Allocating Vaccines in a Pandemic: Strategic and Ethical Aspects

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Abstract

The issue around the allocation and distribution of COVID-19 vaccines and who deserves priority on a local and global level is a question of justice, best addressed by keeping the entire population's health as the primary objective. The benefits of vaccination during a pandemic extend beyond preventing mortality and morbidity since it effectively protects and promotes health within populations by eradicating and eliminating diseases. Moreover, globally it directly impacts public welfare, health and the economy whilst extending life expectancy. A comparative analysis of the three most prominent strategies recommended by the World Health Organisation, the Centers for Disease Control and Prevention and the European Commission will be discussed and analysed. The study briefly outlines the underlying ethical aspects of the respective strategies before comparing the frameworks. However, as observed during the pandemic, whether the allocation and distribution of vaccines are done justly is a point of contention, often due to conflicting interests. In an unprecedented effort to tackle the global crisis, governments, international institutions, and pharmaceutical companies created a milieu to develop safe and effective COVID-19 vaccines.

Nevertheless, instead of making the vaccines available to everyone on a fair and equal basis, vaccine nationalism was prominent, where rich countries stockpiled vaccines instead of redistributing them to undeveloped countries. Hence, it is argued that if vaccines are allocated and distributed justly, with the common good in mind, then viral transmission is curbed more effectively. Consequently, the health and quality of life within any given population would improve significantly.

Keywords

COVID-19 vaccines, allocation, distribution, priority-setting, justice, populations' health.

Dedication

I dedicate this dissertation to my loving son, Francois, who would be very proud of my academic achievement.

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Abbreviations

ACIP	Advisory Committee on Immunisation Practices
ACT-A	Access to COVID-19 Tools Accelerator
AFR	Accountability for Reasonableness
APAs	Advanced Payment Agreements
AVATT	African Vaccine Acquisition Task Team
CDC	Centers for Disease Control and Prevention
CEPI	Coalition for Epidemic Preparedness Initiative
COVAX	COVID-19 Vaccines Global Access facility
COVID-19	Coronavirus disease
C-TAP	COVID-19 Technology Access Pool
DALYs	Disability-Adjusted Life Years
DSD	Delayed Second Dose
EC	European Commission
ECDC	European Centre for Disease Prevention and Control
ECHR	European Convention on Human Rights
EU	European Union
FDA	Food and Drug Administration
GAVI	Global Alliance for Vaccines and Immunisations
GVC	Global Value Chains
H1N1	Hemagglutinin Type 1 and Neuraminidase Type 1 (Swine flu)
HCWs	Healthcare Workers
IHR	International Health Regulations
IPRs	Intellectual Property Rights

IVAC	International Vaccine Access Center
LMICs	Low-Middle Income Countries.
NOR	Normal Opportunity Range
OECD	Organisation for Economic Co-operation and Development
OHCHR	Office of the High Commissioner for Human Rights
OWS	Operation Warp Speed
PIIE	Peterson Institute for International Economics
QALYs	Quality-Adjusted Life Years
SAGE	Strategic Advisory Group of Experts on immunisation
SARS	Severe Acute Respiratory Syndrome-related virus
SARS-CoV-2	Severe Acute Respiratory Syndrome Corona Virus
SDOH	Social Determinants of Health
SVI	Social Vulnerability Index
TRIPS	Trade Regime for Intellectual Property Rights
UK	United Kingdom
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations International Children's Emergency Fund
USA	United States of America
VoC	Variants of Concerns
WHO	World Health Organisation
WTO	World Trade Organisation

Introduction

Severe Acute Respiratory Syndrome Corona Virus (SARS-CoV-2) is the official name given to the 2019 coronavirus reported in Wuhan (China), known as the COVID-19 virus, which has spread globally[1] and was declared a pandemic by the WHO on 11th. March 2020.[2]

The COVID-19 global pandemic is a fast-moving, relatively unpredictable situation of uncertain duration.[3] It is an unprecedented worldwide threat with a sudden, widespread transmission resulting in high morbidity and mortality rates, with vulnerable people of any given society suffering severe consequences.[4] The ethical challenges arising from this pandemic are not just physical, emotional, or psychological but also socio-economic and cultural, affecting every aspect of life globally, whilst impacting, and influencing values, not just on an individual level, as a unique human being, but on families, societies, governments, and policymakers. Hence, access to healthcare and the limited supply of resources such as vaccines, materials, medical equipment, and professional healthcare personnel proved challenging.[5] Specifically, developing safe and

[1] European Centre for Disease Prevention and Control (ECDC), "Question and Answers on COVID-19: Basic Facts," accessed October 29, 2020. https://www.ecdc.europa.eu/en/covid-19/facts/questions-answers-basic-facts.
[2] World Health Organisation, "WHO Director-General's Opening Remarks at the Media Briefing on COVID-19 - 11 March 2020", accessed October 29, 2020. https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020.
[3] British Medical Association, "COVID-19 – Ethical Issues. A Guidance Note," accessed October 29, 2020. http://www.bma.org.uk/media/2360/bma-covid-19-ethics-guidance-april-2020.pdf
[4] European Centre for Disease Control and Prevention, "Question and Answers on COVID-19: Basic Facts," accessed October 29, 2020. htpp://www.ecdc.europa.eu/en/covid-19/facts/questions-answers-basic-facts.
[5] Norman Daniels, "Resource Allocation and Priority-Setting," in *Public Health Ethics: Cases Spanning the Globe. Public Health Analysis*, eds. H.D. Barrett, W. L. Ortmann, A. Dawson, C. Saenz et al. (Cham (CH) Springer) 2016, Chapter 3, accessed November 14, 2020. https://www.ncbi.nlm.nih.gov/books/NBK435786/

effective vaccines is the primary tool in eradicating COVID-19 whilst protecting populations' health and well-being.[6]

The dynamics surrounding the Coronavirus disease (COVID-19) vaccine's accessibility and supply place constraints on the ability to vaccinate populations worldwide, especially those suffering from a poor economy or facing social disruption before this pandemic. The COVID-19 pandemic has highlighted the health inequalities within and between populations and the dynamics surrounding vaccine distribution for the provisions of immunisation programmes within countries. Many contributing factors that affect decision-making processes necessitating priority setting of limited vaccine supply will be viewed to explain vaccine distribution dynamics through various strategies employed in the fight against COVID-19.

During the COVID-19 pandemic, countless challenges emerged due to the highly contagious disease, with no medical cure and protection. Medical resources such as ventilators and human resources, including healthcare professionals, proved scarce, while vaccines were not yet developed. Moreover, with only supportive measures in care management in place and overwhelming hospital admission rates necessitating intensive therapy care, significant mortality and morbidity rates rose globally.[7] Health care systems were quickly overwhelmed, placing exceptional demand on an already limited resource within any given country since epidemiologists' understanding of this disease was still in its infancy phase. Thus, creating an element of great uncertainty for

[6] European Commission (EC), "Public Health: Overview," accessed April 7, 2022. https://ec.europa.eu/health/vaccination/overview_en

[7] EC, "Statement on Scientific Advice to European Policy Makers During the Covid-19 Pandemic," accessed January 7, 2021.

humanity and the future, with reasonable fear and anxiety as COVID-19 has claimed more than 4,067,517 deaths with 188,655,968 infected people worldwide to date.[8] The pandemic continued to wreak more global health havoc, especially with the emergence of new viral mutation variants, despite the benefits of newly developed vaccines.[9]

COVID-19 differs significantly from past pandemics, although its responses are derived from lessons learned in influenza preparedness.[10] The strategic prioritisation planning across all socio-demographic groups is considered a central public health policy, given the ethical implications of protecting the most vulnerable within societies. Following epidemiological evidence, Buckner et al. highlighted that prioritising vaccines among various socio-demographic groups reduces infections, years of life lost, and deaths due to a targeted approach.[11] Evidence indicates a lower susceptibility in children and adolescents, with increased infection rates amongst the most vulnerable within societies, especially the elderly, those with underlying chronic health conditions, low immunity, male gender, obesity, or those who smoke.[12] Thus, affecting the overall percentages in increased deaths prominently with age and amongst those vulnerable with a higher 4% in developing severe symptoms whilst needing hospitalisation.[13]

[8] WHO Coronavirus (COVID-19) Dashboard Overview", accessed July 16, 2021. https://covid19.who.int/
[9] Seyed M. Moghadas, et al., "Evaluation of COVID-19 Vaccination Strategies with a Delayed Second Dose", *PLoS Biology* 19, no. 4 (2021).
[10] WHO Global Influenza Programme & WHO, "Pandemic Influenza Preparedness and Response: a WHO Guidance Document," accessed May 29, 2021. https://apps.who.int/iris/handle/10665/44123.
[11] Jack H. Buckner, Gerardo Chowell, and Michael R. Springborn, "Dynamic Prioritization of COVID-19 Vaccines When Social Distancing is Limited for Essential Workers," *Proceedings of the National Academy of Sciences of the United States of America* 118, no.16 (2021): 1-12.
[12] Public Health England, "COVID-19: Epidemiology, Virology, and Clinical Features," accessed October 2, 2020. https://www.gov.uk/government/publications/wuhan-novel-coronavirus-background-information/wuhan-novel-coronavirus-epidemiology-virology-and-clinical-features.
[13] ECDC, "Question and Answers on COVID-19: Basic Facts".

This study which is concerned with evaluating how COVID-19 vaccines are being allocated and distributed within this pandemic and addressing how a just and equitable distribution could be attained, is divided into three chapters. The first chapter focus on vaccine allocation and the importance of priority setting in times of pandemic with a comparative study of three chosen frameworks: the World Health Organisation (WHO), the Centre for Disease Control and Prevention (CDC) and the European Commission (EC) strategies. The second chapter explores the ethical theories of distributive justice and the common good that populations have the right to healthcare and good health and how this can be achieved. Finally, finalising the dissertation with insights gained and propose a way forward followed by recommendations for the just allocation and distribution of vaccines. The study concludes that by establishing collaboration and creating opportunities in the allocation and distribution of COVID-19 vaccines, the benefits of a cooperative approach ought to be synonymous with solidarity, thus providing a unified, cohesive, coordinated front that would ultimately produce better results.

The author of this dissertation, a 22-year skilled female senior nurse working in Malta's critical care unit (Europe), witnessed the consequences on population health and deaths during the COVID-19 pandemic. Moreover, while undergoing a Master of Arts in Bioethics, the author, as a professional health provider, recognised the benefits of vaccines, especially before and post-vaccine development which had reduced acute care admissions. Together with priority setting, these factors have promoted the reflection on the strategic and ethical implications related to the distribution and allocation of COVID-19 vaccines globally.

Chapter 1: Vaccine Distribution and its Priority Setting in Times of Pandemic

This chapter will start with a brief overview of the COVID-19 pandemic before reviewing those dynamics affecting the ability and strategies of distributing and allocating vaccines within populations. Moreover, the second part of this chapter provides a better understanding of the three chosen frameworks for the comparative analysis of policies and strategies as recommended by the World Health Organisation (WHO),[1] the Centers for Disease Control and Prevention (CDC),[2] and the European Union (EU).[3] The author will first outline the underlying ethical frameworks of the respective strategies before comparing the same frameworks, followed by recognising the strengths and weaknesses of each approach.

1.1. The Dynamic of Vaccine Distributions and its Ethical Implications

Fair allocation of vaccines during the COVID-19 pandemic presented a set of ethical challenges when the demand became devastating and the limited supply of resources, together with those accompanying factors that influenced the availability and

[1] World Health Organization, "Access and Allocation: How Will There Be Fair and Equitable Allocation of Limited Supplies?" accessed March 27, 2021, https://www.who.int/news-room/feature-stories/detail/access-and-allocation-how-will-there-be-fair-and-equitable-allocation-of-limited-supplies.
[2] Centers for Disease Control and Prevention, "How CDC Is Making COVID-19 Vaccine Recommendations," accessed March 27, 2021, https://www.cdc.gov/coronavirus/2019-ncov/vaccines/recommendations-process.html.
[3] European Commission (EC), "EU Vaccines Strategy", accessed March 27, 2021, https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/public-health/eu-vaccines-strategy_en.

accessibility of vaccines.[4] Thus, the question of which ethical values should guide decisions in the fair allocation and distribution of vaccines arises.

Valuable lessons from past pandemics concerning the dynamics surrounding the ethical implications in vaccine allocation with differences in epidemiology from other pandemics, such as the SARS or H1N1 influenza, indicated different approaches towards vaccination strategies.[5] Nevertheless, identifying sources of infection, monitoring, tracking contagiousness and the severity of case fatality rates whilst quantifying the transmissibility of the disease have proven to be valuable in this pandemic.[6] Consequently, providing valuable epidemiological data for decision-making processes in limiting transmission rates and reducing international spread through identification, contact tracing, isolation, quarantine and mitigating measures to curb contagiousness, together with the development of vaccines.

The benefits of vaccines are of great value and measured in parallel to sanitation and the provision of safe, clean water within societies[7] as a reasonably low-cost, powerful tool compared to the impact of SARS-CoV-2 infections.[8] Moreover, COVID-19 vaccines were authorised in early December 2020 for worldwide vaccination programmes, with thirteen different vaccines approved for global distribution.[9] Thus,

[4] Joseph H. Wu, Stephen D. John, and Eli Y. Adashi, "Allocating Vaccines in a Pandemic: The Ethical Dimension," *The American Journal of Medicine* 133, no. 11 (2020): 1241-1242.
[5] Buckner et al., "Dynamic Prioritization of COVID-19 Vaccines When Social Distancing is Limited for Essential Workers," 1.
[6] Haley E. Randolph, and Luis B. Barreiro, "Herd Immunity: Understanding COVID-19," *Immunity (Cambridge, Mass.)* 52, no. 5 (2020): 737-41.
[7] Charlene M.C. Rodrigues, and Stanley A. Plotkin, "Impact of Vaccines; Health, Economic and Social Perspectives," *Frontiers in Microbiology* 11 (2020): 1-15.
[8] Shan Su, Lanying Du, and Shibo Jiang, "Learning from the Past: Development of Safe and Effective COVID-19 Vaccines," *Nature Reviews. Microbiology* 19, no. 3 (2021): 211-19.
[9] WHO, "Coronavirus Disease (COVID-19): Vaccines – What vaccines are there against COVID-19?" accessed October 10, 2021. https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-(covid-19)-vaccines

achieving immunity via vaccinations through the development, dissemination and distribution of vaccines globally is crucial in curbing the pandemic.[10]

Vaccines have consequential health, social and economic benefits by lowering mortality and morbidity rates whilst increasing life expectancy, influencing public health, productivity and wealth, lowering healthcare costs, and thus reducing inequities.[11]

Disease control benefits of vaccines include eliminating and eradicating the disease, mitigating severity in protection from infection, whilst protecting the unvaccinated population through indirect effects of herd immunity. Further benefits extend to safer travel and mobility, thus affecting individual freedom and liberties. Indirect benefits of vaccines include promoting economic growth, reducing poverty, contributing to peace in regions of civil conflicts by the vaccine-mediated ceasefire, and empowering individuals in making vital decisions on family planning, also considered indispensable against bioterrorism.[12] Experience gained from past pandemic immunisation programmes and research in vaccine strategies has provided insight into achieving targets within this pandemic. Furthermore, having solid governmental and healthcare organisational support and customised vaccine strategies embrace the socio-cultural dimension of one's country.[13] Therefore, developing such a vaccine strategy's

[10] Rebecca Forman, Soleil Shah, Patrick Jeurissen, Mark Jit, and Elias Mossialos, "COVID-19 Vaccine Challenges: What Have We Learned So Far and What Remains to Be Done?" *Health Policy* 125, no. 5 (2021): 553-567.
[11] Andre, F. E., R. Booy, H. L. Bock, J. Clemens, S. K. Datta, T. J. John, B. W. Lee, et al, "Vaccination Greatly Reduces Disease, Disability, Death and Inequity Worldwide," *Bulletin of the World Health Organization* 86, no. 2 (2008): 140-6.
[12] *Ibid*, 143.
[13] Karin Hardt, Paolo Bonanni, Susan King, et al, "Vaccine Strategies: Optimising Outcomes," *Vaccine* 34, no. 52 (Dec 20, 2016): 6691-6699.

structure and the strength of a country`s healthcare system are considered critical in successful vaccination programme rollouts.

COVID-19 herd immunity expects to be around the 60 - 70% goal mark or that of approximately in reaching 7.9 billion vaccinated people worldwide to protect the entire world from the virus.[14] In June 2021, statistics reported that only 10.04% of the global population had been fully vaccinated worldwide, mostly from rich countries.[15] Moreover, only 0.9% of low-middle income countries (LMICs) had vaccinated their population with at least one dose.[16] Discussions revolved around vaccines' supply and distribution issues as the main reason behind the global health crisis for countries not vaccinating their populations, with most nations worldwide experiencing severe coronavirus outbreaks. Advanced purchasing agreements (APAs) practised by the United States of America (USA), Australia, Canada, and Japan, have secured more than enough vaccines doses to vaccinate their entire populations twice to five times over, which means that these nations have reserved around half of all available vaccines (51%) by November 2020.[17] Consequently, these actions affected procurements and vaccines' deployment by other countries either through direct advance market agreements or through the COVID-19 Vaccines Global Access (COVAX) facility, which was created on

[14] Randolph and Barreiro, "Herd Immunity: Understanding COVID-19", 738.
[15] "Corona Virus Vaccinations," accessed July 16, 2021. https://ourworldindata.org/covid-vaccinations.
[16] Maria De Jesus, "Global Herd Immunity Remains Out of Reach Because of Inequitable Vaccine Distribution – 99% of People in Poor Countries are Unvaccinated," accessed July 13,2021. https://theconversation.com/global-herd-immunity-remains-out-of-reach-because-of-inequitable-vaccine-distribution-99-of-people-in-poor-countries-are-unvaccinated-162040.
[17] Anthony So, and Joshua Woo, "Reserving Coronavirus Disease 2019 Vaccines for Global Access: Cross Sectional Analysis," *British Medical Journal* 371 (2020).

purpose for equitable vaccine access, resulting in the nationalism of hoarding of vaccines despite the need and promotion not to do so.[18]

The WHO/Europe high-threat pathogen team have pointed out that the virus mutations emerging from COVID-19 are a challenging pandemic response. Although affecting higher transmissibility and severity, the currently available vaccines protect against emerging new variants through vaccination programmes.[19] Furthermore, suppose vaccines prove to be less effective against the emerging variants of concern (VoC); in that case, it is possible to change the vaccine composition, thus highlighting the importance of not just having the appropriate vaccine but ensuring its effectiveness and impact on its distribution and the allocation frameworks. Moreover, a booster vaccine dose is needed in the future for added protection, subsequently affecting strategic vaccination planning, funding, production, supply, and allocation of vaccines globally into a more complex mission.

This pandemic has continued to affect socio-economic livelihoods and the overall population's health worldwide,[20] with a tremendous negative impact on global public health services due to the overwhelming demand that prioritises resource allocation,[21] including COVID-19 vaccines. Consequently, vaccines are a valuable resource to radically

[18] Organisation for Economic Co-operation and Development (OECD), "Coronavirus (COVID-19) Vaccines for Developing Countries: An Equal Shot at Recovery," accessed July 17, 2021. https://read.oecd-ilibrary.org/view/?ref=1060_1060300-enj5o5xnwj&title=Coronavirus-COVID-19-vaccines-for-developing-countries-An-equal-shot-at-recovery&_ga=2.187515688.1002044059.1626524051-693436168.1626379314.

[19] World Health Organisation (Europe), "Q&A: COVID-19 variants and what they mean for countries and individuals," accessed July 10, 2021. https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2021/5/q-and-a-covid-19-variants-and-what-they-mean-for-countries-and-individuals.

[20] Maria Nicola, Zaid Alsafi, Catrin Sohrabi, et al, "The Socio-Economic Implications of the Coronavirus Pandemic (COVID-19): A Review," *International Journal of Surgery* 78 (2020):185-193.

[21] Emmanuel J. Ezekiel, Persad Govind, Upshur Ross, et al, "Fair Allocation of Scarce Medical Resources in the Time of Covid-19," *The New England Journal of Medicine* 382, no. 21 (2020): 2049-2055.

reduce deaths, morbidities and cease the transmission rates whilst protecting global health, in conjunction with the necessary mitigating measures held obligatory by governments.[22]

Despite COVID-19 vaccine development being rapid, the provision, manufacturing, and delivery of vaccines are challenging due to supply shortages in conjunction with various logistic problems, deployment, and inadequate distribution capacity in numerous countries.

A thriving global vaccination campaign is based on constant clear communication regarding the understanding that affects the acceptance and perception of vaccines' benefits and adverse effects.[23] Clinical trials and vaccine campaigns revealed that vaccines provide an outstanding level of protection against the severity and symptoms of coronavirus infections, with the 2-dose vaccination 3-to-4-week apart policy.[24] However, evidence supports that the delayed second dose (DSD) by 9-to-12-weeks maximising the benefits of vaccination programmes, averting 95% of infection rates, hospitalisations, and deaths, compared to the recommended 21-day schedules.[25] Consequently, affecting the strategic allocation of prioritising vulnerable groups within society, whereas both the United Kingdom (UK) and Canada approved the DSD policy.[26]

[22] Laura Matrajt, Julia Eaton, Tiffany Leung, and Elizabeth R. Brown, "Vaccine Optimization for COVID-19: Who to Vaccinate First?" *Science Advances* 7, no. 6 (2021).
[23] OECD, "Enhancing Public Trust in COVID-19 Vaccination: The Role of Governments," accessed June22,2021. https://www.oecd.org/coronavirus/policy-responses/enhancing-public-trust-in-covid-19-vaccination-the-role-of-governments-eae0ec5a/.
[24] Fernando P. Polack, Stephen J. Thomas, Nicholas Kitchin, et al., "Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine," *The New England Journal of Medicine* 383, no. 27 (2020): 2603-2615.
[25] Moghadas et al, "Evaluation of COVID-19 Vaccination Strategies with a Delayed Second Dose", 1.
[26] "Statement from the UK Chief Medical Officers on the prioritisation of first doses of COVID-19 vaccines," accessed July 17, 2021. https://www.gov.uk/government/news/statement-from-the-uk-chief-medical-officers-on-the-prioritisation-of-first-doses-of-covid-19-vaccines. See also, Global News, "Canada can delay 2nd coronavirus vaccine dose if there's a shortage, panel says," accessed July 10, 2021. https://globalnews.ca/news/7573376/coronavirus-vaccine-2nd-dose-delay/

Moreover, literature contends that a 2-dose vaccination programme decreases immunisation opportunity for certain societal groups, especially those difficult to reach and bring back for their second doses, such as the homeless, drug users or those living in rural areas.[27] Therefore, developing a one-shot vaccine proves to be more practical, especially in geographically challenging conditions, since its cold-chain requirement is less meticulous and better managed.

The necessity arises in balancing competing values, objectives and presenting challenges that will depend on the effectiveness of different vaccines within different population groups. Moreover, considering the cost-effectiveness of different strategies and a country's resources and health systems available with far-reaching ethical implications.[28] Giubilini et al. claim that it would be a mistake to assume that prioritising vulnerable individuals is the best strategy, notwithstanding the chosen approach employed by several countries, requiring more in-depth ethical and empirical analysis.[29] However, epidemiological and expert advice deliberations in mainly protecting the vulnerable are the wisest approach applied as it saves lives, protecting healthcare system capacity and the quality of lives saved. For example, an estimated six million preventable deaths annually result from vaccine immunisation programmes in preventing diseases, saving lives, and influencing disability-adjusted life years (DALY) worldwide.[30] Nevertheless, funding, provision, distribution, and administration of

[27] Heidi Ledford, "J&J's One-shot COVID Vaccine Offers Hope for Faster Protection," accessed June 26, 2021. https://www.nature.com/articles/d41586-021-00119-7.
[28] Alberto Giubilini, Julian Savulescu, and Dominic Wilkinson, "Queue Questions: Ethics of COVID-19 Vaccine Prioritization," *Bioethics* 35, no. 4 (2021): 348-55.
[29] *Ibid*, 348.
[30] Jenifer Ehreth, "The Global Value of Vaccination," *Vaccine* 21, no. 7-8 (Jan 30, 2003): 596-600.

vaccines are challenging, with much more effort needed to reach people living in poverty or civil disruption.[31]

Vaccine hesitancy needs addressing since delayed acceptance or refusal due to reasons of wellbeing, efficacy, religious beliefs, and misinformation are issues that affect the overall vaccine uptake. Therefore, it necessitates an approach that promotes public confidence and complacency, guarantees convenience in access, and utilises transparent communication systems to ensure clear, understandable information recognising socio-demographic characteristics within populations.[32] Irrationally antivaccine lobbying exists, despite the proven advantages of vaccines in eliminating rare and infectious diseases, cutting healthcare costs, and reducing health inequalities and poverty.[33]

The COVID-19 virus crisis has created an urgent need to develop, manufacture, and distribute more supplies of vaccines at a higher rate, as the demand is more significant.[34] The WHO, the United Nations International Children's Emergency Fund (UNICEF), the Global Alliance for Vaccines and Immunizations (GAVI), The Bill & Melinda Gates Foundation, together with the Coalition for Epidemic Preparedness Initiative (CEPI) are all involved in the multiple funding programmes, which are instrumental in intensifying vaccine benefits to all. Hence, funding for vaccines in unified global

[31] Rodrigues, and Plotkin, "Impact of Vaccines; Health, Economic and Social Perspectives,"1.
[32] Mohammad S. Razai, et al, "COVID-19 Vaccine Hesitancy: The Five Cs to Tackle Behavioural and Sociodemographic Factors," *Journal of the Royal Society of Medicine*; 114, no.6 (2021): 295-98.
[33] Andre, et al, "Vaccination Greatly Reduces Disease, Disability, Death and Inequity Worldwide", 141.
[34] Rodrigues, and Plotkin, 1-2.

cooperation is essential for populations' health and economic impact during this pandemic.[35]

In April 2020, the COVAX facility was launched and co-led by the agencies, as mentioned earlier. It is one of the main structures for global vaccine diagnostics and treatment, mainly the Access to COVID-19 Tools (ACT) Accelerator, aimed to coordinate an international risk-sharing mechanism facilitating procurement and equitable distribution of vaccines whilst ensuring vaccine accessibility to all nations regardless of their wealth, as quickly, equally, and safely as possible.[36] The main goal is to deliver two billion affordable and available vaccine doses by the end of 2021, targeting to aid countries to vaccinate at least 20% of their population, thus impacting the acute phase of the pandemic with a balanced vaccine allocation approach.[37]

After all, the world leaders from the G7 Summit group have pledged donations of one billion COVID-19 vaccine doses by the end of 2022 to support the COVAX facility and the emerging countries, seeking to share vaccines as rapidly and equitably as possible.[38] However, despite all the international efforts and assistance offered to countries struggling to vaccinate their communities, global herd immunity and the benefits of immunisation remained at a low level. Data revealed that the resultant

[35] *Ibid*, 2.
[36] Seth Berkley, "COVAX Explained," accessed June 10, 2021. https://www.gavi.org/vaccineswork/covax-explained.
[37] WHO, "Fair Allocation Mechanism for COVID-19 Vaccines Through the COVAX Facility," accessed May 30, 2021. https://www.who.int/publications/m/item/fair-allocation-mechanism-for-covid-19-vaccines-through-the-covax-facility.
[38] WHO, "G7 Announces pledges of 870 million COVID-19 Vaccine Doses, of Which at Least Half to be Delivered by the End of 2021," accessed July 18, 2021. https://www.who.int/news/item/13-06-2021-g7-announces-pledges-of-870-million-covid-19-vaccine-doses-of-which-at-least-half-to-be-delivered-by-the-end-of-2021.

record number of high infections, massive viral outbreaks, deaths, and the overall burdens from COVID-19 illnesses occur in developing nations such as Brazil and India.[39]

Therefore, the need is not just to strengthen the fair allocation and distribution of vaccines but to address bottlenecks in the manufacturing and capacity of vaccine production so that developing countries can vaccinate their populations efficiently with a more affordable, accessible supply of vaccines.

1.2. Vaccine Distribution Strategic Frameworks

A strategy provides a vision for direction and action planning towards goals, thus, establishing frameworks for prioritising resource allocation through planned initiatives. In addition, a designed structured plan enables coordinated actions to achieve desired outcomes and accountability.[40] As a result, international organisations developed COVID-19 strategic frameworks in vaccine distribution and deployment.

The following is a comparative analysis of the proposed policies and strategies by the WHO, CDC, and the EU. Initially, the author of this dissertation will review and summarise each framework to outline and understand the respective strategic policies and the supportive values before comparing them, whilst noting the strengths and weaknesses of each framework.

[39] De Jesus, "Global Herd Immunity Remains Out of Reach Because of Inequitable Vaccine Distribution – 99% of People in Poor Countries are Unvaccinated".
[40] Fred Nickols, "Strategy, Strategic Management, Strategic Planning and Strategic Thinking", accessed April 08, 2022. https://nickols.us/~nickols1/strategy_etc.pdf.

1.2.1. The World Health Organisation Framework

The WHO strategy[41] comprises two phases to achieve its target objectives through the COVAX facility, with vaccine allocation and distribution within populations issued by the Strategic Advisory Group of Experts on immunization (SAGE). The framework seeks to provide a transparent process of decision-making that is fair and equitable to its participating member countries. It also aims at achieving an approximate 20% vaccinated individuals per country within phase one by prioritising three targeted cohorts based on scientific data. The prioritised groups scheduled to receive the vaccine during phase one are all the frontline workers in health and social care settings, the elderly group (> 65 years old) and all other vulnerable individuals with any underlying chronic health conditions and are considered high risk for death.[42]

Phase two proceeds by incorporating additional vaccines provided to countries through a risk criteria evaluation based on threats and the high impact of COVID-19 on the liability of health care systems and vulnerable populations within those countries. These vaccines will depend significantly on funding, particularly for communities challenged with major viral outbreaks or those confronting issues throughout their allocation process. Arguably funding is of great importance to societies already suffering disparities.

Furthermore, apart from the above phases, a humanitarian aid safeguard buffer of 5% COVID-19 vaccines was set to reserve, so to be utilized in case of any government-led interventions fail to achieve vaccination of their targeted populations and all high-

[41] WHO, "Access and allocation: how will there be fair and equitable allocation of limited supplies?".
[42] *Ibid*.

risk individuals, such as those groups of people living outside controlled constitutional areas and those working or living within these settings, such as refugees, asylum seekers, detainees, or migrants.

1.2.2. The Center for Disease Control and Prevention Framework

The Advisory Committee on Immunization Practices (ACIP) provides medical and public health proficiency on the guidance of the CDC regarding the use of vaccines in controlling vaccine-preventable diseases within the USA population. The CDC reviews recommendations made by the ACIP, approved, and adopted officially after the Food and Drug Administration (FDA) vaccines approval or emergency authorisation. Thus, the safety of COVID-19 vaccines goes through extensive deliberation before the commencement of the vaccination roll-out programmes. In addition, Operation Warp Speed (OWS), a partnership among organisations such as the CDC and FDA, has provided enormous funding in the USA to deliver up to three hundred million doses of safe and effective vaccines by early 2021.[43]

The CDC framework[44] is developed around a three-phase approach strategy, whereas each phase direction depends on vaccine supplies' availability. Phase 1 is subdivided into stages (as outlined below) and is designed for a limited initial supply of vaccines, focusing on those within groups of the communities listed as high-risk individuals. On the other hand, Phase 2 strategy focuses on vaccinating those other critical populations that during Phase 1 were either missed or failed to be reached for

[43] CDC, "Operation Warp Speed: Vaccines, Diagnostics, and Therapeutics," accessed July 28, 2021. https://www.cdc.gov/washington/testimony/2020/t20200702.htm.
[44] CDC, "How CDC Is Making COVID-19 Vaccine Recommendations".

vaccination, alongside the general population, when a larger supply of vaccine doses is readily available for the required demand. Finally, Phase 3 is intended to roll out when enough vaccine supplies are available for the entire remaining population, aimed to reach both the public and private entities while ensuring equitable open access to vaccination.

The CDC recommends that all healthcare workers (HCWs) and long-term care facility residents be vaccinated first during phase 1a. They are followed by the elderly (>75 years) and other non–essential frontline workers during the next phase 1b. Afterwards, all other individuals aged 65 to 74 years and a cohort of people between 16 to 64 years with high-medical risk conditions will be offered the vaccine in phase 1c and those essential workers who failed to be vaccinated earlier.[45]

1.2.3. The European Commission Vaccine Strategy

The EU strategy[46] aims for an effective, fair allocation of COVID-19 vaccines in safeguarding the quality, safety, and efficacy by enabling affordable rapid access of vaccines to its member European states. The strategy has two pillars: (i) securing the production of vaccines with sufficient supplies through the APA, funded from the emergency support response tool, and (ii) accelerating the development, authorisation, and availability of vaccines in adapting the existing regulatory framework.[47]

[45] CDC, "The Advisory Committee on Immunization Practices' Updated Interim Recommendation for Allocation of COVID-19 Vaccine — United States, December 2020," accessed July 15, 2021. https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm695152e2-H.pdf.
[46] EC,"EU Vaccine Strategy".
[47] *Ibid*.

THE European Commission (EC) directed all its member states to follow a common vaccination strategy for distributing vaccines while applying proportionate mitigating measures to decrease viral transmission spread.[48] Moreover, each member state directs their process according to the EU's defined priority groups, targeting sub-population categories. COVID-19 vaccinations' importance in containing the pandemic is acknowledged as vital in saving lives, protecting health care systems, and restoring economies. In comparison, the established priority groups recognised in guiding the EU immunisation programme follow the same outline and recommendations as that of the WHO and CDC frameworks. Each member state decides whom to vaccinate first. This framework focuses on prioritising HCW, the elderly >60 years, high-risk individuals with co-morbidities, vulnerable socioeconomic groups, and all other essential workers that cannot maintain social distancing due to the nature of their job.

By July 2021, Europe had enough vaccine doses to vaccinate 70% of its population,[49] thus achieving herd immunity. Moreover, the EU had confirmed its participation within the COVAX Facility by contributing millions of euros as grant funding in supporting safe access to vaccines for low and middle-income countries. This action is a favourable decision providing a platform for collaboration between countries towards a common goal, that of global responsibility of governance processes in making COVID-19 vaccine universally available, and strategically aimed towards quality, safety, efficacy, and easy accessibility in a coordinated manner. Furthermore, strength-based

[48] EC, "Preparedness for COVID-19 Vaccination Strategies and Vaccine Deployment," accessed April 17, 2021.
https://ec.europa.eu/health/sites/default/files/vaccination/docs/2020_strategies_deployment_en.pdf.
[49] ECDC, "COVID-19 Vaccine Tracker," accessed July 28, 2021.
https://vaccinetracker.ecdc.europa.eu/public/extensions/covid-19/vaccine-tracker.html#uptake-tab

solidarity offers a meaningful opportunity for individuals to be vaccinated and treated equally and respectfully. A comparative table of the three strategies in vaccine allocation and distribution is available for a more comprehensive review – as shown below.

Vaccination Frameworks	Phase 1	Phase 2	Phase 3 (or others)	COVAX facility Participation
WHO	Health Care Workers (HCW), Elderly >65, Vulnerable Individuals.	Criteria assessment on high impact of pandemic on country's Health Care Systems & vulnerable population health (depend on funds)	Humanitarian Aid Safeguard Buffer - a Vaccine Reserve in case government-led intervention unsuccessful to reach targeted populations and all high-risk individuals	Yes
CDC	**Limited** initial supply of vaccines. Further subdivided into 3 sections. **1a** HCW, Long-term care facility residents (LTCFs). **1b** Elderly >75, non-essential frontliners. **1c** Cohorts of those 65 -74ys, 16 - 64yr with high-risk chronic conditions (vulnerable population) = all those missed in the other phases.	**Larger** supply of vaccines available: Aim to vaccinate all other critical populations that were not reached during Phase 1	**Sufficient** vaccine supplies: Target for an Open Equitable Access to the remaining entire population. (Vaccination roll-out by public and private entities)	Yes
EU	No **basic specific phases** were delineated as each member-state had planned their strategy according to a defined **priority groups** for vaccination as issued by the EU, targeting sub-population categories based-on same guidelines by the WHO and CDC. This framework focuses on prioritizing HCW, the elderly >60 years, all LTCFs, high-risk individuals with co-morbidities, vulnerable socioeconomic groups, and all other essential workers.			Yes

Table 1: Comparison between Strategic Phases.

1.2.4. Comparative Analysis

This section will present a comparative analysis of the three strategies, based on their prioritisation and strategic planning around the allocated limited vaccine supply,

together on how expert advice was undertaken and addressed. The issue around distribution and allocation of vaccines and who deserves priority on a local and global level is a question of justice, best managed by keeping the population's health at large as the primary objective.

The WHO strategy encourages governments to allocate vaccines irrespective of an individual's legal status within their countries, thus upholding the principle of distributive justice and equality. It provided a well-analysed set of proposals taking into consideration the degree of the disease outbreak, the viral severity and transmission rates, together with the availability of the number of supplied vaccines. The WHO strategy employs a benefit-burden ratio risk assessment for vaccine criteria allocation within subpopulations, affecting prioritisation decisions within nations. However, global allocation decisions are not directly addressed, even though global equity is part of its value framework.[50] It also recognises the limitations in its guidance development for decision-making by addressing all possible contingencies during situations of uncertainty for the prioritisation of vaccines,[51] within various possible scenarios of vaccine supply stage availability, in the milieu of public health, epidemiology, vaccine efficacy on age-related populations and of the ongoing available scientific data.

Consequently, the WHO SAGE value framework involves principles considered essential in ensuring limited supplies' fair and equitable vaccine allocation whilst

[50] WHO, "WHO SAGE Values Framework for the Allocation and Prioritization of COVID-19 Vaccination," accessed March 14, 2021. https://apps.who.int/iris/bitstream/handle/10665/334299/WHO-2019-nCoV-SAGE_Framework-Allocation_and_prioritization-2020.1-eng.pdf?ua=1.

[51] WHO, "WHO SAGE Roadmap for Prioritizing uses of COVID-19 Vaccines in the Context of Limited supply," accessed March 14, 2021. https://www.who.int/docs/default-source/immunization/sage/covid/sage-prioritization-roadmap-covid19-vaccines.pdf?Status=Temp&sfvrsn=bf227443_2.

recommending a list of core principles supporting objectives in prioritising groups.[52] The framework provides a valuable ethical tool for policy decision-making by experts and governments for prioritising vaccines by identifying various vulnerable groups whilst incorporating shared values and objectives essential for the allocation set up of COVID-19 vaccines. Thus, accountability, transparency, efficiency, and adaptability within the immunisation programmes are considered in providing health benefits of the approved vaccines attained through the WHO framework. The WHO strategy clarifies justifying rationale for ethical decision-making processes shared amongst the public. It enables disregarded groups to advocate their vaccination claim while also providing a valuable feedback mechanism for critique. Nevertheless, the WHO SAGE value framework acknowledges vaccine constraints due to supply limitation, characteristics, and availability, narrowing down options in allocating vaccines between countries and prioritising groups within countries.

The principles of human well-being, equal respect, global and national equity, reciprocity, and legitimacy are all highlighted as essential goals for the priority groups during the COVID-19 vaccination. Therefore, the main objective of the WHO strategy is the promotion of human well-being through vaccine benefits and the value of ensuring equitable access to these benefits, both globally and within countries.[53]

As global public goods, vaccines contribute to the equitable protection and promotion of public health.[54] While maximising vaccination benefits when vaccine

[52] WHO SAGE Values Framework for the Allocation and Prioritization of COVID-19 Vaccination, pp.10-12: Table 2- Translation of Values.
[53] *Ibid*, 6.
[54] United Nations (UN), "Quick, Equal, Affordable Access to COVID-19 Vaccine Must Be Considered Global Public Good, Secretary-General Says in Remarks to Africa Dialogue Series," accessed July 15, 2021. https://www.un.org/press/en/2020/sgsm20089.doc.htm.

supplies are low, and health risks are high, it is a virtuous approach to utilizing practical and intellectual wisdom to reach the best solution from expertise—targeting all those at risk for disease or death in an unranked prioritisation. The framework acknowledges those factors that contribute to inequalities in health within the population, such as socioeconomic status, location, race, gender, and the ability to pay, that place individuals at greater risk during the COVID-19 pandemic. This strategy is flexible to pandemic circumstances with feedback mechanisms for critical reviewing and refinement modification. Taking note of all stakeholders' feedback critique concurrently to available data is a step in the right direction. Hence, this elevates all stakeholders' activities, motivation, and understanding as a valuable tool for guidance in the performance development of strategic allocation of vaccines in an ethical manner.

While the CDC framework is also well-planned, based on ethical decision-making principles of existing scientific data, and considering scarce vaccine supplies. Such standards clearly outline the decisions toward maximising vaccine benefits while minimising harm and reducing health disparities by mitigating health inequalities.[55] Therefore, it safeguards the opportunity and the right of access to health, identifying barriers within the targeted segments of populations in promoting justice in fair vaccine allocation. Furthermore, it supports public transparency throughout the process within the strategic framework, whereas the public could clearly understand the rationale behind its course of action.[56]

[55] Nancy McClung, Mary Chamberland, Kathy Kinlaw, Dayna B. Matthew, Megan Wallace, et al, "The Advisory Committee on Immunization Practices' Ethical Principles for Allocating Initial Supplies of COVID-19 Vaccine—United States, 2020," *American Journal of Transplantation* 21, no. 1 (2021): 420-25.
[56] *Ibid*, 421.

The framework goes into meticulous detail about the prioritising allocation of vaccines for all groups of societies within the USA. This framework's main strengths and qualities are vaccinating those people with the greatest needs and values of reciprocity towards health personnel, which are identified in Phase 1. Hence prioritising those groups of society who are most likely to suffer illnesses and death from COVID-19 due to their vulnerability is justified. In addition, the CDC strategy prioritises HCWs, demonstrating that safeguarding healthcare capacity is considered a high priority duty in protecting a population's health.[57] Furthermore, in parallel to the WHO strategy, the CDC strategy provides vaccine safety surveillance mechanisms for monitoring any adverse effects of approved vaccine product allocation. Hence, both the WHO and CDC strategies clearly outline harm prevention through early identification and reporting processes.

The CDC strategy also recognises vaccine rollouts depend on variable factors such as vaccine characteristics, supplies, disease epidemiology and consideration of community factors, all of which have affected priority setting in the allocation of vaccines. Similar to the WHO strategy, the CDC`s ethical principles justify providing stewardship during limited vaccine supplies. Additionally, the focus on equitability and fairness found within the CDC strategy represents the effort employed for a just allocation of vaccines as seen within the extensive listed categories of sub-populations within phases, such as those in transport logistics, food industry, construction, finance, and public health workers.[58]

[57] *Ibid*, 422.
[58] CDC, "The Advisory Committee on Immunization Practices' Updated Interim Recommendation for Allocation of COVID-19 Vaccine — United States, December 2020," p.1659.

Conversely, the EU strategy only addresses fair equality and justice within its member states, not universally as the WHO strategy does. This matter is evident since its approach to securing the distribution of vaccines among its member states is based on the APA per capita, despite recognising the need to reach worldwide herd immunity through global vaccination. The strategy takes note of the capacity of vaccination services required to distribute vaccines together with the workforce, logistics, infrastructure, and protective equipment necessary in providing fair vaccine accessibility to the targeted populations. Moreover, the strategy rightly addresses communication transparency of vaccine benefits and risks to build public trust and engagement. It is the only strategy not distributed in phases and according to vaccine supply availability, even though guiding prioritizing groups within societies is similar to the WHO and CDC. The EU strategy supports and aligns with vaccinating HCWs and vulnerable high-risk groups within communities, similarly to WHO and CDC strategies. However, it allows member states to make their own decisions about whom to vaccinate first.

The EU and CDC strategies have created flexibility in regulatory mechanisms within EU member states and the USA for greater efficiency in a COVID-19 vaccine deployment supply chain. Nevertheless, none of these two strategies addresses contingency plans for massive outbreaks within nations, highlighting the necessity of collaborative measures between countries in urgent situations.

Likewise, all three strategies have clear stipulated goals for vaccine allocation based on scientific evidence when looking at the bigger picture of saving lives and impacting populations` health. Priority setting of limited vaccines has necessitated

strategic rationing, with transparency, efficiency, health benefits and adaptability found within all three frameworks in varying degrees for equity considerations.

One of the fundamental similarities found within each strategy is the application of epidemiology advice following extensive expert deliberations in parallel to allocating vaccines for priority groups and according to pre-established risk criteria. The CDC framework has the most detailed structure for prioritising sub-populations categories from all three presented frameworks, whereas a more comprehensive values structure by the WHO facilitates prioritisation with a more transparent, thorough explanation. These structured decisions followed a scientific approach, claiming to save more lives whilst populations' health and quality of life improve significantly through strategic planning.[59] Moreover, all three strategies address safety measures for vaccine security, surveillance, and reporting in ensuring safety and protecting public health by providing procedural guidance on the allocation of vaccines based on extensive expert deliberations.

Nevertheless, all strategies recognise vaccine allocation to the elderly, those at high risk and the HCW, where such decisions are based on achieving herd immunity within targeted sub-populations towards sustainability of healthcare services. The three frameworks focus on vaccinating the most vulnerable, those who help others or are at greater risk of exposure to the disease or may increase transmissibility within vulnerable populations.

[59] Rohit Gupta, and Stephanie R Morain, "Ethical Allocation of Future COVID-19 Vaccines," *Journal of Medical Ethics* 47, no.3 (2021): 137-41.

All three strategies recognise the pandemic's direct and indirect health impacts, such as decreased livelihoods, increased hospitalisations, and intensive care admissions. Furthermore, acknowledging that vaccine supplies are expected to be limited in their initial deployment phase, the deliberate planning of rationing resources was essential. Finally, all strategies support the COVAX facility initiative, which has brought countries together collectively in a more cooperative manner. Hence, recognising the missing element of vaccine strategy that must not simply divide a whole into parts but rather establish collaboration and create opportunities.[60]

Regarding fair vaccine allocation, the WHO and CDC strategies have taken note of the total amount of vaccine supplies available and the procedural guidance to be adopted, with each having a different approach according to supply availability. Notwithstanding, the EU strategy does not address this directly despite acknowledging it. Furthermore, none of the frameworks mentioned the DSD vaccination method to protect a wider population when supplies of vaccines are low. In the same way, none of the strategies addresses the need for booster doses due to immunity waning, which ultimately affects even more vaccine supplies and their demand.

On the other hand, vaccines were not fairly distributed amongst countries as commercial greed, politics, and the country`s ability to pay, influenced decisions and the ability to acquire or deploy their share of vaccines. In September 2021, 45.2% of the world population had received at least one dose of COVID-19 vaccine from a total of 6.24 billion doses globally, with only 2.3% being from LMICs, including Tanzania (0.57%),

[60] George Grima, "Allocation of Health Care Resources: Strategy in an Ethical Perspective", in *Bioethics and Society: A Brave New World?* ed. Anna Maria Vella (Msida: University of Malta, 2012), 96–131.

Nigeria (2.2%) and Ethiopia (2.4%).[61] Despite the WHO criticising nationalism and stockpiling of vaccine doses, an egotistic approach that wealthy nations adopted, in short-sightedness, humanity cannot conquer the pandemic if most of the world is not vaccinated. All individuals have the right to vaccines irrespective of one's country of birth or wealth influencing one's opportunity for vaccination.[62]

To sum up, a fair strategy cannot allow hoarding of vaccines by rich countries but, at the same time, minimises the opportunity for those unable to obtain adequate vaccines simply because they live in a developing country with poor infrastructure, a deprived economy, insufficient capacity, and lower ability to buy or distribute vaccines. As a result, global reports predict that poorer countries will register a delayed COVID-19 vaccine rollout until 2024.[63]

Therefore, the ultimate aim would be to have the most significant impact on protecting population health and not focus on one's own country`s population first. The United Nations Office[64] outright pointed out the importance of this goal which was not mentioned within any of the three strategies. Furthermore, none of the mentioned frameworks addressed the importance of contributing excessive vaccines to populations or hard-hit countries that had struggled to contain the pandemic.

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[61] H. Ritchie, D. Beltekian, E. Mathieu, J. Hasell, B. Macdonald, et.al, "Statistics and Research: Coronavirus (COVID-19) Vaccinations. 2021 - Our World in Data," accessed September 29, 2021, https://ourworldindata.org/covid-vaccinations.

[62] Office of the High Commissioner of Human Rights (OHCHR), "Human Rights and Access to COVID-19 Vaccines," accessed March 29, 2021. https://www.ohchr.org/Documents/Events/COVID-19_AccessVaccines_Guidance.pdf.

[63] OECD, "Coronavirus (COVID-19) vaccines for developing countries: An equal shot at recovery," OECD Policy Responses to Coronavirus (COVID-19), OECD Publishing, accessed July 17, 2021, https://www.oecd.org/coronavirus/policy-responses/coronavirus-covid-19-vaccines-for-developing-countries-an-equal-shot-at-recovery-6b0771e6/

[64] OHCHR, "Human Rights and Access to COVID-19 Vaccines".

1.3. Vaccine Distribution, Values and Priority Setting

This pandemic has forced international institutions, governments, and policymakers to evaluate the benefit versus harm of one's decisions for actions in protecting public health. To maximize benefit and minimize damage, respect all individuals' equal moral status and human rights by embracing fairness, transparency, and legitimacy.[65]

Fair vaccine distribution requires reflecting on decision-making consequences, with a country's capacity to reduce health disparities, save the most lives, and help the most vulnerable as a top priority-setting.[66] In addition, difficulties in LMIC's inability to afford vaccine supplies, coupled with their inadequate resources in healthcare systems provision to vaccinate their populations, present real ethical challenges that need to be addressed both at an international and national level.[67]

The issue around allocation and distribution of vaccines and who deserves priority on a local and global level is a question of justice that is best addressed by keeping the population's health at large as the main aim. Furthermore, the common good of protecting public health is to be kept in mind to successfully curb the pandemic's impact through a fair allocation of vaccines globally. The common good, in this case, is the overall health gained by vaccine benefits for all humanity. However, another valid argument is that governments and international bodies ought to dedicate more time,

[65] Emanuel J. Ezekiel, Persad Govind, Kern Adam, Buchanan Allen, Fabre Cecile, Halliday Daniel, et al, "An Ethical Framework for Global Vaccine Allocation," *Science (American Association for the Advancement of Science)* 369, no. 6509 (2020): 1309-312.
[66] Nancy S. Jecker, Aaron G. Wightman, and Douglas S. Diekema, "Vaccine Ethics: An Ethical Framework for Global Distribution of COVID-19 Vaccines," *Journal of Medical Ethics*, 47, no. 5 (2021): 308-317.
[67] Liu, Yangzi, Sanjana Salwi, and Brian C. Drolet, "Multivalue Ethical Framework for Fair Global Allocation of a COVID-19 Vaccine," *Journal of Medical Ethics* 46, no. 8 (2020): 499-501.

money, and energy to tackle those social determinants of health (SDOH) that ultimately contribute not just to health but may even prevent pandemics from happening in the first place by socially controllable factors that prevent illnesses and increase a population's vulnerability to disease.

Distributive justice requires fair allocation of limited vaccine supplies both at a global and national level justified by morally significant factors of need and benefits. However, the limited supplies and mass demand for vaccines during the initial phase make equitable distribution suboptimal or even impossible.[68] Thus, the rationale of prioritizing those populations that are at a greater risk of death and burden from the pandemic is imperative. Hence, stressing the respect towards human vulnerability and personal integrity as a valued core principle as reflected in Article 8 of the Universal Declaration on Bioethics and Human Rights, stating that while "applying and advancing scientific knowledge, medical practice and associated technologies, human vulnerability should be considered. Therefore, individuals and groups of special vulnerability should be protected, and the personal integrity of such individuals be respected."[69]

In conclusion, these strategies established in early 2021 followed evidence-based science in protecting societies and human lives through vaccination. The right to health access and be treated equally, fairly and justly is a fundamental human right. Ethical decisions ought to reflect and scrutinize societal values deem worth investing in global health. Therefore, the prioritisation of scarce vaccines is justified by morally

[68] *Ibid*, 500.

[69] United Nations Educational, Scientific and Cultural Organisation (UNESCO), "Universal Declaration on Bioethics and Human Rights," accessed November 7, 2020. https://unesdoc.unesco.org/ark:/48223/pf0000146180.

significant factors, for instance, the need and maximizing vaccine benefits. Such factors are difficult to reconcile at times, especially in determining who gets priority of vaccines first; however, the allocation of vaccines in all three mentioned strategic frameworks is based on scientific evidence data aided by ethical decision making in the achievement of goals when looking at the bigger picture of saving lives and health burden. Hence, all frameworks prioritise the vulnerable elderly and persons at higher risk, including all health and social care workers who are considered crucial in maintaining healthcare services capacity. Therefore, implementing procedural justice prioritises the worst first and helps others with a utilitarian approach in sharing vaccine benefits.[70]

[70] WHO, "Ethics and COVID-19: Resource Allocation and Priority-Setting," accessed October 14, 2020. https://www.who.int/ethics/publications/ethics-covid-19-resource-allocation.pdf?ua=1

Chapter 2: Ethical Theories of Distributive Justice

This chapter will review the allocation strategies discussed in the previous chapter, considering ethical theories of justice regarding the fair distribution of vaccines by claiming an argument on justice and the common good. In the first part, this chapter will review the importance of viewing the vaccine strategies discussed in the first chapter as a cooperative action in the interest of the common good,[1] the end of which is the population's health. In the second part, the "health" that the just allocation of vaccines seeks to achieve will be understood in Norman Daniels` "Just Health".[2] Finally, this chapter briefly addresses human rights, inequalities, vulnerabilities, social well-being, and community benefits in vaccine distribution decision-making processes.[3]

2.1. Health Strategies as Human Cooperative Action in the Interest of the Common Good

The importance of defining health provides an understanding for reviewing achieving health through cooperative actions and what fair vaccine allocation seeks to achieve. The vaccine allocation programme strategies aim to attain the principal target objective, which is the interest of the common good of protecting populations' health. Like any other resource allocation strategy, the vaccination programme is a cooperative activity that seeks to reach the most significant health impact as a goal-directed

[1] George Grima, "Allocation of Health Care Resources: Strategy in an Ethical Perspective," in *Bioethics and Society: A Brave New World?* ed. Anna Maria Vella (Msida: University of Malta, 2012), 103.
[2] Norman Daniels*, Just Health: Meeting Health Needs Fairly* (Cambridge: Cambridge University Press, 2008).
[3] OHCHR, "Human Rights and Access to COVID-19 Vaccines," accessed March 29, 2021. https://www.ohchr.org/Documents/Events/COVID-19_AccessVaccines_Guidance.pdf.

intervention, especially in the ever-changing situation of the pandemic-vaccine allocation scenario. Here one argues that it is no surprise that preserving good health requires collective efforts in maintaining social and economic stability, even though proven to be challenging to employ since it involves many actors and diverse circumstances within this pandemic.

According to the WHO,[4] "health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity". Therefore, this implies that individuals care for their health, but rather health is linked with social welfare and not just with diseases and considered the overall state of good public health. Furthermore, health can conduct a socially and economically productive life. Therefore, undeniably, good health generates extensive benefits for societies, valued for human welfare.[5] Consequently, good health is considered a fundamental resource for living and a significant societal asset.[6] Furthermore, the WHO declares that health promotion should enable individuals to control and improve their health.[7] Hence, this is a positive aspect, where individuals and societies can achieve aspirations in satisfying their health needs through their capabilities.

Additionally, health can be achieved by addressing those modifiable factors, such as the SDOH, that play a crucial role in the aetiology, prevalence, and prognosis of

[4] WHO, *Basic documents: forty-ninth edition (including amendments adopted up to 31 May 2019* (Geneva: World Health Organization; 2020).
[5] WHO, *Health 2020: A European Policy Framework and Strategy for 21st. Century* (Copenhagen: Denmark, 2013), 1 – 182.
[6] *Ibid*, 11.
[7] WHO, "The 1st International Conference on Health Promotion, Ottawa, 1986," accessed October 10, 2021. https://www.who.int/teams/health-promotion/enhanced-wellbeing/first-global-conference.

diseases worldwide. Fundamentally, socially controllable health factors[8] such as a person`s education, low-income level, environmental factors, poor housing, neighbourhoods, and access to medical care affect a person`s vulnerability to disease and spread within a pandemic influenced by money, power, global and national decision making.[9] For example, the SARS-CoV-2 pandemic has aggravated disadvantaged groups within societies with higher rates of unemployment, increased poverty, infection rates, hospital admission and deaths.[10] Hence, promoting health through vaccine allocation programmes as a common good is vital for individuals and communities. The WHO SAGE value framework offers global guidance in allocating vaccines and not increasing further injustices within disadvantaged populations.[11] Moreover, the CDC strategy also addresses this principle in identifying racial and minority populations. Therefore, protecting populations' health requires international collective and individual action, whilst the health of poor people needs collective action between and within countries to be effective in this pandemic.[12]

[8] Annette Rid, "Just Health: Meeting Health Needs Fairly," *Bulletin of the World Health Organization* 86, no. 8 (2008): 653.
[9] K. Stronks, B. Toebes, A. Hendriks, U. Ikram and S. Venkatapuram, *Social Justice and Human Rights as a Framework for Addressing Social Determinants of Health: Final Report of The Task Group on Equity, Equality and Human Rights Review of Social Determinants of Health and The Health Divide in The WHO European Region* (Copenhagen: Europe WHO International, 2016), 1-68.
[10] Harald Schmidt, Parag Pathak, Tayfun Sönmez, and M Utku Ünver, "Covid-19: How to Prioritize Worse-off Populations in Allocating Safe and Effective Vaccines," *British Medical Journal*, 371 (2020): M3795.
[11] WHO, *WHO SAGE Values Framework for the Allocation and Prioritization of COVID-19 Vaccination* (World Health Organization, September 14, 2020), https://www.who.int/publications/i/item/who-sage-values-framework-for-the-allocation-and-prioritization-of-covid-19-vaccination.
[12] Richard D. Smith, "Global Public Goods and Health," accessed September 2, 2021. https://www.who.int/bulletin/volumes/81/7/Smith0703.pdf.

Jean Monnet, a French political and economic adviser, had convinced European leaders to work together towards common interests and understanding of the benefits of cooperative efforts,[13] which echoed within the EU vaccine strategy.

According to Gozum Efreaim, the common good is the aim of a community, involving a group of persons geared together toward a common goal that unites their social interests, participation, and cooperative actions in maintaining social systems upon common mutual goals.[14] American political philosopher John Rawls describes the common good as "certain general conditions that are … equally to everyone's advantage", [15] thus associating the common good with a combined equal share of social conditions, such as fair economic and health opportunities for all within societies.

The cooperative process of COVID-19 vaccination programmes is quite complex and initiates with the exploratory research, manufacturing, supply, distribution, and allocation of vaccines. These processes involve many efforts and actions by companies, experts, policymakers, regulatory bodies, human resources, and institutions working together cooperatively in systems that function. Here the author recognises the extraordinary scientific research efforts and the achievement gained in developing effective and safe COVID-19 vaccines rapidly within less than a year from the pandemic with the massive number of activities and work involved for the common good towards

[13] EC, "Jean Monnet: the unifying force behind the birth of the European Union," accessed August 12, 2021. https://europa.eu/european-union/sites/default/files/docs/body/jean_monnet_en.pdf.
[14] Ivan Gozum A. Efreaim, "Common Good and Public Service as Vital Components for Government Officials in Promoting COVID-19 Vaccination," *Journal of Public Health (Oxford, England)* 43, no. 2 (2021): 311-312.
[15] John Rawls, *A Theory of Justice: Original Edition*, Harvard University Press. (Original work published 1971), 246.

public health.[16] Policymaking, funding, APAs, research, and clinical trials are some examples of achieving the common good for health in attaining vaccine allocation strategies. All these cooperative actions involving governments, contract manufacturers, health care institutions, supply chains of materials, logistics and medical consumables required for vaccine product development and administration entail common goals for global vaccine distribution and allocation. Therefore, these activities form part of the effort and cooperative actions in achieving global health through COVID-19 vaccine strategies, even though ulterior monetary profit may be another interest goal of certain actors.

Every human being is entitled to health equally regardless of their place of birth or country's health capacity, as a fundamental human right, based on dignity, fairness, and respect; therefore, human rights are foreign to no society and nations; thus, they are universal.[17]

Decisions regarding vaccine allocation strategies directly impact the disease burden whilst safeguarding public health, together with economic and social well-being, thus falling under the ethical value of promoting the principle of the common good in a just manner.[18] International organisations, such as the WHO and CDC, addressed cooperative actions to safeguard public health sustainability in protecting populations

[16] Chad P. Bown and Thomas J. Bollyky, "Here's how to get billions of COVID-19 vaccine doses to the world," in *Peterson Institute for International Economics: Economic Policy for a Pandemic Age: How the World Must Prepare ed. Monica de Belle, Maurice Obstfeld, and Adam S. Posen*, (PIIE April 2021), 57-67. https://www.piie.com/sites/default/files/documents/piieb21-2.pdf.
[17] UNESCO, "Universal Declaration on Bioethics and Human Rights," accessed November 7, 2020. https://unesdoc.unesco.org/ark:/48223/pf0000146180.
[18] E. Toner, A. Barnill, C. Krubiner, et al, *Interim Framework for COVID-19 Vaccine Allocation and Distribution in the United States* (Baltimore, MD: Johns Hopkins Center for Health Security; 2020), 9.

within their strategic frameworks for allocating COVID-19 vaccines. Thus, those actions taken in the interest of the common good of promoting health includes ensuring those conditions and activities for the just equitable distribution and allocation of vaccine benefits among countries and within countries. Moreover, all citizens form part of a larger society and cannot be excluded from access and benefits of vaccines, thus having the same fundamental human rights to health and healthcare. Because of limited vaccine supplies, immunization roll-out programs have targeted priority groups before progressively increasing vaccine access to all, aiming to reduce mortality and protect health systems.[19]

The allocation of goods, according to Grima, is the process of distributing goods involving large-scale cooperation of sharing and distributing divided parts from a whole.[20] COVID-19 vaccines and immunisation are seen as a global public good for health.[21] As cited in the literature, the common good should not be confused with public goods encountered in economic standings.[22] When providing public goods, no one should exclude anyone from consuming them (non-excludable), and a person's utilization does not prevent others from consumption (non-rival).[23] Hence, no one within a community should be excluded from gaining COVID-19 vaccine benefits, significantly minimizing the risk of infection. Accordingly, on non-rivalry terms, individuals who gain from vaccine benefits do not prevent anyone else from

[19] WHO, "WHO Concept for fair access and equitable allocation of COVID-19 health products," accessed July 14,2021. https://www.who.int/docs/default-source/coronaviruse/who-covid19-vaccine-allocation-final-working-version-9sept.pdf.
[20] Grima, "Allocation of Health Care Resources: Strategy in an Ethical Perspective," 104.
[21] WHO, *WHO SAGE values framework for the allocation and prioritization of COVID-19 vaccination*, 6.
[22] Greg Latemore, "COVID And The Common Good," *Philosophy Of Management* 20, no. 3 (2020): 257-269.
[23] *Ibid*, 260.

benefitting.[24] In reality, global public goods are goods of this kind, where the benefits cross the border and are universal in scope, such as COVID-19 vaccine injections.

Addressing the issue of cooperative actions for the common good is not simply concerned with protecting people from SARS-CoV-2 and promoting public well-being, but the importance of achieving health in a just manner, which is fundamental to all societies.

Consequently, common goods for health are recognised as population-based functions or interventions that require collective financing by governments or bodies such as the COVAX facility, contributing to health and economic progress, which have a clear rationale for specific interventions.[25] Moreover, the common good involves more than just coordination of duties, but a series of cooperative actions done for the best interest of the common good, which cannot be a series of isolated activities carried out by separate entities but in a collaborative multidisciplinary approach. [26]

The impact of the COVID-19 pandemic has increased morbidity and mortality, causing significant economic, social, and political disruption with loss of livelihoods, closure of schools and imposed restrictions on everyone's autonomy, affecting both mental and physical health.[27] Indeed, the introduction of COVID-19 vaccines has seen the prudent release of health mitigating measures through governments' policies and

[24] Smith, "Global public goods and health".
[25] WHO, "Common Goods for Health," accessed October 6, 2021. https://www.who.int/docs/default-source/health-financing/common-good-for-health/common-goods-for-health-definition.pdf?sfvrsn=b5c9a9f8_2
[26] Grima, "Allocation of Health Care Resources: Strategy in an Ethical Perspective," 103.
[27] OECD, "COVID-19: Protecting people and societies," accessed October 7, 2021. https://www.oecd.org/inclusive-growth/resources/COVID-19-Protecting-people-and-societies.pdf.

decision-making. Therefore, the argument of protecting the global population's health justly through vaccine allocating strategies is vital to all humanity.

2.2. Exploring Norman Daniels's Concept of "Just Health" to Vaccine Distribution

This section of chapter two explores public and community health challenges as understood in terms of Norman Daniels's "*Just Health: Meeting Health Needs Fairly*"[28], in employing the four principles of accountability for reasonableness approach to guide priority setting towards health that the just allocation of vaccines seeks to achieve during COVID-19 pandemic. Health opportunity dimensions will then be explored concerning vaccine distribution and followed up, further supported by Daniels's work.

Norman Daniels` concept of justice goes beyond John Rawls` by proposing that populations have a right not only to healthcare but rather to good health and that this can only be achieved if other factors of justice and the common good are achieved within society. Daniels takes a broader approach to health and justice where he builds upon his previous work related to health care by stating that "medical services and public health measures, both are functionally aimed at individual and population health".[29] Directly addressing distributable and the just allocation of goods to individuals and focusing on global and public health can be applied to the fair allocation of vaccines during this pandemic. Therefore, it provides a clearer understanding of how equitable distribution of vaccines is necessary to achieve and maintain health.

[28] Daniels, *Just Health: Meeting Health Needs Fairly*, 2008.
[29] *Ibid*, 12.

According to the WHO, public health is described as "the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society."[30] Hence, through public health benefits, people and community health are protected and improved by promoting healthy lifestyles, avoiding injuries, investigating illnesses, and preventing and controlling infectious diseases. Public health is further described as collaborative trans-national research and action to promote health globally.[31] A broader explanation of global health based on Koplan et al.'s definition prioritises improving and achieving health equity for worldwide populations.[32]

In addressing global health challenges, Norman Daniels` theory on justice and population health asks a fundamental question, which is "What do we owe each other to promote and protect health in a population and to assist people when they are ill or disabled?".[33]

In answering this fundamental question, three further focal questions of distributive justice are raised by Daniels as follows:

i. "What is the special moral importance of health?"

ii. "When are health inequalities unjust?" and

iii. "How can we meet health needs fairly under resource constraints?"

[30] World Health Organisation, "Public health services," accessed October 14, 2021. https://www.euro.who.int/en/health-topics/Health-systems/public-health-services.
[31] Robert Beaglehole, and Ruth Bonita, "What Is Global Health?" *Global Health Action* 3, no. 1 (2010): 5142-2.
[32] Jeffery P. Koplan, T. C. Bond, Michael H. Merson, K. S. Reddy, et al, "Towards a Common Definition of Global Health," *The Lancet* 373, no. 9679 (2009): 1993-5.
[33] Daniels, *Just Health: Meeting Health Needs Fairly*, 11.

Daniels` health theory of justice claims to provide a practical guide for worldwide applicability aimed at policymakers.[34] Indeed, a fair process seeks to ensure legitimacy and fairness upon limited-setting decisions towards global health, such as COVID-19 vaccine allocation programmes. Furthermore, Daniels argues that this theory can be adapted to all societies, from those fully developed nations to poor, low-income countries.[35] The author of this dissertation concurs with this conclusion since creating a fair procedural just ethical framework within a priority setting cannot be a wrong approach, and thus an agreed consensus for the best way forward will be established democratically. This statement is also a matter of global solidarity. If the allocation of COVID-19 vaccines is not directed in a definite collaborative approach aimed at providing equitable access globally, then the pandemic will remain a threat, where the population's health and herd immunity will fail to prosper. The world nations were unable to share the COVID-19 vaccine correctly, and thus it is estimated that the poorest countries will only be able to reach their vaccination by 2023 or beyond.[36]

During a global crisis such as the current pandemic, health systems struggle to meet population health needs due to various limited resources. Priority setting is a complex process of making decisions about how best to allocate limited resources to improve a population's health.[37] Furthermore, the WHO describes the term "priority-setting" as a comprehensive process involving situation analysis based on criteria set by

[34] Rid, *Just Health: Meeting Health Needs Fairly*, 653.
[35] Annette Rid and Biller-Andorno N, "Justice in action? Introduction to the minisymposium on Norman Daniels' Just health: Meeting health needs fairly," *Journal of Medical Ethics* 35, no.1 (2009):1.
[36] T.V. Padma, "COVID Vaccines to Reach Poorest Countries in 2023 — despite Recent Pledges," *Nature (London)* 595, no. 7867 (2021): 342.
[37] Primary Health Care Performance Initiative, "Priority Setting," accessed November 5, 2021. https://improvingphc.org/sites/default/files/Adjustment%20to%20pop%20health%20needs_priority%20setting.pdf.

health stakeholders, involving the public whilst embracing societal values and goals that are important in allocating resources.[38]

Values that underly and motivate decisions in such a process are essential because there is a tendency for various actors involved in the decision-making process to have diverging values,[39] such as in the case of COVID-19 vaccines regarding their efficiency, quality, or equity in the allocation decisions. Therefore, when agreement on prioritisation becomes difficult to achieve, a mechanism of structured discussion and deliberation contributing to legitimising necessary decisions is important, resulting in beneficial outcomes.

Accountability for Reasonableness (AFR) is an ethical framework used within a priority setting that ensures that the process is fair, where definite priorities are based on reasons shared with all relevant stakeholders.[40] Daniels and Sabin refer to this fair process that translates into practice as a solution for fair justice in action decision-making,[41] which establishes legitimacy and fairness, and decisions are reviewed upon new evidence.[42] Hence, AFR allows decision-makers to deliberate on competing values in the priority setting process.[43] Daniels puts forward the example of universal health insurance coverage, which raises fundamental questions about the proper scope of governments and what is owed to mankind for the just allocation of resources for

[38] WHO, "Priority-setting for national health policies, strategies and plans," accessed October 31, 2021. https://apps.who.int/iris/bitstream/handle/10665/250221/9789241549745-chapter4-eng.pdf
[39] Jens Byskov, et al, "The Accountability for Reasonableness Approach to Guide Priority Setting in Health Systems within Limited Resources - Findings from Action Research at District Level in Kenya, Tanzania, and Zambia," *Health Research Policy and Systems* 12, no.49 (2014): 2.
[40] *Ibid*, 2.
[41] Norman Daniels, and James E. Sabin, "Accountability for Reasonableness: An Update," *British Medical Journal (Online)* 337, (2008).
[42] Daniels, *Just Health: Meeting Health Needs Fairly*, 274.
[43] *Ibid*.

health.[44] Furthermore, the AFR process in setting priorities can only be reasonable and fair if the four AFR conditions are met: publicity, relevance, revision/appeals, and regulative.[45]

Hence, this approach applies to vaccine allocation strategies aimed toward global and national objectives where the WHO SAGE value framework focuses on the primary goals for COVID-19 vaccine allocation. Thus, this contributes to the adequate protection and promotion of population health through global and national decisions while targeting prioritisation through a transparent public process.[46] Furthermore, the WHO strategic framework provided values on prioritising population groups at different stages of vaccine supplies aimed toward the principle of legitimacy[47] transparently.

AFR procedures have distinct features as being easily accessible, accepted and held relevant by reasonable individuals.[48] For example, in maximizing the gain in vaccination programmes, it is crucial to allocate available COVID-19 vaccines strategically and, at the same time, allow individual autonomy based on extensive, transparent communication regarding all risks and benefits of vaccines.[49] Likewise, this approach will be fulfilling the publicity condition in providing public information on the rationale that justifies achieving health needs during vaccination roll-outs.

[44] *Ibid*, 14.
[45] *Ibid*, 118-9.
[46] WHO, *WHO SAGE values framework for the allocation and prioritization of COVID-19 vaccination*, 2-8.
[47] *Ibid*, 4-8.
[48] Samuel Y. Sessions, "Book Review: Just Health: Meeting Health Needs Fairly," *The New England Journal of Medicine* 358, no. 12 (Mar 20, 2008): 1310.
[49] Malte Kohns Vasconcelos, et al, "A conceptual approach to the rationale for SARS-CoV-2 vaccine allocation prioritisation," *Pathogens and Global Health* 115, no. 5 (2021): 273.

The relevance condition requires that decisions are based on shared goals of deliberations established on the values held important by stakeholders in meeting the population's health needs, whereby all relevant participants have the opportunity to contribute to decision-making in the context of limited resources.[50] Relating to the relevance condition, the CDC, with the collaboration of ACIP, has provided guidance and vaccine-specific recommendations throughout the ongoing COVID-19 vaccine allocation efforts in meeting populations' health needs.[51]

The revision/appeal condition, in turn, ensures that a fair process requires a mechanism that provides dispute resolutions regarding limit-setting decisions.[52] Furthermore, it also offers opportunities to review new evidence or arguments to improve policies.[53] Subsequently, the new evolving data regarding the transmission of the coronavirus and the waning of immunity against it supports this statement. Thus, the need for and timing of an additional booster dose has currently placed added revision on international vaccination strategies and, therefore, has necessitated further updating policies in protecting public health.[54] It also results in further vaccine demands among countries and injustices resulting from stockpiling of vaccines to vaccinate their populations first.

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[50] Monika Wagner, et al, "Moving Towards Accountability for Reasonableness - A Systematic Exploration of the Features of Legitimate Healthcare Coverage Decision-Making Processes Using Rare Diseases and Regenerative Therapies as a Case Study," *International Journal of Health Policy and Management* 8, no. 7 (2019): 424.
[51] CDC, "COVID-19 ACIP Vaccine Recommendations," accessed October 16, 2021. https://www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/covid-19.html
[52] Daniels, *Just Health: Meeting Health Needs Fairly*, 119.
[53] *Ibid*, 119.
[54] WHO, "Interim statement on booster doses for COVID-19 vaccination," accessed November 5, 2021. https://www.who.int/news/item/04-10-2021-interim-statement-on-booster-doses-for-covid-19-vaccination.

Finally, according to Daniels, the regulative condition establishes that a voluntary or a public regulatory body[55] must enforce all three previous criteria. In this regard, the WHO, CDC, and EU guided their governments to achieve public health through mitigating measures in conjunction with vaccine allocation strategies.

Daniels acknowledges that it is unlikely to agree on how limited resources could be fairly distributed and deployed due to differences in values and various stakeholders' beliefs. However, he argues that the concept of AFR requires that decisions should reconsider when their application is problematic. According to Rid, the four AFR conditions connect decisions regarding fair equality of opportunity as these grounds the moral importance of health.

Daniels argues that the moral importance of health originates from health`s effect on opportunities.[56] In other words, he extends his argument by adding the concept of linking health and opportunity together whilst expressing that meeting health needs promotes equality of opportunity.[57] Moreover, Daniels focuses on the social obligations of justice to protect unique opportunities for health for everyone.[58] Furthermore, he declares that poor health aggravates the functionality of health and thus impedes an individual's options. Additionally, protecting individuals' normal functioning through health promotion is vital in maintaining fair opportunity and public fairness.[59] The development of effective COVID-19 vaccines, free of charge to the public,

[55] Daniels, *Just Health: Meeting Health Needs Fairly*, 119.
[56] Sessions, *"Book Review: Just Health: Meeting Health Needs Fairly,"* 1310.
[57] Adriana Lee Benedict, "Just Health: Meeting Health Needs Fairly," *Revista De Direito Sanitário* 11, no. 2 (2010): 316.
[58] Daniels, *Just Health: Meeting Health Needs Fairly*, 249.
[59] Sessions, 1310.

is therefore seen as an opportunity to maintain population health and is crucial in ending the pandemic once global herd immunity is achieved. However, equitable access to vaccines is considered to have failed in reaching this objective, with the WHO Director-General stating that the "world is on the brink of a catastrophic moral failure and the price of this failure will be paid with lives and livelihoods in the world's poorest countries."[60]

Health inequalities are described as unfair and avoidable disparities in health outcomes across populations and between different groups within societies.[61] These inequalities are seen as a gradient across the population ranked by social position.[62] On the other hand, health equity is viewed as a fair and just opportunity for everyone to be healthy by removing socio-economic obstacles to health, such as poverty and discrimination.[63] Therefore, engaging in health equity requires all efforts necessary in improving everyone's health while focusing on those groups of people who have fewer resources to improve their health. Hence, equity differs totally from equality because those populations with the greatest needs and having the least resources require more, not equal, effort and resources to equalise their opportunities.[64]

Here, the author of this dissertation does agree with Daniels` claims that "health inequalities across demographic groups are prejudiced when they result from the unjust

[60] WHO, "WHO Director-General's opening remarks at 148th session of the Executive Board," accessed February 11, 2021. https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-148th-session-of-the-executive-board.
[61] National Health System (UK), "Definitions of Health Inequalities," accessed September 21, 2021. https://www.england.nhs.uk/ltphimenu/definitions-for-health-inequalities/#health-inequalities
[62] G. McCartney, F. Popham, R. McMaster, and A. Cumbers, "Defining Health and Health Inequalities," *Public Health (London)* 172 (2019): 22-30.
[63] Paula Braveman et al., *What Is Health Equity? And What Difference Does A Definition Make?* Princeton, NJ: Robert Wood Johnson Foundation, 2017.
[64] *Ibid*, 10.

distribution of socially controllable factors affecting health".[65] Minority groups have suffered greater unemployment, higher infection rates, more hospital admissions, and increased deaths during this pandemic.[66] Consequently, the WHO SAGE value framework insisted upon the importance that disadvantaged groups should be respected when allocating vaccines, corresponding to the values of prioritising groups categorisation, aimed not to increase existing unjust disparities.[67]

Moreover, Daniels builds upon the understanding of SDOH, those socially controllable factors of health, including wealth, education, sense of community, distribution of power and rights, together with opportunities of particular moral importance and considered as distributable goods for health.[68] In addition, Daniels refers to other factors, including public health measures, medical care, and the distribution of those non-related health sectoral goods. He argues that poor health impairs normal functioning and prevents opportunities;[69] thus, health provision and promotion are crucial in maintaining fair opportunity. Additionally, Daniels elaborates on the significance of meeting health needs in achieving a normal opportunity range (NOR) for health,[70] highlighting, once again, the social obligation that exists to protect the fair share in attaining health needs,[71] which the allocation of COVID-19 vaccines forms part of by reducing risks of disability and the burden of the disease. Furthermore,

[65] Norman Daniels, "Just health: Replies and further thoughts," *Journal of Medical Ethics* 35, no.1 (2009):36.
[66] Schmidt, et al., *"Covid-19: How to Prioritize Worse-off Populations in Allocating Safe and Effective Vaccines"*.
[67] WHO, *WHO SAGE values framework for the allocation and prioritization of COVID-19 vaccination, 1*.
[68] Daniels, *Just Health: Meeting Health Needs Fairly*, 13. See also Jacqueline L. Colby, "Just Health: Meeting Health Needs Fairly," *Journal of Health Politics, Policy and Law* 34, no. 5 (2009): 839-46.
[69] Daniels, Just Health: Meeting Health Needs Fairly, 42-46.
[70] *Ibid*, 43-44.
[71] *Ibid*, 141. See also Daniels, "Just Health: Replies and further Thoughts," 36.

he refers to the accessibility of health services that promote and restore normal functioning, including preventive measures favouring curative ones. Such as, with the pandemic, mitigating actions were necessary for protecting populations even before vaccines were developed, looking beyond the health benefits at the bigger picture. Daniels also points this out through sustaining individuals' capabilities in adopting a better healthy lifestyle – the things that one can do or be to meet health needs, as fundamental in safeguarding the fair share of NOR for health.[72]

The capability approach has been utilized to assess and justify public health policies[73] since the consequences of the SARS-CoV-2 pandemic extended beyond mortality and morbidity. They affected autonomy and the freedom of choice capabilities, where individuals have an opportunity range to make their own informed choice about their health. Additionally, this would include the opportunity for vaccination, rather than that of being vaccinated,[74] as with the adequate provision of opportunity for public engagement, empowerment, education and transparent communication of every updated fact and essential information that the public can easily comprehend regards vaccines and the importance of vaccination during COVID-19 pandemic that enhances public trust.[75]

[72] Daniels, *Just Health: Meeting Health Needs Fairly*, 64.
[73] Michael R. Millar, Yannis Gourtsoyannis, and Angelina Jayakumar, "Ethics of Vaccination: Should Capability Measures Be Used to Inform SARS-CoV-2 Vaccination Strategies?" *British Journal of Clinical Pharmacology*, (2021), 4.
[74] *Ibid*, 5.
[75] OECD, "Enhancing public trust in COVID-19 vaccination: The role of governments," accessed November 16, 2021. https://www.oecd.org/coronavirus/policy-responses/enhancing-public-trust-in-covid-19-vaccination-the-role-of-governments-eae0ec5a/.

In his book, "*Just Health: Meeting Health Needs Fairly*", Daniels makes a solid argument regarding shared assistance obligations in fulfilling the right to health at a national level while challenging the reader to develop a case that supports action at a global level.[76] This argument builds a valid standpoint since every human being is faced with this global emergency together, and if there is no reciprocal cooperation in helping each other within and between countries, then the pandemic cannot be restrained, affecting populations` health, quality of life, and upholding the right to health for all. Therefore, one claims that global responsibilities, collaboration, and obligations should go further beyond charity, justice, and respect for human rights in safeguarding population health. Thus, there must be a more substantial cooperative commitment with actions, not just pledges, towards providing vaccine supplies to developing countries to fulfil equitable vaccine distribution.

However, finally, regarding his theories, Daniels recognises that his fundamental view of health based on relational justice cannot be easily extended to a global level. Yet he concludes that his theory provides an integrated approach that helps one see the path forward that ought to be engaged in "promoting population health and distributing it fairly, globally as well as domestically"[77] whilst revealing pressures that exist between national and global responsibilities for health justice[78] with the human rights approach towards this as providing guidance. The SARS-CoV-2 pandemic has affected the entire

[76] Gorik Ooms, and Rachel Hammonds, "Taking up Daniels' Challenge: The Case for Global Health Justice," *Health and Human Rights* 12, no. 1 (2010): 29.
[77] Daniels, *Just Health: Meeting Health Needs Fairly*, 355.
[78] *Ibid*, 346.

global health and welfare systems, where the principle of global health justice and governance are seriously challenged.

2.3. Human Rights, Vulnerability, Inequalities, Social Well-being and Community Benefits

In this section, the author briefly deliberates upon human rights principles, vulnerability, inequalities, social well-being, and community benefits in the decision-making processes to attain equitable global population health through vaccine distribution and allocation. This part further builds on the previous sections and Norman Daniels` theory of justice about how population health through the just allocation of vaccines seeks to achieve. Therefore, this section is done by understanding those dimensions that affect equity in achieving public health and social well-being during this global emergency crisis.

2.3.1. Human Rights

Decision-making processes regarding population health entail respecting human rights with the right to health through equitable vaccine allocation. According to the Committee on Economic, Social and Cultural Rights of the United Nations, "Health is a fundamental human right indispensable for the exercise of other human rights. Every human being is entitled to the enjoyment of the highest attainable standard of health conducive to living a life in dignity."[79] Therefore, the right to health is an all-

[79] OHCHR, "OHCHR and the Human Rights," accessed March 1, 2021. https://www.ohchr.org/EN/Issues/ESCR/Pages/Health.aspx

encompassing right that extends to timely, appropriate healthcare while noting the underlying SDOH.

Countries across the globe have diverse health needs and face different challenges during a pandemic. These challenges have extended to vaccine distribution, allocation, and logistics capabilities. Article 14 of the Universal Declaration on Bioethics and Human Rights addresses the social responsibilities of governments in promoting the health and social development of their populations as their primary objective.[80] The availability and accessibility found within the right to health also include the quality population participation for health and accountability issues. Indeed, the availability of COVID-19 vaccines, advanced medical technologies and health therapies are all essential aspects of the right to health, the right to development and the right to enjoy the benefits of scientific progress and its applications.[81]

Every individual has the fundamental human right to health and healthcare accessibility. However, when faced with life and health decisions of being just and impartial, age-related cut-off decisions have proven to be challenging and overwhelming. In fact, the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and the WHO encourage transparent prioritisation of vaccine allocation procedures that ultimately respect human rights.[82] Gratefully, with the development, supply and distribution of COVID-19 vaccines and the allocation of vaccination programmes to the most vulnerable in societies, these situations have now

[80] UNESCO, "Universal Declaration on Bioethics and Human Rights," accessed November 12, 2020. http://portal.unesco.org/en/ev.php-URL_ID=31058&URL_DO=DO_TOPIC&URL_SECTION=201.html.
[81] OHCHR, *"Human Rights and Access to COVID-19 Vaccines".*
[82] WHO, *WHO SAGE values framework for the allocation and prioritization of COVID-19 vaccination, 4 -7.*

diminished. Every individual has equal human rights irrespective of age, wealth, gender, status, religion, political opinion, or merits.[83] Essentially, COVID-19 vaccines should be affordable and accessible to everyone without any discrimination, even during desperate situations of limited supplies. Thus, this upholds the moral values and dignity toward having the right to equal treatment and opportunities both in health and illness for everyone.[84] Here one may argue that unequal criteria can only be justified if it leads to less burden of the pandemic with more effective virus suppression, decreased DALYs and increased quality-adjusted life-years (QALYs) towards an individual's health, thus aimed at saving human lives.[85] Alternatively, lack of resources and limited vaccine supplies endangers lives, and thus here, one stresses the complex circumstances of vulnerability surrounding the entire humanity within this pandemic.[86]

Countries are faced with ethical decisions of who to prioritise first, not just in protecting vulnerability but also in upholding international law and addressing social vulnerabilities.[87] The vaccine is a medication; thus, a core obligation exists to ensure its administration to every human being, as is the right to health.

Human rights principles guide us and outline the ethical acceptability of necessary public health measures and restrictions deemed obligatory. However, despite the common interest in conquering the pandemic, mitigating measures have impacted

[83] UN, "Universal Declaration of Human Rights," accessed May 2, 2020. https://www.un.org/en/about-us/universal-declaration-of-human-rights. See also WHO, "Human Rights and Health," accessed May 29, 2020, https://www.who.int/news-room/fact-sheets/detail/human-rights-and-health.
[84] WHO, "Human Rights and Health".
[85] Max Roser and Hannah Ritchie, "Burden of Disease," accessed November 11, 2021. https://ourworldindata.org/burden-of-disease.
[86] Sharifah Sekalala et al., "An Intersectional Human Rights Approach to Prioritising Access To COVID-19 Vaccines," *British Medical Journal Global Health* 6, no. 2 (2021), 1-8.
[87] *Ibid*, 3-5.

all aspects of life despite vaccines and approved vaccination programmes. The pandemic has affected entire health systems worldwide, whereby reconciliation of protecting global health and people's rights has caused tensions and affected sustainable developmental goals, especially safeguarding healthy lives and promoting well-being for all ages.[88]

2.3.2. Vulnerability

Vulnerability is the universal, continuous human condition, which is the ultimate characteristic that defines what it means to be human; hence in this context, all mankind is vulnerable.[89] According to Martha A Fineman, vulnerability is associated with fragility, dependency and equated with weakness.[90] The concept of vulnerability aids rationing access to resources, such as vaccine allocation, and outlines moral and ethical obligations, although it may result in stigmatization.[91]

However, segments of the global population within this pandemic have emerged as being more vulnerable than others, including persons at risk due to factors regarding their age, gender, pregnancy, pre-existing health conditions, barriers and facilities to health access, poor living conditions, minority ethnic groups and their operational roles such as healthcare personnel.[92] Clinical and epidemiological statistics from minority

[88] Sonalini Khetrapal, and Rajesh Bhatia, "Impact of COVID-19 Pandemic on Health System & Sustainable Development Goal 3," *Indian Journal of Medical Research* 151, no. 5 (2020):395.
[89] Beth Clark, and Nina Preto, "Exploring the Concept of Vulnerability in Health Care," *Canadian Medical Association Journal (CMAJ)* 190, no. 11 (2018): 308-309.
[90] Martha A. Fineman, "Elderly as Vulnerable: Rethinking the Nature of Individual and Societal Responsibility," *The Elder Law Journal* 20, no.1 (2012).
[91] Clark and Preto, *"Exploring the Concept of Vulnerability in Health Care".*
[92] CDC, "Underlying Medical Conditions Associated with Higher Risk for Severe COVID-19: Information for Healthcare Providers," accessed November 12, 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/underlyingconditions.html

populations have underlined more significant social inequalities discrimination highlighting their vulnerability associated with higher risks of COVID-19 infections, its severity and even mortality.[93] Black men and women, Asians and other minority ethnic groups were selected for vaccine allocation as proposed by the CDC framework.[94] Consequently, increased hospitalisation rates and high global mortality rates from COVID-19 are inequitably distributed amongst the most vulnerable and the weak within societies in any given population.[95]

Thus, investing in health by addressing SDOH in reducing inequalities and promoting health through cooperative actions, utilising the social vulnerability index (SVI), policies and regulations is a justified principle in identifying vulnerability. The CDC implemented the SVI in the USA to identify COVID-specific vulnerability indicators, including epidemiological factors and varied health system strengths, to identify vulnerable communities that might be more at higher risk than others during the COVID-19 pandemic.[96] The SVI is an indicator system based on American census data utilised during national disasters or emerging crises such as disease outbreaks.[97] It aims to identify various social factors under four themes: socio-economic status, household composition, disability, minority status and language barrier concepts, together with

[93] Schmidt, et al, "*Covid-19: How to Prioritize Worse-off Populations in Allocating Safe and Effective Vaccines*".
[94] Joint Committee on Vaccination and Immunisation, "Updated interim advice on priority groups for COVID-19 vaccination," accessed November 12, 2020. https://www.gov.uk/government/publications/prioritygroups-for-coronavirus-covid-19-vaccination-advice-from-the-jcvi-25-september-2020.
[95] Efrat Shadmi, et al., "Health Equity and COVID-19: Global Perspectives," *International Journal for Equity in Health* 19, (2020): 1-16.
[96] "COVID-19 Community Vulnerability Index Connects Social Vulnerability Factors to Recent COVID Data," accessed December 02, 2021. https://nlihc.org/resource/covid-19-community-vulnerability-index-connects-social-vulnerability-factors-recent-covid.
[97] "CDC/ATSDR SVI Fact Sheet - What is Social Vulnerability?" accessed December 02, 2021. https://www.atsdr.cdc.gov/placeandhealth/svi/fact_sheet/fact_sheet.html.

housing and transportation.[98] In addition, the SVI indicators assisted prioritising the distribution of resources such as vaccine allocation, immunisation centres and COVID-19 testing sites within the USA during this pandemic.

The SARS-CoV-2 pandemic has highlighted how interconnected and vulnerable we are as human beings, with the need to respectfully take care of each other, starting from the most vulnerable. Hence, the priority of vaccine allocation towards the most vulnerable in society is justified based on safeguarding the population's health. Data from a study report[99] confirms that specific-coloured people, namely the black men and women, Hispanics, Latinos and Latinas, and American Indians, have been more severely affected by the SAR-CoV-2 virus than others. Thus, this reflects the impact of the systemic racism and socio-economic adversities with pre-existing co-morbidities due to lack of public healthcare services and other SDOH factors, such as poor housing, lack of water and nutrition.[100] Here, one points out that we are not just dealing with vulnerability but with indirect circumstances of poverty, diseases, suffering, and deprivation of people's capabilities, which require additional ethical responses and principles beyond respect and protection, including reciprocity, human well-being and global equity as directed and stated within the WHO SAGE value framework for the allocation and prioritisation of COVID-19 vaccination programmes.[101] Therefore, it emphasises the state's responsibility in its protective function, aimed at reducing vulnerability towards citizens, thus upholding the principle of justice, respecting dignity

[98] *Ibid*.
[99] National Academies of Sciences, Engineering, and Medicine, *Framework for Equitable Allocation of COVID-19 Vaccine* (Washington, DC: The National Academies Press, 2020), 132.
[100] *Ibid*, 132-33.
[101] WHO, *"WHO SAGE values framework for the allocation and prioritization of COVID-19 vaccination".*

and integrity, and providing remedial targeted social practices to treat or remove harm.[102] Therefore, enabling equitable COVID-19 vaccine accessibility is essential for health and population well-being.

2.3.3. Inequalities

There is no straightforward answer to global justice,[103] given that global health inequalities still occur despite the improvements in health and healthcare over these last decades.[104] However, this statement incorporates inequitable access to vaccines, where LMICs have vaccinated only 8.06% of their populations with just one dose of COVID-19 vaccine as of December 1st 2021.[105] This factual situation has left billions of vulnerable people unvaccinated and, therefore, at greater risk of the virus, allowing more variants to emerge.[106]

The Rio Political Declaration on SDOH acknowledged that health equity is a shared responsibility, requiring the commitment of every government, their societies, and each member within their communities, aimed toward fairness and equal opportunity for health to all.[107] Hence, the declaration asserted that health inequalities are politically, socially, and economically unacceptable and therefore are to be

[102] Michael H. Kottow, "Vulnerability: What Kind of Principle is it?" *Medicine, Health Care, and Philosophy* 7, no. 3 (2004): 281-7.
[103] Daniels, *Just Health: Meeting Health Needs Fairly*, 333.
[104] WHO, "*Health 2020: A European Policy Framework and Strategy for 21st."* accessed November 28, 2021, p.13. https://www.euro.who.int/__data/assets/pdf_file/0011/199532/Health2020-Long.pdf
[105] "Global Dashboard for Vaccine Equity," accessed December 6, 2021. https://data.undp.org/vaccine-equity/.
[106] UN, "COVID vaccines: Widening inequality and millions vulnerable," accessed November 30, 2021. https://news.un.org/en/story/2021/09/1100192.
[107] WHO, *Rio Political Declaration on Social Determinants of Health* (World Conference on Social Determinants of Health, Rio de Janeiro, Brazil, October 21, 2011), 1 - 7.

avoidable.[108] Furthermore, the same statement refers to health equity as a vital principle for sustainable development in achieving better health, quality of life, and well-being for all.[109] Health is one of the most important dimensions of well-being, with vaccines proven to impact health inequities, yet, at the time of writing, accessibility and allocation of COVID-19 vaccines remain globally unequal, thus affecting the population`s social well-being in one way or another.

Even though none of the available vaccines is 100% effective, working together at a community or global level through deliberative vaccine distribution decision making processes and other mitigating measures has promoted added community benefits more than just health; that of solidarity, human respect, and dignity towards each other, whilst upholding human rights.

This pandemic exposed many population disparities, which placed individuals at a greater risk for infectious diseases, despite being recognised in Health for all 2000 direction, plans of which are greatly affected by the impacts of this pandemic. Therefore, this is an opportunity for institutions and governments to act more intensely and collaboratively on disparities in SDOH and increase an individual`s chance for health through equitable COVID-19 vaccine distribution and allocation in promoting healthier populations.

[108] *Ibid*, 1. See also WHO, *Health 2020: A European Policy Framework and Strategy for 21st*., 12.
[109] *Ibid*, 1.

2.3.4. Social Well-being and Community Benefits.

The WHO acknowledged social well-being as a fundamental aspect of an individual`s overall health.[110] Social well-being is defined as the pursuit of a positive social life that involves interaction between individuals, their families, communities, and the wider society.[111] Therefore, expressing individuals' lifestyles, embedded in traditions, and interaction with others within communities and organisations. Furthermore, social well-being involves also equal access to basic needs and services, such as food, water, shelter, education, and healthcare services.[112] This would include the allocation and distribution of vaccines.

Worldwide reports stated and acknowledged that the COVID-19 pandemic had affected everyone's life and social well-being in various ways,[113] and despite vaccines paving the way for some normality, this has not yet been achieved, let alone eradicating the pandemic. Hence, the importance of equitable COVID-19 vaccines as a common good for health within communities is necessary for ensuring social well-being.

The author believes that we as human beings do not live in isolation; our strength lies in being part of a large community. Therefore, everyone within a society must cooperate for the common good towards the population's health. If anything, this

[110] WHO, *Basic documents: forty-ninth edition*, 1.
[111] Victoria Dunaeva, "New Approaches in Social Well-Being Studies," *PEOPLE: International Journal of Social Sciences* 4, no. 3 (2018): 567-8.
[112] *Ibid*, 568.
[113] Karynna Okabe-Miyamoto & Sonja Lyubomirsky, "World Happiness Report 2021 - Chapter 6 Social Connection and Well-Being during COVID-19," accessed December 3, 2021. https://happiness-report.s3.amazonaws.com/2021/WHR+21_Ch6.pdf.

pandemic exposed the necessity for every country to unite and ensure healthier communities worldwide.

Vaccine distribution decision-making processes affect population health and are an ongoing complex activity involving the "synthesis of clinical, epidemiological, policy, and behavioural research, data, and expert opinion to ensure effective delivery of vaccines and immunisation services to priority target populations".[114] Therefore, this dynamic process involves various judgmental approaches towards the population's health needs, disease burden, and socio-economic impacts in the distribution and allocation of COVID-19 vaccines globally with political, ethical, and socio-economic considerations. Other factors that affect these decision-making processes are the aspects related to socio-political and demographic characteristics, such as country dimension and population density, public health, and various clinical factors.[115] Including disease incidences, viral severity and its transmissibility; the risks, benefits and trade-offs between vaccination programmes and existing public health services capacities; whilst considering the country's ability to process reliable data related to vaccine forecasting, supply, and allocation.[116] Furthermore, decision-making processes also imply taking note of formal recommendations and guidelines issued by international professional bodies such as the WHO, CDC, and UNICEF. All of which affect social well-being and contribute towards community health benefits, as acknowledged within the three chosen frameworks for this dissertation.

[114] International Vaccine Access Center (IVAC), *Supporting Immunization Decision-making in Low-and lower-middle-income countries* (Johns Hopkins Bloomberg School of Public Health (JHBSPH), February 2020), 3.
[115] *Ibid*, 9.
[116] *Ibid*.

In conclusion, vaccines and vaccination programmes are recognised as beneficial mechanisms in decreasing population disparities and increasing community benefits through the decision-making of vaccine distribution.[117] The decision to prioritise the most vulnerable first is justified since a healthier community is more productive, can combat diseases more efficiently, has a healthier quality of life, and pool its resources for wider health opportunities. Furthermore, Norman Daniels` theory of justice for health provides a way forward that guides practice in attaining health and well-being whilst upholding human rights in the just distribution of health within populations. Therefore, the promotion and allocation of equitable COVID-19 vaccines are aimed to attain herd immunity and promote a sense of cohesiveness, engagement, unity, and efficiency towards a common goal for public health through cooperative actions, that of achieving healthier and social well-being within global communities.

[117] Andre, F. E., et al., "Vaccination Greatly Reduces Disease, Disability, Death and Inequity Worldwide,"140.

Chapter 3: Proposing a Way Forward

Given the direction in which the ongoing global pandemic is evolving, including the developments and international approaches as regards the deployment of COVID-19 vaccines, this final section of the dissertation will further discuss and propose a way forward toward the distribution of vaccines globally, in line with the insight gained from the previous two chapters. The way ahead will be included throughout the first section of this chapter and underlined through the recommendations by focusing on the importance of global cooperation in solidarity to safeguard health within populations. The second section will address how the COVID-19 pandemic has brought global value chains (GVCs) to the forefront, that vaccine health-related decisions have consequences and what needs to be done, since poorer countries are more dependent on others regarding their equal share of vaccine deployment.[1] Finally, the last part of this chapter will conclude by proposing that any vaccination strategy must not simply divide a whole into parts but rather establish cooperation and create opportunities to distribute vaccine benefits in a collaborative approach.

3.1 Solidarity: A Collaborative Approach

One of the most critical aspects of a way forward is that of coherent global solidarity within and between countries during this pandemic in attaining and improving global public health and well-being through COVID-19 vaccine benefits. Therefore, the author proposes universal support and unity for equitable vaccine deployment, building

[1] Oliver J. Wouters, et al, "Challenges in Ensuring Global Access to COVID-19 Vaccines: Production, Affordability, Allocation, and Deployment," *The Lancet (British Ed.)* 397, no.10278 (2021):1023-1034.

on international participation in helping the most disadvantaged poorer countries and hard-hit regions pursue fair vaccination programs amongst their populations. Thus, this upholds the principle of solidarity, which Jalsenjak has described as a "socio-ethical and political theory that affirms the acceptability and fairness of shared benefits and obligations between members of society."[2] Additionally, solidarity refers to unity between social groups with a common interest for mutual cooperative practices towards established agreements, belonging to specific responsibilities, legal or public obligations and moral values that guide decisive actions.[3] Hence, central to solidarity is the concept of relationships that emphasises similarities, bonds, and interdependences between groups and individuals.[4] Therefore, solidarity is about those things that bring people together - communities, groups, or states - and thus unite them in achieving the common good for public health during a pandemic.

Similarities exist among worldwide citizens, including that we are all vulnerable in one way or another within this pandemic, affecting populations' health and well-being, some countries more than others, thus requiring consistent collaborative and cooperative practice to allocate and distribute COVID-19 vaccines globally in protecting public health. Hence, the concepts of reciprocity, equity, respect, social and distributive justice in protecting citizens, particularly those at greater risk of harm, are all

[2] Borna Jalsenjak, "Principle of Solidarity", in *Encyclopedia of Sustainable Management* (eds). S.O. Idowu et al (Springer Nature Switzerland AG 2020),1. https://doi-org.ejournals.um.edu.mt/10.1007/978-3-030-02006-4_114-1

[3] Olivier Bellefleur and Michael Keeling, "Solidarity in Public Health Ethics and Practice: Its Conceptions, Uses and Implications," *Montréal, Québec: National Collaborating Centre for Healthy Public Policy*. 2015: 1-23.
https://www.inspq.qc.ca/sites/default/files/publications/2739_solidarity_ethics_conceptions_uses_implications.pdf.

[4] *Ibid*, 2-3.

theoretically linked with solidarity.[5] Additionally, this ensures that no one is left behind and enables a more effective, timely response to this pandemic whilst enabling health risk management improvement through an effective and efficient global COVID-19 vaccination strategy.

According to the WHO Director-General, the best way to fight effectively and eradicate the pandemic outbreak is cooperative solidarity by all countries.[6] The author acknowledges that solidarity among human beings and international cooperation must be upheld and encouraged, as declared in Article 13 of the Universal Declaration on Bioethics and Human Rights.[7] Furthermore, as highlighted in Article 24, international cooperation is essential in supporting the accessibility and sharing of scientific and technological knowledge[8] during the fight against pandemics and scientific progress, as it is with the development of COVID-19 vaccines. Moreover, Article 24 of the declaration emphasises the importance of mutual respect and the promotion of solidarity among nations, communities, and citizens, especially those special vulnerable groups within

[5] WHO, "WHO SAGE Values Framework for the Allocation and Prioritization of COVID-19 Vaccination," accessed March 14, 2021. https://apps.who.int/iris/bitstream/handle/10665/334299/WHO-2019-nCoV-SAGE_Framework-Allocation_and_prioritization-2020.1-eng.pdf?ua=1.

[6] "WHO Director-General's Opening Remarks at the Media Briefing on COVID-19 - 26 October 2020," accessed October 29, 2020. https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---26-october-2020. See also Afifah Rahman-Shepherd et al., "*Solidarity in Response to the COVID-19 Pandemic - Has the World Worked Together to Tackle the Coronavirus?*", 4-5. https://www.chathamhouse.org/sites/default/files/2021-07/2021-07-14-solidarity-response-covid-19-pandemic-rahman-shepherd-et-al_0_0.pdf.

[7] Alphonse Elungu, "Article 13: Solidarity and Cooperation", in *The UNESCO Universal Declaration on Bioethics and Human Rights: Backgrounds, Principles and Application* ed. Henk A.M.J. ten Have and Michèle S. Jean (Paris: UNESCO, 2009), 211-217

[8] Ousmane Blondin Diop, "Article 24: International Cooperation", in *The UNESCO Universal Declaration on Bioethics and Human Rights: Backgrounds, Principles and Application* ed. Henk A.M.J. ten Have and Michèle S. Jean (Paris: UNESCO, 2009), 312.

societies and those with the most limited resources[9] , such as is with the supply of vaccines.

Furthermore, Prainsack and Buyx[10] claim that solidarity may carry certain "costs" (financial, social, or emotional) in assisting and respecting others, for instance, the participation of countries in the WHO COVAX facility by pledging COVID-19 vaccines to LMICs, that ultimately may reduce one's own provisions. Another example of solidarity within countries is getting vaccinated in protecting others, not just oneself. Similarities in solidarity include a range of shared individual and social ties, needs and interests between and within countries that reflect collective efforts for the common good, especially during this pandemic in maintaining populations' health through immunisation strategies. Therefore, an element of reciprocity exists in vaccine solidarity, as acknowledged earlier in chapter one, within all the three frameworks, that of the priority vaccine allocation to those members of society that carry additional risks. Hence, the author reflects with the above statements that moral obligations do exist, and the willingness to accept liabilities and costs for the benefit of others is necessary. Consequently, this provided the basis for policy decision-making and action to move forward for a specific purpose and shared commitment to values such as the equitable allocation of vaccines to achieve global herd immunity.

Moreover, the author outlines vaccine solidarity as the moral value that reduces inequality and social injustices while binding governments together, committed to their

[9] *Ibid*, 311.
[10] Barbara Prainsack, and Alena Buyx, "Solidarity: Reflections on an Emerging Concept in Bioethics," *Swindon: Nuffield Council on Bioethics* (2011): 46. https://www.nuffieldbioethics.org/wp-content/uploads/2014/07/Solidarity_report_FINAL.pdf

international health agreements through global vaccination - the "putty"[11] that binds nations for shared vaccine equitable commitment.

Therefore, solidarity for health within this pandemic requires every individual's participation, moral obligation, and responsible behaviours within wide-reaching societies in protecting public health. Consequently, getting vaccinated and the effectiveness of global vaccination are crucial. As discussed earlier in previous chapters, the author highlights that vaccination protects and contributes to the population's overall well-being. Solidarity should be a common ground for unity with shared human consciousness, upholding universal rights, respecting each other, and understanding that we are all in this health crisis together, irrespective of differences. So, health and governmental authorities must learn from past experiences, such as the 2009 Influenza H1N1 pandemic, where inadequate global distributive justice and wastage of surplus vaccines occurred.[12] Therefore, vaccine solidarity in this concept involves sharing one another's burdens[13] and not passing from the same experience of the H1N1 pandemic.

Vaccine solidarity justifies and highlights the necessity to act upon health needs and those vulnerabilities within societies by reducing the risk of harm. Here, the author emphasises that ensuring vaccine equity towards nations encountering difficulties in obtaining and allocating vaccines should be addressed globally, supporting the population's need to achieve the protective and beneficial component of COVID-19

[11] Avery Kolers, "What does Solidarity do for Bioethics?" *Journal of Medical Ethics* 47, no. 2 (2021): 122.
[12] Reidar K. Lie, and Franklin G. Miller, "Allocating a COVID-19 Vaccine: Balancing National and International Responsibilities," *The Milbank Quarterly* 99, No. 2 (2021): 463-4.
[13] Ben Davies, and Julian Savulescu, "Solidarity and Responsibility in Health Care," *Public Health Ethics* 12, no. 2 (2019): 135.

vaccines.[14] An ethical, reflective approach that is deliberative and enforces accountable powers, based on awareness of all elements, some of which have already been highlighted in chapter 1 and emphasised in chapter 2.

Present online data[15] concerning vaccine donation pledges reveals that countries that promised vaccines to the COVAX initiative have failed to fulfil their entire obligations to support this program. Therefore, these countries should be held accountable to ensure a more equitable vaccine distribution globally in upholding their commitments. The WHO showed leadership and determination ahead of the pandemic by establishing the COVAX facility, the ACT Accelerator tool, and launching a cohesion donation fund as an emergency COVID-19 solidarity response to ensure, safeguard, and promote global health despite being criticised for the delayed crisis alertness of the pandemic.[16]

The interconnectedness between countries creates health risks, so it stands to reason that one ought to collaborate. Therefore, one argues that responsibilities exist that oblige governments to act in a solidaristic manner that influences actions, practices, and social welfare policies, that have a social and normative role that ultimately affect the overall public health.[17] These realities raise questions about why COVID-19 vaccine

[14] WHO, "WHO SAGE Values Framework", 4.
[15] Duke Global Health Innovation Center, "Vaccine Donations," accessed January 30, 2022. https://launchandscalefaster.org/covid-19/vaccinedonations.
[16] Jesse B. Bump, Peter Friberg, and David R Harper, "International Collaboration and Covid-19: What Are We Doing and Where Are We Going?" *BMJ (Online)* 372 (2021). See also "WHO Foundation Established to Support Critical Global Health Needs," accessed January 30, 2022. https://www.who.int/news/item/27-05-2020-who-foundation-established-to-support-critical-global-health-needs#:~:text=The%20WHO%20Foundation%20is%20an%20independent%20grant%2Dmaking%20foundation%20focused,support%20the%20global%20health%20ecosystem.
[17] O. Bellefleur and M. Keeling, "Solidarity in Public Health Ethics and Practice: Its Conceptions, Uses and Implications,"2-6.

international solidarity has not produced better results and moved forward in a united manner. What is required is to eliminate nationalism and create a multilateral collaborative approach. The author of this dissertation claims that a possible way forward can be achieved through international collaboration, sharing of information, and accepting an authoritative leadership of universally recognised health organisations such as the WHO. Moreover, governments and other entities such as the World Trade Organisation (WTO) must have the administrative and political capacity to delegate and carry out functions efficiently and effectively in an organised hierarchical approach by supporting coordinated actions towards equitable vaccine allocation.

To conclude this section, the author claims that solidarity and constant cooperation in global vaccine deployment have been lacking since countries aim to protect their populations first. Consequently, it resulted in vaccine hoarding and nationalism, which impacted the already limited availability of vaccine supplies despite various demands for solidarity and pledges of vaccine to LMICs. Thus, the ultimate way forward is to focus on the need and the importance of cooperation in context, with global vaccine solidarity emerging as instrumental for the common public good of health.

3.2. Global Value Chains in Vaccine Distribution and the Way Forward

Developing strategies and policies for equitable global distribution of COVID-19 vaccines requires a comprehensive, coordinated and evaluated process reflecting global immunisation demand. Moreover, one should explore how vaccines are internationally produced, distributed, and geographically dispersed. Hence, this section briefly

incorporates what global value chains (GVCs) incorporate, the constraints and the system mechanisms that evolved from this pandemic, viewing the complex production, supply, and deployment of vaccines, influenced by many factors. Nevertheless, GVCs players have recognised the value of cooperation in removing vaccine manufacturing barriers to achieving effective global distribution during this pandemic.[18]

Around 11 billion doses of COVID-19 vaccines are estimated to vaccinate worldwide populations to reach global herd immunity.[19] However, these estimated amounts do not include the need for further extra vaccine booster doses. To provide and supply vaccines globally, relying on GVCs, involves international production and sharing of goods, where the manufacturing process divides into stages, and activities are carried out and spread across nations.[20] Nevertheless, the colossal global demand for COVID-19 vaccines has challenged infrastructures, government finances, and GVCs processes.

Cross border production of goods is made possible due to the liberalisation of trade between entities and nations, lower transport costs, improvements in logistics, and advancement in information technologies with mass production and distribution.[21] GVCs encompass coordinated actions between different actors, each with different

[18] Wouters et al, "Challenges in Ensuring Global Access," 1028. See also "COVID-19 Vaccine Industry Cautions Immediate Action Needed to Remove Manufacturing Supply Barriers to Meet Production Targets and Keep on Course to Equitable and Fair Access to COVID-19 Vaccines," accessed February 1, 2022. https://www.ifpma.org/resource-centre/covid-19-vaccine-industry-cautions-immediate-action-needed-to-remove-manufacturing-supply-barriers-to-meet-production-targets-and-keep-on-course-to-equitable-and-fair-access-to-covid-19-vaccines/

[19] Irwing Aisling, "What It Will Take to Vaccinate the World against COVID-19," *Nature (London)* 592, no. 7853 (2021): 178. See also WHO, "Strategy to Achieve Global COVID-19 Vaccination by mid-2022," accessed December 19, 2021. https://cdn.who.int/media/docs/default-source/immunization/covid-19/strategy-to-achieve-global-covid-19-vaccination-by-mid-2022.pdf.

[20] Adnan Seric, and Yee Siong Tong, "What are Global Value Chains and Why Do They Matter?" accessed January 04, 2022. https://iap.unido.org/articles/what-are-global-value-chains-and-why-do-they-matter

[21] *Ibid*.

roles, tasks, and services - from research, innovation, design, production, marketing, supply, and distribution of the final product to consumers. Therefore, various stage processes in manufacturing a product break up production between firms across different countries, adding value at each stage.[22]

Goods of a complex nature, such as COVID-19 vaccines, involve an extensive division of labour to manufacture the product to a complete transaction of services, the provision of raw materials, and other components held necessary traded between countries before finalised goods are then transported and supplied worldwide.[23]

Here one must understand the supply and value chains around vaccine production and deployment. A supply chain involves those activities in sourcing, procurement, processing of raw materials and logistic requirements. At the same time, value chain concepts build upon incorporating a set of actions that focus directly on creating an added value to the specific product, service, and administration.[24] The objective is to maximise value at the least possible cost.

During this pandemic, every nation needs COVID-19 vaccines to protect their population's health, although not all can produce them since production is limited and concentrated in a few countries, thus making trade a vital characteristic in vaccine

[22] P. Antràs, "Conceptual Aspects of Global Value Chains," *The World Bank Economic Review* 34, no. 3 (2020): 553.
[23] OECD, "Trade Policy Implications of Global Value Chains," accessed December 16, 2021. https://www.oecd.org/trade/topics/global-value-chains-and-trade/
[24] "What is Value Chain? Definitions and Characteristics," accessed January 20, 2022. https://www.cisl.cam.ac.uk/education/graduate-study/pgcerts/value-chain-defs. See also "Value Chains vs. Supply Chain: What's the difference," accessed February 2, 2022. https://www.investopedia.com/ask/answers/043015/what-difference-between-value-chain-and-supply-chain.asp.

supply and deployment.[25] Global vaccine production companies are the primary source and the export agents of the main essential ingredients for vaccine production. However, the leading vaccine producers also source other non-essential ingredients, such as plastic bags, glass phials and syringes.[26] This pandemic has exposed various operational flaws with vaccine production dependencies that are highly interconnected between leading companies and suppliers across continents.[27] Shortages of raw materials and essential components for vaccine production, such as nucleotides and lipids, are part of manufacturing setbacks and constraints in scaling up the production of COVID-19 vaccines to reach its global demand.[28] In addition, the intellectual property rights of specific vaccine components required for production are controlled by a few elite companies.[29] These issues and mitigating legislative measures related to international border control, export bans, customs clearance procedures, increased production costs, market-driven values, and advanced purchase agreements eventually affected the global availability of COVID-19 vaccine supplies.[30]

Furthermore, the author claims that GVCs are not just market relations of buyers and sellers acting freely but powerful actors that ultimately control the flow of knowledge, goods, and events that affect vaccine availability. The COVAX and other regional initiatives, such as the African Vaccine Acquisition Task Team (AVATT) to

[25] Silvia Sorescu, Javier López González, and Andrea Andrenelli, "Using Trade to Fight COVID-19: Manufacturing and Distributing Vaccines," *Tackling Coronavirus (Covid-19)-Browse OECD Contributions* (2021): 1-16.
[26] Simon J. Evenett, Bernard M. Hoekman, Nadia Rocha, and Michele Ruta, "The COVID-19 Vaccine Production Club: Will Value Chains Temper Nationalism?" (Policy Research Working Paper No.9565: World Bank, Washington, DC, 2021), 15. https://openknowledge.worldbank.org/handle/10986/35244.
[27] *Ibid*, 13 -17.
[28] Aisling, "What it Will Take to Vaccinate the World Against COVID-19," 177.
[29] *Ibid*.
[30] Evenett, et al, 3. See also Wouters et al, 1028.

support COVID-19 immunisation rollouts within the African countries and the Asia-Pacific Vaccine Access Facility,[31] have been affected by these consequential trade decisions.

Indeed, a way forward to improve vaccine productivity and thus enhance the supply of vaccines for global distribution is to ensure and facilitate timely access to COVID-19 vaccines, streamlining international processes and reducing trade regulations without endangering safety for better coordination of international collaborative participation. Therefore, the Organisation for Economic Co-operation and Development (OECD) encourages companies to share more transparency and information for vaccine production and distribution by utilising an online platform to promote accessible linkage between manufacturers and distributors across the entire vaccine GVCs.[32] Furthermore, it supports reduced tariffs and provisions for improved, smoother logistical processes.[33]

Moreover, the author highlights that the WHO COVID-19 Technology Access Pool (C-TAP) tool is another way to enhance global vaccine solidarity. The C-TAP is a platform tool that facilitates the voluntary sharing of patent-protected information regarding diagnostics, therapeutics, vaccine development, production, and other related data during this pandemic.[34] Thus, it provides manufacturers with legal and intellectual property rights (IPRs) and technology know-how to increase the output of COVID-19 vaccines.

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[31] Kerry Elgar, Ruth Lopert, Eleanor Carey, and Martin Wenzl, "Coronavirus (COVID-19) Vaccines for Developing Countries: An Equal Shot at Recovery," *Tackling Coronavirus (Covid-19)-Browse OECD Contributions (*2021): 9

[32] OECD, "Using Trade to Fight COVID-19 Manufacturing and Distributing," 2 and 12.

[33] *Ibid*, 9.

[34] WHO, "How WHO C-TAP Works?" accessed January 10, 2022. https://www.who.int/initiatives/covid-19-technology-access-pool/what-is-c-tap.

Besides this, adjusting the trade regime for intellectual property rights (TRIPS) agreement [35] is considered a step in the right direction for protecting public health by scaling up vaccine productivity. TRIPS is an international legal agreement between all the World Trade Organisation (WTO) members, establishing standard regulations, dispute settlements and enforcement of different IPRs. Thus, this safeguards accountabilities and obligations of manufactured goods, such as COVID-19 vaccines, whilst reducing monopolies over the vaccine market by certain international pharmaceutical companies.[36] Nevertheless, the author acknowledges that IPRs constitute a significant barrier to vaccine supply, affordability, and accessibility.

It is not a question of just 'my health', but the importance of how health decisions have consequences, with GVCs affecting vaccine productivity, availability, and deployment. Moreover, it was revealed that poorer countries are more dependent on others for vaccines, which must be coordinated geographically.[37] Therefore, priority setting with initially limited supplies has established criteria for whom to vaccinate first. Indeed, despite more than a year since COVID-19 vaccine development and subsequent boosted efforts to increase capacity vaccine production, we are still far from changing the pandemic's progression.

[35] European Parliament, "World Trade Organization TRIPS waiver to tackle coronavirus," accessed January 12, 2022. https://www.europarl.europa.eu/RegData/etudes/ATAG/2021/690649/EPRS_ATA(2021)690649_EN.pdf
[36] Vijay K. Chattu, Bawa Singh, Jaspal Kaur, and Mihajlo Jakovljevic, "COVID-19 Vaccine, TRIPS, and Global Health Diplomacy: India's Role at the WTO Platform," *BioMed Research International* (2021): 1-8.
[37] Elgar, Lopert, Carey, and Wenzl, "Coronavirus (COVID-19) Vaccines for Developing Countries: An Equal Shot at Recovery," *OECD*, 2.

Ultimately, the importance of achieving populations' health for the common good is associated with decisions and actions upon collective consensus, based on the values of mutual respect and participation for cooperative solidarity.

3.3. A Country's Values: Shaping Policies and Strategies

Countries offered various policies, strategies, attitudes, and approaches to allocating and distributing COVID-19 vaccines during this pandemic. Their influenced methods depended on different ethical considerations, values, international organisations' directions, and additional socio-economic factors such as religion, wealth, politics, and culture. Additionally, the purchasing power and political agendas guided certain countries' decisions, affecting pandemic vaccine-related policies and strategic responses. Concurrently they depend on their health infrastructures, technologies, logistics, and response to develop, acquire, and access available vaccines. Nevertheless, values provide the ethical compass for decision-makers. As a result, many countries pursued the recommended approach in prioritising the most vulnerable first within their communities for vaccination—a strategy aimed at reducing morbidity, decreasing viral transmission, and saving more lives, which was the most predominant plan mentioned in all the three recommended frameworks in the first chapter.

However, nationalism has prevailed over cosmopolitanism, where countries have not collectively worked together, and their domestic interest has triumphed over a fair global approach to allocating COVID-19 vaccines. Consequently, the author suggests that worldwide vaccine strategies must not be divided into tasks or between nations but rather establish a cohesive action for global cooperation and solidarity—a

complex and challenging task aimed toward creating opportunities for a fair and equitable allocation of vaccines in a planned manner. Collaborative team-effort participation between communities, governments, public health organisations and higher authorities leads to shared cooperative activity in the interest of the common good in protecting and achieving public health whilst upholding the theory of justice through the concept of AFR. Therefore, the author claims that such an approach offers transparency and recognised legitimacy whilst ensuring a fair worldwide distribution of limited doses of COVID-19 vaccines until sufficient supply is available. Furthermore, a way forward maximises practical vaccine benefits through efficient vaccination programs by saving more lives, controlling the ongoing pandemic transmission, and reducing the emergence of viral mutations. Thus, establishing pandemic related regulations for standardised immunisation practices would increase trust and support between governments, nations, and international health entities for focused public health interventions.

The term “values” is a hard word to express, characteristically described either as guiding principles, attitudes, or standards of behaviour; within people's lives that lead to concrete decisions or actions and adaptation to the demands of societal reality.[38] Within the context of vaccines, the societal value of immunisation contributes to the benefits of immunity and eradicating diseases, thus improving populations' health and well-being by reducing health inequities and ensuring that nobody is left behind.[39]

[38] “Values,” accessed February 10, 2022. https://psychology.iresearchnet.com/social-psychology/attitudes/values/

[39] Andre, et al., “Vaccination Greatly Reduces Disease, Disability, Death and Inequity Worldwide,”141-2.

Literature shows that vaccination has diverse health, economic, and social benefits.[40] Furthermore, as already discussed, the promotion and protection of global public health require cooperative, and collective action between and within countries since the values of global health as public goods of both the poor and rich countries is valued as one of the leading global agendas.[41]

The locus of decision-making through subsidiarity is equally essential as solidarity in achieving public health for the common good concerning vaccine allocation. Many institutions, organisations and governments reach healthcare decisions and set policies based-on moral values and analysis of societal benefits. According to Brakman, subsidiarity is a fundamental principle in locating the proper level of decisional authority among many stakeholders with a bottom-up approach.[42]

The author of this dissertation claims that solidarity and societal partnerships are seen as a way forward in meeting public health needs by enhancing citizen and community participation in promoting vaccine benefits, thus protecting community health, especially those socially disadvantaged, such as refugees and the homeless. Therefore, the principle of subsidiarity is consistent with social and community participation in sharing decisions and activities in ensuring equitable distribution of COVID-19 vaccines, which also emphasises the principle of solidarity for the common good of societies.[43] Furthermore, this concept also upholds the national equity value

[40] *Ibid*, 143. See also David E. Bloom, Daniel Cadarette, and Maddalena Ferranna, "The Societal Value of Vaccination in the Age of COVID-19," *American Journal of Public Health*, 111, no.6 (2021): 1049.
[41] Smith, "Global Public Goods and Health," 475.
[42] Sarah-Vaughan Brakman, "Guiding Principles of Community Engagement and Global Health Research: Solidarity and Subsidiarity," *American Journal of Bioethics* 20, no. 5 (2020): 63. See also De Campos, 213.
[43] Jesus Colina, "Vaccines for All? Catholic Principles for the Common Good," accessed February 17, 2022. https://aleteia.org/2021/06/02/vaccines-for-all-catholic-principles-for-the-common-good/

within the WHO SAGE Value Framework, providing practical strategic measures for equal COVID-19 vaccine access to priority populations within communities.[44]

The principle of subsidiarity, which has played an enormous role within the EU since the 1992 treaties, retains member states' self-governance and employs successful integration by balancing solidarity with community participation on a national level.[45] Moreover, acknowledging the central authoritative power of the EU collectively, recognising that health and vaccine-related decisions should be taken as close as possible to the citizens within each member state while upholding the EU's core principle of solidarity.

The central procurement strategy within the EU created several advantages for member states that profited from purchasing vaccines via a single procurement action.[46] A concept based on values that influenced and shaped policies offered various benefits, such as providing a simple negotiation process with vaccine manufacturers by reducing costs and avoiding competition between EU countries.[47] Thus, promoting a swift centralised vaccine procurement method that increased efficiency and purchasing power. Furthermore, it creates solidarity between member states, irrespective of their population, capacity, and wealth. However, each member state could also engage in COVID-19 vaccines APAs independently.

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[44] WHO, "WHO SAGE Values Framework", 7.
[45] Jaro Kotalik, "Examining the Suitability of the Principle of Subsidiarity for Bioethics," *Kennedy Institute of Ethics Journal* 20, no.4 (2010): 374. See also European Parliament, "The Principle of Subsidiarity – Facts Sheets on European Union," accessed February 2, 2022. https://www.europarl.europa.eu/factsheets/en/sheet/7/the-principle-of-subsidiarity.
[46] EC, "Communication from the Commission to the European Parliament, the European Council, the Council and the European Investment Bank," (Brussels, Europe: EU strategy for COVID-19 Vaccines, 2020), https://ec.europa.eu/info/sites/default/files/communication-eu-strategy-vaccines-covid19_en.pdf.
[47] *Ibid*,3.

An EU vaccine strategic policy respects the principle of subsidiarity of its member states' capabilities towards a coordinated action within and between countries towards an effective vaccination program - a collaborative and cooperative partnership between governments and their societies for a better community engagement and trust, despite the initial tensions between countries that had emerged. Here the value of legitimacy comes into play with the country's engagement towards transparent consultation, appropriate authority, and cooperative actions in determining shared values that guide decision-making for the prioritisation of global vaccine allocation and deployment.[48]

Subsequently, the issue of mandatory COVID-19 vaccination was held necessary by many countries in late 2021 and early 2022,[49] which was never included in any of the three mentioned frameworks. A decision considering whether to make COVID-19 vaccination compulsory to ensure higher vaccination rates for better controlling the impact of SAR-CoV-2 viral mutation outbreaks and thus achieve better public health goals.[50] The author strongly argues that mandatory vaccination ethically interferes with personal integrity, autonomy, and human rights. Additionally, the initiative of compulsory vaccination strategy provides governments and public health authorities with the obligation to protect life, as affirmed within Article 2 of the European

[48]"WHO SAGE Values Framework," 4 and 8.

[49] Reuters, "Factbox: Countries Making COVID-19 Vaccines Mandatory," accessed January 17, 2022. https://www.reuters.com/business/healthcare-pharmaceuticals/countries-making-covid-19-vaccines-mandatory-2021-08-16/. See also, Katharina Buchholz, "The Countries Where Covid-19 Vaccination Is Mandatory," accessed March 10, 2022. https://www.statista.com/chart/25326/obligatory-vaccination-against-covid-19/.

[50] WHO, "COVID-19 and Mandatory Vaccination: Ethical Considerations and Caveats," *WHO Policy Brief*, April 13, 2021, accessed January 15, 2022. https://apps.who.int/iris/bitstream/handle/10665/340841/WHO-2019-nCoV-Policy-brief-Mandatory-vaccination-2021.1-eng.pdf?sequence=1&isAllowed=y.

Convention on Human Rights (ECHR) - the right to life of societies.[51] However, haphazardly introduced to safeguard populations' health, such mandates must be considered only necessary for public health protection.[52]

Nevertheless, every nation must recognise all relevant aspects regarding this matter and ensure that such policies do not place any inadequate burdens on those hesitant about vaccination. Moreover, when considering launching mandatory vaccination policies, governments should apply transparent deliberative procedures to respect all ethical considerations behind their decision,[53] acknowledging other Human Rights such as ECHR Article 8 – the right to respect for a private and family life, and article 9 – freedom of thought, conscience, and religion.[54] Here, the author points out that the idea behind mandatory vaccination further exacerbates the already limited supplies of vaccines and creates more inequitable allocation globally. However, this dissertation does not have the scope to go into the ethical implications of mandatory vaccination.

The author recognises that International Health Regulations (IHR) have been revised and built upon the existing regulations to address global health security concerns to protect global health by better tracking communicable diseases, health threats, and

[51] European Convention on Human Rights (ECHR), "Guide on Article 2 of the European Convention on Human Rights - Right to Life," accessed January 29, 2022. https://www.echr.coe.int/Documents/Guide_Art_2_ENG.pdf
[52] WHO, "*COVID-19 and Mandatory Vaccination: Ethical Considerations and Caveats*",1.
[53] *Ibid.* See also Fereniki Panagopoulou, "Mandatory Vaccination during the Period of a Pandemic: Legal and Ethical Considerations in Europe," *BioTech* 10, no.29 (2021): 1 -14.
[54] *Ibid*, 3-5. See also Anna Nilsson, "Is Mandatory Vaccination Against COVID-19 Justifiable Under the European Convention on Human Rights?" *GC Human Rights Preparedness*, *15 April 2021*, accessed February 2, 2022. https://gchumanrights.org/preparedness/article-on/is-mandatory-vaccination-against-covid-19-justifiable-under-the-european-convention-on-human-rights.html

conditions that cause death and disability.[55] Lessons learnt from this pandemic are valuable in setting out a country`s obligations, which better triggers containment response, with all the necessary support given to those affected.

The author coincides that all the wealthiest economic countries are a way ahead in allocating COVID-19 vaccines to their communities, thus enhancing their populations' health with booster vaccine doses, whilst LMICs are still way behind, even though the advancement of new vaccines and other therapies beyond 2022 had gained impetus in production and availability. The unanswered queries, particularly how equitable access to vaccines would reach everyone in a justified manner, remains vague.

Ultimately, even if an adequate supply of vaccine doses is available for global demand through multilateral efforts and solidarity approaches between and within countries, the author believes that equitable achievement in vaccination strategies remains constrained due to various challenges within the health systems of many developing and poorer countries. These challenges include lack of trained medical personnel, deprived medical infrastructure, funds, and inadequate logistic facilities associated with vaccine storage and transportation.[56]

Nevertheless, various literature recognises that COVID-19 vaccination is the primary contributor to health protection in safeguarding human life during this pandemic.[57] Many factors discussed during this chapter pose significant challenges and

[55] CDC, "Global Health Protection and Security: International Health Regulations (IHR)," accessed March 03, 2022. https://www.cdc.gov/globalhealth/healthprotection/ghs/ihr/index.html.
[56] Elgar, et al., OECD, 3-10.
[57] CDC, "Benefits of Getting a COVID-19 Vaccine," accessed June 16, 2021. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/vaccine-benefits.html#:~:text=COVID%2019%2Dvaccines%20are%20effective,they%20do%20get%20COVID%2D19.

consequences for global COVID-19 vaccine uptake. Furthermore, it has become evident that ensuring effective vaccination globally in reaching the common good in protecting the population's health is by having affordable enough, safe vaccines for all. Accelerating the availability of COVID-19 vaccines can only be gained by eliminating manufacturing chain barriers to production. Hence, allowing unrestricted raw material convenience to enhance more availability and accessibility of vaccines globally.[58] The definitive way forward involves the need for all the mechanisms that contribute towards solidarity whilst establishing support and global partnership in the just allocation of vaccines' benefits worldwide.

[58] WHO, "Strategy to Achieve Global COVID-19 Vaccination by mid-2022," 9-11.

Conclusion

The author claims that the COVID-19 pandemic has emphasised global interconnectedness, vulnerability, and inequities. Rich countries have taken a nationalistic stance in protecting their own country first, thus lacking the foresight that the interdependences between nations create a collective health risk that cannot be managed independently. In fact, throughout this study, it has become evident that pre-existing inequalities between countries and populations within countries have been exacerbated. The pandemic has placed burdens on any country's resources and affected the most vulnerable significantly. This global progress requires that international health authorities, especially the WHO and the CDC (including regional groups such as the European and African sectors), be strengthened and given all the capacity required to lead and coordinate global responses towards disease outbreaks and other health threats.

The comparative methodology within this dissertation of the three chosen vaccine allocation strategies, the WHO, CDC, and the EU, has provided an insightful understanding of the priority setting and rationing of resources from different perspectives. In the ethical justifications of protecting the most vulnerable first, in addition, frontline workers in safeguarding healthcare systems and essential services. The lack of global vaccine allocation mechanisms and limited manufacturing capacity and health infrastructure systems concerning the worldwide demand for COVID-19 vaccines has contributed significantly to the delays and vaccine accessibility issues to LMICs.

Indeed, the underlined wide-range COVID-19 vaccine benefits go beyond protection from the disease, as any given population's health and quality of life are improved. Moreover, meeting health needs through vaccination programmes requires an established process for cohesive cooperation.

This study exposed why it is relevant to evaluate the ethical implications around COVID-19 vaccine allocation and distribution processes and that any decision-making undertaking has ultimately global consequences. Other than that, since international health protection begins at every national level; nations are to be able to support and guide each other in a coordinated approach to develop and strengthen their national public health systems for better vaccine accessibility and distribution, with more durable sustenance for universal support groups such as the COVAX and AVATT facilities.

This dissertation revealed and debated that the global response to the COVID-19 pandemic had exposed several flaws aligned to global vaccination: from vaccine trade barriers to international cooperation, from political nationalism versus global public health solidarity. Therefore, it is vital to strengthen global and regional infrastructures and innovative platforms for developing, producing, and distributing more vaccines, diagnostics, and therapies. Finally, the author concludes that to achieve this goal, trust, subsidiarity, and solidarity among nations are needed to enhance the ability to share international knowledge, technologies, and assistance to safeguard and protect humanity. Therefore, the significant result around the deployment, allocation, and distribution of vaccines and who deserves priority on a local and global level during this pandemic is a question of justice. The main aim is to address the importance of protecting the population’s health.

In conclusion, the present COVID-19 pandemic is unprecedented and has an ongoing devastating global consequence. Therefore, the entire world must come together to determine better preparedness and response in protecting public health; otherwise, we will not have learned any lessons, as it will not be the last pandemic to challenge the world.

Following is a list of recommendations on the significance of global cooperation to safeguard public health and beyond.

Recommendations

Findings from this dissertation provide encouraging evidence for global, local, and national prioritisation of vaccine allocation. However, the present pandemic is unprecedented in terms of uncharted territory and unclear future progression; thus, the global health crisis cannot be terminated unless comprehensive collaboration, determination, solidarity, and cooperative partnerships are set up.

i. Hence, a unified approach between governments, international health and trade organisations, global and national public health institutions, and non-governmental organisations to share reciprocally and develop systems that function between and within countries in reaching targeted vaccination rollouts, particularly to those marginalised communities and undeveloped countries without enough opportunities and logistics to meet their domestic demand for COVID-19 vaccines.

This recommendation is essential and can be encouraged through:

- Support and deliver all the required resources for the production, supply, and distribution of vaccines globally, such as trained personnel.

- Sharing of scientific data, knowledge, expertise and IPRs.
- Participation and recognition of the COVAX and the AVATT initiatives as permanent instruments for equitable vaccine allocation.
- Developing better agreed-upon platforms between companies to share methods in reducing GVCs barriers in vaccine manufacture, delivery, and provision of other adequate supplies, besides vaccines (such as needles, syringes, suitable storage facilities, and other medical goods) resulting in ideal supplies of necessary goods that eventually provide and create more efficiency and effectiveness in an equitable global vaccine allocation and administration.

ii. Several additional factors, such as the availability and production of vaccines for the actual global demand required, its deployment and distribution, epidemiological situation of the disease, and vaccine hesitancy, should be considered by individual countries to refine their vaccine allocation plans.

iii. The author strongly recommends the theory of justice for ethical decision-making, based on Norman Daniels` Accountability for Reasonableness, to aid and provide a structure for decision-making and international policy matters. This is essential to set up legitimate priorities for fairer decisions and provide the support were needed regarding the global supply, distribution, and allocation of COVID-19 vaccines.

iv. Therefore, vaccine doses should not remain idle or 'stockpiled'. Countries should not be allowed to hoard vaccine supplies, but an established mechanism should be in place that supports the effective allocation of COVID-19 vaccines, especially in helping LMICs.

v. Vaccination targets must be globally aligned and coordinated. Therefore, nations move together to achieve the most significant impact and response to a more just distribution of vaccines—an approach that requires strong commitment towards equity between countries and actions to fulfil that commitment.

vi. Strengthening the build-up of a global fund for support in times of pandemic to those struggling and undeveloped countries in allocating and distributing vaccines, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria,[1] which is ideally structured to acclaim this recommendation.

vii. Establish an agreement through an international treaty that utilises recommendations for sharing resources, goods, vaccines, public health knowledge, data, and genome sequencing to defend and prepare for future pandemics. Therefore, establishing a better earlier recognition declaration and containment systems, which then triggers a solidaristic organised response, with all the necessary support given to the affected population. This would also involve establishing rules and regulatory procedures for equitable vaccine allocation.

viii. Initiate global investments for governments to provide and improve public health systems and facilities that enable a better quality of life, increase life expectancy, and tackle communicable, contagious diseases more effectively and efficiently.

ix. Invest in international research and development in vaccinology and immunology.

[1] Steven Radelet, "The Global Fund to Fight AIDS, Tuberculosis and Malaria: Progress, Potential, and Challenges for the Future- Executive Summary," Center for Global Development (2004), accessed April 2, 2022. https://www.cgdev.org/sites/default/files/archive/doc/commentary/GFATMexecsum.pdf.

x. Invest and improve existing health systems within countries and enhance population education and support that increases citizen capabilities, and

xi. Re-evaluate the existing poorer country's health infrastructure and social services by supporting the improvement of better disease surveillance, enhancing communication through modern information technology, and increasing the healthcare professional workforce.

Limitations of this Study

i. A significant limitation of this study was mainly due to the complexity and the ongoing modifications surrounding the COVID-19 pandemic progression. In addition, various changes in health-related guidelines, updates and scientific evidence have affected vaccine strategic approaches and policies, which influenced the build-up of this dissertation.

ii. The author observed that most of the literature editorials available and utilized during the preliminary phase of the pandemic (i.e., those archived between 2019 to early 2021) seemed outdated to the present circumstances of 2022 for this dissertation. For example, while composing the recommendation section, the WHO published the latest "Strategy to Achieve Global COVID-19 vaccination by mid-2022".[2] These dynamic aspects influenced this study's critique and reflective processes, as quoted at the author's time and date of access. Hence, the continuous ongoing COVID-19 pandemic in ever-changing contexts, the content

[2] WHO, "Strategy to Achieve Global COVID-19 Vaccination by mid-2022," accessed December 19, 2021. https://cdn.who.int/media/docs/default-source/immunization/covid-19/strategy-to-achieve-global-covid-19-vaccination-by-mid-2022.pdf.

within this dissertation is to date at the time of access and submission to the supervisor.

iii. Also, to note that the subject of vaccines in a pandemic is very vast, and the main focus of this dissertation was on the just allocation and distribution of the COVID-19 vaccine and not on alternative ways of dealing with the pandemic and its economic effects.

iv. Finally, the author recognises her limitations whilst proposing recommendations since she has no control over such a global crisis and events, as the locus of power is at higher universal authorities such as the WHO, WTO, and the CDC. The dynamic of this pandemic has produced a massive amount of scientific, medical, and socio-economic data and information. Unfortunately, various data sources from news channels, online articles and bulletins had to be used.

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