Review MECAS V° 17/ N° 4/ December 2021

# Access to COVID-19 vaccines: inequality between developed and developing countries

**Hamadi Abdelkader** [1]
Dr, Skema Business School, Lille, France
abdelkader.hammadi@gmail.com

**Jou Siham**
Dr in Pharmacy, University of Tlemcen
sihamdjou.07@gmail.com

**Datoussaid Aimad**
Dr, Lab MIM, university of Sidi Bel-Abbes, Maghtech Network, Algeria.
datou_imad@yahoo.fr

Received date : 23-10-2021 Accepted date : 18-12-2021 Publication date: 31-12-2021

**Abstract:**
In this article we discuss the concept of inequality access to COVID-19 vaccine between developed and developing countries. Based on statistics on vaccination launches, countries which already have a pharmaceutical industry achieve better vaccination rates. This pandemic has once again revealed the inequalities that exist in terms of unequal access to healthcare, drugs, and vaccines. We offer a framework for understanding inequality in access to COVID-19 vaccines. Decision-makers, especially in the South, must be aware of these challenges and strategize solutions that can be implemented at scale. These include challenges around affordability, availability, and vaccination hesitancy.

**Key words**: access, inequality, COVID-19, vaccines
**Code JEL:** I10, I14

## Introduction:

Vaccination emerged as the most effective public health intervention to prevent communicable diseases, save lives, and reduce disease burden. Following the "*Pasteur's Germ Theory*," Edward Jenner produced the smallpox vaccine in 1798.[2] The current pandemic has proven to intensify many pre-existing social and health disparities worldwide, directly impacting the lives of many underserved communities, such as people experiencing homelessness or living in precarious conditions, those without residence or with irregular migration status (such as refugees, asylum seekers, and undocumented migrants), persons with disabilities

[1] **Corresponding Author.**
[2]Bazin H. A brief history of the prevention of infectious diseases by immunisations. *Comp Immunol Microbiol Infect Dis.* (2003) 26:293–308. doi: 10.1016/S0147-9571(03)00016-X

(whether physical, sensory, intellectual, or psychosocial disabilities) and their support network. The COVID-19 pandemic has caused substantial impact both on health and economic sides. It results in terms of excess mortality and put national health systems under pressure. Although several COVID-19 vaccines have now been authorized or approved for human use in almost all over the world, it is remained challenging to be produced at scale, priced affordably, allocated globally so that they are available where needed, and widely deployed in local communities. Several manufacturers have successfully developed COVID-19 vaccines in less than 12 months – an extraordinary achievement, given it typically takes a decade or longer to develop new vaccines[1].

As of Feb 3, 2021, there were 289 experimental COVID-19 vaccines in development, 66 of which were in different phases of clinical testing, including 20 in phase 3. Only five of these 66 vaccines—those developed by AstraZeneca in partnership with Oxford University, BioNTech in partnership with Pfizer, Gamaleya, Moderna, and Sinopharm in partnership with the Beijing Institute—have been authorized by stringent regulatory authorities (as per WHO criteria of such authorities2) or WHO vaccines often suffer from underinvestment,[2] but that has not been the case in this pandemic.[3] The top five companies have each received between $957 million and $2.1 billion in funding commitments, mostly from the US Government and the Coalition for Epidemic Preparedness Innovations (CEPI). The Chinese and Russian Governments have invested in several vaccine candidates being developed by private companies or state-owned enterprises. Because many funding arrangements are confidential, details regarding the specific breakdown of spending are unclear. Scaling up production to meet global demand is a monumental challenge.[4][5]
Additionally, the volume of vaccines that is needed places pressure on global supply chains for inputs, such as glass vials, syringes, and stabilizing agents. The production of COVID-19 vaccines is limited by the highly concentrated state of global vaccine manufacturing capacity[6].Currently, few countries have the domestic capacity to rapidly produce COVID-19 vaccines on their own and instead will need companies to actively share knowledge, technology, and data with domestic

[1] Hanney SR, Wooding S, Sussex J, Grant J. From COVID-19 research to vaccine application: why might it take 17 months not 17 years and what are the wider lessons? Health Res Policy Sys 2020; 18: 61.

[2]Xue QC, Ouellette LL. Innovation policy and the market for vaccines. *J Law Biosci* 2020; **7:** a026

[3] Olivier J Wouters. And al. 2021Challenges in ensuring global access to COVID-19 vaccines: production, affordability, allocation, and deployment, Lancet 2021; 397: 1023–34**.**

[4] Amanat F, Krammer F. SARS-CoV-2 vaccines: status report. Immunity 2020; 52: 583–89

[5] Wang W, Wu Q, Yang J, et al. Global, regional, and national estimates of target population sizes for covid-19 vaccination: descriptive study. BMJ 2020; 371: m4704

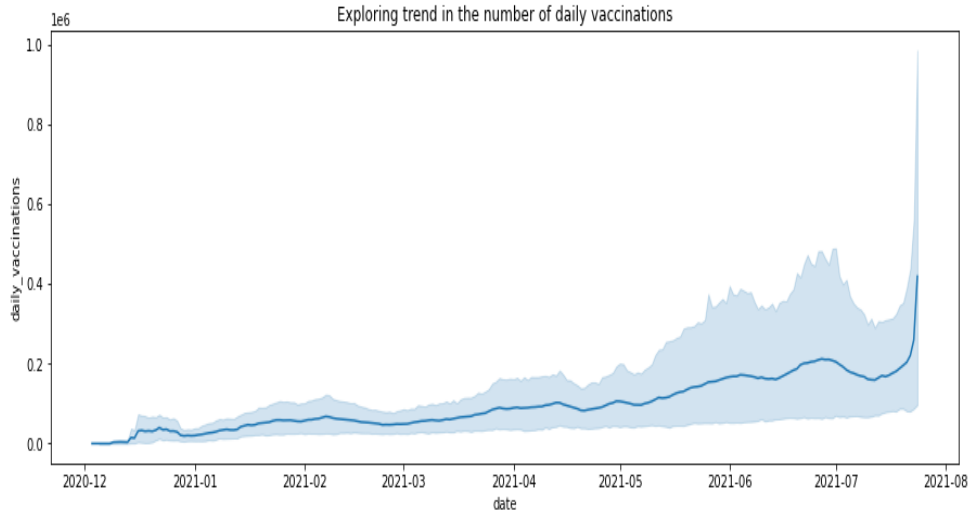
[6] Coalition for Epidemic Preparedness Innovations. Manufacturing survey results analysis. June 29, 2020. https://cepi.net/wp-content/ uploads/2020/08/CEPI_Survey-of-global-drug-substance-and-drug-product-landscape-June-2020_RELEASED-1.pdf (accessed Feb 6, 2021)

manufacturers[1].This article will be organized as follows, we will discuss the inequality of access to vaccines in both Northern and Southern countries. Then, the idea of challenges faced by Southern countries will be discussed.

## 2. Inequality to access to Vaccination: overview

Access to medicines remains a public health problem for most countries in the South[2]and even less so for essential vaccines mainly in Africa. Since the introduction of COVID-19 vaccines, developed and developing countries have embarked on vaccination campaigns.In last September, 29.9% of the world population has received at least one dose of a COVID-19 vaccine, and 15.4% is fully vaccinated.4.43 billion doses have been administered globally, and 39.99 million are now administered each day (figure 1). Only 1.1% of people in low-income countries have received at least one dose[3]. At least 214 countries and territories have administered more than 4 billion doses of a COVID-19 vaccine, barely a year after the first COVID-19 case was reported in China. Several different vaccines have been developed at record speed, in large part due to years of research on related viruses and billions of dollars in investment[4].

**Figure 1: Daily vaccination in the world**




[1] Price WN II, Rai AK, Minssen T. Knowledge transfer for large-scale vaccine manufacturing. *Science* 2020; **369:** 912–14

[2] Hamadi A. (2013). Vers une approche systémique de la gouvernance : cas de l'accès aux médicaments en Algérie, Thèse en sciences économiques, Université de Lille, France.

Hamadi A. (2017), « Vers une politique publique de l'accès aux médicaments : approche instrumentale », *Cahiers du Cread*, 119 (2017): 119-120.

Hamadi, A., & Datoussaid, A. (2019). Endogenous institutional change in favor of access to medicines: the case of Algeria. *El-Bahith Review*, 19 *(1)*, 541-549.

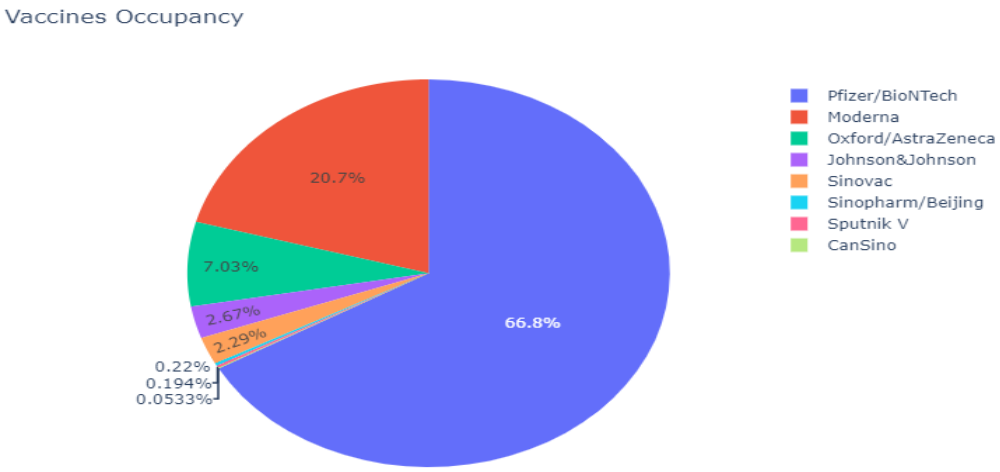
[3] https://ourworldindata.org/covid-vaccinations

[4] https://edition.cnn.com/interactive/2021/health/global-covid-vaccinations/

Though the vaccines are available in most developed nations, timely delivery and equal access in developing and poor nations are not in sight. In late-January 2021, approximately 40 million doses of the vaccine had been administered in at least 49 high-income countries, but just 25 doses had been given in one of the lowest-income countries.

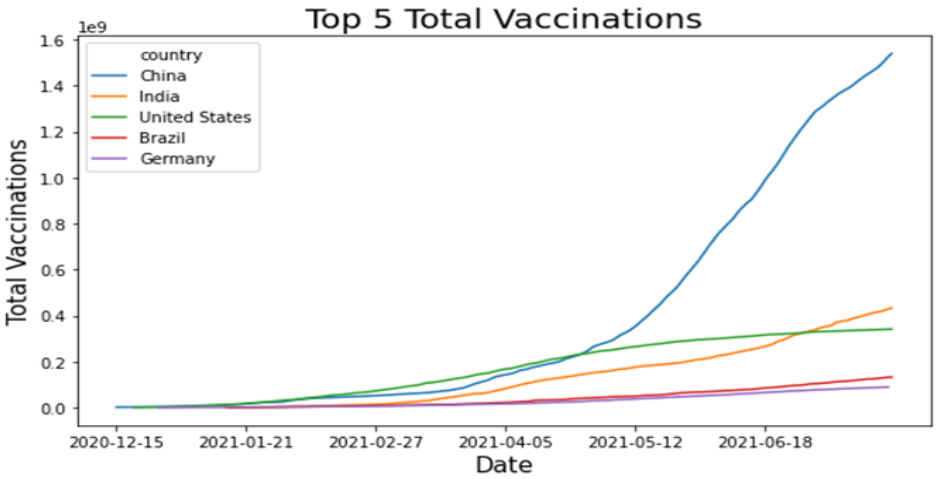
Since the emergence of this novel coronavirus in December 2019, more than a dozen vaccines have started to be rolled out (figure 2). We notice that practically all the vaccines were conceived and developed by pharmaceutical laboratories residing in the countries of the North: three United States, one in England, three in China and one Russian. The two most injected vaccines are that of Pfizer and Moderna. The latter which the final trial results confirm this vaccine has a 94% efficacy, and the data has been sent to regulators around the world. As with the Pfizer vaccine, this RNA vaccine will need to be kept in ultra-cold freezers. The vaccine has been developed by Moderna, in Cambridge, Massachusetts, and funded by the National Institute of Allergy and Infectious Diseases (NIAID), which is part of the US National Institutes of Health.

**Figure 2: vaccines occupancy**




The graph shows the countries which have most vaccinated their populations. These same countries: China, the United States, have developed anti-COVID-19 vaccines (figure 3).Given the high number of populations in these countries, their government adopted a strategy of massive vaccinations to stem the pandemic. these same countries have the highest death rates.

**Figure 3: Better vaccination rates**




We notice, China, India and Brazil have developed a pharmaceutical industry based on generics. These countries are engaged in a massive vaccination strategy with vaccines developed and produced on their soil.

## 3. The challenges related to COVID-19vaccination in the South

Public health authorities across the globe have been mobilizing to deliver the biggest ever vaccination program to battle COVID-19. Supplying and delivering these vaccines around the world involves two key components: ensuring equitable vaccine access globally; and manufacturing enough and maintaining supply chain capacity.[1] Three issues that we believe are critical to ensuring effective access to vaccines for HIV 19.

### 3.1. Affordability and Availability

In this part, we ask a question will COVID-19 vaccine be available to all people worldwide anxious to accept and want this vaccine? Most probably, it would not be possible due to the existing economic and political conditions of the world. Mechanisms are needed to ensure the affordability and sustainable financing of COVID-19 vaccines in low-income and middle-income countries, which are home to about 85% of the global population and which might lack the resources to buy adequate quantities of vaccines.[2] Even in high-income countries, it is important to ensure access to COVID-19 vaccines for poor and marginalized populations.

### 3.2. Logistical and Administrative Challenges

The deployment of COVID-19 vaccines prove a challenge due to the volumes required, but also involving the intricacies of transportation and storage; testing the robustness of Global supply chains to the nth degree. With more than five COVID-

[1] Forman R and al, 2021, COVID-19 vaccine challenges: What have we learned so far and what remains to be done? Health policy 125 (2021), 553-567.

[2] Crager SE. Improving global access to new vaccines: intellectual property, technology transfer, and regulatory pathways. *Am J Public Health* 2018; 108: S414–20

19 vaccines having received regulatory approval and the start of vaccination in these countries, the next challenge is large-scale vaccine production and equitable distribution worldwide to contain disease transmission.

According to World Economic Forum, "*5,000 flights and 15 million cooling boxes could be needed to transport billions of doses of COVID-19 vaccine around the world. There are more than 250 potential vaccines in development. We could see some vaccines ready by the end of the year - and we need to make sure medical supply chains are in place*"[1].This rapid rollout is only possible if special approaches in vaccine development, testing and stabilization are used. These issues relating to logistics and the supply chain are crucial in the countries of the South.

### 3.3. Vaccine Hesitancy

Several rumors and conspiracy theories have already surfaced about COVID-19 and affected its people's perceptions and preventive behaviors (Ali, 2020a; 2020b; 2020c).Even so; more than 1 in 5 Americans say they won't get vaccinated, according to a recent poll by the American Psychiatric Association. Among the reasons that often pop up are worries that the vaccines were developed too fast: Normally, drug research takes years or even decades from idea to reality. The first vaccines to combat COVID-19 were developed, tested, and given emergency use authorization in 11 months[2]. Numerous people in America and Canada preferred natural COVID-19 immunity. They showed mistrust in vaccine benefits and concerns about unforeseen future effects, and commercial profiteering from pharmaceutical companies.[3]

### 3.4. Case of Algeria

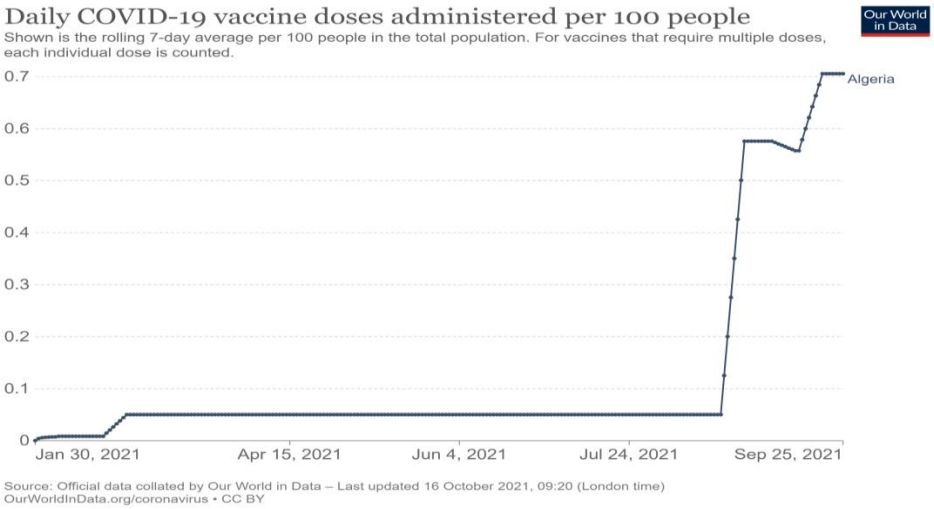
Algerians became aware of the need to get vaccinated only during the second week of July, which had a significant impact in terms of the number of deaths. The number of COVID-19 infections soared from just over 200 to over 1,200 in less than ten days, and then to 1,500 cases per day. There are between 25,000 and 30,000 infections per day, according to statistics from the National Institute of Public Health (INSP). In September 2021, according to Google Health statistics, the vaccination coverage rate is 9.2%, which is a relatively low rate compared to the general population (figure 4).

[1]https://www.weforum.org/agenda/2020/09/covid-19-vaccine-the-greatest-logistics-challenge-in-a-lifetime/

[2] https://www.sciencenews.org/article/covid-coronavirus-vaccine-development-speed

[3]Taylor S, Landry CA, Paluszek MM, Groenewoud R, Rachor GS, Asmundson GJ. A proactive approach for managing COVID-19: the importance of understanding the motivational roots of vaccination hesitancy for SARS-CoV2. *Front Psychol.* (2020) 11:2890. doi: 10.3389/fpsyg.2020.575950

**Figure 4: Daily vaccination in Algeria**




This second wave resulted in a sharp increase in the number of deaths as a result of the lack of medical equipment in public hospitals, including a widespread shortage of oxygen concentrators. The Algerian authorities, caught off guard by the arrival of the second wave, have been trying to organize a large-scale vaccination campaign. Currently, this vaccination campaign is characterized by a slowdown due in part to two major factors. On the one hand, the population's distrust of the vaccine against the virus. Algerians have been drawn into conspiratorial and conspiracy speeches about the origin of COVID-19 and vaccines relayed by social networks. This view is more flagrant among young people under 25 years. They believe that the vaccine is only effective for people over sixty years old. On the other hand, there are also problems related to the lack of human and logistical resources. Algeria does not have a pharmaceutical infrastructure capable of covering the vaccine needs of the entire population. For this reason, it has turned to China (Sinovac) and Russia (Sputnik V) to obtain supplies of vaccines. For the time being, Algeria has recently embarked on a vaccine production process through SAIDAL, a public pharmaceutical group, in partnership with the Chinese SINOVAC.

**Conclusion:**

In this article, we have tried to contribute to the current debate around access to medicines and especially to vaccines. This gap in access between the North and the South has been confirmed with the COVID-19 pandemic. The countries of the North, which have a solid pharmaceutical infrastructure, are able to have wider vaccination coverage of their populations. This pandemic should make countries in the South aware of the need to put in place a drug and vaccine production strategy to meet their drug needs (Hamadi, 2017). To overcome this pandemic, two strategies can be adopted by Southern countries. Firstly, governments should be transparent about their COVID-19 response programs and vaccine availability and should disclose how key decisions are being made. Secondly, the North must share a collective responsibility in the fight against this pandemic by providing scientific

and technological assistance to the countries of the South in the form of partnerships.

## References:

Ali I. COVID-19: are we ready for the second wave? *Disaster Med Public Health Prep.* (2020) 14:e16–8. doi: 10.1017/dmp. 2020.149.

Ali I. Impacts of rumors and conspiracy theories surrounding COVID-19 on preparedness programs. *Disaster Med Public Health Prep.* (2020) 1–6. doi: 10.1017/dmp.2020.325

Ali I. The COVID-19 pandemic: making sense of rumor and fear. *Med Anthropol.* (2020) 39:376–9. doi: 10.1080/01459740.2020.1745481

Amanat F, Krammer F. SARS-CoV-2 vaccines: status report. Immunity 2020; 52: 583–89

Bazin H. A brief history of the prevention of infectious diseases by immunisations. *Comp Immunol Microbiol Infect Dis.* (2003) 26:293–308. doi: 10.1016/S0147-9571(03)00016-X

Crager SE. Improving global access to new vaccines: intellectual property, technology transfer, and regulatory pathways. *Am J Public Health* 2018; 108: S414–20

Forman R and al, 2021, COVID-19 vaccine challenges: What have we learned so far and what remains to be done? Health policy 125 (2021), 553-567.

Hamadi A. (2013). Vers une approche systémique de la gouvernance : cas de l'accès aux médicaments en Algérie, Thèse en sciences économiques, Université de Lille, France.

Hamadi A. (2017), « Vers une politique publique de l'accès aux médicaments : approche instrumentale », *Cahiers du Cread*, 119 (2017): 119-120.

Hamadi, A., & Datoussaid, A. (2019). Endogenous institutional change in favor of access to medicines: the case of Algeria. *El-Bahith Review*, 19 *(1)*, 541-549.

Hanney SR, Wooding S, Sussex J, Grant J. From COVID-19 research to vaccine application: why might it take 17 months not 17 years and what are the wider lessons? Health Res Policy Sys 2020; 18: 61.

Olivier J Wouters. And al. 2021Challenges in ensuring global access to COVID-19 vaccines: production, affordability, allocation, and deployment, Lancet 2021; 397: 1023–34**.**

Price WN II, Rai AK, Minssen T. Knowledge transfer for large-scale vaccine manufacturing. *Science* 2020; **369:** 912–14

Taylor S, Landry CA, Paluszek MM, Groenewoud R, Rachor GS, Asmundson GJ. A proactive approach for managing COVID-19: the importance of understanding the motivational roots of vaccination hesitancy for SARS-CoV2. *Front Psychol.* (2020) 11:2890. doi: 10.3389/fpsyg.2020.575950

Wang W, Wu Q, Yang J, et al. Global, regional, and national estimates of target population sizes for covid-19 vaccination: descriptive study. BMJ 2020; 371: m4704

Xue QC, Ouellette LL. Innovation policy and the market for vaccines. *J Law Biosci* 2020; **7:** a026