



Asia-Pacific
Economic Cooperation

APEC Policy Support Unit
POLICY BRIEF No. 40
May 2021

Promoting Trade in Vaccines and Related Supplies and Equipment

By Carlos Kuriyama

KEY MESSAGES

- The global trade in vaccines and related supplies and equipment is significant, equivalent to USD 418.5 billion in 2019, with further growth prospects based on trade estimates in 2020.
- APEC is a net importer of vaccines and related goods. Most of these products imported by APEC economies come from other APEC economies. While most vaccines for human use imported by APEC originate in Europe, APEC economies are collectively responsible for the majority of the world's COVID-19 vaccine production. Moreover, most of the goods vital for COVID-19 vaccine manufacturing and distribution also originate from within the APEC region.
- Five APEC economies explain more than 80 percent of APEC exports of vaccines and related supplies and equipment. Similarly, over 75 percent of APEC imports involved five APEC economies.
- Most-favoured nation (MFN) tariffs on vaccines are very low in most APEC economies. However, other products within the vaccine supply chain face higher tariff rates in a number of APEC economies, including alcohol solutions, freezing equipment, packaging and storage materials, vials and rubber stoppers.
- Trade policy could facilitate the provision of COVID-19 vaccines. APEC economies could discuss initiatives to reduce or eliminate tariffs on vaccines and related goods, and refrain from implementing export restrictions and prohibitions on those goods.
- APEC economies could also discuss initiatives on trade facilitation to secure supply lines and minimise disruptions in the vaccine supply chain. They also need to look at issues related to intellectual property and standards and conformance to help increase vaccine production levels within a short timeframe.

One of the strategies to control the COVID-19 pandemic is by enhancing testing capacity and deploying comprehensive vaccination programmes to protect the population against COVID-19. Creating testing kits, as well as producing, distributing and administering vaccines are not easy tasks, as they involve vast resources in research, logistics and complex global supply chains.

In November 2020, APEC Leaders recognised that 'extensive immunisation against COVID-19 is critical in order to bring the pandemic to an end'.¹ They reaffirmed the need to cooperate on different aspects of the fight against COVID-19, including the various phases of the vaccine supply chain. The Declaration

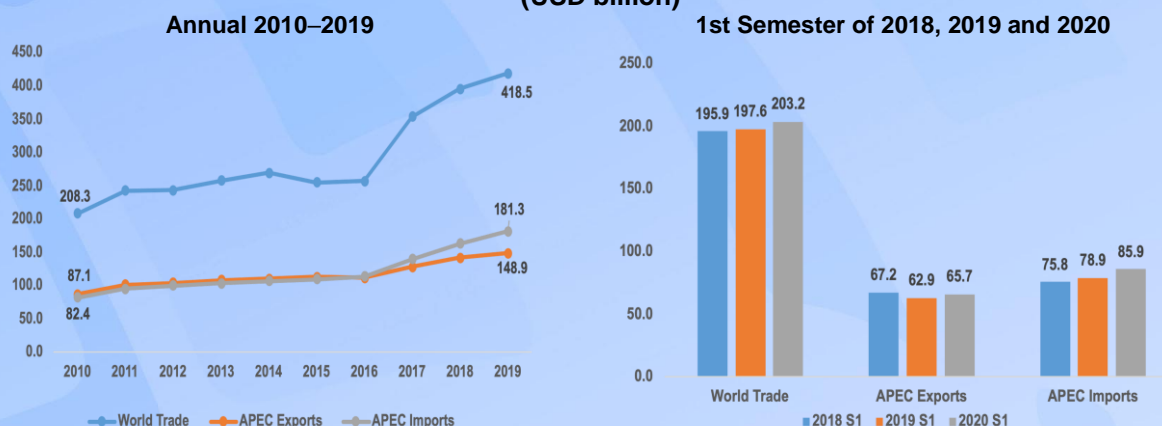
underlined that facilitating access to safe, effective and affordable COVID-19 vaccines is one of the critical steps for any effective strategy to safeguard people's health in the context of this pandemic.

The general situation in most of the world is critical and APEC economies have been responding quickly to the challenges. However, the COVID-19 pandemic is far from being under control. APEC economies need to take not just individual, but also collective action to fight this pandemic. The situation is unprecedented and there is a sense of urgency to look beyond business-as-usual considerations to propose effective measures.

¹ APEC, "2020 Leaders' Declaration," 27th APEC Economic Leaders' Meeting, Kuala Lumpur, Malaysia, 20 November

2020, https://www.apec.org/Meeting-Papers/Leaders-Declarations/2020/2020_aelm

Figure 1. Trade in vaccines and related supplies and equipment, World and APEC (USD billion)



Note: For comparison purposes, data in the chart on the right for the first half of 2018, 2019 and 2020 only takes into account 79 economies, including 15 APEC members. Within APEC, 2020 quarterly data are not available yet for Brunei Darussalam; Hong Kong, China; Indonesia; Mexico; Papua New Guinea; and Viet Nam.

Source: International Trade Centre (ITC) Trade Map; APEC Policy Support Unit (PSU) calculations.

Trade policy could contribute to tackling this crisis. This Policy Brief seeks to study the importance of the trade in vaccines and their related supplies and equipment, as well as identify issues affecting COVID-19 vaccine trade. In addition, the Policy Brief analyses existing tariff levels and non-tariff measures affecting those products in the APEC region, and provides policy recommendations to facilitate the provision of COVID-19 vaccines and related products, which are necessary to advance vaccination efforts.

Trade in Vaccines and Related Supplies and Equipment

Any vaccine supply chain is very sophisticated. Components used to produce a vaccine for human use include preservatives, adjuvants, stabilisers, inactivated ingredients, antibiotics and lipid nanoparticles. Vaccines also require proper packaging for storage and distribution, which means a need for products such as ampoules, vials, stoppers, insulated cartons, cold boxes, dry ice and freezing equipment. The vaccine administration stage usually requires trained staff to use medical products like disinfectant, gauze, and syringes with needles in a safe manner.

In order to estimate the amount of trade in vaccines and related supplies and equipment, this Policy Brief takes into account 42 products from the list developed jointly by the World Customs Organization (WCO) and

World Health Organization (WHO) on vaccines and related supplies and equipment,² and the list included in a 2021 Organisation for Economic Co-operation and Development (OECD) study on selected vaccine-related inputs.³ Among the products, 11 are categorised as vaccine ingredients; 7 as vaccines, test kits, instruments and apparatus used in diagnostic testing; and 24 as disinfectants, medical consumables and equipment related to vaccines⁴.

Calculations take into account trade flows of these 42 products using the harmonised system (HS) nomenclature at the 6-digit code level, as indicated in the WCO and OECD lists. Trade figures may be overestimated in some cases, as some of these 6-digit codes may include products unrelated to any vaccine supply chain. Trade data at a higher level of disaggregation (e.g., 8- or 10-digit codes), which could provide a more accurate estimation, are not harmonised across economies and not publicly available in some cases.

At the global level, the amount of trade in vaccines and related supplies and equipment is significant (Figure 1). The world trade of these products doubled from USD 208.3 billion to USD 418.5 billion between 2010 and 2019 and have been increasing since the start of the pandemic. Similarly, APEC economies increased their exports of vaccines and related supplies and equipment by 70.9 percent from USD 87.1 billion to USD 148.9 billion over the same period. APEC

² World Customs Organization (WCO), "HS Classification Reference for Vaccines and Related Supplies and Equipment," 2020, <http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/facilitation/activities-and-programmes/natural-disaster/covid-19-list-for-vaccines/hs-classification-reference-vaccines-english.pdf?la=en>

³ Organisation for Economic Co-operation and Development (OECD), "Using Trade to Fight COVID-19: Manufacturing and

Distributing Vaccines" (OECD, 2021), <https://www.oecd.org/coronavirus/policy-responses/using-trade-to-fight-covid-19-manufacturing-and-distributing-vaccines-dc0d37fc/>

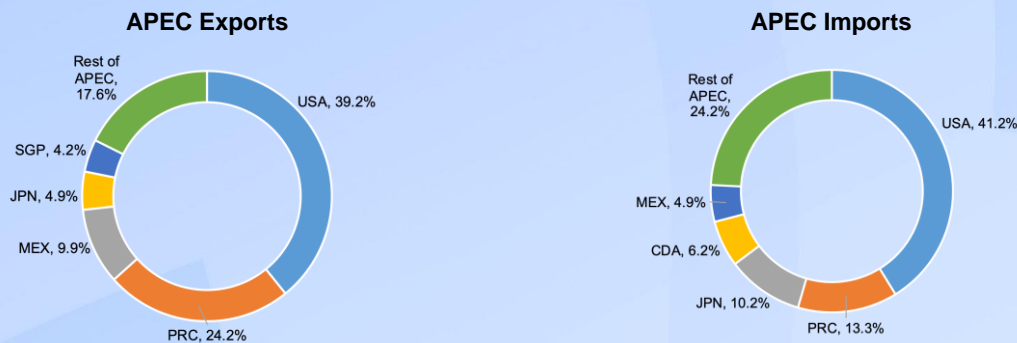
⁴ See Annex for the details of the HS sub-headings included in this Policy Brief.

Figure 2. Distribution of APEC trade in vaccines and related supplies and equipment by category, 2019



Note: Percentages obtained from trade data expressed in nominal USD.
Source: ITC Trade Map; APEC PSU calculations.

Figure 3. Distribution of APEC trade in vaccines and related supplies and equipment by economy, 2019



CDA=Canada; PRC=China; JPN=Japan; MEX=Mexico; SGP=Singapore; USA=United States
Note: Percentages obtained from trade data expressed in nominal USD.
Source: ITC Trade Map; APEC PSU calculations.

imports also went up from USD 82.4 billion to USD 181.3 billion, an expansion of 120.1 percent.

While data for year 2020 is only available for the first half of the year, it is very likely that the trade flows of these products increased worldwide in 2020, as their trade flows grew 2.9 percent year-on-year in the first half of 2020. Likewise, APEC exports and imports increased by 4.3 percent and 8.9 percent, respectively.

In addition, with COVID-19 vaccinations beginning to roll out at the end of 2020, it is possible that the emerging COVID-19 vaccine trade had a significant positive effect on the trade statistics of vaccines and related supplies and equipment during the second half of 2020.

In APEC, a majority of trade in vaccines and related supplies and equipment is explained by disinfectants, medical consumables, and equipment related to vaccines.

In 2019, most of APEC exports of vaccines and related goods is explained by disinfectants, medical consumables and equipment related to vaccines (71.0%) (Figure 2).⁵ In other words, a majority of these exports in terms of value are related to goods that are critical for the distribution and administration of vaccines. Vaccines, test kits, and apparatus for diagnostic testing represented 25.4 percent of those exports. Ingredients to produce vaccines accounted for only 3.6 percent of those exports. From the import perspective, 56.0 percent of those APEC imports correspond to disinfectants, medical consumables and equipment related to vaccines; 41.9 percent to vaccines, test kits, and apparatus for diagnostic testing and 2.2 percent to vaccine ingredients.

⁵ Since trade data for 2020 is not available for all APEC economies, this Policy Brief analyses trade flows using data from year 2019, unless otherwise stated.

Table 1. Top 5 APEC exports of vaccines and related supplies and equipment, 2019

Type	HS 2017 Code	Description	USD billion	Share
DMCE	901890	Vaccine carriers	26.9	18.1%
DMCE	854370	Ultra-violet irradiation equipment for disinfection	24.7	16.6%
DMCE	901839	Needles used in medical science	15.3	10.3%
VTKD	300215	Test kits based on immunological reactions	13.4	9.0%
VTKD	382200	Test kits based on polymerase chain reaction	11.8	8.0%
Total Top 5 APEC exports			92.1	61.9%
Total APEC exports			148.9	100.0%

DMCE=disinfectants, medical consumables and equipment related to vaccines; VTKD=vaccines, test kits/instruments and apparatus used in diagnostic testing

Source: ITC Trade Map; APEC PSU calculations.

Table 2. Top 5 APEC imports of vaccines and related supplies and equipment, 2019

Type	HS 2017 Code	Description	USD billion	Share
VTKD	300215	Test kits based on immunological reactions	42.3	23.4%
DMCE	901890	Vaccine carriers	30.6	16.9%
DMCE	854370	Ultra-violet irradiation equipment for disinfection	22.6	12.4%
DMCE	901839	Needles used in medical science	14.2	7.8%
VTKD	300220	Vaccines for human use	12.0	6.6%
Total Top 5 APEC imports			121.8	67.2%
Total APEC imports			181.3	100.0%

DMCE=disinfectants, medical consumables and equipment related to vaccines; VTKD=vaccines, test kits/instruments and apparatus used in diagnostic testing

Source: ITC Trade Map; APEC PSU calculations.

Products related to diagnostic test kits, vaccine distribution and administration are more traded by APEC economies than vaccines for human use.

In 2019, the most exported products by the APEC region in the vaccine supply chains were related to the stages of vaccine distribution and administration. Vaccine carriers, ultra-violet irradiation equipment for disinfection purposes and needles used for medical science accounted for nearly 45 percent of the exports of the products in the vaccine supply chain, followed by test kits based on immunological reactions and polymerase chain reactions, which accounted for 9 percent and 8 percent respectively of these exports (Table 1).

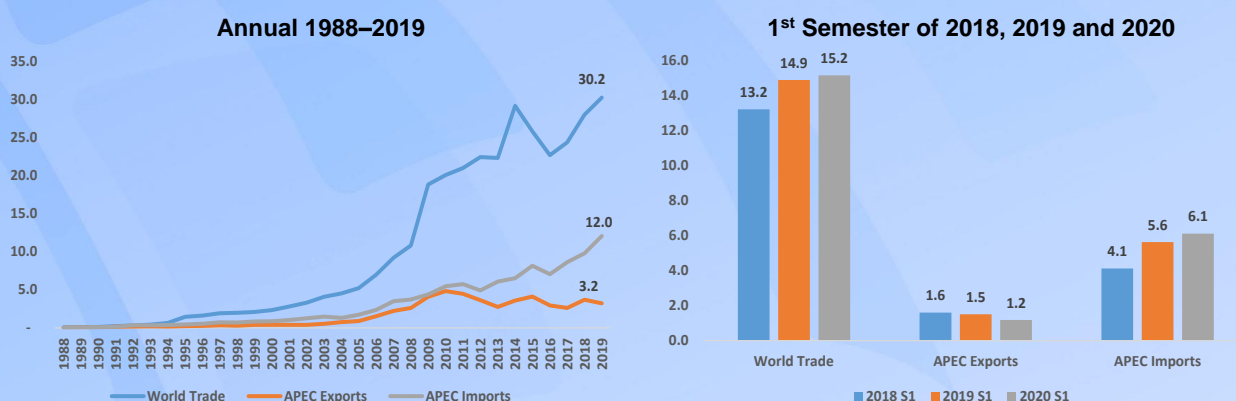
Together, the top five products in the vaccine supply chain represented 61.9 percent of these exports. In contrast, vaccines for human use only accounted for 2.2 percent of these exports

In APEC, test kits based on immunological reactions topped the list of imports of vaccines and related goods, representing 23.4 percent of the total. Similar to the top products in the export list, the main imported products were related to vaccine distribution and administration. Vaccine carriers, ultra-violet irradiation equipment for disinfection purposes and needles used for medical science also appeared in the top five main products imported by the APEC region. Vaccines for human use complete the list of top five APEC imports.

On the whole, the top five imported products in the vaccine supply chains accounted for 67.2 percent of the imports in the APEC region.

A few APEC member economies account for a significant percentage of APEC exports and imports of vaccines and related goods.

In 2019, the United States and China accounted for 63.4 percent of the exports of vaccines and related supplies and equipment by APEC economies (Figure 3). The top five APEC exporters, which also included Japan; Mexico; and Singapore, accounted for 82.4 percent of APEC exports. On the other hand, the relative share of the top five importers (the United States; China; Japan; Canada; and Mexico) was slightly lower (75.8 percent of APEC imports), with the United States and China representing 54.5 percent of the APEC imports of vaccines and related supplies and equipment.

Figure 4. Trade in vaccines for human use (HS 300220) (USD billion)

Source: ITC Trade Map; World Integrated Trade Solution (WITS); APEC PSU calculations.

Note: For comparison purposes, data in the right chart for the 1st half of 2018, 2019 and 2020 only takes into account 79 economies, including 15 APEC members. Within APEC, 2020 quarterly data is not available yet for Brunei Darussalam; Hong Kong, China; Indonesia; Mexico; Papua New Guinea; and Viet Nam.

A majority of the APEC imports of all types of vaccines for human use and related supplies and equipment come from within the APEC region, followed by Europe.

In 2019, 55.6 percent of APEC imports of vaccines and related supplies and equipment originated within the APEC region (Table 3). Another importance source for APEC economies was Europe, in particular those economies within the European Union and the European Free Trade Association (EFTA), as well as the United Kingdom, which collectively contributed to 39 percent of APEC imports. In fact, the list of top 10 economies supplying those products to the APEC region comprised five APEC members (the United States; China; Mexico; Japan; and Canada) and five European partners, accounting for nearly 75 percent of APEC imports. Deepening economic relationships within APEC and with European partners could facilitate the provision of goods that are essential for the production, distribution and administration of vaccines.

Trade in vaccines for human use has increased significantly worldwide. Imports by APEC members have risen considerably.

In 2019, vaccine trade worldwide reached USD 30.2 billion, a 50.7 percent growth from the level recorded in 2010. Likewise, APEC imports of vaccines also jumped from USD 5.5 billion to 12 billion during the same period, equivalent to an increase of 120.6 percent. On the other hand, APEC exports of vaccines declined by 32.9 percent, falling from USD 4.8 billion to 3.2 billion.

Data from the first half of 2020 show a global increase in the vaccine trade, as well as a higher level of APEC imports in comparison to similar periods in 2018 and 2019. This suggests that global trade and APEC

Table 3. Main sources of APEC imports of vaccines and related supplies and equipment (USD billion)

	2019	Share
Total	181.3	100.0%
United States of America	30.5	16.8%
China	22.4	12.3%
Germany	21.4	11.8%
Mexico	16.0	8.8%
Ireland	15.9	8.8%
Japan	9.3	5.2%
Belgium	5.9	3.3%
Switzerland	5.8	3.2%
United Kingdom	4.2	2.3%
Canada	4.1	2.3%
Others	45.8	25.2%
From APEC	100.8	55.6%
From EU+EFTA+UK	70.8	39.0%

EFTA=European Free Trade Association;
EU=European Union; UK=United Kingdom
Source: ITC Trade Map; APEC PSU calculations.

imports of vaccines would record a higher value in 2020 than in 2019, particularly since COVID-19 vaccines only became available at the end of 2020.

Figure 4 shows exponential growth in the global trade in vaccines for human use. Between 1988 and 2019, their global trade multiplied 416 times, from USD 73 million to USD 30.2 billion. Certainly, trade liberalisation has played an important role in facilitating the accessibility of vaccines for human use worldwide. In the 1990s, most-favoured nation (MFN) tariffs for these vaccines were at least 5 percent in at least 73 economies and at least 10 percent in 30

Table 4. Global trade and APEC imports of vaccines by source, 2019

Global			APEC Imports		
Source	USD billion	Share	Source	USD billion	Share
Total	30.2	100.0%	Total	12.0	100.0%
Belgium	9.4	31.1%	Belgium	4.5	37.3%
Ireland	5.3	17.7%	Ireland	3.1	26.0%
France	4.3	14.1%	United States	1.3	10.8%
United Kingdom	3.4	11.3%	France	0.9	7.3%
United States	2.0	6.7%	Canada	0.5	3.7%
Italy	1.1	3.7%	Italy	0.4	3.1%
India	0.8	2.6%	United Kingdom	0.3	2.1%
Netherlands	0.6	2.0%	Germany	0.3	2.1%
Poland	0.6	2.0%	Switzerland	0.2	1.8%
Germany	0.5	1.7%	Netherlands	0.2	1.6%
Others	2.2	7.3%	Others	0.5	4.1%
APEC	3.2	10.7%	APEC	2.1	17.4%
EU+EFTA+UK	26.1	86.5%	EU+EFTA+UK	9.9	81.8%

EFTA=European Free Trade Association; EU=European Union; UK=United Kingdom

Source: ITC Trade Map; APEC PSU calculations.

Table 5. COVID-19 vaccine production as of 03 March 2021 (million doses)

Economy	No. of vaccines produced	Share	Manufacturer
Total	413.0	100.0%	All
China	141.6	34.3%	CanSino, AstraZeneca, Beijing/Sinopharm, Sinovac
United States	103.0	24.9%	Pfizer/BioNTech, Moderna
Germany/Belgium	70.5	17.1%	Pfizer/BioNTech
India	42.4	10.3%	AstraZeneca, Bharat/ICMR/NIV
United Kingdom	12.2	3.0%	AstraZeneca
Netherlands/Belgium	10.5	2.5%	AstraZeneca
Russia	10.5	2.5%	Gamaleya Research Institute
Switzerland	5.5	1.3%	Moderna
Korea	1.6	0.4%	AstraZeneca
Others	15.2	3.7%	

Source: Airfinity.

economies.⁶ By 2019, only eight economies around the world imposed MFN tariffs above 5 percent and only two economies charged tariffs reaching 10 percent.

European partners dominate the world trade of vaccines for human use. Most of the APEC imports of vaccines for human use are purchased from those partners.

Members of the European Union and EFTA, and the United Kingdom, exported collectively 86.5 percent of the global trade of vaccines in 2019. Only 10.7 percent of the total exports of vaccines originated from the APEC region. The United States was the only APEC member in the top 10 list of vaccine exporters worldwide.

Most of the vaccines imported by APEC also came from Europe. 81.8 percent of the vaccines imported by APEC economies came from their European partners. Only 17.4 percent of the APEC imports of vaccines were sourced from within the APEC region. The United States and Canada were the only APEC economies in the top 10 list of suppliers of vaccines for the APEC region.

While the 2019 statistics do not reflect any trade of COVID-19 vaccines, the information could help to identify those economies with the capacity to meet Good Manufacturing Practices (GMP). GMP is required to produce vaccines for human use, including COVID-19 vaccines. Table 4 suggests that the APEC region may be relying on Europe for the supply of COVID-19 vaccines being manufactured in Europe, as well as on the development and production of those vaccines within the APEC region.

COVID-19 Vaccine Production in the APEC Region

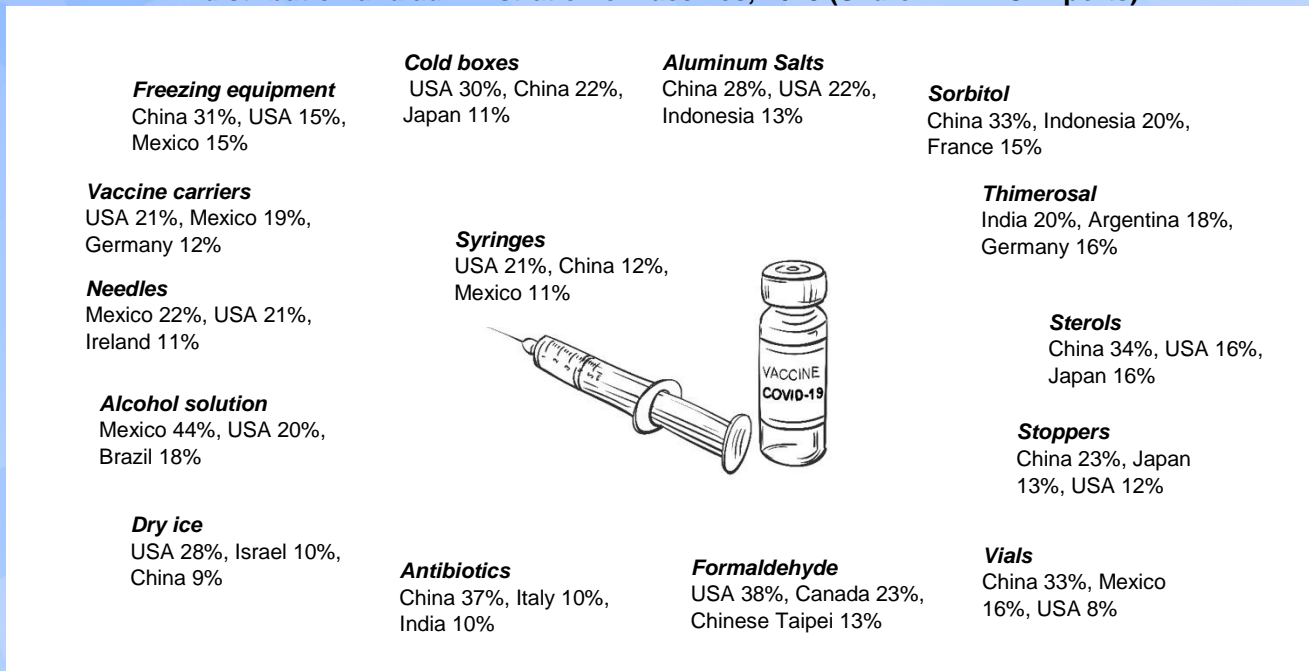
COVID-19 vaccine production is ramping up quickly in the APEC region and Europe, but production levels are clearly insufficient to meet demand.

Some APEC economies have already started manufacturing COVID-19 vaccines. Data as of early March 2021 show that China tops the production of vaccines with 141.6 million doses, followed by the United States with 103 million doses. Russia and Korea have also produced 10.5 million and 1.6 million

⁶ APEC, "APEC Regional Trends Analysis – Globalisation: The Good, the Bad, and the Role of Policy," (Singapore: APEC, May 2017), 7,

<https://www.apec.org/Publications/2017/05/APEC-Regional-Trends-Analysis-Globalisation-The-Good-The-Bad-and-the-Role-of-Policy>

Figure 5. Main sources of APEC imports of supplies and equipment necessary for the production, distribution and administration of vaccines, 2019 (Share in APEC imports)



Source: ITC Trade Map; APEC PSU calculations. Image from Shutterstock.

doses, respectively.⁷ These four APEC members account for 62.2 percent of the global COVID-19 vaccine production as of early March 2021.

The current production capacity falls short of meeting the global demand for COVID-19 vaccines, including in the APEC region. As of early March 2021, an estimated 413 million doses have been produced.⁸ Considering that the global population is 7.9 billion, assuming that two doses are needed to fully vaccinate one person, around 14.2 billion doses are required to vaccinate 90 percent of the population, which is a safe estimated level that could lower the number of new cases and eventually stop the spread of the disease.⁹

Similarly, the APEC region with a population of 2.9 billion people will require around 5.2 billion doses to cover 90 percent of the population. However, since the vaccines are not 100 percent effective and it is possible that some vaccines may require a booster as they may lose their effectiveness against new variants, more vaccine doses will be needed to achieve herd immunity.

⁷ Airfinity, "COVID-19 Vaccine Production" (presented at the *Global COVID-19 Vaccine Supply Chain and Manufacturing Summit*, International Federation of Pharmaceutical Manufacturers and Associations, 8 March 2021), https://www.ifpma.org/wp-content/uploads/2021/03/Airfinity_global_summit_master_final.pdf

⁸ Airfinity, "COVID-19 Vaccine Production".

⁹ K. Kadhoda, "Herd Immunity to COVID-19: Alluring and Elusive," *American Journal of Clinical Pathology* 155, no. 4 (April 2021): 471–2, <https://academic.oup.com/ajcp/article/155/4/471/6063411?logi>

According to the Duke Global Health Innovation Center, an optimistic forecast by the end of 2021 is to produce 12 billion doses of COVID-19 vaccines.¹⁰ However, to achieve this, producers have to ramp up their production capacity to levels never achieved before. According to the WHO, the global market volume of all types of vaccines (against flu and other diseases) was around 5.5 billion doses in 2019.¹¹

Difficulties in ramping up production include shortage of trained staff; intellectual property rights (concerning the manufacturing of COVID-19 vaccines and vaccine components) being in the possession of a few firms; lack of laboratories with the capacity to meet GMP to produce safe vaccines; trade barriers affecting vaccine components and related goods; and other unexpected events disrupting the COVID-19 vaccine supply chain.

Since vaccine production relies on a specialised supply chain with multiple inputs originating from

n=true. This paper mentions that a decent safety margin to achieve herd immunity is vaccination levels of around 86 to 90 percent of the population.

¹⁰ Duke Global Health Innovation Center, *Launch and Scale Speedometer*, accessed 07 May 2021, <https://launchandscalefaster.org/covid-19/vaccinemanufacturing>

¹¹ World Health Organization, "Global Vaccine Market Report," December 2020, 1, https://www.who.int/immunization/programmes_systems/procurement/mi4a/platform/module2/2020_Global_Vaccine_Market_Report.pdf?ua=1

Table 6. Number of APEC member economies per range of average MFN tariff, 2020

Duty Range	All Vaccine-related Products	Vaccines, Test Kits/Diagnostic Instruments	Disinfectants, Medical Consumables and Equipment	Vaccine Ingredients
0	2	4	2	5
0<=2.5	6	6	6	12
2.5<=5	4	3	2	1
5<=7.5	3	8	4	3
7.5<=10	2	0	2	0
10<=15	3	0	2	0
>15	1	0	3	0
Average MFN tariff (%)	6.0	3.1	8.7	1.9

Table 7. APEC average MFN tariffs on vaccine ingredients, 2020

#	HS Code	Description	Average MFN Tariff (%)
1	283322	Aluminum salts. Adjuvants	3.9
2	290544	Sorbitol. Stabilizers	3.8
3	291211	Formaldehyde. Inactivating ingredients to kill viruses or inactivate toxins	2.8
4	285210	Thimerosal. Preservatives	2.1
5	294110	Penicillins and their derivatives with a penicillanic acid structure, salts thereof	1.8
6	290613	Sterols. Lipid nanoparticles (LNP) in mRNA vaccines	1.6
7	294130	Tetracyclins and their derivatives; salts thereof	1.1
8	294140	Chloramphenicol and its derivatives; salts thereof	1.1
9	294150	Erythromycin and its derivatives; salts thereof	1.1

Table 8. APEC average MFN tariffs on vaccines, test kits and diagnostic instruments, 2020

#	HS Code	Description	Average MFN Tariff (%)
1	701090	Vials or phials	6.3
2	401699	Stoppers	5.1
3	701010	Ampoules	3.6
4	382100	Prepared culture media for the maintenance of a viral sample or cells	2.5
5	382200	Test kits based on polymerase chain reaction	2.3
6	300215	Test kits based on immunological reactions	0.9
7	300220	Vaccines for human use	0.8

Note (tables 6 to 8): Latest available data was from year 2019 for Brunei Darussalam; Chile; and Papua New Guinea; 2018 for Indonesia and Peru; and 2017 for Viet Nam.

Source (tables 6 to 8): WTO Data Portal; UNCTAD TRAINS Database; APEC PSU calculations.

across the APEC region and the rest of the world, this further underscores the importance of ensuring that global supply chains are functional and resilient. The economic interdependence invariably means that free and open trade will help ramp up COVID-19 vaccine production quickly. This, together with addressing supply chain challenges, is critical to ensure that vaccine distribution is not jeopardised. Indeed, if vaccines or important related goods are unaffordable or unavailable due to tariffs, export restrictions or delays in transit, additional vaccine production may be for naught.

MFN Tariffs on Vaccines and Related Supplies and Equipment

MFN tariffs on vaccines and related supplies and equipment are low in a majority of APEC members. Most APEC economies impose low average MFN tariff rates on vaccine ingredients.

Table 6 shows 12 APEC economies recording an average MFN tariff of 5 percent or less on all vaccines and their related supplies and equipment. Just four APEC economies still maintain an average MFN tariff above 10 percent.

In the case of vaccine ingredients, the average MFN tariff is low in most APEC economies (Table 7). Eighteen APEC economies impose an average MFN tariff equivalent to 5 percent or below. The highest MFN average tariffs are imposed on aluminum salts (adjuvants to help stimulate a stronger immune response), sorbitol (stabiliser to keep the strength of the vaccine during transportation and storage) and formaldehyde (inactivating ingredient to kill viruses or inactivate toxins) at 3.9 percent, 3.8 percent and 2.8 percent, respectively.

In APEC, the average MFN tariff duty on vaccines for human use is very low. However, vials and rubber stoppers, which are essential to produce vaccines, are subject to higher average MFN tariff duties.

The average MFN tariff rate on vaccines for human use is very low in the APEC region, equivalent to only 0.8 percent (Table 8). In fact, 15 APEC economies do not charge any tariff duty on vaccines and only one economy imposes an MFN tariff duty above 5 percent.

However, the situation is different for other essential products in vaccine manufacturing, such as glass vials and rubber stoppers, which have average MFN tariff rates of 6.3 percent and 5.1 percent, respectively. Indeed, nine APEC

Table 9. APEC average MFN tariffs on disinfectants, medical consumables and equipment related to vaccines, 2020

#	HS Code	Description	Average MFN Tariff (%)
1	220710	Alcohol solution. Undenatured, containing by volume 80% or more ethyl alcohol	77.2
2	220890	Alcohol solution. Undenatured, 70% ethyl alcohol	29.5
3	220720	Alcohol solution. Denatured ethyl alcohol, of any strength	14.6
4	841840	Freezers of the upright type, not exceeding 900 l capacity	8.5
5	841830	Freezers of the chest type, not exceeding 800 l capacity	8.2
6	841850	Furniture incorporating refrigerating or freezing equipment	6.8
7	392310	Cold boxes for storage or distribution	5.8
8	841869	Other freezing equipment	5.6
9	481950	Other packing containers, including record sleeves	5.3
10	481960	Box files, storage boxes of paper or paperboard	5.3

Note: Latest available data was from year 2019 for Brunei Darussalam; Chile; and Papua New Guinea; 2018 for Indonesia and Peru; and 2017 for Viet Nam.

Source: WTO Data Portal; UNCTAD TRAINS Database; APEC PSU calculations.

economies impose MFN tariff rates above 5 percent for both vials and rubber stoppers.

The highest MFN average tariffs are on disinfectants, medical consumables and equipment related to the production, distribution, storage or administration of vaccines.

A review of the 10 products with the highest average MFN tariff in the APEC region shows that almost all of them are disinfectants, medical consumables, or materials or equipment that are required in the stages of vaccine production, distribution, storage or administration (Table 9).

Three types of alcohol solutions, which are important to disinfect the area where vaccines are administered, recorded average duty rates of 77.2 percent, 29.5 percent and 14.6 percent.¹² These average MFN tariffs are high because many economies implement high non ad-valorem duties, as those products could also be used for purposes unrelated to health. Thirteen APEC economies have an MFN tariff rate or ad valorem equivalent higher than 10 percent for at least one of those alcohol solutions. Only four APEC economies record tariff rates or ad valorem equivalents of below 5 percent for the three alcohol solutions.

Other important products with high MFN tariffs in some economies are freezing equipment and packaging materials for vaccine storage and distribution. For example, eight APEC economies impose MFN tariff rates of 10 percent or above for some freezing equipment. For two of them, their tariff duties are equivalent to 30 percent. In the case of packing containers and storage boxes made of paperboard, two APEC economies record MFN tariff rates greater than or equal to 20 percent.

¹² Ad-valorem MFN tariff rates and ad-valorem tariff equivalents over 100 percent have been reported in some APEC member economies.

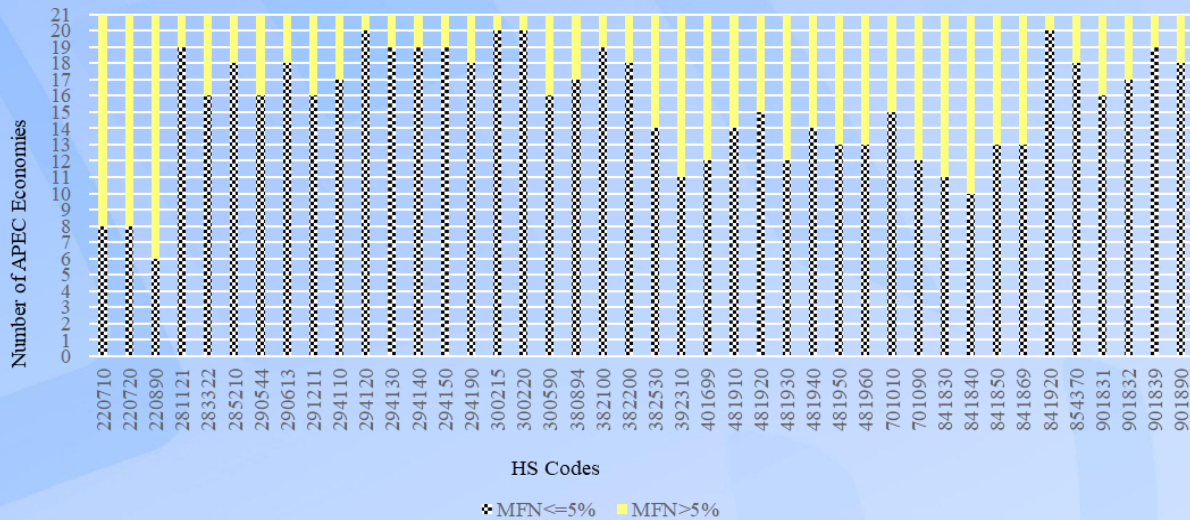
APEC could further facilitate trade on vaccines and related supplies and equipment by reducing or eliminating tariffs on those products that are important in the vaccine supply chain on a permanent basis. This could help in tackling the COVID-19 pandemic and getting the APEC region more prepared when other pandemics emerge in the future.

Sixteen of the 42 HS sub-headings in the list of products covered in this Policy Brief concern at least two-thirds of the APEC membership (14 economies) with MFN tariffs above 5 percent (Figure 6). Those products are as follows: alcohol solutions (HS 220710, 220720 and 220890), clinical waste from vaccination procedures (HS 382530), cold boxes for storage and distribution (HS 392310), stoppers (HS 401699), insulated cartons, containers and boxes for storage and distribution (HS 481910, 481930, 481940, 481950 and 481960), glass vials or phials (HS 701090) and freezing equipment (HS 841830, 841840, 841850 and 841869).

Since the emergence of the pandemic, several APEC economies have implemented measures to facilitate trade of medical products, including those that are part of the vaccine supply chain. According to the WTO, nine APEC economies have reduced or eliminated import tariffs below reported MFN tariff rates on a temporary basis.¹³ Those facilitating measures are usually for alcohol solution, vaccine ingredients, test kits, syringes and needles. While those measures could help facilitate access to vaccines on a temporary basis, a better outcome could be obtained by making those measures long-lasting. Only Mexico; New Zealand; and Singapore reported measures that seek

¹³ Other measure implemented by some APEC economies to facilitate trade of vaccine-related products is to exempt those imported products from value-added taxes and income taxes.

Figure 6. Number of APEC economies with MFN tariffs > 5%, 2020



Note: Latest available data was from year 2019 for Brunei Darussalam; Chile; and Papua New Guinea; 2018 for Indonesia and Peru; and 2017 for Viet Nam.
 Source: WTO Data Portal; UNCTAD TRAINS Database; APEC PSU calculations.

to keep the elimination of those import tariffs on vaccines and related goods in the long term.¹⁴

Other Measures Affecting Trade in Vaccines and Related Supplies and Equipment

While export restrictions on vaccines and related supply and equipment are in place in few APEC economies, export controls in the European Union may also affect supplies to the APEC region.

According to the WTO database on COVID-19 measures affecting trade in goods, only two non-tariff measures restricting trade on vaccines and related supplies and equipment are in force within the APEC region. Those two measures include a conditional prohibition on exporting certain pharmaceutical products in cases of drug shortages and a temporary measure to request an authorisation to export syringes and hypodermic needles.¹⁵ Since the start of the pandemic, four other measures implementing temporary export restrictions or bans have been repealed. They affected products such as alcohol solution, disinfectant preparations and bandages.¹⁶

However, in recent months, as the production of COVID-19 vaccines has not been able to meet the

demand, some governments outside APEC have issued measures to restrict exports of COVID-19 vaccines through export controls. One of these measures comes from the European Union, which is one of the most important vaccine suppliers for the APEC region. The European Union has put in place an export authorisation scheme, effective until 30 June 2021. This could have an impact on APEC members, as exports of COVID-19 vaccines to APEC economies could be affected if vaccine producers within the European Union cannot produce enough to execute the Advance Purchasing Agreements with the European Union.¹⁷

If export restrictions are placed on vaccines in either the APEC economies or the European Union, this could certainly affect the provision of vaccines to APEC members, given that APEC and the European Union export vaccines to APEC members (Table 4) and the importance of several economies in the two regions as COVID-19 vaccine producers (Table 5). Such restrictions could affect negatively vaccine production capacity as well, by discouraging investments and restricting the use of economies of scale.¹⁸ If export restrictions are also applied to important products in the vaccine supply chain, vaccine production could be further affected.

¹⁴ World Trade Organization (WTO), “COVID-19: Measures Affecting Trade in Goods,” as of 23 April 2021, https://www.wto.org/english/tratop_e/covid19_e/trade_related_goods_measure_e.htm

¹⁵ WTO, “COVID-19: Measures Affecting Trade in Goods.”

¹⁶ WTO, “COVID-19: Measures Affecting Trade in Goods.”

¹⁷ WTO, “COVID-19: Measures Affecting Trade in Goods.”

¹⁸ S.J. Evenett et.al. “The Covid-19 Vaccine Production Club: Will Value Chains Temper Nationalism?” (Policy research working paper no. 9565 (World Bank, March 2021), <http://documents1.worldbank.org/curated/en/244291614991534306/pdf/The-Covid-19-Vaccine-Production-Club-Will-Value-Chains-Temper-Nationalism.pdf>

Bottlenecks on intellectual property rights could affect plans to expand the production of COVID-19 vaccines in the short term.

Trade in COVID-19 vaccines is certainly being affected by bottlenecks that are affecting their production. In the opinion of some experts, one of the bottlenecks concerns intellectual property rights. Producing a vaccine requires a number of processes and components, which means that ownership of intellectual property could be scattered among several companies. Hence, negotiating those licences to enable a vaccine to be produced could take some time¹⁹. In addition, the intellectual property rights for some vaccine components could be held by very few companies.²⁰

The WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) allows governments, subject to meeting certain conditions, to issue a compulsory license to allow someone to produce a patented pharmaceutical product or process without the consent of the patent owner, and export those products under compulsory license to developing and least-developed economies lacking the capacity to produce those products. However, some experts have advised on certain disadvantages of using the compulsory license during a pandemic. The process to meet the requirements to issue these licenses could take time, and tackling a pandemic requires immediate action to produce vaccines and other necessary goods that are part of the vaccine supply chains.²¹

There are regulatory challenges to meet GMP. Divergence in protocols among economies could further complicate plans to ramp up production of vaccines.

To expand vaccine production is not an easy task as facilities also need to meet GMP to produce safe vaccines and other vaccine-related components.²² Biosecurity conditions to produce vaccines for human use are stringent and one of the biggest regulatory challenges for vaccine developers is ensuring that GMP in vaccine manufacturing facilities are met.²³ In addition, further complications may appear because of differences in the protocols that economies put in place to assure that the vaccine meets proper quality criteria.

¹⁹ A. Irwin, "What It Will Take To Vaccinate the World against COVID-19," *Nature* 592 (8 April 2021): 176–8. <https://www.nature.com/articles/d41586-021-00727-3>

²⁰ Irwin, "What It Will Take to Vaccinate."

²¹ R. Labonte and B.K. Baker, "Dummy's Guide to How Trade Rules Affect Access to COVID-19 Vaccines," *The Conversation*, 10 January 2021, <https://theconversation.com/dummys-guide-to-how-trade-rules-affect-access-to-covid-19-vaccines-152897>; P. Ranjan, "The Case for Waiving Intellectual Property Protection for Covid-19 Vaccines," (Issue Brief no. 456, Observer Research

Policy Recommendations

Fighting any pandemic requires collective action. APEC economies need to work together and governments need to join forces with the private sector. One strategy to combat the pandemic is to implement comprehensive vaccination programmes to protect the population. To support this, APEC economies could take action in the following areas.²⁴

- **Trade Liberalisation:** The world trade in vaccines and related supplies and equipment is significant and keeps growing. Trade is essential for the provision of vaccines. No economy has all the resources to produce sufficient vaccines and their components in an affordable and efficient manner. APEC economies should discuss initiatives involving the reduction or elimination of tariffs on vaccines and those goods that are essential to the production, distribution and administration of vaccines. This is crucial as several goods in the vaccine supply chain such as disinfectants, freezing equipment, vials and stoppers still face MFN tariff rates of above 5 percent in a number of APEC economies. In addition, APEC economies could commit to refraining from implementing unnecessary non-tariff measures, such as export restrictions and prohibitions affecting trade in vaccines and related goods.
- **Trade Facilitation:** The vaccine supply chain is sensitive to disruptions affecting any of its components. It is therefore important that APEC economies keep supply lines open even as movement restrictions on passenger travel have led to fewer flights, and thus less cargo capacity and higher prices. Strategies will also be needed to ensure that vaccines and their components can be procured from more than one source in order to prevent any unexpected events from affecting the provision of any goods in the vaccine supply chain. In addition, vaccines and other components are sensitive to temperature and require special equipment during the transportation and distribution process. Efforts to implement cold chain equipment and storage at strategic locations, including in communities far from the main urban centres, are required to keep several types of vaccines in good condition.

Foundation, April 2021), https://www.orfonline.org/wp-content/uploads/2021/04/ORF_IssueBrief_456_TripsWaiver.pdf

²² Irwin, "What Will It Take To Vaccinate."

²³ F. Mirasol, "GMPs Guide COVID-19 Vaccine Manufacturing," in BioPharm International, *Regulatory Sourcebook* (BioPharm International, eBook, October 2020), 9–10, <https://www.e-digitalitions.com/i/1300450-biopharm-october-regulatory-sourcebook/7>

²⁴ These actions could also support APEC economies in fighting future pandemics.

- Intellectual Property:** In order to produce the necessary quantities of vaccines, partnerships between academia, government and private sector are required globally. In the case of the COVID-19 vaccines, the intellectual property on components and processes are held by several firms. Technology transfer is an important aspect that APEC economies should promote to ramp up production levels. Licensing intellectual property rights to third parties within a short time could play an important role in increasing vaccine production. In addition, as identified by the WTO, some intellectual property-related actions are already being implemented by a number of parties to assist in the development and manufacturing of vaccines, such as committing to non-exclusive and royalty-free licensing, or issuing non-enforcement declarations in relation to patent rights in some or all jurisdictions, publishing scientific data on a free-to-use basis, publishing technical specifications of vital equipment and sharing knowledge.²⁵

Currently, there is a proposal at the WTO on a temporary waiver on certain TRIPS obligations in response to COVID-19, with the intention of accessing vaccines and medicines in a timely and affordable manner and to scale up production of essential medical products.²⁶ It would be ideal if APEC economies could bring a common position to the discussions at the WTO on the matter.

- Standards and Conformance:** To facilitate the production of vaccines, APEC economies need to ensure that their domestic regulations incorporate the WHO's GMP guidelines. In addition, they could collaborate on mutually recognising GMP inspections and approvals to ensure that the quality assurance for vaccines produced in one economy is valid for the other economies as well.

This crisis provides an opportunity for APEC to strengthen regional cooperation and ensure that APEC refocus its efforts on trade liberalisation and facilitation with the aim of ensuring equitable access to vaccines for all people and all economies in an attempt to end this pandemic. Trade policy efforts to facilitate the provision of vaccines clearly need to keep

in mind inclusion aspects. The pandemic will not end unless a significant part of the population has access to vaccines. In this sense, the implementation plan of the APEC Putrajaya Vision 2040 provides an opportunity for APEC members to include a strong cross-cutting component on inclusion for the years to come.

Carlos Kuriyama is a Senior Analyst with the APEC Policy Support Unit. The views expressed in this Policy Brief are those of the author and do not represent the views of the APEC member economies.

The author would like to thank Allan Goh Chye Soon for his research assistance and Denis Hew, Emmanuel San Andres and Aveline Low for their comments.

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Address: 35 Heng Mui Keng Terrace, Singapore 119616

Website: www.apec.org/About-Us/Policy-Support-Unit

E-mail: psugroup@apec.org

APEC#221-SE-01.4

²⁵ WTO, "Developing and Delivering COVID-19 Vaccines Around the World" (WTO, 22 December 2020), https://www.wto.org/english/tratop_e/covid19_e/vaccine_report_e.pdf

²⁶ WTO, "TRIPS Council to Continue to Discuss Temporary IP Waiver, Revised Proposal Expected in May," 30 April 2021, https://www.wto.org/english/news_e/news21_e/trip_30apr21_e.htm

Annex. Harmonised System classification for vaccines and related supplies and equipment

#	HS Code	Description	WCO	OECD
1	220710	Alcohol solution. Undenatured, containing by volume 80% or more ethyl alcohol	X	
2	220720	Alcohol solution. Denatured ethyl alcohol, of any strength	X	
3	220890	Alcohol solution. Undenatured, 70% ethyl alcohol	X	
4	281121	Dry ice (solid carbon dioxide)	X	X
5	283322	Aluminum salts. Adjuvants		X
6	285210	Thimerosal. Preservatives		X
7	290544	Sorbitol. Stabilisers		X
8	290613	Sterols. Lipid nanoparticles (LNP) in mRNA vaccines		X
9	291211	Formaldehyde. Inactivating ingredients to kill viruses or inactivate toxins		X
10	294110	Penicillins and their derivatives with a penicillanic acid structure, salts thereof		X
11	294120	Streptomycins and their derivatives; salts thereof		X
12	294130	Tetracyclins and their derivatives; salts thereof		X
13	294140	Chloramphenicol and its derivatives; salts thereof		X
14	294150	Erythromycin and its derivatives; salts thereof		X
15	294190	Other antibiotics		X
16	300215	Test kits based on immunological reactions	X	
17	300220	Vaccines for human use	X	
18	300590	Wadding, gauze, bandages, cotton sticks and similar articles	X	
19	380894	Alcohol-based hand sanitiser or other disinfectant preparations	X	
20	382100	Prepared culture media for the maintenance of a viral sample or cells	X	
21	382200	Test kits based on polymerase chain reaction	X	
22	382530	Clinical waste	X	
23	392310	Cold boxes for storage or distribution		X
24	401699	Stoppers		X
25	481910	Cartons, boxes and cases, of corrugated paper or paperboard		X
26	481920	Folding cartons, boxes and cases, of non-corrugated paper or paperboard		X
27	481930	Sacks and bags of paper, paperboard, cellulose wadding or fibres having a base of a width of 40cm or more		X
28	481940	Sacks and bags, including cones of paper, paperboard, cellulose wadding or fibres having a base of a width of 40cm or more		X
29	481950	Other packing containers, including record sleeves		X
30	481960	Box files, storage boxes of paper or paperboard		X
31	701010	Ampoules	X	
32	701090	Vials or phials	X	X
33	841830	Freezers of the chest type, not exceeding 800 l capacity	X	X
34	841840	Freezers of the upright type, not exceeding 900 l capacity	X	
35	841850	Furniture incorporating refrigerating or freezing equipment		X
36	841869	Other freezing equipment	X	
37	841920	Medical, surgical or laboratory sterilisers, including autoclaves	X	
38	854370	Ultra-violet irradiation equipment for disinfection.	X	
39	901831	Syringes, with or without needles	X	X
40	901832	Tubular metal needles and needles for sutures	X	
41	901839	Needles used in medical science		X
42	901890	Vaccine carriers		X

WCO=World Customs Organization, OECD=Organisation for Economic Co-operation and Development

Note: Based on the Harmonised System 2017 classification.