



The missing piece of the puzzle: Getting from vaccine hesitancy to acceptance

December 14, 2020

Introduction

Since the start of the COVID-19 pandemic, the development of safe and effective vaccines that are affordable and equitably distributed around the globe has been a priority for the world. The arrival of COVID-19 vaccines will be a crucial step forward to end the deadly and costly COVID-19 pandemic, creating a healthier, safer, and more equitable future for humankind. Yet the development of safe and effective COVID-19 vaccines is only one of many hurdles. The success of this vaccination effort largely depends on strong, functional health systems as well as widespread acceptance in the population and willingness to be vaccinated.

Yet skepticism about the adverse effects, safety, and the lack of efficacy of vaccines has been rising—and increasingly politicized—over the past decade, leading to the World Health Organization (WHO) listing vaccine hesitancy as one of the world's top ten global health threats in 2019, alongside climate change.ⁱ In 2020, this has been supercharged by the COVID-19 pandemic.

Differences in vaccine coverage between countries due to vaccine hesitancy could delay the world's ability to control the pandemic and restart the global economy. Growing public skepticism risks jeopardizing countries' abilities to overcome COVID-19. Most experts estimate that around 70% of the population will have to be immunized to reach herd immunity.ⁱⁱ Yet while polls estimate that slightly more than 70% of adults globally are likely to get a vaccine, only 33% strongly agree that they would get a vaccine if one were readily available, with another 40% only somewhat agreeing.ⁱⁱⁱ Surveys at the national level reveal that while some countries such as China and South Korea tend to highly trust vaccines, others have concerning levels of hesitancy. Recent polls (October 2020) found that only 58% of Americans would get vaccinated if a vaccine was available today, mostly due to safety and efficacy concerns.^{iv} Although this is up from 50% in September, this is still indicative of significant challenges to achieve the necessary coverage to ensure herd immunity.^v A survey by the University College London in September 2020 found that only half (49%) of British people considered themselves “very likely” to get vaccinated against COVID-19 with 22% unlikely to get the vaccine.^{vi} Fewer than 70% of respondents in France, the United States, Spain, Italy, South Africa, Japan, and Germany report having an intent to get vaccinated.^{vii}

The spread of misinformation online has significantly contributed to the rise of vaccine hesitancy across communities, regions, and countries. Social media platforms have become a commonly used source of information about vaccination, and research has found that in the majority of cases, social media usage had a negative influence on vaccine confidence and uptake.^{viii}

According to the Center for Countering Digital Hate (CCDH), the proportion of people who say they will not get a COVID-19 vaccine is higher among those who use social media more than traditional media to gain information about COVID-19 than the inverse.^{ix}

Public acceptance and uptake of COVID-19 vaccines will play a major role in countries' ability to vaccinate as many people as possible and defeat the virus. This pandemic also represents a tipping point when the world must invest and address vaccine hesitancy overall, or risk increases in anti-vaccination sentiments that are already raising at an alarming rate. This challenge will not be solved through the health sector alone, nor through top-down nor one-way efforts from authorities or media that face their own growing trust deficits. To that end, international and national health authorities, governments, business, the health care industry, civil society, media, schools, faith, community, and other trusted leaders and information sources must join forces now to address the root causes of vaccine hesitancy and misinformation to increase vaccine acceptance at local, regional, and national levels.

Terminology: vaccine hesitancy

According to the WHO Strategic Advisory Group of Experts on Immunization (SAGE) Vaccine Hesitancy Working Group, vaccine hesitancy refers to delay in acceptance or refusal of vaccines despite availability of vaccine services. Vaccine hesitancy is complex and context specific, varying across time, place and vaccines. It is influenced by factors such as complacency, convenience, and confidence.^x It is set on a continuum between full acceptance and outright refusal of all vaccines, with people such as those who refuse some vaccines but agree to others or those who delay vaccination between the two.^{xi}

Despite concerns about its potential negative connotation, “hesitancy” was considered by the SAGE Working Group on Vaccine Hesitancy the most appropriate term to describe the issue. The more positive alternatives such as vaccine confidence, acceptance, or uptake were deemed too narrow to reflect the problem in its entirety. While confidence covers a range of issues such as trust in vaccines safety and efficacy, trust in health care workers and health authorities, it is narrow in scope covering only one category of factors that affect vaccination decisions. Vaccine acceptance and uptake are also considered too narrow as they don't capture the issue of delay, i.e., one might accept a vaccine but delay in accepting it.^{xii}

Vaccine hesitancy is measured against a specific coverage goal, given the immunization services available. Vaccine uptake may be low because of system failures, e.g., limited availability of vaccines or vaccination services. In these situations, vaccine hesitancy may be present, but it is not the main driver of low coverage. Assessing whether low uptake is caused by hesitancy or other reasons is essential to ensure appropriate interventions.^{xiii}

Key Facts

- **Vaccines are one of the world's most successful health interventions.** Vaccines save up to 3 million lives every year.^{xiv} It is estimated that thanks to the polio vaccine, more than 18 million people are able to walk today who would otherwise have been paralyzed.^{xv}
- **Vaccines are highly cost-effective.** From 2011 to 2030, the net benefit of vaccine programs was estimated to range from \$1.45 trillion to \$3.37 trillion in 94 LMICs.^{xvi}
- **Vaccines can help limit the rising antimicrobial resistance caused by the misuse or overuse of antibiotics.** Immunization helps prevent humans and animals from getting infected and hence reduces the need for antibiotics.^{xvii}
- **Vaccine hesitancy is on the rise.** Vaccine hesitancy has been reported in more than 90% of countries in the world.^{xviii} As a result of declining immunization coverage, the world has witnessed a 30% rise in measles cases worldwide between 2016 and 2018.
- **We can't just rely on natural herd immunity to end COVID-19.**
 - It is estimated that around 70% of the human population would need to have antibodies in order to achieve herd immunity.^{xix} Thousands of lives are lost each day due to COVID-19.^{xx} Waiting until the disease becomes widespread enough to achieve herd immunity would lead to millions of deaths that could have been avoided. Uncertainty also remains about the duration of acquired immunity from past infections.
 - Herd immunity didn't develop to cholera, yellow fever, smallpox, measles, or Tuberculosis. Vaccines were developed to eliminate these diseases.
- **Vaccine hesitancy is threatening the fight against COVID-19.** Globally only 33% of adults strongly agree that they would get a COVID-19 vaccine. As stated above, fewer than 70% surveyed in France, the United States, Spain, Italy, South Africa, Japan, and Germany indicated an intent to get a COVID-19 vaccine, the estimated herd immunity threshold for COVID-19.^{xxi}
- **Some of the communities who have been disproportionately affected by COVID-19 are among the most hesitant.** Surveys conducted in Europe and the United States have found that hesitancy toward a COVID-19 vaccine tends to be more prevalent among ethnic minorities and low-income households.^{xxii}

Recommendations

No single actor can address vaccine hesitancy alone. The challenge of vaccine hesitancy demands collective global action for vaccine confidence and acceptance. A global and connected effort that makes meaning of insights, drives the right messages to the right audiences, rapidly responds to misinformation, and rallies a diverse set of stakeholders to action on vaccine hesitancy is what the world needs today.

Governments should:

- Communicate early, transparently, and effectively on the fast-track approval processes for the COVID-19 vaccine and the measures taken to ensure the safety and efficacy of the vaccine during these processes.
- Where appropriate, and with broad support, initiate an open and honest national conversation on the importance of vaccines, including a broad range of views. Ensure communities are given a voice and can express concerns and fears.
- Develop and implement an action plan to manage the spread of misinformation and how it impacts vaccine confidence and uptake. Initiate a public education campaign to warn about the potential dangers of trusting information on social media.
- Train health care workers, community leaders, opinion leaders, and any other groups engaged in public health issues to be able to recognize vaccine hesitancy behaviors and be equipped to engage in difficult conversations, including on social media platforms.
- Introduce an office and budget dedicated to addressing vaccine hesitancy/confidence and misinformation within their health ministry/department.
- Use the WHO/Europe's Guide to Tailoring Immunization Programmes (TIP)^{xxiii} and other appropriate frameworks to identify sub-optimally vaccinated populations, determine barriers and drivers and design tailored interventions to make vaccination accessible, acceptable, convenient, and attractive to them.
- Invest in communication systems, including digital platforms where possible, using the most up-to-date available research on how to talk to different audiences to deliver more effective, targeted messages to different constituencies. Apply Communication for Development (C4D) strategies^{xxiv} to achieve social and behavioral change in regard to vaccine confidence and acceptance.
- Ensure vaccines are accessible to underserved populations by making vaccination services available as part of essential health services provided to communities, maximizing contact points available through health, education, and other local service providers.
- Fund opinion polls of various groups, including health care workers, to expand the understanding of context-specific perceptions of vaccines and drivers of vaccine hesitancy within different settings.
- Employ policies and strategies that will build trust, a strong understanding of the necessity for universal vaccine coverage, and promote vaccine confidence.

International health organizations should:

- Ensure full transparency and global access to the evidence of the safety, efficacy, and potential side effects of any current and future vaccine against COVID-19 or other infectious diseases.
- Use the pandemic to initiate a global, integrated campaign that promotes a renewed understanding of the threat of infectious diseases to humanity and presents immunization as an act of global solidarity.
- Launch a global, publicly available tracker to monitor vaccine hesitancy and misinformation across countries and regions in order to detect emerging trends and prompt swift interventions.
- Build capacity in low- and middle-income countries (LMICs) for vaccine hesitancy research, including polling, to understand the drivers of vaccine hesitancy in these settings.

Social media platforms and search engines should:

- Block all ads and user-generated content promoting vaccine misinformation as soon as possible before vaccine roll-outs begin.
- Systematically redirect users to science-based information from the WHO and other trusted sources in response to searches for information on, and hashtags associated with vaccines.
- Stop people from sharing content labeled as false and redirect them to content from trusted sources debunking these false claims. Label content that has successfully passed independent fact-checks as trusted.
- Close all fake social media accounts (bots) and block users who are systematically sharing misinformation.
- Highlight, surface, and prioritize content on vaccines from authoritative sources such as the WHO and the Centers for Disease Control and Prevention (CDC), including in groups where vaccine issues are discussed.
- Increase free advertising to international and national health authorities on the safety and efficacy of vaccines.
- Work with international and national health authorities on vaccine education campaigns and train them to use their platforms to reach as many people as possible.

Legislators and regulators should:

- Increase social media companies and their executives' accountability over the content shared on their platforms through the adoption of a regulatory framework for social media platforms.
- Until a new regulatory framework is put in place, use existing regulatory powers available to regulate the spread of misinformation on social media.

Vaccine developers and manufacturers should:

- Ensure transparency and access to data and information on the safety, efficacy, and potential side effects of vaccines.

- Support and invest in third-party vaccine education campaigns to communicate why vaccines in general, and current and future COVID-19 vaccines specifically, are safe and effective.
- Explain how vaccines are being developed in order to reassure the public that despite record-breaking development timelines, COVID-19 vaccines manufacturers are not compromising on safety and efficacy. Be transparent about any associated risks or side effects.

Schools should:

- Educate staff, parents, and caregivers about the importance of immunization to allow a safe return to in-person learning.
- Provide students with media literacy skills and education, including on how to identify misinformation online.^{xxv}
- Systematically offer in-school vaccination programs when appropriate, e.g., seasonal flu vaccination.

Employers should:

- Educate themselves and employees about the importance of immunization for the safe return to normal operations.
- Systematically offer at-work vaccination programs when appropriate, e.g., seasonal flu vaccination.
- Offer vaccine information workshops.
- Offer paid time-off to their employees to get themselves or their children vaccinated.

Community leaders, opinion leaders, civil society groups, and citizens should:

- Educate themselves and their communities about vaccination and the threat of vaccine hesitancy.
- Foster community conversations on the importance of vaccines, allowing people to raise concerns and share reputable information about vaccination.
- Help flatten the infodemic curve by choosing not to share posts containing misinformation and by denouncing social media posts based on fake information.
- Work to form a broad movement of organizations and citizens from different walks of life to help provide information on vaccination programs to increase confidence and uptake in communities. Mobilize champions and influencers as spokespeople.

The Lifesaving Impacts of Vaccines

Vaccines are one of the best investments in the health of a community. They are the most effective way to prevent infectious diseases from spreading. In addition to protecting individuals, vaccines benefit the whole community—including those who cannot be vaccinated (e.g., people who have a weakened immune system)—through "herd immunity". Before the introduction of a measles vaccine in 1963, major measles epidemics occurred every 2–3 years, causing an estimated 2.6 million deaths annually.^{xxvi} Between 2000 and 2018, measles vaccination prevented an estimated 23.2 million deaths, resulting in a 73% drop in measles deaths.^{xxvii} Thanks to vaccination, measles mortality declined by 85% between 2000 and 2015 in Africa.^{xxviii}

If enough people are vaccinated, a disease can be eradicated. In 1980, following an historic global immunization campaign, smallpox, a disfiguring and potentially lethal infection, was eradicated.^{xxix} The world has nearly eradicated polio, a disease that paralyzed generations of children.^{xxx} Meningitis A, a potentially deadly disease that causes severe brain damage has nearly been eliminated in 26 African countries since a vaccine was introduced in 2010.^{xxxi}

Immunization is a key piece of the puzzle to achieve the Sustainable Development Goals (SDGs). The value of vaccines go well beyond the prevention of illness and death. Good health provides a gateway to social and economic development, better education, and many other positive outcomes for individuals and their communities. From 2011 to 2030, the net benefit of vaccine programs was estimated to range from \$1.45 trillion to \$3.37 trillion in 94 LMICs.^{xxxii}

How Vaccines Work and Are Developed

Despite the lifesaving impact of immunization, the anti-vaccine movement has sown doubt about the efficacy and safety of vaccines. Vaccines are very carefully developed and tested to ensure they are safe and effective. Vaccines greatly reduce the risk of infection by working with the body's natural defenses to safely develop immunity to disease. Vaccines help develop immunity by imitating an infection leading the immune system to produce antibodies. Sometimes, after getting a vaccine, the imitation infection can cause minor symptoms, such as fever. Such minor symptoms are normal and should be expected as the body builds immunity. Once the imitation infection goes away, the body is left with a supply of "memory" antibodies that will remember how to fight that disease in the future.^{xxxiii}

Vaccine development is a long, complex process, typically lasting around 10 years. Vaccines go through a three-stage clinical trial process before they are sent to regulatory agencies for approval—which tends to be a lengthy process itself. The mumps vaccine that was developed in just four years was considered the fastest ever approved. It is however becoming quicker to develop new vaccines than it was in the past as experts can build on research from vaccines used for other diseases.

Vaccine Development Cycle

Exploratory	Initial research
Pre-clinical	Usually carried out in animals ^{xxxiv} . During an outbreak, different research groups often work together to speed up this part of the process.
Clinical trials	Human testing in a three-phase process. Through these phases the vaccine needs to show it is safe, leads to a strong immune response, and provides effective protection against the virus.
<i>Phase 1</i>	Testing on fewer than 100 (20 to 80) healthy volunteers, to assess safety , and any adverse effects . If the product is found to be safe, it proceeds to Phase 2 trials.
<i>Phase 2</i>	Phase 2a is designed to assess dosing requirements for the vaccine candidate. Phase 2b consists of testing on several hundred people for efficacy (a “target population” who are ideally those most at risk of the disease). If the vaccine performs well in Phase 2 trials, it moves to a Phase 3 trial.
<i>Phase 3</i>	Testing on several thousand people for efficacy and safety . Many vaccines undergo formal, ongoing studies in Phase 4 after the vaccine is approved and licensed. ^{xxxv}
Regulatory review and approval	Safety is overseen closely during the trials by the regulator. When an application for use of the vaccine is made to the regulator, safety and efficacy data from the trials will be fully assessed and used to inform the decision about potential use. Safety is also regularly monitored during the process of clinical development by a Data Safety Monitoring Board (DSMB)—a group of third-party independent experts (clinicians, epidemiologists, and statisticians)—to detect potential safety risks. ^{xxxvi} The safety profile of the vaccines is made available upon authorization or approval.
Manufacturing	Even after a vaccine is approved/licensed, the regulator stays involved, monitoring and inspecting manufacturing, testing for potency, safety, and purity.
Quality Control	Ongoing inspection for safety and efficacy.

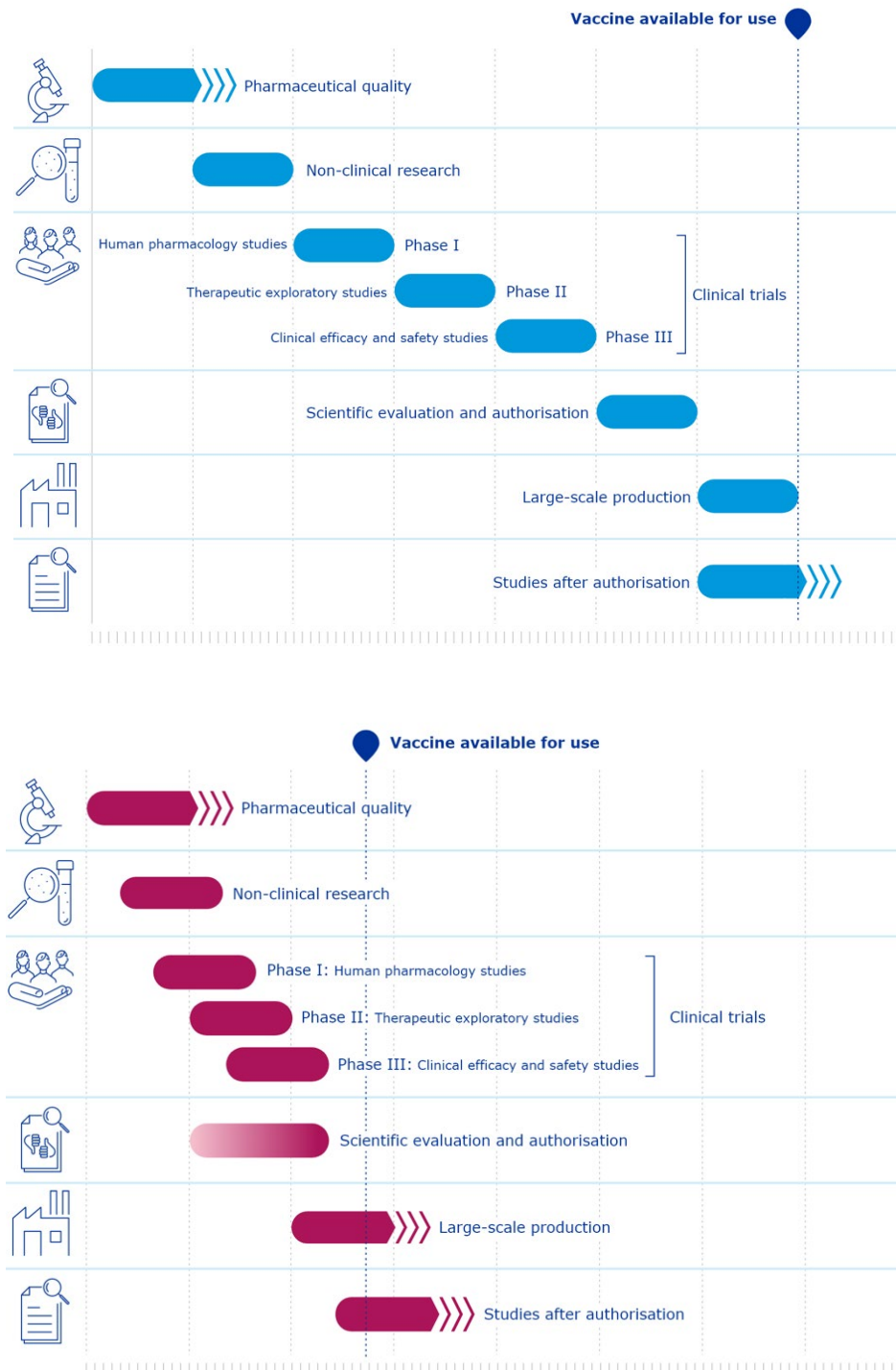
There have been unprecedented efforts and resources mobilized to find a COVID-19 vaccine. More than 150 vaccine candidates are in development across the globe. With a number of candidates showing high efficacy in late stage trials at the end 2020, hopes are high to bring one, or a few, to the market in record time (12-18 months) to solve the current crisis.^{xxxvii} And we are already seeing promise of that historic effort with the recent deployment in the United Kingdom and the United States of the COVID-19 vaccine developed by Pfizer and BioNTech. As we look to broad vaccine deployment, several efforts are underway to help make that possible, including through the Access to COVID-19 Tools (ACT) Accelerator coordinated by the WHO. The accelerator aims to speed up the development and production of, and equitable access to COVID-19 tools, including 2 billion vaccine doses by the end of 2021. Ways through which the development of COVID-19 vaccines have been accelerated include:

- Unprecedented mobilization of resources to speed up processes and reduce timelines;

- Combining clinical trial phases or conducting some studies in parallel where safe to do so, applying the extensive knowledge on vaccine production gained with existing vaccines;
- Provision of early scientific advice from regulators to help speed up development. For example, the European Medicine Agency (EMA) offers informal consultation with its COVID-19 EMA pandemic Task Force (COVID-ETF) that brings together key experts from across the European medicines regulatory network, which is made up of national competent authorities in the Member States of the European Economic Area.^{xxxviii}
- Sharing of data, e.g., publishing genome sequence / pre-prints;
- Producing vaccines in parallel with clinical trials;
- Expanding manufacturing capacity and large-scale production;
- Reviewing data by the regulator as they become available on a rolling basis, while development is still ongoing;
- Emergency authorizations: In the context of a pandemic, regulators also benefit from emergency procedures allowing for fast-track approval of vaccines. An emergency authorization allows limited groups of people to get the vaccines before the regulator has completed the full approval process which then allows vaccinations of the general population.

Some vaccines for COVID-19 are being developed using novel methods that are expected to increase the volume and speed of production compared to other types of vaccines, enhance product stability, and bring about strong immune responses. Other vaccines are being developed using existing methods, which means it could be easier to use existing production facilities to produce COVID-19 vaccines at a larger scale than for newer vaccine types.

FIGURE 1: INDICATIVE TIMELINES FOR COVID-19 VACCINES COMPARED WITH STANDARD VACCINES



Source: European Medicine Agency, <https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-covid-19/treatments-vaccines/covid-19-vaccines-development-evaluation-approval-monitoring>

The Growing Threat of Vaccine Hesitancy

Despite the proven effectiveness of immunization, vaccine hesitancy has been rising over the years, leading to the WHO listing vaccine hesitancy as one of the world's top ten global health threats in 2019.^{xxxix} Vaccine hesitancy poses significant risks not only for individuals refusing immunization, but also the wider community. Low vaccination rates prevent communities from reaching thresholds required to achieve herd immunity, leading to increases in disease outbreaks and communities' inability to control existing outbreaks.

The measles outbreaks that have surged in recent years represent a useful example. In many areas across the globe, immunization for measles has decreased to less than the 95% herd immunity threshold set by the WHO. This has resulted in a 30% rise in measles cases worldwide between 2016 and 2018. Approximately 863,000 cases of measles were reported globally in 2019, more than twice as many as the 360,000 cases reported in 2018.^{xi} Even in countries such as the United States, where measles had been eradicated in 2000, 1,282 cases of measles were reported in 2019, the greatest number of cases reported in the United States since 1992.^{xii} Europe has been particularly affected by this new measles epidemic. In May 2019, WHO classified measles outbreaks across the WHO European Region as a "Grade 2 emergency".^{xiii} More than 120,000 measles cases were reported in the 53 countries of the WHO European Region between August 2018 and July 2019, compared to 5,273 in 2016. Similar examples can be drawn from other vaccines. For example, as a result of a boycott against the polio vaccine in Northern Nigeria in 2003, polio incidence in Nigeria quintupled between 2002 and 2006 (from 202 cases in 2002 to 1,143 cases in 2006) and Nigerian strains of the virus spread across Africa and beyond, contributing to polio outbreaks across three continents.^{xiv}

Vaccine hesitancy pre-COVID-19

Vaccine hesitancy is not a new challenge. According to the *Wellcome Global Monitor 2018*, a 140-country global study, people living in high-income countries (HICs) had the lowest confidence in vaccines in 2018 and Europe was the least vaccine confident region.^{xv} One-fifth of Europeans either disagreed or were unsure of whether vaccines are safe. In low-income regions, vaccine confidence tends to be much higher, with 95% of people in South Asia and 92% in Eastern Africa agreeing that vaccines are safe in 2018. Vaccine hesitancy has however been growing in LMICs as well. Evidence shows that a growing number of people in Africa have been delaying or refusing vaccines.^{xvi} According to the *Global Monitor 2018*, the world's highest percentage of parents who say their children did not receive a vaccine are in Southern Africa. At the country-level, France had the lowest levels of trust in vaccines globally: a third of its population disagreed that vaccines are safe. Other countries with relatively high levels of hesitancy included Liberia, Gabon, Togo, Ukraine, and Russia, illustrated in Figure 2.

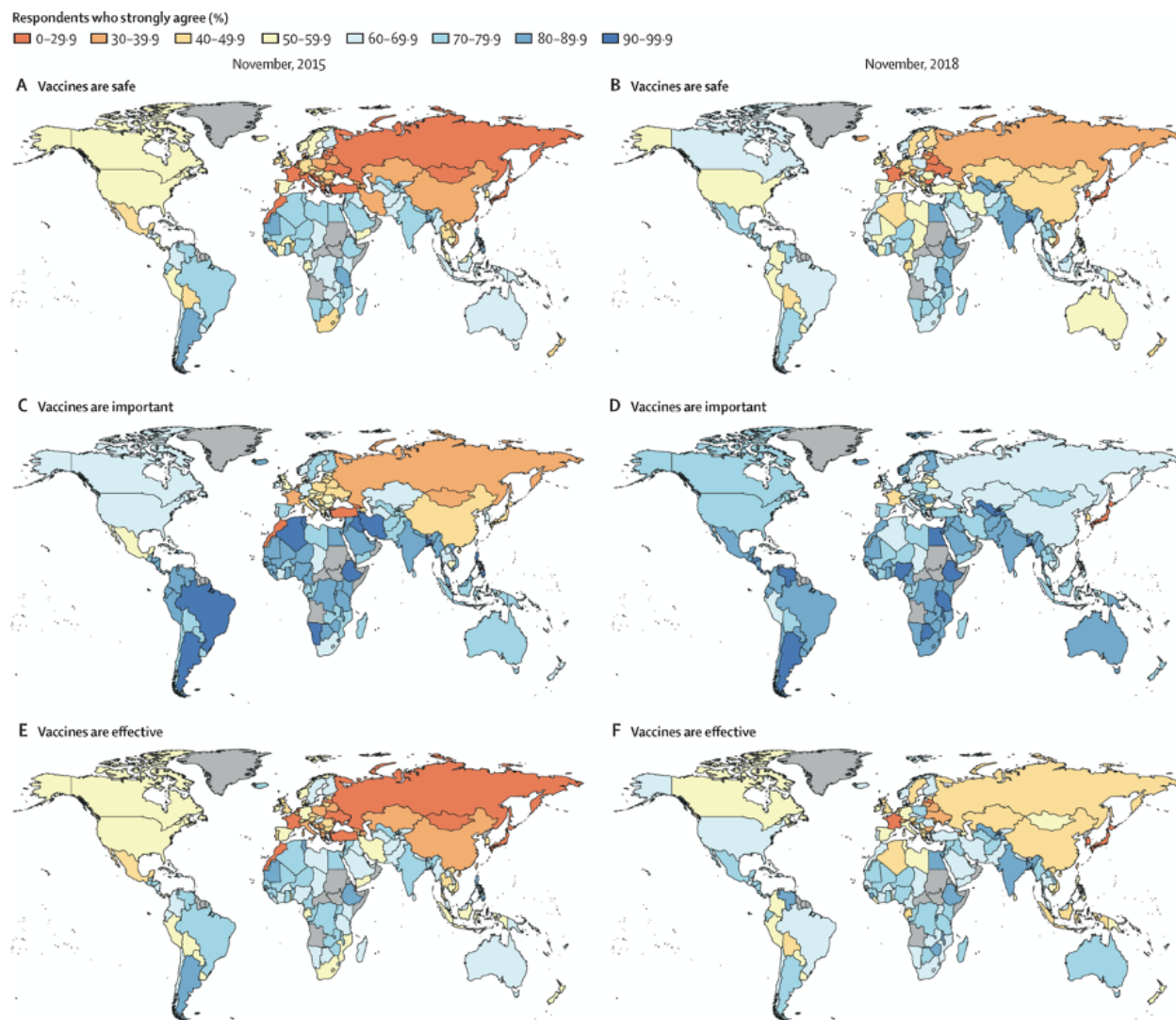
FIGURE 2: COUNTRIES WITH HIGHEST LEVELS OF VACCINE HESITANCY IN 2018

Most vaccine hesitant countries, Global Monitor 2018		
Strongly/somewhat disagree that vaccines are safe	Strongly/somewhat disagree that vaccines are effective	Strongly/somewhat disagree that vaccines are important for children to have
France (33%)	Liberia (28%)	Armenia (12%)
Gabon (26%)	France (19%)	Austria (12%)
Togo (25%)	Nigeria (16%)	France (10%)
Russia (24%)	Namibia (15%)	Russia (9%)
Switzerland (22%)	Peru (15%)	Switzerland (9%)
Armenia (21%)	Uganda (13%)	Azerbaijan (8%)
Austria (21%)	Armenia (12%)	Belarus (8%)
Belgium (21%)	Gabon (12%)	Italy (8%)
Burkina Faso (20%)	Russia (12%)	Bulgaria (7%)
Haiti (20%)	Togo (12%)	Moldova (7%)
	Austria (11%)	Montenegro (7%)
	Indonesia (11%)	
	Netherlands (11%)	
	South Africa (11%)	

Source: Wellcome, Global Monitor, 2018

A recent study led by the Vaccine Confidence Project at the London School of Hygiene & Tropical Medicine, mapped vaccine confidence across 149 countries between 2015 and 2019 and demonstrated that confidence varies widely between countries and regions (Figure 3).^{xlvii} The research found signs that although it remains low across Europe, vaccine confidence in European countries increased between 2018 and 2019, including in France and Italy. However, the report also reveals hotspots with declining confidence in vaccine safety, in particular in countries experiencing political instability and religious extremism such as Afghanistan, Azerbaijan, Indonesia, Nigeria, Pakistan, and Serbia. Poland also recorded significant losses in confidence in vaccine safety. Professor Larson’s study found that overall confidence in vaccines—including their safety, effectiveness, and importance—fell in Indonesia, the Philippines, Pakistan, and South Korea. Japan ranked among the countries with the world’s lowest vaccine confidence, probably due to safety concerns about the human papillomavirus (HPV) vaccine that emerged in 2013.

FIGURE 3: GLOBAL TRENDS IN PERCEPTIONS TOWARDS THE SAFETY, IMPORTANCE AND EFFECTIVENESS OF VACCINES IN NOVEMBER 2015, AND NOVEMBER 2018



Source: Alexandre de Figueiredo, Clarissa Simas, Emilie Karafillakis, Pauline Paterson, Prof Heidi J Larson, Mapping global trends in vaccine confidence and investigating barriers to vaccine uptake: a large-scale retrospective temporal modelling study, Lancet 2020, <https://www.thelancet.com/action/showPdf?pii=S0140-6736%2820%2931558-0>

Vaccine hesitancy in 2020

Surveys conducted since the beginning of the pandemic show that the pandemic has supercharged already concerning hesitancy trends and that the intent to get a COVID-19 vaccine has been rapidly declining.

According to an October 2020 survey by Ipsos Mori, a global marketing research firm, conducted in 15 countries, while 73% of adults globally said they are likely to get a vaccine, only 33% strongly agreed that they would take a vaccine if one were readily available, with another 40% only somewhat agreeing. Three months earlier, 77% of adults in the same countries

agreed, including 40% who strongly agreed. Intentions to get vaccinated have dropped in 10 of 15 countries, in particular China, Australia, Spain, and Brazil.^{xlvi} Additionally:

- Surveys by the University of Hamburg carried out in Germany, Denmark, France, Italy, the Netherlands, Portugal, and the United Kingdom in April and June 2020 found that the willingness to vaccinate against COVID-19 fell from 74% to 68% over just two months.^{xlix}
- Surveys by Gallup revealed that the share of Americans who say they would get vaccinated for COVID-19 steadily dropped from 66% in July to 50% in September 2020, before rebounding to 58% in October 2020, giving a glimpse of hope that vaccine acceptance may improve in the United States.^l
- A survey by the University College London in September 2020 found that only half (49%) of British people considered themselves “very likely” to get vaccinated against COVID-19 with 22% “unlikely” to get the vaccine.^{li}
- Euronews surveys from October 2020 found that 37% of French people, 55% of Italians, and 57% of Germans would take a low-cost vaccine if it became available in 2021.^{lii}

According to Ipsos Mori, countries where the intent to get vaccinated against COVID-19 is lowest include France (54%), the United States (64%), Spain (64%), Italy (65%), South Africa (68%), Japan (69%), and Germany (69%)—all of which indicate compliance among less than 70% of the population, which is the estimated herd immunity threshold for COVID-19. Countries where intent to take a COVID-19 vaccine is the highest include India (87%), China (85%), South Korea (83%), and Brazil (81%), Australia (79%), the United Kingdom (79%), Mexico (78%), and Canada (76%).^{liii}

The Drivers of Vaccine Hesitancy and Acceptance

Vaccine hesitancy is complex, diverse, context-specific, and varies across time, place, group, person and vaccines.^{liv} According to the WHO SAGE Vaccine Hesitancy Working Group, it is influenced by factors such as **complacency, convenience, and confidence**.^{lv} While complacency and convenience relate to the perceived risk of disease and the ease with which vaccine services can be accessed, vaccine confidence is defined by trust: in the effectiveness and safety of vaccines, in the information from international and national health authorities, and in the health care system that delivers vaccines.^{lvi}

Because vaccine hesitancy is complex, diverse, and context-specific, there is no simple strategy to tackle it. To be effective, interventions must be tailored to specific populations, address community-specific concerns and misconceptions, take religious and philosophical beliefs into consideration, and identify locally trusted sources of information.^{lvii}

For example, in the case of the polio vaccine boycott in Northern Nigeria in 2003, an understanding of the local context is key to understanding the power of the accusation that oral polio virus causes sterility. These rumors had traction because of a number of contextual circumstances unique to Northern Nigeria such as the religious and ethnic elements, socio-economic marginalization, conflicts, etc.^{lviii} Although civil society organizations and other organizations like UNICEF have been actively trying to address vaccine hesitancy in Africa, very little research has been produced to understand the drivers of vaccine hesitancy in African

countries, undermining efforts to develop tailored strategies to tackle this growing problem across the continent.^{lix}

In the case of France, vaccine hesitancy is present and consistent across several demographic groups within society and does not vary significantly by education, age, gender, urban or rural status, or whether people are parents.^{lx} Researchers noticed a rise in vaccine hesitancy in France after the influenza vaccination campaign in 2009, during which the WHO was accused of being influenced by pharmaceutical companies.^{lxi} A public debate around the safety of the vaccine arose, with prominent politicians and activists claiming that it had been produced too quickly and had not been tested enough.^{lxii} Consequently, the immunization campaign failed with only 8% of the population vaccinated and unfavorable attitudes to vaccination in France increased from 9.6% in 2005 to 38.2% in 2010.^{lxiii} Post-mortem research found that one of the key mistakes made by French authorities was their lack of transparency with regard to the measures taken to ensure the safety of the vaccine. Officials refused to communicate early on about the regulatory process out of fear that the mere evocation of risk might provoke irrational reactions.^{lxiv}

A recent global survey of potential acceptance of COVID-19 vaccines (October 2020) found that all people, regardless of their nationality, were less likely to accept a COVID-19 vaccine if mandated by their employer, as it was perceived as limiting employees' freedom of choice or as a manifestation of employers' self-interest. This suggests that promoting voluntary rather than mandated acceptance of COVID-19 vaccines may be more effective across all countries.^{lxv}

Although communities' reasoning is extremely diverse in nature, some key factors seem particularly determinant in driving vaccine uptake or refusal, outlined below.

Trusted and vaccine-confident health care providers lead to improved uptake and confidence in vaccines.

A number of research studies have found that health workers are the most trusted and influential advisors on immunization decisions.^{lxvi} According to the Vaccine Confidence Project's study (Figure 3), one of the factors most frequently associated with improved vaccine uptake is trust in health workers. According to another study on the state of vaccine confidence in the EU in 2018, also led by the Vaccine Confidence Project, a strong correlation can be found between health workers' confidence in vaccines and vaccine confidence among the general public. Countries whose general practitioners hold higher confidence in vaccines tend to have higher levels of vaccine acceptance.^{lxvii}

Exposure to conspiracy theories and general distrust in public authorities have fueled vaccine hesitancy.

At the heart of the anti-vaccine conspiracy theories lies the belief that pharmaceutical companies and public authorities are distorting and covering up facts about vaccines to meet their own, often profit-seeking, agendas. Exposure to anti-vaccine conspiracy theories and distrust in public authorities and elites have been found to significantly impact vaccine decision and other health-related behaviors in Western countries, including France.^{lxviii} But conspiracy theories have also been very detrimental to vaccine confidence and uptake in other parts of the world. Rumors in various African countries that immunization is causing infertility have proven particularly harmful and have undermined immunization efforts in these countries.^{lxix} For

example, in Cameroon in 1990, rumors spread that health workers were administering a range of childhood vaccines to sterilize women.^{lxx} In 2003, as Nigeria was on the brink of eradicating polio, a group of religious and political leaders in Northern Nigeria advised their followers against taking OPV. One of their claims was that OPV spread HIV and caused sterility in Muslim girls as part of a Western-led plot to reduce the Muslim population.^{lxxi}

Conspiracy theories can have long legs and travel across borders. In 1998, British researcher Andrew Wakefield published his infamous paper linking autism to the vaccine for measles, mumps and rubella. Evidence later emerged that there was no evidence of harm and that Wakefield's data was fraudulent. While The Lancet retracted his study in February 2010 and Wakefield was found guilty of professional misconduct by Britain's General Medical Council with his license being revoked, the damage was done.^{lxxii} Even while debunked, many credit the distrust sown by Wakefield's research fraud as the cause of declining vaccination and rising measles outbreaks in subsequent years in the United States, Europe, and Australia.^{lxxiii}

The spread of misinformation online is contributing to vaccine hesitancy.

Across the globe, social media platforms have offered an unprecedented opportunity to amplify and spread anti-vaccination messages and conspiracy theories across communities, regions, and countries.^{lxxiv} Social media platforms have become a commonly used source of information for vaccination and research has found that in the majority of cases social media usage had a negative influence on vaccine confidence and uptake.^{lxxv} Facebook was found to be the leading platform for the anti-vaccine movement, hosting accounts with 31.9 million followers in total as of September 2020.^{lxxvi}

- In South Korea and Malaysia, online mobilization against vaccines has been identified as a key barrier to vaccination.
- In the United Kingdom, a survey by the Royal Society for Public Health revealed that half of parents of children under five routinely came across anti-vaccine messages on social media.^{lxxvii}
- Research has found that one-fifth of South African social media users are vaccine hesitant.^{lxxviii}
- Vaccine-hesitant parents have been found to be more active in searching for information online than vaccine-compliant parents, and hence have more exposure to misinformation spread by anti-vaccination campaigners.^{lxxix}

According to the Center for Countering Digital Hate (CCDH), the proportion of people who say they will not get a COVID-19 vaccine is higher among those who use social media more than traditional media to gain information about COVID-19 than the inverse. Similarly, among those who get more information about COVID-19 from social media, there is a significantly higher belief in various misinformation statements about the pandemic.^{lxxx} Social media platforms have proven particularly useful for anti-vaccine advocates to spread their messages to a wide audience beyond their own communities and countries. A study of anti-vaccine messages on the Facebook page of a community clinic in the United States found commentators from 36 states and eight different countries.^{lxxxi} Some research has claimed that vaccine hesitancy in Eastern Europe may have been boosted by Russian misinformation campaigns on social media.^{lxxxii}

Social media platforms have started to take action.

In 2019, Facebook ruled that content that included vaccine-related misinformation would no longer be recommended on its site and banned ads carrying misinformation, although still allowing ads expressing opposition to vaccines if they did not contain false information. In October 2020, the platform further strengthened its stance by introducing a ban on ads that discourage people from getting vaccinated. Facebook will however still allows ads in favor or against vaccine-related legislation or government policies.^{lxxxiii} In early December 2020, Facebook said in a short blog post that it planned to take down false claims about COVID-19 vaccines that have been debunked by public health experts as well as conspiracy theories about COVID-19 vaccines. But it added that it would “not be able to start enforcing these policies overnight”.^{lxxxiv}

Harmful anti-vaccine hashtags have also been banned from Instagram. Vaccine-related searches on Pinterest are meant to only show links to trusted public health organizations.^{lxxxv} YouTube removed advertisements from anti-vaccination videos, stopping the sharers from making any profit. Searches on vaccines on Twitter ensure that the first result comes from national health authorities—although quickly followed by anti-vaccination messages.^{lxxxvi}

Although all of these are steps in the right direction, social media companies have so far failed to fully and properly address the problem. None of these platforms have gone as far as fully removing harmful content. Commitments to tackle misinformation have not always translated into effective action. Research by CCDH found that out of 912 posts containing misinformation and reported by volunteers between July and August 2020, 95.1% of posts were not acted on by social media companies after they were flagged as containing misinformation. Facebook was found to be particularly poor at removing the accounts and groups posting misinformation.^{lxxxvii}

The drivers of vaccine hesitancy in the context of COVID-19

The pandemic has accelerated hesitancy trends not only by escalating the conversation, but also due to new factors contributing to hesitancy toward COVID-19 vaccines, namely the speed of the vaccine development process as well as the politicization of the crisis.

Many people have expressed safety and efficacy concerns due to the unprecedented speed at which COVID-19 vaccines are being developed. The survey by the University of Hamburg found that 45% of people in Germany, Denmark, France, Italy, the Netherlands, Portugal, and the United Kingdom who refused to be vaccinated—and 61% of those who were unsure—cited possible side effects and vaccine efficacy as the most important reasons. However, those who trust the information from national and international authorities were much more open to a COVID-19 immunization.^{lxxxviii} According to the Ipsos Mori survey, fear of side effects was reported to be the top reason for not wanting to take a future COVID-19 vaccine, followed by doubt about its effectiveness.

These debates were particularly politicized in the United States leading up to and during the presidential election in November 2020. Despite the FDA’s insistence that no vaccine would be authorized unless it was proven to be safe and effective, 62% of Americans in September 2020 were worried that the political pressure would lead the FDA to rush to approve a coronavirus vaccine without making sure that it was safe and effective. About four in ten adults overall were saying that both the FDA (39%) and the CDC (42%) were paying too much attention to politics when it comes to reviewing and approving treatments for coronavirus.^{xc} A survey by The Harris

Poll conducted between August 25 and August 27, 2020 found that 78% of Americans feared the process for a COVID-19 vaccine approval is more influenced by politics than science, and about 83% said they would worry about how safe a COVID-19 vaccine is if it was approved quickly.^{xcv} Americans' willingness to be vaccinated against COVID-19 rebounded a bit in October, with 58% of Americans saying they would get a COVID-19 vaccine. However, they remain largely concerned about a potential lack of efficacy and safety due to a rushed timeline.^{xcvi} In the United States, the vaccine trust gap is particularly pointed in Black and Latino communities. According to a September 2020 survey, 4 percent of Black people trust that a vaccine will be safe, and 18 percent trust that it will be effective in shielding them from the coronavirus. Among Latinos, 34 percent trust its safety, and 40 percent trust its effectiveness.^{xcvii}

Conclusion

Vaccine hesitancy is threatening the historical achievements made in reducing the burden of infectious diseases. For too long, the world has failed to treat vaccine hesitancy as the existential threat it represents for global health. The global health community has ignored the warning signs, assuming that anti-vaccination challenges were limited to a single geography or vaccine, and that anti-vaccination beliefs were fringe and would not impact broader uptake. In 2019, the WHO finally listed vaccine hesitancy as one of the world's top ten global health threats. In 2020, this threat has been supercharged by the pandemic, representing a critical tipping point in the decades-long trend of vaccine distrust and hesitancy. The world must now act urgently to address this growing threat in order to end the COVID-19 pandemic and help stop future deadly outbreaks.

The stakes are very high. Vaccine acceptance will be key to solve the crisis the world is currently in. It will be essential to save millions of lives, allow economies to recover, and the world to eventually return to normality. Billions currently being invested in the ACT Accelerator and other efforts risk being wasted if we don't address vaccine hesitancy urgently. Furthermore, while vaccine acceptance is critical for the success of the COVID-19 vaccine, this moment is not only about the current vaccine hesitancy challenge. To date, most efforts to combat vaccine hesitancy have been short-term or narrowly focused on a single vaccine. This hasn't paid off. The pandemic represents a tipping point when the world must finally invest and address vaccine hesitancy overall.

No one actor can address vaccine hesitancy alone. The challenge of vaccine hesitancy demands collective global action for vaccine confidence and acceptance. A global and connected effort that makes meaning of insights, drives the right messages to the right audiences, rapidly responds to misinformation, and rallies a diverse set of stakeholders to action on vaccine hesitancy is what the world needs today.

References

- ⁱ Vaccine Confidence Project, WHO announces Top Ten Threats to Global Health in 2019, 20 January 2019, <https://www.vaccineconfidence.org/blog/who-announces-top-ten-threats-to-global-health-in-2019>
- ⁱⁱ Herd immunity can be defined as the resistance to the spread of a disease when a sufficient percentage of a population has become immune to the infection
- ⁱⁱⁱ Ipsos MORI, COVID-19 vaccination intent is decreasing globally, 5 November 2020, <https://www.ipsos.com/en/global-attitudes-covid-19-vaccine-october-2020>
- Jeffrey V. Lazarus, corresponding author¹ Scott C. Ratzan,² Adam Palayew,¹ Lawrence O. Gostin,³ Heidi J. Larson,⁴ Kenneth Rabin,² Spencer Kimball,⁵ and Ayman El-Mohandes², A global survey of potential acceptance of a COVID-19 vaccine, 20 October 2020, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7573523/>
- Ipsos MORI, op. cit.
- ^{iv} RJ Reinhart, More Americans Now Willing to Get COVID-19 Vaccine, Gallup, 17 November 2020, <https://news.gallup.com/poll/325208/americans-willing-covid-vaccine.aspx>
- ^v Ibid
- ^{vi} Nuffield Foundation, One fifth of people say they are unlikely to get vaccinated against COVID-19, 24 September 2020, <https://www.nuffieldfoundation.org/news/one-fifth-of-people-unlikely-to-get-vaccinated-against-covid-19>
- ^{vii} Ipsos MORI, op. cit.
- ^{viii} ECDC, Systematic scoping review on social media monitoring methods and interventions relating to vaccine hesitancy, February 2020, <https://www.ecdc.europa.eu/sites/default/files/documents/vaccine-hesitancy-systematic-scoping-review-social-media.pdf>
- ^{ix} CCDH, Failure to Act, How Tech Giants Continue to Defy Calls to Rein in Vaccine Misinformation, 2020, https://252f2edd-1c8b-49f5-9bb2-cb57bb47e4ba.filesusr.com/ugd/f4d9b9_8d23c70f0a014b3c9e2cfc334d4472dc.pdf
- ^x WHO, Report of the SAGE Working Group on Vaccine Hesitancy, 2014, https://www.who.int/immunization/sage/meetings/2014/october/1_Report_WORKING_GROUP_vaccine_hesitancy_final.pdf
- WHO, What influences vaccine acceptance: A model of determinants of vaccine hesitancy, 18 March 2013, https://www.who.int/immunization/sage/meetings/2013/april/1_Model_analyze_driversofvaccineConfidence_22_March.pdf
- ^{xi} Noni E. MacDonald, the SAGE Working Group on Vaccine Hesitancy, Vaccine hesitancy: Definition, scope and determinants, 14 August 2015, <https://www.sciencedirect.com/science/article/pii/S0264410X15005009>
- ^{xii} Ibid
- ^{xiii} Ibid
- ^{xiv} WHO, Immunization, 05 December 2019, <https://www.who.int/news-room/facts-in-pictures/detail/immunization>
- ^{xv} WHO, Poliomyelitis, 22 July 2019, <https://www.who.int/news-room/fact-sheets/detail/poliomyelitis>
- ^{xvi} So Yoon Sim, Elizabeth Watts, Dagna Constenla, Logan Brenzel, and Bryan N. Patenaude, Return On Investment From Immunization Against 10 Pathogens In 94 Low- And Middle-Income Countries, 2011–30, August 2020, <https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2020.00103>
- ^{xvii} WHO, Immunization, op.cit. <https://www.who.int/news-room/facts-in-pictures/detail/immunization>
- ^{xviii} The Lancet Child & Adolescent Health, Vaccine hesitancy: a generation at risk, 01 May 2019, [https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642\(19\)30092-6/fulltext](https://www.thelancet.com/journals/lanchi/article/PIIS2352-4642(19)30092-6/fulltext)
- ^{xix} Cynthia Demarco, COVID-19 herd immunity: 7 questions, 17 July 2020, <https://www.mdanderson.org/cancerwise/what-is-covid-19-coronavirus-herd-immunity-when-will-we-achieve-herd-immunity.h00-159383523.html>
- ^{xx} WHO Coronavirus Disease (COVID-19) Dashboard, <https://covid19.who.int/>
- ^{xxi} Ipsos MORI, COVID-19 vaccination intent is decreasing globally, op. cit.
- ^{xxii} Shannon Mullen O'keefe, One in Three Americans Would Not Get COVID-19 Vaccine, Gallup, 7 August 2020, <https://news.gallup.com/poll/317018/one-three-americans-not-covid-vaccine.aspx>

The COCONEL Group, A future vaccination campaign against COVID-19 at risk of vaccine hesitancy and politicisation, 20 July 2020, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7239623/>

CCDH, Failure to Act, op. cit.

xxiii WHO, Tailoring Immunization Programmes (TIP), May 2018, https://www.who.int/immunization/programmes_systems/Global_TIP_overview_July2018.pdf?ua=1

xxiv such as involving individuals and caregivers both as primary audience and as agents of change, offering visibility and voice for the most marginalized and vulnerable groups, facilitating intergenerational listening, dialogue and debate; linking community perspectives and voices with sub-national and national policy dialogue; ensuring cultural appropriateness of content and approach

xxv Schools should consider partnering with Lie Detectors, a non-profit that helps teenagers and pre-teens learn how to spot and resist the growing volume of manipulative media crowding social media accounts <https://lie-detectors.org/>

xxvi WHO, Measles, 5 December 2020, <https://www.who.int/news-room/fact-sheets/detail/measles>

xxvii WHO, Immunization, op. cit.

WHO, Measles, op. cit.

xxviii Sara Cooper, Cornelia Betsch, Evanson Z. Sambala, Nosicelo Mchiza & Charles S. Wiysonge, Vaccine hesitancy – a potential threat to the achievements of vaccination programmes in Africa, 22 May 2018, <https://www.tandfonline.com/doi/full/10.1080/21645515.2018.1460987>

xxix WHO, Smallpox, 13 January 2014, <https://www.who.int/biologicals/vaccines/smallpox/en/>

xxx WHO, Immunization, op. cit.

xxxi Ibid

xxxii So Yoon Sim, Elizabeth Watts, Dagna Constenla, Logan Brenzel, and Bryan N. Patenaude, op. cit.

xxxiii CDC, Understanding How Vaccines Work, July 2018 <https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-understand-color-office.pdf>

xxxiv *ILAR Journal*, Volume 56, Issue 1, 2015, Pages 53–62, <https://doi.org/10.1093/ilar/ilv009>

xxxv CDC, Vaccine Testing and the Approval Process, <https://www.cdc.gov/vaccines/basics/test-approve.html>

xxxvi Also called Data Monitoring Committees or Data Monitoring Board

xxxvii At time of publishing three vaccine candidates had reported being around 90% effective in late stage trials - University of Oxford/AstraZeneca vaccine, Pfizer/BioNTech vaccine and Moderna vaccine.

xxxviii European Medicines Agency, COVID-19 vaccines: development, evaluation, approval and monitoring, <https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-covid-19/treatments-vaccines/covid-19-vaccines-development-evaluation-approval-monitoring>

xxxix The Vaccine Confidence Project, op. cit.

xl WHO & UNICEF, Progress and Challenges with Achieving Universal Immunization Coverage, 2019 WHO/UNICEF Estimates of National Immunization Coverage (Data as of 15 July 2020) https://www.who.int/immunization/monitoring_surveillance/who-immuniz.pdf

xli CDC, Measles Cases and Outbreaks, <https://www.cdc.gov/measles/cases-outbreaks.html>

xlii a single or multiple country event with moderate public health consequences that requires a moderate WCO response and/or moderate international WHO response. Organizational and/or external support required by the WCO is moderate. An Emergency Support Team, run out of the regional office (the Emergency Support Team is only run out of HQ if multiple regions are affected), coordinates the provision of support to the WCO.

xliii WHO, WHO urges investments to stop measles transmission in Europe, 24 September 2019, <https://www.euro.who.int/en/health-topics/communicable-diseases/measles-and-rubella/news/news/2019/9/who-urges-investments-to-stop-measles-transmission-in-europe>

xliv Vinayak Bhardwaj, ANALYSIS: Why does an old, false claim about tetanus vaccine safety refuse to die?, Africa Check, 25 May 2016 <https://africacheck.org/2016/05/25/analysis-why-does-an-old-false-claim-about-tetanus-vaccine-safety-refuse-to-die/>

Ayodele Samuel Jegede, What Led to the Nigerian Boycott of the Polio Vaccination Campaign?, 20 March 2007, <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.0040073>

Isaac Ghinai, Chris Willott, Ibrahim Dadari & Heidi J. Larson, Listening to the rumours: What the northern Nigeria polio vaccine boycott can tell us ten years on, December 2013, <https://www.tandfonline.com/doi/full/10.1080/17441692.2013.859720>

Charles Shey Wiysonge, Vaccine Hesitancy, an Escalating Danger in Africa, 17 December 2019 <https://www.thinkglobalhealth.org/article/vaccine-hesitancy-escalating-danger-africa>

Sara Cooper, Cornelia Betsch, Evanson Z. Sambala, Nosicelo Mchiza & Charles S. Wiysonge, Vaccine hesitancy – a potential threat to the achievements of vaccination programmes in Africa, 22 May 2018, <https://www.tandfonline.com/doi/full/10.1080/21645515.2018.1460987>

^{xlv} Wellcome Trust, How much does the world trust medical experts and vaccines?, 19 June 2019, <https://wellcome.ac.uk/press-release/how-much-does-world-trust-medical-experts-and-vaccines>

^{xlvi} Sara Cooper, Cornelia Betsch, Evanson Z. Sambala, Nosicelo Mchiza & Charles S. Wiysonge, Vaccine hesitancy – a potential threat to the achievements of vaccination programmes in Africa, op.cit.

Charles Shey Wiysonge, Vaccine Hesitancy, an Escalating Danger in Africa, op. cit.

^{xlvii} Alexandre de Figueiredo, Clarissa Simas, Emilie Karafillakis, Pauline Paterson, Heidi J Larson, Mapping global trends in vaccine confidence and investigating barriers to vaccine uptake: a large-scale retrospective temporal modelling study, <https://www.thelancet.com/action/showPdf?pii=S0140-6736%2820%2931558-0>

^{xlviii} Ipsos Mori, COVID-19 vaccination intent is decreasing globally, op.cit.

^{xlix} University of Hamburg, Managing the COVID-19 pandemic: New results from the European survey on policy support, confidence and vaccination attitudes, 5 August 2020, <https://www.hche.uni-hamburg.de/forschung/corona/managing-corona-zweite-welle.pdf>

^l Gallup, More Americans Now Willing to Get COVID-19 Vaccine, op. cit.

^{li} Nuffield Foundation, One fifth of people say they are unlikely to get vaccinated against COVID-19, op. cit.

^{lii} Euronews, Coronavirus: Only around 1/3 of French respondents would take COVID-19 vaccine, Euronews poll shows, 22 October 2020, <https://www.euronews.com/2020/10/16/coronavirus-only-around-1-3-of-french-respondents-would-take-covid-19-vaccine-euronews-pol>

^{liii} Ipsos Mori, COVID-19 vaccination intent is decreasing globally, op. cit.

^{liv} WHO, Report of the SAGE Working Group on Vaccine Hesitancy, op. cit.

^{lv} Ibid

WHO, What influences vaccine acceptance: A model of determinants of vaccine hesitancy, op. cit.

^{lvi} Heidi Larson, Dr. Alexandre de Figueiredo, Emilie Karafillakis and Mahesh Rawal, State of vaccine confidence in the EU, 2018, <https://op.europa.eu/en/publication-detail/-/publication/678e38ae-a154-11ea-9d2d-01aa75ed71a1/language-en>

University of Hamburg, Managing the COVID-19 pandemic, op. cit.

Wellcome Trust, How much does the world trust medical experts and vaccines?, op. cit.

^{lvii} Caitlin Jarrett, Rose Wilson, Maureen O’Leary, Elisabeth Eckersberger, Heidi J.Larson, the SAGE Working Group on Vaccine Hesitancy, Strategies for addressing vaccine hesitancy – A systematic review, 14 August 2015, <https://www.sciencedirect.com/science/article/pii/S0264410X15005046>

Heidi J. Larson,⁴ Kenneth Rabin,² Spencer Kimball,⁵ and Ayman El-Mohandes², A global survey of potential acceptance of a COVID-19 vaccine, op. cit.

^{lviii} Isaac Ghinai, Chris Willott, Ibrahim Dadari & Heidi J. Larson, Listening to the rumours: What the northern Nigeria polio vaccine boycott can tell us ten years on, op. cit.

^{lix} Sara Cooper, Cornelia Betsch, Evanson Z. Sambala, Nosicelo Mchiza & Charles S. Wiysonge, Vaccine hesitancy – a potential threat to the achievements of vaccination programmes in Africa, op. cit.

^{lx} Wellcome Trust, Global Monitor 2018, Chapter 5: Attitudes to vaccines, 2018, <https://wellcome.ac.uk/reports/wellcome-global-monitor/2018/chapter-5-attitudes-vaccines>

^{lxi} Ibid

^{lxii} The COCONEL Group, A future vaccination campaign against COVID-19 at risk of vaccine hesitancy and politicisation, July 2020, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7239623/>

^{lxiii} Ibid

Wellcome Trust, Global Monitor 2018, Chapter 5: Attitudes to vaccines, op.cit.

Michael Skapinker, Why rich countries are more prone to 'vaccine hesitancy', 26 June 2019, <https://www.ft.com/content/2271a90c-942d-11e9-b7ea-60e35ef678d2>

lxiv The COCONEL Group, A future vaccination campaign against COVID-19 at risk of vaccine hesitancy and politicisation, op. cit.

lxv Jeffrey V. Lazarus, corresponding author¹ Scott C. Ratzan,² Adam Palayew,¹ Lawrence O. Gostin,³ Heidi J. Larson,⁴ Kenneth Rabin,² Spencer Kimball,⁵ and Ayman El-Mohandes², A global survey of potential acceptance of a COVID-19 vaccine, op. cit.

lxvi Alexandre de Figueiredo, Clarissa Simas, Emilie Karafillakis, Pauline Paterson, Heidi J Larson, Mapping global trends in vaccine confidence and investigating barriers to vaccine uptake: a large-scale retrospective temporal modelling study, op. cit.

lxvii Heidi Larson, Dr. Alexandre de Figueiredo, Emilie Karafillakis and Mahesh Rawal, State of vaccine confidence in the EU, op. cit.

lxviii Conspiracy theories are attempts to explain events as the secret acts of powerful, malevolent forces

Jonathan Kennedy, Populist politics and vaccine hesitancy in Western Europe: an analysis of national-level data, 1 June 2019, <https://pubmed.ncbi.nlm.nih.gov/30801109/>

lxix Amy Kaler, Health interventions and the persistence of rumour: The circulation of sterility stories in African public health campaigns, May 2009, <https://www.sciencedirect.com/science/article/abs/pii/S0277953609000495?via%3Dihub>

lxx Pamela Feldman-Savelsberg Flavien T. Ndonko Bergis Schmidt-Ehry, Sterilizing Vaccines or the Politics of the Womb: Retrospective Study of a Rumor in Cameroon, 08 January 2008, <https://anthrosource.onlinelibrary.wiley.com/doi/abs/10.1525/maq.2000.14.2.159>

lxxi Vinayak Bhardwaj, ANALYSIS: Why does an old, false claim about tetanus vaccine safety refuse to die? op.cit.

lxxii Julia Belluz, Research fraud catalyzed the anti-vaccination movement. Let's not repeat history. Vox, 5 March 2019, <https://www.vox.com/2018/2/27/17057990/andrew-wakefield-vaccines-autism-study>

lxxiii Anders Hviid, Jørgen Vinsløv Hansen, PhD, Morten Frisch, Mads Melbye, Measles, Mumps, Rubella Vaccination and Autism, 16 April 2019, <https://doi.org/10.7326/M18-2101>

lxxiv Ibid

lxxv ECDC, Systematic scoping review on social media monitoring methods and interventions relating to vaccine hesitancy, op. cit.

lxxvi CCDH, Failure to Act, op. cit.

lxxvii Talha Burki, Vaccine misinformation and social media, October 2019, [https://www.thelancet.com/journals/landig/article/PIIS2589-7500\(19\)30136-0/fulltext](https://www.thelancet.com/journals/landig/article/PIIS2589-7500(19)30136-0/fulltext)

lxxviii Rosemary Joyce Burnett, Lauren Jennifer von Gogh, Molelekeng H Moloji, Guido François, A profile of anti-vaccination lobbying on the South African internet, 2011 - 2013, 2015, <http://www.samj.org.za/index.php/samj/article/view/9654>

lxxix The Lancet Child & Adolescent Health, Vaccine hesitancy: a generation at risk, op. cit.

Amelia M. Jamison, David A. Broniatowski, Mark Dredze, Zach Wood-Doughty, Dure Aden Khan, Sandra Crouse Quinn, Vaccine-related advertising in the Facebook Ad Archive, 16 January 2020, <https://www.sciencedirect.com/science/article/pii/S0264410X1931446X?via%3Dihub>

Alexandre de Figueiredo, Clarissa Simas, Emilie Karafillakis, Pauline Paterson, Heidi J Larson, Mapping global trends in vaccine confidence and investigating barriers to vaccine uptake: a large-scale retrospective temporal modelling study, op. cit.

lxxx CCDH, Failure to Act, op. cit.

lxxxii Beth L. Hoffman, Elizabeth M. Felter, Kar-Hai Chu, Ariel Shensa, Chad Hermann, Todd Wolynn, Daria Williams, Brian A. Primack, It's not all about autism: The emerging landscape of anti-vaccination sentiment on Facebook, 10 April 2019, <https://www.sciencedirect.com/science/article/pii/S0264410X19303032?via%3Dihub>

lxxxiii Wellcome Trust, Global Monitor 2018, Chapter 5: Attitudes to vaccines, op.cit.

lxxxiii Kang-Xing Jin and Rob Leathern, Supporting Public Health Experts' Vaccine Efforts, Facebook Blog, 13 October 2020

<https://about.fb.com/news/2020/10/supporting-public-health-experts-vaccine-efforts/>

^{lxxxiv} Kang-Xing Ji, Removing False Claims About COVID-19 Vaccines, Facebook Blog, 3 December 2020, <https://about.fb.com/news/2020/12/coronavirus/>

^{lxxxv} Talha Burki, Vaccine misinformation and social media, op. cit.

^{lxxxvi} Ibid

^{lxxxvii} CCDH, Failure to Act, op. cit.

^{lxxxviii} University of Hamburg, Managing the COVID-19 pandemic, op. cit.

^{lxxxix} Ipsos Mori, COVID-19 vaccination intent is decreasing globally, op. cit.

^{xc} Liz Hamel, Audrey Kearney, Ashley Kirzinger, Lunna Lopes, Cailey Muñana, and Mollyann Brodie, KFF Health Tracking Poll - September 2020: Top Issues in 2020 Election, The Role of Misinformation, and Views on A Potential Coronavirus Vaccine, 10 September 2020, <https://www.kff.org/coronavirus-covid-19/report/kff-health-tracking-poll-september-2020/>

^{xcⁱ} The Harris Poll, Nearly 80% of Americans think that the speedy approval process of a coronavirus vaccine is driven by politics – NOT by proof that shots work, 10 September 2020, <https://theharrispoll.com/nearly-80-of-americans-think-that-the-speedy-approval-process-of-a-coronavirus-vaccine-is-driven-by-politics-not-by-proof-that-shots-work/>

^{xcⁱⁱ} RJ Reinhart, More Americans Now Willing to Get COVID-19 Vaccine, op. cit.

^{xcⁱⁱⁱ} Langer Research Associates, COVID Collaborative, UNIDOS US, NAACP, COVID Collaborative Survey: Coronavirus Vaccination Hesitancy in the Black and Latinx Communities, 23 November 2020, <https://www.covidcollaborative.us/content/vaccine-treatments/coronavirus-vaccine-hesitancy-in-black-and-latinx-communities>

^{xc^{iv}} Ibid