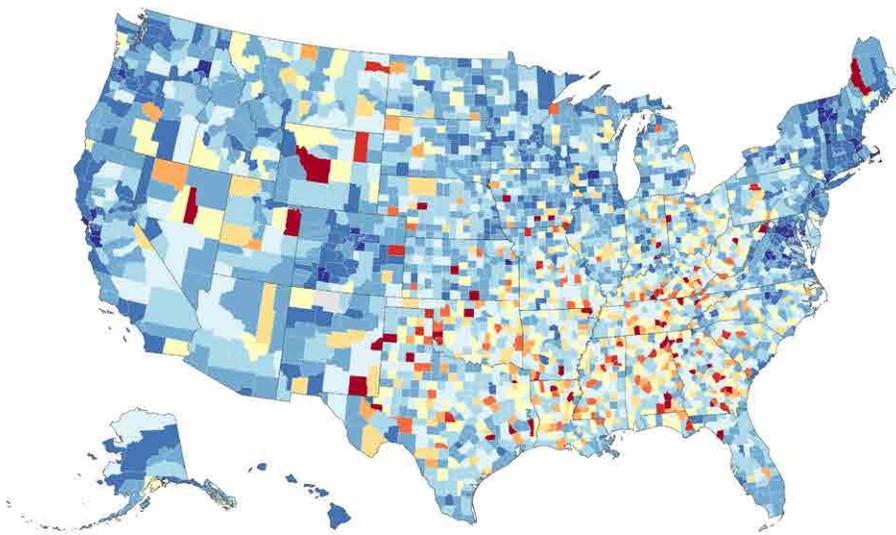
We also explored demographic differences in the cited reasons for vaccine hesitancy and again found stark heterogeneities in individual characteristics. The overall probability of selecting no need for the COVID-19 vaccine among all reasons for hesitancy was 30%,

but a Non-Hispanic White male aged 18-24 had a 46% probability of selecting this answer while a 35–44-year-old Non-Hispanic and Asian female aged 35-44, in contrast, only had a 12% probability.

In contrast, a Non-Hispanic Asian female with a graduate degree, for example, had a 52% probability of saying they wanted to wait and see if the COVID-19 vaccine was safe before getting it versus 50% of respondents overall.

## RECOMMENDATIONS

Our research has highlighted large disparities in vaccine hesitancy within the United States. Our findings highlight the need to understand vaccine hesitancy and the reasons behind it at the local level and for specific populations within the US. Our results provide critical input on the variation in vaccine hesitancy across several important population characteristics, including where people live, in addition to demographic characteristics such as race/ethnicity, age, and gender. For future vaccination efforts, it's important to understand the drivers in vaccine hesitancy for each of these groups of the population and tailor the approaches aimed to improve vaccine uptake to incorporate the information about the level of hesitancy as well as the main reasons behind it.



### ◀ VACCINE HESITANCY LEVELS BY COUNTY

This map highlights areas of the US that would benefit most from increased vaccination acceptance. This view shows, by county, survey respondents who answered “Yes, probably” or “No, probably not” when asked “If a vaccine to prevent COVID-19 were offered to you today, would you choose to get vaccinated?” as of February 24, 2022.

DATA SOURCE: The Delphi Group at Carnegie Mellon University, U.S. COVID-19 Trends and Impact Survey, in partnership with Facebook.

# REDIRECTING EXISTING DEMAND FOR INFORMATION TOWARDS VACCINE CONFIDENT INTERPRETATION BY IDENTIFYING ONLINE BEHAVIORAL NUDGE INTERVENTIONS

## ORGANIZATION NAME

Upstream Thinking

## GEOGRAPHY

Rural, southern United States

## FOCUS POPULATION

Unvaccinated African Americans

## METHODOLOGY TYPE

Qualitative interviews

HCD led solutioning

Quantitative survey



## SOCIAL MEDIA PLATFORM/S USED



## PROJECT SUMMARY

The majority of strategies addressing vaccine hesitancy to date have sought to act on the supply side of content by prefacing, restricting, or removing content. This project aims to affect the other side of the equation which has received much less attention - existing demand. How might we channel the existing demand to formulate personal opinions to shift online behavior towards vaccine confident content and interpretations?

## KEY FINDINGS

In many ways, the behavior of the unvaccinated population is unexpected and inconsistent. In spite of historical precedent of vaccination, where they fully trust their doctors and uptake other immunizations, they are motivated uniquely within COVID-19 context and common desire for safety for self and family, to arrive at their own conclusion, rather than defer the decision to medical and public health experts.

**For many, vaccine hesitancy is a result of unmet needs in the demand for information to make a decision. Providing information that meets these needs is more effective than simply telling people what to do.**

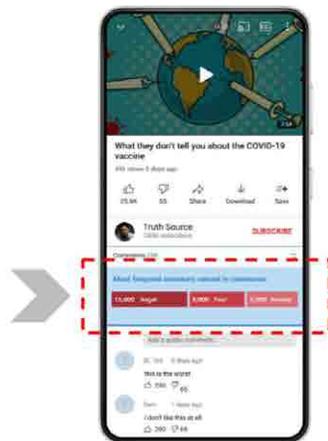
Our research revealed that there are 5 drivers of demand that currently drive their consumption for COVID-19 vaccine content.

- Balance and diversity—Individuals seek out counter-narratives to the mainstream narrative to balance out the perceived mainstream bias
- Freedom to choose (decision autonomy)—Individuals are strongly driven to make an informed decision for themselves, so they seek out content that informs rather than instruct
- Trust—Individuals seek out experiences directly from first-hand sources as they distrust institutions
- Transparency—Individuals glean available information (e.g. comments) to judge the incentives and inclinations of various sources
- Certainty about value of time spent—Individuals avoid spending time on content that does not fulfill their needs

When levers were harnessed to develop new social media concepts that aligned with these needs, the quantitative results indicate a nudge towards more COVID vaccine positive content and away from pathways that lead to vaccine hesitancy and misinformation. There is a preference for wisdom of the tribe over wisdom of the crowd, as content suggestions sourced from people similar to themselves than 'other YouTube users. 'Likes' and 'Views' are signals not credible enough for people to evaluate content. Providing prompts that make audience aware of potential YouTube algorithmic bias is helpful in promoting vaccine positive content.



**Stimulus:**  
Presenting users with a definite playlist of videos that indicates its helpfulness as sourced from 'others' and whose size is defined too



**Stimulus:**  
Presenting users with an information prompt that informs them about the sentiments contained in the comments



**Stimulus:**  
Presenting users while they view a covid-19 vaccine related content, a suggestive content they might miss out on because of YouTube's algorithm

**SOLUTION CONCEPTS**  
Screen captures from YouTube demonstrating the various stimulus.

## KEY PROCESS INSIGHTS

The process deployed on this project encompassed three stages – qualitative interviews, human centered design solution development, and quantitative solution/lever testing. Combining these techniques into one study provided a much richer and holistic view of the challenge of vaccine hesitancy.

### 1: Exploration of motivations and needs

A total of six 90-minute triad interviews (3 respondents together) were conducted with participants screened for the vaccine hesitant characteristics aligned to our project.

Triad interviews probed motivations for the search or demand for alternative narratives about COVID vaccines. Leveraging motivation as an anchor, interviews then probed current YouTube Search and Consumption routines to expose the needs those routines address. The behavioral drivers revealed the core unmet needs of this user group in their attempts to identify a “path to safety” for themselves.

### 2: HCD-led generative solutioning

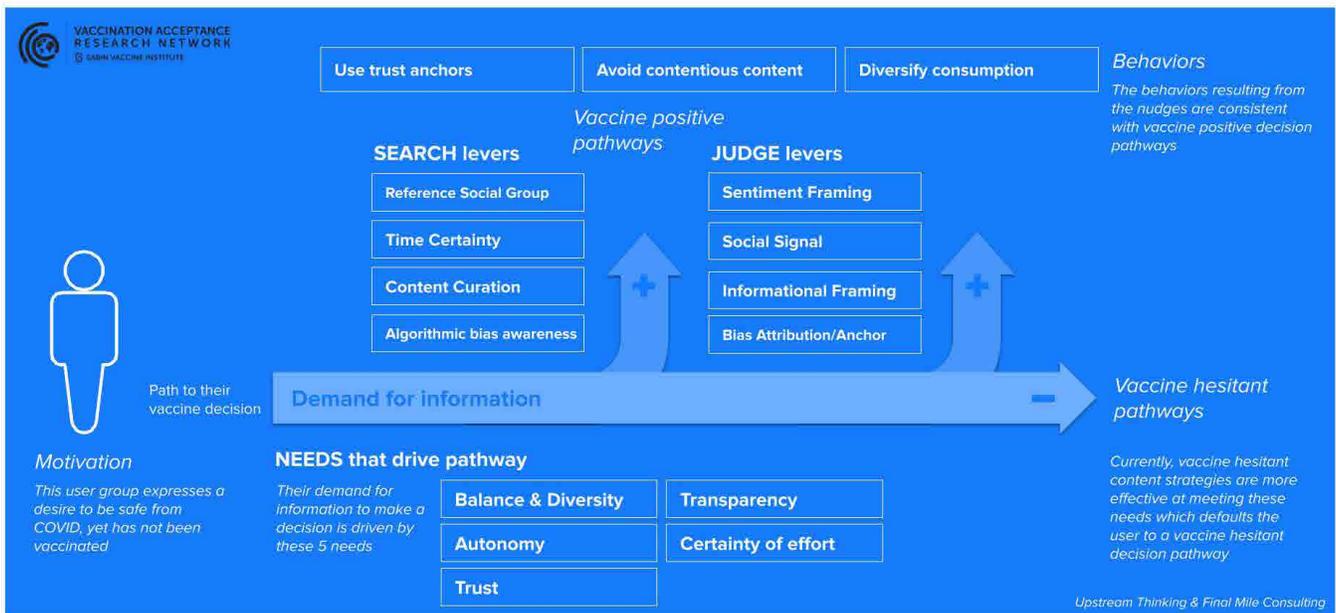
Leveraging the dominant pattern of opinion forming needs and online search & judgment heuristics, we developed 2-3 core hypotheses for changing search and content judgement decisions. The top 3 were further developed into user scenarios/simulations brought to life via screen flow wireframes and/or story boards that were leveraged in the subsequent solution testing.

### 3: Concept testing

Outputs from phase 2 were evaluated for efficacy by surveying 500 respondents screened using the same criteria outlined in phase 1. Respondents were exposed to each concept and asked a series of close-ended questions about each individually and comparatively across all 3. The results revealed which concepts tied to the unmet needs of this population resulted in a stated shift/nudge in search or judgement behavior towards a more vaccine positive landscape of content.

## EFFECTIVE NUDGES

A graphic looking at how vaccine positive pathways could be more successful at meeting the demand for information.



# APPENDICES



GRANTEE	PROJECT NAME	Country (research)	Closed loop fb?*	TECH PLATFORM										
				FB	IG	YT*	Twitter	TikTok	WhatsApp/msg	ChatBots*	Influencers	Crowd-sourcing	Other/multiple	
Oklahoma State University	Modeling Vaccine Confidence Interventions for Marginalized Migrant Communities: A Mixed Method Approach to Leveraging Social Media Narratives	US		1										
ORB International	Exploring drivers of HPV vaccine confidence and community-led solutions leveraging the experiences of mothers, daughters, and health-care providers in Brazil	Brazil												
Purpose Campaigns LLC	Harnessing virality for vaccine confidence: testing tactics to optimize sharing of pro vaccine content between WhatsApp and traditional social media platforms	Nigeria, India, Brazil							1					
RMIT University	Modeling vaccine-related information to create hybrid information hubs for people with disabilities in Vietnam and Indonesia	Vietnam, Indonesia	1	1		1		1	1					1
Shujaaz, Inc.	Tunajengana: Using social media to mobilise young East Africans to champion community uptake of COVID-19 vaccines	Kenya, Tanzania												1
The Behavioural Insights Team	Designing and testing a WhatsApp chatbot to increase Covid-19 vaccination bookings in Argentina	Argentina	1						1	1				
The Indiana University Observatory on Social Media	"The Black and Thriving Project": The use of message framing and social contagion to promote vaccines in African American communities	US	1				1							
Unity Consortium	Study on Activating Vaccine Supportive Parents of Adolescents and Young Adults as Trusted Voices on Social Media	US												1
University of Antwerp	Research to increase confidence in maternal vaccination by digital communication interventions	Belgium + 10 European countries		1			1							
University of California, San Francisco	WhatsApp Bots for Overcoming Vaccine Misinformation and Increasing Vaccine Confidence among Pregnant Women in Northern India: Development and Impact Assessment	India	1						1	1				
University of Chicago	Testing interventions to address vaccine hesitancy on Facebook in East and West Africa	Nigeria, Kenya		1							1			
University of Chicago, Department of Economics	Positive reinforcement of online and offline social signaling to accelerate COVID vaccine uptake	Sierra Leone	1									1		
University of North Carolina at Chapel Hill	Targeted Vaccine PSAs Based on Political Science and Economic Insights	US	1	1		1								
University of Washington (Department of Human Centered Design & Engineering)	Large-scale Studies to Advance Public's Access and Trust of COVID-19 Vaccine Research on Social Media	US	1											1
University of Washington (Institute for Health Metrics and Evaluation)	Using social media to identify drivers of COVID-19 vaccine hesitancy in the US by county and ZIP code	US		1										
Upstream Thinking	Redirecting existing demand for information towards vaccine confident interpretation by identifying online behavioral nudge interventions	US												
<b>TOTALS</b>			17	17	4	4	4	1	6	5	1	1	10	

## APPENDIX 2: ADVISORY COUNCIL

We want to especially thank the members of the Advisory Council – a small interdisciplinary group of domain experts from the vaccination confidence, public health, social media, and behavioral and data sciences fields – for providing expert guidance and thought leadership during key milestones of this Fund’s grant selection and management processes.



Monta Reinfelde, WHO



Renos Vakis, World Bank



Benjamin Djoudabaye,  
Africa CDC



Angus Thomson, UNICEF



Lauren Smith, CDC Foundation



Monica Jain, 3ie Impact



Gustav Praekelt, Praekelt  
Group



Amin Rahimian, University  
of Pittsburg



Chizoba Barbara Wonodi, The  
Johns Hopkins University



Heidi Larson, The Vaccine  
Confidence Project



Shobhini Mukerji, J-PAL  
South Asia



Sohail Agha, Global  
Health Leader | Behavioral  
Scientist | Intervention  
Designer & Evaluator



Ana Maria Munoz Boudet,  
World Bank

# APPENDIX 3: THE FUND'S PRINCIPLES

Priority was given to proposals that demonstrated how the Fund's core principles, as articulated below, would be incorporated into research plans.



**Equity:** Given the disproportionate impact COVID-19 has had on historically marginalized or excluded communities globally, the Fund is committed to

ensuring that equity is core to the work we support, and we prioritize equity as an essential principle. The WHO defines equity as the absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically. Equity includes the shifting of power to the communities of focus, shifting narratives and language to be representative and inclusive of all experiences and identities. Thus, this Fund is interested in proposals that focus on reaching historically marginalized or excluded populations globally and are authentically considerate, aware of, and proactively addressing the significant barriers those populations experience.



**Interdisciplinary Collaboration:** This Fund highly encourages interdisciplinary collaboration and cross-fertilization of ideas from outside traditional disciplines. While

not exhaustive, example researchers and disciplines that this Fund would be interested in seeing further integrated and supported include behavioral sciences, communications (including marketing), data sciences, technology, and public health. This Fund firmly believes that rigorous collaboration and partnership are at the heart of the truly bold and transformative approaches (and solutions) needed to address the complexity of today's vaccination confidence and uptake challenges.



**External Validity:** Challenges and solutions to increasing COVID-19 vaccination confidence and uptake can often be context specific. While this Fund seeks to provide targeted support to both underserved and

historically excluded or marginalized communities, this Fund's priority is also to surface insights that are more universally valid and potentially scalable, at least within focus communities globally. In lay terms: the Fund would prefer to support research where the findings are potentially applicable to segments of the population or population cohorts rather than, for example, a single demographic within a single city.



**Community Engagement:** We believe one way to achieve equity is ensuring authentic community engagement throughout this work. From research

design through to research implementation and dissemination of findings, we highly encourage all applicants to proactively engage and authentically partner with the communities with whom they are working. This engagement would include seeking to understand the obstacles, potential solutions and assets to build on, from the perspective of the community – ensuring that their voices, perspectives, and experiences are centered in the work. This also includes sharing resources with the community, as with any other partners. The Fund will not finance proposals that appear to be extractive in nature vis a vis the communities they seek to work in or learn from; we very much encourage applications from individuals and institutions representative of these same communities.



**Actionable Focus:** Research should be immediately actionable and valuable for the global health community rather than highly theoretical. However, the Fund will consider projects that may not directly

increase vaccinations in a particular community, but rather, for example, provide new approaches to increasing vaccination confidence that can be adapted to other settings/contexts or provide new insights on vaccination behavior that can be shared with and used by others.



**Transparency and Information Sharing:**

This Fund recognizes that we can only truly maximize our impact by being transparent. Information sharing is a critical process; it will enable the global health community to collaborate effectively and efficiently to solve the toughest challenges around increasing vaccination confidence and uptake. This Fund is interested in supporting proposals that are committed to rapidly disseminating insights, data, and learnings from their work as public goods for implementers to utilize in the design and execution of their vaccination campaigns and to continue to advance the global agenda around vaccination confidence and uptake. Proposals that explicitly embrace open access and open data principles will be viewed favorably by the Fund.



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