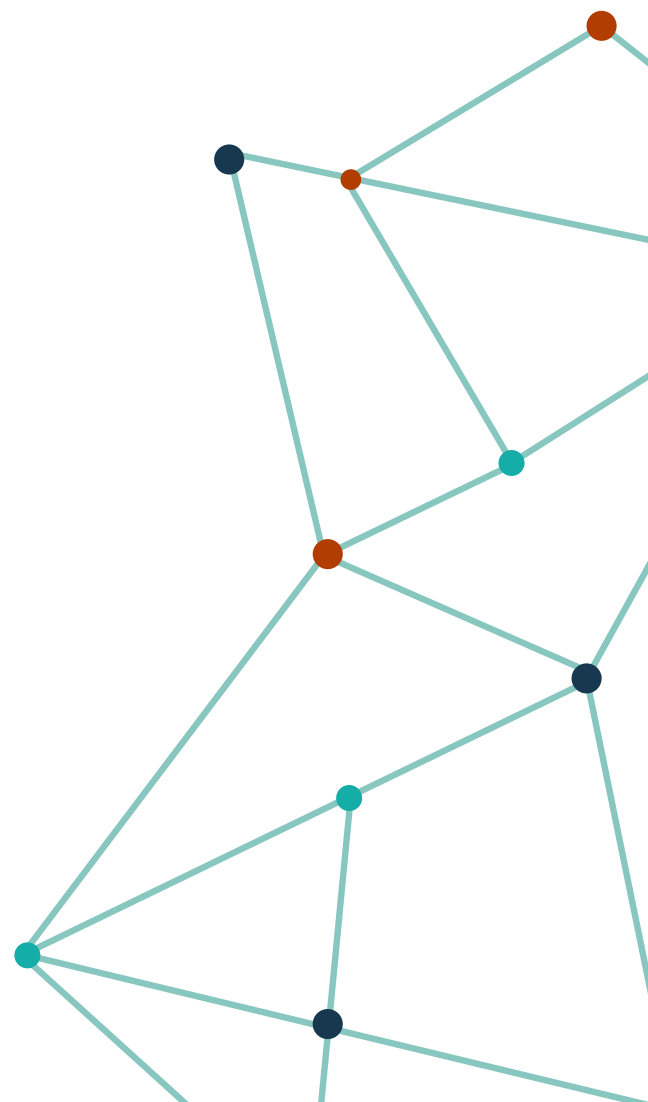




The Mercury Project Research Framework

March 2023



[The Mercury Project](#) is a consortium of social and behavioral scientists and practitioners committed to identifying cost-effective and scalable interventions to build vaccination demand. While considerable attention has been addressed to mitigating problems of vaccine supply, much less effort has been devoted to solving problems of vaccination demand ([WHO 2022](#)). Teams in the Mercury Project consortium are evaluating a portfolio of interventions that vary in settings, target populations, and risk/reward ratios, with the goal of identifying those interventions that most cost-effectively increase vaccination demand at scale ([Kremer et al. 2021](#)).

Vaccination is an action with clear health benefits. But individuals may face a variety of barriers to realizing those benefits, including the direct and opportunity costs required to search for accurate vaccine information (“search costs”), to assess the accuracy of multiple forms of vaccine information (“decision costs”), and to acquire an actual vaccination (“logistical costs”). These costs are higher for those with fewer resources. Interventions that reduce these costs may increase vaccination demand, particularly among those with fewer resources. Interventions that leverage other potential benefits from vaccination, including the social benefits conferred through vaccine-acceptant social networks, may also increase vaccination demand.

REDUCING THE SEARCH COSTS OF ACQUIRING ACCURATE VACCINE INFORMATION

Vaccination has well-documented health benefits. Underestimating disease risk and/or overestimating vaccine risk can influence vaccine preferences ([Sadique et al. 2013](#)). Individuals’ information environments may regularly expose them to inaccurate information about vaccines, including vaccine and vaccine-preventable disease risks. Searching for and acquiring accurate vaccine information imposes both direct and opportunity costs on individuals (“search costs,” cf. [Diamond 1971](#); [Stigler 1961](#)). These search costs, which are proportionately higher for those with fewer resources, may require the expenditure of time, cognitive effort, and/or financial resources. Information search costs may be reduced by directly providing individuals with accurate vaccine information (cf. [Jacobson et al. 2022](#); [Jensen, Ayers, and Koskan 2022](#); [Milkman et al. 2021](#); [Powell-Jackson et al. 2018](#)), and/or by changing individuals’ information environments to increase the freely available presence of accurate information ([Chen and Yang 2019](#); [Levy 2021](#)).

REDUCING THE DECISION COSTS OF ASSESSING THE ACCURACY OF VACCINE INFORMATION

Individuals who have acquired accurate vaccine information may also be exposed to inaccurate vaccine information. Assessing the accuracy of multiple sources of vaccine information also imposes both direct and opportunity costs on individuals (“decision costs,” cf. [Goldin et al. 2020](#)), which are again proportionately higher for those with fewer resources. Individuals may rely on decision heuristics in the presence of decision costs, including making standing decisions to accept the accuracy of information from specific sources or messengers (“trust,” cf. [Ho 2021](#)). Some trusted sources or messengers may not, however, convey accurate vaccine information. Interventions that reduce individuals’ decision costs by increasing the credibility of sources providing accurate vaccine information, and/or by reducing the credibility of sources providing inaccurate vaccine information, may increase vaccination demand.

These interventions may include delivering accurate vaccine information through already trusted messengers ([Alsan and Eichmeyer 2021](#); [Milkman et al. 2021](#); [Rabb et al. 2022](#)), building the capacities of new trusted messengers to deliver accurate vaccine information ([Mobarak et al. 2022](#)), providing individuals with skills to more easily distinguish between accurate and inaccurate vaccine information ([Bowles et al. 2022](#); [Brashier et al. 2021](#); [Cook, Lewandowsky, and Ecker 2017](#); [Guess et al. 2020](#); [Maertens et al. 2021](#); [Roozenbeek et al. 2022](#); [Vraga, Bode, and Tully 2022](#)), fact-checking and labeling inaccurate vaccine information ([Bowles et al. 2022](#); [Pennycook et al. 2021](#)), supporting guided vaccination conversations ([Andersson et al. 2009](#); [Broockman and Kalla 2016](#); [Lemaitre et al. 2019](#)), and building information literacy and information processing skills ([Badrinathan 2021](#); [Maertens et al. 2021](#)).

■ REDUCING THE LOGISTICAL COSTS OF ACQUIRING VACCINATIONS

Individuals who have cleared informational and decisional barriers to vaccination still face logistical barriers to vaccination. Vaccination is an action that requires time, cognitive effort, and potentially financial resources, again imposing direct and opportunity costs on individuals and households that are proportionately larger for those with fewer resources. Individuals seeking vaccinations must identify vaccination site locations, make vaccination appointments if necessary, remember vaccination appointment times, take time off from work, secure childcare if necessary, and secure transportation to vaccination sites. These logistical barriers to vaccination may be mitigated through interventions that reduce the direct and opportunity costs of identifying vaccination site locations ([Baskin 2018](#); [Dai et al. 2021](#)), making and remembering vaccination appointments ([Kagucia et al. 2021](#); [Kawakatsu et al. 2020](#); [Patel et al. 2022](#); [Regan et al. 2017](#); [Rogers et al. 2015](#); [Yokum et al. 2018](#)), taking time off from work, securing childcare, and/or securing transportation to vaccination sites ([IDinsight and Hanovia 2020](#); [Jacobson et al. 2022](#); [Kusuma et al. 2017](#); [Launay et al. 2014](#); [Mobarak et al. 2022](#); [Ofstead et al. 2013](#)). Logistical costs of vaccination may also be offset by framing vaccinations as valuable assets that can be lost ([Dai et al. 2021](#); [Glanz et al. 2020](#); [Keppeler, Sievert, and Jilke 2022](#); [Milkman et al. 2021](#)).

■ INCREASING THE SOCIAL BENEFITS FROM VACCINATION

Although the most obvious benefit of vaccination is health-related, it may be possible to leverage other kinds of benefits valued by individuals in support of vaccination demand. For example, individuals in a variety of contexts value social acceptance by their neighbors and peers ([Allcott 2011](#); [Bond et al. 2012](#); [Gaube et al. 2018](#); [Gerber, Green, and Larimer 2008](#); [Karing and Naguib 2021](#); [Marshall 2019](#)). These contexts include vaccination ([Bicchieri et al. 2021](#); [Hoy, Kanagavel, and Cameron 2022](#); [Karing 2019](#)). Interventions that increase the social benefits of vaccination from vaccine-accepting neighbors and peers, including by increasing the information available about others' vaccination status ([Alatas et al. 2019](#); [James et al. 2021](#); [Karing 2019](#); [Karing and Naguib 2021](#); [Moehring et al. 2021](#)), reminding individuals about familial and social impacts of vaccination ([Clayton et al. 2021](#); [Rabb et al. 2021](#); [Ruggeri et al. 2022](#); [Tironi et al. 2021](#)), and sharing accurate vaccine information within social networks ([Siddiqi et al. 2020](#)), may increase vaccination demand.

Table 1: Mercury Project Intervention Designs

Projects	Reducing information search costs	Reducing decision costs	Reducing logistical costs	Increasing social benefits
<u>A tough call</u>				
<u>Afya Yako</u>				
<u>Boosting boosters at scale</u>				
<u>Building a better toolkit</u>				
<u>Community-designed messages</u>				
<u>Community education to build trust</u>				
<u>Doctors' talks</u>				
<u>Harnessing influencers</u>				
<u>Health ambassadors</u>				
<u>Sharing in social networks</u>				
<u>Targeting health misinformation networks</u>				
<u>Unfollowing low-quality sources</u>				
<u>Vishvaas mat karo!</u>				

Table 2: Mercury Project Study Outcomes

Projects	Exposure to accurate vaccine information	Knowledge about vaccines/vaccine-preventable diseases	Confidence in vaccines	Knowledge of others' vaccination choices	Vaccine information literacy skills	Sharing accurate vaccine information	Vaccination intentions	Vaccination behavior
A tough call								
Afya Yako								
Boosting boosters at scale								
Building a better toolkit								
Community-designed messages								
Community education to build trust								
Doctors' talks								
Harnessing influencers								
Health ambassadors								
Sharing in social networks								
Targeting health misinformation networks								
Unfollowing low-quality sources								
Vishvaas mat karo!								

I FIRST COHORT PROJECT DESCRIPTIONS

A TOUGH CALL: *Impacts of mobile technology on Covid-19 (mis)information and protective behavior decision-making*

Partnering with a local government in northern India, researchers will evaluate the impacts of mobile phone access on information-seeking and health-protective behaviors. This evaluation is set in the context of a response to the digital gender divide, whereby the government of Chhattisgarh provided free smartphones and improved access to the internet to two million women in rural areas across the state who live in areas with at least one village with more than 1,000 residents. With this improved internet access, women may have better access to information—including health information—but this information may be accurate or inaccurate.

This intervention design incorporates one lever to promote vaccine uptake:

- Reducing information search costs

This study team will measure multiple outcomes, including:

- Exposure to accurate vaccine information
- Knowledge about vaccines/vaccine-preventable diseases
- Vaccine information literacy skills
- Sharing accurate vaccine information
- Vaccination behavior

AFYA YAKO: *Countering public health misinformation through local media in Tanzania*

Partnering with local radio stations in Tanzania to produce weekly public health programs designed to combat misinformation, researchers will assess the effects of a four-month nationwide campaign, Afya Yako (“Your Health” in Swahili). The initiative will include a scripted radio drama and two-way dialogue encouraged through radio call-in, and will draw on citizen feedback; the program and dialogue will explain vaccine benefits as well as dramatize vaccine decision-making to build audience skills. A subset of villages within the campaign’s broadcast radius will also receive an in-person mobilization campaign. Researchers will work to equip interested parties at local radio stations with the knowledge and skills to recognize and dispel misinformation as it emerges.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs
- Reducing logistical costs

This study team will measure multiple outcomes, including:

- Knowledge about vaccines/vaccine-preventable diseases
- Confidence in vaccines
- Vaccine information literacy skills
- Sharing accurate vaccine information
- Vaccination behavior

BOOSTING BOOSTERS AT SCALE: *A megastudy to increase vaccination*

Partnering with large U.S. companies, researchers will simultaneously test different tactics designed to increase Covid-19 booster uptake. Interventions will include texts from trusted messengers as well as offers to subsidize transport costs to vaccination sites. This megastudy aims to identify which tactics effectively increase vaccinations overall and which tactics work best for whom (e.g., based on age, gender, race, etc.), which could help address disparities in vaccination rates across different demographic groups.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs
- Reducing logistical costs
- Increasing social benefits

This study team will measure one outcome:

- Vaccination behavior

BUILDING A BETTER TOOLKIT (FOR FIGHTING MISINFORMATION): *Large collaborative project to compare misinformation interventions*

Researchers will test ways to help people distinguish between true and false information and to reduce the spread of false information in online spaces. A series of online experiments and real-world tests in partnership with YouTube will allow the researchers to create a handbook for practitioners, detailing the relative strengths and weaknesses of each intervention and guiding their choices. The handbook will help practitioners build a toolkit of useful misinformation interventions and understand which interventions will be most effective for their particular problem.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs

This study team will measure one outcome:

- Vaccine information literacy skills

COMBATTING HEALTH MISINFORMATION WITH COMMUNITY-CRAFTED MESSAGING: *Developing a scalable community-driven approach in Brazil, Mexico, and the United States*

Partnering with local NGOs in Brazil, Mexico, and the US, as well as Facebook and YouTube, researchers will evaluate the effectiveness of health-information messaging generated from members of a given community in improving vaccine attitudes and intentions. These messages will also be compared to messaging currently in use, created by technical experts who represent government and public health organizations.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs
- Increasing social benefits

This study team will measure multiple outcomes, including:

- Sharing accurate vaccine information
- Vaccination intentions

COMMUNITY EDUCATION TO BUILD TRUST: *Leveraging community health workers to combat health misinformation in Haiti, Malawi, and Rwanda*

Working in and with Partners in Health and its local affiliates—Abwenzi Pa Za Umoyo (Malawi), Zanmi Lasante (Haiti), and Inshuti Mu Buzima (Rwanda)—researchers will test a new system to support Community Health Workers (CHWs) as they in turn support their communities. This will include discussions of misinformation with CHWs and establishing an SMS and phone-hotline system to hear concerns from CHWs and provide tailored scripts to overcome misinformation to encourage vaccine demand and take-up.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs
- Reducing logistical costs

This study team will measure multiple outcomes, including:

- Knowledge about vaccines/vaccine-preventable-diseases
- Confidence in vaccines
- Vaccination intentions
- Vaccination behavior

DOCTORS' TALKS: *An in-clinic communications intervention to combat COVID-19 misinformation and improve vaccine attitudes and behavior in Ghana*

Partnering with the Ghana Health Service, researchers will assess the effects of improving government health workers' communication and persuasive skills in support of Covid-19 and other vaccination. To date, government health care workers—trusted health messengers in many communities—have not been systematically mobilized to promote vaccination and dispel misinformation. Researchers will work to equip clinical health workers with the knowledge and skills to have open, persuasive vaccination conversations with patients who present at a clinic for other reasons.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs
- Reducing logistical costs

This study team will measure multiple outcomes, including:

- Knowledge about vaccines/vaccine-preventable diseases
- Confidence in vaccines
- Vaccination behavior

HARNESSING INFLUENCERS TO COUNTER MISINFORMATION: *Scalable solutions in the Global South*

Partnering with the fact-checking NGOs AfricaCheck (in Kenya, Nigeria, and South Africa) and Chequea Bolivia, researchers will test approaches to counter misinformation and change users' engagement with reliable information. In one approach, positive social media influencers—high-profile journalists and social activists with relatively large local followings—will be provided with digital-literacy training resources and fact-checks, along with modest financial compensation. In another approach, researchers will provide the fact-checkers with data on viral posts by serial misinformation spreaders. In a final approach, researchers will support the fact-checkers in directly reaching out to misinformation spreaders and their followers to debunk the misinformation they have shared or have been subjected to and provide digital literacy training materials.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs
- Increasing social benefits

This study team will measure multiple outcomes, including:

- Confidence in vaccines
- Vaccine information literacy skills
- Sharing accurate vaccine information
- Vaccination behavior

HEALTH AMBASSADORS: *EGAP-PASGR-CERAP Sub-Saharan African partnership*

Partnering with Ministries of Health in Côte d' Ivoire, Senegal, Malawi, and Zimbabwe, researchers will help select and train 'health ambassadors' to have face-to-face, bilateral engagement to move the public past their mistrust and toward vaccine demand and uptake. Health ambassadors will offer a direct and private opportunity to discuss vaccination concerns. The health ambassadors will be social mobilizers recruited to work alongside public health authorities to address individuals' concerns and promote vaccine uptake. The health ambassadors will then proactively engage individuals around vaccine risks and benefits face-to-face in an effort to increase public fluency and confidence in reliable scientific information about Covid-19 and Covid-19 vaccine uptake to ultimately increase vaccination rates.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs
- Increasing social benefits

This study team will measure multiple outcomes, including:

- Knowledge about vaccines/vaccine-preventable diseases
- Confidence in vaccines
- Sharing accurate vaccine information
- Vaccination intentions
- Vaccination behavior

SHARING IN SOCIAL NETWORKS: *Evidence from a field study in Sierra Leone*

In partnership with Sierra Leone's Ministry of Health and Sanitation (MoSH), UNICEF, and Development Media International (DMI), researchers will investigate how to leverage and enhance social learning in the context of vaccine take-up and misinformation response. In a first study, participants will be randomized to receive training on misinformation, vaccine literacy, both or neither. The impact of these interventions on trained individuals' and their network's vaccination take-up rates and ability to identify misinformation will be assessed. In a second, sequentially run study, researchers will delve into the barriers to social learning by evaluating how different interventions harnessing underlying motivations for information sharing impact social learning and, consequently, the health outcomes of participants' networks.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs
- Increasing social benefits

This study team will measure multiple outcomes, including:

- Knowledge about vaccines/vaccine-preventable diseases
- Confidence in vaccines
- Knowledge of others' vaccination choices
- Sharing accurate vaccine information
- Vaccination behavior

TARGETING HEALTH MISINFORMATION NETWORKS: *Network-transforming interventions for reducing the spread of health misinformation online*

Researchers will design, build, and evaluate network-transforming interventions: software-assisted systems to alter the underlying networks that spread health misinformation online. A health misinformation monitor Twitter account will continuously track emerging health misinformation on English-speaking Twitter and deliver counter-messaging to the recipients of that misinformation, with the aim of motivating users to unfollow the source.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs
- Increasing social benefits

This study team will measure multiple outcomes, including:

- Exposure to accurate vaccine information
- Sharing accurate vaccine information

UNFOLLOWING LOW-QUALITY SOURCES—*A Field Experiment to Mitigate the Harm of Online Misinformation*

Researchers will create sustained changes to information exposure over time by encouraging users to change the composition of the social media accounts they follow and measure their effects on real-world behavior. This will allow them to assess the extent to which respondents can be nudged to alter the set of accounts they follow and thus the information they consume. The aim is to encourage increased engagement with trustworthy news sources and reduce engagement with low-quality sources and/or inaccurate health information.

This intervention design incorporates one lever to promote vaccine uptake:

- Reducing information search costs

This study team will measure multiple outcomes, including:

- Exposure to accurate vaccine information
- Sharing accurate vaccine information

VISHVAAS MAT KARO!—*A media literacy field experiment in north Indian secondary schools*

Partnering with local authorities, researchers will evaluate whether a six-month grassroots training program will effectively reduce reliance on health misinformation and positively change health behaviors among secondary school students in northern India. “Vishvaas Mat karo,” which means “don’t believe it” in Hindi, is a direct attempt to increase the salience of reliable information and provide tools to detect misinformation through classroom-based pedagogical modules. The program will include both health information as well as skill-building to improve media literacy.

This intervention design incorporates multiple levers to promote vaccine uptake:

- Reducing information search costs
- Reducing decision costs
- Increasing social benefits

This study team will measure multiple outcomes, including:

- Knowledge about vaccines/vaccine-preventable diseases
- Confidence in vaccines
- Vaccine information literacy skills
- Sharing accurate vaccine information
- Vaccination behavior

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