

# Behavioral and social science in support of SARS-CoV-2 vaccination: National Institutes of Health initiatives

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## Abstract

Control of the COVID-19 pandemic relies heavily on behavioral mitigation strategies such as physical distancing, hand washing and mask wearing. Even with the availability of SARS-CoV-2 vaccines, the extraordinary effort to distribute the vaccines must be paired with continued adherence to behavioral recommendations as well as vaccine confidence. To facilitate rapid and equitable uptake of the vaccines, there is a need for responsive, trustworthy, and evidence-informed communication about vaccination, enhanced trust in science, and engaging populations disproportionately affected by the pandemic. Efforts to address vaccine hesitancy and increase vaccine confidence will address the emerging gaps between vaccine availability and actual vaccination. Although these gaps are attributable, in part, to challenges with logistics and access, social and behavioral drivers of vaccination decision making also have a significant role in vaccination uptake. As federal, state, and local health and public health agencies coordinate vaccine dissemination, there will be a continuous need to adapt to an evolving landscape of SARS-CoV-2 vaccines, new scientific information, and the spread of COVID-19- and vaccine-related misinformation. Facilitating widespread vaccination and maintaining a focus on equity requires thoughtful and compassionate approaches to reach and address the needs of those who are disproportionately affected by the pandemic such as underserved, vulnerable, and racial/ethnic minority populations. This commentary focuses on several National Institutes of Health initiatives that are supporting behavioral and social science research to address SARS-CoV-2 vaccine communication and increase the uptake of vaccination. We conclude with implications for future research.

## Keywords

SARS-CoV-2, COVID-19, Vaccine hesitancy, Health disparities, Health communication

## INTRODUCTION

To realize the public health potential of the SARS-CoV-2 vaccines, the extraordinary effort to develop and distribute vaccines must be paired with evidence-informed vaccination communication to foster vaccine confidence, as well as to support continued social and behavioral mitigation. To facilitate rapid and equitable vaccination, it is critical to enhance the public's trust in science, address vaccine hesitancy, and engage and partner with communities

## Implications

**Practice:** Reducing COVID-19 vaccine hesitancy and increasing vaccine confidence requires clear, honest, and respectful engagement and communication with the public.

**Policy:** Coordinated outreach and communication between federal, state, and local partners, with an emphasis on equity, will enhance trust in the national vaccination strategy.

**Research:** The National Institutes of Health is supporting behavioral and social science research to reduce vaccine hesitancy, increase vaccine confidence, and increase engagement with underserved and vulnerable communities.

disproportionately affected by the pandemic. In addition to the logistical and access challenges around vaccination completion, applying existing knowledge about psychosocial drivers of individuals' health-related decision making and behavior (e.g., tailored messaging) can support vaccination efforts by federal, state, and local health agencies. Public health professionals and agencies must adapt continuously to an evolving landscape of vaccine access, types of available vaccines, new scientific evidence, as well as the rapid spread of vaccine-related misinformation. Most importantly, maintaining a focus on equity is a public health responsibility, which requires compassionate and respectful approaches to understand and address the needs and concerns of the public, particularly populations that are disproportionately affected by the pandemic, such as rural populations, racial/ethnic minority communities, front-line workers, individuals with limited access to transportation and internet, and incarcerated individuals.

SARS-CoV-2 has brought with it a new wave of health disparities. Racial/ethnic minority populations are experiencing a disproportionate burden of COVID-19 cases, hospitalizations, and mortality. Compared to White individuals, COVID-19

cases are estimated to be almost two times higher among American Indian/Alaska Native persons, hospitalizations are over three times higher among Hispanic/Latino individuals, and deaths are nearly two times greater among African American/Black persons [1]. Equitable vaccination can significantly reduce these COVID-19 disparities; consequently, there is an urgent need to ensure prompt and widespread administration and uptake of SARS-CoV-2 vaccines among the populations hardest hit by the pandemic. However, due to myriad social and historical reasons, concerns and hesitancy about being vaccinated persist among many of those most vulnerable to infection. National surveys suggest that racial/ethnic minority groups are less likely to report having gotten vaccinated or that they plan to get vaccinated compared to White counterparts [2]. An Associated Press-NORC Center for Public Affairs Research poll found that 57% of African American/Black respondents reported that they have either received the vaccine or that they will definitely/probably get the vaccine, compared to 68% of White respondents [3]. Similarly, a January 2021 Kaiser Family Foundation poll found that while overall willingness to get a COVID-19 vaccine has increased since December 2020, White adults are more likely to have already been vaccinated or to report wanting to get the vaccine “as soon as [they] can” (53%) compared to African American/Black (35%) and Hispanic/Latino (42%) adults [4]. Conversely, African American/Black adults and Hispanic/Latino adults were significantly more likely than White adults to say they will “wait and see how [the vaccine] is working,” which is partially attributable to concerns about vaccine safety. African American/Black and Hispanic/Latino adults were more likely to report having questions or lacking adequate information about COVID-19 vaccines [4].

The National Institutes of Health (NIH) is spearheading several initiatives to support SARS-CoV-2 vaccination and enhance vaccine access, communication, and uptake, focusing on reaching and engaging those who have been disproportionately affected by the pandemic. One of the NIH’s major priorities is to support research and evidence-informed approaches to understand and address racial/ethnic disparities in vaccine uptake, with the goal of reducing COVID-19 morbidity and mortality and promoting health equity. This commentary highlights several NIH efforts that apply behavioral and social science research to address SARS-CoV-2 vaccination challenges. We conclude with implications for vaccination-related research gaps and opportunities in the behavioral and social sciences that will support the COVID-19 pandemic response as well as responses to future public health crises.

## USING BEHAVIORAL SCIENCE TO GUIDE COMMUNICATION ABOUT SARS-COV-2 VACCINATION

Successes in vaccine distribution and the public’s willingness to receive SARS-CoV-2 vaccines will ultimately determine the outcome of the nation’s mass-scale vaccination intervention. Yet, vaccine confidence is driven by many factors which differ by population and context. For many individuals, simply conveying scientific information and recommendations will be insufficient to address hesitancy and foster vaccine confidence [5, 6]. Moreover, because both the COVID-19 trajectory and vaccination implementation are evolving in real-time, there is a need for rapid adaptation of communication approaches to ensure that the most current evidence is disseminated across sources. To address this complex information environment and the diverse factors underlying hesitancy, communication efforts must be informed by extant knowledge from a range of disciplines in social and behavioral sciences and public health.

To support vaccination communication efforts by federal agencies and their partners, the NIH Behavioral and Social Sciences Research Coordinating Committee formed an NIH working group in September 2020 and convened a multidisciplinary expert panel in November 2020. The goals of the panel were to identify evidence-informed approaches to guide government entities in communicating SARS-CoV-2 vaccine-related information to their diverse constituents. The panel input and discussion formed the basis of an NIH report, “COVID-19 Vaccination Communication: Applying Behavioral and Social Science to Address Vaccine Hesitancy and Foster Vaccine Confidence” ([https://obssr.od.nih.gov/wp-content/uploads/2020/12/COVIDReport\\_Final.pdf](https://obssr.od.nih.gov/wp-content/uploads/2020/12/COVIDReport_Final.pdf)). Since its publication in December of 2020, the NIH report has been shared widely across a range of government and non-governmental agencies.

The report begins by outlining foundational considerations for all public health communication efforts and then delves into specific communication strategies for reducing hesitancy and enhancing confidence in SARS-CoV-2 vaccination. Translating extant research findings on communication regarding other health behaviors such as HPV vaccination, the report emphasizes that communication approaches must be tailored to the needs and perspectives of the intended audience (e.g., those who are disproportionately at risk due to their occupation, health status, race/ethnicity, socioeconomic status, and rural residents, homeless populations, and migrant communities) [7]. These principles also apply to other individuals who are more vaccine hesitant due to beliefs or perceptions stemming from religious or political affiliation. The recommendations offered are evidence-informed, actionable (an accompanying

“Communicator’s Tip Sheet” summarizes key Dos and Don’ts, [https://obssr.od.nih.gov/wp-content/uploads/2020/12/COVIDTipSheet\\_Final\\_508.pdf](https://obssr.od.nih.gov/wp-content/uploads/2020/12/COVIDTipSheet_Final_508.pdf), and responsive to the unique challenges faced by the United States (U.S.) during the COVID-19 pandemic. Foundational considerations for effective communication include coordinated and consistent messaging, trust building through community partnerships, consideration of different health literacy levels in the population, and prioritizing equity in all aspects of communication. The following are examples of recommendations for targeted and tailored communication strategies in the report:

- Develop accurate, truthful, and transparent communication
- Use messages that provoke positive emotions (such as hope and self-worth) and not negative emotions (such as fear and shame) [8]
- Partner with and co-design messages with individuals or organizations that are trusted by the target audience
- Develop messages that are aligned with the values of the target audience
- Consistently frame vaccine acceptance as a social norm
- Use choice architecture to make vaccination the default choice while respecting individual autonomy to make health decisions
- Preemptively and proactively convey vaccine information to those who may be hesitant before their views are crystalized
- Promote unity instead of division in vaccine-related discussions (e.g., we are in this together, promote the good of all)
- Adopt a balanced, empathic, and compassionate approach towards those who have concerns about vaccines
- Reinforce that vaccination is not an immediate replacement for continued preventive behaviors such as mask wearing, hand washing, and social distancing

Timely, coordinated, nimble, and evidence-informed communication about vaccine safety, efficacy, and access is essential in addressing vaccine hesitancy, one of the most significant public health challenges today.

#### **ADDRESSING VACCINE HESITANCY IN COMMUNITIES DISPROPORTIONATELY AFFECTED BY COVID-19**

There exist notable racial/ethnic disparities in the uptake of routine vaccinations [9], and many are concerned that such disparities may be exacerbated in SARS-CoV-2 vaccination, in part, due to scientific and institutional distrust and unequal access. In addition, healthcare experiences of racial/ethnic minority individuals, both past and current, may cause delay in care-seeking due to fear [10]. Understanding and addressing the multifaceted and complex reasons for low vaccine confidence in racial/ethnic

and underserved populations is a priority at the NIH including significant efforts focused on outreach and engagement to increase vaccine confidence among group hardest-hit by the COVID-19 pandemic. Accomplishing the goal of vaccine confidence and uptake will require that scientists, healthcare systems, and institutions demonstrate trustworthiness and earn the trust of marginalized groups.

Underserved populations have been historically excluded from biomedical clinical trials and have not benefitted equitably from previous medical advances, and thus, are more likely to report elevated hesitancy and wariness about receiving SARS-CoV-2 vaccines. Overcoming the understandable distrust will require significant effort, consistent messaging, and investing in communities. *The NIH Community Engagement Alliance Against COVID-19 Disparities (CEAL)* is supporting community-engaged outreach and research to promote COVID-19 awareness and education, address misinformation and distrust, and facilitate the inclusion of underrepresented populations in clinical trials (prevention, vaccine, and therapeutics). The CEAL mission is to “provide trustworthy information through active community engagement and outreach to the people hardest-hit by the COVID-19 pandemic.” This mission includes disseminating findings from COVID-19 clinical trials in an accessible and understandable way to lay audiences. Among the goals of the CEAL initiative are rapid impact and addressing vaccine hesitancy, COVID-19 misinformation, and distrust in near-real time. The initial CEAL cohort includes research teams in 11 states (AL, AZ, CA, FL, GA, LA, NC, TX, MI, MS, TN) who have been in the field since the winter of 2020. CEAL has generated over 40 research products that are being disseminated into communities and can be downloaded on the website ([covid19community.nih.gov](https://covid19community.nih.gov)). In a short time, the CEAL leadership both within the NIH and across the research teams executed on the need to reduce the time to translate evidence into practice through national and local town halls, Facebook Live events, and media stories in reputable outlets. With the availability of SARS-CoV-2 vaccines, the CEAL research teams are applying evidence-based approaches to disseminate information about the vaccines, engage trusted community voices and scientists to address commonly asked questions, and share promising practices for promoting vaccine uptake.

Additional NIH efforts to support research on equitable access to and uptake of vaccines include a Notice of Special Interest (NOSI): Research to Address Vaccine Hesitancy, Uptake, and Implementation among Populations that Experience Health Disparities (NOT-MD-21-008), led by the National Institute on Minority Health and Health Disparities along with 13 other NIH Institutes, Centers and Offices. This NOSI supports interventions to reduce barriers to access, acceptance, and

uptake of vaccines among groups that experience disparities. Vaccination outcomes are required of all applications, as is a focus on an NIH-designated population experiencing health disparities. Fields such as communication science, psychological and behavioral sciences, and bioethics can offer significant contributions to the understanding and shaping of beliefs, attitudes, and vaccination intentions across populations. This information is needed to inform interventions that increase the reach, access, acceptance, and uptake of vaccination now and in the future. The COVID-19 crisis has encouraged a refocus on community-engaged and community-driven interventions to develop resonant messages, partner with trusted messengers, generate and disseminate data on vaccine safety and community benefit, and to evaluate implementation strategies in community and clinical contexts. As such, communication strategies that consider and incorporate community assets, unique facilitators and barriers to vaccine uptake, within group heterogeneity, geography, intergenerational variation, language, and literacy, are encouraged. Finally, the NOSI's focus on dissemination and implementation research can inform policies and practices focused on improving individual, clinical and community-level outcomes.

#### CONSIDERATIONS FOR FUTURE RESEARCH

In addition to the current efforts at the NIH and across other federal, state, local, and non-governmental organizations, it is important to identify new and ongoing research gaps and opportunities. The NIH has a strong commitment to social and behavioral science, from basic discovery to intervention and implementation research that will inform how we can more effectively address the current pandemic and future public health crises. Across this translational spectrum, there needs to be an emphasis on reaching and engaging populations that experience health disparities. In this final section, we reflect on some research gaps and opportunities in social and behavioral science to address COVID-19 vaccination-related health disparities. Also, see the 2020 commentary on “National Institutes of Health social and behavioral research in response to the SARS-CoV2 Pandemic” for a summary of other NIH research efforts to more rapidly inform pandemic response [11].

It has been a herculean effort from the grass roots level to the federal level to implement communication and outreach efforts in communities across the USA, particularly those who have barriers to accessing the SARS-CoV-2 vaccines or who are vaccine hesitant. The rapidly shifting COVID-19 and vaccination landscape creates an ideal opportunity for natural experiment research [12] to understand what works, for whom, and under what circumstances to facilitate equitable and rapid vaccination. This includes assessing how and why a particular

approach works or does not work as intended. By using rigorous natural experiment methodologies [13], this type of research can meaningfully inform future public health intervention development, testing, implementation, and policies. For example, research might examine how service delivery or organizational level policies facilitate or hinder broad vaccination uptake and influence barriers to vaccine uptake such as stigma, distrust, fear, discrimination, and exposure to misinformation. This type of research could be further advanced if consistent and comparable demographic data were collected at the local, state, and federal levels. This would allow researchers and public health officials to more accurately and rapidly identify trends and gaps in care and access in vulnerable populations.

Further research is also needed to better understand the drivers of vaccine hesitancy specific to SARS-CoV-2 vaccines as well as other vaccines. This includes understanding the cultural, social, and informational/media environments and how they differ by community characteristics. The current communication landscape is characterized by the rapid spread of misinformation, divisive discourse, and information silos, creating unique challenges in effectively conveying accurate public health information about preventive behaviors as well as vaccination to the public. Research is needed to understand the consequences of exposure to misinformation and ways to respond and mitigate the harms [14, 15]

Other areas of needed research include building upon the established literature that have identified critical drivers of trust in science and health information (such as working with those within the target audience's personal networks and trusted community partners). In practical terms, how can public health communication be grounded in the values and perceptions of the community while leveraging trusted sources and channels? There are also populations where evidence regarding vaccines as well as communication is still being generated, such as children, pregnant women, and immune-compromised individuals; devoting research opportunities and engaging with these populations will be a critical priority as vaccines continue to roll out.

The pandemic has highlighted that one approach to promoting vaccine uptake will not fit all. Continued intervention research to enhance vaccine confidence is also needed. This should include research that develops and tests interventions at the individual and population-levels as well as testing multilevel interventions. Research is also needed to test targeted and tailored approaches for various settings (e.g., primary care settings, prisons and detention facilities, medical centers, reproductive health clinics, dental clinics, community health clinics, pharmacies, Tribal health facilities, schools, workplaces, pharmacies, remote care settings, and

faith-based organizations) and through a variety of messengers (doctors, nurses, pharmacists, trained community health worker, or community leaders). To facilitate more rapid and widespread adoption of effective intervention approaches, evidence from and methods used in implementation science should be integrated into the research. Implementation science can inform intervention development through research questions that account for various end user and implementation setting needs.

Finally, across all research endeavors, a critical priority needs to be promoting health equity and reducing the health disparities that have been exacerbated by the current pandemic. To this point, it would be a lost opportunity not to consider how to sustain the enhancements to existing or newly built partnerships and public health infrastructures that have resulted from the COVID-19 pandemic. These foundational resources are critical for other ongoing health challenges such as obesity, diabetes, cancer, heart disease, or opioid misuse. With these resources and established partnerships with trusted stakeholders in place, we may be able to respond more effectively and efficiently to the research and practice needs of new and ongoing public health challenges, particularly in populations that are most vulnerable and underserved.

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**Human Rights:** This article does not contain any studies with human participants performed by any of the authors.

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**Welfare of Animals:** This article does not contain any studies with animals performed by any of the authors.

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