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Fostering Vaccine Acceptance and Demand in Latin America

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Key recommendations to enhance trust, acceptance, and vaccine uptake

1. **Countries should establish a national strategy for vaccine uptake**. This should be based on a local understanding of barriers and facilitators for the 6As, developed and owned by a multi-stakeholder taskforce. NITAGs should incorporate experts in behavioral and communication sciences, and coordinate with these experts to ensure recommendations are well informed by an understanding of the current local context.

2. **Invest in listening and understanding people's attitudes to vaccines in real time**. Programs should integrate mechanisms such as social listening and behavioral pulse surveys to enable real-time understanding of attitudes and trust in vaccines and circulating misinformation. The human side of vaccination is complex, influenced by myriad psychological and social factors, and must be understood at a local level and in real time if vaccine communications and community engagement is to be appropriate, accessible, and acceptable to people. These actions could be implemented at a national and/or sub-regional and regional levels.

3. **Engage with people where they get information, about what matters to them, through trustworthy voices**. Communications should be proactive, contain salient messages based on an understanding of the identity, worldview, or cultural and social values that may be influencing community's decisions to vaccinate, and should come from trustworthy sources. Misinformation should be assessed and addressed where appropriate, and reactive responses to issues should be informed by a risk communication plan.

4. **Make vaccination as easy as possible.** Vaccination should be made available in convenient, familiar and accessible places with equitable and empathetic service provision. Understand the vaccination journey of communities and iteratively remove points of friction.

5. **Health Authorities should set vaccination coverage rates (VCR) targets for every vaccination program**. Annual monitoring and communication of immunization rates for every target group can ensure accountability from all stakeholders for the performance of a program.

6. **Build a multistakeholder coalition**. Close coordination of the actions of all stakeholders, and consistent communications can support increased immunization rates.

1. Introduction

1.1. High immunization rates protect people & communities

Immunization is a cornerstone of strong primary health care and Universal Health Care (UHC), offering every child the opportunity of a healthy life. Vaccines help children survive and thrive contributing to the transformation of communities and societies. Every minute immunization averts at least 5 infant deaths globally from deadly diseases such as diphtheria, hepatitis B, measles, pertussis, polio, and tetanus.

Vaccines also protect health and well-being, enabling children to thrive free of the burden of many infectious diseases. There are over 16 million people walking today because vaccines protected them from paralytic poliomyelitis. Vaccines support child development beyond health, with recent studies showing vaccination is associated with improved physical and cognitive development and educational attainment. Immunization prevents millions of people from falling into poverty because of healthcare costs.

However, the great gains that immunization programs have brought are inherently fragile. Almost 1 in 7 children, an estimated 19.9 million infants worldwide, still miss out on basic vaccines.[1] The vast majority of under-immunized children live in low resourced settings, where poor access to immunization services and inequities of gender, geography and wealth are the drivers of under-immunization. While access and affordability barriers account for much of these immunization gaps, awareness and acceptance remain important barriers as well.[2] This paper will focus on public vaccine acceptance as a key determinant of the success of immunization programs but will underscore the importance of understanding acceptance in the broader context of the other determinants of vaccination uptake like access. The COVID-19 pandemic has had a vast and variable impact on vaccine acceptance across the world, which is reviewed in detail here.

1.2. The impact of COVID-19 on vaccination uptake

The COVID-19 pandemic has also had a dramatic impact on routine immunization programs, with marked **widening of immunization gaps**. Shutdown of immunization outreach services, the absence of health staff in facilities and public fear of infection have undermined demand for vaccination and trust in government services. Disruption of immunization services during the pandemic has resulted in millions of children missing out on routine immunization and increasing the number of zero-dose children and creating a potential **lost cohort** of under-vaccinated children who have not received basic childhood immunization.

Recent WHO/UNICEF data estimated that 23 million children missed out on basic vaccines through routine immunization services in 2020, an increase of 3.7 million over 2019.[3] The important gains made in the last 10 years have been fully lost, with a return to 2009 immunization rates for key vaccines like diphtheria, tetanus, and pertussis vaccine (DTP) and measles (MCV) in many countries. As compared

with 2019, 3.7 million more children missed their first dose of DTP-1, and 3 million more missed their first measles dose. A recent modelling study found even greater disruption to routine immunization, estimating that 30 million children missed DTP3 in 2020.[4] In addition to routine immunization disruptions, in 2021 UNICEF identified that 57 mass vaccination campaigns in 66 countries, for measles, polio, yellow fever and other diseases, had been postponed. The first whitepaper in this series describes in detail the troubling picture in the PAHO/WHO Region of the Americas where the pandemic has further widened immunization gaps that had already been declining progressively over many years.[5]

2. Vaccine Acceptance: the human side of vaccination

Vaccine hesitancy is not a new phenomenon; there was organized resistance to the very first smallpox vaccination campaign. Vaccine acceptance manifests as a continuum ranging from active demand and acceptance, to hesitancy, to refusal of vaccines (Figure 1). Most people accept routine immunization, with only a small minority actively refusing them (usually only 1-2%). People who are hesitant about vaccines may vaccinate anyway, they may delay vaccination or refuse one vaccine. People who accept all vaccines may be influenced by disinformation or loss of trust in health services and slide back along the continuum. The goal of any vaccine promotion strategy should be to build demand for vaccination, whereby individuals and communities seek, support, and/or advocate for vaccines and immunization services.

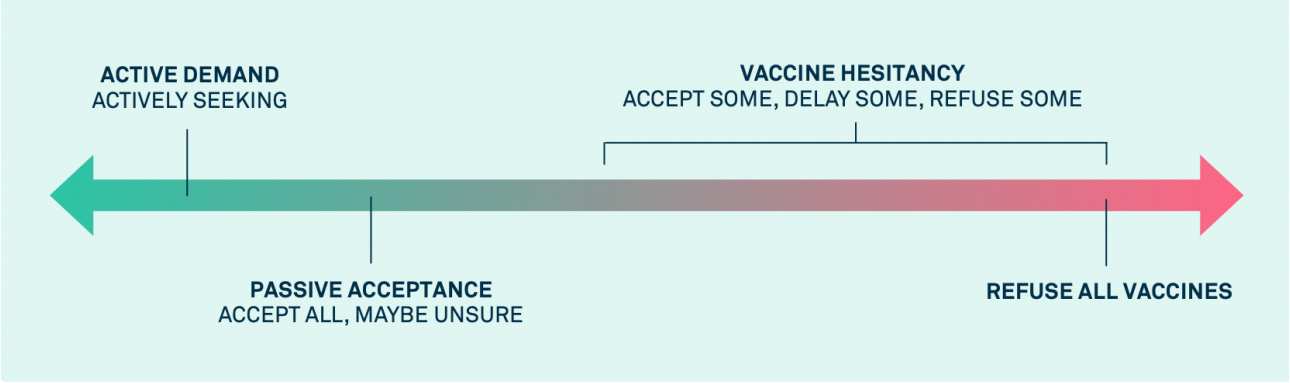


Figure 1: Vaccine acceptance manifests along a continuum.

To achieve optimal vaccine uptake, health systems must ensure for people to have access to and are aware of affordable vaccines. However, even when this is the case, there are myriad socio-psychological factors which may affect whether people will accept to be vaccinated. Vaccine acceptance is a complex, context- and vaccine-specific phenomenon. It may be influenced by a broad range of socio-psychological factors including attitudes, past experiences, thoughts and feelings, cognitive biases, and underlying trust[2] moral values[6], beliefs, or worldview[7] (Figure 2). These determinants can be triggered or fueled by vaccine misinformation which can spread rapidly across social networks to reach new, often geographically distant communities.

Disease salience Vaccines are victim of their own success – less visible disease decreases its relevance in people's lives	**Motivated reasoning** *We see what we believe rather than believing what we see.* People seek information reinforcing their beliefs, & ignore belief-conflicting information	**Social norms** Our behavior may be influenced by what we think others like us are doing, or by what we think other people expect us to do	**Moral value – Purity** Concerns with sanctity, chastity and avoiding contamination (spiritual and metaphorical) of oneself
Disinformation Exposure to vaccine disinformation can decrease vaccine acceptance	**Loss aversion** People are more affected by losses than gains	**Trust** We may do what we think other people expect us to do	**Moral value – Liberty** Belief in the rights of the individual
Information gaps If people cannot find reliable, relevant information, concerns may transform into hesitancy	**Omission bias** Rear of causing harm by acting is greater than that by not acting	**Beliefs** Religious beliefs may be perceived as precluding vaccination[8]	**Worldview** Conspiratorial thinking is associated with vaccine hesitancy[9]
HCP Recommendation A recommendation from a healthcare provider is consistently correlated with vaccine acceptance	**Present bias** People tend to focus on immediate gains or costs rather than long-term outcomes	**Past health experiences** A previous poor experience with the health system may decrease intention to vaccinate	**Political Affiliation** Emerged as a correlate of vaccine acceptance for the first time during COVID-19

Figure 2: Socio-psychological determinants of vaccine acceptance

2.1. Vaccine Hesitancy in health workers

Health workers are multipliers of trust in vaccination. A recommendation from a healthcare provider is consistently found to correlate with vaccine acceptance,[10] yet health workers may also be hesitant to vaccinate. Depending upon context, health workers may show similar levels of vaccine acceptance to the general population,[11] or may even be more hesitant, as was seen in the Democratic Republic of Congo.[12] In 2021 a study by the Pan American Health Organization (PAHO) which assessed vaccination attitudes in 1200 healthcare workers across 14 Caribbean countries found that 23% did not intend to be vaccinated against COVID-19, a rate which increased to 34% among nurses.[13] Given the pivotal role of health workers in building trust in vaccination, the author and colleagues developed two scales to measure health worker hesitancy and their self-perceived agency to advocate vaccination.[14]

2.2. Determinants of vaccine uptake: Understanding acceptance in context

There has been a tendency among national programs, policymakers, and the media in recent years to attribute missed vaccinations to faltering demand or refusal among parents. However, the journey of an individual to vaccination may be affected by many other barriers, so the reasons for suboptimal coverage are multifactorial. A multi-country study in early 2021 found that convenience, health providers' advice, and costs of vaccines were important factors in people's decisions to accept COVID-19 vaccines.[15] The 6As taxonomy captures all identified determinants of vaccine uptake in 6 categories: Access, Affordability, Awareness, Acceptance, Activation and Accountability.[2]

Factors within these different categories may interact for example if it is difficult to reach a vaccination site, or if vaccination carries financial or opportunity costs, people may be more hesitant to vaccinate. Therefore, we cannot view awareness and acceptance outside the context of the other categories. The author has used this intuitive taxonomy to facilitate a mutual understanding of the primary determinants of suboptimal coverage within an inter-sectorial working group in Mexico and a number of other countries. This was a first step towards a national strategy with targeted and effective solutions. With this practical application in mind, we use this taxonomy to organize proven and promising interventions for raising awareness and acceptance of vaccination (Annex 1).

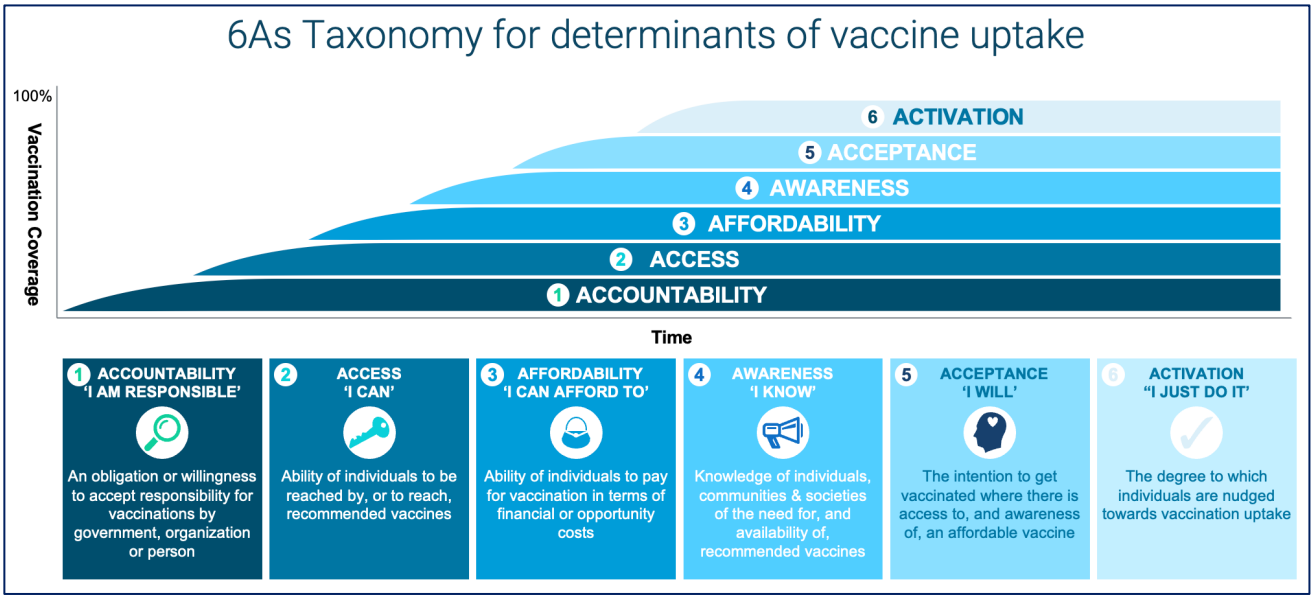


Figure 3: The 6As taxonomy of determinants of vaccine uptake

3. The impact of COVID-19 on vaccine acceptance

The only path out of the COVID-19 pandemic is for countries to achieve high vaccination rates with newly developed vaccines in adults, health workers, adolescents, and children – indeed all members of society. A spectacular mobilization of resources, political will, vaccine development science and regulatory measures enabled the rapid development, testing and introduction of a host of new vaccines against the SARS-CoV-2 virus which use new technologies such as mRNA. In this context, it is not surprising that many people have questions or concerns about vaccines, which if not answered well by authorities may translate into hesitancy or even refusal. The way countries have implemented strategies to manage COVID-19 spread have had strong impact - both negative and positive - on public trust in general and on vaccine demand.

In times of elevated uncertainty and anxiety some people are more likely to seek out and believe in conspiracy theories, and during this pandemic they did not have to go far to find conspiracies. The pandemic has been accompanied by an 'infodemic', an epidemic of misinformation. Vaccines have been drawn into this maelstrom of rumors, conspiracy theories and other misinformation. The Public Good Projects organization, which has been monitoring vaccine misinformation in the US for over 3 years, detected a 3-fold increase in vaccine-critical content in 2020.[16] Mis- and dis-information has added new, unfounded concerns and obscured reliable information.

> "*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.

Several surveys of vaccine acceptance and intentions have been initiated during the COVID-19 pandemic, including some longitudinal surveys which have allowed the tracking of trends. One survey of almost 1.5 million Facebook users from 23 countries, which collected data in 18 waves from July 2020 through March 2021, found generally high levels of intent to vaccinate which often increased through the pandemic, although there were some countries that were exceptions to these trends.[17] In Latin America a study which has run throughout the pandemic found initial high acceptance across most countries,[18] consistent with another region-wide study performed early in the pandemic.[19] A global longitudinal survey showed an inflection point in mid 2021 with a subsequent decrease in acceptance and increase in COVID-19 refusal, however this seems to be related to rapid increases in uptake at that time. This highlights the fact that as a program begins to achieve higher immunization rates, there will be a higher proportion of hesitant and refusing people among those who remain unvaccinated (Figures 4, 5, 6).

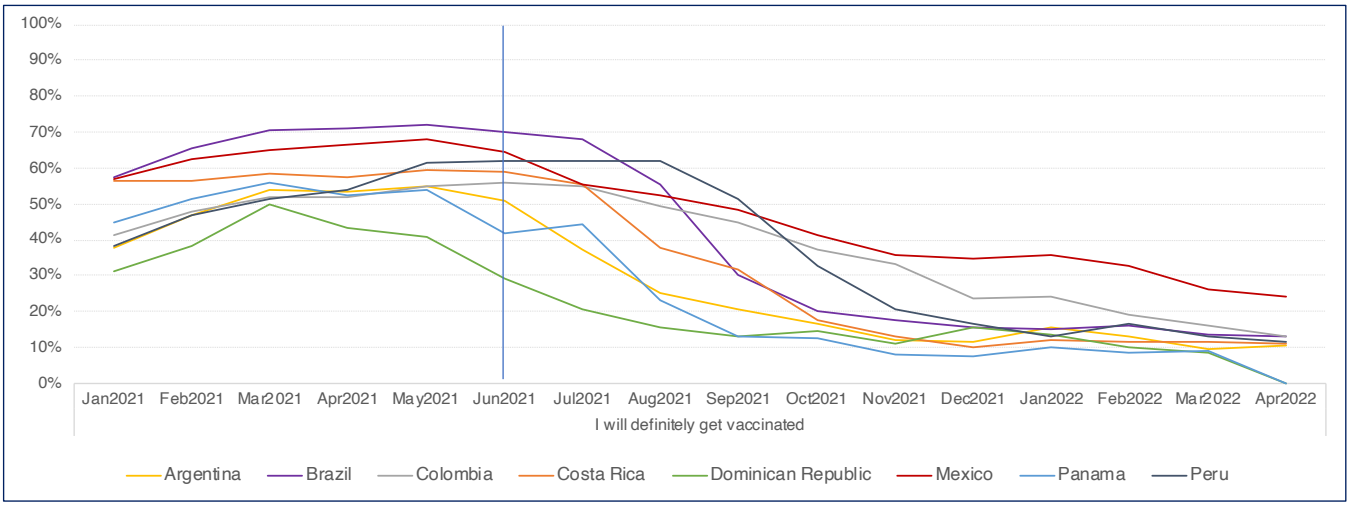


Figure 4: COVID-19 Vaccine Acceptance in LatAm countries – Official data collected by Our World in Data - Last updated 29 May 2022

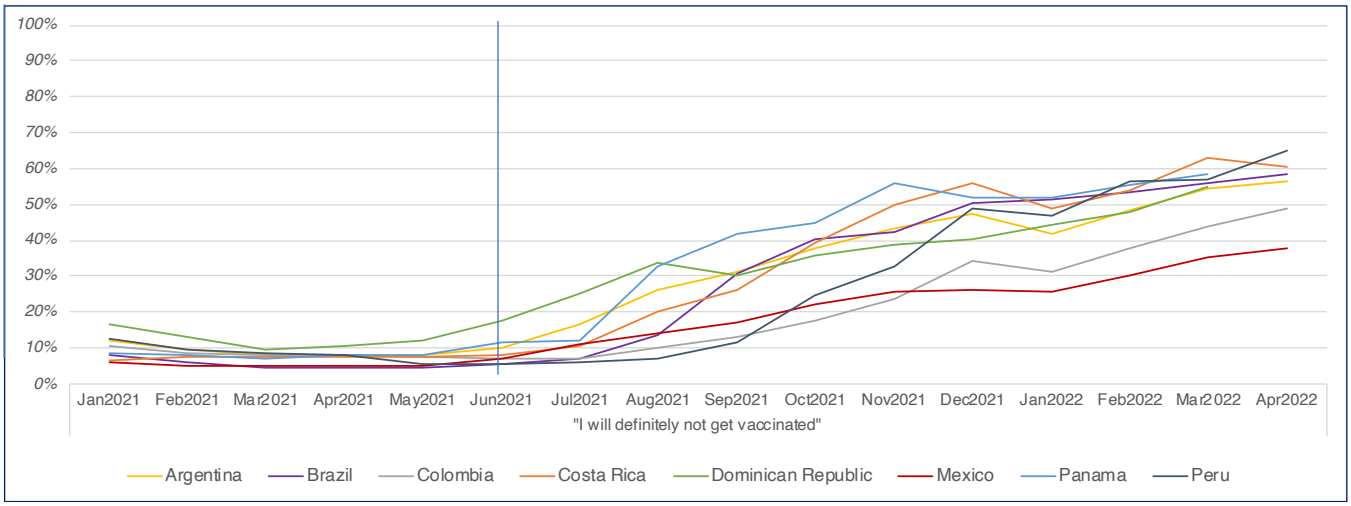


Figure 5: COVID-19 Vaccine Refusal in LatAm countries – Official data collected by Our World in Data - Last updated 31 May 2022

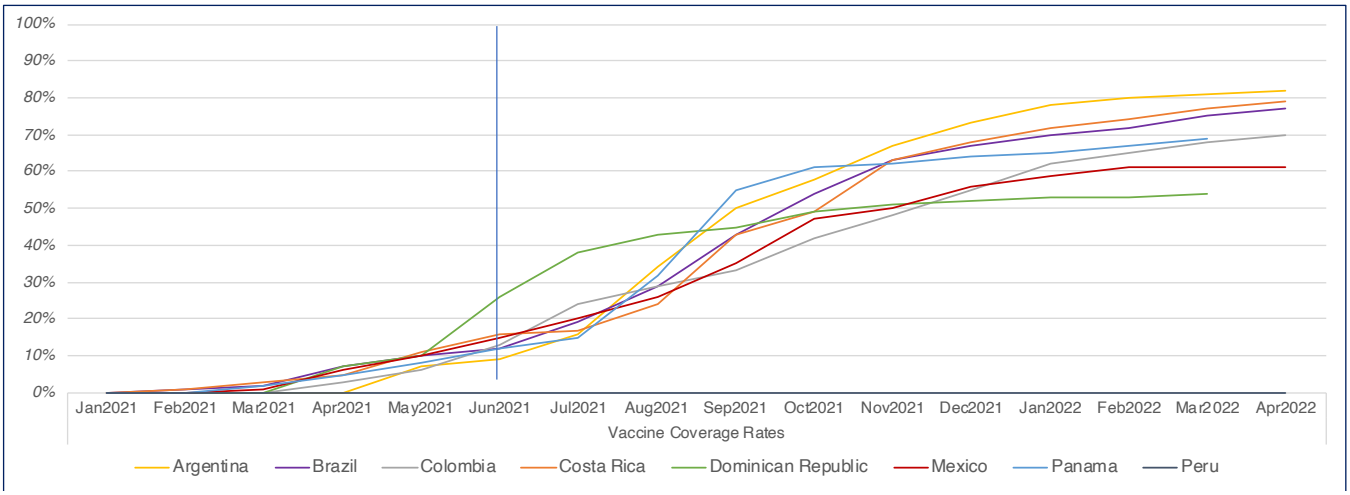


Figure 6: COVID-19 Vaccine Coverage Rates in LatAm countries – Official data collected by Our World in Data - Last updated 31 May 2022

3.1. Emergent determinants of vaccine acceptance

During the COVID-19 pandemic there have emerged some new determinants of vaccine acceptance and certain others have become more important. Hesitancy to vaccinate against COVID-19 has been associated with hesitancy for other vaccines including routine immunization. Here we discuss some of these emergent determinants in greater detail.

3.1.1. Trust

The bedrock of vaccination acceptance is public trust; trust in vaccines and vaccine producers, in the healthcare profession and the government.[20] Trust has been consistently identified as a determinant of hesitancy across different vaccines and contexts. National responses to the COVID-19 pandemic were often not accompanied with clear, consistent, regular risk communication to the public. They involved the imposition of public health measures like movement restrictions or compulsory mask use which had never been implemented at a national scale. Continuously in the spotlight, public health interventions like vaccination often became politicized. For the first time political affiliation has been found to be associated with acceptance. In the US Democratic party membership and decreased level of religiosity predicted acceptance of a COVID-19 vaccine,[21] and self-identified democrats were significantly more likely to be vaccinated (73%) than republicans (59%).[22]

Trust in government has emerged in the pandemic as an important determinant of people's vaccine decisions. One study found that institutional trust - measured using an index that combined the level of mistrust in the head of state, parliament, electoral system, courts and local government - correlated with child vaccination rates across 22 African countries.[23] Low trust in health authorities and government has

been correlated with COVID-19 vaccine hesitancy in Latin America and the Caribbean.[24] In Trinidad and Tobago trust in the health authorities and health practitioners was associated with higher acceptance of COVID-19 vaccination and lower acceptance of vaccine misinformation.[25] Lack of vaccine acceptance was associated with lack of trust in authorities and scientists in 8 European countries.[26] A study in the UK and Ireland found that higher mistrust of authoritative sources of vaccine information, including healthcare professionals, scientists and government, was associated with vaccine hesitancy.[27] Public trust may be the most important element of a vaccination program in the context of a pandemic: An analysis of the resources committed to COVID-19 vaccination, health outcomes, vaccination strategies and public trust in government and health systems in the US, Canada and Denmark, countries with very different pandemic responses and COVID-19 vaccination rates, found that trust alone correlated with high uptake.[28] Trust in government and the collective trust among people was associated with compliance with directives and public health measure at the start of the pandemic.[29]

3.1.2. Disinformation

During the pandemic, the global information ecosystem in which people seek vaccine information has been characterized by mis- and dis-information, and information voids. While misinformation is accidental falsehoods, which can distract people or distort reliable information, disinformation is deliberate falsehoods engineered by bad actors, circulated with malicious intent to serve a personal, political, or economic agenda.[30] Information voids leave people unable to find the reliable, accessible information that they need to make their decisions. The spread of disinformation is accelerated by the algorithms used by social platforms to promote content, which prioritize content which is popular rather than content which is reliable or relevant. These algorithms have been proven to preferentially promote disinformation and polarize the societal debate.[31] Vaccine disinformation is increasingly being deliberately generated and spread across social networks in calculated attempts to politicize or monetize vaccines or polarize societies.

The uncertainty of a pandemic context and associated anxiety and feelings of powerlessness or mistrust in authorities can leave people more susceptible to conspiracy theories. These can help people to simplify complex and uncertain situations,[32] and believing in one conspiracy narrative increases the likelihood that people will believe additional conspiracy narratives.[33]

There is increasing evidence that prevalence of vaccine disinformation on social networks may correlate with decreased intention to vaccinate and even vaccination coverage rates. The incidence of foreign disinformation on twitter was associated with lower COVID-19 vaccination rates in one multi-country study,[34] and an ecological study in the US found that levels of online misinformation were associated with vaccine hesitancy and COVID-19 immunization rates. Exposure to misinformation may increase vaccine hesitancy in individuals.[35]

Latin America has not been spared from the infodemic, with early surges of misinformation related to subjects such as the use of unproven drugs to treat COVID-19 like hydroxychloroquine and

ivermectin.[36] Fake news spread rapidly and easily across borders in the region.[37] One study of 6 countries in the region found a correlation between higher COVID-19 mortality rates and higher use of social media and trust of social network health-related content.[38] Peru, the country with the highest COVID-19 mortality rate in the region in early 2022, also had the highest Infodemic Risk Index (IRI; 0.998) which suggests that someone in Peru would have a chance larger than 75% of reading an online post linking to a Web site with potentially misleading information about COVID-19, as well as a chance between 51% and 75% of re-sharing or commenting about that information.[39] In Costa Rica, the vaccination decisions of people already hesitant were found to be more susceptible to misinformation.[40] However, in a global study people which found large regional differences in perceived risk of misinformation, the highest levels of concern about misinformation were in Latin America.[41]

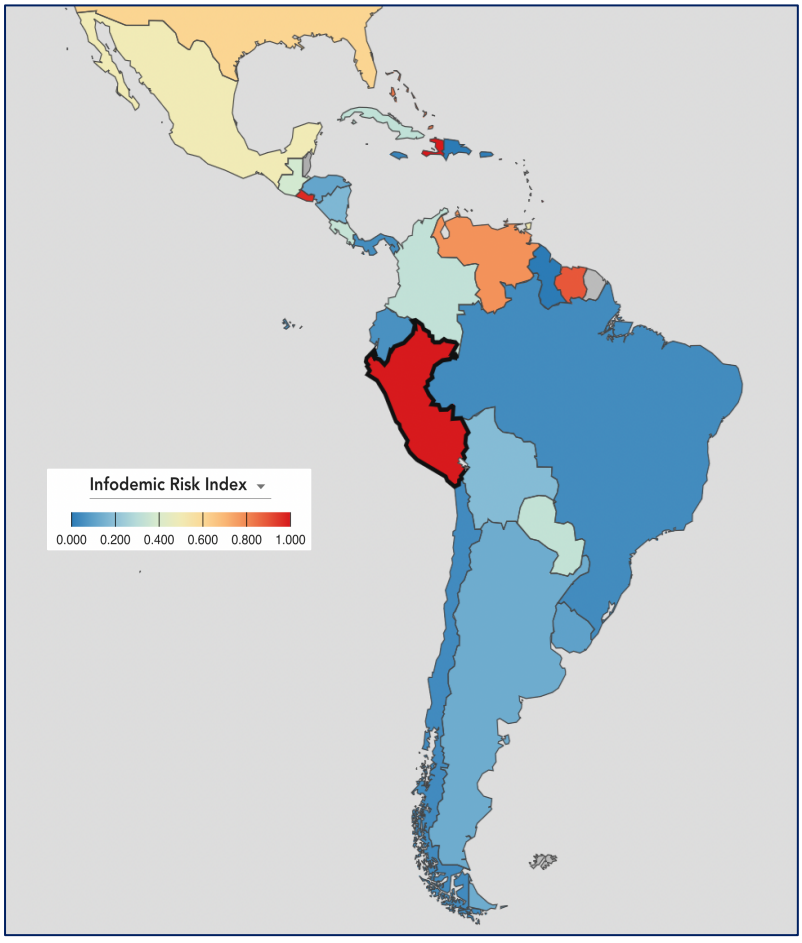


Figure 7: Infodemic Risk Index (IRI) for the Latin America region (April 30, 2022).

The IRI, developed by the COVID-19 Infodemics Observatory, estimates the chance that a user of a social media platform is directed to potential misinformation or disinformation about COVID-19.[37]

3.1.3. Moral values

Six almost-universal moral values have been proposed as potentially influencers of people's decisions, often subconsciously. While vaccine promotion messaging has often emphasized the moral values of care/harm (emphasizes caring for others and protecting them from harm) or fairness/cheating (appeals to altruism) a seminal study showed that, at least in the US, these are not associated with vaccine acceptance.[6] However, significant associations of the purity (avoiding contamination of body) and liberty (belief in the rights of the individual) moral values with hesitancy in parents were found in this study and subsequently in others.[42] Purity, in which people disapprove of acts thoughts to be "disgusting" or "unnatural", was in particularly associated with high hesitancy or vaccine refusal in these two studies.

Vaccine disinformation is engineered by bad actors who often test many different themes and formats for their ability to attract attention and trigger sharing on social networks. Purity has been a common theme in vaccine disinformation: one pre-pandemic thematic analysis of vaccine-opposing tweets found vaccine ingredients were an important element of much disinformation.[43] However, there is evidence of a pivot from purity-themed to liberty-themed vaccine critical narratives which suggest COVID-19 vaccination programs may affect civil liberties and personal freedom.[44,45] Disinformation authors have malicious motivations which are commonly financial profiteering. A recent report, which identified 12 active vaccine critical people who accounted for the majority of vaccine disinformation in the US, and who have created an industry worth over $1 billion, found that a very common theme that these profiteers used was 'health freedom'.[46]

3.1.4. Threat perception

There is evidence that for routine immunization, vaccines may be a victim of their own success. The dramatic reductions in burden of diseases due to vaccination programs has led to decreased disease salience for individuals and even healthcare providers. However, during the current pandemic there was a novel, unknown and debilitating disease - COVID-19 - which was at the forefront of public consciousness across the world. A study in 8 LMICs including Brazil, conducted as countries were beginning to roll-out vaccination, found that worry about COVID-19 disease was associated with vaccine acceptance.[47] A review identified confidence in vaccine safety and effectiveness and high COVID-19 disease risk perception as facilitators of vaccine acceptance.[48]

The Protection Motivation Theory (PMT) posits that people evaluate a health threat and their ability to cope with that threat in parallel. For vaccines, this threat appraisal involves feelings of personal susceptibility to a disease through perceived vulnerability and likelihood that one may catch the disease, and a more rational appraisal of disease severity.[49] Coping appraisal includes perceived efficacy of the vaccine, costs (or risk) of the vaccine, and self-efficacy to get vaccinated. If someone finds that their threat and coping appraisals are equivalent, they are more likely to be motivated to protect themselves. If not, they may adopt maladaptive coping behaviors. PMT has been shown to predict intentions to

vaccinate against measles,[50] influenza[47,51], pandemic H1N1 influenza[52] and COVID-19.[53] In the next section we discuss how these findings may be applied to more effective communications strategies.

3.1.5. Selective vaccine hesitancy

While the determinants of vaccine hesitancy may vary within an individual for different kinds of vaccine (e.g., A childhood vaccine like MMR versus an adolescent vaccine like HPV), prior to the pandemic there was little evidence for preferences among the public for vaccines of the same type which come from different manufacturers. However, with multiple new vaccines against COVID-19 being produced by western manufacturers, China, Russia and other countries, there is increasing evidence of selective vaccine hesitancy. A study in France found that people's attitudes were more positive for vaccines manufactured in Europe versus China.[54] Trust again may underpin selective vaccine hesitancy. A study of vaccine hesitant individuals across Latin America found that vaccine hesitancy decreased with increasing trust in the government of the vaccine producers' country, with respondents showing a preference for western-produced vaccines.[55] This study found that trust for COVID-19 vaccines was sometimes mediated by perceived efficacy of the vaccines, with hesitancy increasing in people who were informed of the 50% efficacy of the Sinovac vaccine.

4. Effective strategies for fostering vaccine acceptance

While the focus of this paper is vaccine acceptance, there are barriers and facilitators to the other elements of the 6As taxonomy (accountability, access, affordability, awareness, activation) which may have an impact on people's acceptance of vaccination. This section highlights and organizes these barriers using the intuitive 6As taxonomy (Figure 3), and describes *proven* interventions which correspond to these barriers, drawing upon systematic reviews of the evidence.[2,56,57]

Addressing under-vaccination requires a nuanced and real-time understanding of the root causes of the problem.[2] Strategies to increase vaccine acceptance and uptake need to be multilayered, evidence-based, culturally appropriate, and context specific.[58] Interventions should be targeted to locally-defined barriers to uptake and issues related to awareness and acceptance. They should also be targeted to the level of acceptance or hesitancy in communities or populations. For example, for people who are willing to be vaccinated, interventions should focus on making vaccination as affordable (in terms of financial and opportunity costs) and as easy as possible through reducing the effort and time necessary to get vaccinated. Even someone willing to be vaccinated is likely to be juggling myriad priorities in their daily life, so strategies which activate people to act are important.

Different strategies may be required for people who have concerns (but are otherwise accepting) and those who are hesitant or distrusting. Interventions may need to focus on, for example, building trust in vaccines and vaccination programs, proactively providing information and resources which are relevant

and resonant and come from trustworthy sources, and countering misinformation through pre-bunking and debunking. Those who actively refuse vaccines, and the few vocal vaccine deniers, may be very hard to reach and any program of vaccine advocacy should consider in whom it could have the most impact.

4.1. Measure and track vaccine acceptance

To develop effective targeted interventions, it is crucial to measure and track vaccine acceptance and barriers to vaccine uptake. Routine monitoring of vaccine acceptance through regular pulse surveys, which use items that have been validated against intentions and behaviors, would allow program managers and communications specialists to identify signals of increasing hesitancy, to tailor demand generation strategies, and to measure the impact of interventions. Validated tools which measure vaccine acceptance are now available for childhood immunization,[59] health workers (includes a scale for advocating vaccines),[15] and adults.[60] During the COVID-19 pandemic, one such survey tracked acceptance in over 100 countries, but did not employ a validated scale.[61]

Rapid assessments should also be used to identify the true barriers to vaccine uptake to inform any intervention strategy. One such survey conducted by the author in Mexico clearly disproved the consensus that acceptance was a barrier to early influenza vaccine uptake. The actual challenges were identified as being related to access and awareness, with people not knowing that a free vaccine was available to them (Figure 8). This allowed a cross-sectorial working group to triangulate the interventions employed with the actual barriers and effectively increase uptake earlier in the season.[62,63]

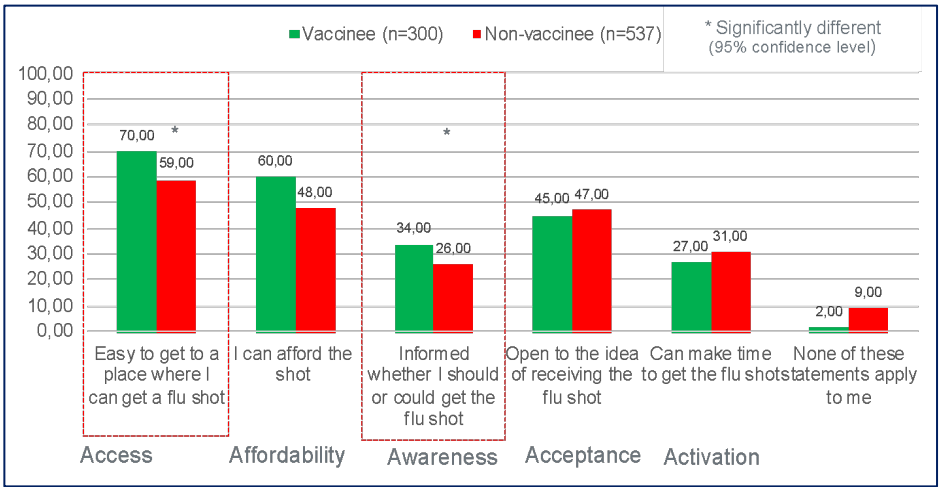


Figure 8: Results of 5As survey in Mexico evaluating potential barriers to early influenza vaccine uptake in Mexico in 2015.

4.2. Accountability

Accountability refers to an obligation or willingness to accept responsibility for immunization rates by government organization or person. A vaccination program requires more than a recommendation and funding to be impactful. Senior political and technical leaders must be committed and highly engaged in the mobilization of resources and implementation of actions to foster public trust and vaccine uptake. Health Authority accountability was identified as a pillar of high-performing influenza vaccination programs.[64] This manifested in multiple policies and actions including political or health leaders championing vaccination, VCR targets set for recommended populations, and generation and use of epidemiological, coverage and economic data. A characteristic of LMICs which have achieved good uptake of COVID-19 vaccines aligned political leaders behind their vaccination strategies, and some even launched strategies with the public vaccination of Heads of State.[65] Regional and national immunization advisory groups could add vaccine demand and uptake to their remit.[66] Vaccine mandates, which must be implemented with strong political commitment, are effective but should be implemented with the appropriate level of coerciveness to ensure that public trust is not eroded.[67] Accountability also refers to the willingness to implement multiple interventions, such as those listed below for the other As, in an integrated National Vaccine Deployment Strategy.

Annex 1 ("Barriers and proven facilitators of vaccine uptake") lists specific barriers and proven or very promising interventions which may address these barriers.

Best practice: COVID-19 vaccination program in Morocco
Political or technical expert champions of vaccination. Morocco had reached 63% COVID-19 vaccination coverage in mid-May 2022. A national vaccine deployment plan was being followed in early 2021, which clearly laid out the roles and responsibilities of various government departments, with a National Steering Committee chaired by the Minister of Health. Public trust was built through a champion at the highest political level; King Mohamed VI being the first person to be vaccinated.[67]

Best practice: US National Adult and Influenza Immunization Summit (NAIIS).
It takes a village to build high VCR in a vaccination program. Mobilization and coordination of multiple stakeholders was a key characteristic of high-performing influenza vaccination programs. The NAIIS, dedicated to addressing and resolving adult and influenza immunization issues, mobilizes over 700 partners representing over 130 public and private organizations. These include the CDC and federal agencies, hospital and pharmacy groups, vaccine manufacturers, medical societies, and civil society organizations. The NAIIS holds a Flu Summit at the beginning of every influenza season, setting common goals among partners.

4.3. Access

Access refers to the ability of individuals to be reached by, or to reach recommended vaccines.

Vaccination sites should be easily accessible and findable (people need to know where they are), with minimal wait times. Offering immunization services on a continual basis, by appointment or walk-in can improve uptake. Onsite vaccination, where vaccines are provided at places where people are already present - such as workplaces, places of worship, or even at home[68] - is an effective way to smooth the vaccination journey.

Access also refers to the experience that someone may have with the health services providing vaccines. A qualitative study in Gabon found that non-adherence to vaccination at mother and childcare clinics was due to access issues (distance to clinic, transport costs) and mothers' feelings of shame which arose from the health providers reactions to poverty-associated issues such as attending the clinic with a dirty or poorly clothed child.[69]

Case study
A 6-week pilot in Portugal which offered free influenza vaccination to older adults on a walk-in basis in community pharmacies led to a 30% increase in uptake.[70] This facilitated access was part of a multicomponent program which also included a communications campaign which let people know about the easily accessible vaccination.

4.4. Affordability

Affordability refers to the ability of individuals to pay for vaccination in terms of financial or opportunity costs. Providing vaccines free of financial cost removes an important barrier to uptake. However, opportunity costs can also be an important barrier to vaccination uptake. In rural South Sudan, the long distances that women must walk to vaccination sites were identified as a key barrier to routine immunization.[71] In both high- and low-income countries, other affordability barriers may include cost of transportation, waiting times, and childcare for other children.[56] These opportunity costs can make vaccination a negative experience. There is good evidence for provision of small, non-financial incentives effectively increasing vaccination rates through making the vaccination experience a net-neutral or even net-positive experience.[57] In Panama, Argentina and the Philippines, the public were offered free transportation to vaccination sites to encourage uptake of COVID-19 vaccination.[72]

Best practice: Small incentives in India
A seminal study in rural India showed a modest increase in immunization rates with provision of a reliable monthly immunization camps in villages (Access) but a doubling of vaccination rates associated with the provision of small, non-financial incentives. Each time a parent brought their child for a vaccine they received a packet of lentils (sufficient for one meal) and a metal plate when the child completed all the required vaccines.[73]

4.5. Awareness

Awareness is the knowledge of individuals, communities & societies of the need for, and availability of, recommended vaccines. Information and knowledge alone are rarely sufficient to motivate people to act, but they are an essential base for any vaccination decision. If someone does not know that there are serious diseases which they are vulnerable to, or that there are vaccines which can prevent these diseases, they will simply attend to other priorities.

Awareness includes knowing that there are accessible and affordable vaccines available: the analysis shown in Figure 8 found that a major barrier to influenza vaccine uptake in Mexico was a lack of awareness of eligibility for a free vaccine. Mis- and disinformation can impact awareness by obscuring the reliable vaccine information which may be available. Data deficits, where there is high demand but low supply of accurate information "typically occur when health authorities and scientific experts are unaware of the demand for information on a specific aspect of vaccination or fail to provide the information in an accessible, compelling manner.[74] Thus people searching for information on vaccines may find insufficient, inaccurate, or inappropriate information or be dissatisfied with the content that they find.

Any strategy for pro-vaccine messaging and misinformation management should involve close coupling of **social listening** and analysis with risk communication and community engagement (RCCE), communications, advocacy, and social mobilization activities. Social listening to both online and offline conversations is an essential way of understanding local information gaps, concerns and questions, and disinformation. The **Vaccine Misinformation Management Field Guide** provides detailed guidance for establishing or strengthening a national vaccine social listening program.

The **Vaccination Demand Observatory**, a collaboration between UNICEF, Public Good Projects, and Yale Institute of Global Health provides tools, training, and technical support to countries to develop a vaccine social listening strategy. The Observatory is also consolidating reports on misinformation and information needs from across the world in a single repository. See these reports and learn more here: https://www.thevdo.org/.

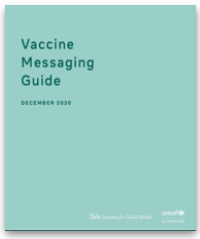
4.6. Acceptance

Acceptance is the intention to get vaccinated where there is access to, and awareness of, an affordable vaccine. Consistent with the broad range of socio-psychological factors which may influence vaccine decision making described in *Section 2*, a number of barriers to vaccine acceptance have been identified.[56]

While many communications interventions have focused on vaccine- and disease-specific factors, there is strong evidence that trust is foundational to vaccine acceptance; trust in vaccines and health providers, and institutional trust (health authorities, government).[10] Past health experiences, such as a bad experience with needles or a healthcare encounter may also underpin some vaccine decisions.[10]

There is mixed evidence on the impact of **educational campaigns**, which can potentially improve both awareness and acceptance.[73] Well-intentioned vaccine promotion content may actually backfire, decreasing intentions to vaccinate, particularly in those who are already hesitant.[75,76] Effective public communications campaigns on vaccines should be context-specific, culturally-appropriate, and informed by behavioral and local insights.[58]

For example, a collaboration between UNICEF, Yale Institute of Global Health and Meta has been testing vaccine promotion messages in 4 countries. Messages were designed based on local insights on social media usage and vaccine hesitancy and on behavioral science. We found that content must be locally-relevant, such that values-based and social norm-based messaging worked well in some countries but not others, and that the messenger was very important.[77] As discussed in the previous section on threat perception, messages which highlight the risks of disease should also emphasize self-efficacy and response-efficacy (vaccine).



The **Vaccine Messaging Guide**, written by Dr. Thomson and colleagues at Yale Institute of Global Health, is a quick-start guide providing evidence-based recommendations for developing behavior-centered vaccine messaging.[78] It provides a detailed overview of the sociopsychological determinants of vaccine decision making and many tips and examples.

An essential part of an effective vaccine communications campaign is trustworthy messengers. **Vaccine Champions** (community mobilizers), voices who are considered trustworthy by the target community, such as religious or community leaders, celebrities or peers should be mobilized to support any campaign. Health providers are consistently the most trusted voice on vaccines, and a **provider recommendation** is a strong driver of vaccine acceptance and uptake.[73] However providers often need support to manage vaccine conversations with their patients. The **AIMS method** for vaccine conversations, which teaches health professionals how to speak with patients and what to say, is being rolled out globally in an online training program led by the International Pediatrics Association.[79]

The **Vaccine Misinformation Management Field Guide**, written by Dr. Thomson and published by UNICEF, helps organizations to address the global infodemic through 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.[84] It is available in English, Spanish, French and Arabic.

Effectively countering **disinformation** and ensuring people can find reliable, trusted vaccine information remains a major challenge for vaccination programs. A pillar of any strategy to manage misinformation should be to fill information gaps with reliable, resonant, relevant information. In Denmark, after the decline in HPV immunization rates that was associated with misinformation, a national information campaign with wide reach on social media led to increased immunization rates.[80]

There is very promising research to show that people may be immunized against disinformation. Psychological inoculation approaches may either be preventative (pre-bunking) or therapeutic (debunking). **Pre-bunking** involves people can be 'inoculated' against misinformation by being shown how to identify the misleading tactics used in disinformation or the hidden motives of the disinformation authors and exposed to a refuted version of the message beforehand.[81] The author is co-leading a collaboration to develop a vaccine module for the **game Cranky Uncle**[82] which promises to take debunking to scale, with initial roll-out in East and West Africa.

Debunking, to provide specific immunity against a specific disinformation narrative, may be used if social listening has identified and assessed a rumor as medium or high risk (see Misinformation Management Field Guide for more on rumor assessment). An effective debunk highlights that a message is false, explains why it is false, and shows what may have led people to believe the falsehood in the first place, and it includes the facts in simple, clear terms.[84]

Best practice: Trusted outreach through micro-influencers in the US. Public Good Projects built a digital campaign employing user-generated content from social media 'micro influencers' who are predominantly followed by African Americans and Hispanics during two influenza seasons to disseminate positive information about influenza vaccines. This campaign led to a large increase in positive information in target online communities and was associated with significant increases in positive beliefs about the influenza vaccine, and significant decreases in negative community attitudes toward the vaccine.[83]

4.7. Activation

Activation refers to prompts or nudges which activate people to get vaccinated. The journey to vaccination is often filled with friction, and people are always managing competing priorities. A behavioral nudge refers to an intervention which makes it easier for someone to make a good decision and works by adjusting any aspect of the choice architecture that alters people's behavior in a predictable way (without forbidding any options). Prompts and reminders are effective ways of activating people to do something that they intended to do but have not got around to. There is a lot of evidence to show that reminder and recall interventions can increase vaccine uptake in both high- and low-income countries, particularly if they are linked to vaccination records.[57,84]

Best practice: Reminders in Kenya
Multicomponent interventions may be more effective in raising uptake. In Kenya, which already has high levels of full childhood immunization (>80%), a randomized trial found that SMS reminders led to marginal increases in immunization rates. However, when parents received both and SMS and a small monetary incentive, there was a significant increase in the number of fully immunized children.[85]

5. Conclusions

The ultimate goal of any strategy to increase vaccine acceptance is to **improve immunization rates**. Health authorities must assume accountability for the performance of national vaccination programs, as measured by VCR. Studies to understand the root causes for suboptimal coverage, including each of the 6As, can inform the development of targeted national strategies by multi-stakeholder working groups.

The **6As VCR workshop methodology** was developed by the author to facilitate the convening of such working groups and development of national strategies.

National Immunization Programs should establish robust mechanisms to listen to and understand people's vaccine-related concerns, the underlying determinants of their vaccine decisions, and their vaccination-related experiences. These insights can then inform multi-modal, people-centered approaches to policies and programmatic interventions.

Annex 1: Barriers and Proven Facilitators of Vaccine Uptake

BARRIERS	FACILITATORS
Lack of political will and accountability	Activate political and technical expert champions of vaccination
	Regional & National Immunization advisory groups add vaccine demand & uptake to their remit
	National Vaccine Deployment Plans
	Vaccine mandates or institutional recommendations
	Investment in pandemic preparedness
	Sustainable procurement system to ensure appropriate vaccine supply
Failure to prioritize program performance	VCR targets set at national & regional levels for recommended populations, including HCWs
	Nationwide regular monitoring of patient VCR at vaccination site
	Immunization registry
	Structured & robust disease surveillance network
	Incentives for HCWs
Poor coordination among partners	Multi-stakeholder coalition supporting immunization
Limited or difficult-to-access vaccination sites	Onsite vaccination at workplace, places of worship etc
	Simple vaccination journey
Inconvenient location or hours of vaccination site	Flexible hours for vaccination
	Access to multiple vaccination settings
Financial costs of vaccine or service delivery	Provision of vaccines free of cost
Opportunity costs	Small non-financial incentives
	Free transportation to vaccination sites
Lack of knowledge about diseases or vaccines	Coordinated multi-stakeholder communication campaigns
	Data generation on disease burden and disease-related disruption to healthcare system

Lack of knowledge of eligibility for vaccines	
Insufficient or inappropriate information	Systematic social listening and tailored communications
	Vaccine Communication Working Group
Misinformation	Systematic social listening
	Psychological inoculation interventions – debunking and prebunking
Low trust	Recommendation from trusted healthcare provider
	Vaccine champions
	Patient associations endorse vaccination
Social norms	Communicate positive social norms for vaccination
Risk perception	Health Authorities follow proven risk communication principles when communicating to the public and health professionals
Past healthcare experience	Ensure safe, reassuring vaccination experience
Thoughts and feelings; beliefs and values	Tailored communications design including message framing, response and self-efficacy
Low disease salience (perceived susceptibility)	
Low perceived response (vaccine) efficacy	
Disinformation	Psychological inoculation
Competing priorities	Reminders sent to all target populations (preferably by multiple stakeholders)
	HCP pop-up notification to vaccinate eligible patients
Time constraints	Access to multiple vaccination settings
	Flexible vaccination hours

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