Vaccine Acceptance & Demand

SABIN VACCINE INSTITUTE

COMMUNITY-LED STRATEGIES TO AID VACCINE ACCEPTANCE

FIVE CASE STUDIES FROM THE GLOBAL SOUTH

INITIAL RESULTS FROM THE 2020-2021 SOCIAL AND BEHAVIORAL RESEARCH GRANTS PROGRAM

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A PRIMER FOR DECISION-MAKERS

FIVE CASE STUDIES FROM THE GLOBAL SOUTH

In 2019, the World Health Organization (WHO) designated vaccine hesitancy among the top ten health threats[1] and identified earning public trust as one of thirteen urgent health challenges for this decade.[2] This warning rings true as we enter the third year of a global COVID-19 pandemic, not only impacted by vaccine access, but also complex issues related to vaccine acceptance. The series of missteps fueling COVID-19 vaccine hesitancy, refusals, and mistrust in health systems has unfortunately spilled over to degrade the progress of previously successful routine immunizations (RI). Compounded by lockdowns and caregivers' fear and risk of exposure to COVID-19 in health care settings, many children are being left unvaccinated and becoming vulnerable to previously controlled vaccine-preventable diseases including measles, rubella, and rotavirus.

Building trust in vaccines requires an understanding of the unique social, cultural, political and economic dimensions of vaccination anxieties, avoidance and refusal. The complexity of the behavioral dynamics driving vaccine acceptance has inspired calls for social science perspectives to understand and address the challenges across local- and national-level settings.[3] Investments are needed for on-the-ground research from diverse regions to inform community-appropriate interventions.

Launched in 2019, Sabin Vaccine Institute's (Sabin) Social and Behavioral Research Grants Program supports a global network of interdisciplinary researchers and partners to investigate the social and behavioral drivers behind vaccine acceptance. Delivering contextualized evidence to help improve vaccination uptake in low- and middle-income countries (LMICs), the program supports the design, piloting and testing of interventions to reduce barriers and identify opportunities in diverse, local settings.

Generating Localized Knowledge for Global Solutions

Key insights have begun to surface from Sabin's 2020-2021 grant partners and are presented here to continue to inform action and investment around the globe that seek to build more vaccine confident communities. The grant partners represent multidisciplinary teams from the Kambia District, Sierra Leone; Mewat, India; Sindh Province, Pakistan; and Trans-Nzoia County, Kenya. Together, research teams and communities designed interventions employing a range of strategies including digital and social media messaging to increase vaccine literacy. Participatory research was implemented to equip and empower community health workers (CHWs) and community influencers to dispel rumors and strengthen trust between patients and providers (see Table 1).

1 World Health Organization. Ten threats to global health in 2019. https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019
2 World Health Organization. Urgent health challenges for the next decade. https://www.who.int/news-room/photo-story/photo-story-detail/urgent-health-challenges-for-the-next-decade
3 The Lancet. Looking beyond the Decade of Vaccines. Lancet. 2018 Nov 17;392(10160):2139. doi: 10.1016/S0140-6736(18)32862-9

Table 1. Common components in the individual research protocols

Commonality	Specific Examples
Multiple steps-between two and five-of exploratory, qualitative, social science methods of research to garner a multi-level understanding of experiences, knowledge and perceptions relating to vaccination and suitability of a proposed intervention	• Five-step Design Thinking Model[4] • Pre- and post-intervention surveys, focus group discussions and/or key informant interviews to assess the impact, feasibility, and acceptance of the intervention
Purposive sampling of the study population	• Power mapping to identify key community stakeholders • Community workshops to identify community influencers to recruit into a Community Accountability Board (CAB)
Information was sought from at least two different cadres of study participants, though the composition within those groupings differed	• Community members: Adults, child caregivers/ parents, youth, individuals from key groups (schools, religious institutions) • Healthcare workers: Facility-based, community-based
Co-design, implementation and evaluation of an intervention pathway amongst key stakeholder groups	• Healthcare workers • Civil society members • Community influencers

These investigational approaches prioritized the understanding of localized contexts and supported community-centric design, implementation, and evaluation of interventions to increase vaccine acceptance. Several common strategies emerged as effective in increasing vaccine confidence and acceptance across the different project partner communities (see Table 2).

4 Plattner, H. An Introduction to Design Thinking PROCESS GUIDE. https://dschool-old.stanford.edu/sandbox/groups/designresources/wiki/36873/attachments/74b3d/ModeGuideBOOTCAMP2010L.pdf

Table 2: Common strategies of effective interventions for increasing vaccine acceptance

Type of Intervention	Specific Examples
Trainings to empower local stakeholders	• Training of healthcare workers and civil society activists in social science methodologies and strategies to track and respond to rumors and concerns and devise evidence-driven community engagement strategies • Walkthrough and/or mock interpersonal communication exercises to improve upon messaging delivered from healthcare workers to community members and amongst different cadres of healthcare workers for improved coordination • Targeted training for healthcare workers on the safety, efficacy and importance of vaccines and vaccination • Engagement of religious leaders in workshops and trainings to address concerns and gain their trust and involvement in informational campaigns
Social listening through various pathways to understand misinformation circulating throughout the community and identify and prioritize concerns	Social listening was achieved through the following mechanisms: • Continued engagement with a CAB • Routine dialogue through WhatsApp groups and group teleconsultations
Creation of contextualized and targeted communication materials to raise awareness of COVID-19 signs, symptoms and prevention methods and counter myths and misinformation	• Informational pamphlets with colorful visuals • Short videos of endorsements from local vaccine champions or community influencers (religious leaders and elders) advocating for childhood and COVID-19 vaccination and sharing personal experiences to ease common concerns • Teleconsultation guide to address and directly counter common points of misinformation • Automated replacement of standard mobile phone ringtones with recorded health awareness and informational messaging
Continuous feedback loop amongst community and healthcare stakeholders to promote sustainability and adaptability of interventions	• Monthly CAB meetings to review healthcare worker services, identify problems and solutions, and support healthcare workers improve their rapport in the community • Civil society activists working with District Health Management Team on community engagement and information dissemination

Informing & Investing in Vaccine-Confident Communities

The goals of sharing these initial results are to:

Provide researchers and program implementers in LMICs with blueprints of successful research methodologies and approaches for piloting and evaluating strategies to increase vaccine confidence and acceptance in their communities.

Demonstrate the value of inclusion of these types of approaches and perspectives to sub-national, national and global funders, policymakers and decision-makers.

The five case studies presented in the next section of this brief provide specific methods and outcomes from the 2020-2021 research teams. Common themes emerged from the evidence which can inform policy, program, and practice aimed at increasing opportunities to build vaccine confidence and improve vaccination uptake within specific communities. These themes are described in Table 3.

Table 3 - Summary of Case Study Findings Related to Policy, Program, and Practice

Policy	Program	Practice
Integrate insights curated from context-specific, in-depth social science research in community experiences of vaccination, including an exploration of access and confidence issues, into routine and emergency vaccination programs as they are being planned and conducted. Build community trust through supporting, investing in and engaging community members as participants and leaders in the co-creation of viable, sustainable solutions to increase vaccine confidence and acceptance and to facilitate vaccine deployment. Prioritize Primary Health Care (PHC) system strengthening efforts and equitable healthcare service provision in COVID-19 testing, case management and vaccination, as trust in vaccines and vaccination is closely related to broader structural challenges with deeply-rooted community mistrust in political and healthcare systems. Monitor and address misleading informational posts and videos circulating on digital and electronic media, including social media, by engaging local authorities when possible. Showcase consistent endorsement and adherence to COVID-19 prevention measures by political, public and community leaders and influencers.	Equip and invest in CHWs to become advocates for vaccine confidence and equitable, expansive vaccine access in their communities. Earn the trust of faith leaders and empower them with knowledge on vaccine benefits so they may become vaccine champions. Conduct community-wide social listening exercises to understand common concerns and/or information gaps and identify pieces of impactful information to include in vaccination communication campaigns in advance of vaccination days. Provide additional training for both community- and facility-based healthcare workers to ensure understanding of the safety, efficacy and importance of locally available vaccines. Adapt training to address any harmful, exogenous narratives that are circulating in the community. Provide CHW training on RI advocacy and awareness campaigns within rural and peri-urban settings. This has been shown to yield maximum knowledge translation from CHWs to heads of households being counseled on the quality, safety and efficacy of RI and the importance of adhering vaccination schedules during the COVID-19 pandemic. Provide interpersonal communication for immunization training for different cadres of healthcare workers to encourage effective discourse with community members, particularly amongst populations exhibiting vaccine hesitancy or refusal. Train healthcare workers on the use of digital health tools to create sustainable vaccine awareness and advocacy and increase science literacy, which is particularly important in rural and peri-urban settings.	Improve upon health, vaccine and vaccination messaging by translating it into local languages, considering local vernaculars, and disseminating it through locally acceptable pathways including low-cost digital health solutions: pamphlets, video clips and messaging via social media platforms, automated audio ring tunes, Friday prayer, etc. Use local dialects and non-technical terms in health communications, especially those relating to vaccine safety and efficacy. Accompany the information with visual supplementary material when possible. Deploy corrective messaging strategies, including tele-consultative and virtual engagements, to address COVID-19 misconceptions and misinformation in the community. Conduct CHW-led home vaccination drives and surveillance within rural populations to increase vaccination uptake. This is especially useful during pandemic lockdowns and times of healthcare facility closures. Improve communication and coordination between CHWs and health care providers who administer vaccinations. Tailor community engagement and deployment strategies to the specific needs and experiences of communities. This should include accounting for power dynamics, existing knowledge, local concepts and prior experiences with healthcare.

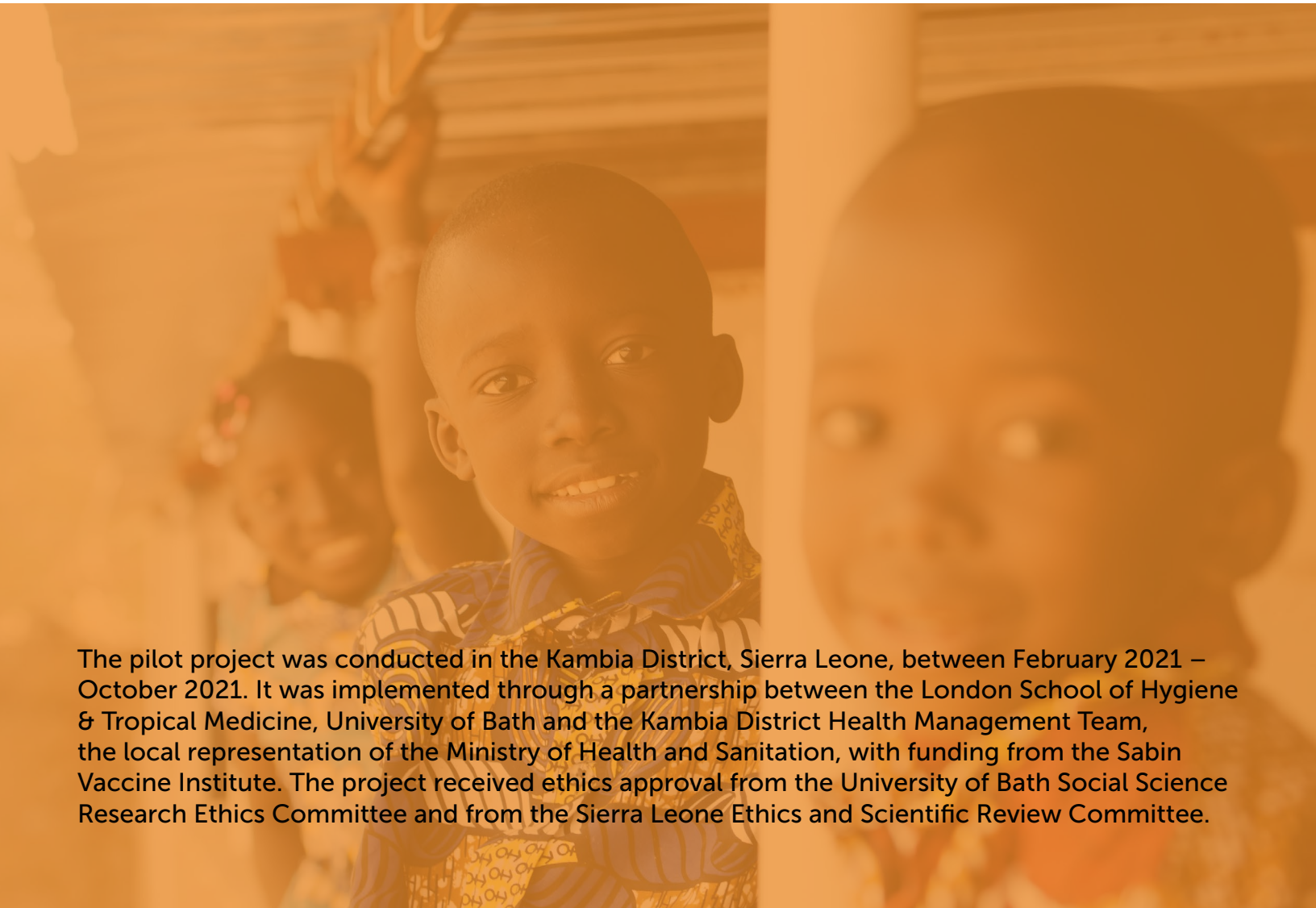
The case studies demonstrate the value of community-centric approaches for generating localized solutions, which is an essential strategy for addressing the complex social factors of vaccine acceptance. These early learnings aim to inspire and inform similar methodologies that can and should be used to continue generating critical knowledge and solutions to strengthen vaccine confidence in LMICs. One size does not fit all, and resources should focus on understanding effective approaches to design context-appropriate messaging and policy. These strategies should be adopted globally at this critical moment when focus remains on driving COVID-19 vaccine coverage to end the global pandemic and recovering from the lost ground in routine immunization to protect future generations.

2020-2021 Grant Partners

- **Equipping Community Health Workers with Social Science Training: Invaluable Liaisons to Support Vaccine Access and Acceptance**
  Dr. Luisa Enria and Dr Joseph S Bangura
  Kambia District, Sierra Leone
- **Community Health Worker-Led Intervention for Vaccine Information and Confidence**
  Dr. Rajeev Seth, Dr. Anita Shet and Baldeep Dhaliwal
  Mewat District, India
- **Value of Community Co-Design for Vaccine Confidence Interventions**
  Rubina Qasim, Dr. Mohammad Tahir Yousafzai and Dr. Uday Narayan Yadav
  Karachi, Pakistan
- **Interrupted Time Series Study of Adult Perceptions Regarding COVID-19 and COVID-19**
  Dr. Benson Wamalwa and Chrysanthus Wamela
  Trans-Nzoia County, Kenya
- **mHealth and Social Media-Based Interventions to Improve Childhood Immunization Coverage & COVID-19 Vaccine Hesitancy**
  Dr. Abdul Momin Kazi and Dr. Fauzia Malik
  Sindh Province, Pakistan
- **Using Community Influencers to Address COVID-19 Misinformation and Vaccine Hesitancy: A Quasi Experimental Study (not summarized in this report)**
  Dr. Freddy Eric Kitutu and Jacquellyn Nambi Ssanyu
  Buikewe, Uganda

CASE STUDY FROM THE KAMBIA DISTRICT OF SIERRA LEONE

Equipping Community Healthworkers with Social Science Training: Invaluable Liaisons to Support Vaccine Access and Acceptance



The pilot project was conducted in the Kambia District, Sierra Leone, between February 2021 – October 2021. It was implemented through a partnership between the London School of Hygiene & Tropical Medicine, University of Bath and the Kambia District Health Management Team, the local representation of the Ministry of Health and Sanitation, with funding from the Sabin Vaccine Institute. The project received ethics approval from the University of Bath Social Science Research Ethics Committee and from the Sierra Leone Ethics and Scientific Review Committee.

KEY TAKEAWAYS

- **Equip and invest in CHWs to engage their communities around vaccine confidence and as advocates for equitable vaccine access**
- **Support community-led research and participatory processes for operationalizing research findings to improve community engagement and vaccine deployment strategies**
- **Connect vaccine confidence and access programming to wider health system strengthening efforts as trust in vaccines is closely related to broader structural challenges**

APPROACH

Community Health Workers (CHWs), District-level COVID-19 response team members, and key community members, including local civil society activists, from five communities within the Kambia District in Sierra Leone bordering Guinea, participated in rumor tracking and ethnographic observation to investigate the three key themes and generate knowledge and solutions towards increased vaccination in their communities. This research builds upon previous work by the study team in this setting.

To achieve this overarching objective, a five-step approach was utilized, as follows:

- Train CHWs on social science methodologies and techniques
- Implement CHW-led research of daily ethnographic observations of community members within their communities
- Analysis of collected observations and translation of findings into co-designed operational recommendations for vaccine deployment and community engagement around vaccination
- Capacitate and collaborate with civil society activists in the District through conducting trainings on, a) key methods to track and respond to rumors and concerns and how to devise evidence-driven community engagement strategies, and b) recommendations from CHW-led research
- Directly support the implementation of District-level community engagement strategies

The Kambia District in Sierra Leone was hit by Ebola in 2014-2016, followed by outbreaks of measles, yellow fever and then the COVID-19 pandemic, and there was little evidence to determine why this region was experiencing significant challenges with vaccine uptake. This project highlights the value of community co-designed research and interventions, particularly of engaging CHWs in the process, in supporting localized solutions to strengthen vaccine confidence and immunization coverage.

IMPLEMENTATION STAGES

1. Training of Community Health Workers in Social Science Methodologies

CHWs associated with the relevant Peripheral Health Units (PHUs) were invited to a one-week tailored, intensive social science training program, as led by experienced social scientists and the District Health Management Team (DHMT) supervisory team. The training workshop was aimed at a lay audience and framed as an introduction to qualitative research with an emphasis of ethnographic perspectives and participatory methods. Theoretical and practical sessions included topics covering:

- Foundational concepts in qualitative social science
- The interpretivist paradigm
- Participant observation and writing ethnographic notes
- Conducting in-depth interviews and focus group discussions
- Participatory activities including, power mapping and rumor tracking group exercises

2. Community Health Worker-led Ethnographic Observations

A summary of key findings from daily CHW observations over 2.5 months are as follows:

- Common concerns and confusion centered around if COVID-19 truly exists and asymptomatic transmission
- General concerns about COVID-19 and mistrust in the health system might have affected vaccine confidence
- Political economy fueled concerns that COVID-19 was a money-making exercise and vaccines were given 'by force'
- Fears of vaccines (e.g.; given 'by force') impacted community members accessing other services (e.g.; antenatal care services) as they stayed away from health facilities; however, initial fears of traveling to health centers subsided
- Acceptability of COVID-19 prevention measures were affected by accessibility of resources (e.g., face masks) or impacts on livelihood due to border closures
- Social media played a role in propagating rumors about vaccines (e.g.; the vaccine spreads the virus)
- Importance of positive role models in creating vaccine confidence and acceptance (e.g. President taking the vaccine)

Insights from rumor tracking include:

- Rumors are expressions of genuine concern, change over time, and need to be addressed dynamically and by building trust
- Public health measures must consider local livelihoods, feasibility of interventions, and adapt to community contexts
- Mistrust can be deeply-rooted, and vaccine confidence requires trust-building across the whole health sector, long-tern dialogue and local leadership

3. Co-designed Operational Recommendations

The following four key operational recommendations for community engagement stemmed from ethnographic observations:

- Strengthen community trust in the health system and COVID-19 response team
- Increase community awareness of the benefits of COVID-19 vaccination
- Address and counter rumors/misinformation and concerns about COVID-19 vaccines and the vaccination drive
- Address concerns around the implementation of COVID-19 regulations, prevention measures and compliance

4. Collaboration with Civil Society Activists

Two civil society activists, directly involved in the District COVID-19 response, were trained in social science methods and on the insights from the CHW observations.. The activists worked closely with the research team to remain informed of ethnographic observations, discuss implications of the findings, and determine how to integrate them into their ongoing COVID-19 response activities. These activists then further supported community engagement in the CHWs' target communities.

5. Support to District-level Community Engagement

Ethnographic observations were routinely communicated to the Head of Social Mobilization at the DHMT, which informed ongoing work on the COVID-19 response, including regular radio shows and targeted activities across the District.

Ninety community members were targeted through organized workshops, as identified through previously power mapped community influencers, and included town heads, CHWs, health staff and health facility management members, youths, religious leaders, teachers, traditional healers and women's groups. Facilitated by the District Social Mobilization Committee and members of civil society, discussions focused on issues identified through the research, and community members were provided with correct key messaging.

The following action points and outputs emerged from the community engagement workshops:

- Participants pledged to hold engagement meetings within their communities to disseminate DHMT information with support from CHWs
- Cross contacts were shared to create a database of available community response focal points to drive community-led engagements for COVID-19-related response efforts and future needs
- All invited communities have rolled-out engagements in their communities in diverse ways
- Targeted knowledge was observed within the community, and stakeholders were actively sustaining and building upon those efforts

The DHMT organized a District stakeholders vaccine confidence workshop at the Kambia Government Hospital to provide feedback of key findings and recommendations from the research and to give stakeholders the opportunity to express viewpoints and concerns and to facilitate discussion between public health officials and community representatives, including Paramount Chiefs from each Chiefdom were in and civil society representatives. Feedback was as follows:

- Participants felt the research had significance and felt the engagement had greatly reduced the fear of COVID-19 and vaccination
- Generalized mistrust in the health system, including negative experiences with healthcare providers, created low vaccine confidence in both routine vaccination and emergency vaccination including for COVID-19
- The District Medical Officer reflected on the positive changes to the district community engagement and immunization strategies, highlighting that listening to communities' concerns, both in relation to trust and in the mismatch between vaccine deployment strategies and local socio-economic realities, has allowed for better targeted vaccination efforts resulting significant gains

INFORMING COMMUNITY ACTION

Policy

- Support community-led research and participatory processes for operationalizing research findings to improve community engagement and vaccine deployment strategies
- Equip and invest in CHWs to engage their communities around vaccine confidence and as advocates for equitable vaccine access
- Connect vaccine confidence and access programming to wider health system strengthening efforts as trust in vaccines is closely related to broader structural challenges

Program

- Include context-specific, in-depth social science research in community experiences of vaccination, including an exploration of access and confidence issues, in routine and emergency vaccination programs

Practice

- Tailor community engagement and deployment strategies to specific needs and experiences of different communities, taking seriously power dynamics within these communities, existing knowledge and local concepts and prior experiences of healthcare

SOURCES

- Bringing the social into vaccination research: Community-led ethnography and trust-building in immunization programs in Sierra Leone

RESEARCH LEADS

Luisa Enria,Phd.

Department of Global Health and Development
London School of Hygiene & Tropical Medicine

Dr. Enria is an Assistant Professor at the London School of Hygiene and Tropical Medicine (LSHTM). Her work applies approaches from political anthropology to community experiences of epidemic preparedness and response and humanitarian emergency interventions. In 2015, she worked on the Ebola Vaccine Projects Trials (EBOVAC) in Sierra Leone, carrying out ethnographic research on community experiences of the Ebola outbreak. She currently holds a UK Research and Innovation (UKRI) Future Leaders Fellowship and earned her PhD from the University of Oxford.working with communities to co-create grassroots-level interventions to improve vaccine uptake

Joseph Sylvanus Bangura, MBCh.B, MPH

Sierra Leone Ministry of Health and Sanitation

Joseph Sylvanus Bangura holds a MBCh,B from the University of Sierra Leone and an MPH from Southern Medical University. He is a District Medical Officer (DMO) with the Sierra Leone Ministry of Health and Sanitation.

CASE STUDY FROM MEWAT DISTRICT, HARYANA, INDIA

Community Health Worker-Led Intervention for Vaccine Information and Confidence

The pilot project was conducted in India's Mewat District between January 2021 – December 2021. It was implemented through a partnership between the Johns Hopkins Maternal and Child Health Center India and Bal Umang Drishya Sanstha (BUDS), with funding from the Sabin Vaccine Institute. The project received ethics approval from The Office of the Institutional Review Board (IRB) The Ethics Committee (IRB) of BUDS.

KEY TAKEAWAYS

- **Support non-traditional leadership, such as Community Accountability Boards and faith-based leaders, to facilitate change and ownership over health promotion as a sustainable method**
- **Effective health communication strategies are targeted health promotional videos and simple pamphlets with local community influencers shareable via digital platforms (e.g.: WhatsApp)**
- **Improve lines of communication and coordination between community health workers and the health care providers who provide vaccinations**

APPROACH

Community members from the rural village of Ghasera in the Mewat District, India, co-developed and co-developed and implement a four-step intervention to motivate vaccine acceptance and uptake of routine childhood and COVID-19 vaccination, as follows:

- Develop a Community Accountability Board (CAB) comprised of identified community influencers
- Conduct human-centered design (HCD) workshops with both community health workers (CHWs) and CAB members to establish a multi-level understanding of the barriers faced in accessing vaccines, and implement a baseline survey with caregivers of children to assess their knowledge, attitudes and practices (KAP) around vaccines
- Co-design, implement and evaluate an intervention pathway with CHWs and CAB members
- Ensure long-term sustainability through monthly CAB meetings

The intervention included several components, including endorsements from religious leaders, pamphlets and videos of local vaccine champions, targeted training for CHWs, walkthrough interpersonal communication exercises, and improved coordination between cadres of CHWs. Findings from pre- and post-intervention KAP survey analysis and qualitative in-depth interviews with CHWs and CAB members suggested there were improvements in caregivers' vaccine KAP and that intervention was impactful for CHWs and CAB members. Community health workers shared feelings of ownership over vaccine uptake, and both CHWs and CAB member discussed their empowerment to address broader health issues. Understanding this intervention in the context of Mewat can provide a prototype of how this co-design method of interventions could be implemented in similar settings.

IMPLEMENTATION STAGES

1. Development of a CAB

Influential community members (i.e.; religious leaders, teachers, sarpanches, senior CHWs, and village elders) were identified through local knowledge of the community, recruited to participate, and interviewed to assess their interest and commitment as a CAB member. All potential members were interviewed and asked questions about their perceptions of vaccines, their role in the community, how long they have been involved in their role in Ghasera. Participants were then selected based on a combination of high influence, commitment to the project, and willingness to advocate for vaccines. This project identified 10 CAB members, comprised of teachers, city council (panchayat) members, social workers, community mobilizers, senior CHWs, religious leaders, and local medical officers.

Figure 1: Maualana (religious leader) and CAB member advocating for vaccination in a short video of well-respected community members.

2. Preliminary Data Collection and Human-Centered Design Workshops

Table 1 - Findings from the baseline data collection

Caregivers	CHWs	CHWs & CAB members
Felt CHWs provided valuable access and information regarding vaccines, while poor interactions with CHWs resulted in negative perceptions of impact on the community Had perceptions that CHWs do not properly listen to, or properly address, concerns; and/or do not react in ways that allow caregivers to discuss concerns Were concerned about side effects of vaccines Trusted religious leaders based on perceptions of them having their best interests at heart Viewed COVID-19 as a 'city problem' or a 'disease of western countries'	Did not feel well-trained to address community concerns on vaccination records or side effects Did not perceive the same level of ownership or impact on vaccine acceptance within the community Felt Auxiliary Nurse-Midwives are not typically able to provide them with enough notice to inform caregivers of vaccination appointments and patiently address their questions and concerns, leaving the caregivers feeling rushed	Identified communication barriers due to lack of training, creating, a) a lack of coordination on vaccination guidance between CHWs and CHW supervisors (Accredited Social Health Activists), b) less optimal knowledge shared by CHWs to caregivers Shared concrete examples of known individuals benefiting from vaccination would be more impactful Felt that religious leaders were the most trusted and valued community members as perceived by the community Believed community members would refuse COVID-19 vaccines due to perceptions that COVID-19 is not in Mewat

The baseline KAP surveys provided an understanding of vaccination barriers, motivation, misinformation, myths, and community rumors among caregivers of children. The human-centered design workshops amongst CHWs and CAB members allowed for the design of intervention based on the insights of the community. Insights from the baseline data collection can be seen within Table 1.

3. Implement the Intervention as Based on Insights Gained

Interventions to address the most prominent rumors, misconceptions, and barriers was created and subsequently refined through two, online HCD workshops conducted with the CHWs and CAB members. Priority interventions included:

- Engagement of religious leaders in workshops/trainings to address concerns and gain their trust and involvement in informational campaigns
- Development and distribution of pamphlets with and videos via WhatsApp of influential community leaders (e.g.; religious leaders and elders) as vaccine champions advocating for routine childhood immunization and COVID-19 vaccination and sharing personal experiences to ease common concerns (see Figures 1 and 2)
- Enhanced and targeted communication training for CHWs, which included practical interpersonal mock scenarios to address common vaccine-related misconceptions and fears (e.g.; side effects)
- Conduct walkthrough, reflective listening exercises to enable CHWs to communicate more effectively and empathetically with caregivers, as guided by materials from Johns Hopkins Center for Communication Programs (see Figure 3)
- Improved coordination between CHWs and supervisors regarding information sharing and vaccination schedules

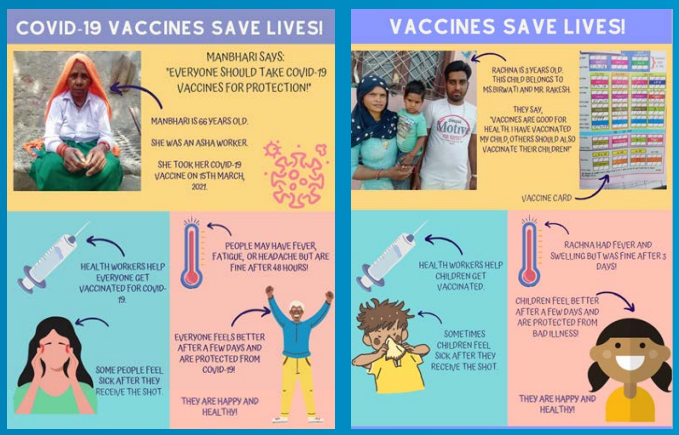


Figure 2: Pamphlets to motivate vaccine uptake by addressing the most frequently discussed fear of routine vaccines (side effects).

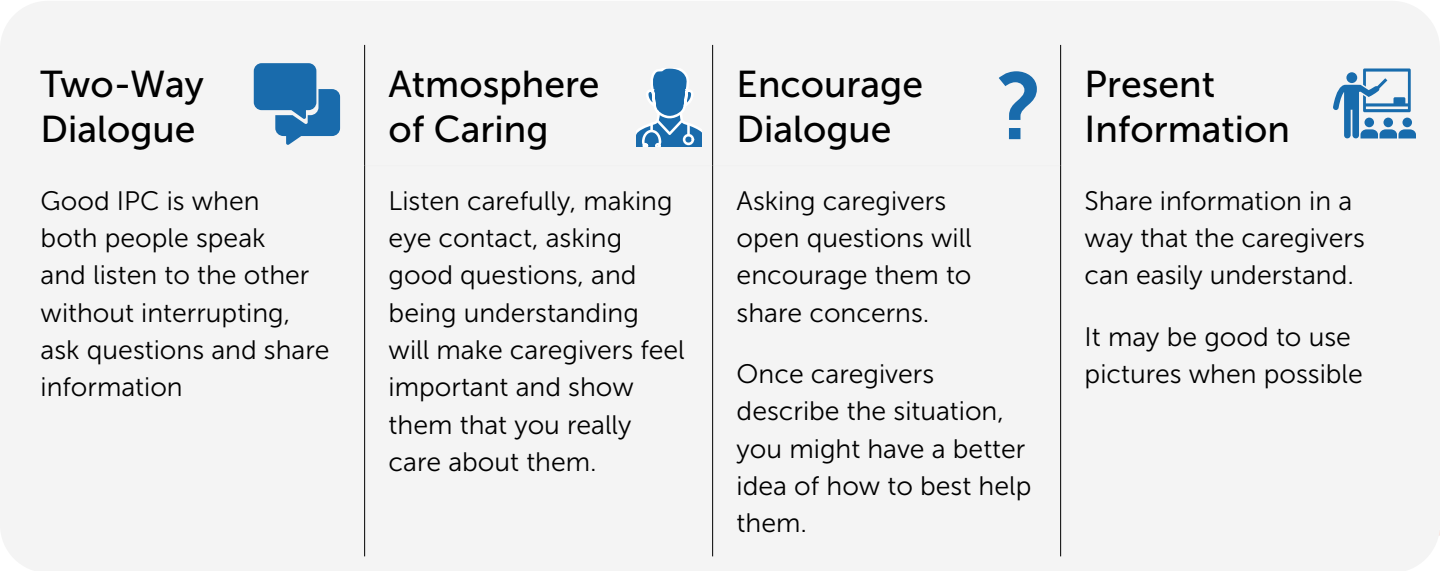
4. Evaluation of the Intervention and CAB Sustainability

The post-intervention caregiver KAP survey and interviews with CHWs and CAB members observed several improvements within the community, as follows:

Caregivers' perceptions	CHW's perceptions
Improvements in community knowledge of vaccination side effects and benefits of vaccination Caregivers welcomed the involvement of fathers and community leaders in vaccination CHWs are perceived as being more present and active in the community Caregivers were more personally involved in obtaining vaccines, willing to travel long distances; and there were fewer suggested reasons to refuse vaccination	Physical items (videos and pamphlets) were most helpful for communication with caregivers Communication training was a helpful method of training Links with community leaders were improved, which provided support towards reaching hesitant caregivers Improvements in both routine immunization services and COVID-19 vaccination due to various communication, coordination, and strengthened connections Increased confidence due to broad skill development allowing for the use of online platforms, discussion of issue with caregivers, and improved relationships with caregivers by leveraging the CAB Increased ownership and empowerment to apply skills to facilitate change

Throughout the study intervention period, the CAB met monthly to review CHW services, identify problems, talk about solutions, and help CHWs improve their rapport in the community. As an indicator of sustainability, the CAB found significant value in their work and expressed the desire to continue meeting to facilitate positive impact in Mewat regarding other key community priorities: preventing child marriage, improving education for girls, and more autonomy for women.

Figure 3: Interpersonal Communication for Immunization Training



INFORMING COMMUNITY ACTION

Policy

- Acknowledge, articulate, and address the values that community members hold
- Invest resources for community members to co-create viable solutions and trust their ability to do so
- Support non-traditional leadership (CAB) to facilitate change and ownership over health promotion as a sustainable method

Program

- Faith leaders: Earn their trust, empower them with knowledge on vaccine benefits and as vaccine champions
- Conduct a robust communication campaign of the COVID-19 vaccine prior to vaccination days
- Engage with CHWs and community members to understand the specific type of impactful information and ways it should be communicated. Suggestions of communication strategies are using targeted health promotional videos and simple pamphlets with local community influencers shareable via digital platforms (e.g.: WhatsApp)

Practice

- Improve lines of communication and coordination between CHWs and health care providers who provide vaccinations
- Communicate health information in local dialects and in less technical terms that people understand
- Empower CHWs to address vaccine adverse events and vaccine-related queries from communities

RESEARCH LEADS

Baldeep Dhaliwal, MSPH

John Hopkins Bloomberg School of Public Health

Baldeep K. Dhaliwal (she/her) is in the doctoral program at Johns Hopkins Bloomberg School of Public Health in the Department of International Health, Social and Behavioral Interventions. She previously worked as a Research Associate II at the International Vaccine Access Center. Baldeep's work has focused on understanding multi-level perceptions that impact vaccine-seeking behavior, while working with communities to co-create grassroots-level interventions to improve vaccine uptake

Rajeev Seth, MD, MBBS

Bal Umang Drishya Sanstha (BUDS)

Dr Rajeev Seth is a U.S.-trained, American Board Certified Social Pediatrician with expertise in the delivery of mobile health, access to vaccinations and welfare for underprivileged children and young people in low resource community settings. As co-founder of a non-profit organization BUDS, Dr Seth's work has reached out to serve the child health, vaccinations, nutrition and rehabilitation needs of more than 81,000 marginalized children in Delhi and rural villages in the backward district of Mewat, India since 2003.

Anita Shet, MD, MBBS, PhD

Johns Hopkins Bloomberg School of Public Health

Anita Shet is a pediatric infectious diseases specialist with broad interests in childhood infections in low and middle-income countries with a specific focus on vaccine-preventable infections. Her research also explores the link between timely immunization and cognitive outcomes in children. She currently serves on the Council of the International Congress of Infectious Diseases, and is member of the Dengue Vaccines Advisory Committee on Immunization Practices (ACIP) Workgroup. She also serves on the NIH Candidate Vaccine Advisory Committee and the Steering Group on Epidemiological Preparation for Vaccine Trials established by the Indo-US Vaccine Action Program to provide guidance on epidemiological and vaccine studies for dengue and chikungunya control in India.

CASE STUDY FROM KARACHI, PAKISTAN

Value of Community Co-design for Vaccine Confidence Interventions

The pilot project was conducted in Karachi, Pakistan between January 2021 – December 2021. It was implemented through a partnership between Dow University of Health Science, Karachi, and Aga Khan University, with funding from the Sabin Vaccine Institute. The project received ethics approval from the Dow University of Health Science Institutional Review Board.

KEY TAKEAWAYS

- **Co-designed approaches involving multiple, highly influential and trusted institutions (e.g.; academic, religious, healthcare) need to be employed to develop trust and confidence in vaccines and generate demand for vaccination**
- **Engagement and empowerment of females is crucial in driving change, especially in Muslim settings, but attention needs to be given to their local values, traditions and cultural practices**
- **Utilizing and moderating conversational social media platforms (e.g.; WhatsApp) can be successful in tackling misinformation amongst youth and their families**

APPROACH

A community-driven approach to improve vaccine literacy and strengthen participants' capacity for vaccination decision-making was implemented with the objective of improving vaccine uptake among an under-served urban population residing in Muslim Abad Colony, Landhi Town, Karachi, Pakistan.[1] Household surveys and focus group discussions (FGDs) were conducted to explore misinformation, rumors, misconceptions, and fear regarding the COVID-19 pandemic and vaccination among residents of informal settlements. Insights established key areas for an intervention designed with and for the community. The process involved five stages of the Design Thinking Model (see Table 1).

1 Plattner, H. An Introduction to Design Thinking PROCESS GUIDE. https://dschool-old.stanford.edu/sandbox/groups/designresources/wiki/36873/attachments/74b3d/ModeGuideBOOTCAMP2010L.pdf

Table 1 - The Five Co-Design Phases of the Design Thinking Model

Co-Design Phase	Specific Objectives	Methodology
Empathize	Explore the misinformation, rumors and misconceptions regarding vaccination and COVID-19 from the perspective of different stakeholders	Household survey, focus group discussions (FGDs) by age and gender Identify and engage key stakeholders for co-design
Define	Identify issues and address and validate the findings with different stakeholders	Information sharing workshop among research team and community to identify current vaccine misconceptions
Ideate	Design the solutions for the identified problems based on knowledge-based evidence (what the people think will work for them) and evidence-based practice	Ideation workshops among research team and community to develop problem-based solutions
Prototype	Design and validate a single mature intervention prototype required for testing or implementation phase Develop the implementation action mechanism and theory of change to support the intervention Develop a continuous monitoring framework for the intervention	Design and action plan workshops to develop and translate resources and messaging
Testing	Deliver the mature intervention to the beneficiaries. Evaluate the effectiveness of the intervention.	Field implementation with in-depth interviews and FGDs

Co-design approaches aim to provide greater sustainability and longevity of strategies (e.g.; vaccination acceptance messaging). Given post-intervention evaluation showed these community-centered intervention components were effective in dispelling COVID-19 misconceptions and improving COVID-19 vaccine acceptance, these strategies could inform global stakeholders targeting similar objectives.

IMPLEMENTATION STAGES

1. Empathize Phase

Baseline Understanding

A quantitative cross-sectional survey administered amongst a random selection of 470 households determined the following common misconceptions and beliefs:

- All migrants carry COVID-19 (46%)
- Only the elderly can be infected with COVID-19 (32%)
- Only those who practice taboo behaviors (e.g., not offering prayers, sex etc.) can be infected with COVID-19 (35%)
- Drinking water (48%) and eating nutritious food (59%) prevents COVID-19
- COVID-19 vaccines are unsafe (26%)
- People with comorbidities should not receive vaccination (25%)

Presence of comorbidities, exposure to radio/TV were all associated with higher scores of misconceptions. More than half of survey participants had smart phones. Increased access to messaging channels coupled with low literacy may contribute to the spread of misinformation.

Qualitative data gathered through 20 in-depth interviews and four FGDs (two per sex group; 20 participants total) with community stakeholders identified the following themes:

- Mistrust of vaccine safety and trust in home remedies
- Trust in elder and peer advice, may consider vaccination if recommended by these relations
- Religious prohibition of vaccination
- Perception among youth that COVID-19 is not a serious illness requiring vaccination
- Media playing significant role in spreading misinformation including conspiracy theory that COVID-19 vaccine is a 'Western Plot' to harm particular ethnic groups like people practicing Islam
- Poor health literacy and health care seeking, and lack of communication channels are barriers for healthcare workers in building public confidence in COVID-19 vaccine

Identification and Engagement of Key Stakeholders for Co-Design Process

Community trust, facilitating buy-in of key stakeholders in the co-design process, was developed through the following considerations:

- Hiring study staff from the same target community, with a key member belonging to the same Pashtu ethnicity with fluency in local language
- Engaging with influential community stakeholders, including religious leaders, school teachers, and informal healthcare workers.
- Holding informal meetings from the study outset, to allowed for discussion and community concerns to be addressed
- Honoring of cultural norms and tradition of the community by completely segregating male and female activities and allowing only female staff to interview and approach the female stakeholders
- Providing FGDs in a comfortable, respectful environment with available refreshments, facemasks, sanitizers, and social distancing to motivate and engage participants

Key local stakeholders identified were healthcare providers (informal health workers, Expanded Program on Immunization vaccinators, polio workers), union council chairmen, political party members from the community, law enforcement personnel, religious leaders (male and female), school teachers (male and female), Medical Superintendent of local community hospital, and other community leaders.

2. Define Phase

Using insights from baseline data, key actional problem statements were constructed (see Table 2).

Table 2 - Key Actionable Problem Statements

Level of Action	Key Actionable Problem Statements
Individual/ family level	• Poor health literacy resulting in susceptibility to rumors and mis- or disinformation • Lack of female involvement in decision making (poor female empowerment) • Lack of trust in government hospitals and doctors, considered as party in global COVID-19 hoax • Inherently vaccine hesitant population with hardcore refusal for polio vaccination
Community/ society level	• Faith based trust (more trust in religious leaders), strong influence of religious leaders in the community • School teachers and schools influential and respected by the community where literacy is less than 50% • Poverty, lack of civic facilities and healthcare by the government create lack of trust and negative sentiment
Service level	• Lack of COVID-19 vaccination center in close proximity • WhatsApp, YouTube, and Facebook as major source of acquiring information • Local informal healthcare providers, religious leaders, school teachers and school going youth considered as knowledgeable regarding COVID-19 pandemic & vaccination

3. Intervention Phases: Ideation and Prototyping

Four, in-person ideation workshops with local stakeholders, held separately for males and females, were conducted to define the identified issues/problems and set priorities. Further brainstorming and mind-mapping exercises were conducted to refine and integrate the collection of ideas into cohesive applicable concepts and solutions to fill knowledge gaps and debunk disinformation within the community. The derived interventions were shared with 20 stakeholders, which included policy makers, general population, and religious leaders to obtain additional insights.

4. Prototyping Phase

The main purpose of this stage was to refine the ideated interventions into the most suitable prototype/intervention and delivery strategy required for testing or implementation. This was achieved through a preliminary consultative meeting and final community stakeholder co-design workshop. A single mature package of interventions involving four different strategies was finalized for testing and evaluation, as listed below:

- School-based approach to disseminate correct contextual information and knowledge to the school children and their teachers who would in turn inform the families.
- Masjid-based approach to disseminate the same contextual messages/knowledge to the masjid imams (religious leaders) to then convey forward to their followers.
- Healthcare providers-based approach to actively involve and educate informal healthcare providers working within clinics and maternity homes within the target setting who will then inform their patients and attendants.
- Youth-based approach to disseminate short video clips and health messaging to correct misinformation through created youth WhatsApp groups from each Mohalla (neighborhood), as moderated by the research team.

Contextual communication materials (see Figure 1) to raise awareness of COVID-19 signs, symptoms and prevention methods; depict how to register for COVID-19 vaccination; and counter myths and misinformation were developed in Urdu for community wide dissemination including through WhatsApp groups and Friday prayer services. Key stakeholder groups including school teachers, religious leaders, informal healthcare workers, and youth assisted in disseminating messaging materials.

5. Testing and Evaluation Phase

Information was disseminated amongst six schools (four standard schools and two madrassahs - one of female and male religious students, each) and two youth WhatsApp groups. All informal healthcare worker and religious leader stakeholders disseminated the correct messaging within their workplaces and during Friday prayer.

To assess the impact, feasibility, and acceptance of the intervention among the community, a post-intervention survey from 401 randomly sampled participants, and 20 in-depth interviews and three FGDs were conducted amongst key stakeholder groups. Tables 3 contains the quantitative survey findings.

Figure 1. Contextualized Communication Pamphlets in Urdu

Table 3 - Comparison of Misconceptions and Intention to Vaccinate between Baseline and Post-Intervention Survey Findings

Knowledge, Attitude, Perception	Baseline (N=470)	Endline (N=401)
COVID-19 vaccine-related misconceptions, overall	45%	14%
COVID-19 vaccines are unsafe	26%	15%
COVID-19 has severe side effects (disability, hospitalization, death)	18%	15%
COVID-19 vaccination should not be offered to people with underlying chronic conditions, pregnancy or are breastfeeding	25%	5%
Intention to receive a COVID-19 vaccine once it is available	15%	85%

A summary of the post-intervention qualitative findings are as follows:

- Delivery of fact-based information through key community stakeholders was an essential element in changing the community's perception towards COVID-19 vaccination.
- Stakeholders acknowledged the value of the co-design process to create community-centered behavior-change, as it addressed contextual factors.
- Community members stopped trusting hearsay and developed a habit of cross-checking information with local medical professionals or other trusted sources.
- Evidence of positive shifts in attitude towards the COVID-19 vaccine and reductions in vaccine-related misconceptions.
- Community stakeholders expressed desire for the intervention to be long-term and scaled-up.

INFORMING COMMUNITY ACTION

Policy

- Engagement and empowerment of females is crucial in driving change, especially in Muslim settings, but attention needs to be given to their local values, traditions and cultural practices
- Co-designed approaches involving multiple, highly influential and trusted institutions need to be employed to develop trust and confidence in vaccines and generate demand for vaccination

Program

- Engaging key stakeholders from the outset of a program enables the creation of feasible interventions
- Utilizing and moderating conversational social media platforms (e.g.; WhatsApp) can be successful in tackling misinformation amongst youth and their families

Practice

- Interventions need to be tailored to the needs of the community
- Involve key stakeholders from different fields (e.g.; education, religion, medical) to create change within their communities

RESEARCH LEADS

Rubina Qasim, MSc

Institute of Nursing, Dow University of Health Sciences, Pakistan

Rubina Qasim, RN/RM, BScN, MScN, works as an Assistant Professor at the Dow University of Health Sciences in Pakistan. Rubina has more than 10 years of teaching and research experience in both public and private sector academic institutions. Her area of research is maternal and child health including routine immunization, and vaccine acceptance and hesitancy among marginalized hard-to-reach populations. She leads a team of research staff working for the health and social uplifting of the marginalized population living in the peri-urban slum of Karachi, Pakistan.

Mohammad Tahir Yousafzai, PhD, MPH

Department of Pediatrics & Child Health
Aga Khan University, Karachi, Pakistan

Tahir Yousafzai, MPH, PhD (Global Health) Scholar is working as Assistant Professor at the Dept. of Pediatrics and Child health, Aga Khan University Karachi, Pakistan. Tahir has more than 10 years of research experience in Pakistan, Middle East and Australia. His research interests rang from surveillance of vaccine preventable diseases among children, impact evaluation of newly introduced pediatric vaccines and vaccine hesitancy. He recently completed a funded study exploring the misinformation regarding COVID-19 pandemic and COVID-19 vaccines and used co-design methodology to develop contextual strategies to address misinformation among the marginalized communities living in peri-urban settlements in Karachi. In addition, he is co-investigator on a CEPI funded multicenter phase 2 trial evaluating the immunogenicity and safety of various COVID-19 vaccines administered through mix-and-match strategy in Pakistan. Tahir is also co-PI in GAVI funded project to evaluate the impact of typhoid conjugate vaccine among children in several cities of Pakistan.

RESEARCH LEADS

Uday Narayan Yadav, PhD, MPH

National Centre for Epidemiology and Population Health, Australian national University, Canberra

Uday Narayan Yadav has implemented various public health programs and conducted research in Nepal, Bangladesh, Pakistan, India and Australia, and has worked with development partners such as USAID, UNAIDS and IOM. He is the recipient of the 2021 David L. Sackett Fellowship from the Nuffield Department of Primary Care Health Sciences at the University of Oxford, and the 2021 National Health Research Award from the Government of Nepal. Uday holds the position of Associate Editor at BMC Public Health for the "Global Health" section and is a member of the United Nations Research Consortium.

CASE STUDY FROM TRANS-NZOIA COUNTY, KENYA

Interrupted Time Series Study of Adult Perceptions Regarding COVID-19 Vaccine

SABIN VACCINE INSTITUTE

AMUA SIKHENDU MEDICAL CENTER (AMUA-SMC)

University of Nairobi

The pilot project was conducted in Kenya's Trans-Nzoia County between January 2021 – October 2021. It was implemented through a partnership amongst the University of Nairobi, the AMUA Sikhendu Medical Center, Kitale County Hospital, and GrainBank and VaccineLink LTD, with funding from the Sabin Vaccine Institute. The project received ethics approval from the Kenyatta National Hospital - University of Nairobi Ethics and Research Committee.

KEY TAKEAWAYS

- **Deeply-rooted contextual challenges serve as barriers towards reinforcing corrective messaging regarding COVID-19 and COVID-19 vaccination: mistrust in the government and healthcare system**
- **Conduct social listening exercises to uncover and address anecdotal accounts of local adverse events following immunization circulating in social media platform news feeds – exogenous narratives will change and strategies must adapt, accordingly**
- **Strategies to boost social confidence in COVID-19 vaccination should center around the promotion of the safety, efficacy and importance of COVID-19 vaccines**

APPROACH

An interrupted time series analysis[1] was conducted to investigate the following amongst the adult population in Kiminini sub-county rural smallholdings of Trans-Nzoia County, Kenya:

- COVID-19 misinformation in trusted social networks to better understand the public's risk perception about COVID-19 and willingness to vaccinate for COVID-19 in future, and
- Testing and evaluation of a community-led virtual intervention that organically amplifies accurate COVID-19 messaging to debunk misinformation and increase acceptance of a COVID-19 vaccine.

The Interrupted Time Series Panel (ITSP) of randomly recruited 300 adult respondents, aged ≥ 18 years, included 75 healthcare workers of different cadres (e.g.; community health workers, nurses, nurse-aids, clinical officers, medical laboratory technicians and specialist doctors). Participants were interviewed virtually at regular intervals over seven months regarding their perception of COVID-19 and willingness to be vaccinated if accurate information and COVID-19 vaccines were made available. A corrective intervention on the ITSP was conducted for two weeks at midpoint and followed by three, post-intervention surveys within the ITSP at two-week intervals to assess its impact.

1 Hudson, J., Fielding, S. & Ramsay, C.R. Methodology and reporting characteristics of studies using interrupted time series design in healthcare. BMC Med Res Methodol 19, 137 (2019). https://doi.org/10.1186/s12874-019-0777-x.

IMPLEMENTATION STAGES

Pre-Intervention

The ITSP's perceived susceptibility of and knowledge, misconceptions and misinformation about COVID-19; and acceptance of a COVID-19 vaccine is described in Table 1.

Table 1 - Baseline ITSP Findings

Indicator	Evidence	Examples
Perceived susceptibility of COVID-19	The majority of panelists (80%) did not perceive susceptibility to COVID-19 17% believed they would get a mild case 3% believed they had already had COVID-19 and survived	• Does not exist – government hoax • Disease of the rich, not poor • Mostly affects white people than black people • Keeping up with safety measures • The curve is already flattened • God will protect me
Knowledge, misconceptions and misinformation about COVID-19	The majority of panelists (81%) were aware of COVID-19, its symptoms, and its preventative measures, with the most common sources of information being television, radio, Facebook, WhatsApp, and Opera News. Panelists' lack of knowledge and misconceptions about COVID-19 were influenced through conspiracy theories, religious beliefs, and misinformation. Few HCWs (n=3/75) believed in publicly circulating misconceptions/misinformation centered around symptomatology and idiosyncratic themes.	Common COVID-19 misconceptions: • Was created to reduce the African population • Is a God-sent demonic animal spirit as punishment for human disobedience • Could be prevented by keeping warm, and/or using herbal medicines and home remedies, and/or praying to God • Could be treated in the same way common colds are treated (i.e.; menthol lozenges, decongestants, etc.)
Acceptance of COVID-19 vaccine	Of all panelists: 76% would accept a COVID-19 vaccine if made available 22% would have refused 2% were unsure **68% of HCW panelists would refuse a COVID-19 vaccine**	Reasons for acceptance: • Prevention is better as there is no cure • Fear of dying from COVID-19 Reasons for refusal: • Low perceived case and fatality rate in community • Lack of government vaccination guidelines • Not 100% effective • Not locally made or tested Reasons for indecision: • Fears of authenticity (real or fake) • Awaiting country leadership to participate first as examples

At baseline, the ITSP had strong opinions doubting, a) the existence of COVID-19, b) legitimacy, safety and efficacy of COVID-19 vaccines and c) whether it was necessary to receive a COVID-19 vaccine. There was an inequitable evidence-based healthcare service provision in COVID-19 testing, case management and vaccination, which led to deeply rooted mistrust in the political and healthcare system. Additionally, there was unavailability of testing in grassroots communities and unwillingness of local healthcare workers to accept COVID-19 vaccines.

Intervention

At midpoint, a team of researchers from the University of Nairobi jointly with local healthcare providers and trusted community voices within the target population (e.g.; clergy, elders, herbalists, civic/political representatives) designed and virtually delivered to the ITSP brief and concise corrective messaging to the misconceptions and misinformation identified at baseline. The intervention, containing both counter messaging and associated virtual ITSP engagement guide, was created through five, one-hour-long virtual workshops, and delivered to the ITSP through iterative virtual conversations.

Post-intervention

A survey was undertaken to assess the impact of the intervention on COVID-19 vaccine acceptance. A comparison of results is depicted below in Table 2.

Table 2 - Comparison and Baseline vs Post-Intervention COVID-19 Vaccine Acceptance

Indicator	Pre-Intervention	Post-Intervention
Acceptance of a COVID-19 vaccine of entire ITSP	76%	79%
Acceptance of a COVID-19 vaccine amongst HCWs	32%	26%

Furthermore, a wait-and-see attitude on vaccine acceptance, as shared by some panelists pointed to a possible desire to rule out adverse event after immunization (AEFI). Anecdotal reports of AEFI after COVID-19 vaccination by global social media platform newsfeeds may have contributed to this viewpoint.

Deductive reasoning surrounding low levels of vaccine acceptance amongst healthcare workers during project period

- Albeit rare, adverse events (myocarditis and pericarditis) were reported in people aged 16-24 who had received the mRNA vaccines[2]
- There was a temporary pause in the use of the Janssen COVID-19 vaccine due to an investigation of six cases of a rare and severe type of blood clot in individuals following vaccine administration[3]
- Countries paused briefly on using AstraZeneca COVID-19 vaccine due to fears over safety[4]

2 Centers for Disease Control and Prevention. Selected Adverse Events Reported after COVID-19 Vaccination. June, 2021. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/safety/adverse-events.html

3 USFDA. FDA and CDC Lift Recommended Pause on Johnson & Johnson (Janssen) COVID-19 Vaccine Use Following Thorough Safety Review. April 2021. https://www.fda.gov/news-events/press-announcements/fda-and-cdc-lift-recommended-pause-johnson-johnson-janssen-covid-19-vaccine-use-following-thorough

4 The Economist. EU countries pause AstraZeneca's covid-19 jab over safety fears. March, 2021. https://www.economist.com/science-and-technology/2021/03/15/eu-countries-pause-astrazenecas-covid-19-jab-over-safety-fears

INFORMING COMMUNITY ACTION

Policy

- Prioritize health system strengthening and equitable healthcare service provision in COVID-19 testing, case management and vaccination to address community mistrust in political and healthcare systems
- Endorsement of COVID-19 prevention measures by politicians and public leaders through practice

Program

- Create additional training opportunities for healthcare workers and ensure they are aware of the safety and efficacy of the vaccines available in the country to increase vaccine acceptance amongst healthcare workers
- Conduct rigorous socio-behavioral research amongst healthcare workers to better understand barriers towards vaccine acceptance, as this population is highly influential of community behavior

Practice

- Deploy sustainable corrective messaging strategies, including tele-consultative and virtual engagements, amongst the community to address COVID-19 misconceptions and misinformation and change public perceptions
- Conduct social listening exercises to uncover and address anecdotal accounts of local adverse events following immunization circulating in social media platform newsfeeds – exogenous narratives will change and strategies must adapt, accordingly

RESEARCH LEADS

Benson Wamalwa, PhD, MSc

University of Nairobi

Benson Wamala holds a PhD in Biotechnology and Bioinformatics from Mie University and is a Research Scientist and Lecturer at the University of Nairobi in Kenya. Dr. Wamalwa is a member of the Saving Lives at Birth (SL@B) Community of Innovators; a grantee of the Stars in Global Health Innovation; an awardee of the Grand Challenges Explorations program; and a Volkswagen Foundation Fellow at the Leibniz University Hannover in Germany. His research interests are in global health innovations with emphasis on vaccinology, immunization and bioactive molecules from extremophiles.

Chrysanthus Wamela

Registered Nurse, Kenya AMAU

CASE STUDY FROM SINDH PROVINCE, PAKISTAN

mHealth and Social Media Based Interventions to Provide Childhood Immunization Coverage & COVID-19 Vaccine Hesitancy

The pilot project was conducted in Pakistan's Sindh Province between January 2021 – October 2021. It was implemented through a partnership between the Aga Khan University and Yale Institute for Global Health, with funding from the Sabin Vaccine Institute. The project received ethics approval from the Ethics Review Committee of Aga Khan University.

KEY TAKEAWAYS

- **Design and train healthcare workers on the use of digital health tools to create and sustain vaccine awareness and advocacy and increase science literacy, especially within rural and peri-urban settings**
- **Capacitate lady health workers and home routine immunization vaccinators to effectively communicate about vaccines and vaccination and engage interpersonally with vaccine refusers**
- **Conduct home vaccination drives and employ targeted informational outreach with community members and heads of household influencing vaccination decision-making behavior**

APPROACH

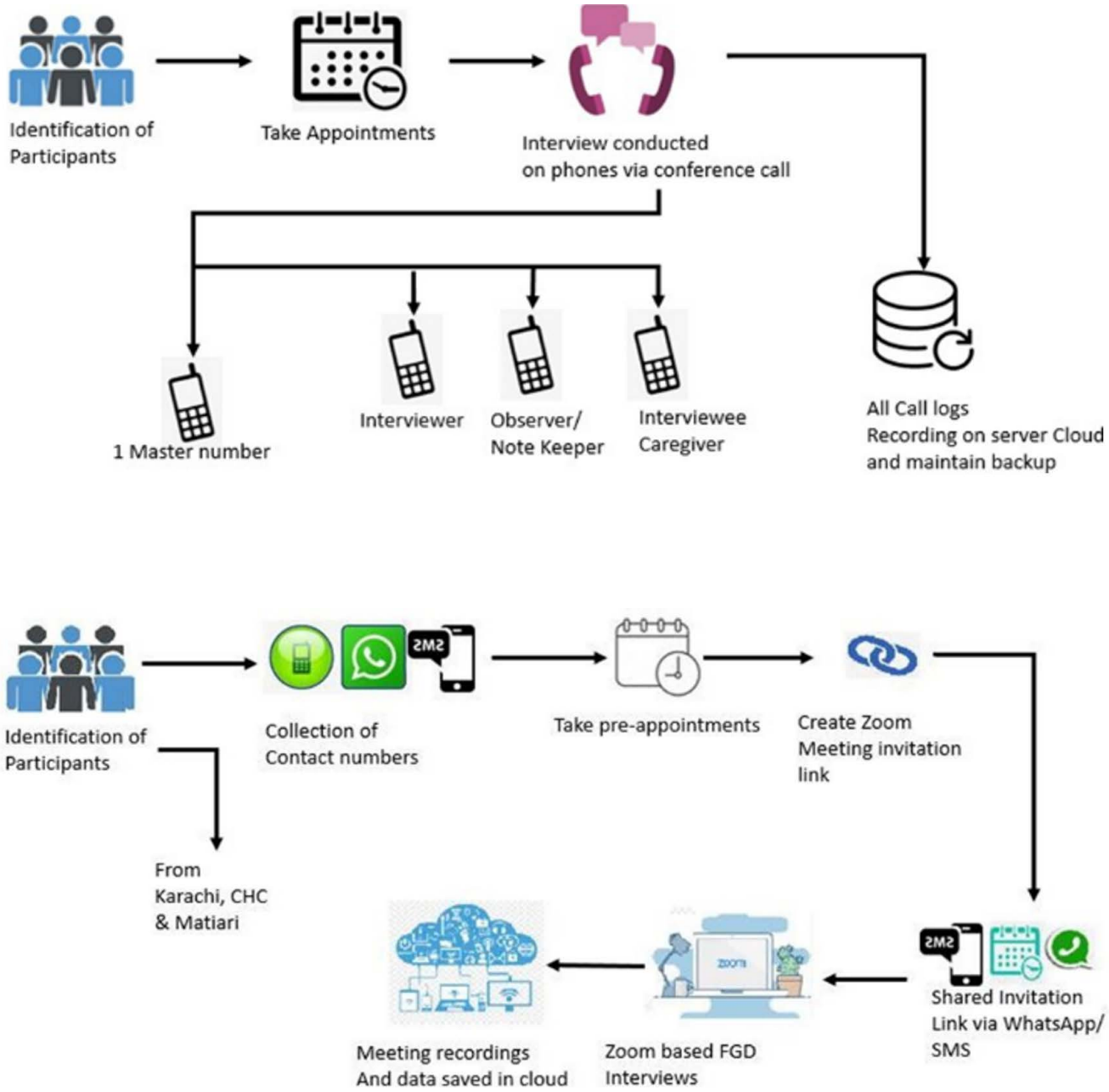
Exploratory research using a purposive sampling approach was implemented to conduct semi-structured (60) in-depth interviews (IDIs) with parents/caregivers and (7) focus group discussions (FGDs) amongst healthcare workers (HCWs; doctors, nurses, pharmacists, lady health workers [LHWs], etc.); across three sites to:

- Investigate the knowledge and awareness of parents/caregivers and HCWs regarding childhood routine immunization (RI) and COVID-19 vaccines, and
- Understand the suitability of mHealth and social media interventions to improve vaccination coverage during the COVID-19 pandemic in the Pakistani context.

Data was collected at one urban and peri-urban setting, each, in Karachi and one rural site in Matiari; and analysis was conducted using a thematic analysis framework (see Figure 1).

This qualitative study was among the first few studies in Pakistan attempting to assess the knowledge, attitudes, practice, perceptions and barriers related to RI and COVID-19 vaccination. It also explored the role of mHealth in improving vaccination uptake in a socioeconomically diverse population of caregivers and HCWs residing in rural and urban areas of Sindh Province. Findings may inform policymakers and health organizations in designing effective digital communication strategies and mHealth interventions to strengthen positive attitudes regarding vaccines in these settings.

Figure 1. Virtual flow of mobile phone-based in-depth interviews & focus-group discussions



IMPLEMENTATION STAGES

In-depth Interviews amongst Parents/caregivers

Perceptions of parents and caregivers by setting are described below.

Rural & Peri-urban	Urban
• Denied the existence of COVID-19 in their community • Concerned about vaccine safety/side effects, efficacy, availability, and quality control for home vaccinations • Distrust in governments (forcing the vaccine due to payment by Western governments) • Used electronic media (television) as the main source of health information	• More generally trusted COVID-19 vaccines as protection • Used television and social media platforms (WhatsApp, Facebook and Twitter) to seek COVID-19 information

Across Settings

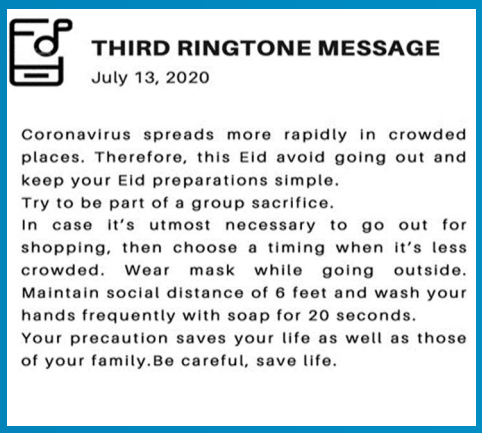
- Aware of COVID-19 signs, symptoms, severity of disease, and preventive measures; but skeptical about government-imposed lockdowns, having suffered financially and psychologically
- Viewed RI as beneficial in reducing severity of life-threatening disease
- Influenced in vaccination decision-making by elders' opinions, healthcare providers' advice and others' experiences regarding vaccination; with physicians' views more heavily trusted, as compared to others
- Accepted the replacement of standard mobile phone ringtones with recorded health awareness and informational messages during the COVID-19 by the Government of Pakistan
    - The information (e.g.; spreading awareness about COVID-19 health risks, signs, symptoms, prevention, vaccination and government-enforced lockdowns) was well received (see Figure 2)
- Confused by conflicting health information received through various information sources, including electronic media, which caused apprehension in acceptance of COVID-19 vaccination

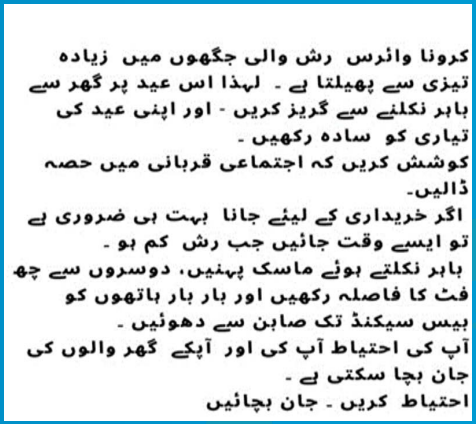
Focus Group Discussions amongst Healthcare Workers

Perceptions amongst HCWs are as follows:

- Satisfied with the safety/efficacy of available COVID -19 vaccines in Pakistan, but had doubts regarding the rapid research and development of these vaccines and covering multiple COVID-19 strains
- Felt that COVID-19 vaccines should be included as part of the Expanded Program on Immunization (EPI), Pakistan
- Aware of and trusted in globally and nationally recommended COVID-19 prevention guidelines; however, social distancing and face masks were less adhered to amongst HCWs outside of hospitals and primary healthcare facilities
- Utilized WhatsApp groups, Facebook, and government dashboards to obtain vaccination/ pandemic-related information
- Identified specific social media news content led to vaccine hesitancy (e.g.; infertility, brain stroke and death due to COVID-19 vaccination)
- Considered electronic media as an important medium for awareness related to COVID-19 information
- Felt the financial and mental well-being of overworked frontline HCWs was not appropriately considered by employers
- Perceived home vaccination services as successful during suspended public transportation and RI center closures

Figure 2. Innovative ringtone message for COVID-19 preventive measures





INFORMING COMMUNITY ACTION

Policy

- Create measures to support the financial and mental well-being of HCWs during the pandemic
- Improve upon and translate content of informational automated audio ring tunes and text messages into regional languages
- Monitor and address misleading informational posts and videos circulating on digital and electronic media including social media (e.g.; engage the Pakistan Telecommunication Authority)

Program

- Design low-cost digital health solutions to identify and overcome vaccination barriers (e.g.; mobile phone based-caller tunes, text and automated call-based messages, behavior change applications including social media-based applications and complex digital health solutions such as Artificial Intelligence and Machine Learning platforms)
- Train HCPs on using digital health tools to create and sustain vaccine awareness and advocacy and increase science literacy, especially within rural and peri-urban settings
- Capacitate LHWs and home RI vaccinators to effectively communicate about newly approved vaccines and engage interpersonally with vaccine refusers

Practice

- Conduct key physician-led trainings for HCWs ON RI advocacy and awareness campaigns within rural and peri-urban settings to yield maximum knowledge translation from HCWs to heads of households being counseled on the quality, safety and efficacy of RI and importance of adherence to the vaccination schedule during the COVID-19 pandemic
- Conduct home vaccination drives and LHW-led surveillance within rural populations
- Implement a feasibility study of integrating COVID-19 vaccines into the EPI framework to increase COVID-19 vaccine acceptance and compliance

RESEARCH LEADS

Abdul Momin Kazi, MBBS, MPH

Aga Khan University Department of Paediatrics and Child Health

Abdul Momin Kazi is a Research Assistant Professor in the Department of Paediatrics and Child Health at the Aga Khan University in Pakistan. His expertise includes epidemiology, global health, clinical research, data analysis and digital health. Kazi received his MBBS from Dow Medical College and his MPH from Vanderbilt University. He is currently a PhD candidate at the University of British Columbia focused on digital health and working on multiple studies focused on surveillance and digital health as an investigator at the Aga Khan University.

Fauzia Malik, PhD, MSc

Yale University

Fauzia Aman Malik PhD, MSc is the Special Advisor to the Dean for Global Health Research and Initiatives at the Yale School of Public Health, and an Associate Research Scientist at the Department of Health Policy and Management. As a trained Medical Anthropologist, she specializes in ethnographic, participatory mixed methods research, and designing and evaluation of community-based health programs that address the needs of vulnerable populations. A substantial portion of Dr. Malik''s research portfolio includes work on improving acceptance and uptake of vaccines for pregnant women and their children in Pakistan, Kenya, Honduras, Argentina, Peru, Brazil, Mexico and the United States.

ABOUT THE ORGANIZATION

SABIN
VACCINE INSTITUTE

ABOUT SABIN

The Sabin Vaccine Institute is a leading advocate for expanding vaccine access and uptake globally, advancing vaccine research and development, and amplifying vaccine knowledge and innovation. Unlocking the potential of vaccines through partnership, Sabin has built a robust ecosystem of funders, innovators, implementers, practitioners, policy makers and public stakeholders to advance its vision of a future free from preventable diseases. As a non-profit with more than two decades of experience, Sabin is committed to finding solutions that last and extending the full benefits of vaccines to all people, regardless of who they are or where they live. At Sabin, we believe in the power of vaccines to change the world.

For more information, visit sabin.org and follow us on Twitter, @SabinVaccine.

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For more information, please visit vaccineacceptance.org and/or contact us at VaccineAcceptance@Sabin.org