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COVID-19 Vaccination Policies

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AUTHOR BIO

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ABSTRACT

The COVID-19 pandemic emerged in late 2019, caused by SARS-CoV-2, which led to vaccination becoming the cornerstone strategy to control transmission. Despite proven efficacy, vaccination uptake and distribution varied across countries due to economic constraints. This research paper examined how the economic system influences vaccination policies during the production, implementation, and promotion of the COVID-19 vaccination. The comparison between developing and developed countries included collecting data for Japan and the United Kingdom, Brazil, and India, to examine the extent to which economic structures influence vaccination policies. The research found that developed countries prioritized healthcare workers, the elderly, and high-risk groups, but strategies differed based on their abilities to expand the approaches. Vaccine hesitancy in developed countries was linked to misinformation and social media influence. This was easily mitigated by transparent communication and open data sharing. On the contrary, hesitancy linked to misinformation plus access issues often existed in developing countries. Therefore, policies emphasized outreach, free transport, and the narrowing of targeting of special groups. Overall, noting parallels and distinctions between independent economic bodies, these findings suggest that future outbreak responses adopt globally coordinated but locally adaptive strategies to enhance the existing public health systems.

Keywords*: Coronavirus, Vaccination, Vaccine Hesitancy, Developing Country, Developed Countries, Vaccine Policies, Public Health, Politics, Economic, Virus Outbreaks.*

INTRODUCTION

The transmission of Coronavirus Disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), emerged in late 2019 and rapidly escalated into a global pandemic. Biologically, SARS-CoV-2 is an enveloped, positive-sense single-stranded RNA virus. It primarily enters human cells via the ACE2 receptor, causing a range of clinical symptoms, from mild respiratory symptoms to severe pneumonia, systemic inflammation, and multi-organ failure (Lotfi & Rezaei, 2020). The virus's high transmissibility and rapid mutation rate made resolution key, prompting urgent global responses including the accelerated development of vaccines.

Vaccination has played a pivotal role in controlling the spread and severity of COVID-19. COVID-19 vaccines adopted a variety of approaches, including messenger RNA (mRNA) based and adenovirus-vectored strategies. In total, mRNA-based COVID-19 vaccines had 94.6% efficacy (Pormohammad et al., 2021). mRNA COVID-19 vaccines, like those from Pfizer-BioNTech and Moderna, use mRNA to instruct cells to produce a harmless piece of the virus's spike protein (Demongeot & Cécile Fougère, 2022). For adenovirus-vectored types, total efficacy is 80.2% (Pormohammad et al., 2021). An adenovirus-vectored COVID-19 vaccine utilizes a harmless adenovirus, a common virus that causes the cold, as a delivery system to introduce genetic material from the SARS-CoV-2 virus (Chavda et al., 2023).

Given the biological efficacy of vaccines, increasing vaccination coverage is crucial. However, global vaccination rates have been inconsistent, shaped by both a shortage in availability and hesitancy to take the first dose. Vaccine hesitancy is a complex phenomenon characterized by a delay in acceptance or refusal of vaccines despite their availability (Dubé et al., 2013). Vaccine hesitancy undermines public health efforts and increases healthcare and economic burdens. Understanding the root causes behind vaccine hesitancy and variation across countries is essential to designing effective policies.

Global patterns of vaccine hesitancy and policy responses vary significantly across developed and developing countries. Developed countries, typically characterized by high per capita income, robust healthcare systems, and advanced infrastructure, often possess more resources to promote effective vaccine policies. In contrast, developing countries have lower income levels, limited healthcare access, and greater dependency on international support. Despite these differences, both groups of countries have experimented with a range of policy tools to combat vaccine hesitancy.

This literature review aims to examine the interplay between economic systems and policies designed to mitigate vaccine hesitancy during the COVID-19 pandemic. It focuses on the contrast between developed and developing countries and investigates how economic structures influence the design, implementation, and outcomes of vaccination policies. This study aims to inform global health stakeholders on how to plan for and respond to future outbreaks more effectively. Understanding economic policy can help in building more resilient, adaptive, and equitable public health systems worldwide.

METHODOLOGY

The research process involved consulting multiple academic databases, including PubMed and Google Scholar. A total of 25 sources were identified through keyword searches, with an emphasis on the COVID-19 pandemic, which spans from 2019 to 2025, and peer-reviewed literature. Search terms included combinations and variations of "COVID-19 vaccination policies" and "global COVID vaccine strategies." Following a screening process for relevance based on title, abstract, and publication date, key sources were selected for in-depth analysis. The research was conducted on developing and developed countries. Chosen countries for comparison are Japan and the United Kingdom, and Brazil and India, respectively.

RESULTS

Japan

In August 2022, Japan reported 255,508 new COVID-19 cases, accounting for 30% of the world's cases, prompting its government to take immediate action to mitigate the challenge (Ma et al., 2023). The Japanese government responded to the pandemic through a multifaceted public health approach. Japan's ultimate goal is to mitigate infection outbreaks, maintain the medical system, and prioritize the treatment of severe cases. Guided by these principles, Japan enacted several strategic policies. As of August 19, 2022, 82.1% of the total population had received their first dose, 81.0% received the second dose, and 63.9% received a third booster dose (Ma et al., 2023).

Japan's vaccination process was organized in six phases, as shown in Table 1. Each phase was subdivided by age.

Table 1

Phase	Date	Target Group
Phase I	Feb 17, 2021	40,000 healthcare workers (safety trial)
Phase II	Mid-March 2021	General medical practitioners, doctors, nurses, and COVID-19 response personnel
Phase III	Late March 2021	Individuals aged 65 and older
Phase IV	April 2021	People with underlying conditions (20–64) and nursing home staff
Phase V	June 2, 2021	General public over age 16, excluding specific groups (e.g., pregnant women)

Phase VI	Not specified	All remaining individuals not previously eligible

Japan’s early vaccination efforts faced significant delays due to limited vaccine supply, but this issue was gradually resolved through a series of agreements starting in mid-2020. These included initial contracts with Pfizer and AstraZeneca, as well as later deals with Moderna, Takeda Pharmaceuticals, and participation in the COVAX initiative. More agreements followed through 2022 to secure additional booster doses. Alongside these international efforts, Japan also invested heavily in domestic vaccine production, allocating around $1.85 billion in May 2020 to support research and development (Ma et al., 2023). By June 2021, four Japanese pharmaceutical companies had entered clinical trials (Ma et al., 2023).

The country’s booster policy unfolded in stages. First, third doses were initially approved in September 2021 for those who had completed their second dose eight months earlier. The interval was shortened to six months in November 2021, with boosters offered to adults 18 and over by December 2021. These were extended to teens aged 12–17 in April 2022, and to children aged 5–11 by August 2022. A fourth shot was introduced in May 2022 for people over 60 and those at higher risk, and expanded in July 2022 to include healthcare workers and staff at elderly facilities. Japan also broadened its vaccine eligibility to younger children. Pfizer boosters were approved for 5–11-year-olds in August 2022, and vaccines were cleared for infants aged 6 months to 4 years in October 2022 (Ma et al., 2023).

To improve vaccine access, Japan set up a voucher system, which allowed people over 5 years old to receive vaccination. The system included not only Japanese citizens but also long-term residents, and some short-term visitors who could not leave the country. Vaccination was not mandatory, but the government encouraged vaccination by working through local governments and making sure those most at risk were prioritized (Ma et al., 2023).

A nationwide survey revealed that COVID-19 vaccine acceptance in Japan was lower than in many Western countries, with only about half of the general population (48.6%) willing to be vaccinated. Extensively, 17.5% of the general population were hesitant, compared with 11.7% of doctors, 18.5% of nurses, and 21.5% of medical clerks (Hara et al., 2021). Research identified that social media-linked misinformation was the root cause of vaccine hesitancy (Nomura et al., 2024). These studies provided specific data linking vaccine hesitancy to social media, showing that "high trust in information obtained from YouTube was associated with vaccine hesitancy in Japan” (Nomura et al., 2024, p. 4). To treat this, the Japanese government's strategy was a collaborative effort. First, its "Basic Plan for Vaccination" outlined a structure where the national government and local municipalities collaborated for on-the-ground usage of the vaccination to residents. Second, the central method involved providing transparent information to directly counter misinformation, a plan to set up a Q&A website to outline vaccine efficacy and side effects clearly, and to address and mitigate other pathways of misinformation. With the help and guidelines from their scientific professionals, inaccurate information is corrected on social media and websites (Nomura et al., 2024). This was finally supplemented by distributing public brochures and multilingual information leaflets.

United Kingdom

The first phase of the UK's vaccination program comprised nine priority groups, stratified by age, with a focus on individuals with existing health conditions. This included the front-line health and social care workers who had significant exposure to COVID-19.

Another measure the UK took to maintain the success of vaccination in preventing COVID-19 was the addition of a gap between the two doses. On December 30, 2020, the UK's Medicines and Healthcare products Regulatory Agency approved the Oxford–AstraZeneca vaccine for use in a two-dose schedule. Citing data showing strong protection from a single dose and improved efficacy with longer gaps between doses, the Joint Committee on Vaccination and Immunisation (JCVI) advised that the Oxford–AstraZeneca and Pfizer–BioNTech vaccines should be given 12 weeks apart (Public Health England, 2020). On February 26, 2021, the JCVI also issued interim guidance for Phase 2 of the vaccination program, recommending a continued rollout based on age, targeting adults aged 18 to 49. Evidence showed that some groups, including males, certain Black, Asian, and minority ethnic groups, and individuals with a body mass index (BMI) > 30, were at the highest risk for hospitalization (Harnden & Earnshaw, 2021).

Patients receiving vaccinations were divided into two groups. The first included general practitioners, nurses, practice pharmacists, and recently retired doctors and nurses. The program had been successful due to the experience in delivering 15 million influenza immunizations each year. In addition, they also put pressure on developing massive vaccination centers, staffed with groups of trained vaccinators (Harnden & Earnshaw, 2021). The vaccination locations included local hospitals, pharmacies, and community centers. Due to the large implementation across the country, by April 2021, the UK government provided 32 million vulnerable individuals with the first dose of the Pfizer–BioNTech or the Oxford–AstraZeneca vaccines (Harnden & Earnshaw, 2021).

To increase efficiency and country-wide trust in their vaccination program, the UK government implemented a communication strategy from the start. The strategy included press conferences and media events to explain the rationale behind their prioritization strategy for the most vulnerable patients first. After initially allowing the first doses, the UK government postponed people's second doses. The delaying of the second dose was also effective in terms of allowing more people to be immunized with the first dose.

Longitudinal research revealed that the overall vaccine hesitancy rate among UK adults was 18% (Robertson et al., 2021). Hesitancy was higher in women (21.0%) than in men (14.7%). Hesitancy was inversely related to age, being highest among 16–24-year-olds (26.5%) and lowest among those aged 75 and older (4.5%). Hesitancy varied across the specific ethnicity of the population (Black or Black British: 71.8%, Pakistani/Bangladeshi: 42.3%, Mixed Ethnicity: 32.4%, White British or Irish: 15.6%). The leading cause cited by 42.7% of the hesitant was the unknown future of the vaccine. In general, respondents were concerned with the side effects and lack of trust in vaccines. Compared to the White British/Irish group, Black or Black British participants were far more likely to state they 'Don't trust vaccines' (Robertson et al., 2021). To mitigate these challenges, the success of their uptake relied primarily on multilayered responses by the government. First, they addressed the spread of misinformation to build trust among citizens. Open data sharing was available, making the safety and effectiveness of the vaccine transparent to the public (Chirico & Teixeira da Silva, 2023). Moreover, they also strongly relied on actively managing the misinformation and disinformation on social media. The UK has national health agencies to maintain a strong presence on social media to counter the false claims. Last, the overarching recommendation was for policies to be grounded in Evidence-Based Medicine (EBM). This involved using robust, constantly updated scientific data to inform all public health decisions and communications (Chirico & Teixeira da Silva, 2023).

Brazil

During the COVID-19 pandemic, many countries faced significant challenges due to limited access to vaccines. To mitigate the challenge, the global vaccine has implemented the type of COVAX that functions to alleviate low and middle-income countries that lack access to vaccination, and maintain their abundant supplies (Holzer et al., 2022). Similarly, Brazil also takes this approach. Brazil originally joined the COVID-19 Vaccines Global Access facilities (COVAX) in September 2020 to secure vaccines for 10% of its population. Nevertheless, the government still considered COVAX only as one of its backup plans (Massard et al., 2021).

One of the main contracts of the vaccination facilities was with AstraZeneca, which partnered with Brazil's Oswaldo Cruz Foundation (Massard et al., 2021). The plan had two stages: first, Fiocruz would do the fill-finish manufacturing process, including the materials provided by AstraZeneca. Then, they would finish up their productions. This process required both abundant capital and skilled labor to facilitate meeting AstraZeneca's standards of production. At the same time, the São Paulo state government agreed to team up with China's Sinovac to run vaccine trials and start production in the Butantan Institute. Brazil ended up importing AstraZeneca doses and relying on Butantan to kick off its vaccination campaign in early 2021. More deals followed with Pfizer, Janssen, and Bharat Biotech to keep the supply going (Massard et al., 2021).

In Brazil, the management of the COVID-19 vaccination campaign was a collaborative effort between the federal, state, and municipal governments. The Ministry of Health (MoH) coordinated the overall campaign, including preparation for vaccines, syringes, and needles. The states were responsible for distributing these supplies. Municipalities were responsible for administering vaccinations (Bernardeau-Serra et al., 2021).

Due to limited vaccine availability, the Programa Nacional de Imunizações (PNI) outlined a phased approach. They prioritized groups based on risk factors, such as institutionalized individuals, healthcare workers, the elderly, and Indigenous populations. These priority groups were defined by the MoH, with additional guidance provided through Distribution Schedules that specified which groups should be targeted during each vaccination phase. PNI introduced the concept of "priority of the priority" groups to ensure that the most vulnerable were vaccinated first. Once a municipality completed vaccinations for a given priority group, it could proceed to the next group on the list. The system ensured that vulnerable populations (including individuals with disabilities, homeless individuals, and workers in essential sectors) were covered.

Based on data analysis, the overall prevalence of COVID-19 vaccine hesitancy in Brazil was found to be 13.3%, specifically 13.6% during the first wave and 11.4% during the second wave (Sardinha et al, 2025). The reasons behind the hesitancy lay in a few narrowed-down factors. Misinformation tools played a significant role in the hesitancy, as the presence of fake news and a lack of knowledge about the vaccines led to participants being less reliant and trusting in the success of the vaccinations. Moreover, there were also reasons lying behind its demographic, socioeconomic influences, and sometimes even personal beliefs (Sardinha et al, 2025). The Brazilian government aimed to increase the uptake and was able to implement a few protocols and measures to control the number of its vaccination recipients. In detail, a D-day was implemented, where localized health workers went door-to-door to find and vaccinate people who missed their shots (Alves et al., 2024). They also enabled people in rural areas to access the policies, offering free transportation or travel vouchers for those who lived far away and could not afford to travel to a vaccination site. Moreover, they were also able to run public awareness campaigns that were simple to understand and trusted by local leaders and influencers to spread vaccination messages. In addition, they were also successful at pinpointing the exact neighborhoods where vaccination rates were low and mobile (Alves et al., 2024).

India

The Government of India established the National Expert Group on Vaccine Administration for COVID-19 (NEGVAC) to guide the COVID-19 vaccination process in the country (Kumar et al., 2021). NEGVAC recommended that the initial phase prioritize healthcare workers, frontline workers, and individuals aged 50 years and above. The next priority group consisted of individuals under 50 with comorbidities, along with a committee of experts from various fields, including oncology, nephrology, pulmonology, and cardiology. People with conditions like congenital heart disease leading to pulmonary arterial hypertension, end-stage kidney disease, cancers, liver cirrhosis, immune deficiencies, and sickle cell anemia were included in the priority list as well (Kumar et al., 2021). The electoral roll from the 2021 general election was used to identify individuals aged 45 and older (Kumar et al., 2021). A self-registration system was available for those who missed the initial rollout. After vaccinating nearly 300 million people in the first phase, the remaining population was vaccinated based on disease patterns and vaccine availability.

India had substantial vaccine manufacturing abilities, producing over 2.4 billion doses annually, along with necessary medical supplies like syringes and vials. However, storage and transportation initially posed challenges due to the need for specific temperature conditions, with some vaccines requiring temperatures as low as -80°C (Kumar et al., 2021). Fortunately, the vaccines introduced in India required a storage temperature of only 2–8°C (Kumar et al., 2021). To facilitate distribution, the vaccines were airlifted in cold boxes with digital temperature monitoring to major depots in Karnal, Mumbai, Chennai, and Kolkata, where they were stored in walk-in coolers (Kumar et al., 2021). From there, they were transported by insulated vans to various regions across India.

The vaccination process was entirely under government control, with coordination established at national, state, and district levels among 23 ministries and various development partners. The Co-WIN system tracked vaccine distribution and followed up with individuals post-vaccination. In the initial phase, each session vaccinated 100 people per day, with a 30-minute observation period for adverse reactions (Kumar et al., 2021). Some vaccination centers had been authorized to operate 24 hours a day, increasing the daily session capacity to 200 people to expedite the process.

India's Universal Immunization Program (UIP) employed 55,000 cold-chain staff and 2.5 million health workers (Kumar et al., 2021). The initial vaccination targeted healthcare workers, and additional personnel training began in December 2020. As the vaccination effort progressed to priority groups, trained medical and paramedical staff were required to support the vaccination process.

In India, almost 70% of the population had concerns regarding the vaccines (Sneha Chandani et al., 2021). People mostly expressed worries about the short-term side effects and unknown long-term consequences of the developed vaccines. Moreover, misinformation was prevalent, leading to a concerning level of ignorance and a negligible factual understanding of the COVID-19 pandemic (Kumar et al., 2023). A widespread misconception was that developing natural immunity through infection was better than immunity from vaccination. Furthermore, lower levels of education and income were strongly correlated with higher hesitancy. Younger adults (aged 18-24) showed higher resistance compared to older groups. Interestingly, pregnant women showed the highest level of hesitancy (77.9% in one study), primarily due to concerns that the vaccine could be harmful to their baby (Kumar et al., 2023).

DISCUSSION

Vaccination policies can be generalized into 3 separate stages.

First, the manufacturing processes for vaccines can be easily manipulated in developed countries, whereas in developing countries, these processes can be much more challenging. Developing countries often emphasize their reliance on COVAX facilities and cooperation with other developing countries for mass production. Economic abilities and logistics affected how these plans worked. Japan and the UK made early agreements with drug companies, which enabled local investment in vaccines. Therefore, it was easy to obtain doses quickly and adjust their rollout plans to accommodate special needs. Brazil and India had more trouble getting enough vaccines. Some made vaccines locally through deals, but many still had to depend on COVAX.

Second, implementing specific policies to design a country's approach for achieving massive vaccination coverage. Developing and developed countries had different resources and healthcare systems, but they followed similar rules for COVID-19 vaccination. Most started by offering vaccines to people at the highest risk, like the elderly, those with health problems, and healthcare workers. After that, they opened vaccines to the rest of the population. Many countries also used age rules, but the age limits were different depending on the country's population and vaccine supply. Countries also had different rules for the time between doses. The UK gave a longer gap to protect more people with one dose sooner. Developing countries kept shorter gaps, ensuring quantity over quality.

Third, the policies to boost vaccination uptake and mitigate hesitancies. In developed countries like Japan and the UK, vaccine hesitancy was primarily fueled by sophisticated information challenges, including safety concerns with widespread misinformation on social media platforms. To counter this, their governments implemented policies centered on building trust through transparency and accountability. This involved creating expert-led Q&A websites, actively countering misinformation on social media with scientific facts, and practicing open data sharing to demonstrate vaccine safety. Conversely, in developing nations like Brazil and India, hesitancy was more directly linked to access issues, such as a lack of knowledge. The policy responses were therefore more focused on logistical support. Brazil's strategies included door-to-door outreach campaigns, providing free transportation to vaccination sites, and bridging the trust gap between different age groups.

A strength of this study is its comparative focus on both developed and developing countries. This approach of research highlights not only the contrasts in economic capacity but also the shared patterns in vaccination policy design. By analyzing four case studies across different regions, this research was able to bring forward an elaborate and scoped analysis of how structural economic factors might shape individual countries to the COVID-19 vaccine program. Another strength lies in the integration of peer-reviewed literature from multiple sources, ensuring that the analysis reflects diverse findings and perspectives.

However, the study also has limitations. The scope of data availability varied by country. While detailed information was accessible for Japan, the UK, and Brazil, there was a lack of sufficient data on India's specific policies to directly address ways to decrease vaccine hesitancy and improve vaccine uptake.

CONCLUSION

Generally, the differing economic factors between developing and developed countries resulted in varying efficacy across their policies. However, there is also a course of generalized similarity that can be similar across all countries. The logistics of vaccine development, application, and uptake were similar across all countries. In future outbreaks of any virus, the logistical approach to carefully follow the structure and vary slightly in their economic abilities is important for their general success. Looking ahead, global health systems must prepare for future outbreaks through strategies that are globally coordinated but also locally adaptive. Building resilient vaccination systems will require not only strong logistics, but also culturally sensitive communication and flexible policy design.

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