Hearing title: "A Shot at Normalcy: Building COVID-19 Vaccine Confidence." –

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With the U.S. vaccine supply outpacing the number of doses being administered, there is no shortage of diagnoses for what ails the US COVID-19 immunization efforts. Twenty years of research on vaccine acceptance and data from this pandemic show that the reality is nuanced. Here are a few observations based on this research.

Frist, vaccine acceptance behavior is a spectrum. On the one end of this spectrum are individuals who actively demand vaccines and on the other end are people who would refuse vaccines in all situations. In this pandemic, active vaccine seekers were so vociferous that it created the impression that as soon as supply improves and major delivery bottlenecks are resolved, there will be persistent increase in immunization rates until herd immunity is reached. However, for several weeks, there's more vaccine available in the US than there are seekers.

Fortunately, strict refusers are a relatively small group -estimated to be approximately 13% of eligible adults. There's a much larger group of "fence sitters" who have questions about the vaccine but can be persuaded with the right interventions. Then there are those who do not have a lot of concerns about immunization but are not particularly enthusiastic about it either - making them amenable to nudges.

Given the range of enthusiasm about vaccines, there's an interplay between vaccine demand and vaccine access. Those who actively demand vaccines go the extra mile for getting it, sometimes traveling long distances to be vaccinated. However, now that most of the vaccine enthusiasts have been immunized, practical issues such as how easy it is to get an appointment have become relatively prominent reasons for non-vaccination.

Ethnic and racial minority groups in the United States have been disproportionately harmed by the pandemic: African Americans had a COVID-19 mortality rate twice that of Whites. Many nascent efforts to bring vaccines directly to communities, including programs that work with local civic and religious leaders are playing a role in addressing barriers for getting vaccinated. These programs need to be sustained and scaled up. Getting communities engaged with the vaccine will be easier with a scalable template. One approach involves pairing a community validator (e.g. a church leader) with an expert (e.g. a physician with roots in the same community) and replicating this model across the country.

Conservative men have emerged as another group particularly hesitant to vaccinate against COVID-19. Trying to persuade this group through messages that don't speak to their values could be counterproductive. A few years ago, building on the work of social psychologists, my colleagues and I found that those who emphasize liberty were more likely to be vaccine hesitant compared to those who did not. Messages that emphasize liberty are likely to be useful in persuading conservatives.

Overall, vaccines have traditionally enjoyed bipartisan support. Leveraging trusted, bipartisan vaccine endorsers is important. In a survey experiment, my colleagues and I found that a bipartisan endorsement of COVID-19 vaccines would help increase confidence in the vaccines.

Irrespective of the reason for non-vaccination, health care providers are the most trusted source of vaccine information - even among those who end up refusing the vaccine. A strong endorsement by someone's health care provider is a consistent predicter of vaccine acceptance. The likelihood of a strong health care provider endorsement increases if the provider is well versed in the vaccine subject matter as well as in communication approaches. There is a need for a national Continued Medical Education (CME) program that covers information on the mechanism of action of these novel vaccines, modes of ensuring vaccine safety, as well evidence-based communication approaches. Yale is developing such a program.

While physicians and other health care providers are best suited to persuade vaccine hesitant individuals, having an effective vaccine conversation requires time. Currently, a doctor can charge for administering a vaccine, but the time spent on vaccine counseling is not billable. If your doctor counsels you to get a vaccine, and you end up getting that vaccine, they get reimbursed; but if you don't, they don't get compensated.

Since doctors are not clairvoyant, they don't know in advance whether their counseling effort will be successful – hence they are disincentivized to spend time on difficult but essential conversations on vaccines. Making vaccine counseling itself reimbursable will go a long way in facilitating this promising intervention for those most hesitant about vaccines.

Highlighting that a desired behavior (e.g. vaccination) is a social norm can increase the uptake of that behavior. In early phases of a vaccine program, social norms cannot be communicated as only a small percentage of the population is vaccinated. However, communicating that an increasing number of people are taking the vaccine can help leverage an emerging social norm. Public messaging should emphasize this.

Sustainable control of the pandemic will require vaccinating a high proportion of the population. This cannot be achieved by only increasing physical access to COVID-19 vaccines. So far approximately 40% of the US adults have been fully vaccinated. Getting the next, 10, 20, 30 percent of the people vaccinated will be progressively more challenging and cannot be achieved until interventions focusing on human behavior are implemented.

In this pandemic, a lot of time and resources were wasted by implementing interventions based on hunches rather than evidence. We cannot make the same mistake when it comes to the next phase of vaccine deployment. Interventions to increase vaccination rates must be based on high quality evidence from social, behavioral, and epidemiological sciences.

Here's a summary of recommendations to address vaccine hesitancy:

1. Any response to vaccine hesitancy should recognize the heterogeneity in people's beliefs and vaccination behaviors.
2. Given the range of enthusiasm about vaccines, there's an interplay between vaccine demand and vaccine access. Making it extremely easy to get vaccinated will tip the balance for many who are yet to be vaccinated.
3. Many nascent efforts to bring vaccines directly to communities, including programs that work with local civic and religious leaders need to be sustained and scaled up.
4. Messages that emphasize liberty are likely to be useful in persuading conservatives and bipartisan endorsement of a vaccine would help increase confidence in COVID-19 vaccines.
5. Irrespective of the reason for non-vaccination, health care providers are the most trusted source of vaccine information - even among those who are vaccine hesitant. There is a need for a national Continued Medical Education (CME) program that covers evidence-based communication approaches for health care providers.
6. Making vaccine counseling itself reimbursable will go a long way in facilitating this promising intervention for those most hesitant about vaccines.
7. Interventions to increase vaccination rates must be based on high quality evidence from social, behavioral, and epidemiological sciences.

For further details and context, I am including the following documents and reports (that I have contributed to) in the appendix:

1. National Academies of Sciences, Engineering, and Medicine Report: "Strategies for Building Confidence in the COVID-19 Vaccines (2021)"
2. Vaccine Misinformation Management Field Guide: Guidance for addressing a global infodemic and fostering demand for immunization.
3. WHO technical advisory group on behavioral insights and sciences for health. Behavioural considerations for acceptance and uptake of covid-19 vaccines.
4. National Academies of Sciences, Engineering, and Medicine Report. Framework for Equitable Allocation of COVID-19 Vaccine (2020), Chapter 7: "Achieving Acceptance of COVID-19 Vaccine."

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APPENDIX

Strategies for Building Confidence in the COVID-19 Vaccines (2021)

DETAILS

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STRATEGIES FOR BUILDING CONFIDENCE IN THE COVID-19 VACCINES

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SEAN is interested in your feedback. Was this rapid expert consultation useful? For further inquiries regarding this rapid expert consultation or to send comments, contact sean@nas.edu or (202) 334-3440.

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Strategies for Building Confidence in the COVID-19 Vaccines

EXECUTIVE SUMMARY

Public engagement and effective communication through clear, transparent messaging will play a central role in building confidence in the COVID-19 vaccines. This rapid expert consultation describes a variety of public engagement and communication strategies that can be implemented at the national, state, and local levels to change patterns of interaction with the public, address hesitancy about the vaccines, and build trust.

In general, given the prevalence of local concerns and information needs, it is important to support local communities with the resources needed to engage people and reinforce information coming from the federal and state levels. Strong community engagement aimed at identifying and understanding local concerns will help determine what messaging, delivered by whom, will be most effective. Moreover, it will be essential to provide people who are hesitant, reluctant, distrusting, or otherwise unmotivated with respect to the COVID-19 vaccines with the resources, information, and support they need to make the vaccination decision that is right for them. This rapid expert consultation highlights overall strategies for engaging the public and building community trust (Box 1), as well as strategies focused specifically on communicating effectively to ensure demand for and promote acceptance of the vaccines (Box 2). These strategies are informed by five principles for effective risk communication:

1. Do not wait.
2. Be credible.
3. Be clear.
4. Express empathy and show respect.
5. Acknowledge uncertainty and manage expectations.

This rapid expert consultation also presents current data about people's motivations, which are informed by perceptions and social norms. These motivations, combined with pragmatic considerations, will determine the uptake of the COVID-19 vaccines. Given that any issues in the early stages of the vaccination program may affect motivation and confidence in the vaccines, distribution, allocation, and patient experience at vaccination sites are important to achieving herd immunity.

BOX 1
Six Strategies for Engaging Communities to Combat Mistrust and Build Public Confidence in COVID-19 Vaccines

1. Form Partnerships with Community Organizations
2. Engage with and Center the Voices and Perspectives of Trusted Messengers Who Have Roots in the Community
3. Engage across Multiple, Accessible Channels
4. Begin or Continue Working toward Racial Equity
5. Allow and Encourage Public Ownership of COVID-19 Vaccination
6. Measure and Communicate Inequities in Vaccine Distribution

Strategies for Building Confidence in the COVID-19 Vaccines

BOX 2
Nine Communication Strategies for Ensuring Demand for and Promoting Acceptance of COVID-19 Vaccines

1. Meet People Where They Are, and Don't Try to Persuade Everyone
2. Avoid Repeating False Claims
3. Tailor Messages to Specific Audiences
4. Adapt Messaging as Circumstances Change
5. Respond to Adverse Events in a Transparent, Timely Manner
6. Identify Trusted Messengers to Deliver Messages
7. Emphasize Support for Vaccination Instead of Focusing on Naysayers
8. Leverage Trusted Vaccine Endorsers
9. Pay Attention to Delivery Details That Also Convey Information

INTRODUCTION

Ensuring strong demand for and promoting acceptance of the COVID-19 vaccines is critical to achieving herd immunity, protecting the most vulnerable populations, and reopening social and economic life (NASEM, 2020a). To this end, two distinct challenges must be overcome. First, people who are willing and eager to be vaccinated must be able to do so easily, with minimal friction and hassle; second, people who are hesitant, reluctant, distrusting, or otherwise not motivated with respect to being vaccinated need resources, information, and support for making the vaccination decision that is right for them. Each of these challenges requires different strategies. This rapid expert consultation provides guidance on meeting the second challenge. It is intended to assist decision makers in building public confidence in the COVID-19 vaccines and in communicating with the public about the vaccination process and rollout by highlighting strategies for public engagement and message delivery to ensure demand and promote acceptance.[1,2] While it does not outline a national vaccine marketing strategy, the principles and strategies outlined herein will be critical in the design of such a campaign.

[1]The full statement of task for this rapid expert consultation is as follows: "The National Academies of Sciences, Engineering, and Medicine will produce a rapid expert consultation to assist decision makers in building public confidence in SARS-CoV-2 vaccines, with special attention to communities at higher risk of contracting and dying from the disease, including underserved and vulnerable communities. Drawing from research on decision making, changing beliefs and attitudes, community engagement, and how to reach and engage diverse audiences, this document will identify strategies of communication that are likely to promote uptake of FDA-approved vaccines to prevent COVID-19. This rapid expert consultation will be designed to be of practical use to decision makers, but will not recommend specific actions or include other recommendations. It will be reviewed in accordance with institutional guidelines."

[2]A number of other organizations and agencies have produced guidance on this issue, and those references may also be of use to state and local decision makers. See, for example, "Language That Works to Improve Vaccine Acceptance Communications Cheat Sheet" (www.changingthecovidconversation.org) (accessed January 19, 2021); "COVID-19 Vaccination Communications Toolkit" (https://www.cdc.gov/vaccines/covid-19/health-systems-communication-toolkit.html) (accessed January 19, 2021); and "A Communicator's Tip Sheet for COVID-19

Evidence from the behavioral, psychological, and social sciences demonstrates that people's motivations—their readiness, willingness, intention, or hesitancy—are informed by the information they process; by how they think and feel (their perceived risk, worry, confidence, trust, and safety concerns); and by social processes (recommendations from health care providers, social norms, gender norms, equity, and information processing and sharing). Evidence from anthropology indicates that individuals' motivations are further influenced by cultural understandings of the body, disease, and appropriate types of health care. Motivations can also be influenced by perceptions and beliefs about equitable allocation, distribution, and delivery of services as early vaccination programs roll out. Research from New Jersey's and Rhode Island's COVID-19 testing programs, for example, showed that customer experience challenges at point-of-care testing sites deterred some individuals intending to receive a COVID-19 diagnostic test and discouraged others from repeat testing (Policy Lab et al., 2020). Motivations thus formed interact with practical considerations (e.g., vaccine availability, costs, service quality) to determine vaccination uptake (Brewer et al., 2017).

Of course, context is also important. In particular, it is critical that the efforts of trusted messengers be coordinated. The public has already been receiving information about the COVID-19 vaccines and vaccination efforts from multiple sources, including state and local government entities, local news and community channels, physicians, and employers, among others. The messaging from these sources can be conflicting, which helps to undermine vaccine confidence and trust in public health authorities. Therefore, efforts to influence the shape of public discussion of vaccine issues may be as important as any direct persuasive communication.

Moreover, the pandemic conditions are dynamic and will continue to change as distribution of the COVID-19 vaccines continues and evolves, and ongoing monitoring of beliefs and attitudes will be needed so that messaging can be adjusted as the vaccines become widely available. The ways in which the principles described herein are operationalized will vary based on local context, so that ongoing testing of messages to learn which work best may be needed to optimize communication efforts. Dedicating more resources and technical assistance to local efforts in conjunction with national campaigns could support rapid learning and ultimately increase vaccine acceptance at the community level.

UNDERSTANDING COVID-19 VACCINE HESITANCY

The public's opinions on vaccination fall along a continuum, ranging from those who fully accept vaccines, to those who are vaccine hesitant (two groups that collectively represent the majority of the population), to those strongly or unequivocally opposed to vaccination (a very small minority of the population). It is the middle group that is most likely to respond positively to intervention (Gust et al., 2008a, 2008b). Previous research has found that communications focused on reaching those who are hesitant rather than those firmly opposed to vaccination will be most effective at increasing uptake (NASEM, 2020b), while focusing on those firmly opposed to vaccination will exaggerate and may contribute to the problem.

Since the first COVID-19 vaccine was authorized in December 2020 in the United States, public confidence in COVID-19 vaccines has risen relative to reported attitudes regarding a hypothetical vaccine in early 2020 (Hamel et al., 2020). Relevant details from recent polling are

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Vaccination" (https://obssr.od.nih.gov/wp-content/uploads/2020/12/COVIDTipSheet_Final.pdf) (accessed January 19, 2021).

included in Box 3. As these data reveal, hesitant individuals are not a monolithic group, and hesitancy is not static. As summarized in Box 3, much of the existing hesitancy regarding COVID-19 vaccination revolves around a desire to wait and see how others will respond physically to being vaccinated, as well as technical questions related to the vaccine's safety and efficacy (e.g., "Should I get the vaccine if I'm pregnant?"), which in some cases are accompanied by mistrust of medicine, public health, and government. The desire to "wait and see" is not unique to the COVID-19 vaccination experience. Research on H1N1 vaccine uptake in 2009–2010 shows that, at least in some populations, concerns about the new vaccine affected confidence in the vaccine (Hausman et al., 2020). Although the H1N1 vaccine was approved through the standard FDA process, there were initial concerns that it could have been released under the Emergency Use Authorization mechanism. Quinn and colleagues (2009) found that in that case, intent to take such a vaccine was extremely low, with African Americans being the most reluctant. The phased rollout of available COVID-19 vaccines, all authorized under the EUA mechanism, may provide an opportunity for responding to hesitancy in this respect: officials can make safety and effectiveness data transparent and accessible, especially as additional vaccines are authorized. Acknowledging people's uncertainty and their desire for more data becomes possible as vaccination programs continue.

Specific concerns among those who are vaccine hesitant vary widely, although they tend to cluster geographically and/or culturally. Mistrust of a vaccine in communities of color is of particular concern given that ethnic and racial minority groups in the United States have been disproportionately harmed by the pandemic: individuals from Black, Hispanic, and American Indian/Alaska Native communities all have experienced COVID-19 mortality rates nearly three times higher than the rate among White individuals, as well as higher rates of hospitalization due to the disease. These groups are also more likely to have underlying conditions that place them at higher risk for severe outcomes and complications related to the virus (CDC, 2020a, 2020b).

Mistrust of a vaccine in communities of color is grounded in current experience with structural inequities that permeate public health, medicine, and social services in the United States. Beyond a system that is not reliably trustworthy for many populations, a painful legacy of health care discrimination, medical research exploitation, and unconsented experimentation on Black, American Indian/Alaska Native, Latinx, and other communities that have experienced racism has contributed to justified distrust of government-sponsored medical research and resultant reluctance to become vaccinated (Frakt, 2020; Gamble, 1997; Hoffman, 2020; NASEM, 2020a).[3] This distrust will not be easy to overcome, but the glaring racial and ethnic disparities in the impact of the pandemic will only worsen if decision makers fail to address it.

[3]"Examples include the infamous Tuskegee study—in which hundreds of Black men in Alabama were lied to about being treated for syphilis while the disease was allowed to run its course; the Edmonston-Zagreb vaccine trial, during which parents of immunized infants (mostly Black and Latinx) were not informed that the vaccine used was an unapproved experimental vaccine; and less well known but equally abhorrent instances of unconsented sterilization of Latinx and American Indian and Alaska Native women (Carpio, 2004; Gamble, 1997; University of Wisconsin, 2018). This legacy leaves many communities of color wary of participation in medical research, suspicious of initiatives to engage them in health promotion or surveillance efforts, and, in many cases, reluctant to become vaccinated (Hoffman, 2020)" (NASEM, 2020a, p. 190).

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BOX 3
Highlights from the Kaiser Family Foundation's COVID-19 Vaccine Monitor Project, January 2021

Attitudes about the COVID-19 vaccination are changing rapidly. Reported here are the most recent data available at the time of publication. Current data are available from the SEAN Survey Archive at https://covid-19.parc.us.com/client/index.html?mc_cid=a543a1dc66&mc_eid=656554d0a6#/.

Among respondents to a public opinion survey conducted by the Kaiser Family Foundation's (KFF's) COVID-19 Vaccine Monitor project between January 11 and 18, 2021, 41 percent said they would get the vaccine "as soon as possible," and 39 percent said they would "wait and see" (6% said they had already received the vaccine). Compared to results from KFF's December Vaccine Monitor update, the share of adults willing to get the vaccine "as soon as possible" increased, including among Black and Hispanic individuals. However, Black and Hispanic respondents and those aged 18–29 were demographically overrepresented in the "wait and see" group, while "Democrats," those aged 65 and older, Whites, health care workers, and those with someone with a chronic health issue in their household were overrepresented in the "already vaccinated" and "as soon as possible" groups (Hamel et al., 2021).

Although the sentiment reflected in these findings is promising, 13 percent of respondents said they would "definitely not" get the COVID-19 vaccine and 7 percent said they would get it "only if required" (Hamel et al., 2021). These figures are concerning given the anticipated high level of vaccination coverage needed to achieve herd immunity in the United States, previously estimated at 60–70 percent of the population but now expected to be higher (likely closer to 90%, although the exact figure remains unknown) (CDC, 2020; McNeil, 2020; Omer et al., 2020). Thirty-three percent of "Republicans" said they would either "definitely not" get the COVID-19 vaccine or only get it if required, as did 29 percent of rural residents, 21 percent of Black respondents, 28 percent of essential workers, and 21 percent of "independents" (Hamel et al., 2021).

Among those who said they would "definitely not" get the COVID-19 vaccine, the primary concerns included the possibility that the vaccines are not as safe as they are said to be (81%); the unknown long-term effects of the vaccines (77%); the possibility of serious side effects (73%); and the possibility that the vaccines are not as effective as they are said to be (66%). Black and Hispanic respondents who had not yet been vaccinated reported higher levels of concern across these same four factors compared to White respondents (Hamel et al., 2021).

STRATEGIES FOR PUBLIC ENGAGEMENT TO COMBAT MISTRUST AND BUILD CONFIDENCE IN THE COVID-19 VACCINES

Public engagement is critical to overcoming mistrust and building confidence in the COVID-19 vaccines. Public engagement is more likely to be impactful (and build trust beyond COVID-19 vaccination programs) if the process is established and designed so that public values (ascertained through engagement) can be translated into practice and policy. Public health practitioners—if given the necessary resources—can create a strong infrastructure that helps earn community trust by building relationships that encompass organizing for policy change,

providing accessible COVID-19 testing and treatment, listening to the needs of communities, addressing the structural factors that create greater exposure to and poorer treatment for COVID-19, and ensuring the equitable allocation of vaccines. This section summarizes six public engagement strategies designed to combat mistrust and build confidence in the COVID-19 vaccines.

1. *Form Partnerships with Community Organizations*

Partnerships with community organizations that have strong existing community relationships are critical. These organizations are close to their audiences; know how to tailor information to those audiences effectively; and, most important, have trusted leaders who can be effective spokespersons. Research shows that credible partnerships require early two-way dialogue to establish trust and build a shared vision for addressing a problem, citizen involvement in the decision-making process, and sharing of information in a way that is understandable and responsive to local needs (NASEM, 2020a; Quinn et al., 2020). A good example is a communication planning strategy for building partnerships at a New Jersey environmental agency, which included the following steps: identify the issue; set goals; know the issue, audience, and constraints; assess audiences; identify messages and methods; implement a communication strategy; and evaluate, debrief, and follow up (Pflugh et al., 1992). Local governments thus could utilize or leverage existing relationships, social capital, and resources to build vaccine confidence. Potential partners might include faith-based networks, existing community health worker programs, or local advocacy and activism groups (e.g., organizers of get-out-the-vote efforts or the census, or neighborhood coalitions formed to improve walkability or green spaces).

2. *Engage with and Center the Voices and Perspectives of Trusted Messengers Who Have Roots in the Community*

Evidence suggests that efforts to counter vaccine hesitancy and promote vaccination need to emphasize putting "people at the center" of those efforts (Schoch-Spana et al., 2020). Research has highlighted the potential effectiveness of dialogue-based interventions, including social mobilization and engagement with community leaders and trusted community representatives, as well as the importance of community involvement in creating, adjusting, and implementing these solutions to ensure adequate buy-in and trust (Dubé et al., 2015; Jarrett et al., 2015; NASEM, 2020a). Social media or advertising campaigns encouraging community members to share why they choose to get vaccinated—such as the "whatsyourwhy" factor and "blackwhysmatter" social media hashtags—can be persuasive.

Central to this strategy is developing long-term relationships with trusted community members—a process that takes time but is essential. If such relationships are not already in place, local health departments can begin by listening to community members' concerns and providing support and resources to ensure that they have culturally appropriate information about the vaccines and, most critically, equitable access to vaccination.

3. *Engage across Multiple, Accessible Channels*

Community engagement will need to occur across a variety of channels well suited to reaching vulnerable populations, including people who cannot attend public meetings (e.g., because they work, live remotely, are incarcerated, or are undocumented), who have limited broadband service, who speak languages other than English, or who cannot use written text

(NASEM, 2020a). Determining which channels are most appropriate for particular populations is essential. State and local leaders can choose to communicate through town hall meetings, special community events, or faith-based gatherings.

4. *Begin or Continue Working toward Racial Equity*

Public engagement around vaccination, particularly with communities of color, needs to begin with acknowledgment of existing inequities. A health department could, for example, garner supporters and allies—and elevate racial equity—by recognizing how systemic racism has disadvantaged these communities and explaining how the department is working to create health for all communities.

Talking about vaccines in isolation risks reinforcing deeply held beliefs that health (or ill health) is purely a matter of individual behaviors (such as choosing to get vaccinated) and obscuring the broader structural factors—such as housing, jobs, and health care access—that also impact health. It is critical for authorities to acknowledge these broader shortcomings in health equity, to frame the COVID-19 vaccines as one of several tools that can help advance equity in communities most affected by the pandemic, and to reassure those communities that this type of work will continue beyond the pandemic. The pandemic has exposed myriad health disparities, and public health policies and action, including vaccination, need to reflect a deeper commitment to equity (Berkowitz et al., 2020).

An example of such an effort is the Bay Area Regional Health Inequities Initiative, a coalition of health departments and community partners in California's Bay Area focused explicitly on the advancement of health equity, racial justice, and economic opportunity. The group works across nine counties and has recently focused its efforts on COVID-19 response while continuing to highlight the importance of broader social determinants of health in shaping community health outcomes, particularly among communities of color (Bay Area Regional Health Inequities Initiative, 2020; Kritz, 2020).

5. *Allow and Encourage Public Ownership of COVID-19 Vaccination*

As noted earlier, while trust is critical to vaccine acceptance, trust in public health is low within some populations, including many communities of color. Public ownership of COVID-19 vaccination through public oversight and community engagement can inspire greater confidence in COVID-19 vaccination. Best practices for public ownership include actively seeking engagement with the public, listening to feedback and adapting accordingly, establishing local public oversight committees, and implementing bottom-up approaches with community members leading solutions. Research has also highlighted the benefits of public ownership of vaccination through governance structures that involve community members, noting the potential for those mechanisms to drive trust and improve access (Schoch-Spana et al., 2020). Also beneficial is emphasizing vaccination as a public good (e.g., "I am doing this because my vaccination helps the community at large, and I care about my fellow citizens").

6. *Measure and Communicate Inequities in Vaccine Distribution*

Real-time measurement of inequities in vaccine distribution and communication of those findings to the public is critical to building trust. Communities could disaggregate vaccine distribution across the 15 factors that make up the Centers for Disease Control and Prevention's (CDC's) Social Vulnerability Index and publish that information on public dashboards, for

example. Decision makers will need to monitor this information and work with community leaders to implement solutions as inequities arise.

EFFECTIVE COMMUNICATION TO BUILD CONFIDENCE IN THE COVID-19 VACCINES

Principles for Effective Communication

This section highlights five principles of effective risk communication, adapted from guidance issued by the CDC: (1) do not wait; (2) be credible; (3) be clear; (4) express empathy and show respect; and (5) acknowledge uncertainty and manage expectations. These principles can inform communication efforts and the development of strategies and tactics for building confidence in the COVID-19 vaccines and promoting uptake.

Do Not Wait

Begin Communicating Immediately. Once formed, attitudes are difficult to change (Weber and Johnson, 2006). Therefore, COVID-19 vaccination programs will need to develop their communication strategy as soon as possible. Because most people form judgments about new ideas based on narratives they have developed from past experiences, communication approaches could cue or activate people's existing mental models to recognize the COVID-19 vaccine as something with which they are already familiar (i.e., the prototypical childhood vaccines, which are widely accepted in the United States).

Be Credible

Be Consistent and Transparent. Transparency is key, particularly as new data become available. Any vaccine will likely have some side effects and risks associated with its use, and these need to be communicated clearly in ways appropriate for and accessible to target audiences. Likewise, unknowns about the vaccines (e.g., whether they will prevent transmission of the virus as well as symptoms; when the general public will be vaccinated) need to be acknowledged as such. Greater transparency about the vaccine authorization and distribution process, for example, could potentially address concerns about the politicization of the process (Quinn et al., 2020).

Be Clear

Use Accessible, Jargon-free Messages. Accessible communications that avoid jargon and are tailored to the literacy level of the target audience are important. Avoiding jargon is not a matter of merely removing difficult chemical or biological terms from messages, but also entails examining seemingly simple terms for overlooked problems (e.g., whether "significant" refers to statistical or substantive significance). Tailoring messages to the health literacy and numeracy levels of the target audience will also foster greater understanding.

Express Empathy and Show Respect

Avoid Dismissing Concerns. Ensuring that people feel heard—not dismissing their concerns—is important because if people do not feel heard, they are unlikely to listen. Instead, effective communications require listening to people's concerns, rephrasing and restating those

concerns, and presenting relevant new information with empathy. For example, responses to misinformation could begin with, "I see that you have concerns about X. There's a lot of information out there, and some of it is true, and some of it is not true. Let me tell you what I know...."

Acknowledge Uncertainty and Manage Expectations

Acknowledge Uncertainty. During a pandemic, what is and is not known changes constantly, and policy and programs change accordingly. Even now, as the vaccine rollout continues, some people interpret the changes in dose availability and allocation and priority groups as signs of incompetence or mistakes on the part of government or scientists. According to Quinn and colleagues (2013), preparation for uncertainty contributes to the public's acceptance of such change and trust in associated communication. With respect to COVID-19 vaccination, the public could be prepared with such statements as, "While we'd like this to move faster, we cannot always predict how many doses we will have each week, and our limited doses mean it will take longer to vaccinate people."

Don't Overreassure. The vaccine rollout will take significant time and effort. Honestly sharing realistic projections of the timeline could help manage people's expectations. Conversely, overpromising how quickly the process will proceed could undermine trust. Also crucial in ensuring that reasonable expectations are set is clear guidance on how to sign up for vaccination appointments and the various avenues for doing so. Sharing this planning information proactively and widely will help manage expectations and reduce frustration, and ideally will encourage fair coverage of the process as it unfolds.

Communication Strategies for Promoting Acceptance of the COVID-19 Vaccines

There is no single solution to vaccine hesitancy. Rather, multiple nuanced approaches are key to ensuring that those who are hesitant do not evolve to outright vaccine refusal and that existing health inequities are addressed. This section summarizes nine best practices for communication strategies designed to build confidence in the COVID-19 vaccines.

1. *Meet People Where They Are, and Don't Try to Persuade Everyone*

Models identifying stages of behavior change suggest that information and resource needs differ for people who are "considering" a particular self-protective action, such as vaccination (Why should I adopt it?) versus those who have decided to take the action (How do I go about doing it?). Thus, it is important to develop different messages for those who are willing to be vaccinated and need information on how to do so and those who are hesitant but open to learning more. Moreover, trying to persuade those who are completely opposed to vaccination is not a wise use of resources (Public Health Institute, 2020), especially given that, as noted earlier, most people who are unwilling to get vaccinated immediately can be considered hesitant or skeptical, with just a small portion of the population being absolutely opposed to vaccination (Bruine de Bruin et al., 2019).

Research on COVID-19 vaccination, and routine vaccination more broadly, emphasizes the importance of empathy as key to interacting with those who may be vaccine hesitant or skeptical, including through such techniques as motivational interviewing between providers and patients (Ferreri, 2020; Gagneur, 2020; Martin, 2021; Maurici et al., 2019). For these exchanges,

it is important to use such phrasing as, "I understand that you might have questions about the vaccine, and I'm here to answer them as best I can…."

2. *Avoid Repeating False Claims*

Correcting information that is inconsistent with scientific evidence is difficult under most circumstances (Cook and Lewandowsky, 2011; Lewandowsky et al., 2012; NASEM, 2017). It should be noted, moreover, that repeating false claims and misinformation risks inadvertently amplifying and strengthening that information. Occasionally, however, public health practitioners may have to address false claims (Ecker et al., 2017). In these situations, it is important to warn recipients before confronting them with the false information (e.g., "The following claim is misleading…") and to emphasize the facts over the misinformation (MacFarlane and Rocha, 2020). Practitioners can also use a pivot approach to avoid addressing and correcting false claims and misinformation directly, instead diverting the listener to consider concerns about the risk of disease (Omer et al., 2017). According to MacFarlane and Rocha (2020), additional strategies for debunking misinformation and overcoming its effects include preemptively explaining flawed arguments, using visual representations to increase data comprehension (Dixon et al., 2015), and providing alternative explanations of the debunked phenomenon (e.g., that purveyors of misinformation are interested in selling different remedies or support a political ideology) (Ecker et al., 2010).

The nation's polarized media environment also means that people are receiving very different messaging about the pandemic, and at the same time, the spread of information has become more "bottom-up" than "top-down." Evidence indicates that, instead of treating skeptics as the "other" and adopting a "those people" attitude toward vaccine-hesitant individuals, it is best to adopt an approach that encourages empathy (Hausman, 2020).

3. *Tailor Messages to Specific Audiences*

Messages will be received differently by different groups. To be effective, communication about the COVID-19 vaccines needs to reflect an understanding of the targeted audience, including their concerns and motivations and whom they trust. It is essential to recognize that the information needs of diverse audiences may or may not match communicators' assumptions about those needs. If the audience does not deem the information provided to be relevant or responsive to their information needs, they will ignore it.

Successful communication strategies therefore emphasize population segmentation, recognizing the need to develop different strategies for different subgroups, as characterized by epidemiological, psychographic, and demographic variables. Effective communication will use appropriate approaches to reach vaccine-hesitant audiences that differ by age, gender identity, marriage status, education level, refugee and immigration status, health behaviors/norms, and race and ethnicity, as well as the socially marginalized. Survey data can provide information relevant to target audiences, such as existing beliefs and content to avoid, which can inform development of the messages they receive (see, e.g., Amin et al., 2017; Parvanta et al., 2013; Rutjens et al., 2018). Data from qualitative studies that rely on first-hand explanations can also be used to develop messages that will resonate with particular audiences.

It is important as well to consider tailored messaging needs down to the individual level, including through such strategies as the aforementioned motivational interviewing (Gagneur, 2020), despite the anticipated difficulty of widespread scale-up of such strategies. For example, messaging that explains why the COVID-19 vaccines cannot alter DNA might cause more harm

than good if disseminated widely to an audience not already concerned about this misconception. However, particular individuals may benefit from hearing this message or others like it. This example highlights the importance of tailored individual conversations rather than broadly disseminated communications in certain contexts.

4. *Adapt Messaging as Circumstances Change*

Adaptive messaging is a core tenet of communication during the response to an infectious disease outbreak (Tumpey et al., 2018). Accordingly, what influences people's decisions is likely to shift as vaccine distribution goes forward, reflecting both individual experiences and months of media coverage. Ultimately, communication themes being emphasized today may be inappropriate or incomplete in several months as circumstances change, and campaigns will be forced to adapt accordingly. Recognition of the dynamism of COVID-19 vaccine hesitancy is key to the construction of effective communication strategies, which must mirror the dynamism of beliefs. Therefore, constant research to monitor and understand the addressable influences on vaccine confidence over time will be essential, as will feedback mechanisms to ensure that this information is used to inform planning processes. Rapid research methods will be needed to identify relevant priorities, appropriate message formats, trusted messengers, and appropriate message frequency, along with funding to support this research (Schoch-Spana et al., 2020).

5. *Respond to Adverse Events in a Transparent, Timely Manner*

As vaccination becomes more common, people's experiences with the COVID-19 vaccines will become known. While the vaccines often cause mild and transitory side effects, serious adverse reactions are exceedingly rare (CDC, 2021; n.d.). The rarity of adverse events is not always appreciated, however, as such events are often disproportionately reported in the news media and spread widely on social media. Moreover, serious medical events may occur coincidentally soon after vaccination and be perceived as related to the vaccine (Salmon, 2020). It is important to communicate information about adverse events in a timely and transparent manner and to help people understand what is known, what is unknown, and what should be done. In addition, postvaccination surveillance is essential to identify rare adverse outcomes that may be vaccine related. Taking this approach will help mitigate concerns about safety, side effects, and adverse events moving forward.

6. *Identify Trusted Messengers to Deliver Messages*

Messages about a new COVID-19 vaccine will be novel to all target audiences. Trust in the person or institution that delivers a message, built over previous years, will boost its credibility. Different groups may have different trusted messengers and preferred mediums and channels. Decision makers can identify groups that represent trust gaps in their community and trusted sources within and outside their organization who can convey public health messages to those groups.

7. *Emphasize Support for Vaccination Instead of Focusing on Naysayers*

Research shows that people look to their peers for cues about how to behave in a wide range of areas, from voting to savings (Brunson, 2013; Schultz et al., 2007). Accordingly, making vaccine uptake visible will encourage a social norming of COVID-19 vaccine acceptance. Early on, one approach is to emphasize *increasing* support for vaccination as uptake increases, thus initiating a virtuous cycle. Just as voters receive "I voted" stickers after casting

their ballots, vaccine distribution sites could provide "I got vaccinated" stickers, or encourage people to text their friends and family or post on social media that they received the vaccine (Milkman, 2020). Likewise, state and local jurisdictions could create publicly available dashboards with real-time data about the doses of vaccine administered in their communities or highlight evidence of community demand for vaccination (e.g., through news stories about people seeking vaccination).

8. *Leverage Trusted Vaccine Endorsers*

The immunization of thought leaders, community champions, and celebrities could help encourage members of the public to be vaccinated (Freed et al., 2011; Hoffman et al., 2017; Najera, 2019). Such vaccine promotion messengers should be relatable, trusted, and credible, and their messages should be consistent (Tumpey et al., 2018). This strategy could be paired with strategy 1 above.

A particularly effective way to implement this strategy could be to partner with people who have strong existing popular or community relationships with experts, adapting messages as needed. Examples of this approach include NBA star Stephen Curry's hosting Dr. Anthony Fauci on his video series and national vaccine experts participating in local town hall meetings. Likewise, in Baltimore, public health experts and researchers have partnered with faith leaders in the Black community to reach out to and educate community members about both COVID-19 and influenza (Sokolow, 2020), an approach that could be adapted elsewhere. And in Prince George's County, Maryland, a long-time partnership involving the Maryland Center for Health Equity has focused on having local health care providers talk about the vaccine with barbers and stylists to shift them toward vaccine acceptance, the idea being that these individuals can help clarify misinformation and set social norms in their community.

9. *Pay Attention to Delivery Details That Also Convey Information*

Trust in a vaccination program may be undermined if the user experience with enrolling and getting vaccinated is poor. If exposed to reports of online sign-up portals crashing, dirty clinic sites, or long wait times, for example, people may infer that the vaccine itself is also faulty.

CONCLUSION

Public engagement and messaging are critical to addressing the issues discussed herein to promote public confidence and trust in the COVID-19 vaccines. Given the prevalence of local concerns and information needs, it is important to support local communities by providing the resources they need to engage community members and reinforce accurate, clear information. Accessible, consistent, and transparent communication is crucial to converting hesitancy about vaccination to acceptance. Strong community engagement to identify and understand concerns will help in determining what messaging, delivered by whom, will be most effective.

Everyone—employers, health care providers, faith leaders, elected leaders, and public health officials—has a role to play. All strategies for increasing vaccine confidence need to take into account that vaccine decision making is part of a nuanced ecological model in which individual beliefs and behaviors are influenced by experiences at the community, organizational, and policy levels. As the COVID-19 vaccination campaign continues, it will be important to employ a coordinated approach that is supported at the federal and state levels and invests in

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local resources, expertise, and involvement. A variety of strategies at the national, state, and local levels will be required to change the pattern of interactions with the public, address vaccine hesitancy, build trust, and ultimately ensure a successful COVID-19 vaccination campaign.

SEAN is interested in your feedback. Was this rapid expert consultation useful? Send comments to sean@nas.edu or (202) 334-3440.

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VACCINE MISINFORMATION MANAGEMENT FIELD GUIDE

Guidance for addressing a global infodemic and fostering demand for immunization

LISTEN | UNDERSTAND | ENGAGE

PGP THE PUBLIC GOOD PROJECTS
FIRST DRAFT
Yale Institute for Global Health
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VACCINE MISINFORMATION MANAGEMENT FIELD GUIDE

This resource was created by the UNICEF Programme Division, Health Section, Immunization Unit C4D team, in collaboration with The Public Good Projects, First Draft and Yale Institute of Global Health.

It was developed to facilitate the development of strategic and well-coordinated national action plans to rapidly counter vaccine misinformation and build demand for vaccination that are informed by social listening.

This guide should help practitioners to:

Develop an evidence-grounded understanding of misinformation in the context of vaccination, how it spreads and gets traction, what can be done to mitigate its impact.

Implement evidence-based approaches to address misinformation

Develop a comprehensive and tailored national strategy for misinformation management

Who is it for?

The guide should support practitioners working in immunization programs, including immunization managers, C4D communication for development specialists, behaviour and social change specialists, external and digital communications and health teams.

PART I: VACCINATION IN THE INFORMATION AGE

Digital communication shapes vaccine demand. Modern, resilient health systems need infrastructure and tools to listen to, understand, and engage with their communities.

Vaccines help children to survive and thrive. They save more than 5 lives every minute, helping people to grow up and grow old in good health[1]. Thanks to vaccines, more than 18 million people – who would otherwise have been paralysed by polio – are able to walk, play, and dance today[2]. Vaccinated children do better at school[3] and their communities benefit economically[4]. Vaccines advance global welfare and are among the most cost-effective means of doing so[5]. Despite this, 20 million children miss out on vaccines annually[6] and nearly 30 per cent of deaths among children under 5 years of age are caused by vaccine-preventable diseases[7]. Seasonal influenza vaccination is recommended for older adults to reduce the risk of complications and hospitalisation[8,9]. However, coverage in adults is suboptimal in high-income countries[10,11,12] while influenza vaccines are seldom used in low- and middle-income settings[13].

Vaccine hesitancy is a key driver of under-vaccination[14]. While vaccine hesitancy is as old as vaccination itself[15] the nature of the challenge changes over time[16]. Digital communication, and social media in particular, catalyse the rapid spread of false information, threatening public health. In 2019, the WHO named ‘vaccine hesitancy’ among the Top 10 threats to global health[17], citing its potential to undermine global efforts to eradicate polio, eliminate measles and contain cervical cancer.

The novel SARS-Cov-2 virus has triggered two parallel pandemics: a biological one which has spread to every country in the world, and a social pandemic of misinformation – an infodemic - spreading across social networks. Vaccines have been sucked into this vortex of confusing information which ranges from the innocently misleading to the intentionally deceiving. Vaccine-critical messaging increased more than 2-fold compared to pre-COVID-19 levels, with 4.5 billion views of content spreading vaccine misinformation in just the United States alone between March-July 2020.[18]

This infodemic threatens to augment vaccine hesitancy, which in turn could impact routine immunization programs, complicate new vaccine introductions (including SARS-CoV-2 and nOPV2 vaccines) and erode public trust in public health.

“We’re not just fighting an epidemic; we’re fighting an infodemic. Fake news spreads faster and more easily than this virus and is just as dangerous.”

–Tedros, Director-General of the World Health Organization (WHO)

Vaccine Hesitancy

Vaccine hesitancy, the reluctance or refusal to vaccinate despite the availability of vaccines[19], is a context and vaccine-specific phenomenon, which may be influenced by a complex mix of historical, political, social and behavioural determinants.

Across a broad spectrum of vaccine attitudes and intentions, most parents accept vaccination, with only a small minority actively refusing them (Figure 1). Vaccine hesitant individuals may accept all vaccines but remain concerned about vaccines, some may refuse or delay some vaccines - but accept others, and some individuals may refuse all vaccines.[20,21]

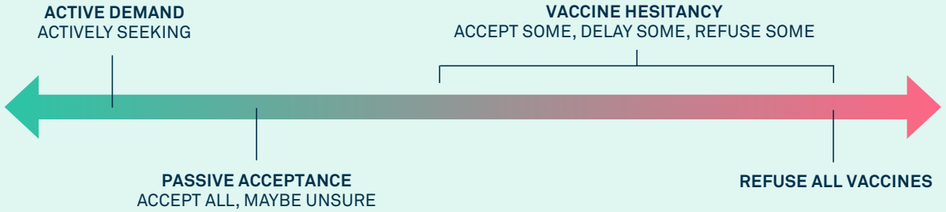


Figure 1. Acceptance of and demand for vaccination exists along a continuum.

A broad range of socio-psychological determinants of vaccine hesitancy have been identified. These may range from attitudes, past experiences and cognitive biases[22], to trust[23], social norms and even moral values[24] and worldview[25] (Figure 2). Evidence suggests that well-intentioned vaccine promotion content can actually backfire, decreasing intentions to vaccinate, particularly in those who are already hesitant[26,27]. Thus, vaccine promotion narratives and their component messages should wherever possible be designed based on behavioural and social evidence, tailored to specific audiences, and tested and monitored for both efficacy and safety before and during implementation.

Figure 2. Socio-psychological determinants of vaccine decision making.

Infodemics, misinformation and disinformation

The WHO defined an infodemic as being an "overabundance of information – some accurate and some not – that occurs during an epidemic. [Which] can lead to confusion and ultimately mistrust in governments and public health response."[28]

Due to the uncertainty that arises during a disease outbreak, conflict or natural disaster, crises are fertile grounds for sowing false information. In this context, an infodemic may arise from an excess of information in general, a lack of reliable information[29], or an increase in misinformation and disinformation.

Unverified information can cause harm by sowing confusion and drowning out accurate health information; it can change behaviour, including panic-buying or consumption of dangerous and unproven treatments[30]; it can shape attitudes to vaccines[31].

Misinformation is false information that's shared by people who don't realise it is false and don't mean any harm, including vaccine proponents[32].

Disinformation is deliberately engineered and disseminated false information with malicious intent or to serve agendas.

First Draft, a non-profit that focuses on misinformation, has created a typology of seven types of information disorder: fabricated content, manipulated content, imposter content, false content, misleading content, false connection, and satire or parody[33,34].

INFORMATION

'Data with meaning': the basis of knowledge when it is resonant, actionable, trusted

RUMOUR

Unverified information: stories/reports that spread rapidly through a group or population – can be *true or false*

MISINFORMATION

Accidental falsehoods. Wrong or misleading information with the power to dilute, distract, *distort*

DISINFORMATION

Deliberate, engineered falsehoods circulated with malicious intent or for the purpose of serving a *personal, political or economic agenda*

“A reliable way to make people believe falsehoods is frequent repetition, because familiarity is not easily distinguished from truth.”

–Daniel Kahneman[54]

Why are people susceptible to misinformation?

People are vulnerable to misinformation[35], especially in times of uncertainty, due to a complex mix of cognitive, social and algorithmic biases. These include information overload and limited attention spans, various cognitive biases[36,37], the novelty of misinformation, trust, and algorithmic popularity.

Lower trust in science and scientists[38], in journalists and the mainstream media[39], or in authorities[40], has been linked to increased susceptibility to misinformation. Belief in conspiracies may help people reduce the complexity of reality and contain uncertainty and may be driven by feelings of powerlessness and mistrust.

People may be exposed to misinformation through media or voiced opinions and rumours, and more and more through online social networks which fuel the infodemic. By amplifying attention-grabbing information, social media algorithms may incentivise the circulation of misinformation and disinformation[41], allowing false information to spread faster and further than true information[42]. This has had a negative impact on polio vaccine campaigns in Pakistan[43] and efforts to contain Ebola in the DRC[44]. Rumours that start online can also spread offline, in printed media and through word-of-mouth[45].

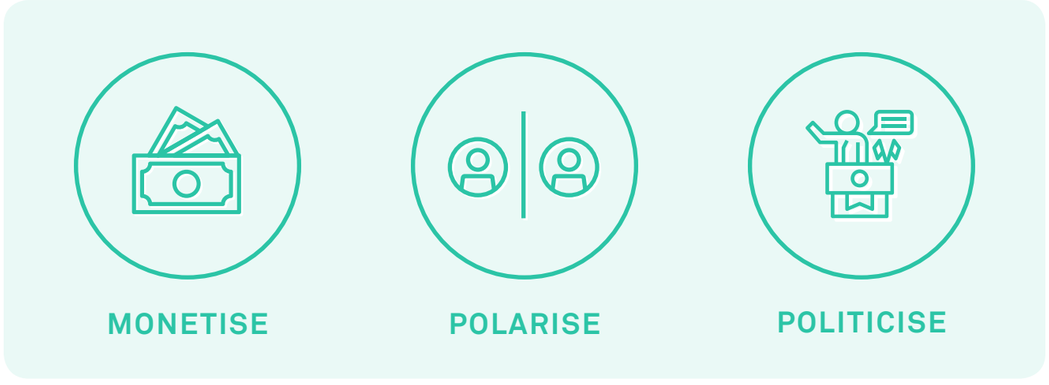
Misinformation is sticky

Misinformation can ‘stick’ in people’s minds and continue to influence their thinking even when it seems to have been corrected[46]. The possibility of a backfire effect, when a correction actually leads to someone increasing their belief in the misconception being corrected, has also been posited for various types of misinformation. Corrections may increase people’s familiarity with the misinformation, which can be confused with truth. If a correction seems to run against a person’s beliefs or worldview, they may actually strengthen their original opinion further. Though recent evidence suggests backfire effects may be overstated for misinformation in general,[47,48] there is emerging evidence that pro-vaccination communications can indeed backfire. This may be particularly true in people who are already vaccine hesitant[49,50,51,52].

The good news is that it is possible to ‘inoculate’ people against misinformation, much as we can vaccinate against infectious diseases[53]. This strategy is outlined in detail in Part 2.

3 reasons why people create vaccine disinformation

People create vaccine disinformation to:



Attention-grabbing disinformation motivates people to visit websites and social media accounts and view content such as videos. Each visit to a website hosting an advertisement creates revenue for the owner of that website and the content on it. Individuals and organizations hoping to sell products can also hope to funnel some of the attention disinformation creates to purchases[55,56]. Vaccine disinformation campaigns have been employed for political purposes[57]. 'Weaponised health information' that focused on vaccines was disseminated by a state actor using bots and trolls in an attempt to promote social discord and polarisation[58].

Don't be distracted by disinformation

Disinformation may influence some people's vaccination decisions. However, behind the noise are many people with valid concerns and questions that must be heard and addressed. In periods of uncertainty like a pandemic, people are actively seeking information, and even unintentional falsehoods can increase confusion and erode trust[59]. Thus, it is important to be able to track and understand more nuanced falsehoods and to acknowledge and address valid concerns[60].

A strategic approach to misinformation management

The risks of disinformation to vaccination programmes has never been higher – nor have the stakes. The successful rollout of novel oral polio vaccine (nOPV) campaigns, efforts to close the childhood immunisation gap and reach children missed during the COVID-19 pandemic, and demand for future vaccines against COVID-19, require national health systems to actively and systematically monitor and address misinformation.

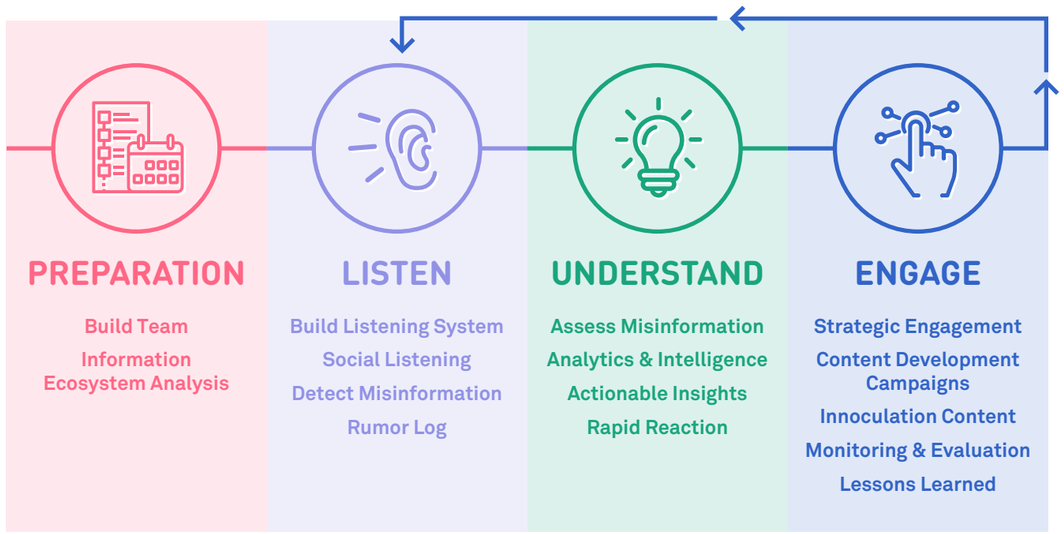
Anti-vaccination actors clearly often operate from a strategy. Current evidence suggests they can have significantly greater reach than vaccine advocates and reach the undecided with content that is often more persuasive. On Facebook, anti-vaccine pages are 'heavily entangled' with undecided users, while pro-science sites are talking to the converted[61]. The top 10 websites identified by researchers as spreading health misinformation had almost four times as many views on Facebook as information from established health sites[62]. Anti-vaccine messages are 'stickier' than pro-vaccine messages[63]. Anti-vaccine websites and social media accounts use persuasive techniques that tap into parents' values and lifestyles; they tend to be more emotionally resonant, salient and visual[64] than official communications[65]. Anti-vaccine entrepreneurs connect with each other and mobilise others to increase their reach[66,50].

Any approach to vaccine misinformation management and pro-vaccine engagement must also be driven by a comprehensive strategy that closely couples social listening and analysis with risk communication and community engagement (RCCE), communications, advocacy and social mobilisation activities.

The World Health Organisation has called for "Member States to develop and implement action plans to manage the infodemic by promoting the timely dissemination of accurate information, based on science and evidence, to all communities, and in particular high-risk groups; and preventing the spread, and combating, mis- and disinformation while respecting freedom of expression."[67] The next section provides comprehensive guidance for the development of a national action plan for vaccine misinformation management.

PART 2: MISINFORMATION MANAGEMENT: A FIELD GUIDE

This field guide outlines an operational framework for vaccine misinformation management that is organised into three phases: **Listen, Understand**, and **Engage**[68].



Strategic implementation should be iterative to ensure continual refinement and adjustment, and cooperative to ensure coordination of all actions and actors. A preparatory phase involves developing a tailored strategy, an information ecosystem assessment, and building the right team. Social listening needs to aggregate and visualise the relevant data sources, whether media, social media, novel digital channels or even offline. Understanding is making sense of the signals in the noise, detecting, tracking with a rumor log, verifying and assessing misinformation, and developing real-time situational insights. Engaging may involve content development and dissemination, creation of inoculation messages, measuring impact, and refining and repeating the cycle.

1 PREPARATION PHASE

1.1 Build Team and Strategy

Any integrated program of misinformation management will require, along with development of new actions, close coordination with a number of ongoing activities. These may include: ongoing traditional media and social media monitoring, community feedback processes, RCCE coordination structures, crisis response mechanisms, vaccine readiness & delivery planning and routine immunization demand work[69]. It may be important to engage with national, regional and local bodies, as well as coordinating with international agencies and NGOs, to avoid duplication of effort and increase the reach of listening and engagement. A misinformation management program should be guided by a strategy that ensures such close coordination, has clear objectives, and includes all the steps in the listen, understand and engage phases described below.

Where feasible, implementation may be guided by a central function, a social analyst or 'infodemic manager' which coordinates the listening, identification and assessment of rumours, and provides actionable insights and recommendations to communications, RCCE, advocacy and other teams involved in public engagement.

A cross-disciplinary function, the fully-trained infodemic manager will require knowledge and competencies in vaccine hesitancy and demand, misinformation and fact-checking, social media and monitoring tools, data analytics, health communication science and social marketing/behaviour change, even if specialists may perform some of these functions[70]. This function may need to consolidate feedback from offline channels as well. It will require ongoing professional development for any individual to achieve this broad span of skills and knowledge, and in the interim this role may be achieved through coordinated work of different specialists.

In addition, all team members should be trained in the basics of misinformation. A good starting point is the First Draft SMS course *Protection from Deception*[71].

1.2 Information Ecosystem Assessment

A country-level communications ecosystem assessment will inform every part of a misinformation management strategy. It should answer the following questions:

What media do people rely upon to stay informed? news media, social media, messaging apps, personal communication, offline comms (e.g., posters and pamphlets)

Which platforms are the most popular, for what audiences, which accounts have the most reach?

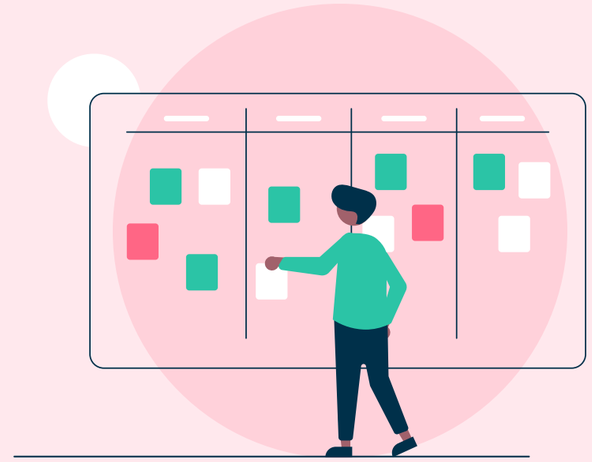
Who is influencing conversations (e.g., trusted voices, vaccine advocates)?

What information/misinformation appears locally when you search on Google, YouTube and Facebook for vaccine-related queries?

What rumours have already been identified? How were they identified? Where were they (online communities, real-world communities)? Who are the authors?

What digital engagement, RCCE, communications initiatives are already in place?

This contextual overview should inform each step of the action plan.



2 LISTEN PHASE

2.1 Build Social Listening System

By aggregating and filtering data from different sources, a social listening system can help streamline the detection of signals in the noise, shifts in online conversations, and identification of emerging or common concerns. The development of a social listening system should be guided by a triangulation between the various tools available and the mapping of the information ecosystem, in particular the channels where vaccine-related information is being diffused and discussed.

Most importantly, the tool is not the solution. Teams should ensure they are equipped with the necessary skills to use these tools and make sense of the data to deliver actionable insights.

2.1.1 Monitoring Tools

There is a variety of free and paid-for media monitoring and analytical tools available. The monitoring system that you create should be able to access the channels, communities, and conversations that were identified as important in the Information Ecosystem Assessment, and thus the system is likely to incorporate a combination of tools.

Google provides a simple alert service and a tool for monitoring search trends. Each of the major social media platforms have an analytics tool. There are a number of paid-for social media monitoring services such as TalkWalker or Brandwatch that can be employed to access multiple platforms. These services have limitations, including the channels they can access and search algorithms (e.g., for sentiment) that are adapted to product sales, not health behaviours. Users should understand the limitations of any tools, including the data that can or cannot be accessed. See Appendix 2 for a list of these various tools.

In addition, UNICEF and partners have a number of novel tools that may be implemented for listening and engagement, including HealthBuddy[72], Health Alert[73], U-Report[74], RapidPro[75] and Viamo[76]. See Appendix 2 for guidance on how to select and configure these various tools.

2.1.2 Search Queries

To use any of these tools it is necessary to first choose the relevant keywords for searches and Boolean search queries (combinations of search terms). Terms can be combined into search strings by joining a series of keywords with connectors such as AND, OR, NOT. Keywords should be in all relevant languages and variations in spelling between formal/informal language should be considered. An example search string for vaccination is shown in Appendix 2.

2.2 Social Listening

Social listening must become routine to effectively detect early signals of rumours before they become “trending events” and begin to get significant traction and spread. Early signals are defined as patterns that appear well before rumours reach their peak time. Early detection can help guide proactive content development to address community concerns and questions ahead and fill information gaps before they are filled by misinformation.

Some tools have a ‘virality score’ that may help detect misinformation that is starting to spread or get traction. Detection also involves planning ahead to prepare for specific events that may trigger new misinformation or resurface old content.

2.3 Rumour Log

A rumour log[77] should be used to capture rumours/misinformation events. Keeping a rumour log will enable you to analyse trends and recurring issues, coordinate the responses to rumours, and share information with other organisations.

3 UNDERSTAND PHASE

3.1. Assess Misinformation

Analysing the potential impact of misinformation in a structured way helps to triage rumours and identify the rumours that require a response. Developing a Standard Operating Procedure (SOP) for recording new challenges, verifying and assessing the impact of misinformation, and tracking trends make it easier to share intelligence between partners.

Not all rumours are false; many contain a grain of truth. It can be challenging to determine conclusively whether something is true. The process requires some investigative work to piece together as much information as possible.

Begin by following the 5 Pillars of Verification[78]

Provenance
Are you looking at the original account, article or piece of content?

Source
Who created the account or article, or captured the original piece of content?

Date
When was it created?

Location
Where was the account established, the website created, or the piece of content captured?

Motivation
Why was the account established, the website created, or the piece of content captured?

Develop a library of factual information and, where possible, consult with experts who can help determine whether the information is correct. This will help to unpack the rumour and deepen your understanding of why the rumour was so virulent. Access to fact sheets and to experts can also help in crafting an appropriate and accurate response.

The potential impact of a rumor should be assessed before any response is formulated, which requires a strong situational understanding. The first task is to understand who is starting and spreading rumours, where the information is circulating, what concerns and stories have traction, how fast and far it is spreading, and why the rumour has taken hold. Questions that could inform this assessment include:

Would a response actually just give oxygen to the misinformation, causing it to spread further?

What happens if nothing is done?

Are there other facts or events that you should wait for the outcome on before deciding? Is there additional expertise to be sought?

What is the reach and scope of the misinformation?

What is the likelihood of spread or escalation?

Could it erode general trust in vaccination or in a specific vaccine?

What is the capacity to respond?

An example risk evaluation matrix is shown below, and **Figure 4** shows a simple algorithm to follow.

INDICATOR	LOW RISK	MEDIUM RISK	HIGH RISK
RISK TO VACCINE HESITANCY & DEMAND	Low risk to vaccine demand	Potential to trigger hesitancy to vaccinate	Potential to lead to vaccine refusals
REACH AND SCOPE OF MISINFORMATION	Limited potential reach or scope	Moderate potential reach or scope	Wide or cross-country reach or scope
LIKELIHOOD OF ISSUE SPREAD OR ESCALATION	Unlikely to spread in community or online	Spreading in community and/or online	Spreading rapidly in community and online
RESPONSE CAPACITY	Strong messaging and capacity in place	Limited existing messages & resources to manage crisis	Limited existing messages and capacity exceeded
GENERAL PUBLIC TRUST	Remaining trust in government, health services, vaccines	Reduced trust in government, health services, vaccines	Outward displays of mistrust government, health services, vaccines
RESPONSE	Monitor closely, consider prebunking	Debunk, raise trusted voices	Debunk, raise trusted voices

Figure 3. Example risk evaluation matrix.

Figure 4. Inoculating against specific misinformation

3.2 Actionable Insights

Social analytics need to turn interesting data into actionable insights to be useful. It needs to answer the question *"So what, who cares?"* for the teams who are engaging with communities. Insights reports should be first developed with the RCCE taskforce or other teams involved in engagement and communications in a country to ensure that the content is clear and actionable. Many end users may not have much experience with social media monitoring for example. Reports should be short and could include:

A short top-line summary with key insights and recommendations for action.

Sections on the key themes identified with:

- examples of disinformation relating to these issues, including where and how it is circulating;
- key interactions and engagements, including who is picking it up and circulating it (journalists, influencers, known vaccine-critical accounts, etc), in which networks or communities is it circulating, and who the audiences are;
- what are the target audiences of the disinformation, what disinformation techniques are being used, what are the possible motives of the authors or spreaders;
- trends and changes in tone and attitudes (can be enriched by any behavioural insights or polling data);
- what is the potential impact of misinformation on audience's attitudes and health behaviours;
- and a summary and actionable recommendations.

4 ENGAGE PHASE

4.1 Shape the Agenda

Misinformation loves a vacuum. Ensure that people searching for information can easily find credible, accurate, and relevant information on vaccines, infectious diseases and immunity in their language. The content should be relevant is available to people searching for in formats that will resonate. Curate and aggregate existing content into content hubs[79,80], including websites of trusted organisations[81,82], and create country-level local-language hubs of vaccine information. See Appendix 3 for tips on how to create sticky content.

Regularly disseminate this content through the channels that are hosting vaccine-related conversations, and consider novel push tools that may reach those with limited or no internet access (e.g., radio, Internet of Good Things[83]). Use this content to connect with and amplify existing trusted pro-vaccine voices. Galvanise new voices to join the conversation such as health professionals[84], youth[85,86], and religious leaders.

To limit the impact of misinformation, amplify trusted online voices such as UNICEF, WHO and public health agencies[87] and partner channels, and connect with those who influence public attitudes on health and social issues (the information ecosystem assessment will have mapped out trusted influencers). Build diverse coalitions and equip them to address misinformation.

4.2. Prevention

There are a few strategies that have been shown to prevent misinformation from sticking in the first place.

4.2.1 Simple Warnings

Warning labels that flag misinformation on social media may reduce the perceived credibility of the false information and users' intentions to share[88]. Any cues or processes that redirect people to reliable information, or simply increase the effort required to share misinformation may reduce its impact[89]. Engagement with social media platforms to encourage such measures may improve the hygiene of the local communication ecosystem[90], but it may also be possible to directly encourage social media users to not share and even refute misinformation[91].

4.2.2 Media and Health Literacy

Helping people to critically evaluating the accuracy of information and sources can reduce the influence of misinformation and the likelihood that people will share[92]. Short online courses and school curricula that may increase media and health literacy are listed in Appendix 6. Finland has implemented a national curriculum of information literacy and critical thinking curriculum, and is currently considered the country the most resistant to misinformation[93].

It is critical to ensure that influential networks (including media organisations) have the context and data that they need to present reliable information. Empower journalists with toolkits and training that helps them to know misinformation when they see it (see Appendix 6). Work with fact-check organisations and resources to verify misinformation. Connect journalists with experts on vaccination by liaising directly with news organisations and with professional networks.

4.2.3 Inoculation (Prebunking)

Emerging evidence shows that it is possible to pre-emptively debunk, or prebunk, misinformation before false beliefs have a chance to take hold[94]. People can be '*inoculated*' against misinformation by being exposed to a weakened version of the misleading tactics used in misinformation or the hidden motives of the disinformation authors, and a refuted version of the message beforehand[95,96]. Just as vaccines generate antibodies to resist future viruses, inoculation messages equip people with counter-arguments that potentially convey resistance to future misinformation, even if the misinformation is congruent with pre-existing attitudes.

Common misleading tactics of science-related misinformation include, for example, cherry-picking of data, or reference to fake experts. A taxonomy of the tactics used in misinformation is available in the **Conspiracy Theory Handbook**[97]. Another strategy is to highlight the ulterior motives for creating and disseminating vaccine disinformation, which can undermine people's trust in that information.

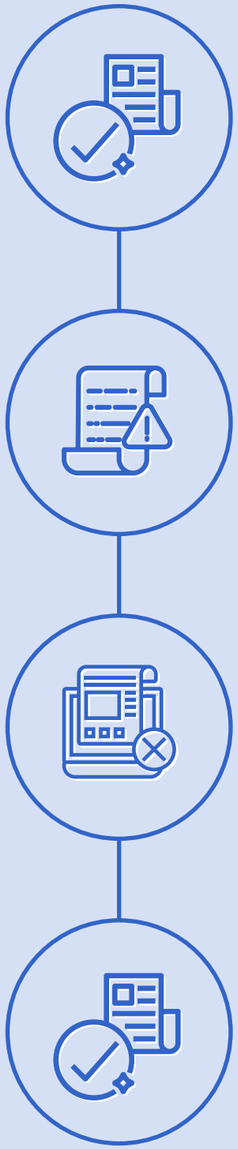
One benefit of inoculations is their potential to convey an "umbrella of protection", providing resistance not just against a single argument but multiple arguments, and even across different topics. Inoculations that focus on specific rhetorical techniques in one area (e.g., tobacco misinformation) have been found to effectively inoculate against the same technique in another area (e.g., climate change)[98].

4.2.4 Inoculating at Scale

Inoculation may be effectively taken to scale with some games and apps that prebunk misinformation. The Bad News game which casts players in the role of a misinformation creator increased players' ability to spot misinformation and decreased its credibility in their eyes[99]. Appendix 6 lists some examples.

4.3. Debunking

There is emerging evidence to support the careful debunking of specific myths or rumours. If a rumour has been assessed as medium or high risk, development of debunking content which may help provide specific immunity to specific misinformation. An inoculating message highlights not only that a message is false, but explains *why* it is false, and what may have led people to believe the falsehood in the first place, and it includes the facts in simple, clear terms. After an expert review of the literature, the **Debunking Handbook 2020**[100] proposes the combination for a debunking message shown in **Figure 5**.



1. Fact
Lead with the truth, state the facts clearly. Do not try to refute the misinformation, just state what is true.

2. Warning
An explicit warning that misinformation is coming, which may contain a weakened version of the misinformation. Only repeat the misinformation once.

3. Fallacy
Explain why the misinformation is wrong and, as with prebunking, explain the specific misleading tactics being employed, or highlight the hidden motives of the authors of the disinformation.

4. Fact
Repeat the truth. This is crucial because the alternative correct information fills the mental 'gap' generated by the correction. Make the facts 'stickier' than the misinformation (see **Appendix 3** for tips).

See Appendix 4 for examples of inoculating messages. The recommendations here are based on the approach proposed in the **Debunking Handbook 2020**[100].

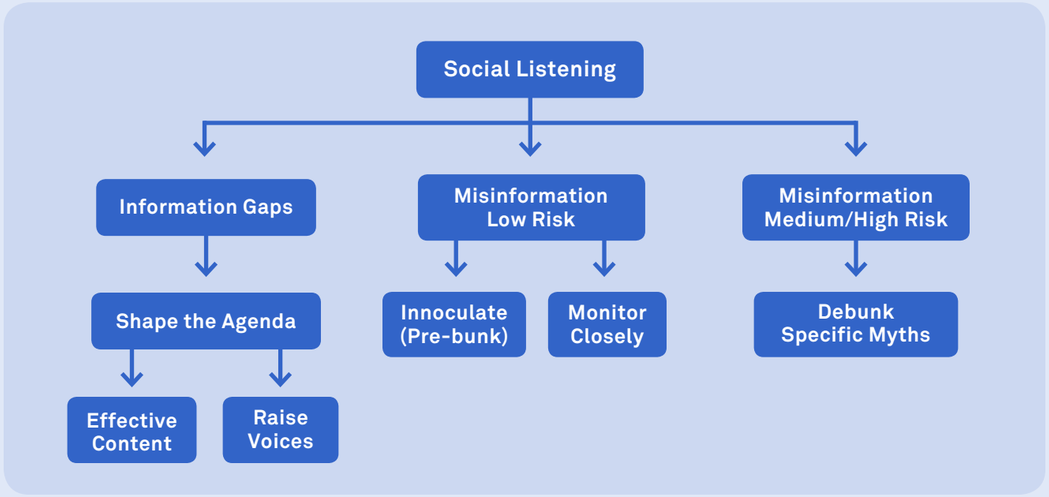


Figure 5. Deciding when to engage

4.4 Trustworthy Communicators

The bedrock of vaccination demand is public trust[101]. Credible information alone is not enough, the information source or communicator also must also be credible, expert and trustworthy. A recent study showed that trustworthiness was actually more important than expertise when addressing vaccine misinformation[102].

Public health agencies and other expert organisations are consistently trusted and effective voices, and are encouraged to raise their voice in social media[103,104]. Health professionals are among the most trusted sources of health information and a provider recommendation to vaccinate significantly may increase vaccine uptake[105]. A multicountry study found that trust in scientists was consistently associated with decreased susceptibility to misinformation[106].

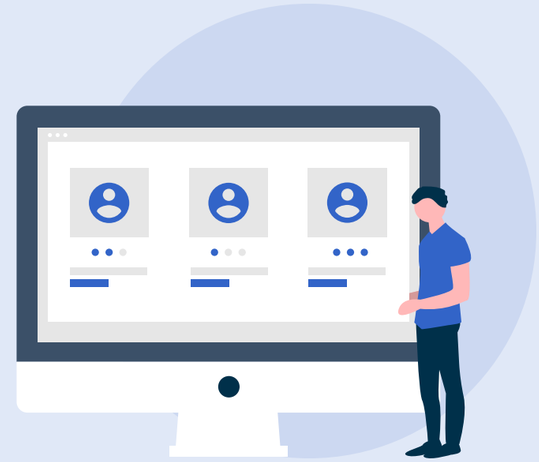
Relationships with community leaders and media and social media influencers can be leveraged to address the rumour. Building and maintaining a network of relationships requires time, resources and skills. Speaking local languages and understanding the cultural and political context is vital.

Mistrust may be as important as *misinformation* in formation of beliefs in conspiracy theories[107], thus anything (and anyone) that helps to build trust with the audience may help unstick misinformation, especially with vaccines.

4.5 Quantify Impact

It is important to implement metrics and qualitative assessment of outputs, outcomes and impact of response to disinformation. As the information ecosystem evolves, your keywords and algorithms may need to change and evolve. Capture lessons learned that can inform future actions.

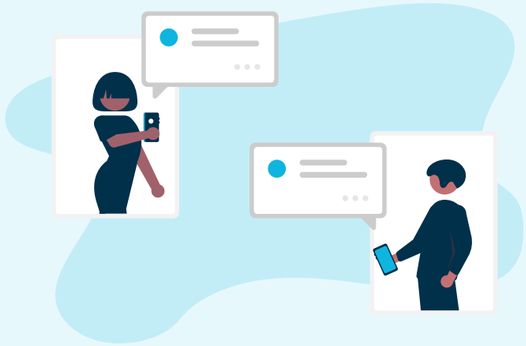
When creating an evaluation protocol, distinguish between performance evaluation and outcome evaluation. Examples of performance metrics and outcome metrics are provided in Appendix 5. The main difference between the two is that performance metrics typically include interim measures that provide directional evidence that an effort is having an impact, whereas outcome metrics indicate verifiable shifts in knowledge, attitudes, and behaviour have occurred. Some of the metrics below apply to both misinformation and the response to misinformation, such as impressions, page views, reach, and frequency. It is important to measure the performance of both in order to be able to compare the relative impact of one to the other. Ideally, one of the first actions of misinformation management would be to select performance and outcome measures and establish a baseline to compare on-going efforts against.



CONCLUSION

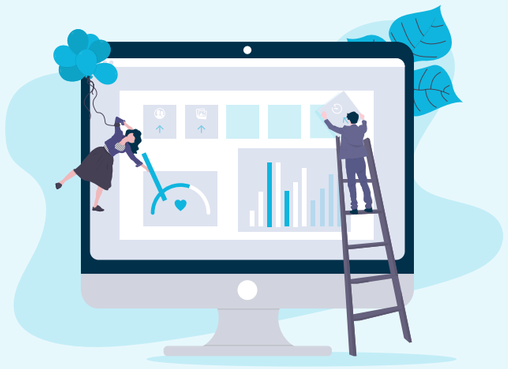
It is possible to immunize against misinformation.

Drawing on social sciences research, evidence-based interventions can help to debunk and pre-bunk potentially damaging rumours. Coupled with fostering strong relationships with professional media, social media platforms, health professionals and other trusted actors, the full benefits of vaccination can be realised.



The infodemic of vaccine misinformation is a public health threat.

It undermines the enormous progress delivered by immunisation programmes and jeopardises campaigns to deliver nOPV and SARS-CoV-2 vaccines.

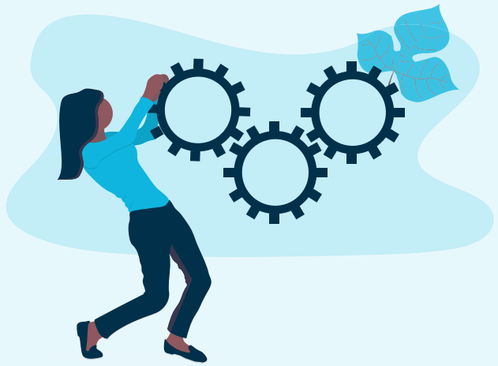


Social listening should access online and offline data sources.

This could include social media, mainstream median, and community feedback. All the data needs to be aggregated, analysed, and used to inform debunking of misinformation and fostering of positive conversations around vaccines.

The task ahead is significant, but inaction is not an option.

To effectively address misinformation, resilient health systems need to build capacity in new areas. Infrastructure, tools and skills must be developed to support social listening. This will deepen understanding and empower engagement.



Local actors play a role in mitigating the impact of disinformation and misinformation.

Strong, robust social mobilisation and community engagement for vaccine promotion will contribute to building public trust. Together, skilled individuals, motivated organizations and modern tools can mitigate the risks of rumours and negative information about vaccines.

APPENDIX 1: CASE STUDIES

Case Study I: Polio in Pakistan: Fake videos fuel mistrust

In April 2019, videos of unconscious children lying motionless on hospital beds began circulating in Pakistan. The clip features a man claiming that the boys began sick after receiving the polio vaccine, adding that unnamed authorities would ‘take us away’ if they refuse to administer the vaccine.

The videos spread like wildfire, prompting 25,000 children to be taken to hospital in the city of Peshawar for fear that they were at risk due to vaccines they had received. By the end of the week, the number of hospitalisations linked to the videos was estimated to be 45,000[108]. A mob of 500 people set fire to a clinic in Peshawar, leading to the death of two police offers and a health worker. Five days after the misinformation outbreak, authorities suspended anti-polio campaigns leading two million children to miss out on immunization.

The video was a deliberate attempt to undermine polio eradication efforts in one of two countries where the diseases are still endemic. Polio vaccination has been the target of rumours and misinformation for decades. Conspiracy theories have included false claims of a western plot to sterilise Muslim women and inaccurate reports that vaccines contain ingredients forbidden by Islam.

A study by First Draft[109] revealed that the staged scenes gained more than 24,000 interactions on Twitter within 24 hours, with their impact further amplified by Facebook and WhatsApp. Some professional media and political organizations shared the videos with ineffective caveats and disclaimers, fuelling their spread rather than effectively blunting their impact.

The experience illustrated the power of visual communication in spreading emotional disinformation on social media platforms. Social media companies have stepped up their efforts to limit the spread of dangerous misinformation and to direct users to reliable sources of information when they use vaccine keywords in their searches. By improving their capacity to identify and address rumours, authorities can seek to slow or stop the spread of disinformation before it derails immunization efforts.

Case Study II: Dengue in the Philippines: How vaccine controversy spreads

In 2016, the Philippines became the first country to launch a nationwide vaccination campaign against dengue fever – a disease which is endemic in the region and puts a significant burden on public health and the health system. Two years later the campaign was suspended, controversy swirled online, and trust in all vaccines was strained[110].

The problem with the misinformation circulating about the safety of the dengue vaccine was that it grew from a grain of truth. A review by the vaccine's manufacturer in late 2017 pointed to rare cases where the vaccine could increase the risk of severe dengue illness. People who had not had the disease prior to being vaccinated were at risk of hospitalization and, potentially, death if there were subsequently infected by one of the four strains of the virus the causes dengue fever.

The government shut down the vaccination programme which had been introduced by their predecessors, sparking a deluge of online conspiracies under the hashtag #denggate. Politicization of a scientific issue, coupled with a lack of clear medical consensus left an opening for anti-vaccine voices, amplifying the concerns of parents. A deep decline in public trust in immunization followed: confidence in vaccine safety fell from 82 percent in 2015 to 21 percent in 2018[111].

The dengue vaccine controversy has been blamed for the decline of vaccine coverage and subsequent cases of polio[112] and measles[113]. It is a stark reminder of how quickly anti-vaccine ideas can take hold, particularly in the absence of clear and consistent messaging from medical and political leaders. It also illustrates the extent to which controversy in one vaccine immunization program can pollute public perceptions of other vaccines.

Case Study III: HPV in Malawi: Crisis preparedness ahead of vaccine rollout

The Human Papilloma Virus (HPV) vaccine is used in more than 100 countries where it is successfully reducing infections with a cancer-causing virus[114,115] . Along with screening and treatment, HPV vaccines are part of a strategy that could ultimately eliminate cervical cancer[116,117] . Despite its potential, the HPV vaccine has been beset by false rumours which have damaged vaccine programmes in Japan[118], Denmark[119] and Ireland[120].

A HPV Vaccine Crisis Communication Plan[121] was central to preparations for the vaccine's introduction in Malawi in 2018. The plan aimed to rapidly contain or limit the negative effectives of misinformation, rumours and misperceptions arising from incidences of adverse events following immunization (AEFI), whether real or perceived. It was designed to build, retain or restore trust and confidence in the vaccine and the vaccine delivery system.

Key components of the crisis preparedness and response plan:

- Systematically tracking rumours, misconceptions, and AEFIs at the field level
- Orienting all District Health Officers, PROs, and designated Spokespersons on the basics of assessing rumours and AEFIs, to respond effectively to any crisis
- Engaging with and sensitizing media-persons and broadcasters, at national and sub-national levels, prior to the launch of the HPV vaccine introduction
- Training all teachers and frontline health workers on the basic management of rumours, misperceptions, and AEFIs
- Using innovative SMS and WhatsApp-based platforms (e.g. the UNICEF RapidPro based U-Report system) for opinion polling, analysing perceptions, messaging, tracking rumours, and monitoring communication interventions

This exemplary approach draws on a range of existing tools and positions health authorities to swiftly identify and address misinformation.

APPENDIX 2: SETTING UP BASIC SOCIAL LISTENING SYSTEMS

Choosing keywords, building Boolean search queries

Search engines can play a central role in searching for information and news, as well as in rumour verification. Google accounts for approximately 90% of online searches worldwide. Like other search tools, including Yahoo, Bing, Baidu, Yandex, DuckDuckGo and others, Google uses Boolean logic. This is a mathematical expression of what you are looking for. For example, when you search for a combination of keywords such as “coronavirus vaccine”, Google retrieves content that has “coronavirus” OR “vaccine”. If the term is in quotation marks, only results with the exact phrase will be returned i.e. articles, images and videos with “coronavirus” AND “vaccine”.

Automatic News Alerts

Setting up Google Alerts for relevant keywords triggers alerts for specific keywords or combinations of keywords. Alerts can be further configured by language and region, providing a simple and easy way to monitoring online content. More complex requests combine keywords in ways that deliver alerts on a wide range of relevant topics.

EXAMPLE SEARCH STRING FOR VACCINATION

(“vaccin” OR “vaccination” OR “vaccinations” OR “vaccine” OR “vaccines” OR “vaccinated” OR “vaccinate” OR “immunization” OR “immunizations” OR “immunize” OR “immunisation” OR “immunisations” OR “immunise” OR “informed choice” OR “medical freedom” OR “vaxxers” OR “antivax” OR “antivaxx” OR “antivaxers” OR “anti-vax” “anti-vaxers” OR antivaccination OR anti-vaxx)*

How to set up an RSS feed

RSS feeds are an alternative way to collect and group content on topics of interest[122]. RSS stands for Really Simple Syndication and is a way of monitoring multiple websites in one aggregated feed. There are a number of RSS readers, such as Feedly. Once you set up an account you can add new content by topic, website or RSS feed, creating lists of interesting websites or blogs in a similar way to Twitter or CrowdTangle lists. Once added, new posts will appear. It’s really easy to use the interface to monitor the output once or twice a day to see new article.

Monitoring Web Search Activity

Google trends. Tracks the volume of searches for certain keywords on several channels including general web, Image search, New search and YouTube. It can compare results for different key words (up to 15). Results can be filtered by time, geography or even related queries. Can help in signal detection and tracking of shifts in conversations.

Platform Analytics

For a full guide to monitoring of different platforms see this guide by First Draft.

Twitter. One of the easiest platforms to monitor, but be sure that the relevant conversations are happening here. Often used to identify break news. Twitter has an advanced search option which gives an easy interface to mak e very specific queries, like only searching for tweets from or to specific accounts, during certain time periods, or containing particular types of content, like videos or links.

One of the easiest and most effective ways of navigating Twitter is with TweetDeck, a free and easy-to-use dashboard owned by Twitter. With TweetDeck, you can display an unlimited number of columns containing tweets from Twitter lists, search strings and specific accounts or activity all side-by- side, updating in real-time.

Facebook and Instagram. Facebook's native search includes a host of filters, including the ability to search for public posts in public Groups and Pages, for example. You can also search by date and by tagged location, as well as by media type, such as videos, photos or livestreams. The best tool for monitoring lists of Facebook and Instagram accounts is CrowdTangle, a platform owned by Facebook. Permission may need to be obtained to use this tool (journalists can request access for example).

WhatsApp. Closed groups, messaging groups and online ads can pose particular challenges when tracking the spread of information. They are often overlooked because they are not amenable to monitoring via search engines, RSS feeds or built-in analytics tools[123]. Nonetheless, they can be influential. WhatsApp is the most popular messaging app globally and its group chat function is well suited to amplifying the impact of information. One of the simplest ways of monitoring and researching WhatsApp for specific information is by establishing a tip line for particular topics so that people can submit misinformation that they come across.

Social Media Monitoring

In addition to the paid social media monitoring services, there are some free tools available.

Agora Pulse: synchronises your social media accounts around the clock, offers unlimited reports and graphics of performance analytics, retains all your account data, compares your page with others on key metrics.

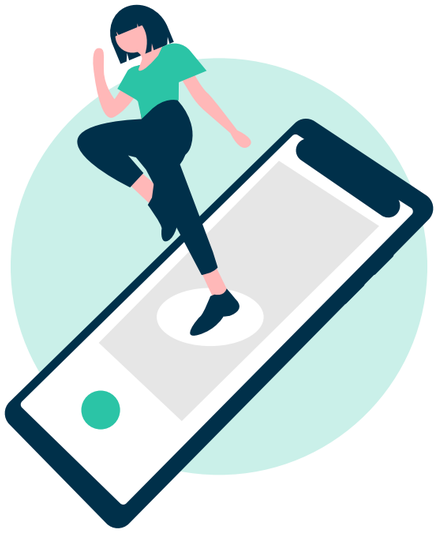
Hootsuite: a social media listening tool with specific search terms in real- time. Can be used to monitor mentions of your brand, products, or relevant keywords you are interested in. Also handy to track all of your social media accounts in one dashboard.

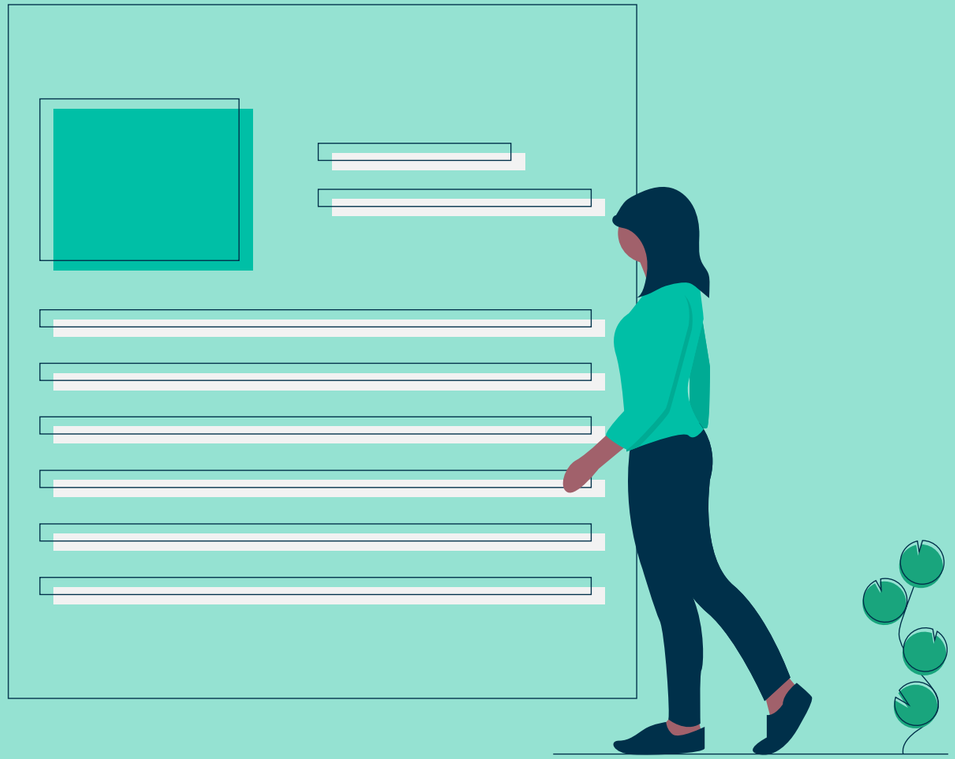
Iconosquare: allows effective management of conversations and your social media accounts. Also facilitates communication planning.

Sprout Social: a popular and user-friendly social media management software – contains tools such as social performance reporting, advanced social analytics, social monitoring and listening tools, and advanced social listening (at the moment does not include visual networks such as YouTube).

Offline Sources of Insights

Social listening should incorporate offline sources of insights as well. For example, many mechanisms exist for collection of community feedback, and some news sources are not online.





APPENDIX 3: FIVE TIPS TO MAKE YOUR CONTENT STICKIER THAN DISINFORMATION

Evidence suggests that anti-vaccine messages are 'stickier', i.e. grab attention and stick in the memory, than pro-vaccine messages[124]. Anti-vaccine websites and social media accounts use persuasive techniques that tap into parents' values and lifestyles; they tend to be more emotionally resonant, salient and visual[125] than official communications[126]. Here are 5 tips for making vaccine-promoting content stickier than misinformation. Combining these tips may help optimise the impact of pro-vaccine and inoculating content[83].

1. Capture Attention

We are more likely to do something that our attention is drawn towards.

Visuals. A picture is worth a thousand words. Visuals can attract attention, facilitate information processing and retention, and help people understand numbers and risks. Plus, they can simplify information processing.

Emotion. Elicit an emotional reaction. Create designs that stand out and remain memorable by appealing to our emotions—with surprise, curiosity, or urgency. Beware however of fear appeals, which may backfire[127].

Personalise. Show personalized content. People respond strongly to messaging that is customized and relevant based on their behaviors, interests, and values.

2. Easy = True

Keep it clear. Information is more likely to stick the more easily it can be processed and the more familiar it feels. Or, when a communication is easy to read and understand, it seems more familiar, and familiar feels true[128]. Provide clear, straightforward content, that is easy to understand and easy to remember. Eliminate jargon, keep language simple, present the key message early, use simple fonts and high contrast colours.

Repeat. Repeating (positive!) messages increases cognitive fluency. Words seen before become easier to see again. In contrast, if someone strains to understand they are more likely to be vigilant and suspicious[129].

3. Be Credible

The information needs to be credible (peer-reviewed scientific research), relevant to target audience, and the source or communicator also needs to be credible (trustworthiness more important than expertise). Anything and anyone that helps to build trust with the audience will help unstick misinformation, especially with vaccines[130].

4. Motivate

Consider communicating vaccination as an aspiration, not an act. If you are communicating to increase vaccine acceptance, then using pictures of distressed, crying children receiving vaccines may make most viewers more reactive - and less receptive - to any new information[131,132,133]. Up to one-quarter of all adults may have a fear of needles, with most fears developing in childhood. About 10% of people may actually avoid vaccination because of needle fears. Vaccines help ensure people grow up and grow old in good health, safe from many infectious diseases. Consider putting vaccination in a 'gain frame'. Show happy, healthy, productive people in graphics, and if you must show the act of vaccination try to avoid needles and tears.

Social norms. Social norms offer implicit guides for our behaviour. Explaining that the majority of people adopt a certain behaviour (descriptive norm), and that it is what others expect you to do to achieve a common good (injunctive norm) may increase the chance that people will adopt that behaviour[134].

Self efficacy. Give people a way of coping with a threat. People will make a parallel appraisal of a threat (eg, risk of catching an infectious disease) and their ability to cope with that threat (a solution that they are able to effect)[89,135].

5. Tell Stories

We understand our world through stories as much as facts. Use narratives to engage your audience[136]. An analysis of content on a European pro-vaccine online hub found parental stories were consistently the most accessed kind of content[137].

APPENDIX 4: EXAMPLES OF INOCULATING MESSAGES

An inoculating message (debunking or prebunking) should contain several key elements. First, it should provide a "replacement fact", an alternative explanation that fills the causal gap left by the corrected misinformation. This can come first, last, or can bookend the message. Second, it should mention the myth, but in a weakened form, which can be a warning that a myth is coming. Third, it should explain why the misinformation is wrong (fallacy). Often this takes the form of explaining the misleading tactics used by the misinformation to distort the facts, or the hidden agenda of the misinformation authors.

Example 1. Debunking the "HPV vaccine causes injury" myth

FACT
Large scale studies find no link between the HPV vaccine and auto-immune symptoms. All the scientific evidence tells us HPV vaccines are safe and effective.

MYTH
One common vaccine myth is that they cause negative health impacts. The evidence cited is often specific examples where a child received a vaccination then suffered adverse health impacts afterwards.

FALLACY
Anecdotes like this mistake correlation for causation. Just because a vaccination and an injury happen close to each other doesn't mean one causes the other. This logic is the same as thinking that wearing lucky colours at a sports game led to your team winning.

This argument also employs anecdotal thinking, relying on isolated examples rather scientific evidence. While stories can be persuasive, they can also mislead if a single experience is not representative of the general populace.

FACT
This is why scientists look at large samples rather than single cases before coming to conclusions.

Example 2. Debunking the “MMR Causes Autism” Myth

FACT

A huge study of over 500,000 Danish children found that unvaccinated children were just as likely to develop autism as vaccinated children.

MYTH

One common vaccine myth is that vaccines can cause negative health impacts. The evidence cited is often specific examples where a child received a vaccination then suffered adverse health impacts just afterwards.

FALLACY

Some people believe that vaccines can cause unrelated diseases that usually appear around the same time that we give children vaccines. They mistake correlation for causation.

For example, if children who receive a teddy bear and children who receive a vaccine both have their teeth fall out, it doesn’t mean that either receiving a teddy bear or receiving a vaccine caused this to happen – it’s just a coincidence.

Also, this concern began with a study led by an English doctor which was retracted because he was found to have lied about the findings, creating an elaborate fraud. He subsequently lost his medical license for acting dishonestly, unethically, and with “callous regard” for the children, and was shown to have major undisclosed financial conflicts of interest[138].

FACT

We still don’t know exactly what causes autism, but over 10 high-quality studies show that it is not caused by vaccines. The observed rise in autism rates is mostly due to broadened diagnostic criteria and heightened awareness of the condition[139].

Example 3. Debunking the “Polio campaign is actually a covert way of testing COVID-19 vaccines” Myth

FACT

Polio is still a risk for children in [country/community], and there is no cure for this disease. Polio drops are the safest, most effective way to protect children from polio. Continuous protection is needed to keep your child safe from polio.

MYTH

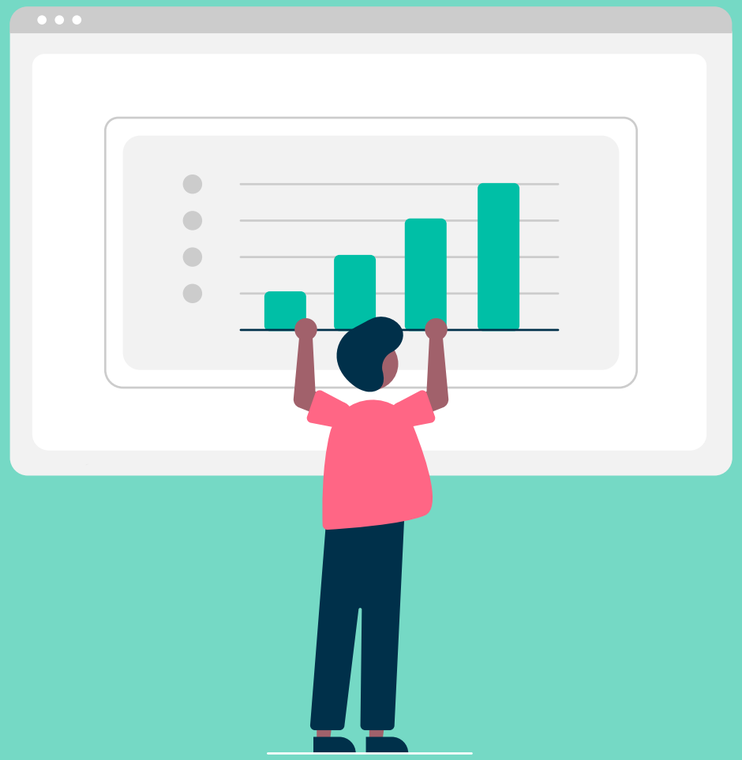
A rumor that is circulating at the moment suggests that this campaign is giving something other than polio drops to children.

FALLACY

During the COVID-19 pandemic there have been many different conspiracy theories circulating. These are often created by people who want to attract attention and traffic to their online businesses to make money. There are specific traits of conspiratorial thinking that are red flags of potential misinformation, such as overriding suspicion of institutions and attributing nefarious intent to benign programs.

FACT

Polio is a real, very dangerous, and highly infectious virus. Millions of doses of polio drops have been administered throughout the world and there are millions of children who are walking and playing and dancing because they did not catch polio. This type of polio drop has been tested in clinical trials, and is proven to safely prevent children from getting polio.



APPENDIX 5: EXAMPLE PERFORMANCE METRICS AND OUTCOME METRICS

INDICATOR	PERFORMANCE	OUTCOME
NUMBER OF MISINFORMATION ARTICLES/MESSAGES *(how many identified, by source/channel)*	X	
IMPRESSIONS *(number of views of content)*	X	
PAGE VIEWS *(of websites/webpages)*	X	
REACH *(number of people who viewed content)*	X	
FREQUENCY *(number of times people saw content, and/or number of times content was posted or shared)*	X	
ORGANIZATIONS, LEADERS, INFLUENCERS RECRUITED TO DISSEMINATE MESSAGES	X	
INOCULATION OR COUNTER MESSAGES CREATED	X	
MISINFORMATION IDENTIFIED AND LOGGED	X	
TRAINING AND TECHNICAL ASSISTANCE PROVIDED	X	
MISINFORMATION AWARENESS *(recall/exposure to misinformation)*		X
BELIEF IN MISINFORMATION *(trust in sources of misinformation, and misinformation messages)*		X
CAMPAIGN AWARENESS *(recall of inoculation and/or counter messages)*		X
RELEVANCE AND CREDIBILITY OF CAMPAIGN MESSAGES *(receptivity of target audiences to messages)*		X
KNOWLEDGE OF FACTS AND RESOURCES *(awareness of local resources, knowledge of priority vaccination facts)*		X
INTENT TO VACCINATE *(self-reported intent to vaccinate self or children)*		X
ATTITUDE TOWARD AUTHORITIES *(trust in health authorities and institutions)*		X
VACCINE HESITANCY *(validated measures of hesitancy)*		X
VACCINATION COVERAGE *(proportion of priority populations vaccinated)*		X

APPENDIX 6: INTERVENTIONS TO BUILD IMMUNITY TO MISINFORMATION

Here are some trainings, games and curricula that may increase community immunity to misinformation.

Media and Health Literacy

Protection from Deception[140] is a free two-week text message course from First Draft that teaches people to how to protect themselves and their community from misinformation. Currently in English and Spanish. A second course, Too Much Information, is available online[141].

Informed Health Choices Effective learning resources to enable primary students to think critically about health claims & make informed choices. Efficacy shown in randomised trial in Uganda[142]. Podcast for adults.

Kids Boost Immunity[143] – Over 60 lessons and quizzes developed by teachers and health professionals to engage digital-age students in grades 4-12. Free for teachers. Currently in Canada, Scotland and Ireland (in English and French) but could be adapted to other countries.

UN Verified initiative has developed the **"Pause. Take care before you share"** campaign[144] which encourages people to stop and verify sources before deciding whether to share any content online. In multiple languages.

Inoculation

Bad News – Online game which inoculates players against fake news across different cultures by focusing on misinformation techniques (prebunking)[145,146] . Users experience life as a fake news creator.

Go Viral is based on Bad News but focuses on coronavirus misinformation.

Cranky Uncle – A game which uses cartoons, humor, and critical thinking to expose the misleading techniques of science denial and build public resilience against misinformation.

Catching conspiracies – Short guide on how to spot COVID conspiracy theories.

For Journalists

First Draft reporter's Toolkit

FACT and FIT Initiative – Combating medical misinformation in India through fostering News and information accuracy and credibility

World Federation Science Journalists (WFSJ) Lab - Course in science journalism

Google News Initiative -Journalist Training that shows the best ways to use Google tools for reporting and storytelling.

UNESCO - Journalism, 'Fake News' and Disinformation: A Handbook for Journalism Education and Training

International Center for Journalists - Resources for Journalists. Make it easy for journalists to find experts on vaccination. For example, **Scholars Strategy Network & the Council for the Advancement of Science Writing** have compiled lists of top experts & scholars who are available for comment on the COVID-19 pandemic

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ACCEPTANCE AND UPTAKE OF COVID-19 VACCINES

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15 October 2020

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CONTENTS

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1. BACKGROUND

On 15 October 2020, the WHO Technical Advisory Group (TAG) on Behavioural Insights and Sciences for Health held a special meeting with the WHO Department of Immunization, Vaccines and Biologicals to discuss behavioural considerations in relation to COVID-19 vaccine acceptance and uptake. The discussion focused on a series of key questions around achieving high and equitable uptake of vaccines through evidence-based and behaviourally informed strategies.

This meeting report is the product of the discussion held by WHO TAG members during the meeting. It covers only the topics that were addressed at the meeting. Following the meeting, the considerations and recommendations made by the members were refined through an iterative process that involved drafting by a core group, literature review and rounds of feedback from all the members. The considerations made by the TAG members during the meeting that were not supported by published evidence were removed with the consensus of the members. The review process was finalized on 15 November 2020.

The TAG members serve in their personal capacity and have completed a declaration of interest form that was subject to evaluation and approval prior to their nomination in July 2020.

This meeting report represents exclusively the views and opinions of the TAG members and does not represent the decisions or policies of WHO.

2. INTRODUCTION

In recent years, there has been a great deal of research on vaccination uptake and its behavioural drivers. While the evidence is still evolving, these efforts have resulted in a better understanding of the barriers and enablers to vaccination – especially, but not only, for child vaccination. Research efforts have also generated potentially effective strategies to improve vaccine acceptance and uptake, which go beyond traditional information campaigns aspiring to change behaviours by improving knowledge. Information on its own has shown a limited impact on facilitating vaccination uptake,

but adding other strategies – such as reducing barriers *(1)*, using reminders *(2)* and planning prompts *(3)*, and training and building confidence in health workers *(4, 5)* – has been shown to be effective.

While evidence on promoting vaccination in general is useful in the context of the current pandemic, the acceptance and uptake of COVID-19 vaccines present an unprecedented challenge. In addition to the sheer magnitude of the coming vaccination effort, the vaccines will be new and are likely to be only partially effective for a yet unknown period of time. There may be so-called adverse events rightly or incorrectly attributed to the new vaccines, and countries will set different safety thresholds before offering the vaccines to their populations. Given the limited supply in the short to medium term, vaccines are likely to be prioritized for health workers at high risk of acquiring or transmitting infection and older adults based on the framework developed by the WHO Strategic Advisory Group of Experts on Immunization *(6)*. Eventually vaccination efforts will expand to target diverse populations not typically reached with immunization programmes, both across and within countries. This will require targeted and tailored strategies, as well as management of expectations.

While the behavioural goal is uptake of COVID-19 vaccine by the general population, achieving that goal will depend on the behaviours of other "actors" in the system – those offering the vaccination, those planning how and where to offer the vaccination, and those tasked with maximizing uptake using strategies such as persuasion and the use of trusted endorsers (or "validators").

To achieve high and equitable vaccine uptake, the use of existing scientific knowledge is essential, as is acquisition of new information, and learning in real time about what works and what does not. Learning can be increased by engaging with target populations in local communities to listen and respond to their perspectives, concerns and expectations in relation to vaccination *(7)*. These efforts can play a role in building the trust of the community in health systems, and in informing the design and delivery of policies and services that are responsive and respectful to local needs.

Behavioural research identifies three categories of drivers of vaccine uptake, in addition to people having the necessary knowledge: 1) an enabling environment; 2) social influences; and 3) motivation. The three drivers interact and overlap, depending on contexts; however, for the purpose of understanding the problem and identifying strategies, it is helpful to keep the categories separate. An appreciation of each driver leads to its own set of insights and interventions, or mix of interventions, which will often vary across communities.

3. DRIVERS OF VACCINE UPTAKE

3.1 AN ENABLING ENVIRONMENT

Multiple groups influence uptake of vaccination, including political decision-makers, immunization programme managers, community and religious leaders, health workers, civil society organizations, media outlets and digital platforms *(1)*. These actors can facilitate or discourage vaccination by creating more or less enabling environments. It is, therefore, important to consider how the behaviours of actors in the system (for example, those responsible for planning locations offering vaccination or setting clinic opening times) might influence the behaviours of the general population.

Evidence has shown that reducing barriers and making it easy to get vaccinated will increase vaccine uptake, especially for the large proportion of people who are not deliberately avoiding vaccination *(8)*. What might seem to be reluctance or resistance, or even opposition, might actually be a response to the burdens or inconvenience of getting vaccinated.

Environmental factors might involve:

- **Location:** Is the vaccination being given in a close by, convenient place?
- **Cost:** Are any costs involved (for the vaccine itself, travelling, or opportunity costs of missing work), either monetary or non-monetary?
- **Time:** Is it time-consuming to be vaccinated? Is booking easy and accessible? Are vaccines delivered at a time of day that is convenient?
- **The quality of the experience of being vaccinated:** Do people feel that they are treated with kindness, understanding and respect? Are health workers well informed and able to answer questions about COVID-19 and vaccination?
- **Information:** Have people been given timely, easy to understand and relevant information about what they are supposed to do, how they are supposed to do it, and how they might benefit? Are the benefits and side-effects of the vaccine explained in plain terms?
- **The default:** Is the default in workplaces to vaccinate all employees, with provision for those who do not want to be vaccinated to opt out? Do health care providers present the opportunity to be vaccinated as the default option?
- **Health regulations or mandates:** Is vaccination mandatory to engage in certain activities, such as employment, education, travelling abroad or enrolling in day care?

In light of these factors, there are several ways to create enabling environments for encouraging widespread vaccination. Strategies include removing barriers in the environment and designing services and policies to support people's intended behaviours and circumstances. For instance, if the default in schools is to vaccinate all students, with the provision of allowing those who object to opt out, then vaccination rates will likely be higher than if the default is to provide vaccination only to those who opt in *(9)*. Making vaccines easily accessible in safe, familiar and convenient locations, such as "drop-in" clinics that are near where people often go, can also encourage uptake *(10)*. In the current pandemic where people have indicated concerns about seeking health services due to fear of contracting COVID-19 in health facilities *(11)*, ensuring that proper safety measures are visibly in place can encourage vaccination. Such measures include facilitating hand hygiene, physical distancing and mask wearing, ensuring rooms are properly ventilated and preventing crowds *(12)*.

An enabling environment is necessary and likely to increase acceptance and uptake of vaccination, but it is unlikely to be sufficient on its own. It should be accompanied by targeted, credible and clear communication from trusted sources demonstrating that getting vaccinated is important, beneficial, easy, quick and affordable. Of course, how easy, quick and affordable it is will vary from place to place, and health systems must be prepared to reduce barriers to supply, service delivery and quality of services, in addition to ensuring that health care and community workers are well trained and well supported *(13)*. Guidance, training, and other tools to support health systems prepare for the introduction of COVID-19 vaccines are currently being developed and made available for adaptation by countries *(14)*.

3.2 SOCIAL INFLUENCES

Sometimes, barriers to vaccine acceptance and uptake are the product of unfavourable social influences and/or insufficiently favourable ones. Such influences can include beliefs about what others in one's social group do, or what they approve and disapprove of ("social norms") *(15)*. For example, if most people in a community are wary of vaccination and believe that the vaccine does not work or that the side-effects will be very bad, they will give a negative signal to others who might otherwise be in favour of, or neutral towards, vaccination *(16)*. On the other hand, if most people in a community support vaccination, they will give a positive signal to others who might otherwise be reluctant to get vaccinated.

Predominant narratives in the media can also skew people's perception of what the majority believe and do *(17)*. For example, anti-vaccine sentiments expressed by relatively small but vocal groups may be promoted, so that they are erroneously seen as capturing a widespread or even majority view. During a pandemic in which people may be confined to their homes, perceptions of other people's behaviours (regarding, for example, mask wearing and physical distancing) are more likely to be inferred from mainstream

and social media and via information online, and less likely to result from direct interactions *(18)*. It is essential to educate the media on the importance of providing context when reporting on anti-vaccine sentiment, to make sure that people do not form an erroneous impression that this is the dominant viewpoint.

Vaccination decision-making is also influenced by people's social networks, which include family members, friends, health professionals and others with whom they interact, as well as the sources of information they consult. The likelihood of vaccine uptake was found to be reduced when a large proportion of people in one's social network did not recommend vaccination *(19)*. On the other hand, encouragement and social pressure from people that an individual respects and trusts have been found to increase vaccine uptake *(20)*. A willingness to get vaccinated, or an unwillingness to do so, can spread through a social cascade as one group of individuals influences another, and then the two influence a third, and so on. Targeting people who are centrally located in the network, such as health professionals who have more opportunities to influence vaccination behaviour, can lead to greater impact of behaviour change efforts *(21)*.

Social influences can be used to promote favourable behaviours of both health professionals and the general population. Five strategies to harness social influences are outlined below.

- **Making social norms in favour of vaccination more salient:** If the majority of people are getting vaccinated, or intend to get vaccinated, that fact can be publicized to good effect. Communication efforts to promote the perception that "most people are getting vaccinated" – if credible and true – are likely to increase vaccination acceptance *(22)*. Making vaccine uptake "visible" to others, through clinics in prominent public places or by enabling ways for people to signal that they have received the vaccine, either on social media, in news media or in person, can contribute to making the social norm more salient *(23)*.

- **Highlighting new and emerging norms in favour of vaccination:** If people learn that others are "increasingly" engaging in certain behaviours, they may be more likely to do so as well *(24)*. Communication efforts to highlight the development of new norms are especially relevant given that the COVID-19 vaccine will be targeting new groups where vaccination may not be the common or the expected behaviour.

- **Leveraging the role of health professionals:** Early priority groups for COVID-19 vaccines include health professionals, who are often the most trusted source of advice on vaccination *(25)*. Studies have shown that health professionals are more likely to recommend vaccination if they themselves have been vaccinated *(26)*. Hence, targeting efforts to facilitate the vaccination of health professionals can in turn lead to greater acceptance and uptake by the general population. These efforts can include improving health professionals' knowledge about the vaccine and increasing their co-workers' support for the vaccine *(26)*.

- **Supporting health professionals to promote vaccination:** Health professionals, including those who are already champions of vaccination, can be equipped with tools to effectively guide communication to encourage people to get vaccinated against COVID-19 *(27)*. Conversations guided by motivational interviewing, a collaborative method of interaction aimed at exploring people's real reasons for hesitancy and strengthening their own motivation for change, can facilitate vaccination *(5)*. Recommendations from providers have also been shown to be more effective when the opportunity to get vaccinated is presented as an expectation (the default) rather than an option – i.e., presuming that people will want vaccination *(28)*.
- **Amplifying endorsements from trusted community members:** An important role can be played by members of the community who are well respected, and who can connect with the group's identity and self-understanding. If endorsers share similar values and characteristics with the relevant group (such as religious or ethnic identity), they are more likely to be influential *(29)*. Endorsement of a COVID-19 vaccine by prominent scientists has also been found to increase trust in the vaccine *(30)*.

3.3 MOTIVATION

Motivation to get vaccinated is usually the result of a combination of factors, such as perceived risk and severity of infection *(31)*, confidence in vaccines *(32)*, values and emotions *(33)*. While motivation to get vaccinated can also be influenced by environmental and social contexts, the focus of this section is on motivational factors themselves.

If people perceive that they are at low risk of contracting COVID-19, or that the consequences of becoming infected will not be severe, they will be less willing to get vaccinated *(34)*. Some people may try to compare the risk of getting infected with that of taking a new vaccine, and determine that between the two, the risk of COVID-19 is lower *(32)*. As it is difficult for most people to understand and assess risks, these risk perceptions are often formed using mental shortcuts *(35)*. For instance, people often judge the likelihood of events by how readily they come to mind ("availability heuristic") *(36)*. As a result, they may downplay some risks (e.g. the likelihood and consequences of getting infected), while exaggerating others (e.g. the likelihood of adverse events following vaccination) based on personal experience or rumours.

Judging events or situations to be risky can also lead to fear, worry and anticipated regret, all of which have been shown to be associated with the intention to accept the offer of vaccination *(20, 37)*. Among these, anticipated regret – when people expect that an unpleasant future outcome would lead them to wish they had made a different decision – shows promise as predictor of intentions and behaviour *(31)*. How anticipated regret is used will determine the direction of its effect: anticipated regret for *inaction* (i.e., not having a vaccination and getting infected and/or infecting loved ones) has

been shown to be associated with a *greater* likelihood of vaccination, and anticipated regret for *action* (i.e., having a vaccination and suffering side-effects) has been shown to be associated with a *lower* likelihood of vaccination *(38, 39)*.

Low levels of vaccine acceptance can follow from low confidence in vaccines, as a result of, for example, the belief that the vaccine will not be effective or that the potential side effects will be severe *(40, 41)*. These concerns may be heightened in the current pandemic, where accelerated timelines may give people the impression that the vaccine was rushed and not tested thoroughly *(42)*. People may also have low confidence in the system that delivers vaccines, including the competence of health workers and motives of other actors *(43, 44)*. For example, confidence may be lowered by scepticism about the profit motives of pharmaceutical companies or the politicization of vaccination *(45)*. In the rapidly evolving situation with multiple uncertainties about COVID-19 vaccines, there is also danger of incorrect information filling the knowledge gap *(46)*. With the overabundance of information circulating around COVID-19 – also known as the "infodemic" – people are inevitably exposed to misinformation, rumours and false conspiracy theories, which may erode their confidence in vaccination. Developing trusted sources, fact-checking and responding to misinformation through dedicated dashboards are some of the strategies suggested to manage infodemics *(47)*.

Vaccine acceptance and uptake may also be undermined by COVID-19 vaccines being not fully effective, meaning that people will have to continue to engage in preventive behaviour (e.g. mask-wearing and physical distancing) even if and after they have been vaccinated. It will be important to manage expectations and ensure that those who have been vaccinated do not stop adhering to protective behaviours and expose themselves and others to risk *(48)*.

As shown above, there are individual and group differences: some may be hesitant toward vaccination due to beliefs that they have a low risk of infection, others may have concerns about the safety of vaccines, while others may be hesitant because of religious values or lack of trust in the health system *(25, 49)*. Engaging in dialogue with communities from the very beginning to understand their different motivations can be a good starting point for designing strategies to tackle specific barriers. Lessons learned from other outbreaks (e.g. Ebola) also highlight the need to actively monitor changes in community sentiments and needs through regular feedback mechanisms and to adapt strategies accordingly *(29)*.

Below are some strategies to tackle motivational barriers to vaccine acceptance and uptake.

- **Building timely trust in vaccines:** Evidence suggests that strategies which aim to change people's thoughts and feelings towards vaccination have not always been successful in increasing uptake *(1)*. It is therefore important to focus on building trust in COVID-19 vaccines *before* people form an opinion against them. This should involve using trusted messengers to help navigate the COVID-19 information landscape and building confidence in the vaccine development process through transparency and managing expectations. Adverse events are often inevitable when large numbers of people get vaccinated in a short period of time, and communities should be engaged early on to listen to concerns, respond to questions and address misinformation *(29)*. Experience suggests that widely rolling out a vaccine followed by announcements of adverse risks can lead to long-lasting damage in confidence in the vaccine *(46)*. Communicating consistently, transparently, empathetically and proactively about uncertainty, risks and vaccine availability will contribute to building trust.

- **Leveraging anticipated regret in communications:** Anticipated regret has been shown to be a strong predictor of vaccination, and there is potential promise in evoking it to encourage vaccination *(39)*. For example, highlighting the consequences of inaction (i.e., by asking people how they would feel if they do not get vaccinated and end up contracting COVID-19 or transmitting it to loved ones) during consultations with health professionals may encourage vaccination.

- **Emphasizing the social benefits of vaccination:** Vaccination not only benefits individuals who receive the vaccine, but also protects others in the community – family members and friends, and eventually the whole of society through "population immunity" if there is a high level of uptake. Communicating the social benefits of vaccination has been found to increase vaccination intention, particularly when the risk associated with vaccination is low and getting vaccinated involves little effort *(50)*. In the specific context of COVID-19, where there can be prolonged duration of illness, putting emphasis on the economic benefits, such as being able to stay in the workforce and provide for one's family, might also encourage vaccination.

4. CONCLUSION

Behavioural research has shown that vaccine acceptance and uptake can be increased by adopting the three strategies below.

- **Creating an enabling environment –** making vaccination easy, quick and affordable, in all relevant respects.
- **Harnessing social influences –** especially from people who are particularly trusted by and identified with members of relevant communities.
- **Increasing motivation –** through open and transparent dialogue and communication about uncertainty and risks, including around the safety and benefits of vaccination.

A common theme is engagement with local communities in developing and implementing tailored strategies to support vaccination uptake. Working in partnership with communities, building trust and ensuring that messages come from trusted endorsers are key to successful strategies. As local circumstances change over time, drivers of people's behaviour will shift as well; it is important to monitor and respond to these changes in as timely a manner as possible.

It is essential to consider local contexts when judging the relevance of research findings. While this report has sought to extract evidence-based principles that can be considered relevant across a wide range of populations and settings, the evidence available is overrepresented from high-income countries; these behavioural considerations should be further researched locally, including in underrepresented low- and middle-income settings, to inform targeted and context-specific interventions.

New evidence relevant to increasing COVID-19 vaccine acceptance and uptake will emerge over time, which means that obtaining and using up-to-date evidence is critical. This report is designed to provide a framework within which to consider new knowledge as it emerges and to help to shape forthcoming policies.

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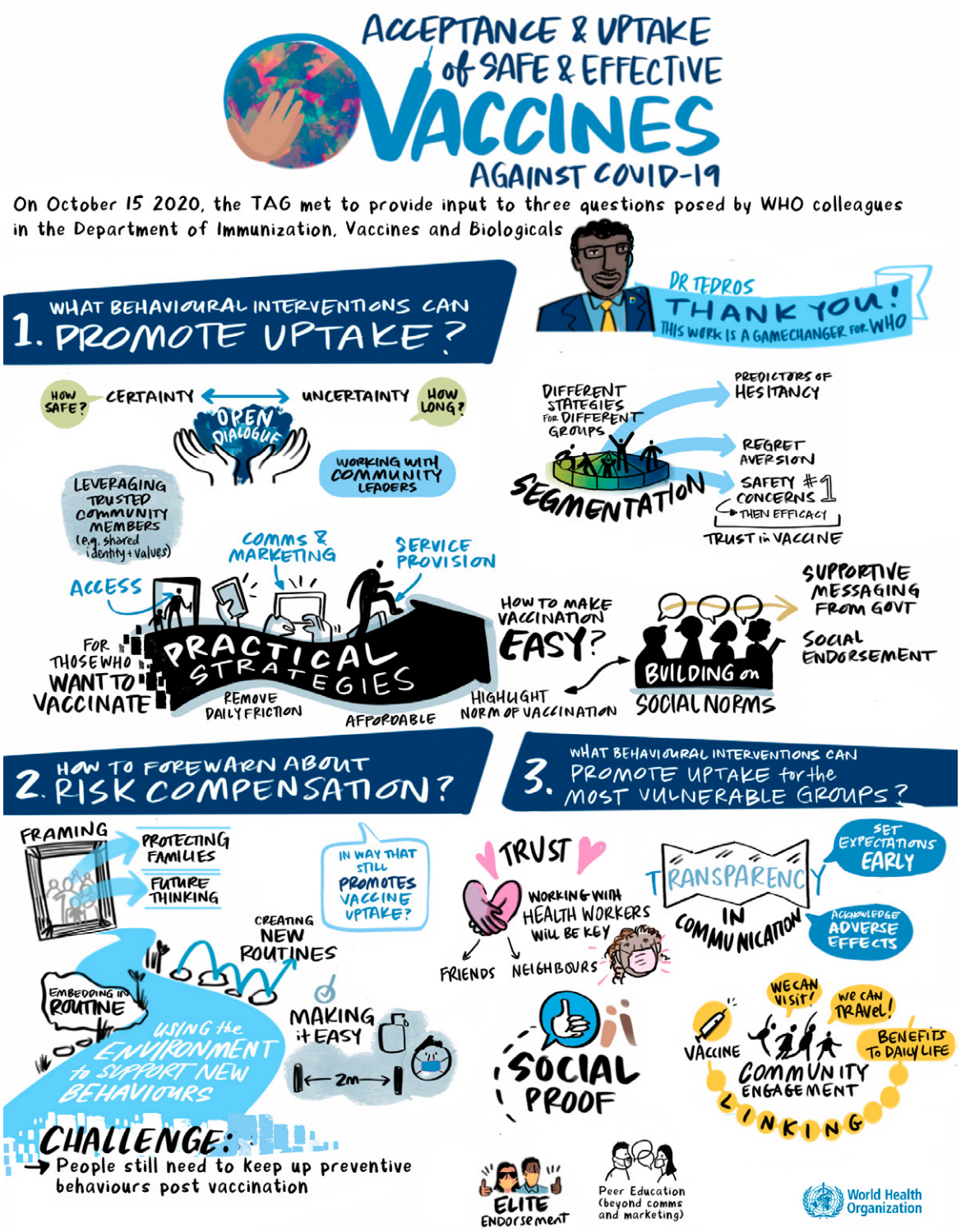

The image above is a visual narration that captures highlights of the meeting on 15 October 2020, during which the TAG on Behavioural Insights and Sciences for Health discussed behavioural considerations in relation to COVID-19 vaccine acceptance and uptake. The discussion was structured around three key questions.

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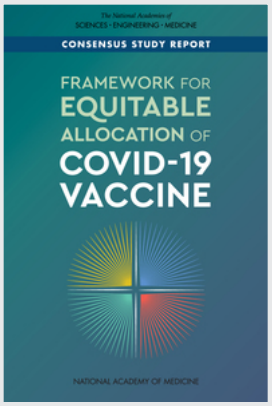

Framework for Equitable Allocation of COVID-19 Vaccine (2020)

DETAILS

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7

Achieving Acceptance of COVID-19 Vaccine

Approval, allocation, and distribution of one or more safe and effective coronavirus disease 2019 (COVID-19) vaccines will be a remarkable achievement. However, as has been pointed out repeatedly since the earliest days of the COVID-19 pandemic, readying a vaccine is just the starting point of what will be a challenging journey to achieving widespread public acceptance of COVID-19 vaccines. Strong demand for and acceptance of COVID-19 vaccines will be critical for protecting vulnerable populations and for regaining our pre-pandemic social and economic lives, but ensuring demand and promoting acceptance will be challenging.

Recent survey data from several sources suggest that willingness to be vaccinated with a novel COVID-19 vaccine is hovering at around 60–70 percent of the general population (Fisher et al., 2020; Kamisar and Holzberg, 2020; Mullen O'Keefe, 2020; Resnick, 2020; Thigpen and Funk, 2020). It is lower—in some cases, much lower—in specific sociodemographic groups: Black or Hispanic communities; those with lower educational attainment; and those who live in rural areas, among other groups (Callaghan et al., 2020; Fisher et al., 2020; Kamisar and Holzberg, 2020; Reich, 2020; Resnick, 2020). The reasons given for COVID-19 vaccine hesitancy are many. Some people have concerns about the safety of the vaccine, particularly given the unprecedented speed with which COVID-19 vaccines have moved through the development pipeline (Silverman, 2020). Distrust in the government, in the medical research community, and in pharmaceutical companies is also common (Fisher et al., 2020). Some people may feel they do not need the vaccine, either because they have already had (or believe they have had) COVID-19, they do not believe COVID-19

is a serious threat to their health, or they simply do not believe in vaccination (Fisher et al., 2020).

In surveys that capture a "not sure" or "maybe" response to questions about accepting a COVID-19 vaccine, this hesitant group is often larger than the "no" or plan to decline group (Fisher et al., 2020; Kamisar and Holzberg, 2020). Hesitant or unsure respondents may be waiting for more information about vaccine trial outcomes (safety and efficacy) or the vaccine approval process; they may also want to wait and see how those in their social networks behave. If the "wait and see" group sits out the early months of widespread vaccine rollout, achieving high population coverage will be delayed. Among the majority of U.S. residents reporting that they do plan to take the vaccine, ensuring that they actually receive the vaccine is also challenging. As has been observed frequently with seasonal influenza vaccination, even individuals with strong intentions to receive an influenza vaccine will often procrastinate, forget, or balk at seemingly small logistic or financial barriers (Harris et al., 2009, 2011; Schmid et al., 2017).

In this chapter, the committee reviews the complex and dynamic landscape of vaccine hesitancy, discusses its specific application and relevance to COVID-19 vaccination, and highlights the World Health Organization's (WHO's) Measuring Behavioral and Social Drivers of Vaccination (BeSD) Increasing Vaccination Model as an organizing framework for recommendations to address COVID-19 vaccine hesitancy and ensure robust demand for an approved vaccine.

THE LANDSCAPE OF VACCINE HESITANCY

Many intersecting social, cultural, legal, and historical factors shape the landscape into which a COVID-19 vaccine will be launched. The committee highlights several of the most relevant in the following sections.

Vaccine Hesitancy Is Common and on the Rise

Over the past 20 years, U.S. residents—and in particular, parents of young children—have reported increasing concerns about vaccine safety, the number of vaccines included in the routine childhood immunization schedule, and purported links (repeatedly proved incorrect) between vaccination and neurocognitive or biomedical conditions (Maglione et al., 2014). Potential consequences of vaccine hesitancy—which the committee views as an attitude, preference, or motivational state—are the behaviors of vaccine refusal or delay (Brewer et al., 2017). A cohort study by Glanz and colleagues (2013) found that in eight managed care organizations across the United States more than 10 percent of parents reported delaying or refusing vaccinations for their children. Another behavioral manifestation

of increased hesitancy is rising rates of personal belief and other nonmedical exemptions from school and day care entry vaccine mandates. From 2005–2006 through 2012–2013, the national rate of nonmedical exemptions almost doubled, and from 2011–2012 to 2017–2018, the median total nonmedical exemption rate increased by nearly 67 percent (Bednarczyk et al., 2019; Wang et al., 2014). Vaccine refusal and exemptions are high enough in some focused geographic regions to sustain outbreaks of vaccine-preventable diseases. According to one 2018 study, a select group of metropolitan "hot spots" in the United States are responsible for a large number of nonmedical exemptions, and overall, there is an inverse relationship between nonmedical exemption rates and measles, mumps, and rubella vaccine coverage in states with hot spots (Olive et al., 2018). Recent outbreaks of infectious diseases, including measles and mumps, may be attributed to current trends in childhood vaccine hesitancy and refusal among parents (Saint-Victor and Omer, 2013; Zipprich et al., 2015). Beyond routine childhood immunizations, many U.S. residents decline the seasonal influenza vaccine, and coverage rates for many teen and adult vaccines are well below what is needed to achieve adequate population health protection (Williams et al., 2017). Globally, vaccine hesitancy was listed among WHO's list of Ten Threats to Global Health in 2019 (WHO, 2019).

Organized, Well-Funded, and Influential Anti-Vaccine Groups

Anti-vaccine sentiment is as old as vaccination itself. Today, groups dedicated to anti-vaccination advocacy are active across the United States (Ball, 2020; Cohen and Vigue, 2020; Johnson et al., 2020; Reich, 2020), and have spurred disease outbreaks including measles outbreaks in the Somali community in Minneapolis, Minnesota (2017), and the Orthodox Jewish community in New York (2019). Recently, online social networks have become a leading source of deliberate misinformation on vaccines, driven by both anti-vaccination advocates and by bots and trolls hoping to amplify debates and drive skepticism. A 2018 study on vaccination activity on Twitter found that bots, trolls, and so-called "content polluters" covered the topic more extensively than did average users, with polluters in particular driving anti-vaccine content (Broniatowski et al., 2018). A 2020 analysis of nearly 100 million people expressing views regarding vaccination on Facebook showed significant growth in anti-vaccination clusters, compared to pro-vaccination clusters, with anti-vaccination clusters being more likely to engage with undecided individuals; the authors predicted that based on current trends, anti-vaccination views will dominate in the next 10 years (Johnson et al., 2020). They also noted that, unlike the singularly focused messaging of pro-vaccination advocates, anti-vaccination messages typically draw on a combination of issues, including safety concerns, con-

spiracy theories, and distrust of government and scientists. Examination of vaccine advertisements on Facebook showed that the median number of ads per buyer was higher for anti-vaccine ads than for pro-vaccine ads and were paid for by a small set of anti-vaccine advertisement buyers (Jamison et al., 2020).

Evidence suggests that members of the anti-vaccination movement are already mobilizing to discourage individuals from receiving a COVID-19 vaccine (Ball, 2020). Deliberately false information about COVID-19 vaccinations (e.g., they are a mechanism to implant microchips into people) is already being widely disseminated. Some members of the anti-vaccination movement have been opposed to other measures to deal with the COVID-19 pandemic, including stay-at-home orders, mask wearing, and contact tracing (Bogel-Burroughs, 2020). A better understanding of both the anti-vaccination movement and approaches that could be successful to counter their actions is needed.

Medical Exploitation and Distrust

Beyond a history of a system that has not always been trustworthy for many populations, a painful legacy of health care discrimination, medical research exploitation, and unconsented experimentation on Black, Latinx, American Indian, Alaska Native, and other marginalized communities has contributed to justified distrust of government-sponsored medical research (Frakt, 2020; Gamble, 1997). Examples include the infamous Tuskegee study—in which hundreds of Black men in Alabama were lied to about being treated for syphilis while the disease was allowed to run its course; the Edmonston-Zagreb vaccine trial, during which parents of immunized infants (mostly Black and Latinx) were not informed that the vaccine used was an unapproved experimental vaccine; and less well known but equally abhorrent instances of unconsented sterilization of Latinx and American Indian and Alaska Native women (Carpio, 2004; Gamble, 1997; University of Wisconsin, 2018). This legacy leaves many communities of color wary of participation in medical research, suspicious of initiatives to engage them in health promotion or surveillance efforts, and, in many cases, reluctant to become vaccinated (Hoffman, 2020). For example, in a study of influenza vaccine uptake among Medicare Fee-for-Service beneficiaries, vaccine receipt was higher among White (49.4 percent) and Asian (47.6 percent) beneficiaries compared to Black (32.6 percent) and Hispanic (29.1 percent) beneficiaries (Hall et al., 2020). Multiple surveys have shown Black and Latinx respondents to be less likely to report intentions to get vaccinated when a COVID-19 vaccine is available (Callaghan et al., 2020; Cohen and Vigue, 2020; Fisher et al., 2020; Kamisar and Holzberg, 2020; Resnick, 2020), and there is widespread concern about the ability of COVID-19

vaccine Phase III trials to enroll individuals from Black, Latinx, Indigenous, and other marginalized communities (Chastain et al., 2020; Feuerstein et al., 2020). Culturally tailored outreach and promotion campaigns that acknowledge this history and actively seek to rebuild trust among marginalized communities will be needed to ensure that the benefits of vaccination are available to all, and to help mitigate disparities that already exist.

Unique Challenges to COVID-19 Vaccine Acceptance

Even among persons typically supportive of vaccination, concerns have been raised about COVID-19 vaccines given the unique circumstances of its development and testing. In one study, 15 percent of persons who said they were at least somewhat supportive of vaccines said they would not get a COVID-19 vaccine (Murphy, 2020). The unprecedented speed with which COVID-19 vaccines have been developed is an important component of safety concerns. If a COVID-19 vaccine is approved or authorized (e.g., through Emergency Use Authorization) by the U.S. Food and Drug Administration (FDA) in the coming months, the vaccine development and approval process will have occurred far more quickly than for any previous vaccine.

Concerns have also been raised that the vaccine development process is being rushed for political ends and are reflected in recent polling as well (Silverman, 2020). To counter these concerns, FDA has developed recommendations for the performance of any approved COVID-19 vaccine (e.g., it will be at least 50 percent effective) and has committed to the use of an independent advisory committee to decide about licensure of candidate vaccines (Burton, 2020). Nine leading pharmaceutical companies involved in COVID-19 vaccine development have also signed a public pledge that no shortcuts will be taken during the approval process (Facher, 2020). Despite these reassurances, the recent emergency use authorization of convalescent plasma (a COVID-19 therapy) based on what many considered insufficient data to support efficacy has reinforced concerns about the politicization of the FDA process (Mahase, 2020; NIH, 2020). It is also important to note that potential mistrust in public health authorities and a COVID-19 vaccine are not emerging on a "blank canvas." More broadly, other systemic failures to contain or mitigate COVID-19, including personal protective equipment shortages, inconsistent and frequently changing guidelines regarding the use of masks and diagnostic testing, and inadequate testing and contact tracing programs, have further eroded the public's trust in government response. In light of these events and the other circumstances previously described, ensuring confidence in COVID-19 vaccines in tandem with other preventive measures will be an important challenge, and one that will likely require greater attention than for a typical new vaccine.

WHO BeSD INCREASING VACCINATION MODEL

In 2018, WHO convened an expert working group called BeSD to advance the development of tools to track and address under-vaccination; BeSD also published a theoretical Increasing Vaccination Model. This model, based on earlier work by Brewer and colleagues (2017), provides a useful organizing framework for important demand-side considerations related to addressing vaccine hesitancy and successfully promoting the novel coronavirus vaccine (WHO, 2020) (see Figure 7-1).

Motivation

At the heart of WHO's BeSD Increasing Vaccination Model is motivation to be vaccinated. Motivation can be captured by concepts like readiness, willingness, hesitancy, or intention. Motivation is what is measured in survey questions such as, "How likely is it that you will get a COVID-19 vaccine when it is available?" In the Increasing Vaccination Model, motivation is shaped both by what people think and feel about vaccination, and also by social processes that play out in their environment. What people believe about the severity of COVID-19 and the effectiveness and safety of a vaccine, their trust in public health or medical authorities, their tolerance for risk, and how they feel about needles are all examples of "think and feel" elements that precede motivation.

At the same time, it is well known that humans are very socially motivated (Reid et al., 2011). It is generally important to people that they fit in and garner social approval; and people commonly take their behavioral cues from those around them. This means that a strong recommendation from a health care provider or a clergy member can increase motivation to vaccinate, whereas hearing from friends, family members, or social net-

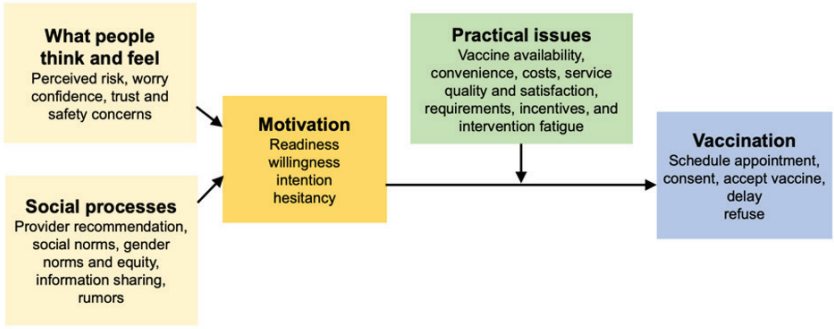

FIGURE 7-1 WHO BeSD Increasing Vaccination Model.
SOURCE: WHO, 2020.

work contacts who choose not to become vaccinated can decrease motivation. The importance of both thoughts and feelings and social processes in shaping motivation makes it very evident how influential, disruptive, and "sticky" misinformation can be. Myths about vaccine risks, misinterpretations of data about the severity of the disease being prevented, or intentional distortions or misreporting of scientific evidence can all shape what people think and feel; the impact of misinformation on motivation increases as it is propagated and amplified through social networks.

Practical Issues

The motivation to be vaccinated results in actual vaccination only if practicalities of availability, accessibility, cost, convenience, service quality, and incentives are all addressed. As previously noted, researchers know from seasonal influenza vaccination (and other screening and prevention behaviors, such as colonoscopies and the proper use of sunscreen) that the motivation–behavior gap can be large. While many of these practical issues were addressed in Chapter 5, it is worth highlighting the aspects of vaccination that can impact demand through behavioral mechanisms. These include:

- **Vaccine availability:** Is the vaccine available in my neighborhood? Do I have to go to a doctor's office, or can I get vaccinated at my pharmacy, my job, or my gym?
- **Cost:** Do I have to pay for the vaccine? Is there an administration fee? What's my co-pay? Even small fees and cost sharing can introduce friction and reduce demand.
- **Convenience:** Can I get the vaccine after hours? Do they have a drive-through? Is there a long wait? How easy is it to make an appointment and sign-in?
- **Service quality:** Do I feel welcome at the vaccine location? Am I treated well? Is there an opportunity to ask questions or follow up with concerns?

STRATEGIES FOR VACCINE PROMOTION AND ADDRESSING VACCINE HESITANCY

A 2015 systematic review of strategies to address vaccine hesitancy stated that "given the complexity of vaccine hesitancy and the limited evidence available on how it can be addressed, identified strategies should be carefully tailored according to the target population, their reasons for hesitancy, and the specific context" (Jarrett et al., 2015). This lesson will be critically important for addressing hesitancy around COVID-19 vaccination

in the United States and elsewhere, especially as unique concerns around the development and safety of COVID-19 vaccines continue to evolve. There is no "one-size-fit-all" solution to vaccine hesitancy, and nuanced approaches are key to ensuring that existing health inequities are addressed and to ensuring that those who are hesitant do not turn to outright vaccine refusal. By addressing vaccine hesitancy in order to gain and build public trust, it is critical to consider the needs and input of specific populations, a position endorsed by WHO's tailoring immunization programmes guidance (WHO, 2020). Multiple literature reviews have noted that single-component interventions to address vaccine hesitancy and promote vaccine uptake are not as effective as those that include multiple components, though the ideal combination of intervention strategies requires further investigation (Brewer et al., 2017; Dubé et al., 2015; Jarrett et al., 2015). Furthermore, the strength of the relationship between stated intentions to vaccinate and actual vaccination behavior requires further investigation (Brewer et al., 2017). Interventions that target direct behavior change, as opposed to those that aim to modify thoughts and feelings about vaccination or the social norms around them, have also been found to be more effective (Brewer et al., 2017). Strategies categorized as behavior focused include incentives, sanctions, and requirements—including, for example, vaccination requirements for school entry. A shared theme among these strategies is that many attempt to shift the framing of vaccination such that it is viewed as a routine, expected behavior—such that vaccination is viewed as the accepted norm (Brewer et al., 2017). This approach is already popular for many routine childhood immunizations in the United States.

Among the strategies discussed by WHO to address vaccine hesitancy are the engagement of community leaders, social mobilization tactics, mass media campaigns, the use of reminder and follow-up systems, training and education of health care professionals, nonfinancial incentives, vaccine mandates, efforts to make vaccination more convenient, and efforts to increase general knowledge and awareness about vaccines and vaccination (Jarrett et al., 2015; WHO, 2020). Ultimately, using a combination of these elements and others, evidence suggests that efforts to counter vaccine hesitancy and promote the vaccine should emphasize putting "people at the center" of efforts, as stated by a 2020 report produced by the Johns Hopkins Center for Health Security focused on the role of the public in COVID-19 vaccination (a report that strongly emphasized the importance of community-informed social and behavioral research and interventions in preparing for mass COVID-19 vaccination) (Schoch-Spana et al., 2020). In particular, dialogue-based interventions—which include social mobilization, engagement with community leaders and trusted community representatives (as discussed in Chapters 5 and 6), and other communication across scales—have been highlighted as potentially effective, and they rein-

force the importance of community involvement in creating, adjusting, and implementing these solutions to ensure adequate buy-in and trust (Dubé et al., 2015; Jarrett et al., 2015). The immunization of thought leaders and celebrities could also play a role in compelling members of the public to vaccinate (Freed et al., 2011; Hoffman et al., 2017; Najera, 2019), and overall, vaccine promotion messengers should be trusted, credible, and consistent (Tumpey et al., 2018). Structurally, a COVID-19 vaccine promotion campaign with its expected large scale and impact could look to mimic the success of an example such as the "Truth campaign" against tobacco use in the United States (Farrelly et al., 2009), and could draw on the experience of existing government investment in this area through CDC (including the Vaccinate with Confidence approach) and the National Vaccine Program (CDC, 2019; NVPO and Emory University, 2017).

Approaches such as social marketing and human-centered design can also support vaccine promotion strategies that are community centered and nuanced, such that those most hesitant to be vaccinated or those most vulnerable to severe outcomes from COVID-19 are targeted appropriately (Nowak et al., 2015; Schoch-Spana et al., 2020). Social marketing, which has been used previously to improve coverage and understanding of human papillomavirus vaccination, among other examples, does this through "tactical segmentation" and consideration of both shared demographic and behavioral characteristics *and* the reasoning behind these characteristics (Nowak et al., 2015). Given that social marketing is end-user driven, the use of such tactics will be critical for reaching potentially skeptical populations, such as communities of color, workers in essential industries, and even health care professionals, who also have been shown to play a critical role in driving vaccination trust and coverage through their own recommendations and communications with patients (Brewer et al., 2017; Dubé et al., 2015; Jarrett et al., 2015; Schoch-Spana et al., 2020). Strategies derived from the fields of behavioral economics and choice architecture could play a role as well.

CONCLUDING REMARKS

Operation Warp Speed has been granted a nearly $10 billion budget to develop one or more safe and effective COVID-19 vaccines, and additional funds will be spent to distribute and deliver a vaccine (HHS, 2020). Ensuring public acceptance of a vaccine is a crucial "last mile" challenge; failing to address vaccine hesitancy or rebuild trust puts the entire investment at risk. Bridging this last mile will require additional resources and significant effort at the national and community levels to ensure that equitable allocation of a COVID-19 vaccine becomes a reality. Operation Warp Speed has been an unprecedented effort to rapidly bring to market a safe and effective

vaccine, and a similarly urgent initiative is needed to speed innovations in social, behavioral, and communication science in order to promote acceptance of that same vaccine.

RECOMMENDATION 5. Develop and launch a COVID-19 vaccine promotion campaign.

The Centers for Disease Control and Prevention should rapidly develop and launch a national, branded, multi-dimensional COVID-19 vaccine promotion campaign, using rigorous, evidence-informed risk and health communication, social marketing, and behavioral science techniques. The COVID-19 vaccine promotion campaign should:

- Be consistent in its messaging but also flexible and modular to allow state, tribal, local, and territorial authorities to tailor it to specific communities and audiences, similar to the truth campaign against tobacco use.
- Partner with diverse stakeholders (e.g., health care providers, Historically Black Colleges and Universities research centers, Hispanic Association of Colleges and Universities, Tribal Colleges and Universities research centers, social marketing firms and other groups with specific expertise reaching underserved communities) and prioritize promoting the vaccine to Black, Hispanic or Latinx, American Indian and Alaska Native, Hawaiian Native and Pacific Islander, and other communities in which vaccine hesitancy and skepticism have been documented.
- Engage thought and opinion leaders, such as celebrities, to help promote COVID-19 vaccination acceptance and uptake.
- Incorporate messaging (in a variety of languages) and graphical elements that increase motivation, counter misinformation, and overcome perceived or actual practical barriers to vaccination.
- Include print, radio, television, and social media formats; incorporate toolkits, educational materials, and guidebooks to support community discussion about the COVID-19 vaccine; and make materials available in multiple languages.
- Be incorporated into broader messaging that provides consistent information on COVID-19 public health strategies that include non-pharmaceutical interventions, such as mask usage, physical distancing, hand washing, and so forth; expanded and accessible diagnostic testing linked to contact tracing, isolation, and quarantine strategies aimed at containing transmission, suppressing outbreaks, and interrupting super-spreading events; and the deployment of therapeutic measures that mitigate morbidity and mortality.

RECOMMENDATION 6. Build an evidence base for effective strategies for COVID-19 vaccine promotion and acceptance.

The Centers for Disease Control and Prevention (CDC) and the National Institutes of Health should invest in rapidly building an evidence base for effective strategies for COVID-19 vaccine promotion and acceptance, acknowledging the unique circumstances around COVID-19 vaccination and the knowledge gaps related to understanding community needs and perceptions and effective promotion and delivery strategies. Specific action steps to implement this recommendation include:

- Support innovation in vaccine promotion at the state, tribal, local, and territorial levels and among community-based organizations through existing and expanded program grant mechanisms, with an emphasis on supporting existing entities, programs, and infrastructure with community knowledge and expertise, and on expanding CDC's existing Vaccinate with Confidence programs.
- Support a new rapid response research mechanism to advance the science of COVID-19 vaccine acceptance through grants that:
  - Foster partnership among research entities, public health agencies, and community-based organizations;
  - Evaluate existing or novel theory-driven strategies and interventions to decrease COVID-19 vaccine hesitancy, increase COVID-19 vaccine uptake, and eliminate social, cultural, logistic, and legal barriers to COVID-19 vaccination in focal populations; and
  - Support research grounded in diverse theoretical and methodological approaches, with an emphasis on novel approaches and data sources.

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