

Preparing for the Next Pandemic: Exploring the Design of a New Pandemic Vaccine  
Facility (“PANVAX”) Through a Qualitative Study

by

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Thesis submitted in partial fulfillment of  
the requirements for the degree of  
Master of Science in the Duke Global Health Institute  
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ABSTRACT

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## Abstract

The global distribution of COVID-19 vaccines has been inequitable: around 8 in 10 people in high-income countries have had at least one dose, compared with just 1 in 10 in low-income countries. Similar global vaccine inequity was seen in past pandemics, such as the 2009 H1N1 pandemic. The COVID-19 Vaccine Global Access Facility (COVAX), launched by the Coalition for Epidemic Preparedness (CEPI), Gavi, the Vaccine Alliance (Gavi), and the World Health Organization (WHO), aimed to equitably distribute vaccines worldwide. COVAX was an unprecedented mechanism—the first attempt to create a pandemic vaccine buyers’ club for all nations of all income levels. COVAX can serve as a case study: by determining what challenges and successes it has had during COVID-19, we can determine what elements a future pandemic vaccine facility (which we can call “PANVAX”) may need to ensure equity in the next pandemic. In this qualitative study, 14 in-depth interviews were conducted across 4 different stakeholder groups to elicit expert opinions on COVAX and on the design of a future PANVAX. These four stakeholder groups were pharmaceutical company representatives, COVAX administrators, academics, and national governments. Key informants argued that the concept of COVAX was strong and COVAX succeeded in securing participation from pharmaceutical companies, but it suffered from many challenges, including vaccine supply shortages and delays, challenges in negotiating

with vaccine companies, internal governance challenges, and a lack of participation by high-income countries in the buyers' club. They also suggested that in a future pandemic vaccine facility, there needs to be upfront funding, investment into the entire vaccine development process, regional vaccine capacity building, and a 'day-job' for the facility when there is no pandemic to keep the facility running. Overall, this study found that COVAX was faced by challenges that were both of its own making and outside of its control. For future pandemics, there is a clear need for a facility that has sufficient upfront funding for purchasing and investing into all aspects of the vaccine process, and that has responsibilities outside of pandemic or emergency response. By focusing on regional vaccine self-sufficiency, several issues can be addressed both for pandemic response and public health benefits.

## **Dedication**

Thank you as well to my family and friends, for affording me the position to make this paper happen. To mom and dad, I can never thank you enough for everything you have done. I love you.

# Contents

Abstract .....	iv
Dedication .....	vi
List of Tables.....	viii
Acknowledgements.....	ix
1. Introduction.....	1
2. Methods.....	4
3. Results .....	9
3.1 KI Opinions on COVAX.....	9
3.1.1 COVAX Successes .....	10
3.1.2 COVAX Challenges and Failures .....	11
3.2 KI Opinions on Planning for the Next Pandemic.....	17
4. Discussion .....	23
5. Conclusion .....	29
Appendix A .....	30
References .....	32

## List of Tables

Table 1: Pseudonym codes assigned to key informants.....	9
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# 1. Introduction

During the COVID-19 pandemic there has been inequity in the global distribution of COVID-19 vaccines. Of the 10 billion doses that have been administered, around 70% have gone to high-income and upper middle-income countries (Ritchie et al, 2022). As of February 23, 2022, 80% of people in high-income countries had received at least one dose of COVID-vaccine compared to just 12% in low-income countries (Ritchie et al, 2022). This inequitable distribution is a common phenomenon in pandemics, as was seen in the distribution of H1N1 vaccines during the 2009 H1N1 pandemic, when rich countries secured large, advanced orders for vaccines from vaccine makers, leaving poorer nations behind (Fidler, 2010).

When the COVID-19 pandemic hit, the international community attempted to prevent this recurrent challenge of dose hoarding with the introduction of COVAX, a global joint procurement mechanism run by the World Health Organization (WHO), Gavi, the Vaccine Alliance (Gavi), and the Coalition for Epidemic Preparedness Innovations (CEPI). COVAX is an unprecedented, first of its kind buyers' club that intended to procure COVID-19 vaccines by securing agreements with vaccine manufactures and distributing these vaccines equitably to all participating countries. Countries participated in COVAX through one of two ways. First, high-income countries and upper middle-income countries participate as 'self-financing' countries. In this bracket, countries purchase doses through COVAX—they can buy enough doses to

cover 10-50% of the country's population. The more a country pays, the larger percentage of its population is covered by COVAX doses. The funds from self-financing countries are what COVAX used to secure agreements with vaccine manufacturers, support at risk manufacturing (production of doses even before trial results are known and subsidize the costs to buy doses for poorer nations. Second, through a separate mechanism, the COVAX Advanced Market Commitment (AMC), COVAX uses official development assistance (ODA) to buy doses for 92 lower-middle-income and low-income countries (the 'funded' countries). COVAX hoped that this first-of-its-kind buyers' club and international procurement and distribution mechanism could to some extent curb vaccine nationalism, or at minimum ensure some form of equity by distributing doses to low- and middle-income countries.

A future pandemic is an inevitability (Dodds, 2019). As such, there is a need to understand the reasons why this inequitable vaccine distribution continues in each pandemic, in order to properly plan for future ones. COVAX serves as a case study for these challenges. By analyzing the successes and challenges COVAX has faced throughout the COVID-19 pandemic, we can determine what elements may be needed for future solutions to ensure equity in vaccine distribution during pandemics.

As it currently stands, academic discourse around COVAX has been based on policy research into the economic and political aspects of COVAX (Gleckman, 2021; Stein, 2021). There has been some qualitative analysis on COVAX conducted, for

example by Felix Stein (Stein, 2021). However, Stein's study focused on the financial logistics of COVAX. Our new looks more broadly at COVAX to allow discussion of topics such as politics, internal governance structure, and manufacturing challenges, to name a few. Moreover, most discourse to date has been focused on how to rectify the challenges currently faced in controlling the COVID-19 pandemic, while little research looks at how to prepare for future pandemics.

This study aimed to understand the successes and challenges of COVAX and the implications that these challenges have for the design of any future pandemic financing facility. Our research has two objectives. First, to determine what are KIs' opinions on COVAX and COVID-19 vaccine distribution. In this objective, KI's responses relate to what COVAX had already done that was successful, and what internal or external factors outside of COVAX's control were associated with under-performance. Second, to determine KIs' opinions on what needs and could be done to prepare for the next pandemic. While the first objective relates to COVAX's past, the second objective discusses theories for PANVAX's future based on the lessons learned from COVAX.

## 2. Methods

We conducted a qualitative study to understand key informant (KI) opinions on COVAX, and their views on how a future pandemic vaccine finance facility might be configured. Four stakeholder groups were identified as the primary groups of interest for our study: pharmaceutical companies; COVAX administrators; academics; and national governments. KIs in the pharmaceutical company category were all high-ranking members of companies currently working with COVAX, or experts in pharmaceutical manufacturing with other global health experience. KIs in the COVAX administrator category were high ranking members of CEPI and Gavi, directly involved in COVAX operations. KIs in the academic category were researchers who had either written extensively on COVAX or were leaders in global health research. Some examples of positions held by these academics include executive directors of research centers, and directors of university global health departments. For national governments, to best represent the diversity of countries, the research team aimed to have a minimum of one representative from each WHO region. National government KIs were selected if they were directly involved in their nation's COVID-19 vaccine response, or if they held an international position, such as regional public health bodies, WHO regional offices, or other regional entities. In total, we conducted 14 interviews: three pharmaceutical company representatives, four COVAX administrators, four academics, and three national government representatives.

KIs were selected using a combination of purposive and snowball sampling. For purposive sampling, a list of experts known by the Center for Policy Impact in Global Health was generated. Following outreach to experts on the list, there was a lack of response from national government candidates interested in participating. As such, we conducted research to determine other potential national government KIs. We researched the main actors involved in the COVID-19 response in different regions at the national or international level, with a focus on those working in high-ranking positions in regional bodies. We focused on experts from regional bodies as such KIs could provide wider views on whole regions rather than only one nation. For snowball sampling, after each interview, KIs were also asked to identify other individuals they believed we should interview. In total, eight KIs were recruited via purposive sampling (3 pharmaceutical representatives, 2 COVAX administrators, 1 academic, and 2 national government), and six via snowball sampling (2 COVAX administrators, 3 academics, and 1 national governments). KIs were included based on the research team's judgment that the KI qualified as an expert in their field, and in their designated stakeholder group. Sample size was set at 15-20 based on feasibility (i.e., how many interviews could be feasibly conducted for an MSc thesis project) and the likelihood of achieving theoretical saturation (Guest et al, 2006).

All potential participants were contacted with the same template recruitment email. Some KIs asked clarifying questions on the study before agreeing to take part,

and the questions in the semi-structured interview guide were provided to KIs who asked for them ahead of the interview. The interview guide is shown in Appendix A. Consent forms were sent to KIs once a meeting had been scheduled, which included their willingness to participate, and to have the meeting recorded. One KI requested that the interview not be recorded, and detailed hand-written notes were taken during the interview to include them in the analysis. All interviews were conducted over Zoom and used Zoom's recording software. All interviews were conducted by Ronan Murphy. Interviews lasted from 25 minutes to 1 hour and 20 minutes depending on the availability of the KI, with an average of 45 minutes per interview. All interviews were conducted in English, with all KIs being fluent. No incentives were provided to KIs.

Interviews were individual, in-depth interviews using a semi-structured interview guide. The guide had five open ended questions with probes for specific questions. The guide was developed through discussions within the research team with members bringing in their experience from conducting similar in-depth interviews and their knowledge of COVAX. At the interviewer's discretion, additional questions were added based on the KIs' answers and their area of expertise. The interview guide underwent minor changes throughout data collection, mostly to correct wording around specific questions to remove any potential bias by the research team.

Interviews were transcribed using either Microsoft Word's dictation software or Zoom's transcription software, and then verified by listening to the recording and editing the transcripts.

Qualitative analysis began with extensive reading of the transcripts. The codebook was developed using both deductive and inductive methods by the author in consultation with a qualitative methods consultant at the Duke Global Health Institute (Raun & Clarke, 2006; Guest et al, 2012). Specifically, structural codes based on the interview guide's questions were first created, then additional codes were added based on patterns and emergent themes identified through reading of the transcripts and initial coding. As additional codes were created during coding, the author returned to previously coded transcripts to check for any applications of the new code. Once all transcripts had been coded, content reports and data reduction tables were generated by code and the author looked at the range of responses for any patterns. As we identified larger themes between codes, we grouped associated codes under the new parent theme and looked at the range of responses for any similarities or differences between KIs. Extensive memo writing was also used to help synthesize emerging themes, flesh out commonalities, and identify the main results. All coding was conducted in NVivo 12 by the author (QSR International Pty Ltd. [2020] NVivo, released in March 2020), <https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home>).



All funding was provided by the Duke Global Health Institute. This author reports no conflict of interest. The study was approved by Duke's Institutional Review Board in 2021.

### 3. Results

For our analysis, 14 KIs were included: four COVAX administrators, three pharmaceutical industry representatives, three national governments (representing governments of North America, Latin America, and Sub-Saharan Africa), and four academics. Table 1 shows the pseudonym codes for each KI.

**Table 1. Pseudonym codes assigned to key informants**

Stakeholder Group	Pseudonym Code
COVAX Administrators	101, 102, 103, 104
Pharmaceutical Representatives	201, 202, 203
National Governments	301, 302, 303
Academics	401, 402, 403, 404

#### **3.1 KI Opinions on COVAX**

KIs were asked questions about the role COVAX has played in equitable vaccine distribution, the obstacles they believed hindered COVAX's ability to reach its 2 billion doses by the end of 2021 target, and about the incentive structure put in place for high income countries and pharmaceutical companies to encourage their participation in COVAX. KI responses were organized into COVAX successes, and COVAX challenges and failures.

### **3.1.1 COVAX Successes**

KIs discussed COVAXs successes primarily in response to the first question about COVAX's role in global equity, and in response to the third question about incentives for pharmaceutical companies. Some KIs were directly asked about COVAX successes as a probe to the first question if they did not mention any successes in their initial response. Successes reported by KIs in order of frequency were COVAX's strong concept, securing pharmaceutical cooperation, and the funds COVAX was able to raise during COVID-19. The two highest frequency themes are further discussed here.

#### **Strong concept: COVAX had a strong rationale and concept of equitable vaccine distribution that was "what the world needs"**

Almost every KI believed that COVAX highlighted a need for global equity that had never been seen before in previous pandemics.

*"I think what COVAX has been able to achieve is to highlight this need for a global equity in a way that I don't think has ever been done before in certainly previous pandemics...and I think COVAX established despite many of the flaws or criticisms that I think are emerging, I think that a need for a global originated response that takes equity into a central role and into account" (KI 202, pharmaceutical representative)*

COVAX presented the world with a mechanism that prioritized equity and gave the world a goal to aspire to in pandemic response. Moreover, KIs also noted that it had a strong structural conception to achieve this goal, especially by providing a global solution that included all countries including high income countries.

*“We said having high income countries, upper middle-income countries at the table was the only real shot we had equity because if they weren’t at the table they were going to go off and do their own thing COVAX would be a competitor and not you know something that they were invested in helping succeed” (KI 101, COVAX administrator)*

### **Securing pharmaceutical cooperation: Success of the no-fault compensation program in securing pharmaceutical cooperation**

The other most commented success of COVAX was its addition of the no-fault compensation program. This program provides lump sum compensation to individuals who suffer from adverse reactions to their COVID-19 vaccines and protects pharmaceutical companies from any legal charges. As one COVAX administrator reported (KI 101), *“putting in liability coverage through the no-fault compensation scheme was big for pharmaceutical companies and for developing countries,”* allowing COVAX to strike deals with pharmaceutical companies. As one of the pharmaceutical reps explained (KI 202), *“one of the stumbling blocks for manufacturers in COVAX was the potential for a no-fault compensation. It was a block for all manufacturers.”* The four KIs who mentioned the benefits of the no-fault compensation program were two COVAX administrators and two pharmaceutical representatives.

### **3.1.2 COVAX Challenges and Failures**

KIs discussed the challenges and failures of COVAX in response to all questions. Most of this discussion came in response to the first three questions that directly addressed COVAX. Many KIs also discussed the challenges and failures of COVAX in

response to the latter two questions that asked about PANVAX and future pandemic challenges, as many KIs noted that any future facility would likely face the same obstacles the COVAX has dealt with during COVID-19. KIs reported challenges and failures of COVAX include supply shortages and delays, negotiation challenges, internal governance challenges, a lack of participation by high income countries, a lack of consideration by COVAX for middle-income countries, and the silver bullet fallacy of COVAX.

The lack of consideration for middle-income countries refers to nations who straddle the bounds of self-financing countries in their economic profile and funded countries in need for COVAX secured doses. These countries were not large enough to properly secure their own bi-lateral deals, were reliant on COVAX for doses, but were given the same priority as low-income countries even if there was an inequitable burden of COVID-19 between these countries. These responses also highlighted a few KIs criticism of COVAX's allocation system. The silver bullet fallacy refers to COVAX being considered as the ultimate solution for all lower- and middle-income countries' vaccine supply. As such, many nations did not seek alternative methods for securing supply believing COVAX was all that was needed. These latter two themes were only discussed by one or two KIs and will not be further elaborated on.

**Supply shortages and delays: Lack of supply due to bi-lateral deals and delivery delays from pharmaceutical companies**

KIs said that COVAX faced several factors outside of its control that limited its access to vaccine supply. By far the most common of these external causes, according to the majority of KIs, was bi-lateral agreements between rich nations and vaccine manufacturers, which led to vaccine nationalism. Vaccine nationalism refers to the monopolization of the vaccine market by national governments, in particular high-income countries, through bi-lateral deals with pharmaceutical companies. These bi-lateral deals left COVAX scrambling to sign deals for whatever doses remained and left it in the back of the line for delivery. For example,

*“we didn't end up where we wanted in the queue, and then once in, we got cut in the queue” (KI 101, COVAX administrator).*

In this quotation, the COVAX administrator touches on another idea commonly mentioned by KIs, which was how bi-lateral deals were given higher delivery priority than COVAX by pharmaceutical companies. These KIs explained that when pharmaceutical companies faced delays in meeting contracts for doses, they would delay the supply to COVAX to maintain consistent supply to rich countries that had secured bi-lateral deals. For example:

*“it's pretty hard to prove this, but, essentially we don't think manufacturers are prioritizing COVAX” (KI 103, COVAX administrator)*

Moreover, the main supply chains that COVAX came to rely on faced unexpected challenges and political constraints during the pandemic. For example, KIs explained that COVAX had expected a large delivery of vaccine doses from the Serum

Institute of India. However, when India experienced a huge wave of cases and deaths, doses that were initially meant for COVAX were redirected for domestic use. KIs reported that AstraZeneca had also faced challenges in maintaining a stable supply of vaccines to COVAX.

**Negotiation challenges: Limited ability to negotiate and close deals with pharmaceutical companies due to a lack of upfront funding and internal bureaucracy**

According to several KIs, COVAX's struggle in signing deals extended beyond bi-lateral agreements to the organization's ability to negotiate. First, COVAX lacked the up-front funding that would have allowed it to negotiate 'at risk'. 'At risk' refers to the high risk involved in investing in pharmaceutical candidates that can fail in clinical trials.

*"we didn't have the money with to allow us to invest with no concern of potential risk"  
(KI 102, COVAX administrator)*

Instead, COVAX had to be timid in its negotiation and had to exclude candidates that were riskier and cost more, such as the Pfizer vaccine, as it was buying doses on pledged finances from donors that it did not have yet. Second, by nature of its position as an international organization, deals took longer to strike as negotiators had to continuously report back to the COVAX governing board.

*"COVAX was the last in the queue for vaccines not because of late conversations with manufacturers, but because of the limited flexibility in how they could negotiate...they had to keep going back to the board" (KI 203, pharmaceutical representative)*

In comparison, national governments could sign deals faster and with a greater acceptance of potential 'risk' in the product. This disparity in the purchasing power of COVAX versus rich country governments was the most frequent responses when KIs were asked about the barriers and obstacles that COVAX has faced.

**Internal governance challenges: COVAX is an unofficial structure without an official division of labor, and with member bodies that lack experience in emergency response**

KIs explained that COVAX is not a legal entity with a strict delineation of responsibilities between its partner agencies. Rather, it is a 'handshake' agreement between the WHO, CEPI, Gavi, and UNICEF. While responsibilities have been distributed between each of these groups depending on their specialty, there has been overlap that has caused internal obstacles to COVAX's operation. According to some KI interviews, the lack of role clarity seems to have made COVAX slow in its operations and unable to quickly react while having to work through the bureaucracy of all 4 organizations. Moreover, according to KI 102, a COVAX administrator, *"if it was a formal agreement, it would have solved some of COVAX's issues"*. While KI 102 was the only one to mention this, as a COVAX administrator, they have an insider's view on COVAX's operations and the effect its unofficial stance has on its operations.

Moreover, several KIs noted that the main governing organization in COVAX, Gavi, does not have experience with emergency response or with dealing with fully self-



financing rich countries. Several COVAX administrators noted that Gavi was not set up as an emergency response mechanism; instead, with its mandate focused on expanding access to vaccines in low- and middle-income countries, it may not have been appropriately staffed with the expertise for pandemic response.

*“it’s also been in a little bit like fitting a square peg in a round hole. GAVI is at its core a development focused public health institution, it’s not a emergency response focused institution...it’s just not you know, in its DNA, set up to do that kind of thing super well” (KI 101, COVAX administrator)*

**Lack of participation from high income countries: high income countries were not appropriately incentivized to participate in COVAX, and their motivations were misunderstood by COVAX**

As noted above, when high-income countries secured bi-lateral deals for large numbers of doses, this pushed COVAX to the back of the queue. Most KIs said that such bilateral deals were an inevitability. Moreover, several believed that it was not possible to stop HICs from securing bi-lateral deals.

*“High income countries will always do bilateral procurements, I don’t think there was a way out of that, particularly because of substantial chunk of the R&D [research and development] investment is coming from bilateral agencies investments and so on so that will always be tied back.” (KI 202, pharmaceutical representative)*

As such, most KIs argued that COVAX did not offer high income countries the right incentives to also purchase vaccine doses through the COVAX facility. To an extent, COVAX recognized this as it marketed participation in COVAX to high income countries as an insurance mechanism to invest in other vaccine candidates in case those from bi-lateral deals failed. However, not only did the initial investments by high

income countries prove successful (e.g. HICs invested in buying doses of the Pfizer and Moderna vaccines), but an element that COVAX may not have initially considered, which several COVAX administrators mentioned, is that high income countries were unlikely to provide significant funding to an organization that would compete with them in the vaccine market.

*“as the rich countries haven’t put enough money into COVAX to enable us to compete with them on these bilateral deals” (KI 102, a COVAX administrator)*

As such, high-income countries did not join COVAX out of the expectation of receiving doses, rather as a mechanism for donating excess vaccines, or showing global goodwill once their own populations were cared for. Moreover, because they did not need an insurance mechanism, they were not incentivized to fund an organization that would compete with them for global supply of vaccines.

### **3.1 KI Opinions on planning for the next pandemic**

KIs discussed their opinions for future pandemic planning in response to all questions. The majority of this discussion was in response to the last two questions which asked them how they would set up a PANVAX based on the lessons from COVAX, and what future challenges PANVAX would face. KIs also discussed future planning in response to the first three questions about COVAX as they often noted what should have been done differently during the COVID-19 pandemic and how that should influence future pandemic responses. Key themes identified by KIs include the upfront

funding, investment into the entire vaccine process, regional vaccine capacity building, a facility that has a 'day-job', and if PANVAX should be a new facility or a future evolution of COVAX. This latter theme was only mentioned by one KI and will not be further elaborated on.

**Upfront funding: The need for a pre-arranged funding pool, potentially through a treaty**

As was noted by KIs in their reflections on the successes and failures of COVAX, a major obstacle was not having sufficient and pre-arranged funds that allowed COVAX to engage early and 'at risk' in the vaccine market. As such, many of the same KIs and others emphasized the importance of having pandemic vaccine financing available for global vaccination ahead of any future pandemic.

*“the whole issue about funding of COVAX is another lesson for us that we really need to make sure that PANVAX or what whichever new facility we develop actually has all the funding, because you don't create a facility that you expect to run with a certain you know number of billions of 22 billion, or 30 something billion dollars and only managed to raise 10 to \$12 billion and it's still expected to function that way you created it” (KI 302, national government representative)*

While no KIs had strong recommendations for how to secure this funding, many talked about the potential for a vaccine treaty or agreement to secure this funding and create global agreements on other measures such as equitable allocation. However, while some were optimistic about the possibility of a treaty, most believed that it will not succeed, either because of a lack of international consensus, especially from high

income countries, or because of such a treaty failing to work in a future pandemic. An example often cited was that of the WHO's Pandemic Influenza Preparedness Framework, which was limited to influenza and ignored entirely in the response to COVID-19 (World Health Organization, 2005). One national government representative who was involved in the formation of this framework noted that high income countries blocked middle- and low-income country advocates from expanding the framework to cover all pandemics. Similar concerns were echoed with strong speculation that countries such as the United States and Germany would block the potential for any treaty.

*“countries pushed a lot to have the same rules apply to all the pandemics but the developed countries never agreed with that, so we couldn't reach a consensus, so the irony is that if [high income countries] had faith in the influenza pandemic we would be better prepared when we were facing the COVID-19 pandemic.” (KI 303, national government representative)*

**Investment into the entire vaccine process: The need for investment into the entire vaccine development and deployment process from R&D to regulatory processes**

KIs frequently discussed the importance of investment in the entire vaccine development and deployment process to make it more efficient for the next pandemic. This would include investing in the end-to-end coverage of vaccine production from research and development, to manufacturing, to distribution and supply-chain, and even regulatory mechanisms. KIs discussed the importance of investing in the whole process as each has its own challenges that became apparent during COVID-19 and will

persist in future pandemics. One particular emphasis was on the investment into vaccine research and development, as manufacturers outside of the pandemic context have little incentive to invest in vaccine research because of the associated financial and opportunity costs.

*“what is very attractive are push incentives where you have a government or philanthropy or a multilateral entity put money into the R&D so that the company is not having to invest its own as much of its own capital” (KI 202, a pharmaceutical representative)*

Some KIs highlighted the potential benefits that operations such as CEPI’s investment into researching vaccines for the 25 viral families through an AMC mechanism could have in encouraging this investment. Others noted that this model has not been as effective in the past as was hoped, highlighting the pneumococcal AMC that Gavi had previously implemented in the hope of bringing new manufacturers into the market--this AMC only added two or three candidates in a 12-year span.

### **Regional vaccine capacity building: the importance and potential benefits of regional capacity building and vaccine self-sufficiency**

Several KIs discussed the importance of building regional vaccine self-sufficiency for pandemic responses. Rather than a single international entity for vaccine distribution, both pharmaceutical representatives discussed the benefits of smaller regional buyers’ groups. KI 202 highlighted that these smaller buyers’ groups would offer increased flexibility and choice in which vaccine candidates were invested in, and

that “*regional blocks are still much closer to regional realities and political contexts*”, which play a large role in pandemic response. KI 203 also noted that “*manufacturers are not as willing to participate in pooled buying, with the exception being for lower- and middle-income countries*”. Regional buyers’ groups could provide flexibility and choices to low- and middle-income countries while removing some of the bureaucracy of negotiating through a large single international body. KI 102 also noted that a potential solution to COVAX’s vaccine supply issue would be increasing “*local capacity development in more places*”. KI 101 disagreed, saying that the “*global answer is still the right answer*” but they did not provide any specific points in favor of it against a regional body approach.

### **Having a ‘day-job’: The need for a ready to go facility with ‘peacetime’ operations outside of pandemics**

Several KIs emphasized the importance of having a future pandemic facility be operational and active prior to the next pandemic event. They noted that not only is there evidence that when institutions are set up for emergency response and are not used in the interim, it results in the failure of the institution in the event it was designed for. Moreover, for a future pandemic facility to be effective, it would need to have ‘peacetime’ operations, or tasks and objectives beyond emergency pandemic responses, that would allow for consistent financing for the facility. As discussed by KI 202. A pharmaceutical representative:

*“there absolutely must be another focus on ongoing public health threats because if you don’t have that motivation or that ongoing use of the facilities ideally for something beyond Covid then the sustainability becomes a real problem.”*

Several KIs noted that there could be several functions of this facility as its ‘day-to-day’ job that would help resolve some of the challenges in the vaccine process that have been seen during COVID-19. The functions recommended included technology transfer to low- and middle-income countries for regional manufacturing capacity building, vaccine research and development financing, and standardizing regulatory mechanisms and supply-chains.

Another benefit of a potential ready to go facility is that it could focus on other public health benefits. These could include strengthening the vaccine process in low- and middle-income countries for pandemic responses along with the manufacturing of childhood immunizations or strengthening supply-chain mechanisms of manufacturing components for both vaccines and other medical countermeasures. This ‘spillover’ benefit into other public health benefits would also provide additional funding opportunities and incentives.

## 4. Discussion

This qualitative study found that the COVAX facility was subject to challenges that were both of its own making and outside of its control. KIs argued that the facility was founded on a solid concept of international collaboration to ensure equity and that it created strong systems that can be implemented in future pandemic responses, such as a system of no-fault compensation. That said, bi-lateral agreements between rich nations and vaccine manufacturers and unforeseen supply-chain delays limited the facility's ability to play a major role in vaccine distribution in 2021 and into 2022. COVAX's ability to quickly close deals were affected by its nature as a multilateral organization, and by its relative lack of funds compared with those of rich nations. Its failure to mobilize funding meant that it was incapable of aggressively acting in the vaccine market to quickly procure vaccines and negotiate 'at risk'.

Our study also found that the COVAX facility's informal governance structure and the lack of experience by its governing bodies in emergency response caused redundancies and overlap, which impeded COVAX in responding to a global crisis. Finally, high income countries did not "play ball" and buy into the global buyers' club. COVAX acknowledged that bi-lateral deals were an inevitability and could not be stopped. The facility hoped that marketing COVAX to rich nations as an insurance mechanism would provide enough of an incentive to attract these nations as self-



funding COVAX members who would buy doses from the facility. This incentive was clearly not big enough to bring rich nations on board.

To prepare for the next pandemic, there is a clear need for a pre-agreed global vaccine production and allocation mechanism, a “PANVAX,” that has sufficient and flexible funding to allow the facility to be a strong competitor in purchasing vaccine doses in the vaccine market. Moreover, procurement cannot be the sole focus of a future facility; rather, investment must go into all aspects of the vaccine process as each has its own challenges that need to be addressed. A future facility also needs to have an active role outside of pandemic events to ensure it is ready to engage in the next pandemic and does not have to be launched from scratch. One way to prevent vaccine inequity in a future pandemic would be to invest now in regional vaccine capacity building.

The common discourse on COVAX is that it has been at fault for its current situation (Goldhill, 2021; Usher 2021). However, our study has shown that while some challenges it faced were of its own making, several other were outside of its control as inevitabilities of the pandemic response. The problems that COVAX faced of insufficient supply and of bi-lateral deals between rich nations and vaccine companies have been widely reported throughout the pandemic (Eccleston-Turner, 2021; Bollyky, 2020), but our study also found that pharmaceutical companies gave COVAX a lower priority than HICs when it came to fulfilling orders and actively dropped COVAX down the queue when the companies were managing supply delays.

In dealing with HICs, COVAX hoped that acting as an insurance mechanism in tangent with bilateral agreements would be sufficient incentive for HICs to participate and fund COVAX. As our KIs noted, this clearly did not happen. In looking to the next pandemic, and understanding the inevitability of bilateral agreements, a future finance facility needs to either provide better incentives for HICs, so their participation is more than cosmetic, or needs to exclude HICs from the buyer's club and find other financing methods. In the first option, this could be done by improving the global buyers' club to provide incentives that bi-lateral agreements do not offer. For example, one incentive would be to offer HICs a lower vaccine price than they would be getting from bilateral deals (with COVAX, HICs were paying the same price as the price they got through bi-lateral agreements). Other possible incentives for joining a "buyers' club" could be the guarantee of getting vaccines earlier and faster than purchasing them directly from companies as ideally this buyers' club will have already made procurement agreements with pharmaceutical companies. Another alternative model for a PANVAX would be for HICs to be excluded, with regional buyers' clubs and regional capacity building as the primary focus. This iteration of PANVAX would focus on making regional buyer's clubs as competitive as possible by pooling purchasing power and building local capacity to deal with supply constraints.

Many KIs discussed the importance of the no fault compensation clause, which highlights the importance of having such a clause pro-actively set up in the next

pandemic. While it was not explicitly mentioned, based on the effort and time that developing the no fault compensation reportedly took, it seems like it could have also been a reason for COVAX's delayed agreement with pharmaceutical companies. If this was indeed a reason, it emphasizes the importance of having pre-arranged agreements in place prior to future pandemics to cut out "red tape" and accelerate vaccine distribution.

Regional capacity building as a focus of a future pandemic facility is the most promising idea based on KI responses. It would allow for investment in the entire vaccine process and can provide public health benefits that extend beyond pandemic settings if the capacity is used to make non-pandemic vaccines or other medicines. By providing other public health benefits, this can offer financial sustainability, as political will to fund an emergency institution may diminishes over time. Moreover, other development programs working on these spillover health benefits, such as childhood immunization campaigns, may fund PANVAX in tandem because of a nexus of objectives. Current regional bodies have come to similar conclusions, with several KIs highlighting the work the African Union is currently undertaking to build regional capacity (Nweneka, 2022). How a pandemic vaccine facility fits in with regional capacity building is a key question. COVAX is potentially well placed to use the connections it has built to facilitate relationships between pharmaceutical companies and regional bodies. Moreover, COVAX has done the groundwork on many of the legal agreements

that would have to be negotiated in these public-private partnerships, like no fault compensation. CEPI's current initiative to fund research on the 25 viral families also provides an avenue for ensuring industry participation in regional capacity building. CEPI could add obligations to any funding it provides for research into these viral families that include participation in tech transfer or guidance for regional capacity building. The exact structure and financing for such a mechanism is unclear, and requires future research, but a regional approach offers exciting opportunities.

There are several strengths of this study. First, while there has been qualitative research into COVAX this is the first that asked KIs about future pandemic mechanisms. Second, this study was conducted as the pandemic was unfolding, so KIs were providing 'in real time' perspectives. Third, there was a strong variety of informants both across and within stakeholder groups. As such our analysis reflects a wide range of opinions and expertise.

There are three important limitations to this study. Data collection and qualitative analysis was all conducted by a single author, which provides a potential source of bias. The author attempted to mitigate this potential bias by creating the codebook with both deductive and inductive codes that were as close to the data as possible. Major results were also reported if there was at minimum four KIs discussing a code, with exceptions made for stand-alone KI comments that brought exceptional information (in this case, a single KI's views were sufficient to create a code). Moreover,

only three national government KIs were recruited, leaving out Europe and Asia most notably. This limits the strength of analysis about how these regions view COVAX and future responses. The smaller sample size limited comparison across groups and as recruitment was stopped due to timing constraints, we likely did not reach thematic saturation across or within stakeholder groups.

More research is needed to analyse potential funding mechanisms or channels for a future facility. Moreover, a game theory analysis on how a facility could be structured to provide the best pay offs for all players is needed to provide more insight into the best structure.

## 5. Conclusion

This qualitative analysis has shown that some of the challenges COVAX has faced, such as its informal governance structure, were probably unique to the facility, given that no similar facility had ever been launched before. Other challenges, such as lack of supply due to bilateral agreements, are ones that any future pandemic finance facility would likely face in a future pandemic. It has also highlighted the potential importance of regional vaccine self-sufficiency in combatting the next pandemic. KIs argued that any proposal or initiative aimed at improving vaccine equity in a pandemic must recognize the fact that high-income countries will flex their market power to buy large volumes of doses as quickly as possible. To address such hoarding, a new initiative could either work to properly incentivize rich nations to participate in a global buyers' club or create a buyer's club that can buy doses for less wealthy nations and effectively compete against rich nations.

This study serves as a launching point in understanding what questions a future facility must address to ensure an equitable distribution of vaccines globally in a pandemic. Future research is needed to determine an effective financing mechanism and a governance structure for such a facility. If the international community does not address both the challenges that were unique to COVAX, and those that are inherent in any pandemic response, then it is destined to repeat the same cycle in the next pandemic, which will cost lives and prolong the crisis.

# Appendix A: Interview Guide

*Semi-Structured Interview Guide*  
*May 15, 2021*

## **Introduction to the project**

“The goal of this study is to design an international pandemic vaccine finance facility (“PANVAX”) that would be ready to fund vaccine development and global deployment in any future pandemic. The design would be based in part from learning lessons from the COVAX (COVID-19 Vaccines Global Access) Facility, a pooled financing mechanism that is funding the delivery of COVID-19 vaccines to low- and middle-income nations. By examining what worked and what failed in the design, launch, and operation of COVAX, we aim to design a new pandemic vaccine finance facility that avoids some of the pitfalls that COVAX faced.

Our pilot project has three aims:

1. Identify the challenges COVAX currently faces
2. Determine expert opinions on the viability of reforms to COVAX, and to a potential PANVAX.
3. Recommend how COVAX can structurally evolve into PANVAX for a future pandemic vaccine response.

We would like to interview you to get your perspective on COVAX and COVID-19 vaccine distribution. No identifiable information about you will be included in our analysis or study report. Before we begin, do you have any questions about the project?”

## **Semi-structured questionnaire**

1. What are your thoughts about the role COVAX has played in ensuring global equity in COVID-19 vaccine distribution?
  - a. Probe: In what ways do you think COVAX has succeeded?
  - b. Probe: In what ways has COVAX under-performed?
2. To date, COVAX has not been able to deliver the number of doses it had hoped to deliver. What do you think are the biggest obstacles that got in the way?
  - a. Probe: why did these obstacles occur?
  - b. Probe: Could these obstacles have been avoided? How?

3. What are your thoughts about the incentive that COVAX put in place to encourage rich nations to buy doses through the COVAX facility? [If the interviewee asks for more details: COVAX had hoped that rich nations, also known as self-funded nations, would buy doses through the facility. COVAX believed these nations would be incentivized to do so as an insurance mechanism, in case their bilateral deals failed. But rich nations ended up buying doses outside COVAX].
4. If you were designing a future pandemic finance facility for vaccines (a PANVAX), what would you say are the key lessons from COVAX?
  - a. Probe: ask about the incentives that they think would be needed to get rich nations to participate
  - b. Probe: how feasible is it to address these lessons with the recommendations they have suggested.
5. What do you think PANVAX's greatest challenges would be?
6. Who else do you recommend that we interview?



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