A COMMUNICATOR'S GUIDE TO COVID-19 VACCINATION

Research, Theories, Models, and Recommendations Communicators Should Know
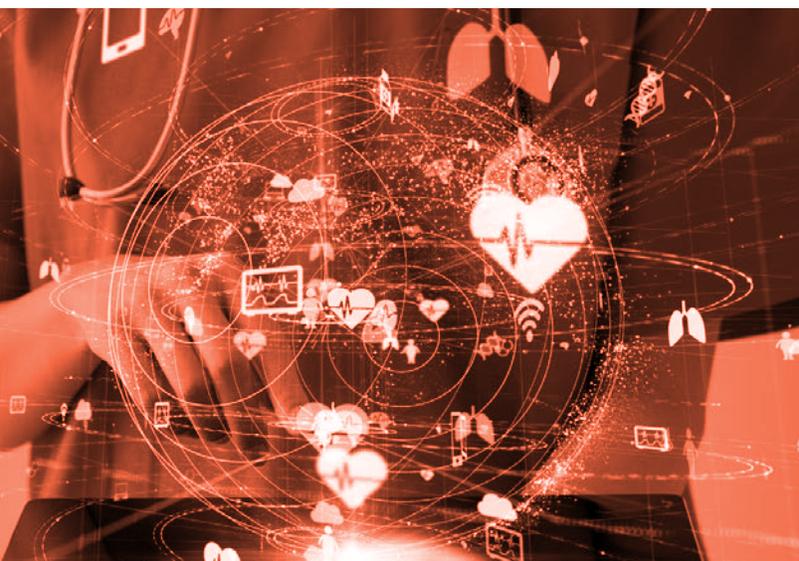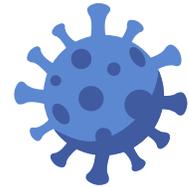
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EXECUTIVE SUMMARY AND KEY FINDINGS

UNESCO (2020) has termed this COVID-19 period to be a "disinfodemic," filled with an over-abundance of information and disinformation. With the staggered rollout around the world of the COVID-19 vaccine, compelling and targeted communications are central to increasing vaccine uptake. Employees and external audiences are increasingly depending on companies to be trusted sources for providing credible information and resources.

The purpose of this guide is to highlight research, theories, models, and research-driven recommendations that will help ensure effective communication strategies for organizations worldwide. The Institute for Public Relations has reviewed more than 100 research articles to assemble this guide.

Below are **17 Key Findings**, which are all backed by research discussed in more detail within the guide

1

Vaccine hesitancy is not due to a lack of information. Vaccine hesitancy, or the reluctance or refusal to vaccinate despite vaccine availability, is a threat to global health. Attitudes toward vaccines typically fall on a continuum (rather than being only "pro" or "anti" vaccinations). Vaccine hesitancy is not due to a lack of information, and sending out information about vaccines alone does not increase vaccine uptake (or taking the vaccine). People who are vaccine-hesitant should be treated with compassion, sensitivity, and respect. Perceptions of risk and safety are two of the main concerns people have about vaccinations. People more willing to be vaccinated are more likely to believe that they are at risk of contracting COVID-19, that the impact can be severe, and that the vaccine is safe and effective.

2

Transparency is key. Being transparent and keeping audiences updated is critically important for building trust and confidence. People are concerned about the "rushed" vaccine process so these concerns need to be addressed. Additionally, people should be given Vaccine Information Statements (VIS) as well as Vaccine Adverse Event Reporting System (VAERS) summary data. The potential adverse effects of a vaccine should be disclosed to patients. Keep it simple or detailed analyses and jargon will dissuade people.

3

Tailoring communication with each audience is critical. Attitudes and perspectives on vaccinations can vary widely depending on demographics, at-risk factors, religion, psychographics, culture, political views, news consumption, geographic locations, technographic factors, among others. A one-size-fits-all approach will not be as effective. Communicators should conduct research about their specific audiences to better understand them. Messaging should be pre-tested and made available in multiple languages. Deploying insights should be done responsibly and ethically.

4 **Use theories and models to guide communication planning as well as strategies and tactics.** Understanding behavioral intentions, how people think and feel, and the determinants of behavior change can make or break a campaign's success. For example, using the COM-B model of behavior by applying the Behavior Change Wheel can increase vaccine uptake.

5 **Marginalized groups have lower vaccine confidence.** Communities of color have lower confidence in vaccines due to historic and systemic racism, discrimination, and inequities within the healthcare system and government. Messaging and education related to COVID-19 vaccinations must specifically focus on these communities with input from people within those communities. Cultural humility is important.

6 **Trust doctors and nurses.** Healthcare providers (HCPs) are the most important source for many to increase vaccine uptake. Research shows that HCPs must be confident in the vaccine and have the resources, knowledge, and tools to effectively communicate with their patients and communities.

7 **Opinion leaders for target audiences should be defined.** Just as audiences and their needs vary widely, so do their opinion leaders. Identifying and employing effective opinion leaders and influencers increases uptake. Vaccinate credible influencers within defined communities to demonstrate vaccine confidence. Per social contagion theory, people have a tendency to think and act like their friends and family, which encourages adoption of behaviors. Family and friends are one of the most trusted sources of information.

8 **The anti-vaccination movement should not be ignored.** While communicators are unlikely to change the minds of those in the anti-vaccination movement, the anti-vaccination community is influential to those who are undecided about vaccinations. This could decrease vaccine confidence within the critically-important, undecided community.

9 **Tell stories, not statistics.** Stories and anecdotes about those affected positively by vaccinations are more likely to be effective than statistics. First-person testimony can help increase confidence. The COVID-19 vaccination should be framed as another important action to take with hand washing, mask-wearing, and physical distancing to prevent COVID-19. Official communications about vaccines should have a clear take-home message, tell a memorable story, and elicit feelings.

10 **Agencies must be aligned.** All agencies (government, the healthcare community, federal agencies, companies, etc.) must provide clear and consistent messaging to increase public trust and confidence.

11 **Misinformation should not be repeated.** Communicators must be careful to not amplify misinformation when they are rebutting or correcting it. Multiple sources providing accurate information is better than a single source. While research about the impact of the backfire effect has seen mixed results, communicators do not want people to reject credible information presented to them and strengthen their original stance on an issue. Also, do not respond to trolls.

12 **Inoculate people against misinformation.** Inoculation theory suggests false claims should be debunked before people encounter them. Inoculating against misinformation, or "prebunking," by warning people about potential misinformation can be effective.

13 **Understand biases.** *Omission bias* indicates a strong preference for inaction even when taking action is more beneficial. Optimism bias means people believe they have a lower chance of contracting COVID-19 than they actually do. *Confirmation bias*, or seeking information that only confirms one's beliefs, may lead to polarization and echo chambers. Understanding biases can equip communicators with strategies for overcoming them.

14 **Help encourage health literacy.** Cultivate critical thinking by increasing the knowledge of employees and the community about health information to help them make appropriate health decisions. Low health literacy is more prevalent among older adults, minority populations, those with low socioeconomic status, and medically underserved people. Offer programs and workshops to help employees become more health literate. It also helps protect against misinformation.

15 **Language matters.** Avoid using loaded terms that can turn people off. Some of these include "conspiracy theories" or "anti-vaxxers." Also, "Operation Warp Speed" or a "rushed" vaccine approval process may impact people's perception of the vaccine's safety. "Public health agencies" is better than "federal" or "government" to not elicit a feeling of red tape.

16 **Listen.** Listen to people's and HCP's concerns about the vaccine to increase vaccine uptake. Listening to rumors also can help identify deeper issues.

17 **Technology can help increase uptake.** Digital push technologies, such as text messaging, have been effective at increasing uptake (including for a series vaccination like the COVID-19 vaccine) for some audiences. Gamification is also effective for changing attitudes and behavior, such as identifying and dismissing disinformation. Also, do not forget to track and measure communication efforts.

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INTRODUCTION

This guide outlines research, theories, models, and research-driven recommendations that organizational leaders should know related to COVID-19 vaccines, including vaccine hesitancy, vaccine uptake (defined as the use of the vaccine), understanding audiences, trust, and disinformation. While additional topics are critical to understand, such as source credibility, due to space and time limitations, we focused on certain key areas from a communication perspective. Finally, research-based recommendations are included.

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Why This Topic Is Important

Organizations play an important role in vaccine uptake even if they are not in the healthcare space. Employees and external audiences are increasingly depending on companies to be trusted sources for providing credible information and resources. Attitudes to and perspectives on vaccinations can vary widely depending on demographics, religion, psychographics, culture, political views, news consumption, geographic locations, technographic factors, among others. Brewer et al. (2017) suggested one of the ways that employers can help increase uptake is to promote vaccinations to employees and offer convenient, free vaccines to employees. To be successful, an understanding of effective behavioral influence and communication strategies are needed. Also, to increase vaccine uptake, tailored plans are critical, especially for at-risk populations and those affected by health inequities.

In a peer-reviewed article in the *International Journal of Environmental Research and Public Health*, French and colleagues (2020) offer key guidelines for developing a proactive COVID-19 Pro-Vaccination Strategy that can benefit organizations (for details of each section, please see French et al., 2020):

1. Behavior Change Planning
2. Audience Targeting and Segmentation
3. Competition and Barrier Analysis and Action
4. Mobilization
5. Vaccine Demand Building
6. Community Engagement
7. Vaccine Access
8. Marketing Promotions Strategy
9. Media Relations and Outreach
10. Digital Media Strategy

In 2019, before the outbreak of COVID-19, the World Health Organization (WHO) named "**vaccine hesitancy**" as one of the top 10 threats to global health. **Vaccine hesitancy is defined by WHO (2019) as the "reluctance or refusal to vaccinate despite the availability of vaccines."** WHO research found inconvenience and lack

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of confidence as two oft-cited reasons why people might be vaccine-hesitant. Vaccine hesitancy is a complex and context-specific issue that varies across time, place, and the vaccines (MacDonald, 2015).

In early December 2020, the Pew Research Center reported that 75% of Americans reported having "a fair amount" or "a great deal" of confidence that the "research and development process in the U.S. will produce a safe and effective vaccine for COVID-19." This was a 10 percentage point increase from September 2020. Those respondents who said they would not get a COVID-19 vaccine said they were skeptical of the vaccine R&D process and were less concerned about getting a serious case of COVID-19.

Other concerns about vaccinations relate to disinformation campaigns against vaccines. Watts (2020) said vaccine disinformation in the United States has the potential to be more "potent" than COVID-19 disinformation due to two sources: legacy anti-vaccination communities and maligned actors (e.g., Russian, Chinese, and Iranian state media).

Limited Health Literacy

Another likely barrier to vaccine uptake is a lack of health literacy, which is the "degree to which individuals have the capacity to obtain, process, and understand basic health information needed to make appropriate health decisions" (Health Resources and Services Administration, 2020, p. 1). **Nine-out-of-10 adults in the U.S. lack the ability to "understand basic medical information and engage in self-care and chronic disease management"** (Liu et al., 2019, p. 2).

According to the Health Resources and Services Administration (2019), low health literacy is more prevalent among older adults, minority populations, those who have low socioeconomic status, and medically underserved people.

When people are searching for information online, algorithms will direct more health literate users to more reputable sources while those with less health literacy will be steered toward fake cures or misleading medical advice (Susarla, 2020). Moreover, an analysis of top COVID-19-related videos screened on YouTube in March 2020 found more

than one-quarter contained misleading or inaccurate information (Li et al., 2020). Evidence indicates that health misinformation is prevalent on social media, especially as it relates to public health situations with limited or novel scientific information (Bolsover & Tizon, 2020).

Importance of Theories and Models

Theories, models, and guidance from psychology, behavioral science, and communication studies can help enhance the understanding of people's perceptions toward vaccination. According to Corcoran (2007), models and theories are useful in explaining influences and factors that impact health decisions and elements important to influencing attitude and behavior change. Even though theories and models may not explain every factor effecting behavior change, having a theoretical grounding can aid in designing, planning, and executing health promotion strategies.

For example, researchers examined how to increase vaccination rates by using communication strategies and psychological science. Brewer et al. (2017) found that perceptions (both cognitive and emotional) can impact motivation. Their research found that risk beliefs (e.g., perceived risk, worry, anticipated regret, fear) also influence motivation (intentions, hesitancy, willingness), which correlates reliably with getting vaccinated or not. Low confidence in safety correlates reliably with not getting vaccinated (Brewer et al., 2017). **Therefore, the perception of risk and safety is a significant factor in vaccination uptake.**

Increasing vaccine adoption and uptake is a complex problem, and the promotion of an effective vaccine is a significant undertaking (Schiavo, 2020). An integrated approach is key among clinicians, universities, employers, professional organizations, policy advocates, policymakers, journalists, scientists, and government agencies. She emphasizes that, "Empathy, respect, cultural humility, and genuine concern in discussing any doubts or fears people may have, and providing them with evidence-based information to positively shape immunization decisions, should inform all our efforts." (p. 74). Sunstein (2020) adds that ensuring information is salient and simplified is also critical.

VACCINE HESITANCY AND CONFIDENCE

This section explores research related to vaccine hesitancy, vaccine confidence, and the determinants of vaccine uptake. Parents are an oft-studied audience for vaccinations so lessons learned in these studies may be applied to the COVID-19 vaccine as well.

Vaccine Hesitancy

Vaccine hesitancy is not a novel phenomenon—widespread community resistance to vaccinations drove a Supreme Court ruling in 1905 that set a precedent for public health law in the U.S. (Harrison & Wu, 2020). Vaccine hesitancy, though, is not necessarily the same as being anti-vaccination, even though some use these terms interchangeably. The term "vaccine hesitancy" emerged to depolarize the "pro" versus "anti" vaccination groups to show that people's perceptions toward vaccinations typically fall on a continuum (Larson et al., 2014). A working group of experts on vaccine hesitancy identified vaccine-hesitant individuals as:

> A heterogeneous [or diverse] group who hold varying degrees of indecision about specific vaccines or about vaccinations in general. Vaccine-hesitant individuals may accept all vaccines but remain concerned about them, they may refuse or delay some vaccines but accept others, or they may refuse all vaccines (as cited in Larson et al., p. 2151).

To understand the diversity among groups in terms of vaccine confidence, researchers mapped 149 countries to find out perceptions of the safety, importance, effectiveness, and religious compatibility of vaccines. For more information about this study, please see the de Figueiredo et. al study in the Recommended External Reading and Resources section.

Conceptualized by WHO, the "Three Cs" model of vaccine hesitancy includes complacency, confidence, and convenience. MacDonald (2015) defines these as:

- ***Confidence:*** Trust in the effectiveness and safety of vaccines, the health system and providers, and the motivations of policy makers who decide they are needed.

- ***Complacency:*** Degree to which people believe in the risk of the perceived disease and whether a vaccine is needed to prevent it.

- ***Convenience:*** Resources and barriers include availability, costs, accessibility, and the ability to understand the vaccine (language and health literacy)

The Sage Working Group on Vaccine Hesitancy developed a Matrix outlining factors that should be considered when dealing with vaccine hesitancy (MacDonald, 2015). These include (p. 4163):

1. ***Contextual influences:*** communication and media environment; influential leaders; historical influences; religion; socio-economic status; culture; gender; politics; geographies; and perceptions of the pharmaceutical industry

2. ***Individual and group influences:*** personal, family or community experiences with vaccinations; health beliefs; level of knowledge/awareness; healthcare providers; perceptions of immunizations

3. ***Vaccine considerations:*** perceived risks/benefits; mode of administration, design of program, reliability of vaccine source, vaccine schedule, costs, strength of the recommendations for the vaccine

Biases can also lead to vaccine hesitancy. One such bias is omission bias, which indicates a **strong preference for inaction even when taking action is more beneficial to the individual**. Harmful actions or "commissions" may be perceived to be more detrimental than inactions or "omissions"—preference for the status quo in some circumstances (Ritov & Baron, 1992). This applies to vaccination in that people become more concerned with the perceived harms of receiving a vaccination rather than the significant harms that may result from **not** being vaccinated (Ritov & Baron, 1990). Therefore, understanding individual reasons for vaccine hesitancy is critical (Habersaat & Jackson, 2020).

Vaccine hesitancy should not be blamed on a lack of information. Rather, Kata (2010) contended that vaccine hesitancy may be attributed to alternative understandings of health, different perspectives of parental responsibility, and questioning the legitimacy of traditional authorities. She concluded that, "labeling the other as 'wrong'—as has been the status quo—is ineffectual" (p. 1715).

Much research exists investigating vaccine hesitancy related to parents and their children's vaccinations. One study investigated lessons learned about vaccine hesitancy in relation to parents and administering Vitamin K in their newborns (Shah et al., 2020). The researchers found that medical organizations typically cite statistics and warn people about the dangers of not vaccinating while failing to recognize the importance of personal stories. Additionally, they failed to take into consideration the impact of communities on skeptical college-educated parents. In this case, the community had a falsely high assumption risk associated with immunization (Shah et al.). **Shah and colleagues recommended those who are vaccine-hesitant should be treated with compassion and sensitivity, rather than attempting to defiantly invalidate their views**.

In an article about COVID-19 vaccine hesitancy with parents, Taylor et. al (1997) said the single most important factor in getting parents to accept vaccinations is one-on-one contact with an informed, caring, and concerned pediatrician. In this case, the rationale should be made for the importance of the vaccination. Vaccine Information Statements (VIS) also should be given before vaccine administration or referrals to authoritative sites, such as the Centers for Disease Control and Prevention (CDC), to increase vaccine confidence. **Stories and anecdotes about those affected are also more effective than statistics**.

Vaccine hesitancy also is caused by a lack of trust in how well vaccine harms are documented and reported (Scherer et al., 2016). In an experimental study on information effectiveness related to uptake of Human Papillomavirus (HPV) vaccines, participants were divided into three groups: those who received only the CDC's VIS, those who received both VIS and VAERS (Vaccine Adverse Event Reporting System) *summary* data, and those who received both the VIS and VAERS *full detailed* reports (Scherer et al.). Those who received the VIS alone saw increased perceptions of vaccine benefits and decreased personal risks. Those who received the VIS and VAERS summary data displayed more trust in the CDC and greater vaccine confidence. However, those who received VIS and full detailed VAERS reports saw a significant decline in trust and confidence. This could be attributed to several possibilities such as the presence of medical jargon or the increase in the vividness of adverse events. Research indicates that **potential vaccine candidates should be informed of the potential adverse events associated with vaccines, but not overwhelm with overly complex jargon and information**.
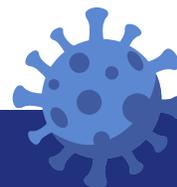
The Anti-Vaccination Movement

The anti-vaccination movement has been around for as long as vaccinations themselves, dating back to the early 1800s (College of Physicians of Philadelphia, 2018). People who strongly oppose vaccinations have been termed "anti-vaxxers,"***** but as that term has been debated, we will refer to them in this guide as the "anti-vaccination community." One challenge for medical experts is dealing with those strongly opposed to vaccinations. Viswanath (as cited in Burki, 2020) has suggested that the dogmatic views of anti-vaccination clusters won't change so it's more important to go after those who are undecided about vaccinations. However, the anti-vaccination community is an important audience as Johnson et al. (2020) determined in a study of Facebook pages. While a minority, they can become "highly entangled with undecided clusters" on the network (Johnson et al., 2020, p. 230).

Some research has investigated attitudes of the anti-vaccination community toward medical experts in shaping their policy positions. One cognitive bias is the Dunning-Kruger effect, in which people with a low level of knowledge think they know more than they actually do. Specifically applied to the debate surrounding vaccinations and autism, research has found that those who know the least about the causes of autism are more likely to think they know more than medical professionals about the causes of autism, perpetuating the claim that vaccines cause autism (Motta et al., 2018). The researchers concluded that "overconfidence has important implications for vaccine policy" (p. 280). Additionally, these individuals are more likely to elevate the role of "non-experts."

Vaccine opposition has been linked to the polarized political environment in the United States. A study investigated how the current polarized political climate and a lack of scientific consensus has an effect on public support for the HPV vaccine. The researchers found that a greater understanding of politization is imperative, especially how the political setting at the state level can undermine public confidence and have an impact on vaccine uptake (Saulsberry et al., 2019).

Some of the anti-vaccination community has been successful at telling first-person stories of those who say they have been harmed by vaccinations, effectively co-opting experts and research (Brewer et al., 2017). The stories typically capitalize on fear, anger, and emotion, and promote messages that

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*People against vaccinations have been campaigning unsuccessfully to replace the term "anti-vaxxer" with "vaccine risk aware."

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are memorable and interesting. Official sources tend to be more clinical, data-driven, and "forgettable." (Brewer et al.) Novelty stands out and attracts people compared to pro-vax messaging (Kofler, 2019). **First-person testimony can help encourage vaccine confidence.**

Determinants of Vaccine Uptake

Specific to COVID-19, Guidry et al. (2020) conducted a survey of 788 people with quota matching on gender, race/ethnicity, and identifying factors that influence vaccine uptake intentions. The factors that lead to a higher likelihood of taking a vaccine include:

- Higher education levels
- Having insurance
- High subjective norms (extent to which an important person or group of people will approve and support a particular behavior)
- Positive attitude toward vaccines
- High perceived susceptibility to COVID-19
- High perceived benefits of the vaccine
- High self-efficacy for getting the vaccine
- Low barriers to the vaccine

In addition to the aforementioned, the same research found that willingness to take the vaccine under emergency use authorization (EUA) was also correlated with:

- Younger Age
- Race/ethnicity (White respondents were more likely compared to Black respondents)
- High perceived behavioral control

In a research essay on vaccine confidence, Harrison and Wu (2020) argued the reason people opt out of vaccination programs might not be due to biomedical considerations and risks, but rather that the social, cultural, economic, religious, or moral outcomes outweigh the risk from the disease.

There are many reasons why people may choose not to be vaccinated, and these may depend on several factors related to the population and their communities. In a 2020 study in China, researchers sampled parents from pediatric immunization clinics in all districts of Shanghai except Chongming. Many parents expressed concerns about vaccine side effects (73%), vaccine safety (63%), and vaccine effectiveness (52%) (Wagner et al., 2020).

Understanding how education influences attitudes about vaccination in various countries is important as one of the more recent phenomena is people with higher levels of education refusing vaccinations. A study of 30 countries by Makarovs and Achterberg (2017) about the H1N1 vaccination found (in a general sense) that some highly-educated people oppose getting vaccinations more so than others with less education. The authors noted, "While the inclination of people with lower socioeconomic status to refuse vaccination may reflect their misinformation, ignorance and perceived vulnerability, the tendency of more educated ones to avoid H1N1 immunization may be attributed to their overall distrust in science and suspicion of all kind of manufactured risks that are intrinsic to the modern world" (p. 8).

However, the impact of education levels on vaccination uptake cannot be applied universally. While some studies in certain countries (e.g., The Netherlands, Nigeria, Greece) have found those with higher education are more likely to vaccinate, research in other countries (e.g., China, Israel, USA) have found this is not the case (Larson et al., 2014). Less education is also a barrier in some countries (e.g., India, Kyrgyzstan, Nigeria), including illiteracy and anti-vaccination attitudes.

Some studies found that disseminating vaccination information alone is insufficient to overcome vaccine hesitancy. Rather, the perceived susceptibility to, and severity of the disease in question, as well as the perceived effectiveness and risks of vaccinations, are important determinants in predicting uptake.

UNDERSTANDING AUDIENCES

To increase vaccine uptake, **strategies must be tailored to specific stakeholder groups based on their demographics, psychographics, geographic locations, technographics, community, cultural considerations, and other factors**. A one-size-fits-all approach will not work. This section discusses some of the audiences and considerations of vaccine uptake.

Influencers

Research indicates influencers can improve or lower vaccine uptake. A study of the impact of social media influencers on flu vaccinations found that individuals will engage in positive ways with vaccine promotion messaging on social media if presented by individuals they admire or follow (Bonnevie et al., 2020). But some research suggests that the most important influencers can be found closer to home. The role of interpersonal networks can be closely related to the concept of social contagion, meaning **people have a tendency to think and act like their friends and family, which encourages adoption of behaviors** (Vaidyanathan, 2020).

Repeatedly, though, research has found **healthcare providers (HCPs) are the most critical influencers and trusted advisors on vaccine confidence**. HCPs with more knowledge about vaccines' safety and effectiveness are more likely to recommend vaccinations than HCPs with less knowledge (Paterson et al., 2016). One of the strategies outlined to increase vaccine confidence is to equip HCPs with tools and guidance to communicate with their patients. This includes communicating with respect and empathy to understand the patient's position regarding vaccinations (Thomson et al., 2018).

It should be noted that HCPs often have time constraints, inadequate information given to them, and increased workloads, so it's important to consider this and offer HCPs more support and resources (Paterson et al., 2016). Additionally, HCPs should

be included more often in establishing vaccine recommendations (Paterson et al.). However, not all HCPs globally are fully supportive of vaccinations. In Israel, parents, nurses, and medical workers not caring for COVID-19 patients expressed higher levels of vaccine hesitancy, especially regarding the safety of a rapidly-developed vaccine, than those who did care for COVID-19 patients (Dror et al., 2020).

Special consideration should be given to how health officials and healthcare professionals, including nurses and ancillary healthcare staff, communicate with communities of high-risk groups, low-income groups, and people of color. **HCPs are critical in terms of encouraging overall vaccine uptake**.

However, who is considered an influencer depends on the culture so communicators must have a strong understanding of the audiences and who they perceive as opinion leaders. In 1956, Elvis Presley received a polio vaccine on "The Ed Sullivan Show," which resulted in a significant uptake among teens and young adults (Perry, 2020). Journalists and historian David Perry said regarding the COVID-19 vaccine, "Celebrity leadership and activism can be overrated, but there are moments in which famous and trusted people can sway mass opinion in ways vital to the public good" (para. 9).

In a study of HPV vaccine uptake of college students in Kentucky, parents were found to be the most significant influencer, while doctors were not very influential (LaJoie et al., 2018). Influencers can be critical to vaccine uptake—the challenge is determining the best influencer for each stakeholder group. Consistently across research studies, though, including the past two years of the IPR Disinformation in Society Report (2020), family and friends are the most trusted source for providing accurate information.

At-Risk Populations

Additional considerations must be taken for at-risk populations when it comes to messaging, including HCPs and immunocompromised patients (Doornekamp et al., 2020). Consistently across all at-risk groups, greater knowledge levels increased vaccination uptake in most cases, but knowledge alone is not sufficient. **At-risk populations should not be treated the same as other groups; rather, campaigns should be targeted to a specific audience**.

For example, extensive research has been conducted on vaccine hesitancy among pregnant women, an at-risk population. A meta-analysis of 50 studies found that beliefs that vaccines could cause

congenital disabilities or general harm were strong deterrents to flu vaccinations, while perceptions of vaccine utility had a strong influence on uptake (Kilich et al., 2020). One of the greatest factors, though, was a healthcare professional (HCP) who recommended the flu shot as a routine vaccination, which resulted in 10 times greater odds of being vaccinated compared to those who didn't receive a recommendation from an HCP (Kilich et al., 2020).

In a U.K. survey of 527 older adults (aged 65+) and young-middle-aged adults with chronic respiratory diseases, researchers found a reluctance to receive the COVID-19 vaccine was associated with the respondents' perceptions that the media have exaggerated the risks and that COVID-19 would be short-lived (Williams et al., 2020). Four key themes emerged from this study that should be considered relating to potential COVID-19 vaccine adoption by respondents:

- Personal health and susceptibility to COVID-19
- Perceptions of the seriousness of the illness
- Perceived health consequences to others and loved ones
- Vaccine safety and the "rushed" process (as a barrier)

Health Inequalities

COVID-19 has disproportionately impacted people of color. According to the APM Research Lab (2020), Black and Indigenous Americans have suffered the greatest loss of life with a death toll of one in 1,000 in the United States. Research found that "prior research on attitudes toward vaccination across ethnic and racial groups suggests that this may in part be attributable to greater mistrust of government and health information possibly due to historical and present-day medical and structural racism" (Jamison et al., 2019, p. 93).

COVID-19 is not the first healthcare challenge that has affected people of color. Certain agents of power have been influential in contributing to racial injustice and inequity in healthcare over a long period of time. The Tuskegee Syphilis Study is one of the most well-known "experiments," but others have been conducted in prisons, hospitals, and in the military, according to Washington (1995). In an essay in Harvard's *Bill of Health,* Campbell (2020) contends, "reducing African Americans' skepticism to anxieties resulting from the U.S. Public Health Service Syphilis Study is a misguided and myopic rhetorical ploy that obscures the very long arc of medical racism in the U.S." (para 9).

Mistrust can have significant consequences. In a study applying disinformation and

inequality-driven mistrust from AIDS denialism to COVID-19, researchers wrote that disinformation promoted from institutions and the federal government to "preserve power" and "undermine already marginalized groups" in the current COVID-19 environment has an impact on communities who already are vulnerable due to "historical and ongoing structural inequities" (Jaiswal et al., 2020, p. 2776).

Jaiswal and colleagues (2020) suggest **public health responses must address the "complex dimensions of mistrust" by paying attention to the "issues of structural racism and systematic discrimination** which create, perpetuate, and sustain mistrust and influence people's acceptance or rejection of misinformation or disinformation" (p. 2777). Similarly, Marmot (2005) outlined the importance of addressing the "causes of the causes: the social conditions that give rise to high risk of non-communicable disease whether acting through unhealthy behaviours or through the effects of impossibly stressful lives" (p. 1102).

Factors of inequality can also play a role in vaccine uptake. Brewer and colleagues (2017) said context determinants must be considered related to vaccine confidence. Social determinants (how people grow up and work), social, economic status, education, and ethnicity also play a role. Outside of the population groups, how healthcare systems services are provided, designed, and financed are important as well. Costs, convenience, and lack of time are other noted barriers.

Wilkinson and Marmot (cited in Marmot, 2005) in a report for the World Health Organization outlined the evidence for 10 factors on the social determinants of health:

- The Social Gradient (inequalities in population health are related to disparities in social status)
- Stress
- Early life
- Social exclusion
- Work
- Unemployment
- Social support
- Addiction
- Food
- Transportation

Messaging and education related to COVID-19 vaccinations must specifically focus on high-risk groups, including low-income individuals and communities of color (Malik et al., 2020). Within these messages is a **need for cultural humility* and community engagement**. Again, this research emphasizes the need for healthcare professionals and health officials to be involved in this process.

TRUST IN INFORMATION
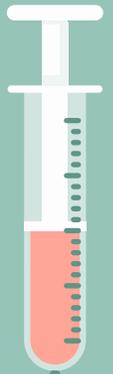
The Role of Trust and Mistrust

According to Macnamara (2020a), corporations, political organizations, and their agents must be trustworthy. To do so, strategic communication serves as a trust intermediary between an organization and the public. Trust plays a key role in rates of vaccine uptake. There have been multiple studies investigating the recent role of trust in institutions during the COVID-19 pandemic. Here are some of the top-line findings:

75%
of respondents said they believe "Americans' trust in the federal government has been shrinking." (Pew Research, July 2020)

20%
of respondents trust the federal government (Pew Research, Sept 2020)

62%
of respondents said the government does a "very good" or "somewhat good" job "ensuring safe food and medicine" (Pew Research, Sept. 2020)

73%
of respondents said they trust the Centers for Disease Control and Prevention (CDC). (The Harris Poll, August 2020)

72%
of respondents said they trust the U.S. Food and Drug Administration (FDA). (The Harris Poll, August 2020)

71%
of respondents said they trust drug makers actively working on COVID-19 vaccines. (The Harris Poll, August 2020)

40%
of the American public said pharma's reputation has improved since the beginning of the COVID-19 outbreak (The Harris Poll, May 2020)

64%
of respondents said they believe "Americans' trust in each other has been shrinking" (Pew Research, July 2020)

62%
Trust in businesses increased to 62% (+4 percentage points), but respondents still hold deep concerns about businesses (Edelman, May 2020)

38%
of Americans have "a lot" of trust in scientists (Pew Research, September 2020)

80%
trust doctors to "tell the truth about COVID-19" (Edelman, May 2020)

67%
trust online health experts to "tell the truth about COVID-19." (Edelman, May 2020)

93%
of U.K. adults trust nurses and 91% trust doctors (Ipsos, November 2020)

16%
of U.K. adults trust government ministers (Ipsos, November 2020)

+8%
The healthcare industry has seen one of the "greatest trust gains to date," with trust increasing by 8 percentage points (Edelman, May 2020)

In a review of Heidi Larson's book, "*Stuck: How Vaccine Rumors Start—and Why They Don't Go Away*," Gellin (2020) emphasizes the critical role trust plays in the vaccine process:

> "The foundation that underpins vaccination acceptance is trust. Trust in the processes, practices, and policies of vaccine development, licensure, and manufacturing; in the policymakers who set vaccine recommendations; and in the healthcare system—the doctors, nurses, and community immunisers who administer vaccines as part of routine care and during mass vaccination campaigns. Without understanding and addressing trust, efforts to improve vaccine confidence will be a steep climb. That will certainly be the case when COVID-19 vaccines arrive, especially given the many new vaccine technologies that are being tested and the speed at which they are being developed" (p. 1).

In a meta-analysis of HPV vaccination mistrust in Europe, studies found, depending on the country, an increased mistrust of health authorities, pharmaceutical companies, doctors, and new vaccines (Karafillakis et al., 2019). In Italy, the willingness to get the COVID-19 vaccine is correlated with trust in scientific research as well as general attitude toward vaccine efficacy (Palamenghi et al., 2020). While some may trust vaccinations and the process, others have varying degrees of mistrust or distrust.

Some scholars have differentiated between the definitions of distrust and mistrust. Lenard (2008) defines **distrust as "a suspicious or cynical attitude towards others" while mistrust is "a cautious attitude towards others"** (p. 313). While there may be distinctions, for this purpose, this guide will view these definitions as being similar, as the literature testing mistrust or distrust uses these terms interchangeably.

Mistrust of the medical profession has a negative impact on vaccine uptake. Hornsey et al. (2020) found the reasons why some people prefer complementary or alternatives medicines (CAMs) over vaccines can be attributed to distrust of conventional medicine rather than trust in CAMs.

In a study investigating the demographic and attitudinal predictors of parental vaccine hesitancy, Reuben et al. (2020) found less trust in the medical profession played a role as did younger age, lower levels of education, greater religiosity, and greater disgust sensitivity. Establishing and reinforcing trust in agencies is critical for vaccine uptake, though, this is easier said than done.

Jamison et al. (2019) caution that enhancing the trustworthiness of agencies will require consistent attention to agency actions, including those beyond influenza vaccination with sensitivity to concerns of minority groups who often have different experiences with government agencies.

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*Disgust sensitivity has been studied in relation to disgust toward certain political and social attitudes, such as ethnocentrism or disapproval of gay people (Reuben et al., 2020).

19

Misinformation and Disinformation

The World Health Organization (WHO) has classified the COVID-19 pandemic as a "massive infodemic" characterized by an over-abundance of information, including disinformation, that makes it difficult for people to find trustworthy sources (2020, p. 2). **Due to the vast amount of disinformation, UNESCO has termed this COVID-19 period to be a "disinfodemic"** and has created two guides to help decipher and dissect disinformation (Posetti & Bontcheva, 2020a; Posetti & Bontcheva, 2020b).

According to Macnamara (2020b), part of the strategy for organizations is deciding how or even whether to challenge and correct misinformation or disinformation. **Disinformation is defined as deliberately misleading or false information, with emphasis on the "deliberately," meaning there are intentions on the part of the sender to deceive** (Institute for Public Relations, 2020). Misinformation, or false or leading information, is more the result of ignorance, carelessness, or a mistake. Misinformation and disinformation can be found in discussions relating to vaccines in both online and offline channels.

One important area of misinformation is related to the confidence of information disseminated by perceived authorities or experts (in some cases, due to their authority in a position rather than their level of knowledge). All agencies must be aligned, including government officials, the healthcare community, and federal agencies; otherwise, vaccine confidence may be reduced. Misinformation by the U.S. government released in 2020 relating to the COVID-19 pandemic included a downplay of the severity of the disease, the level of testing capacity, the efficacy and safety of pharmacological interventions, and the speed of vaccine development. (Malik et al., 2020). These efforts diminish public trust and confidence.

Regarding online channels, a 2020 study (conducted pre-COVID-19) estimated that 84% of Americans visit a vaccine-related webpage annually, with only 18.5% of people encountering vaccine-skeptical content, which is more likely to be published by untrustworthy websites (Guess et al., 2020). Furthermore, searches originating on Google were more likely to generate non-skeptical content than email and, to a lesser extent, Facebook.

People may fall for misinformation when engaging in "cognitive laziness," because they are not careful or do not care deeply enough about the information they are exposed to (Pennycook & Rand, 2018). Those who have a stronger tendency to engage in analysis and evaluation of information are less susceptible to misinformation, even if it aligns with their ideology.

So, what should communicators do? Within the field of behavioral science, there is information about the best strategies for combatting misinformation. **People typically reduce their belief in misinformation if multiple "expert" sources (as opposed to one) correct the misinformation** (Vraga & Bode, 2017). However, when correcting misinformation online, communicators must be careful to prevent the backfire effect. Therefore, they should be aware that those with deeply held beliefs can use fact-based information to counter their claims (Wood & Porter, 2018).

Results have been mixed as to the evidence and strength of the backfire effect. Nyhan and Reifler (2010) define the backfire effect as, "Individuals who receive unwelcome information may not simply resist challenges to their views. Instead, they may come to support their original opinion even more strongly" (p. 307). While Nyhan and Reifler's research consistently found evidence of the backfire effect, others have found its impact to be more elusive. In a series of five experiments testing the backfire effect on 52 polarized issues, Wood and Porter (2017) did not find evidence of the backfire effect. They concluded, "By and large, citizens heed factual information, even when such information challenges their ideological commitments" (p. 1).

Regardless, research does support that rebuttals and corrections of disinformation need to focus on providing scientific, factual, or other credible information relevant to the issue (Macnamara, 2020b). False statements should not be repeated as doing so increases familiarity.

While trolls and bots are sources of disinformation, research indicates it may be counterproductive to engage with bot-driven narratives directly as it may "feed the trolls." (Jamison et al., 2019). Further, "this requires profound understanding of how epistemic and ideology beliefs act as obstacles to accepting scientific evidence" (Wang et al., 2019, p. 8). Research found that increasing "official" health narratives is not enough to counter disinformation (Jamison et al.). Instead, improving social media literacy may be more successful.

In terms of conspiracies, researchers investigated the extent of this in healthcare, including COVID-19. Grimes (2020) outlined three motivations for perpetuating health conspiracies:

- *Epistemic:* Health conspiracies offer simple narratives to complex phenomena, which provides a sense of security.
- *Egotistic:* Narcissistic individuals may be more likely to ascribe to conspiracies, granting them an "illusion of special knowledge."
- *Political:* Health conspiracies can be damaging to "enemies" by undermining public trust.

He concluded, "The dark irony is that such conspiratorial narratives induce an inherent distrust of conventional medicine, providing a cloak for charlatans to operate under" (p. 2).

Macnamara (2020b) summarized some of the flawed argumentation methods and ways to spread disinformation, as reported by Cook et al. (2017):

- *False balance strategy:* exploitation of the widely followed media convention of giving equal space and time to alternative views
- *Fake experts:* people without relevant qualifications
- *Lack of consensus:* even through citing a single dissenting voice, it can create confusion.

When participants were educated in Cook et al's study (2017) about some of the faulty techniques used to spread misinformation, they became more resistant to misinformation and disinformation. This highlights that media literacy, including applying inoculation theory (discussed in the next section), can make a difference.

The framing of messages can impact how information is received. Messages that evoke negative emotions such as fear, anger, or disgust, can be extremely effective and powerful, even if they are false (Vaidyanathan, 2020). Anti-vaccination content on the internet also has contributed to broader and faster dissemination of rumors, myths, and inaccurate beliefs regarding vaccines, which negatively impacts vaccine uptake (Dubé et al., 2013). Additionally, due to the success of vaccines, vaccine-preventable diseases are becoming less visible, and often, the risks or alleged risks of a vaccine are more highlighted than the risk of the disease itself.

LEVERS AND EVIDENCE-BASED PRINCIPLES FOR APPLICATION

This section includes behavioral science levers and considerations that can be deployed across tactical design, key messages, and strategies to influence attitude and behavior change.

Optimism Bias

Optimism bias can present challenges in healthcare. Optimism bias is defined as "the difference between a person's expectation and the outcome that follows. If expectations are better than reality, the bias is optimistic; if reality is better than expected, the bias is pessimistic" (Sharot, 2011, p. R941). **Applied to COVID-19, people who believe they have a lower chance of contracting the virus than they do in reality have an "optimism bias."** Overall, people typically overestimate the likelihood of positive events happening to them and underestimate the likelihood of negative events. Research found that excessive optimism can "reduce precautionary behavior" through the underestimation of risk (Sharot, p. R944).

Researchers conducted studies about the influence of optimism bias relating to COVID-19. Kuper-Smith and colleagues found individuals tested in three countries (U.K., Germany, and the U.S.) all appeared to share an optimism bias regarding their chances of getting infected and infecting others (Kuper-Smith et al., 2020). In a similar vein, researchers also found that risk perception could "become more accurate, as the unrealistic optimism belief updating is dampened down" (p. 3). This means that the more people believe in the risk of COVID-19, the more likely they will engage in behaviors to lessen the spread of COVID-19 (Bottemanne et al., 2020).

Confirmation Bias

Confirmation bias is the seeking or interpreting evidence that aligns with existing beliefs and expectations (Nickerson, 1998). This can be especially

challenging in health contexts as studies in healthcare have found people will selectively expose themselves to information that is consistent with their beliefs when they seek information. For example, those who are anti-vaccination may look for information only on anti-vaccination websites to confirm their viewpoint that vaccinations are bad. One study of early-childhood vaccinations found that people find information more credible, useful, and convincing when in line with their ideas, including individuals with high health literacy (Meppelink et al., 2019).

Confirmation bias is similar to "selective exposure." Selective exposure has been applied to many genres thanks to Leon Festinger, the father of cognitive dissonance theory. Festinger theorized that those who seek out information consistent with their beliefs are doing so to help reduce their cognitive dissonance, or the mental uneasiness they feel when their perceptions do not align with other information or beliefs (Festinger, 1957). **Exposing oneself to information that only aligns with one's beliefs can create "homogeneous clusters"** or echo chambers. When this happens, as one study found, **this "fosters confirmation bias, segregation, and polarization**. This comes at the expense of the quality of the information and leads to a proliferation of biased narratives fomented by unsubstantiated rumors, mistrust, and paranoia" (Del Vicario et al., 2016, p. 558).

Inoculation Theory

One theory that has limited application to vaccines but studied in other healthcare areas where misinformation and skepticism may be encountered is inoculation theory. **Inoculation involves debunking false claims before people encounter them. Then, their first encoding of misinformation is strongly tied with the notion that it is false, equipping people with arguments that can be used to refute and dismiss it**. The two main elements of inoculation are explicit warnings that there are attempts to mislead people and refutations of misinformation (Betsch et al., 2015).

Research indicates countering misinformation once it's already in society can increase the potential of a backfire effect (or strengthening one's existing position). Inoculation theory proactively counters "potential misinformation by exposing some of the logical fallacies inherent in misleading communications a priori" or before people encounter it (also called "prebunking") (Cook et al., 2017, p. 4). Similar to the role of vaccinations, this "inoculates" people to misinformation.

A series of experiments applied to climate change found combining accurate information with an inoculation was effective in neutralizing misinformation, while simultaneously increasing

consensus around climate change (Cook et al., 2017, p. 15). An important note in these experiments relating to climate change is that the specific misinformation was not presented, but rather a warning about misinformation by explaining the "general technique" being used to create doubt. This way, generally-framed inoculations could "potentially neutralize a number of misleading arguments that employ the same technique or fallacy" (Cook et al., 2017, p. 15). While more research needs to be done in health contexts, the inoculation theory has been applied successfully to underage drinking, smoking, and vaccines (Compton et al., 2016).

In a study testing how well inoculation theory works concerning the HPV vaccine, Wong (2016) found two different types of messages—those providing reassurances of the safety and efficacy of the HPV vaccine and those providing reassurances for vaccines in general—were both effective in inoculating against misinformation. Thus, he concluded that "inoculating against negative messages about vaccinations may be an effective strategy to bolster vaccination rates" (Wong, p. 135).

THEORIES AND MODELS TO CONSIDER IN A FRAMEWORK

This section highlights theories and models to include as part of a framework to help explain or predict people's perceptions and subsequent adoption or refusal of vaccinations.

Heuristics

Heuristics are **mental shortcuts people use to help make decisions and solve problems**. Several types of heuristics have been investigated in the vaccination literature, but only two will be addressed here.

Psychologists Amos Tversky and Daniel Kahneman (1973) developed the concept of an **availability heuristic**. "When faced with the difficult task of judging probability or frequency, people employ a limited number of heuristics which reduce these judgments to simpler ones" (Tversky & Kahneman, p. 207). People use availability heuristics during a problem-solving process. This is what people can recall when thinking and making decisions in terms of examples, information, and perceptions about a topic that are just one piece of the broader landscape of available information. News consumption (and recall) and experiences can influence this as well. For example, if a person knows someone who has died of the COVID-19, this information may come to them more readily. Perhaps, they also recall the number of people who have been affected or died of the disease because those statistics are frequently mentioned in the media. At the same time, they could forget, not know about, or not recall helpful or important information that can help them make a decision. Familiarity or salience/importance of the issue plays a role and, in some cases, can lead to biased decisions due to the type and scope of information available or recall (or not available) from an individual during the decision-making process (Siegrist & Árvai, 2020).

The availability heuristic has been applied to risk-related studies. Research found that people who experience an event have higher risk perceptions than those who have not had such an experience. Similarly, the **affect heuristic** represents how people make a decision based

on their current emotions and how they feel—their "gut" feeling. This can have positive or negative consequences on the decision-making process, depending on the situation (Tversky & Kahneman, 1973).

Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) by Icek Ajzen investigates **how attitudes, norms, and perceived control of behavior could impact behavioral intentions and, therefore, behavior**. According to Ajzen (1985), behavior is guided by three types of considerations:

- *Personal factors:* an individual's positive or negative evaluation (or attitude) of performing this behavior.
- *Subjective norms:* an individual's intention to perform a behavior when they evaluate it positively and when they believe the extent to which "important others" should perform it.
- *Perceived behavior control:* the perceived ease or difficulty in performing a particular behavior. High perceived control includes internal factors such as competence, willpower, and determinations and external factors such as resources (time, money, tools, and equipment), depending on other people as well as laws, rules, and regulations (Fishbein & Ajzen, 2011).

TPB has been applied in more than 2,000 studies and in 30 meta-analyses (Hagger et al., 2019). In one meta-analysis of nearly 100 studies, certain factors were found to be more important than others in vaccination intentions. While not focused specifically on COVID-19 vaccinations, some of these include improving cognitive attitude (thoughts, beliefs, ideas) rather than affective attitude (feelings and emotions) and increasing perceived susceptibility belief. However, it should be noted, that research has found that a greater intention to vaccinate does not always translate into people getting vaccinated. Regardless, TPB can help guide large-scale interventions and improve intentions, according to Xiao and Wong (2020).

Anticipated regret may be one of the primary motivators for vaccine confidence in TPB. Sandberg and Connor (2008) defined regret as a "negative, cognitive-based emotion that is experienced when we realize or imagine that the present situation could have been better had we acted differently" (p. 590). Anticipated regret is anticipating that regret before the behavior occurs, so a person avoids it. In a meta-analysis of anticipated regret, scholars found a strong anticipated regret-intention relationship with this factor being more significant than all others. (Sandberg & Connor, p. 590.)

Protection Motivation Theory (PMT)

Developed by Ronald Rogers, the Protection Motivation Theory (PMT) examines an **individual's intention to protect oneself from a potential threat, in this case, a vaccination**. PMT posits that based on one's perception of a threat, people are more or less likely to protect themselves through vaccinations (Makarovs & Achterberg, 2017).

Rogers (as cited in Makarovs & Achterberg, 2017) offers three components of a fear appeal:

- Magnitude of noxiousness (associated with the threat)
- Probability of occurrence (associated with the threat)
- Efficacy of recommended response (associated with the coping response)

According to Makarovs and Achterberg (2017), people translate this "objective" information provided by the three components of the fear appeal into their subjective perceptions. The protection motivation is then their intention to adopt (or not adopt) the recommended coping response (e.g., a vaccination). **Those people who are more likely to believe that they are at risk, that the impact of COVID-19 can be severe, and that the vaccine is safe and effective will be more willing to be vaccinated** (Makarovs & Achterberg). In a study of 30 countries with the H1N1 vaccine, the study confirmed that "belittling a pandemic's danger and being not sure about vaccination effectiveness and safeness results into an unwillingness to get vaccinated, fully underscoring the relevance of the protection motivation theory" (p. 7).

Looking at the impact of theories of behavior change on emergency response in infectious disease outbreaks, the application of PMT yielded support in key outcomes and conclusions. However, along with TPB, one of the criticisms of this theory is it does not adequately allow for emotional factors in decision making (even though PMT does consider emotion) (Weson et al., 2020).

Common-Sense Model (CSM)

The Common-Sense Model of Self Regulation, also known as "the Common Sense Model" (CSM), has been applied to vaccine and medicine adoption to explain the process of how patients become aware of a health threat, navigate their affective responses to it, formulate perceptions of it, and create action plans for addressing it (Leventhal et al., 2016). The model is a multi-level process that incorporates how people view certain illnesses based on symptoms they may experience, observation, discussions with others, and in some circumstances, the mass media and the environment. Perception can influence response. The theory also differentiates prototypes (memory structures) and representations (mental model activated in a specific instance in time).

In a study relating to HPV vaccinations, those who perceive themselves as low risk may decide a vaccine is not needed. Those who have higher illness coherence (or a personal understanding of an illness) may be more likely to engage in preventative behaviors, or in this case, a vaccination (Sherman et al., 2017). However, this is not always the case. A study of the pertussis vaccination applied the CSM model to look at how parents use their perception of pertussis (whooping cough) and their emotional representation to make sense of the pertussis symptoms and their vaccination decision. Those who had a greater awareness of the pertussis symptoms were less likely to vaccinate or plan to do so in the future. Also, the ability

to control the illness representations, or the perception that vaccines are ineffective and antibiotics are an effective treatment, was important. The researchers concluded that educational efforts in West Virginia to help people identify pertussis (through its characteristic cough) may be a double-edged sword, decreasing vaccine uptake among more educated mothers (Garg et al., 2018).

The Common-Sense Model is a complex, multi-level model. For more reading about this model, please see Levanthal (2016).

COM-B Model of Behavior

The COM-B model of behavior was developed to help identify what is needed for an intervention or behavior change to be effective (West & Michie, 2020). Michie et al. (2011) constructed a "behavior system" framework synthesized from 19 behavior-change intervention frameworks (that included nine intervention functions and seven policy categories). This COM-B system comprises **three essential conditions for behavior change: capability, opportunity, and motivation** that form the hub of a Behavior Change Wheel (BCW) (see Figure 1).

Moving out, forming a layer around the center of the wheel are **intervention** functions. These are sets of activities designed to change behavior patterns to address deficits in the three behavior change conditions. These intervention functions include education, restrictions, persuasion, incentivization, coercion, training, enablement, modeling, and environmental restructuring. The final or outside layer of the wheel includes broad **policy** categories that may enable the interventions to occur. These policy categories may include guidelines, planning, communication, legislation, service provision, regulation, and fiscal measures. The researchers recommend the intervention and policy categories should be used to ensure important options are not ignored in the behavioral change process.

Figure 1.
Source: Michie et. al (2020).
Behavioral Change Wheel (BCW)
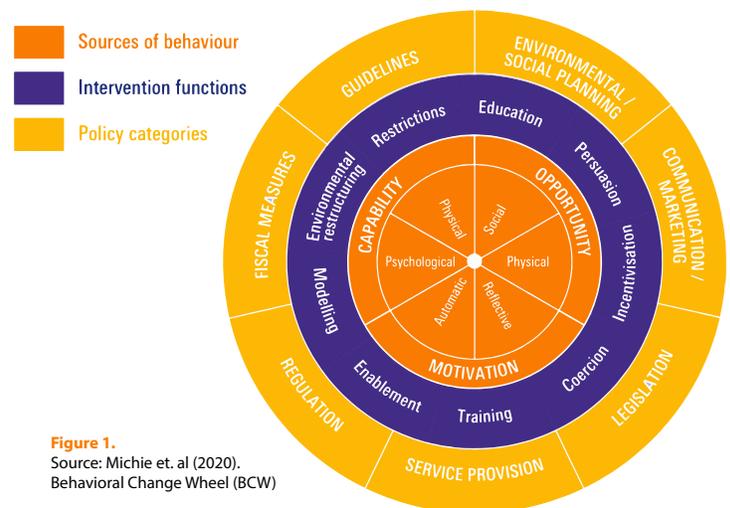
Using the BCW in the COM-B model as a guide, Williams et al. (2020) studied the barriers and facilitators as identified by high-risk individuals in the U.K. for receiving a COVID-19 vaccine. They found that **education and persuasion are most useful, specifically to improve knowledge of the susceptibility and severity of COVID-19 and vaccine effectiveness**. Persuasion could be used to change beliefs and encourage attitudes. Finally, the researchers recommended a **unified traditional media and social media presence to ensure consistent messaging** (focused on concerns for oneself and others).

Diffusion of Innovations Theory

Developed by Everett Rogers (2013), the diffusion of innovations theory looks at **how an innovation (anything perceived as new – in this case, a COVID-19 vaccine) is diffused among a social system over a period of time**. The theory posits that the **media influences awareness and knowledge of an innovation, while interpersonal networks impact its adoption**. Those who are considered "innovators" are the ones who are the first to adopt the innovation. Following innovators, the early adopters, early majority, late majority, and laggards follow an S-curve of adoption in that order. Each innovation may have a different set of innovators.

Innovators and early adopters may be opinion leaders and influence adoption among the rest of the population. However, some innovators, if not perceived as "opinion leaders" or trusted within a community, can create a backfire effect and make people less likely to adopt an innovation. This outcome was experienced in a public health effort in a Peruvian village to encourage the boiling of water. The intervention failed due to its inability to consider the influence of opinion leaders and cultural norms and values.

Important in the diffusion of innovations theory are the five main factors that influence adoption (Rogers, 2003):

- *Relative advantage:* the degree to which an innovation is perceived as better than the idea it supersedes
- *Compatibility:* the degree to which an innovation is consistent with existing values, past experiences, and needs of potential adopters
- *Complexity:* the degree to which an innovation is relatively difficult to understand and use
- *Trialability:* the extent to which can be tested, experimented with, or tried before adoption
- *Observability:* the degree to which the results are visible to others

A study of H1N1 investigating the impact of mass media and personal networks on vaccine willingness found personal information sources were more effective than mass media sources in influencing attitude and intention (Sengupta & Wang, 2014). Social networks are crucial for vaccine uptake, as are healthcare providers. "Healthcare providers who are embedded in large networks tend to be more exposed to innovations, and if they [the networks] are sufficiently dense, more inclined to adopt these" (Wensing et al., 2020, p. 3).

Some studies, though, have seen mixed results with the diffusion of innovations theory. For example, a study on the diffusion of influenza vaccine found diffusion of innovations theory had greater application to younger adults than to older adults, possibly attributed to the latter's long-term exposure to vaccination messaging (Chun et al., 2016).

GUIDELINES & STRATEGY RECOMMENDATIONS

The following section includes additional research-driven recommendations for a vaccine-related communication strategy and messaging based on the literature.

Information Sources (including federal agencies)

- The FDA could enhance its trustworthiness by providing more transparent information on the process of influenza vaccine production, approval, and regulation (Jamison et al., 2019).

- The CDC could potentially improve trust in the agency by acknowledging and explaining how vaccine effectiveness is assessed and what those measures of effectiveness mean for the public (Jamison et al., 2019).

- Transparency and clear information from regulatory authorities and pharmaceutical companies on the COVID-19 vaccine development, approval, and safety monitoring will be pivotal in enabling such trust (Cohen et al., 2020).

- Healthcare providers who make a vaccine recommendation are likely to influence vaccine uptake than those who do not (Kilich et al., 2020).

- The ideology or aesthetic identity of the messenger makes a difference. What matters most varies across time and communities (Harrison & Wu, 2020).

- Behavioral science can inform both empirical work to understand behavior, and the design and implementation of interventions to affect behavior (Weston et al., 2020).

- Health workers, especially those in communities, remain the most trusted advisor and influencers of vaccination decisions, and they must be supported to provide trusted, credible information on vaccines (WHO, 2019).

Theories and Models

- "The messenger effect" and a credible, similar, likeable messenger (for pro-vaccine, i.e., a high school student who is getting himself vaccinated) can be beneficial (Kofler, 2019).

- In line with "the Theory of Planned Behavior (TPB), helping people form intentions and reducing their vaccine hesitancy may be the first and most critical step to increase their vaccine acceptance. Additionally, research should explore whether a "strong vaccination intention" has been formed. If so, resource-based interventions are key; if not, persuasion-based interventions are more effective (Xiao & Wong, 2020).

- In line with TPB, strengthening perceived control (offering resources to make it easier to become vaccinated) among parents or health providers is particularly important (see "perceived behavior control under TPB) (Xiao & Wong, 2020).

- The content of mass media interventions to improve vaccine uptake should focus on the Behavior Change Techniques of health, emotional, social, environmental consequences, and salience of consequences. These techniques should be pitched concerning both self, and most importantly, others (Williams et al., 2020).

- An inoculation message designed to protect a person's generalized attitude toward a topic or behavior may be able to provide a blanket of protection for a person's attitudes toward specific issues that all fall within the same broad content domain (Wong, 2016).

Communicating About the Vaccine (including messaging strategies)

- Being transparent about the adverse effects of a vaccination is essential (Cohen, 2020).

- Concerns about side effects or bad reactions should be incorporated in vaccine communication campaigns and interventions (Guidry et al., 2020).

- Cultivate critical thinking and improve health and media literacy by equipping individuals with the faculty to critically assess information credibility (Wang et al., 2019).

- Official communications about vaccines should have a clear take-home message, tell a memorable story, and elicit feelings (Shelby & Ernst 2013).

- People are concerned about the rushed vaccine development process, so concerns and education about the process need to be addressed (Guidry et al., 2020).

- Frame the intervention so it aligns, so it aligns with existing compliance and messaging about hand washing, mask-wearing, and physical distancing. Also, collective support is drawn from messaging such as, "we're in this together," and the protective discourse implied within phrases like "shielding" (Williams et al., 2020).

- Listening to people's concerns will be fundamental to any successful approach, including thorough engagement with the general public, intended recipients of the vaccine, consumers, and healthcare professionals in discussions on COVID-19 vaccines (Cohen, 2020)

- Listen to these rumors and recognize what people are saying. These analyses can reveal deeper issues such as the feeling of being disenfranchised and not being heard (Gellin, 2020).

- Avoid the term "conspiracy beliefs" which risks "obscuring and denying meaningful aspects of people's lived experience, particularly regarding inequality-mistrust, and is an ethical and strategic mistake for public health" (Jaiswal, 2020, p. 2777).

- Digital push technologies (e.g., text messaging) have a modest, positive impact on vaccine uptake and series completion compared to non-digital interventions (Atkinson et al., 2019).

Conclusion

Understanding what people know, how they think, their behavioral intentions, and subsequent behavior can help increase vaccine uptake with the hope of managing the COVID-19 pandemic. Theories and models are critical guides to help companies on their journeys. But the topic of vaccinations can be complicated. Employees, communities, and other external audiences depend on communicators to provide them with consistent, clear, and accurate information that fosters trust and confidence. This guide aims to help companies reduce uncertainty for their employees and to design tailored, research-driven plans, strategies, tactics, and messaging to increase vaccine confidence, and ultimately uptake.

Institute for Public Relations Resources

The Institute for Public Relations has resources available on its website, including in its Research Library and Behavioral Insights Research Center.

IPR COVID-19 Vaccine Resources Page
This page provides research relating to the COVID-19 vaccination, including topics such as vaccine hesitancy, vaccine confidence, multidisciplinary theories and models for frameworks and planning, levers and evidence-based principles for application, the role of disinformation, and recommendations/strategies for vaccine uptake.

IPR Behavioral Insights Research Center (BIRC)
The mission of the BIRC is to research the factors that influence attitude and behavioral change to enable effective communication. BIRC can help professionals understand how and why people think and behave the way they do in this ever-changing business environment.

COVID-19 Resource Center For PR Professionals
IPR has compiled a list of resources beneficial for public relations and communication professionals to better understand and prepare strategies for COVID-19.

10 Ways To Combat Misinformation: A Behavioral Insights Approach
Misinformation, the unintentional dissemination of false, incorrect, or erroneous information, can lead people to hold inaccurate beliefs and make misguided decisions. To help fight against misinformation, the IPR Behavioral Insights Research Center has published this guide.

2020 IPR Disinformation in Society Report
The second annual study examines and tracks how disinformation — deemed as deliberately misleading or biased information — is spread in U.S. society. The poll of 2,200 Americans conducted March 25-27, 2020 by Morning Consult, explores the prevalence of disinformation in the U.S., the parties most responsible for sharing disinformation, the level of trust the American public has for different information sources, and whose job it is to combat disinformation.

10 Ways to Identify Disinformation – A Guide and Checklist

How can we stop the spread of disinformation? One way is to take additional steps to find out more about the information or articles or posts we may share with others via word-of-mouth or through technology. Advancements in technology have made it difficult for people to discern real posts, sites, or videos from fake ones. To help, IPR has created this guide to help people think before they link.

Why Debunking Myths About Vaccines Hasn't Convinced Dubious Parents by Chris Graves

This blog post by Christopher Graves leverages the day-to-day challenges faced by internal and external communicators and what can be learned from the vaccine wars.

What You Need To Know About Incorporating Behavioral Science Into Public Relations: A Primer

This primer helps organizations deliver more research-based, theoretical insights driven by behavioral science. Behavioral science aims to understand human behavior and decision-making. It encompasses disciplines examining the psychological underpinnings of behavior, such as cognition, neuroscience and social psychology.

IPR Research Letter

This letter is a weekly digest connecting you to noteworthy actionable academic and applied research in public relations, corporate communication, and beyond. We send out a new edition every Wednesday to keep you updated on the latest research in the PR industry.

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RECOMMENDED EXTERNAL READING AND RESOURCES

The Public's Role in COVID-19 Vaccination: Planning Recommendations Informed by Design Thinking and the Social, Behavioral, and Communication Sciences
Monica Schoch-Spana, Ph.D., Emily K. Brunson, MPH, Ph.D., and colleagues
Johns Hopkins Center for Health Security; Texas State Anthropology (2020)

This report examines implications of social and behavioral science on uptake of the COVID-19 vaccine. Several recommendations for US policymakers and communicators are included in the report, such as:

1. Understand and inform public expectations about vaccine benefits, risks, and supply.
2. Earn the public's confidence that vaccine allocation and availability are evenhanded.
3. Make vaccination available in safe, familiar, and convenient places.
4. Communicate in meaningful, relevant, and personal terms, crowding out misinformation.
5. Establish independent representative bodies to instill public ownership of the vaccination program.

The Vaccine Confidence Project

Based in the U.K., The Vaccine Confidence Project (VCP) monitors public confidence in immunization programs, determines the risk level of public concerns in the implementation of vaccine programs, and provides analysis and guidance for sustained public confidence in vaccines. The VCP has several current research initiatives underway to evaluate current attitudes surrounding the COVID-19 vaccine in the U.K. The project website also houses current resources and latest news for vaccines and COVID-19.

Mapping Global Trends in Vaccine Confidence and Investigating Barriers to Vaccine Uptake: A Large-Scale Retrospective Temporal Modelling Study
Alexandre de Figueiredo, Ph.D., Clarissa Simas, MSc, Emilie Karafillakis, MSc, Pauline Paterson, Ph.D., Heidi J. Larson, Ph.D. (2020)

This study mapped vaccine confidence across 149 countries between 2015 and 2019. Findings suggest that confidence in the importance, safety, and effectiveness of vaccines fell in Afghanistan, Indonesia, Pakistan, the Philippines and South Korea during this time. However, confidence in vaccines improved between 2018 and 2019 in some EU member states including Finland, France, Ireland, and Italy. Confidence in the importance of vaccines (rather than their safety or effectiveness) had the strongest association with vaccine uptake.

Combating the Disinfodemic Part One: Deciphering COVID-19 Disinformation
UNESCO (2020)

UNESCO developed a policy brief detailing main themes and dominant forms of COVID-19

disinformation based on research that is currently being conducted by the ITU-UNESCO Broadband Commission. The four dominant forms of COVID-19 disinformation are:

1. Emotive narrative constructs and memes
2. Fabricated websites and authoritative identities

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3. Fraudulently altered, fabricated, or decontextualized images and videos
4. Disinformation infiltrators and orchestrated campaigns
   The brief also explains nine main themes that are present in COVID-19 disinformation, such as false and misleading statistics, discrediting journalists and credible news outlets, and politicization, among others.

Combating the Disinfodemic Part Two: Dissecting Responses to COVID-19 Disinformation
UNESCO (2020)

This policy brief assesses the responses used to combat the prolific spread of COVID-19 disinformation. Four main types of responses to COVID-19 disinformation are:
1. Responses that focus on identifying COVID-19 disinformation.
2. Responses governing the production and distribution of COVID-19 disinformation.
3. Responses within the production and distribution of COVID-19 disinformation.
4. Responses aimed at supporting the target audiences of COVID-19 disinformation campaigns.

Guide to COVID-19 Vaccine Communications
Emily K. Brunson, MPH, Ph.D., and colleagues
Center for Public Interest Communications at the University of Florida; Purpose; The United Nations Verified Initiative (2020)

This guide, prepared by the Center for Public Interest Communications at the University of Florida, outlines a set of research-backed principles for sharing vaccine information that can help increase trust, acceptance, and demand for vaccination. Key principles include, but are not limited to:
- Make content concrete, supply a narrative, and provide value.
- Recognize that communities have different relationships with vaccination.
- Evoke the right emotions.

A Jab for Elvis Helped America Beat Polio. Now Doctors Have Recruited Him Again…
Robin McKie
The Guardian (2016)

This article reflects on campaigns used to combat polio vaccination hesitancy among teens in the 1950s. Elvis agreed to get his polio shot on air during the Ed Sullivan Show in an effort to persuade teens to get vaccinated – the effort worked, but not overwhelmingly. A grassroots organization called Teens Against Polio actually made a bigger difference in convincing other teens to get vaccinated. The takeaway is that hard-to-influence groups can still be reached by tapping into new forms of communication.

Vaccine Hesitancy: Definition, Scope, and Determinants
Noni E. MacDonald
Vaccine (2015)

This article defines vaccine hesitancy as "delay in acceptance or refusal of vaccination despite availability of vaccination services." Vaccine hesitancy is complex and context-specific, as it varies across time, place, and vaccine. Findings suggest that the three determinants of vaccine hesitancy are complacency, convenience, and confidence.

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