28

What Are the Main Challenges That Global COVID-19 Immunisation Efforts Must Now Overcome?

Series | COVID-19 & response strategy

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[This document is part of a series of discussion notes addressing fundamental questions about COVID-19 and response strategies. These documents are based on the best scientific information available and may be updated as new information comes to light.]

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Now that several safe and effective vaccines have been approved by health authorities in various countries, global immunisation efforts against COVID-19 are finally underway. The development of these vaccines—and the many others still in the pipeline—has shattered all previous scientific achievement records and given us a glimpse of the **light at the end of the pandemic tunnel**. However, without an **immunisation strategy** that promises to eventually achieve herd immunity and bring us back to normality, even these advances will be insufficient.

Unfortunately, the foreseeable **vaccine access gap** forces us to reckon with what the World Health Organisation (WHO) recently described as a "**catastrophic moral failure**"[1] — a race among unequal competitors that threatens this global public good.

In this document, we will analyse some of the **fundamental challenges** involved in achieving this goal, particularly with regard to the safety and reliability of the available vaccines and the need to overcome barriers to production, distribution and access for all countries. The ultimate impact of COVID-19 will, in many respects, be shaped by the **decisions** we make in the coming months on this critical issue ●

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[1] WHO chief warns against 'catastrophic moral failure' in COVID-19 vaccine access. UN News. 18 January 2021.

1. Science Has Delivered: The Portfolio of Vaccines Approved or in Development Gives Cause for Hope

"All of the vaccines under development use one of four strategies. The conventional vaccines contain either inactivated whole virus or viral proteins, whereas the more innovative vaccines contain a genetic sequence—delivered directly to the cells or via viral vector—that prompts the body to synthesise the viral protein in question."

Table 1 provides an overview of the **vaccines furthest along in the development process**—i.e. those which have already been approved or are currently in phase III clinical trials. More than 60 additional vaccine candidates are in currently in phase I or II clinical trials. All of the vaccines under development use one of **four strategies**. The conventional vaccines contain either **inactivated whole virus** or **viral proteins**, whereas the more innovative vaccines contain a **genetic sequence** that prompts the body to synthesise the viral protein in question. This genetic sequence can either be delivered **directly to the cells** via messenger RNA or DNA or by means of a harmless **viral vector** that infects the cells.

Tabla 1. Leading COVID-19 Vaccines. Vaccines against COVID-19 which are on plase III of clinical trials or have already been approved in at least one country. [Updated on 19/01/2021]

Strategy	Company	Reported Efficacy[1]	Storage	Number of Doses	Doses Negotiated by the EU
Messenger RNA	Moderna	94%	-20°C, 4°C (1 month)	2 4 weeks apart	160 M*
	BioNTech/Pfizer	95%	-70°C	2 3 weeks apart	500 M (up to 600 M)*
	Curevac	Phase 3 ongoing	4°C	2 4 weeks apart	225 M (up to 405 M)
DNA	AnGes-Osaka University	Phase 3 ongoing	Room temperature	2 2 weeks apart	-
	Zydus Cadila	Phase 3 ongoing	Room temperature	3 4 weeks apart	-
Viral vector	AstraZeneca/ Oxford (ChAd)	70% (up to 90%?)	4°C	2 4 weeks apart	300 M (up to 400 M)
	Gamaleya Institute (Ad5, Ad26)	91,4%	4°C	2 3 weeks apart	-
	CanSinoBio (Ad5)	Phase 3 ongoing	4°C	1	-
	Johnson & Johnson (Ad26)	Phase 3 ongoing	4°C	1	200 M (up to 400 M)
Protein	Novavax	Phase 3 ongoing	4°C	2 3 weeks apart	-
	Medicago	Phase 3 ongoing	4°C	2 3 weeks apart	-
Inactivated virus	Sinopharm	79%[2]	4°C	2 3 weeks apart	-
	Sinovac Biotech	Phase 3 ongoing	4°C	2 2 weeks apart	-
	Bharat Biotech	Phase 3 ongoing	4°C	2 4 weeks apart	-

[1] Efficacy in preventing symptomatic cases in the vaccine group as compared to the placebo group.
[2] The results haven't been published yet.
*Aproved for administration in the European Union.

Sources: Coronavirus Vaccine Tracker. New York Times/European Comission. Coronavirus vaccines strategy.

The **European Union (EU)**—like most high-income countries, as well as some others—has established an ambitious immunisation strategy that started with the approval and distribution of the **Pfizer-BioNTech** and **Moderna** vaccine candidates. The **AstraZeneca-Oxford** vaccine, based on viral vector technology, is expected to secure EU approval shortly.

In other parts of the world, distribution of other vaccines—such as those developed in Russia (**Gamaleya Institute**) and China (**Sinopharm**)—is now getting underway. Although findings from the final phases of research on these products have yet to be published, the Russian vaccine has already received emergency approval in Argentina, Algeria, Bolivia and Serbia. Emergency authorisation of the Chinese vaccine has been granted in Jordan, Egypt and Bahrain. India has granted emergency use authorisation of its **Covaxin** vaccine, despite the fact that phase III safety and efficacy findings have not yet been published ●

2. We Can Trust the Safety and Efficacy of the Vaccines Used in Spain and the Rest of the EU. But What About the Others?

"All vaccines approved by the EU will be safe, as they will have undergone all three clinical trial phases."

COVID-19 vaccines have been developed in record time thanks to major technological advances and experience with the SARS and MERS coronaviruses. This does not mean that the process was not rigorous or that the usual steps were not followed. All vaccines approved by the EU will be **safe**, as they will have undergone all **three clinical trial phases**. Phase I determines safety—a fundamental feature of any drug. The safety of a vaccine is further corroborated in phases II and III, which involve thousands of people. In other words, before immunisation campaigns begin, all vaccines will have been **extensively tested** in clinical trials.

Messenger RNA (mRNA) vaccines—such as the first vaccines distributed in the EU—are based on technology that is new but not unknown. Although it had never previously been approved for use in humans, mRNA vaccine technology is the result of **more than a decade of progress in the biomedical field**. Furthermore, the safety of these vaccines has been demonstrated throughout the three-phase clinical trial process. Regardless of the strategy used by any particular vaccine, the main **unanswered question** is **how long it will protect against COVID-19**. By the time the vaccines reach the market, their efficacy will only have been tested for six to eight months. If their efficacy is found to decline over time, revaccination will likely be necessary.

What about the **vaccines being distributed in other regions of the world**? In order to be approved by regulatory authorities, all vaccine developers must follow the same transparency and safety procedures, provide complete results from all clinical trial phases, and publish these data in peer-reviewed scientific journals in a timely manner. The information published on the phase I and II trials of the Russian (Gamaleya) and Chinese (Sinopharm) vaccines demonstrates their safety and immunogenicity (the ability of

an antigen to activate the immune system and induce an immune response). Doubts regarding their efficacy will be cleared up once the details of the final results are released and published

3. Vaccines Do Not Mean the End of COVID-19 (at Least for Now)

"It is likely that vaccinated people can become infected—albeit without developing symptoms—and pass the virus on to others."

Firstly, although several of the most advanced vaccines have shown efficacy rates of more than 90% in clinical trials, **none have demonstrated 100% efficacy**. The vast majority of people who receive the vaccines will be protected against COVID-19, or at least the most severe forms of the disease. However, we can expect that some percentage of vaccinated people will nevertheless become ill with COVID-19. Therefore, we cannot rule out the possibility that some vaccinated people may die as a consequence of becoming infected and developing COVID-19.

Secondly, while we know the vaccines protect against the development of disease, **we do not yet know whether they prevent viral transmission**—that is, whether they prevent us from becoming infected and infecting others. It is likely that vaccinated people can become infected—albeit without developing symptoms—and pass the virus on to others. Therefore, until a significant percentage of the population has been vaccinated, preventive measures such as mask-wearing and social distancing will remain essential.

Finally, although preliminary results suggest that vaccines are effective against the viral variants that have emerged in the United Kingdom, South Africa and Brazil, SARS-CoV-2 is likely to eventually develop **mutations that will require the adaptation of vaccines and treatments**

4. The Challenge of Global Immunisation: Sink or Swim Together

"The only scenario in which COVID-19 can be brought under some semblance of control in the medium to long term is wordwide herd immunity, such that transmission is interrupted, further uncontrolled outbreaks of SARS-CoV-2 are avoided and new variants are prevented from emerging."

The only scenario in which COVID-19 can be brought under some semblance of control in the medium to long term is wordwide **herd immunity**, such that transmission is interrupted, further uncontrolled outbreaks of SARS-CoV-2 are avoided and new variants are prevented from emerging. This scenario necessarily implies **widespread access to safe and effective vaccines**. It may also require sustained universal access to vaccines over the next few years to prevent outbreaks of the disease from taking root anywhere in the world. Among other things, this will require strengthening health systems and personnel and implementing logistical distribution mechanisms.

The fight against other infectious diseases—**polio**, **measles**, **smallpox**, etc.—provides useful lessons in this regard. Through a combination of investment in science, relatively solid public health systems and ambitious vaccination campaigns, diseases that once inflicted death and suffering on millions of human beings have been brought to bay[2].

[2] Our history is a battle against the microbes: we lost terribly before science, public health, and vaccines allowed us to protect ourselves. Our World in Data. July 2020.

5. Three Fundamental Principles for Achieving This Global Objective

"All countries should be guaranteed access to a sufficient quantity of effective vaccines at prices they can afford or with the backing of international financial solidarity mechanisms."

Three fundamental principles should guide our efforts to achieve this global objective:

- **Vaccine safety and efficacy**, which are achieved via the **control and monitoring mechanisms** described in sections 1 and 2 of this document.
- **Universal access:** The international initiative COVAX (see *Box 1*) has set the goal of **ensuring that all countries have enough doses** to vaccinate 20% of their population during the acute phase of the pandemic before the end of 2021, thereby flattening infection curves simultaneously across the globe.
- **Equity:** All countries should be guaranteed access to a sufficient quantity of effective vaccines **at prices they can afford** or with the backing of international financial solidarity mechanisms. Between January and February 2021, COVAX plans to open a round of financing to official development assistance (ODA) donor countries. Within each country, vaccination strategies should guarantee equitable access to vaccines for all populations—starting with health workers and at-risk populations—regardless of income level ●

Box 1. COVAX: The International Community's Response for Countries Unable to Produce or Purchase Their Own Vaccines..

The COVAX initiative was launched by **Gavi, the Vaccine Alliance**, to ensure that COVID-19 vaccines reach low- and middle-income countries. The COVID-19 vaccine thus provides the first example of **global decision-making platforms being used as an alternative to traditional multilateral organisations**—a model not necessarily endorsed by all governments. States are necessary, but they are no longer the only players at the decision-making table. Like Gavi itself, the **COVAX platform encompasses both public and private interests**. Decision-making involves government representatives from low-, middle- and high-income economies, the pharmaceutical industry, vaccine producers, the World Health Organisation (WHO) and other relevant UN agencies, experts, research centres, private philanthropic organisations and civil society.

Source: World Health Organisation and the article "Geopolítica de la vacuna: un arma para la salud global" (R. Vilasanjuan), which will be published shortly as part of the Elcano Royal Institute's ARI series.

6. Three Obstacles to Achieving This Global Objective

"The risk of a wave of 'vaccine nationalism' and excessive stockpiling of vaccines by the richest countries could exacerbate the scarcity of the vaccines and doom global immunisation efforts."

The unprecedented development of safe and effective vaccines against SARS-CoV-2 is an essential first step in the international community's response to the pandemic. In order to be successful, however, global immunisation efforts must **overcome three fundamental challenges in the coming months**:

• **Funding:** The **COVAX** initiative was designed to ensure that all countries would have access to effective vaccines, regardless of their income level or purchasing power. The initial goal is to **raise $5 billion** in addition to the $2 billion already raised. This would be enough to procure 2 billion doses to cover 20% of the population in 94 low-income countries and lay the groundwork for a **global epidemiological response to end the acute phase of the pandemic worldwide**. The incoming **US** administration is expected to reach an agreement with Gavi, the Vaccine Alliance, to cover the bulk of this round ($4 billion); the rest is expected to be provided by other donors, such as the **EU**, **Norway**, **Canada** and the **United Kingdom**.

With regard to **middle-income countries**, however, much uncertainty remains. Although the **World Bank** has announced $12 billion in **loans** for the purchase of vaccines, there is a risk that these funds will exacerbate the very serious debt crisis faced by many developing regions.

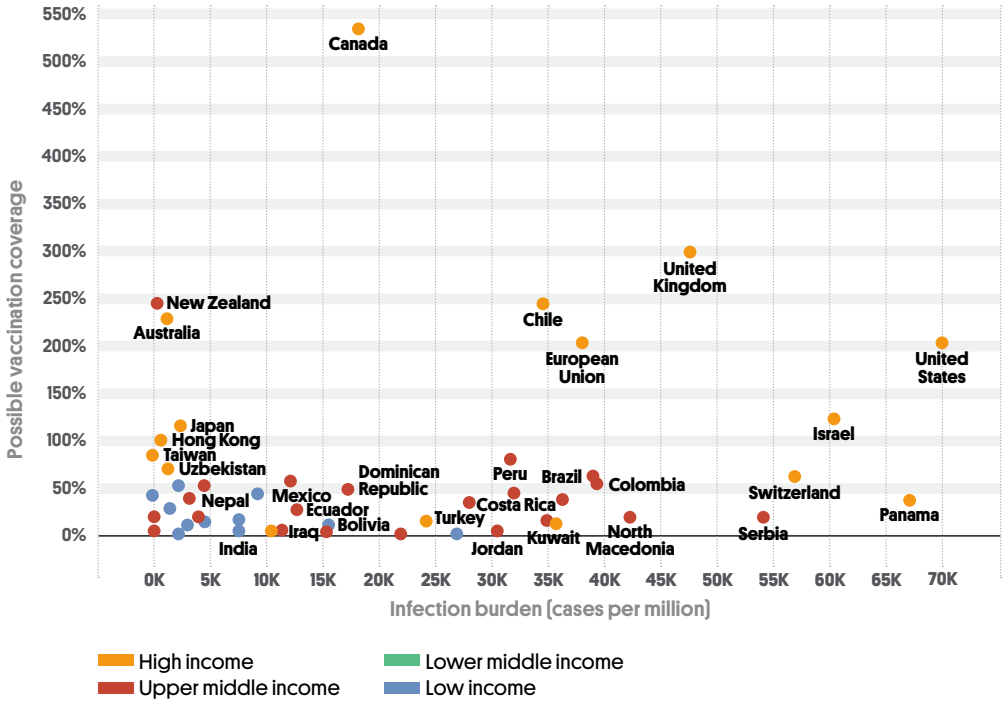
• **Production:** Although advanced economies are more or less guaranteed access to vaccines, the estimated production capacity for the first year is enough to provide coverage to just 30% of the world's population, or perhaps slightly more. The risk of a wave of "**vaccine nationalism**" and **excessive stockpiling of vaccines by the richest countries** could exacerbate the scarcity of the vaccines and doom global immunisation efforts[3]. Data collected by Duke University's Global Health Innovation Center show that Canada has purchased seven times as many vaccines as its population needs; the United Kingdom and the United States nearly six times as many; and the European Union and New Zealand just over four times as many (see *Figure 1*)[4]. Some observers, including the Center for Global Development, have called for countries to explicitly pledge to donate all surplus vaccines that will not be used by the end of this year[5].

[3] Fanjul, Gonzalo. Los peligros del nacionalismo inmunitario. *3.500 Millones* blog. *El País*. 15 January 2021.

[4] COVID-19 Launch and Scale Speedometer.

[5] Glassman, Amanda. G7: Make Plans to Share Excess Vaccine Now. Center for Global Development. 4 January 2021.

Figure 1. Current and Potential Vaccination Coverage by Country and Income Level.



Source: Duke Global Health Innovation Center.

• **Distribution:** Given that the first available vaccines have a **complex supply chain and must be stored at very low temperatures**, COVAX has opted to focus on the vaccines that are simplest from a **transport and distribution** standpoint. The AstraZeneca and Janssen vaccines, for example, are the main candidates for getting immunisation programmes up and running in the countries with the weakest logistics systems. This will open up competition with other vaccines that are based on similar technology and easy to distribute, such as the Russian and Chinese vaccines (Sinopharm, Sinovac, CanSino).

The whole process will inevitably be hampered by the **structural weaknesses of poor countries' health systems**: lack of infrastructure, shortage of skilled personnel, inequity in access to services, etc. In the absence of strict control mechanisms, there is a clear risk that a **black market** will emerge, undermining the effectiveness, safety and equity of the vaccines. Gavi's immunisation programmes in the world's poorest countries have mechanisms to prevent diversions of this sort, but all countries are expected to make an effort to strengthen their systems.

The latest information suggests that the first vaccines for low-income countries covered by the COVAX initiative will be delivered in February by AstraZeneca (around 150 million doses in the first month). COVAX remains confident that it will be possible to deliver 2 billion doses to these regions before the end of the year •

7. Vaccines Are Reshaping the Global Geopolitical Landscape

"Vaccine-producing and donor countries are exerting their influence to benefit partner regions. In today's highly unstable international context, adversaries are prepared to exploit any omissions"

Vaccines have become an **instrument of geopoliticsa**[6]. Vaccine-producing and donor countries are exerting their influence to benefit partner regions. In today's highly unstable international context, adversaries are prepared to exploit any omissions. In **Latin America**, for example, uncertainty regarding the scope of international solidarity mechanisms and the availability of the Pfizer-BioNTech, Moderna and AstraZeneca vaccines has prompted some countries—Brazil, Mexico, Venezuela, Argentina and others—to commit to acquiring the Russian vaccine. Donald Trump's ban on vaccine exports has left **Ukraine** without a direct provider and dependent on supplies from China to avoid resorting to the Russian option. American isolationism has also given China an opening in **North Africa**. With a contract for 65 million doses of the Sinopharm vaccine, **Morocco** has initiated its vaccination campaign without waiting for leftovers from the West.

In a context of high uncertainty regarding production capacity and the future course of the disease, "**vaccine diplomacy**" may disrupt certain existing geopolitical balances

8. COVID-19 Will Reshape Our Model of Pharmaceutical Innovation and Access to Essential Medicines

"The collective impact of COVID-19 and the challenge of responding to the pandemic represent an opportunity to reform and strengthen this system through the power of public investment and procurement."

The COVID-19 pandemic and the international pharmaceutical response pose a double **challenge to the global model** of innovation and access to medicines. Firstly, difficulties in the production and supply of diagnostics, treatments and vaccines have prompted India and South Africa to spearhead a proposal calling for the World Trade Organisation to temporarily suspend the **intellectual property rights** related to these products. Such a suspension would allow the decentralisation of production and increase manufacturing capacity, thereby making these products available to more people at more affordable prices. Dozens of low- and middle-income countries support the proposal, but key high-income countries have rejected it outright. The high-income countries argue that the intellectual property system is necessary to incentivise the development of new vaccines, diagnostics and treatments, and that the removal of such incentives could cause supplies of these products to run out. They further argue that equitable access can be achieved through voluntary licensing, technology transfer agreements and the COVAX Advance Market Commitment (AMC), which allows donors to subsidise vaccines for countries that cannot afford them.

[6] Vilasanjuan, Rafael. Geopolítica de la vacuna: un arma para la salud global. Forthcoming as a part of the Elcano Royal Institute's ARI series.

The second challenge has to do with the **public sector's unprecedented investment** in **generating and developing these innovations**—and, therefore, its ability to set the rules on how they are used. Nearly 90% of the more than $9 billion invested in the pharmaceutical and technological response to COVID-19 over the past year came from public funds. As a result, hundreds of vaccines, diagnostic tests and potential treatments—all targeting a pathogen unknown to science just one year ago—are now under development. The question is whether this investment will give public authorities the **ability to set the price and conditions of access to pharmaceutical innovations**. The drawbacks of this system are a failure to focus on the public interest and the disproportionate power wielded by certain private stakeholders, as evinced by the lack of transparency surrounding vaccine price negotiations. The collective impact of COVID-19 and the challenge of responding to the pandemic represent an opportunity to reform and strengthen this system through the power of public investment and procurement[7]

9. What the EU and Spain Are Doing to Support the Challenge of Global Vaccination— and Why It Isn't Enough

"In addition to their financial contributions, Spain and the EU have an important role to play in this battle, namely, not leaving the nearly 2.4 billion people living in self-financing middle-income countries—including much of Latin America—out in the cold."

Spain participates in the COVAX scheme, fundamentally via the EU. The **Team Europe** programme is the vehicle for Europe's cooperative response the pandemic, which has taken the form of €400 million in guarantees and €100 million in direct contributions to COVAX. This amount is expected to fund the purchase of at least 88 million doses. In addition, Spain has made a **direct contribution** of €50 million. These are valuable initial contributions which must continue in the future if we are to put an end to the pandemic.

In addition to their financial contributions, Spain and the EU have an important role to play in this battle, namely, not leaving the nearly 2.4 billion people living in **self-financing middle-income countries**—including much of Latin America—out in the cold. Although optional purchase agreements through COVAX guarantee the supply of effective vaccines, the conditions are on par with those applied to high-income economies and are therefore likely to put middle-income countries in dire fiscal straits. The international community must guarantee a tiered pricing system that matches countries' real purchasing power.

Finally, like its peers, Spain has made the same mistake of **overbuying** vaccines. As noted above, market saturation could be a serious obstacle to achieving the goal of global immunisation

[7] "COVID-19 and the Reform of the Pharmaceutical R&D System: A Proposal for a Preferred Supplier Model". ISGlobal discussion document (forthcoming).

10. Recommendations

"Success in the battle against COVID-19 depends on how well we manage to consolidate a safe, effective, universal and equitable global immunisation strategy. What more can Spain and the EU do to achieve this goal?"

Success in the battle against COVID-19 depends on how well we manage to consolidate a safe, effective, universal and equitable global immunisation strategy. **What more can Spain and the EU do** to achieve this goal?

- **Consolidate COVAX as the global benchmark for the negotiation, purchase and supply of vaccines.** Spain and the EU must maintain their economic and political commitment to this initiative, on which the vaccination of a large part of the planet now depends. Although the immediate budget has so far secured coverage for 20% of the 94 poorest countries, it is essential to **provide further funding** to allow safe vaccines to be delivered to the rest of the population. As part of the joint EU effort, Spain must make explicit financial and political commitments.

- **Lead an offensive within the EU and the G20 to guarantee access to vaccines for middle-income countries.** Nearly a third of the world's population is at risk of falling into immunity limbo because they have neither enough resources of their own nor enough aid to purchase vaccines. The international community—with Spain and the EU at the forefront—must **urgently offer solutions for these countries**, such as extending non-credit financing mechanisms and facilitating negotiations with pharmaceutical companies.

- **The most developed countries, starting with those of the EU, must reconsider their stockpiling strategy, which threatens the availability of vaccines in other regions.** Once the supply of a sufficient number of vaccines has been ensured, rich countries should facilitate the distribution of their stocks to other regions. Spain and the EU should follow in the footsteps of Canada, which has explicitly pledged to **donate its extra vaccine doses**.

- **Lead a debate on research model reforms and access to essential medicines.** COVID-19 has underscored the need for pharmaceutical innovation and drug access systems to be more closely aligned with **public interest** objectives. States must use their investments to guarantee research activities like those which gave rise to these discoveries. However—in line with recent demands by the European Parliament—they must also guarantee transparency with regard to the cost and prices of vaccines, reconsider the limitations that the prevailing intellectual property system imposes on the mass production of vaccines, and assert the power of public procurement systems to impose public interest criteria.

- **Strengthen the public health systems that are enabling the success of vaccines against COVID-19.** Universal immunisation is the best public health strategy for a pandemic, hence the need for public health systems to maintain control over vaccination efforts. This makes it possible to distribute vaccines equitably and **avoid requiring people to pay for vaccination**, which would create a black market and a dangerous gap in herd immunity.

- **Spain must define a Global Health Strategy to organise and guide its actions in this field.** Global vaccination challenges have become a **key issue for the safety and welfare of all countries**. Like other aspects of global health, these challenges affect a wide range of public policies and government bodies. It is therefore essential to develop a national strategy that clearly defines Spain's objectives and aspirations, calibrates resources accordingly and optimises the actions of everyone involved

TO LEARN MORE

- FAQs on COVID-19 Vaccines. ISGlobal.
- The G20, Vaccines and COVID-19: Why Is the Success of the COVAX Initiative Vital? Series | COVID-19 and response strategy #25. ISGlobal.
- Launch and Scale Speedometer. Duke Global Health Innovation Center.
- COVID-19 Vaccine Predictor. Center for Global Development and Ariadne Labs.
- Coronavirus Vaccine Tracker. *The New York Times*.

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