

Ulep, Valerie Gilbert

**Working Paper**

## Strengthening health systems to address inequities in COVID-19 vaccine access in the Asia-Pacific region

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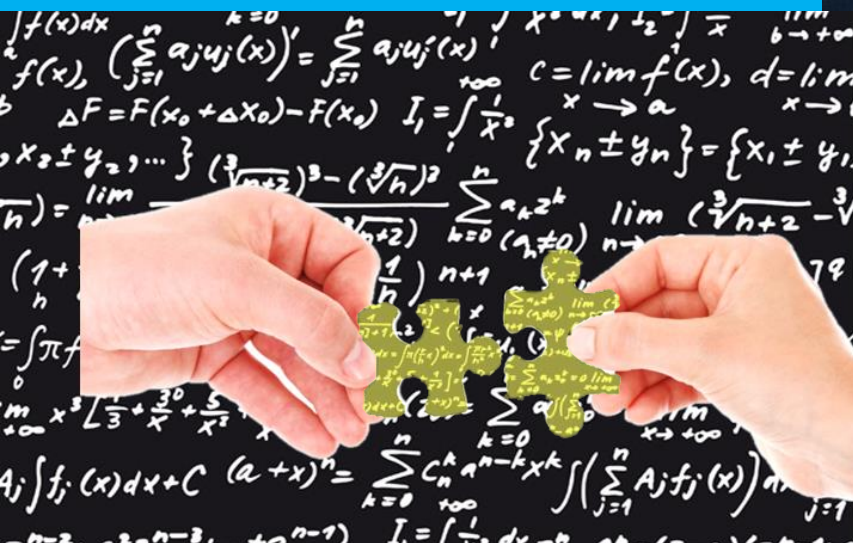
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*Special Series on Trade and Health*

## Strengthening Health Systems to Address Inequities in COVID- 19 Vaccine Access in the Asia- Pacific Region



**Valerie Gilbert Ulep**

ASIA-PACIFIC RESEARCH AND TRAINING NETWORK ON TRADE

# Working Paper

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ASIA-PACIFIC RESEARCH AND TRAINING NETWORK ON TRADE

# WORKING PAPER

## **Strengthening Health Systems to Address Inequities in COVID-19 Vaccine Access in the Asia-Pacific Region**

Valerie Gilbert Ulep<sup>1</sup>

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## **Abstract**

The economic and health recovery of countries in the Asia-Pacific region from the pandemic is hinged on the rapid and equitable deployment of safe and effective COVID-19 vaccines. However, in the initial years of the COVID-19 vaccine roll-out, highly unequal distribution of vaccines occurred across and within countries. Even though the tight global supply was indeed an issue, health system challenges, particularly in terms of financing, service delivery, human resources, regulatory capacity and governance, played an important role in the inequitable deployment of vaccines. Recommendations given in this paper revolve around the importance of strengthening the health system to enable the equitable allocation and distribution of COVID-19 vaccines.

**Keywords:** COVID-19, vaccines, health systems, inequities, Asia-Pacific

**JEL Codes:** I14, I18

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# 1. Introduction

The Asia-Pacific region has been severely affected by the COVID-19 pandemic. The economic and health recovery from the pandemic of countries in the region hinges on the rapid and equitable deployment of safe and effective COVID-19 vaccines. At present, 60 per cent of the population in the region has been fully vaccinated, and there is a large variation across and within countries. As of March 2022, vaccination coverage in high-income countries in the region was 80 per cent compared to 10 per cent in low-income countries. As of March 2022, booster shots are being administered in some countries, while poorer countries have yet to achieve their coverage targets for the primary series. For example, Singapore and the Republic of Korea have already vaccinated 68 per cent and 62 per cent of their population, respectively.

Equitable distribution of COVID-19 vaccines means that all countries should have access regardless of economic development (WHO, 2020). Vaccine inequity is a serious threat to public health and to the global economy. Allowing the populations of certain countries to remain unprotected increases the risk of continuous viral transmission and mutation, leading to a patchy economic recovery (Asundi, O'Leary and Bhadelia, 2021). The problem of accessing life-saving vaccines and drugs in developing countries has been observed in previous public health emergencies and epidemics (e.g. influenza outbreaks in 2004 and 2009) (Fidler, 2010). With the COVID-19 pandemic, there has been a concerted effort to address the problem through the creation of the COVID-19 Vaccine Global Access (COVAX) facility (WHO, 2020; Emanuel and others, 2021). Despite this effort, vaccine inequity remains a challenge in many countries the region (Stein, 2021). In general, poor subnational states and disadvantaged populations have lower vaccination coverage (Thankur and others, 2020; Marmot and others, 2020).

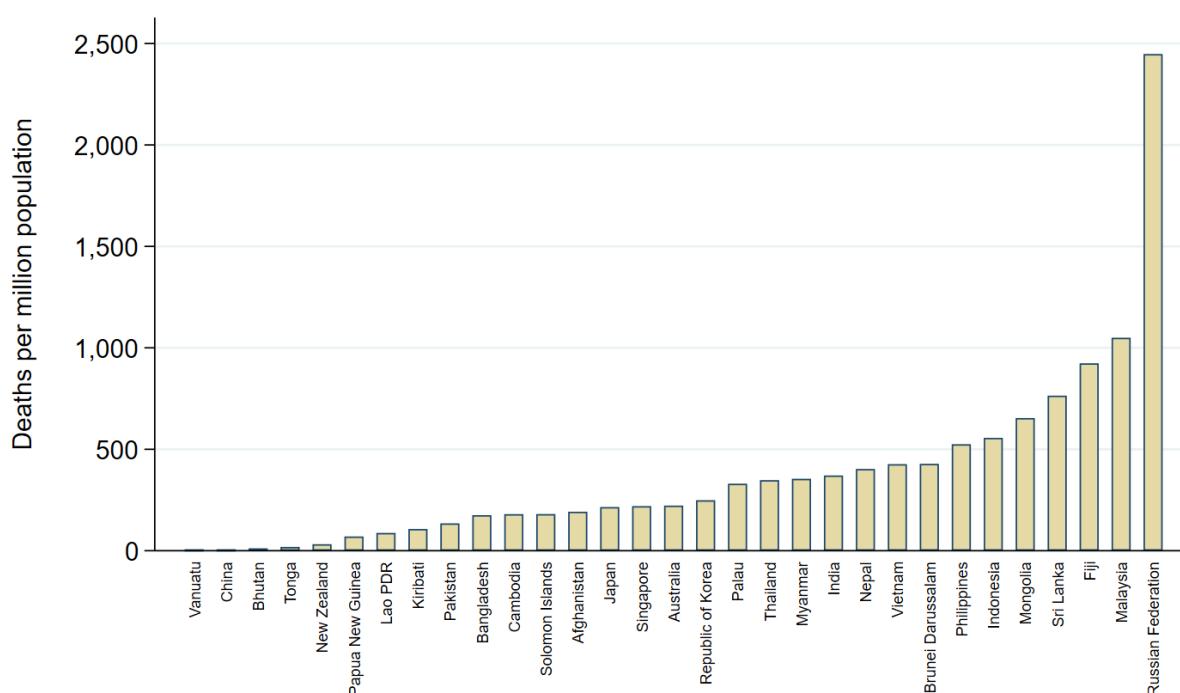
The unequal distribution of COVID-19 vaccines across and within countries in the region during the initial year of vaccine roll-out could be attributed to vaccine nationalism, characterized by competition between countries for the procurement of vaccines (Katz and others, 2021). However, as COVID-19 vaccines become part of the disease prevention programmes of each country and as global supply stabilizes, the readiness of the national health systems becomes even more critical (Haldane and others, 2021). This paper has three objectives: to examine vaccine inequities across and within countries in the Asia-Pacific region; to identify health system barriers that might impede equitable access; and to provide specific recommendations for countries in the region in ensuring vaccine access.



## 2. The state of the coronavirus disease pandemic in the Asia-Pacific region

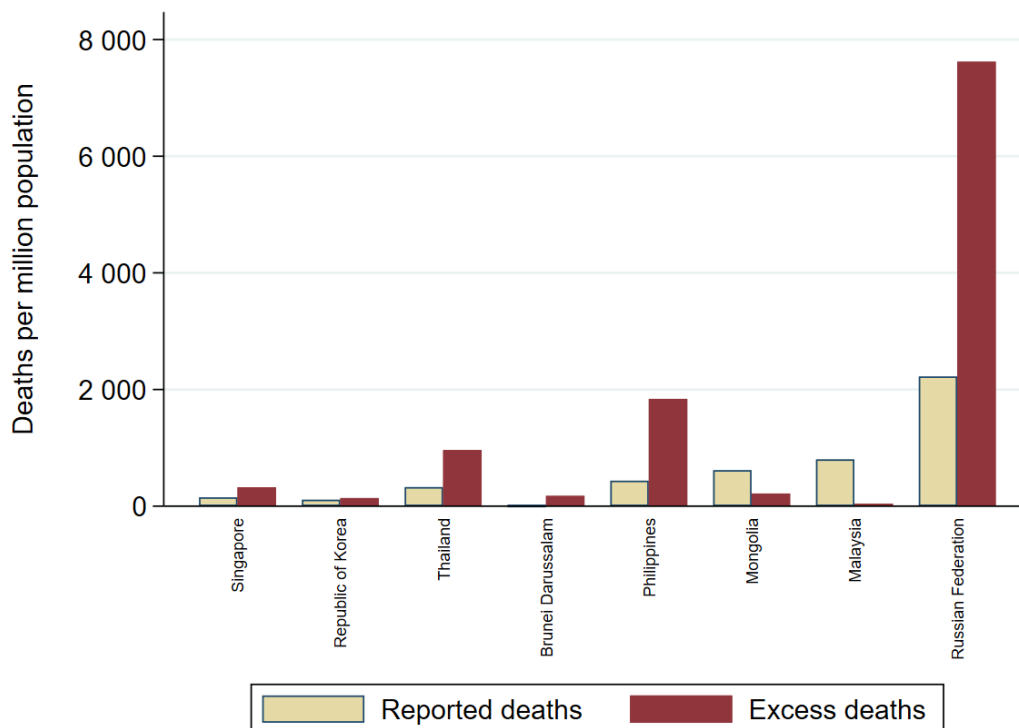
The Asia-Pacific region has been severely affected by the COVID-19 pandemic. As of March 2022, there were 137 million confirmed cases in the region and 1.4 million deaths, with significant differences across countries. **Figure 1** shows the large variation in reported COVID-19 deaths relative to population in selected countries of the region (Ritchie and others, 2020). However, many COVID-19 cases have gone undetected and have been excluded from official death tallies. **Figure 2** shows that excess mortality is significantly higher than reported deaths in some Asia-Pacific countries. Excess mortality is a comprehensive measure of the impact of the pandemic on mortality. It includes the confirmed COVID-19 death count, COVID-19 deaths that were not diagnosed and deaths indirectly attributed to the pandemic, such as the deaths of people who were unable to access treatment owing to the pandemic's impact on health-care systems (Ritchie and others, 2020; David, 2022).

**Figure 1: Confirmed COVID-19 deaths as of March 2022, selected Asia-Pacific countries**



Source: Ritchie et al. (2020)

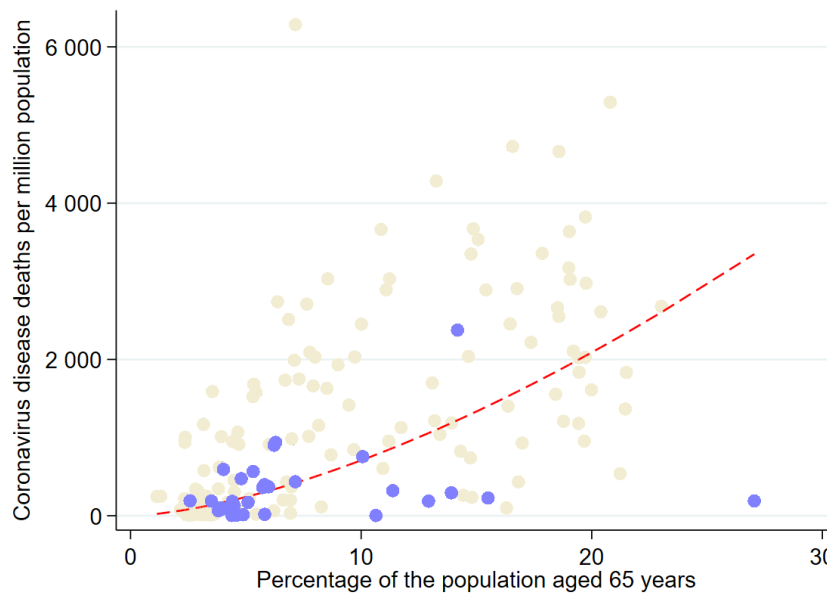
**Figure 2: Confirmed deaths of COVID-19 compared to excess deaths, selected Asia-Pacific countries, latest available period**



Source: Ritchie et al. (2020)

**The disease burden attributed to COVID-19 has significant variance across populations.** The COVID-19 pandemic has disproportionately impacted older people and people with chronic underlying conditions. The mean age of COVID-19 death is 70 years old, and populations with chronic conditions are 1.5 times more likely to die because of the virus (Simonsen and Viboud, 2021; Popkin and others, 2020). **Figure 3** uses regression to illustrate the linear relationship between cumulative COVID-19 death per million population (as of March 2022) and the percentage of the population age 65 years and older. However, emerging studies have shown that the linear relationship between the percentage of the population aged 65 years old and COVID-19 mortality was only significant for countries with low levels of hospital beds, and the number of hospital beds is an indicator of health-care system capacity (Farzanegan, 2020).

**Figure 3: Age structure of confirmed deaths of COVID-19 in Asia-Pacific countries and other countries, March 2022**



Source: Ritchie et al. (2020)

Note: Blue dots represent Asia-Pacific countries and brown dots represent countries in other regions.

**The variation in disease burden across populations is exacerbated by structural inequities.** Vulnerable populations such as minority ethnic groups, people living in areas of higher socioeconomic deprivation and other marginalized groups have a greater risk of COVID-19 infection. They have higher rates of almost all known underlying clinical risk factors that increase the severity and mortality of COVID-19 (Bambra and others, 2020). The inequities caused by the pandemic are observed across the world, including in the Asia-Pacific region. For example, foreign workers in Singapore, Malaysia and Thailand were at a higher risk of infection. Manual labour foreign workers in Singapore who live in crowded dormitories fuelled the first wave of infection in the country (Collins and Low, 2021). This is an example of how crowded conditions result in the rapid spread of infection. Similar patterns were observed in urban slums or informal settlements in Bangladesh, India and the Philippines (George and others, 2021; Sahasranaman and Jensen, 2021).

**Almost all countries in the Asia-Pacific region have implemented public health interventions to stop the exponential spread of infection,** such as mobility restrictions, school and business closures, and border controls. However, the duration and stringency of interventions vary across countries. Some countries maintained a high level of stringency throughout the pandemic (e.g. Bangladesh and the Philippines). However, stringent mobility restrictions came with a heavy price, causing unprecedented economic recessions in many countries. The economy of the Asia-Pacific region declined by approximately 3.8 per cent in 2020 (UN ESCAP, 2021).

**Governments in the region rolled out massive vaccination campaigns as soon as vaccines became available.** The development of safe and effective COVID-19 vaccines has dramatically changed the course of addressing the pandemic. Most countries in the Asia-Pacific region started their COVID-19 vaccination campaigns around the first quarter of 2021, one to two months after Western countries. Many countries in the region aimed to vaccinate at least 70 per cent of their population to achieve a high level of population protection. WHO set a target for COVID-19 vaccination to reach at least 40 per cent of the global population by 2021 and 70 per cent by 2022 (WHO, 2021). Given the tight global supply of vaccines, in particular during the first few months of the vaccination campaign, selected population groups were assigned priority, such as health workers and older people, who are considered the most at risk of morbidity and death. Countries that received COVID-19 vaccine donations from the COVAX facility are also mandated to follow the prioritization framework. The COVID-19 vaccine universal roll-out (to the rest of the population) commenced asynchronously across countries in the region. In Singapore, for example, universal vaccination began in April and May of 2020, while in low- and middle-income countries, namely Bangladesh, Indonesia and the Philippines, it began in August and September of 2021 (Hale and others, 2020).

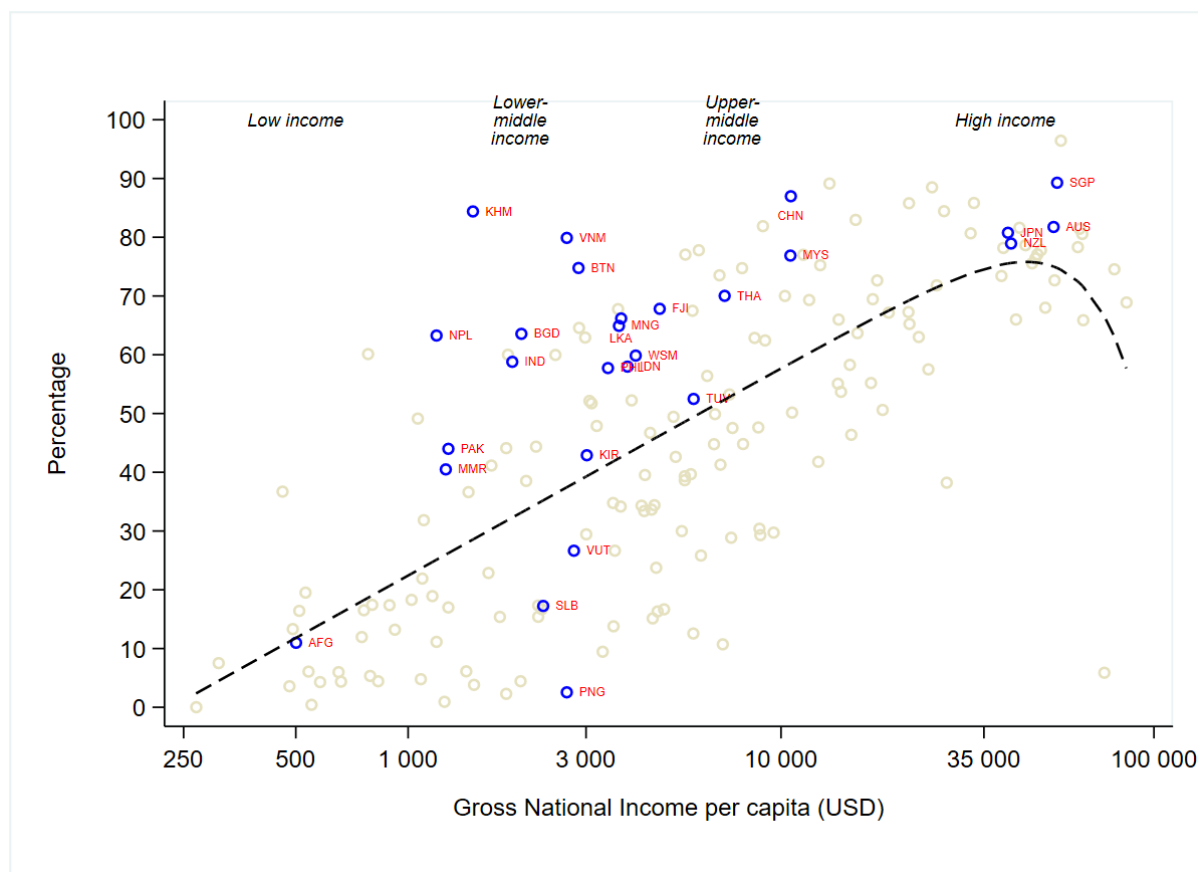
### **3. Equitable coronavirus disease vaccination in the Asia-Pacific region**

**Vaccine equity is critical in addressing the pandemic.** Rapid and equitable distribution of the diagnostics, therapeutics and vaccines within and across countries is the most effective way to address the health and economic impact of the COVID-19 pandemic. Strategies that ignore equity undermine the effectiveness of vaccination as a tool to control the pandemic, potentially increasing hospitalizations and deaths and delaying economic recovery (Asundi, O'Leary and Bhadelia, 2021). Inequitable vaccine distribution not only leaves millions of people vulnerable to the virus, but also allows variants to emerge and reverberate back across the world. Globally, the negative consequences of the pandemic will include unequal impacts on economic growth.

**Approximately 60 per cent of the population of the Asia-Pacific region had been fully vaccinated as of March 2022.** Vaccine coverage in the region is highly unequal. For example, coverage in Singapore has already reached 90 per cent in contrast to less than 10 per cent in Afghanistan. **Figure 4** shows the positive relationship between vaccine coverage (fully vaccinated) and income per capita. Most countries that have already reached a coverage of 70 per cent are high-income countries (e.g. Australia, Singapore, New Zealand, Japan). Several low- and middle-income countries demonstrate the high vaccine coverage, such as Cambodia, and Bhutan (Ritchie and others, 2020). Similar pattern could be observed for booster coverage. Coverage could be affected by the share of priority population; countries with a larger share of older people (e.g. Japan) tend to have higher coverage relative to countries with younger population groups. As of March 2022, most countries in the Asia-Pacific region have

already rolled out the COVID-19 vaccination programme to children (5–17 years old), except Afghanistan, Nepal, Papua New Guinea and Solomon Islands. **Figure 5** shows that high-income countries in the region were more able to vaccinate their population compared to low- and middle-income countries in the region.

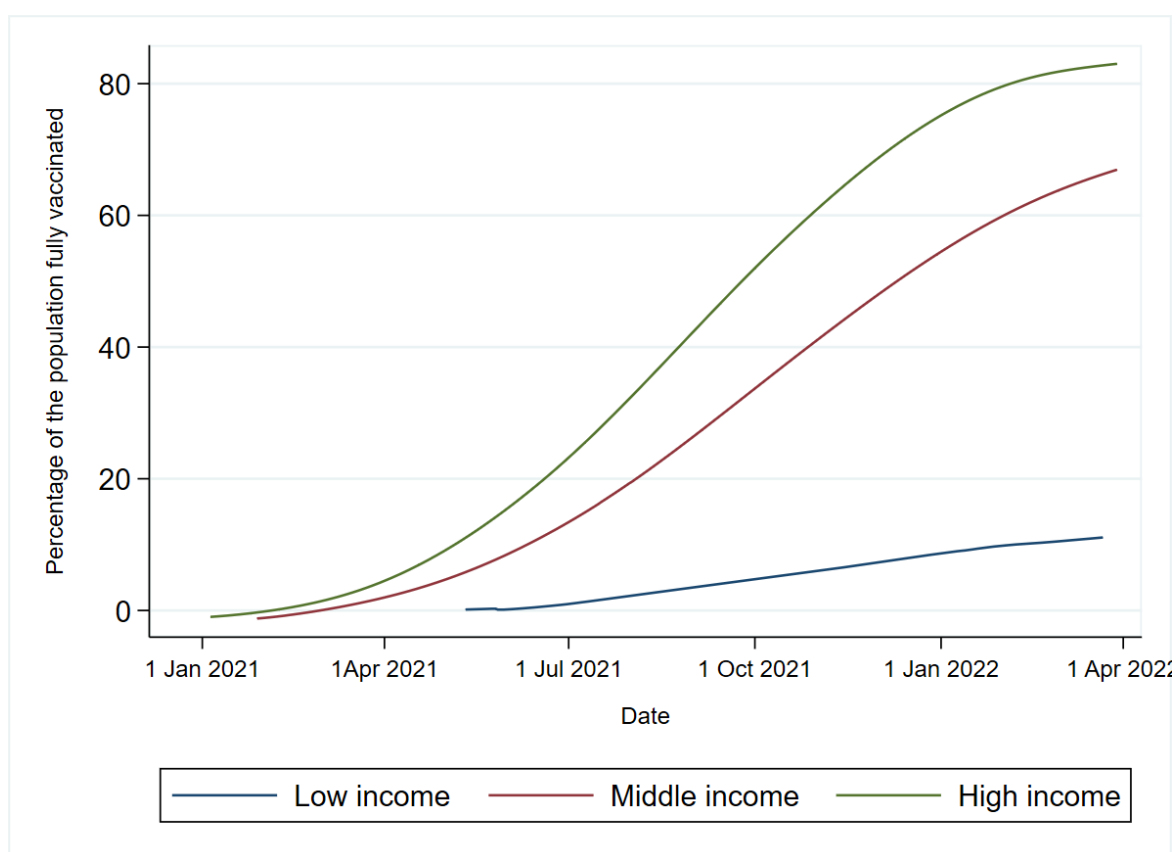
**Figure 4: Vaccine coverage and gross national income per capita, selected Asia-Pacific countries, March 2022**



Source: Author's analysis of data from Oxford University and World Development Indicators

Abbreviations: AFG, Afghanistan; AUS, Australia; BGD, Bangladesh; BTN, Bhutan; CHN, China; FIJ, Fiji; IDN, Indonesia; IND, Indonesia; JPN, Japan; KHM, Cambodia; KIR, KIRIBATI; LKA, Sri Lanka; MMR, Myanmar; MNG, Mongolia; MYS, Malaysia; NPL, Nepal; NZL, New Zealand; PAK, Pakistan; PHL, Philippines; PNG, Papua New Guinea; SGP, Singapore; SLB, Solomon Islands; THA, Thailand; VNM, Viet Nam; VUT, Vanuatu

**Figure 5: Vaccine coverage by income classification in the Asia-Pacific region, March 2022**

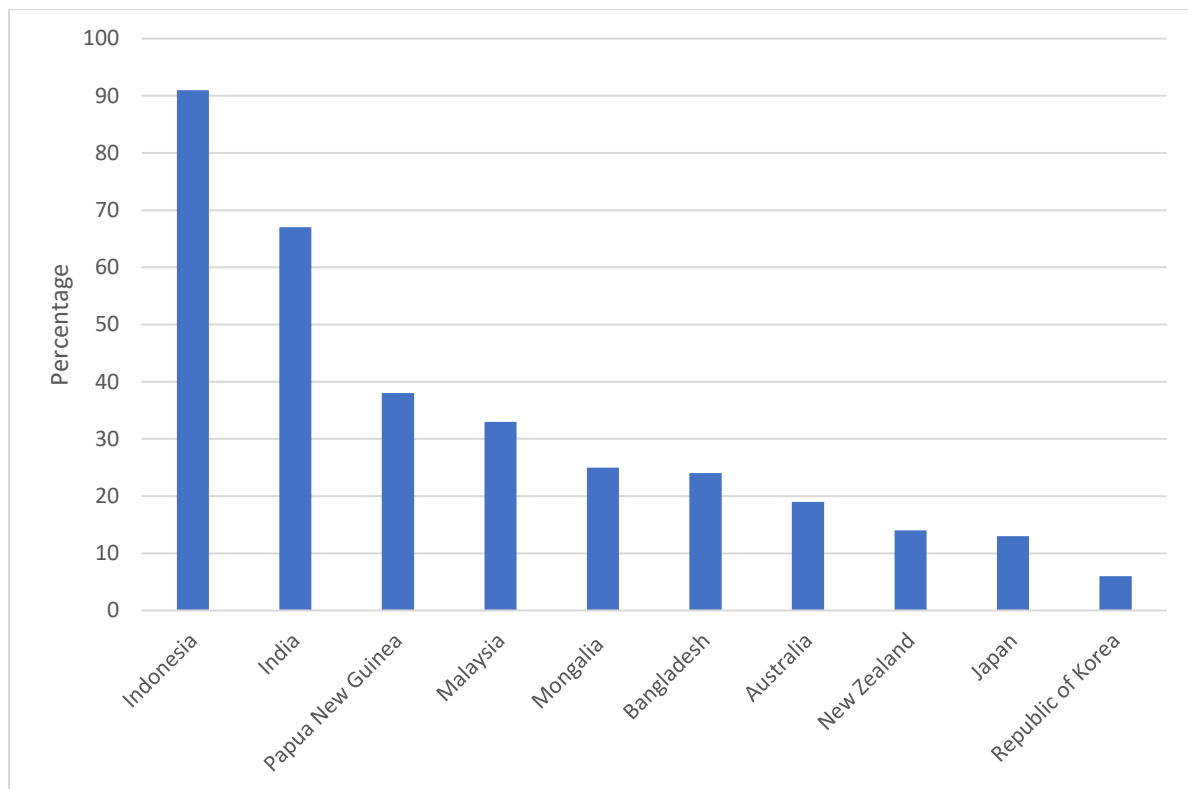


Source: Author's analysis of data from Oxford University and World Development Indicators.

### **Emerging data show a significant disparity in vaccine coverage within countries.**

It is difficult to determine the magnitude of inequality within countries as comprehensive databases remain limited. However, available subnational coverage suggests wide disparity especially in developing countries. **Figure 6** shows the difference between the highest and the lowest coverage rates for selected countries in the Asia-Pacific region with available subnational data (e.g. region, state, province, prefecture). Within-country inequality tends to be higher in low- and middle-income countries compared to high-income countries. In some provinces and states in Indonesia and India, coverage has already reached 70–100 per cent, while other subnational units have yet to reach 20 per cent. In contrast, there is little disparity between the highest and the lowest subnational coverage in high-income countries such as Australia, New Zealand and Japan (IMF, 2021).

**Figure 6: Absolute difference between the highest and lowest coverage of subnational units, March 2022**

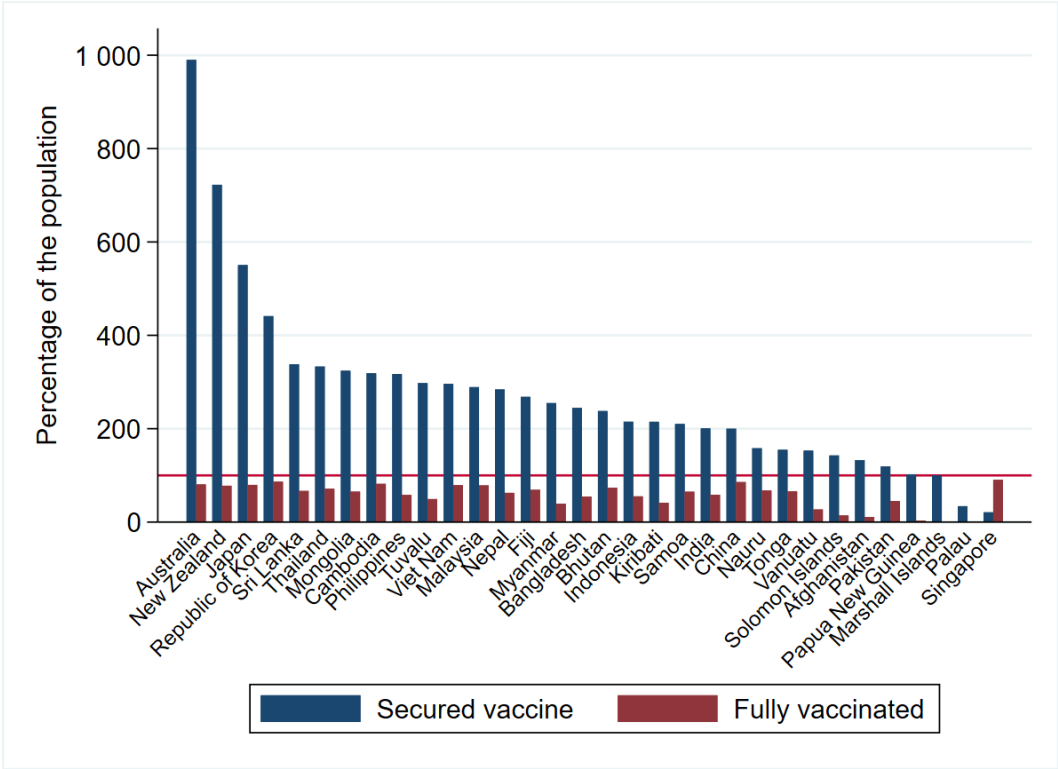


Source: Author's analysis of data from the International Monetary Fund

Note: Absolute difference=highest coverage-lowest coverage.

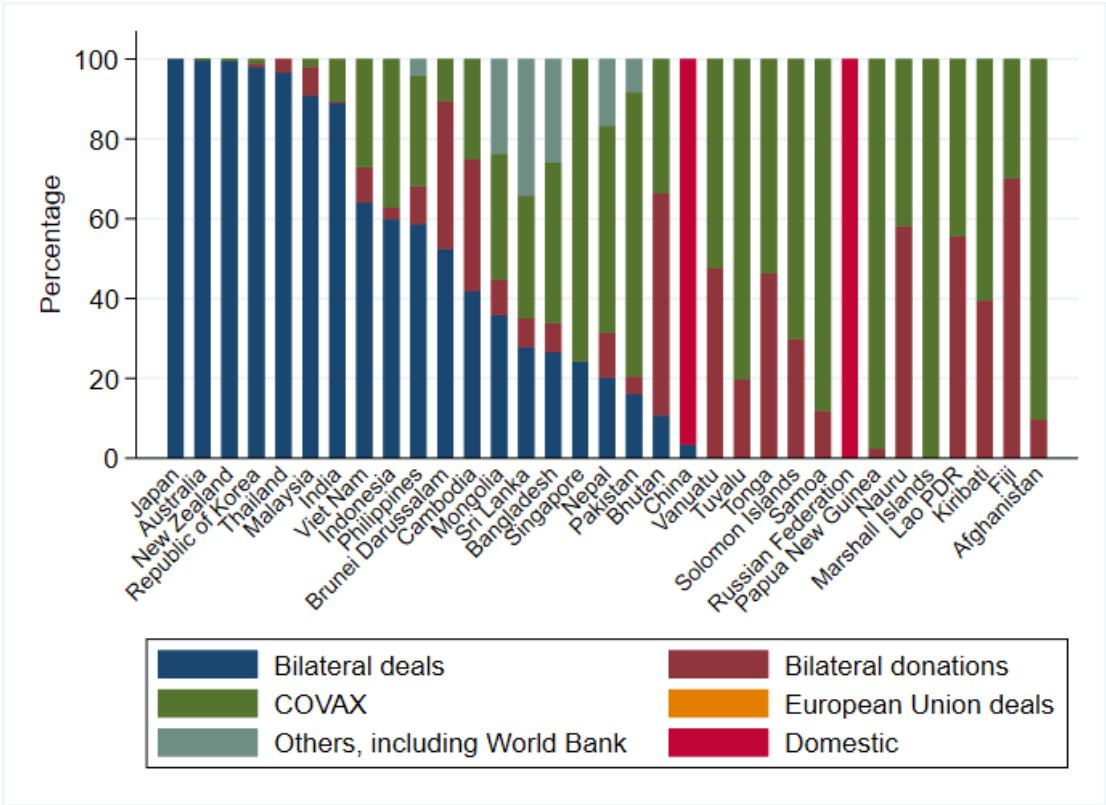
**The supply of COVID-19 vaccine varies across countries in the Asia-Pacific region.** **Figure 7** shows secured COVID-19 vaccines relative to the population of Asia-Pacific countries, based on publicly available data. High-income countries in the region, such as Australia, New Zealand and Japan, have already secured vaccine supply 5–10 times greater than the population size, while a large portion of the population of some low- and middle-income countries is not yet vaccinated and the quantity of secured vaccine is lower than the population size. **Figure 8** shows the variation in sources of secured vaccines in the region. Many island countries have relied exclusively on COVAX and bilateral donations in expanding coverage. Interestingly, sources of secured vaccines in South-East Asian countries include COVAX and bilateral deals.

Figure 7: Secured coronavirus disease vaccine, and vaccine coverage rate, March 2022



Source: Authors' analysis of data from the International Monetary Fund.

Figure 8: Sources of secured coronavirus disease vaccines, March 2022

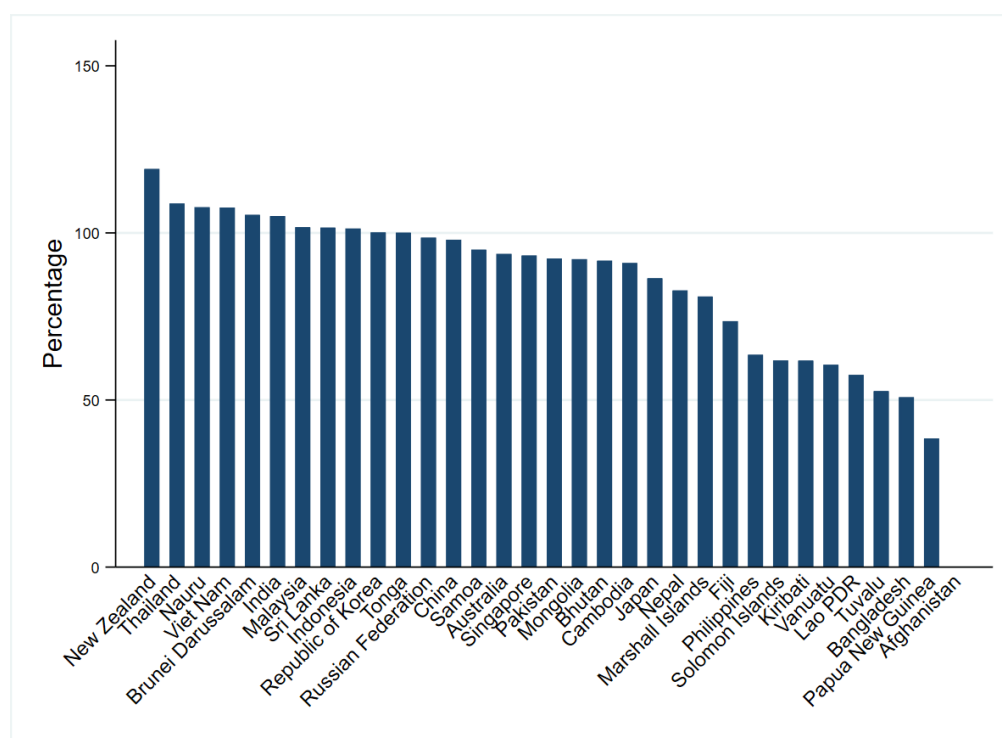


Source: Authors' analysis of data from the International Monetary Fund.



**Vaccine supply does not automatically lead to vaccination.** Even if enough vaccine doses are eventually made available through various channels, success will be hampered by challenges in the health systems in developing countries. **Figure 9** shows that the share of administered vaccines out of delivered vaccines varies across countries in the region. This suggests the low absorptive capacity of some countries (OECD, 2021). The high number of vaccines that were not administered could reflect challenges in the health systems to allocate and administer the vaccine with speed and agility, in particular because of limited infrastructure and human resources. Demand-side challenges could also contribute to the low uptake of vaccines.

**Figure 9: Administered vaccines as a share of total delivered vaccine, March 2022**



Source: Authors' analysis of data from the IMF (2022)

Note: Data shows more than 100 per cent in some countries

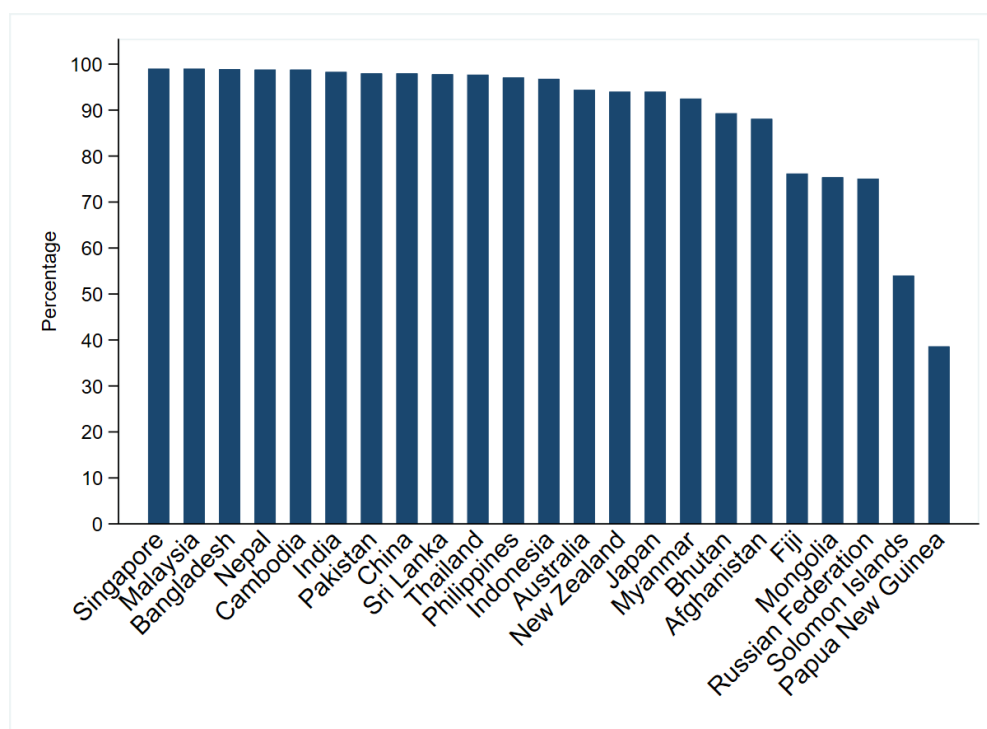
**Vaccine equity should reflect policies and strategies to ensure equal access across countries and to address structural inequities that prohibit disadvantaged population groups** (e.g. poor, older persons, persons with disabilities, indigenous people, migrants, women, prisoners) from accessing vaccines (Agarwal and others, 2021). Disadvantaged groups, such as migrants, indigenous peoples, women and the poor are less likely to access essential health services (Smith and Kaluzny, 1974). At present, there is a lack of comprehensive data that examine the association between structural inequities vaccine coverage. However, the best available global data and case studies provide evidence of inequities. For instance, as of December 2021, coverage in Bangkok had reached 100 per cent. However, coverage in the provinces of Thailand near international borders (e.g. Cambodia, Malaysia, Lao People's Democratic Republic and Myanmar), which are epicentres of cross-border migration, was approximately 30–

40 per cent (WHO, 2021). In the Philippines, the socioeconomic gradient in vaccine coverage is extremely wide. In Indonesia, the coverage rates in Papua and Maluku, islands of mostly indigenous people, were only 20 per cent and 40 per cent (as of December 2021) in contrast to the reported 140 per cent in the mega-city, Jakarta (IMF, 2021). Geographic barriers pose challenge in vaccine access, for example, in high altitude landscapes of the Himalayan regions, and in Afghanistan, Bhutan, Nepal and Pakistan, or in remote areas with war, instability and conflict (Acharya, Ghimire and Subramanya, 2021). Mega-cities of the Philippines have already reached 90 per cent coverage, but coverage was only 10 per cent in the poverty-stricken and war-torn Bangsamoro Autonomous Region in Muslim Mindanao (as of December 2021) (Philippine Department of Health, 2021).

**Countries have adopted allocation frameworks to promote vaccine equity.** Given the limited COVID-19 vaccine supplies and resources to vaccinate the population, almost all countries adopted vaccine allocation frameworks upholding utilitarian principles by prioritizing the population that maximizes the best health outcomes, in this case, older people and people with co-morbidities. However, other countries (e.g. Indonesia) took a divergent path, by first prioritizing economic workers instead of older people (Witando and Diela, 2021). Several countries have included egalitarian approaches in their vaccine allocation framework. In the Philippines and India, for example, priority was given to slum dwellers and people living below the poverty line (Basu and Mishra, 2020; Philippine DOH, 2020). However, the adherence to and implementation of these utilitarian and egalitarian frameworks should be examined as leakages and elite capture are reported to be rampant. For instance, in the Philippines, the vaccine coverage of all-adult populations in mega-cities has already reached 90 per cent, but the nation-wide coverage for older people, despite being a priority group, remains at 50 per cent (as of December 2021) (Philippines DOH, 2021).

**In addition to supply challenges, demand-side challenges such as vaccine hesitancy could be driving low vaccine coverage in some countries in the region.** **Figure 10** shows the share of the population willing to be vaccinated if the supply is available. Willingness is high in most countries in the Asia-Pacific region, but others have remarkably low level, such as Afghanistan, Fiji, Mongolia, the Russian Federation, Solomon Islands and Papua New Guinea. Low willingness in some countries is largely driven by the spread of conspiracies and misinformation and a growing anti-vaccination sentiment (Forman and others, 2021; Carrieri, Madio and Principe, 2019). In the Asia-Pacific region, around 30 per cent of online information is considered unreliable (Collective Service, 2022). Digitalization could facilitate demand for vaccines, as vaccination drives in many countries have depended on digital platforms (e.g. electronic booking systems, demand generation), the large digital divide could exacerbate the problem of lack of access within and across countries in the region. In some settings, rural populations and those who lack digital literacy have been left out of new vaccination processes, while only the privileged, educated and urban populations have benefitted (Poole and others, 2021).

**Figure 10: Share of the population willing to be vaccinated, March 2022**

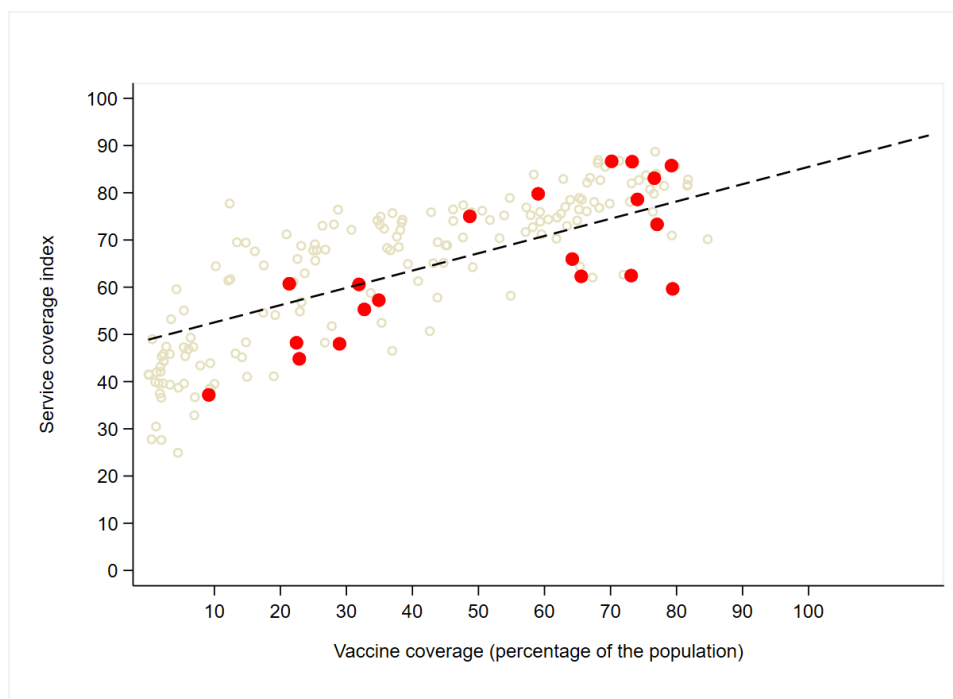


Source: Collective Service (2022)

#### **4. Drivers of inequity in vaccine access**

As COVID-19 becomes part of the prevention and control programmes of most countries, equitable access will be highly dependent of the capacity and readiness of health systems (Usher, 2021). In this section, we classify three supply-side barriers that could impede the equitable access to vaccine: financial; geographic; and regulatory. Financial access means that there are no or few direct or indirect cost barriers to receipt of the vaccine. These access factors are adapted from a framework developed by the Harvard University Health and Places Initiative, which identified different types of health-care access (Health and Places Initiative, 2014). Geographic access means the absence of barriers including distance, transportation and other physical challenges. Regulatory access means the absence of unnecessary policies or processes that impede timely access to vaccines. These supply-side barriers in the health system are not new. They are longstanding features of inequitable access to essential health-care services and goods. **Figure 11** shows the strong linear relationship of universal health coverage service coverage index and COVID-19 vaccine coverage as of December 2021. The service coverage index measures the capacity of health systems to provide a wide-range of essential health-care services to the population (World Health Organization, 2019). **Figure 12** shows the positive correlation between DPT3 child vaccination and COVID-19 vaccine coverage. In general, low coverage of routine child vaccination is a marker of a challenged health system.

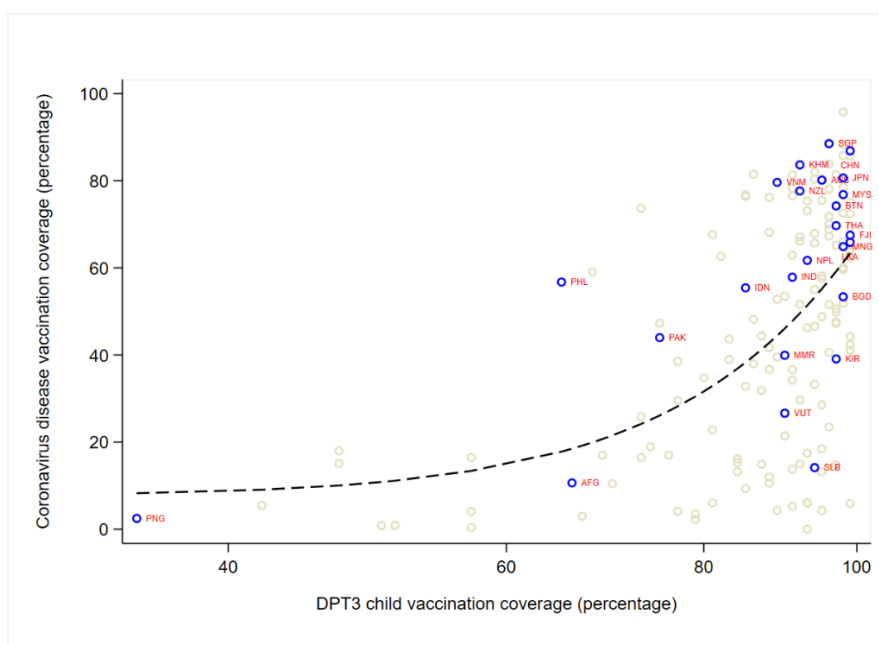
**Figure 11: Coverage of coronavirus disease vaccines and universal health coverage service coverage index, December 2021**



Source: Author's analysis of data from WHO and Oxford University

Note: Red dots represent Asia-Pacific countries.

**Figure 12: Correlation of coronavirus disease vaccination and DPT3 child vaccination, March 2022**



Source: Author's analysis of data from WHO and Oxford University

Abbreviations: AFG, Afghanistan; AUS, Australia; BGD, Bangladesh; BTN, Bhutan; CHN, China; FJI, Fiji; IDN, Indonesia; IND, Indonesia; JPN, Japan; KHM, Cambodia; KIR, KIRIBATI; LKA, Sri Lanka; MMR, Myanmar; MNG, Mongolia; MYS, Malaysia; NPL, Nepal; NZL, New Zealand; PAK, Pakistan; PHL, Philippines; PNG, Papua New Guinea; SGP, Singapore; SLB, Solomon Islands; THA, Thailand; VNM, Viet Nam; VUT, Vanuatu

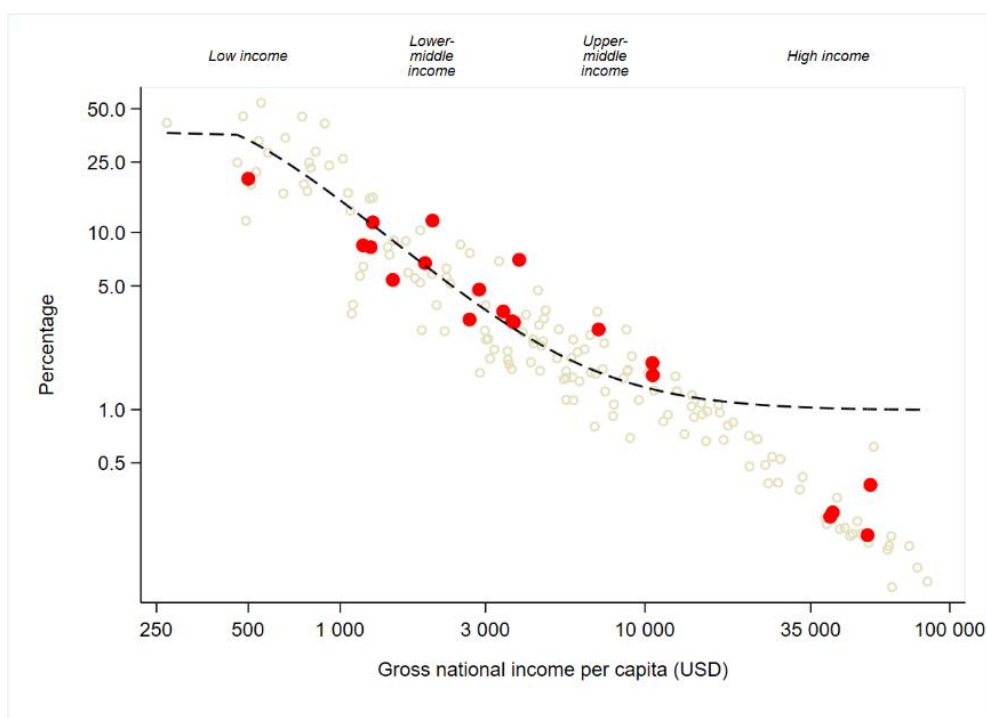
## 4.1 Financial access

### **Financial barriers reflect challenges in countries' health financing systems.**

Financial access is one of the determinants of health-care utilization. To understand financial access, we must examine it from a health financing perspective. One of the core functions of any health financing system is to mobilize resources either from public sources (e.g. government revenues, social insurance) or from private sources (e.g. private insurance and out-of-pocket/user fees). However, the level and source of financing matter. Essential vaccination programmes (e.g. routine child immunization programme) should be publicly financed and out-of-pocket (OOP) costs should be discouraged. WHO and multilateral organizations have discouraged OOP costs or user fees because it is counterproductive to the goals of vaccination programmes (Global Alliance for Vaccines and Immunization, 2018). There is solid evidence to indicate that OOP costs in developing countries discourage vulnerable population from seeking vaccination.

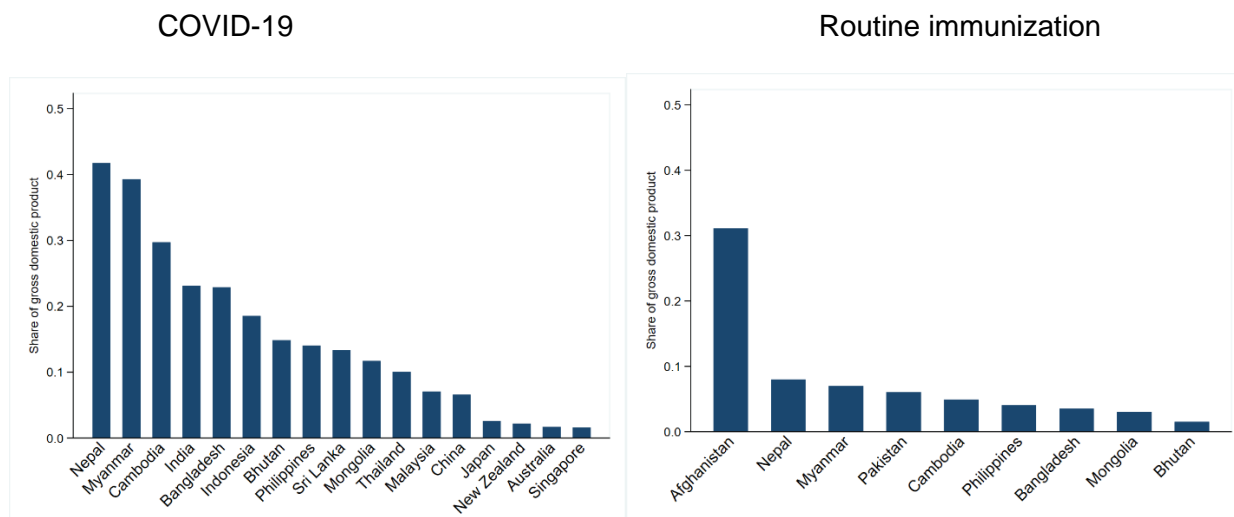
**OOP costs remain the major source of health financing in the region.** In 2018, OOP costs accounted for about 57 per cent of total health spending among low- and middle-income countries in the region compared to 22 per cent among high-income countries (WHO, 2021). Public spending on health remains relatively low with marked differences across countries in the region. With the enormous socioeconomic impact and political pressures of COVID-19, Governments have mobilized public resources (e.g. either from general revenues or external sources) to finance the pandemic response, including vaccination programmes. However, important policy questions remain: will Governments sustainably allocate higher public spending to finance COVID-19 vaccines as with any other regular prevention and control programme? Will the Government rely on OOP costs to finance some parts of the vaccination programme? Will the Government allow the private market to administer COVID-19 vaccines in parallel with the public system, financed through OOP costs? Current vaccines can now be sold in the market, and this is the delivery structure of vaccines in countries such as India and the Philippines (Ulep and Uy, 2020). Given that financial pressures are coming at a time when many economies are in crisis due to the pandemic, Government may have to use OOP costs to mobilize incremental resources for health services. OOP costs could provide adequate, timely and reliable resources for vaccines and thus can contribute to the overall financial balance. However, the potential benefits of OOP costs for the sustainability of the COVID-19 vaccination programme would not offset negative effects on equity. Raising public resources for COVID-19 vaccines faces a mounting challenge, given the enormous financing needs of the programme. In low- and middle-income countries, the cost of vaccinating 40 per cent of the population accounts for approximately 10–20 per cent of total national health spending. **Figure 14** shows the resources needed to fund the COVID-19 vaccination programme for 40 per cent of the population compared to routine immunization programme.

**Figure 13: Coronavirus disease vaccination programme as a share of health spending**



Source: Author's analysis of data from the United Nations Development Programme and the World Bank.  
Note: Red dots represent Asia-Pacific countries

**Figure 14: Cost of routine and COVID-19 vaccination programme as a share of gross domestic product**



Source: Author's analysis of data from the United Nations Development Programme and WHO.

**Fiscal decentralization could exacerbate vaccine inequity within countries.** Public financing in general should promote equitable access to vaccination. However, the growing trend towards political and fiscal decentralization (e.g. India, Indonesia, the Philippines and Viet Nam) should prompt Governments to examine the financing capacity and decision-making process of subnational units, otherwise it will have tremendous impact on vaccine equity. While empirical evidence suggests the variable impact of fiscal

decentralization on vaccination coverage (Khalegian, 2004), heavy reliance on subnational financing for vaccination programmes could have a detrimental equity implication. In general, the subnational units with the lowest capacity to finance the vaccination programme are also the ones in need and the ones where health services are relatively costlier to implement because of geographic and supply-side constraints. Yoong (2007) examined the impact of decentralization in Madhya Pradesh, one of the largest and poorest states in India. Decentralization led to a fall in immunization coverage, particularly in rural areas. Maharani others (2015) suggest that fiscal decentralization in Indonesia had no impact on child immunization. They conclude that decentralization failed to improve outcomes for child immunization due to limited local capacity in planning, budget development and budget execution. A similar pattern was observed in the Philippines. While routine vaccines are procured directly by the central government through the Department of Health (DOH), local government units finance operational costs (e.g. syringe, health promotions). However, given the limited capacity of some local government units to finance and deliver the programme, decentralization resulted in disparities in vaccine coverage (Ulep and Uy, 2020). In some settings, where taxes levied at the subnational level are often less progressive than national-level taxes, decentralization led to inequitable public financing. The rich population mostly benefited from the public vaccination programme.

**Reports show emerging signs of marked COVID-19 vaccine inequity in decentralized regimes.** For example, the provinces of Viet Nam have a greater role in financing immunization, and they are responsible for financing the operational costs of the COVID-19 vaccine roll-out. While subnational autonomy has created flexibility and efficiency in vaccine operations, funds were inadequate in some provinces. In contrast, Pakistan re-centralized vaccine procurement and financing to improve efficiency (Learning Network for Countries in Transition, 2021, p. 8). In the Philippines, global supply was limited during the early stages of the COVID-19 vaccination campaign and affluent local government units in the country (mostly mega-cities) purchased their own COVID-19 vaccines, leaving relatively poor local government units to rely on nationally procured vaccines. Such a scenario created not only inequality in vaccine coverage, but also political tensions within the government (Cabico, 2021). Decentralization has been the subject of debates on the roles of subnational units during the height of pandemic not only during the roll-out of vaccination programmes (OECD, 2020). Previous studies have challenged the effectiveness of decentralization in addressing the pandemic. Cheng and others (2021) find that COVID-19 spreads faster in decentralized countries, leading to a higher disease burden.

## **4.2 Geographic access**

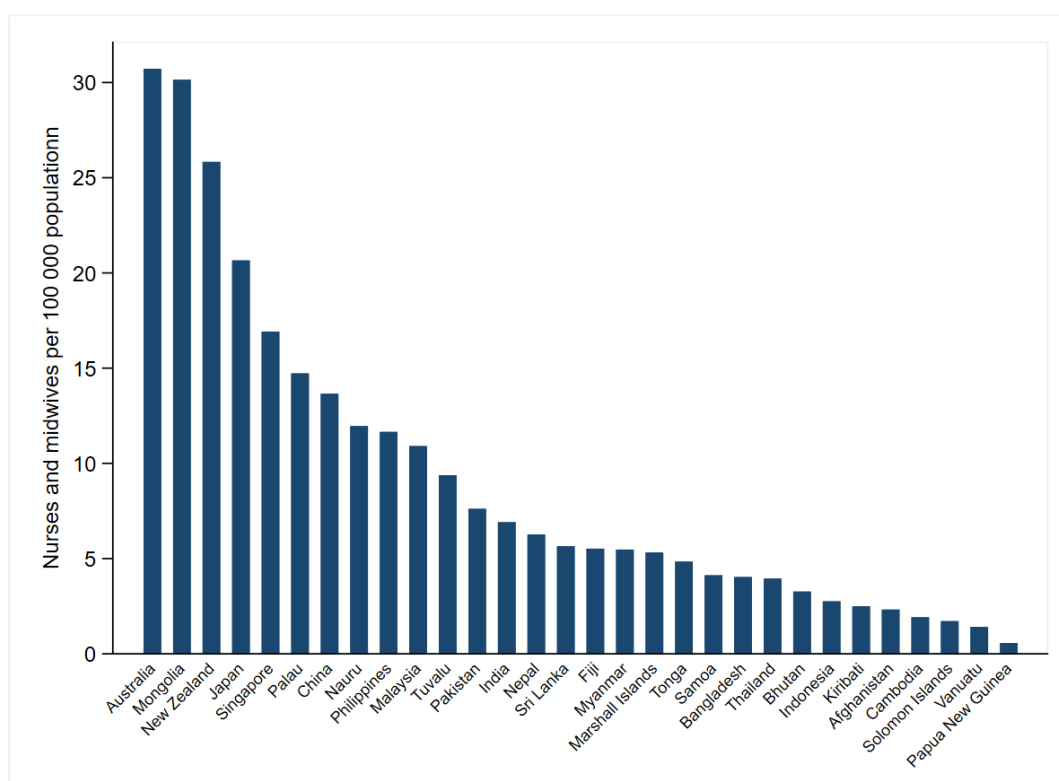
Geographic access refers to supply, diversity and distribution, and physical accessibility of health-care services (Health and Places Initiative, 2014). In identifying geographic barriers to vaccine access, it is imperative to start with the readiness of primary care systems. The locus of sustainable implementation of COVID-19 vaccination, as with any preventive intervention, is primary care. Hence, any challenge in vaccine equity could

reflect weaknesses in primary care. Under geographic access, three supply-side elements are discussed: health workers; health facilities; and supply chains and logistics.

### *Primary care*

**All countries need a sizeable number of health workers to meet the demand of COVID-19 vaccine roll-out.** There should be widespread availability of health workers to reach the target vaccine coverage, in all parts of a country including far-flung areas. While almost all countries even resilient health systems faced scarcity of vaccinators, However, it is apparent in low- and middle-income countries where shortage and maldistribution have been a chronic problem. **Figure 15** shows the large variation of nurse and midwives per 10,000 population recently selected countries in the region. Within country disparity is also ubiquitous. As an example, in the Philippines, poor provinces are suffering from shortage of health workers. Most health workers are located in cities. Abrigo and others, 2019). The shortage of health workers has implications to quick deployment of vaccines, particularly in far-flung areas.

**Figure 15: Health worker density of selected Asia-Pacific countries**



Source: WHO, 2022.

**The lack of trained human resources to perform and assist the COVID-19 vaccination programme appears to be a common problem.** Training more health workers will ensure that vaccines are administered to all, including those living in poor and hard-to-reach communities. Also, it will ensure that vaccines are delivered safely. The lack of trained health workers not only compromises vaccine throughput, but also



the quality, safety and efficiency of the programme. In many countries, vaccines are routinely administered to children, but the massive volume of people needing COVID-19 vaccination, this time mostly adults, requires a different skill set. Based on the WHO Joint Reporting Form, the percentage of countries reporting at least one adult vaccination programme ranged from approximately 10 per cent in South-East Asia to 90 per cent in Europe. For influenza in particular, only Thailand had an adult immunization programme. The success of delivering COVID-19 vaccines is threatened by the lack of sufficient adult immunization infrastructure (Williams and others, 2021). The lack of training led to wastage of vaccines. For example, the Government of India attributed high levels of wastage to the lack of proper training for health workers in the use of multi-dose vials and to improper planning at the local vaccination centre (Kaunian, 2021). In Afghanistan, only 10 per cent of vaccinators fulfilled the required educational criteria and only 14 per cent of health facilities have vaccination micro-plans, which are comprehensive guides for health workers in all aspects of the vaccination programme (Wardak and others, 2021).

**The scarcity of health workers could disrupt the delivery of other primary health-care services.** In assessing vaccine access from a health human resources perspective, we must examine the vaccination programme with other primary care services and programmes that health workers should provide. Even before the pandemic, many health workers were overworked, and the pandemic has exacerbated this problem. In addition to the COVID-19 vaccination programme, health workers still need to maintain the delivery of essential routine vaccinations, manage potential COVID-19 cases, perform surveillance of other diseases and provide health promotion services. Since the onset of the pandemic, many national immunization programmes against diseases such as diphtheria, measles and polio have been substantially disrupted in at least 68 countries, not only in the region but globally, affecting up to 80 million children (WHO, 2022). Many countries in the region have high turnover rates of front-line health workers because of high-level physical and mental stress induced by the workload and the risk of infection (delos Santos and others 2021; Yousaf and others, 2021; Sethi and others, 2020). The high turnover rates, among community health workers in particular, compromise both the quality and quantity of vaccination programmes, especially in far-flung communities where health workers were scarce to begin with. However, Governments in the region have developed programmes to address the problem. In China and Pakistan, for example, the Government raised the morale of front-line health workers by providing financial support and acknowledgement of their services, and this was reported to have psychological benefit (Noreen and others, 2020).

**Low remuneration and incentives result in a high turnover rate of health workers.** Monetary remuneration and non-monetary incentives are important for maintaining motivation and minimizing attrition. Studies have identified low remuneration as one reason for high turnover rates. Without a more harmonized approach for health worker remuneration and incentives, their performance may be inconsistent, which will affect health outcomes (Bezbaruah and others, 2021).

**Regulatory barriers prevent the expansion of the pool of potential vaccinators.**

Existing medical regulations and policies prohibit certain cadres from administering vaccines. Task shifting and rationalization of health workers can help to address scarcity and redistribute health workers in low- and middle-income countries. In response to COVID-19, high-income countries revised their policies to allow certain health cadres to administer vaccines. For example, the Government of the United States authorized pharmacists to procure and administer COVID-19 vaccines. Several states have considered expanding their scope of practice or licensure of non-traditional providers, such as advanced emergency medical technicians, paramedics, and medical and nursing students, for COVID-19 vaccine administration.

*Supply chains and logistics*

**The COVID-19 crisis has revealed the fragility of supply chain systems.** Vaccines were developed with unprecedented speed; however, a critical concern is whether it will be possible for the pharmaceutical supply chains in each country to scale up and deploy vaccines with speed and agility. Supply chains move medical goods from manufacturers to the point of use (e.g. primary care facilities) through many distribution layers using different modes of transport and storage. Hence, well-functioning and efficient supply chains are critical for successful vaccination programmes. Even before the pandemic, underperforming pharmaceutical supply chains were a major challenge, especially in low- and middle-income countries. In most developing countries, supply chains are complex and fragmented, with multiple configurations, levels of maturity and performance and degrees of private sector participation. The COVID-19 vaccines have the added complexity of requiring cold chain logistics and more agility and efficiency to preserve product quality and availability. Some COVID-19 vaccines are temperature sensitive. The inability to maintain the recommended temperature may reduce the efficacy of vaccines, especially in the tropical regions. About 20 per cent of vaccination facilities in low-income countries do not have cold chain capacity, and in a 2017 review by the Global Alliance for Vaccines and Immunization (GAVI), 37–50 per cent of vaccines in low- and middle-income countries had been stored at incorrect temperatures, which undermined the efficacy of vaccines (GAVI, 2022). Supply chains are also more difficult in countries with geographic challenges and in areas prone to natural disasters. Governments are operating supply chains in environments with suboptimal communication and imperfect information (Quiros and others, 2021).

**4.3 Regulatory access**

Regulatory access means the absence of unnecessary policies or processes that impede timely access to vaccines. During emergency situation, one of the major regulatory constraints, in particular in developing countries, is the ability to assess information. The ability to expediently issue emergency authorization for a vaccine during pandemics may depend on local capacity and willingness to 'benchmark' alongside stringent regulatory

authorities, recognizing that WHO takes more time to issue an authorization. Manufacturers file applications for emergency authorization with different levels of urgency in different countries.

In the medium to long term, developing countries need to have the capacity to locally produce vaccines. However, intellectual property rights are regularly cited as a constraint to scaling up access to vaccines in developing countries (OECD, 2020). Sharing technical knowledge, expertise and know-how is increasingly seen as a challenge. More importantly, developing countries need to have strong regulatory authorities to manufacture a product that meets global standards. Unfortunately, WHO estimates that only one out of three countries have the capacity to effectively regulate domestic manufacturing of medical products. Expanding vaccine manufacturing without guaranteeing adequate regulatory capacity would have detrimental repercussion on the quality and safety of the product, and this certainly would damage public trust in vaccines (Guzman and Yadav, 2021). According to the latest data from WHO, vaccine-producing countries in the region with functional national regulatory authorities are as follows: China, India, Indonesia, Japan and Republic of Korea (WHO, 2022).

## 5. Recommendations to governments

Even if vaccine supply was sufficient for all countries, rolling out COVID-19 vaccines would be a challenge because of health system constraints. Hence, our recommendations revolve around health system strengthening.

1. **Accelerate universal health coverage.** Constraints in equitable access to COVID-19 vaccines are a manifestation of problems in health systems. Even the Access to COVID-19 Tools (ACT) Accelerator, a new and ground-breaking global collaboration lead by WHO to fast track the development and production of COVID-19 vaccines, and equitable access to them, has recognized the importance health system strengthening as a critical pillar, albeit with less focus and funding than other pillars. Addressing the problem holistically at the systems level will not only address challenges in the vaccination programme, but also other public health programmes. Therefore, Governments should focus on the following reform areas:
  - a. **Expansion of primary care.** Preventive and existing programmes, including vaccination programmes (both COVID-19 and non-COVID-19), are typically provided at the primary care level. Hence, Governments should make it a priority to improve the quality and availability of primary care. This includes the expansion of capital investments and health benefit packages for primary care services.

- b. **Increase public financing.** The move to universal health coverage means increasing pooled public financing, that is, government budget, social insurance and external grants/aid. Governments should aim to reduce the role of private financing mechanisms, in particular OOP costs, to fund critical and cost-effective public health programmes, such as vaccination programmes for high-burden diseases. However, given the limited fiscal space for health, Governments should mobilize domestic resources through innovative means to fund public health programmes (e.g. health earmarking).
  - c. **Prioritize populations in fragile contexts.** In fragile contexts, vulnerable populations, such as women, indigenous peoples, poor households and migrants, are less likely to seek health care, including vaccination programmes, because of geographic, structural and institutional barriers. Hence, Governments should develop innovative financial and delivery mechanisms to increase access among vulnerable groups.
2. **Institute genuine reforms in the health information system.** The COVID-19 pandemic has provided an opportunity to reflect on the innovations that should become part of an enhanced health information system in the future. Governments should adopt a health information system to facilitate health access (front-facing) through telehealth systems and improve business operations of health facilities, and supply and logistics (back-end).

Before the COVID-19 pandemic, health-care services were traditionally provided through in-person interactions. The spread of the pandemic created an urgent need for providers to deliver health-care services using digital platforms. Governments may need to institute reforms to ensure the quality of care (e.g. telemedicine should be included in medical curricula and providers should receive training) and the financial sustainability of telemedicine (e.g. by including it in government health benefit packages).

Digital technology can improve business operations. In developing countries, medical records in health facilities are kept manually, and they are non-interoperable. Governments should implement an electronic medical record system to improve the efficiency and accuracy of health data. Information is critical in the movement of goods and services. Information is a key supply chain driver because it allows the other systems to work together with the goal of creating an integrated supply chain at different levels of the ecosystem. Information is crucial to supply chain performance because it provides critical insights to decision makers. Without information, they would not know what providers want, how much inventory is in stock or when more products should be produced or shipped.

## **Annex: Guiding questions in ensuring equitable access to COVID-19 vaccines**

### **Policy area 1: Develop a strategy to finance the COVID-19 vaccination programme**

Guiding questions	<ul style="list-style-type: none"> <li>• Does the Government have a clear strategy to finance the COVID-19 programme in the short, medium and long term?</li> <li>• Does the Government have an exhaustive plan that outlines the sources of financing for the COVID-19 vaccination programme?</li> <li>• Does the plan include the financing of non-vaccine components of the vaccination programme, such as human resources, service delivery, and supply chain and logistics?</li> </ul>
Potential challenges/s	<ul style="list-style-type: none"> <li>• Lack of detailed strategy and plan to finance COVID-19 vaccination, in particular as it becomes part of the regular public health/government programme.</li> </ul>
Recommended measures	<ul style="list-style-type: none"> <li>• The Government should develop a well-thought strategy and plan to finance a universal COVID-19 vaccination programme, recognizing the political and economic realities. For example, the plan should describe how the Government will finance the COVID-19 vaccination programme in a highly decentralized health system (i.e. defined roles of national and subnational levels). It should recognize the financing roles of both public and private sectors.</li> </ul>

### **Policy area 2: Ensure out-of-pocket (OOP) costs will not be the main source of financing COVID-19 vaccines**

Guiding questions	<ul style="list-style-type: none"> <li>• Has the Government already identified the actual financing needs for the COVID-19 vaccination programme in the short to medium term?</li> <li>• Does the Government have enough fiscal space for health to finance a universal COVID-19 vaccination programme?</li> <li>• Does the Government aim to incorporate the COVID-19 vaccination programme into the benefit package of the current government financing scheme?</li> <li>• Does the Government aim to use OOP costs or co-payments to finance COVID-19 vaccines?</li> </ul>
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	<ul style="list-style-type: none"> <li>• Has the Government included a line item for the COVID-19 vaccination programme in national budget?</li> <li>• Does the Government have a resource mobilization strategy to finance the COVID-19 vaccination programme (e.g., vaccines and ancillaries) in the short to medium term?</li> <li>• Does the Government have a strategic plan, which outlines the specific roles of national and subnational levels in terms of financing the entire COVID-19 vaccination programme?</li> <li>• Does the Government have an explicit policy to ensure that COVID-19 vaccines are affordable for poor and vulnerable populations?</li> </ul>
Potential challenges/s	<ul style="list-style-type: none"> <li>• The current fiscal space of the Government cannot finance universal implementation of the COVID-19 vaccination programme.</li> <li>• In a decentralized health system, the capacity of subnational units is highly variable.</li> <li>• The Government aims to use OOP payments or user fees to quickly mobilize and implement the COVID 19 vaccination programme.</li> </ul>
Recommended measures	<ul style="list-style-type: none"> <li>• The Government should mobilize additional resources to fund the COVID-19 vaccination programme through higher budget allocation (e.g. budget line item, social insurance) and through external government funds (e.g. loans and grants).</li> <li>• In the event of limited fiscal space, the Government should prioritize financial access among the poor and vulnerable population.</li> </ul>

**Policy area 3: Ensure quantity and quality of primary care providers to deliver the COVID-19 vaccination programme**

Guiding questions	<ul style="list-style-type: none"> <li>• Based on the current inventory of health workers (both public and private health workers), are human resources sufficient to implement the vaccination programme on top of providing other health services?</li> <li>• Is there a strategic plan to address the health human resources gap in the short to medium term to address both the COVID-19 vaccination programme and non-COVID-19 services? In particular: <ul style="list-style-type: none"> <li>○ To increase production (i.e. increase the number of health workers)?</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>○ To increase or change skill mix?</li> <li>• Are there policies and programmes to facilitate task shifting?</li> <li>• Is there a strategic plan to continuously improve the quality of health workers?</li> <li>• Does the Government have a strategic plan to reduce barriers in geographical/physical access to COVID-19 vaccination, including: <ul style="list-style-type: none"> <li>○ Outreach systems in remote areas?</li> <li>○ COVID-19 vaccination programmes in school and workplaces?</li> </ul> </li> </ul>
Potential challenges/s	<ul style="list-style-type: none"> <li>• Scarcity of health workers in local communities to deliver the COVID-19 vaccination programmes and other public health programmes.</li> <li>• Limited capacity and skills of health workers to deliver COVID-19 vaccination programme together with other public health programmes.</li> <li>• Unequal distribution of health workers/community health workers in the country.</li> </ul>
Recommended measures	<ul style="list-style-type: none"> <li>• Facilitate task shifting of health workers to increase the number of health workers who can implement the vaccination programme. This requires changing current medical laws and policies and strengthening capacity-building programmes.</li> <li>• Expand the use of community outreach to improve access to COVID-19 vaccines and other critical public health programmes.</li> <li>• In countries with mixed health systems (public and private), Governments could engage in public private partnerships (PPPs) (e.g. service contracting) to deliver the COVID-19 vaccination programme and other critical public health programmes.</li> <li>• In fragile contexts, vulnerable populations, such as women, indigenous peoples, poor households and migrants, are less likely to seek health care including vaccination programmes because of geographical, structural and institutional barriers. Hence, the Government should develop innovative delivery mechanisms to increase access among vulnerable groups.</li> </ul>

#### Policy area 4: Strengthening supply chain capacity

Guiding questions	<ul style="list-style-type: none"><li>• Has the Government identified/projected the supply and logistics infrastructure needs in the short to medium term?</li><li>• Based on current inventory, do all subnational governments have enough supply chain and logistics infrastructure?</li><li>• Does the Government have a strategic plan to strengthen the supply chain and logistics infrastructure of subnational units by doing the following:<ul style="list-style-type: none"><li>○ Increasing capital investment in supply chains?</li><li>○ Increasing the capacity and skills of subnational governments for supply chain and logistics planning?</li></ul></li></ul>
Potential challenges/s	<ul style="list-style-type: none"><li>• Supply chains in some settings are complex and fragmented, with multiple configurations and variable levels of maturity and performance and degrees of private-sector participation.</li><li>• Supply chains in some settings have geographic challenges, and some areas are prone to natural disasters. Governments are operating supply chains in environments with suboptimal communication and imperfect information systems.</li></ul>
Recommended measures	<ul style="list-style-type: none"><li>• Explore the use PPPs (e.g. management contracts) to strengthen current government supply chain systems.</li><li>• Adopt digital technology in the supply chain system to improve operations. Information is a key supply chain driver because it allows the other systems to work together with the goal of creating an integrated supply chain at a different level of the ecosystem. Information is crucial to supply chain performance because it provides critical insights to decision makers. Without information, they would not know what providers want, how much inventory is in stock, or when more products should be produced or shipped.</li></ul>



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