

Global vaccine market report

2023 Update

Key takeaways

WHO publishes regular reports on [global vaccine market dynamics](#), summarizing the overall health of the vaccine market in terms of enhancing access to vaccines – especially for countries that benefit from limited international support. In the [Global vaccine market report 2022: a shared understanding for equitable access to vaccines](#), WHO's Director-General made a call for action to enhance equitable access to vaccines for all in the wake of the COVID-19 experience. The 2023 report provides an update on key facts and figures and reinforces the call to action in the light of ongoing landmark regional and global initiatives, including the Pandemic Accord discussions¹ and the African Union's call for a New Public Health Order for Africa.²

The detailed analysis that supports the main takeaways of the report provides a supplementary analysis and is organized in the following sections: 1) Market size; 2) regulation; 3) Manufacturing and supply; 4) Global distribution; 5) Regional supply security; and 6) Pricing and procurement. The focus of the analysis is the year 2022, complemented with comparisons to 2021 so as to capture the evolution of the global market. Occasionally, a historical perspective from 2019 onwards is introduced since 2019 is the year with respect to which a “pre-pandemic” comparison can be performed.

This year's main observations are:

Looking at the size of the market, and despite the decline of COVID-19 vaccine purchases in 2022, COVID-19 vaccines continue to amount to a considerable fraction (60%) of the global vaccine market volume. Total volumes in the market, excluding COVID-19 vaccines were approximately 5 billion doses (consistent with 2021 and pre-pandemic years); other high-volume, non-COVID vaccines were seasonal Influenza, oral polio and tetanus-diphtheria-containing vaccines. In 2022 we see a significant increase in volumes of measles-rubella (MR) vaccines as a result of the catch-up efforts.

Excluding the COVID-19 portion of the market, global vaccine value has continued to grow over the past four years, driven partly by increasing use of high-priced adult vaccines (pneumococcal conjugate vaccine and shingles), as well as significant value growth in China driven primarily by private market demand for human papillomavirus vaccine.

Concentration of vaccine manufacturing remains, with 10 manufacturers alone providing 75% of vaccine doses (excluding COVID-19 vaccines) and capturing 85% of the global value of vaccines, with more than 80 manufacturers serving the remaining market.

The supply of vaccines for countries in the WHO African and the Eastern Mediterranean regions continues to come from outside the respective regions. Important investments in local production capacity by the regional and international community are ongoing to align with regional goals.



The Market Information for Access Initiative (MI4A) was launched in 2018 to contribute to the achievement of Sustainable Development Goal 3.8 (Universal Health Coverage target) by enhancing access to safe, effective, quality and affordable vaccines for all. This important issue was highlighted by the World Health Assembly in 2019 with the endorsement of a Roadmap for access to medicines and vaccines, and the adoption of resolution WHA72.8 on improving the transparency of markets for medicines, vaccines and other health products.

MI4A is a peer platform that leverages data collected from countries and provides the data publicly to inform product choice, conduct financial planning, optimize budgets, enhance procurement and strengthen national, regional and global capacity for improved access to vaccines. Vaccine manufacturers also participate by sharing information on their late-stage pipeline and available supply, as well as by engaging in dialogue to inform investment decisions.

More information on MI4A can be found at: [Immunization, Vaccines and Biologicals](#) ([who.int](#))

In terms of geographical volume share of demand, the WHO South-East Asia Region continued to consume some 30% of vaccines globally. The WHO African Region consumed an increasing share (12%) of total volumes in 2022 compared to 2021 (8%). In the years before COVID-19, the region used to account for approximately 20% of global volumes – a fact suggesting that the 2021 and 2022 low numbers can be attributed to the region's lower consumption of COVID-19 vaccines compared to the rest of the world.

From a valueⁱ perspective, the WHO Region of the Americas expends the most, driven by high prices and volumes in the USA, followed by the WHO Western Pacific Region where demand is driven by China's large volumes.

When segmenting the market by income group, vaccines purchased by middle-income countries account for 60% of the global volumes and 34% of the value. High-income countries represent 29% of the global volume and 63% of value, driven by vaccines that are higher-priced than those procured by other groups.

In terms of the procurement mechanism, self-procured vaccines, almost exclusively by middle-income and high-income countries, represent approximately 75% of the market in volume and 90% of the market in value. Pooled procurement mechanisms, by UNICEF, the PAHO Revolving Fund, and others represent the remaining 25% and 10%, respectively.

Globally, prices are tiered by income group, but we continue to identify the opportunity to reduce the spread of vaccine pricing within income groups and improve affordability. This holds particularly for upper middle-income countries This holds particularly for upper middle-income countries which often pay prices comparable to or higher than those of high-income countries (HICs).

Call to action

The *Global vaccine market report 2022: a shared understanding for equitable access to vaccines* highlighted how the COVID-19 pandemic had exposed the unmeasurable public health value of vaccines, offering us an opportunity to establish a new paradigm for vaccine development and access that builds on new practices and some of the lessons learned during the recent pandemic. The report advocated for a new paradigm in vaccine access that should be incorporated as part of a new international accord on pandemic prevention, preparedness and response. In this new paradigm, a call for action was extended to all relevant

stakeholders. One year later, important progress has been achieved in vaccine access. Coverage of the third dose of vaccine protecting against diphtheria, tetanus and pertussis (DTP-3) improved, with partial recovery of the backsliding to 84% in 2022 up from 81% in 2021. The number of unimmunized and under-immunized children fell to 20.5 million children in 2022 from 24.5 million in 2021. A second malaria vaccine (R21/Matrix-M) was recommended by WHO³ and supported by Gavi as an added tool to fight the battle against the disease that claims the lives of nearly half a million children each year. The African Union's call for a New Public Health Order for Africa – targeting health and economic security on the continent, including through regional manufacturing of vaccines, diagnostics and therapeutics – has been met enthusiastically, with many partners working to support this ambitious and complex endeavour.

Unfortunately, the world has experienced many setbacks in vaccine-related disease prevention. Despite the improvements seen in many countries thanks to intensive measles vaccination efforts, 116 of 195 countries have still not recovered even to pre-pandemic performance as of July 2023. At the same time, and after decades of progress against cholera, cases are again on the rise, even in countries that had not seen the disease in years. The lack of preventive vaccination campaigns also contributed to the increased number of outbreaks, with 44 countries reporting cholera cases in 2022 – a 25% increase from the 35 countries that reported cases in 2021. This trend continues into 2023, resulting in (and exacerbated by) a severe shortage of oral cholera vaccine relative to the needs, and climate change that is compounding the problem.⁴ Cholera is one of numerous diseases for which vaccination of adults is advised. The adult vaccination platform remains as a frontier for many countries in spite of the primacy of that age group for COVID-19 vaccination. Less than 10% of vaccines delivered to low-income countries are targeted at adults when excluding COVID-19, compared to 51% in high-income countries, indicating that vaccination throughout the life course can improve. In the face of the above, the 2022 call to action remains more relevant than ever.

WHO continues to call on **governments** to commit to:

1. establish **early, evidence-informed strategic goals and leadership** that serve the collective global health interest, and **shoulder risks and invest aggressively** in order to address today's needs and prepare for future emergencies;
2. **strengthen market preparedness** by investing in new vaccine technologies, regional research and development and manufacturing hubs, and by enabling regulatory harmonization; and

ⁱ The value data represent the volume multiplied by the acquisition cost/price of the vaccine by the end purchaser. Differences in the timing and recording of purchase and sales data for 2022 are not fully aligned across all sources and are approximated.

3. **ensure transparency and oversight** along the vaccine value chain towards enhanced health impact, as well as define principles and operational mechanisms for collaboration across countries in times of scarcity, including particularly for intellectual property and the circulation of inputs and goods.

We call on the **industry** to commit to:

1. **ensure that activities are aligned with WHO's guidance** (namely research and development efforts focused on the WHO list of priority pathogens and target product profiles, more clinical trials performed in low-income countries, and targeted to inform global policy needs and expedited data submissions for regulatory approvals and prequalification);

2. **establish provisions for technology transfer** and ensure transparency along the vaccine value chain; and
3. **implement specific measures that allow for equity-driven allocation** of products.

Finally, we call on **international organizations and partners** to commit to:

1. prioritize the achievement of global public health priorities in line with the Immunization Agenda 2030 as an umbrella for individual organizational strategies, priorities and interests;
2. support country-driven initiatives and projects consistently with organizations' missions and avoid the creation of duplicate efforts;
3. continue to call for technology transfer and for the application of resolutions on market transparency for health products.

Supplementary Analysis

Market size

Fig. 1a. Evolution of vaccine volumes (billion doses) between 2019 and 2022

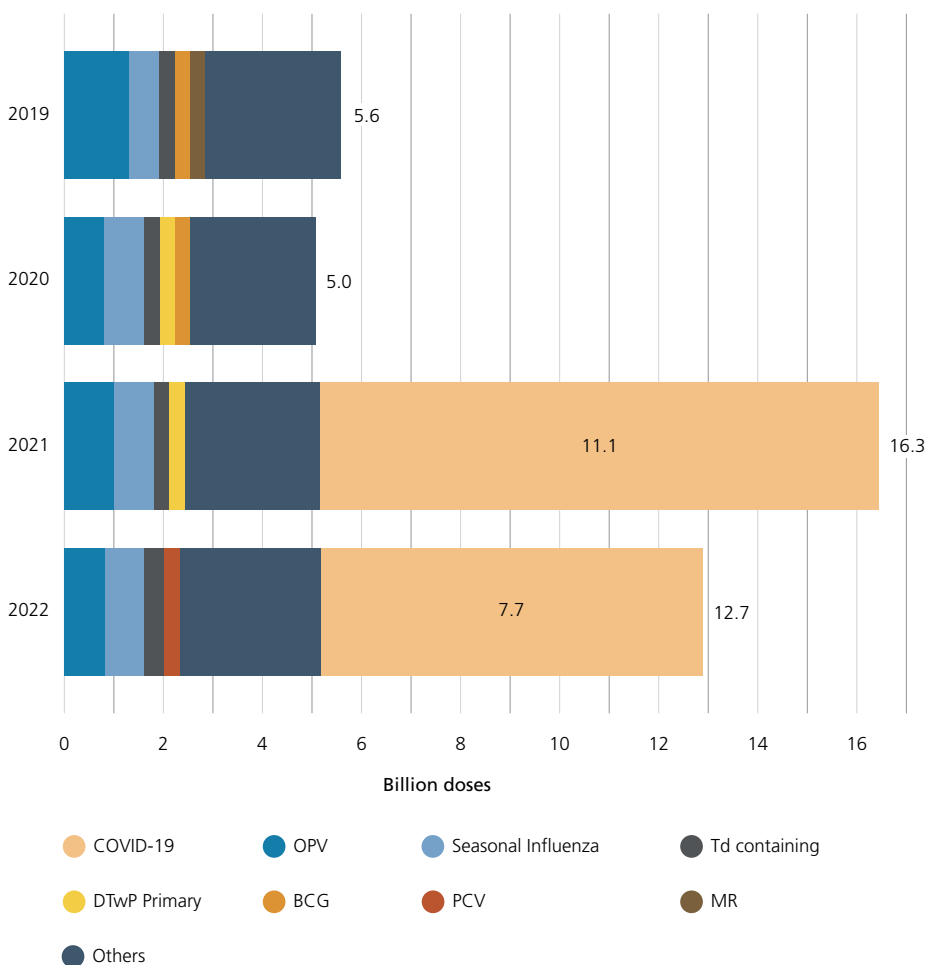


Fig. 1a reveals that COVID-19 continued to capture a considerable percentage of the global vaccine market in 2022 – 7.7bn in a total market of 12.7bn vaccine doses – although COVID-19 volumes have experienced a significant drop since 2021 (11.1bn doses). Looking closer into the 2019–2022 time frame, volumes decreased in 2020 compared to 2019. This drop, especially acute for paediatric vaccines, can be attributed to the pandemic since many measles-containing vaccines (MCV) and oral polio (OPV) campaigns were cancelled. Total volumes in 2022 have still not reached the levels observed in 2019 (Fig. 1a). Focusing on 2022, distribution of the highest-volume vaccines (excluding COVID-19) has not changed significantly since 2021, with seasonal influenza, OPV, tetanus, diphtheria (Td- containing) and diphtheria, tetanus and whole-cell pertussis (DTwP primary) accounting for approximately 50% of all market volumes.

Fig. 1b. Volume (%) change of top 10 vaccines in 2021–2022

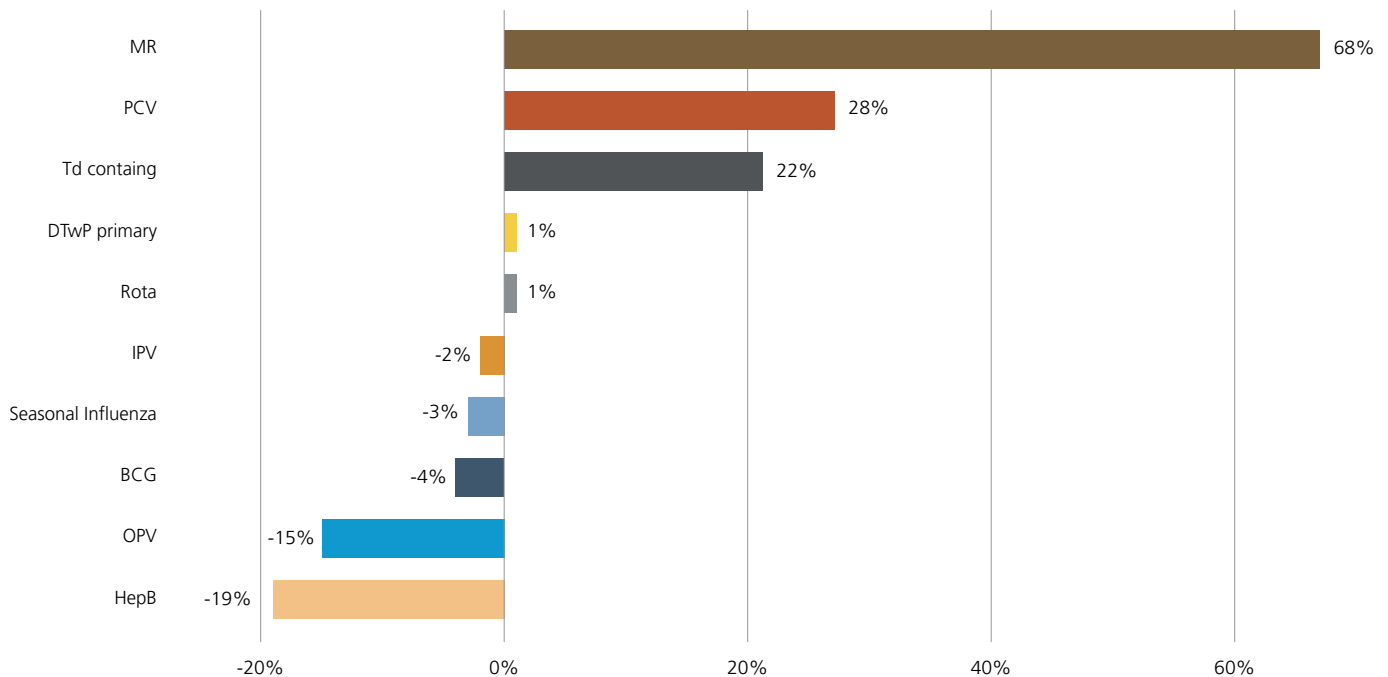
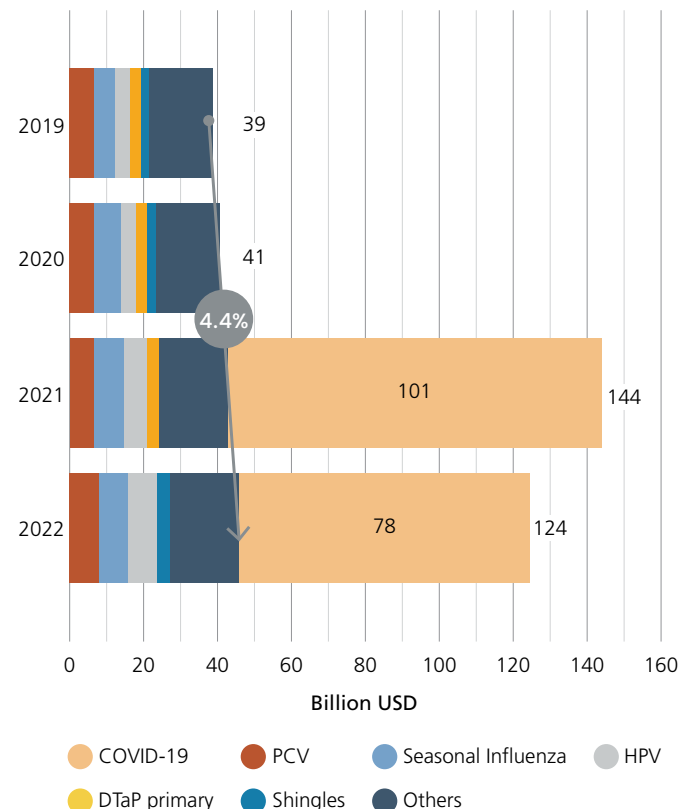


Fig. 1b suggests important MR growth between 2021 and 2022, potentially attributed to resumption and acceleration of post-pandemic activities, as well as India's 2026 goal for measles and rubella elimination. PCV and Td-containing vaccines also exhibited growth in 2021–2022, while OPV volumesⁱⁱ are decreasing steadily – most likely due to there being fewer campaigns.

COVID-19 accounted for US\$ 78 billion in 2022, while all other vaccines accounted for US\$ 46 billion, indicating that COVID-19 vaccines remained a sizeable portion of the market value. Fig. 2a shows the impact of the decline of the COVID-19 market since 2021, which has shrunk the total market by approximately US\$ 20 billion: US\$ 144 billion in 2021, US\$ 124 billion in 2022. Nevertheless, value growth (excluding COVID-19) continues at an average annual growth rate of 4.4%.ⁱⁱⁱ Excluding COVID-19 vaccine, approximately 50% of the market's value was driven by three vaccines in 2022: pneumococcal conjugate vaccine (PCV), seasonal influenza vaccine, and human papillomavirus (HPV) vaccine, each representing a 16–18% share of the total market and growing. Fig. 2b depicts steep growth of the shingles and HPV markets in value over the last year, mainly driven by an increase in volumes. More specifically, shingles vaccine volumes went up by approximately 30% in the USA, whereas HPV volumes went up by approximately 25% in China, driven by increased supply and private-market demand, as well as by the extension of the vaccination schedule to boys.

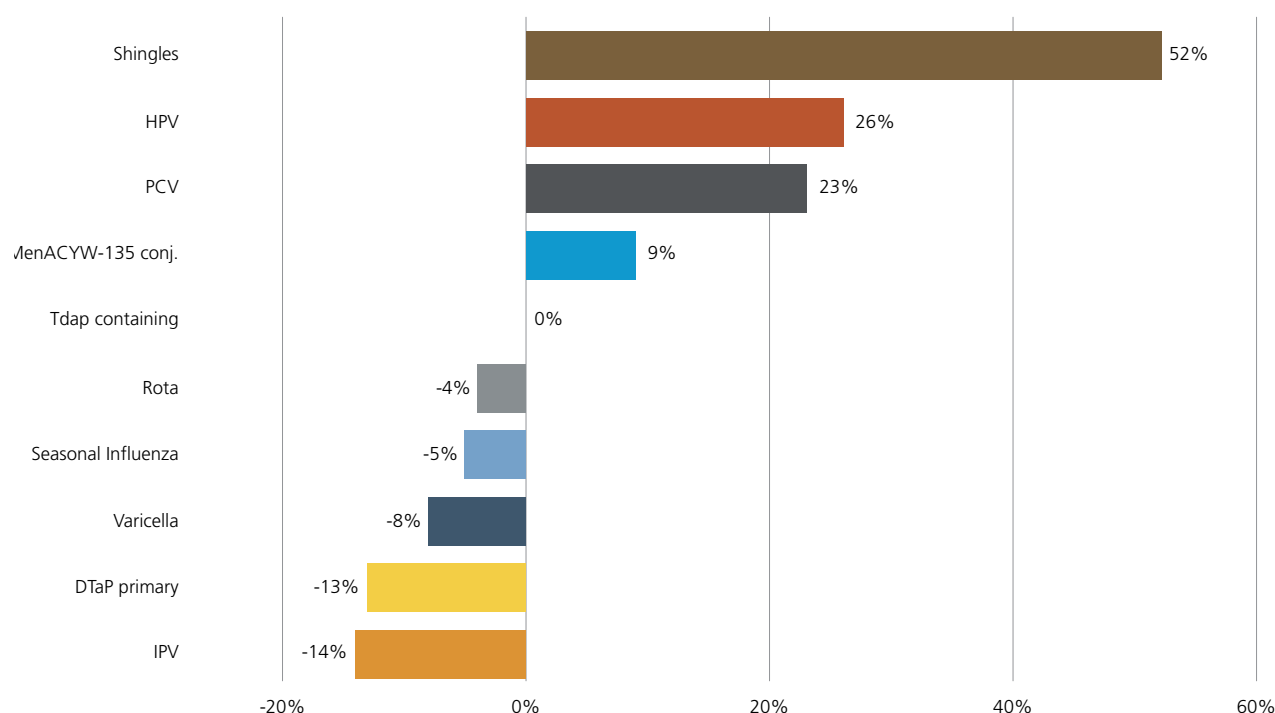
Fig. 2a. Evolution of vaccine value (US\$ billion) between 2019 and 2022



ⁱⁱ OPV volumes only partly capture doses procured through UNICEF by the Global Polio Eradication Initiative and could hence be an underestimate of the global volumes.

ⁱⁱⁱ Although the annual growth rate is not inflation-adjusted, vaccine prices did not change considerably in 2019–2022. Consequently, the annual growth rate can be mainly attributed to purchases of increasing volume of high-priced vaccines such as HPV, PCV and shingles vaccine.

Fig. 2b. Value (%) change of top 10 vaccines in 2021–2022



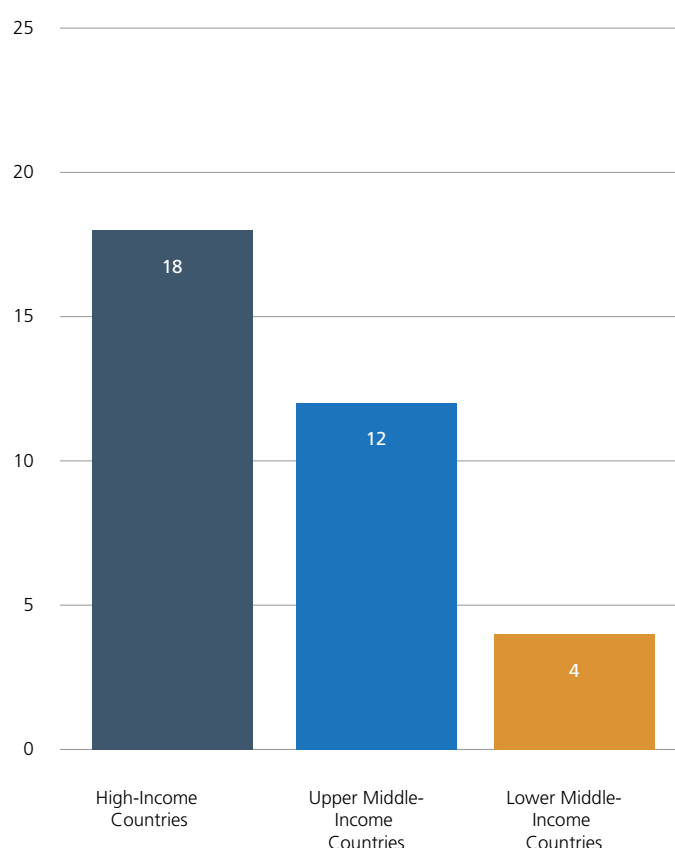
Vaccine regulation

To provide strong regulatory oversight of vaccine development, manufacturing and deployment, the national regulatory authority should have reached a sufficient maturity level (ML 3) or be an advanced regulatory system (ML 4). As of November 2023, 34 vaccine-producing countries are considered by WHO to have reached at least maturity level 3, four of which are new countries that have newly attained that designation since 2019 (Fig. 3).^{iv}

To decrease the burden of lengthy marketing authorization activities in multiple countries, 63 countries and one regional economic community (compared to 42 countries in 2022) participate in the WHO collaborative registration procedure for prequalified vaccines as of November 2023. The procedure ensures timely approval of quality-assured vaccines to countries and allows manufacturers to decrease the regulatory burden of attaining marketing authorization in multiple countries. WHO, supported by UNICEF and other partners within the COVAX facility, has assisted low- and middle-income country regulatory bodies to issue national authorization of COVID-19 vaccines through various emergency use listing and collaborative registration procedures.

This assistance is critical for facilitating rapid access to life-saving vaccines, especially in regions where resources and capacities may be limited.

Fig. 3. Vaccine-producing countries considered ML3 or ML4 (n=34)



^{iv} Based on internal RSS database of WHO Member States and their respective maturity level (actual, based on benchmarking exercises or estimated, based on historical data).

Manufacturing and supply

Fig. 4a. Market share by value in 2022

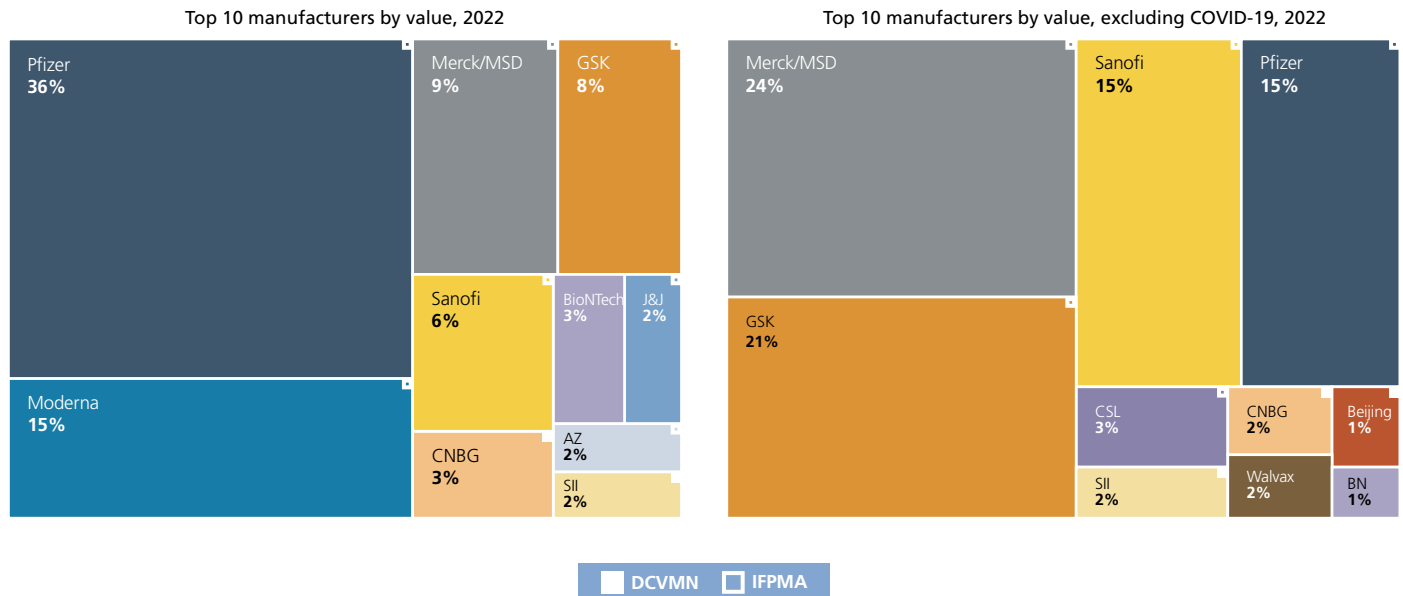


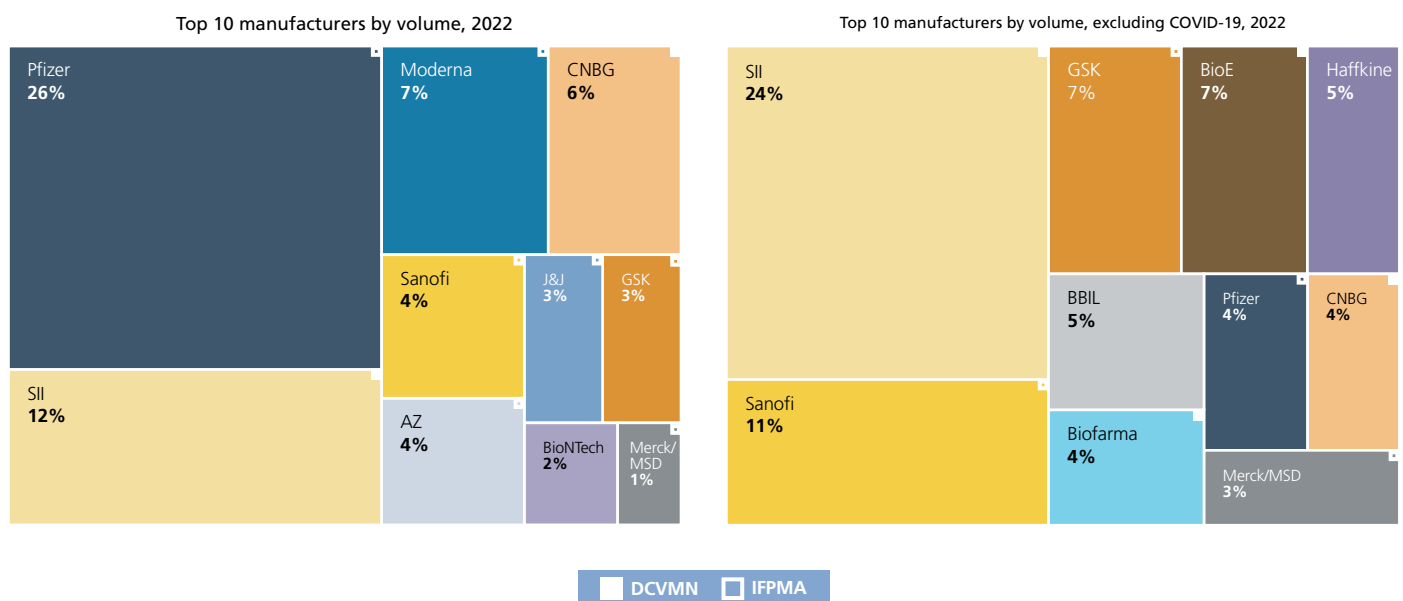
Fig. 4a suggests that the vaccine market remains concentrated (at levels similar to 2021), with approximately 85% of the value going to 10 manufacturers, and almost 50% to only two manufacturers, both with and without considering COVID-19.

Closer inspection reveals that the value captured by manufacturers primarily producing COVID-19 vaccines declined in 2022 (AZ, Sinovac, China National Biotech

Group [CNBG]). For some the decline was drastic: Sinovac COVID-19 sales in China dropped from US\$ 19 billion to US \$ 1.5 billion in the biennium. This led to increases in market share for other major COVID-19 vaccine suppliers (e.g. Pfizer, Moderna).

The International Federation of Pharmaceutical Manufacturers & Associations (IFPMA) manufacturers continue to maintain high market share (by value), capturing about 80% of total value in the market in 2022.

Fig. 4b: Market share by volume in 2022

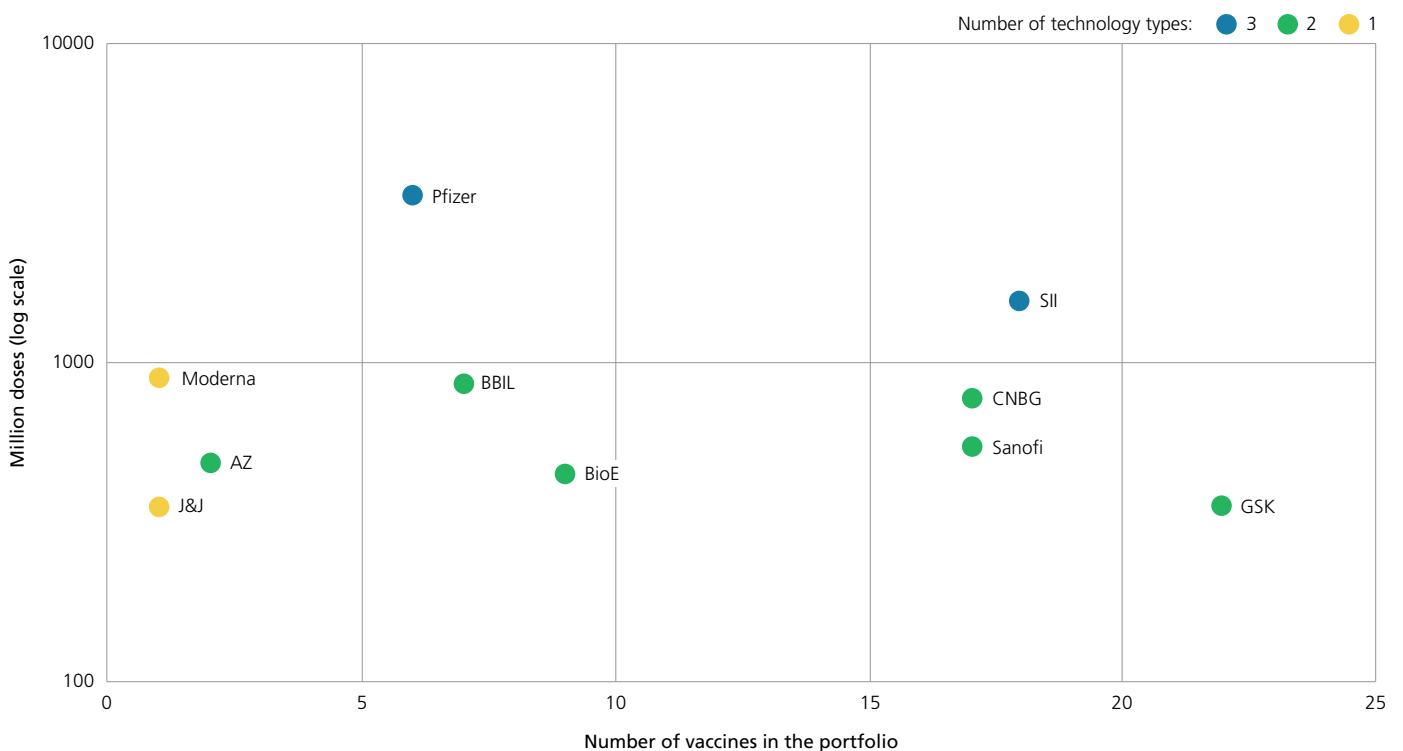


The changes in volume market shares since 2021 are more evident, as illustrated in Fig. 4b, with Pfizer capturing 26% of the market, up from 16% in 2021, and the Chinese manufacturers Sinovac and CNBG shrinking significantly. This can be explained by the total decrease in COVID-19 vaccine sales (especially in China and Indonesia) with the simultaneous slight increase of Pfizer COVID-19 vaccine sales in 2022 when compared to 2021, resulting in Pfizer capturing a (much) bigger share of the market.

The Serum Institute of India's share of global volumes, excluding COVID-19 vaccines, increased from 19% in 2021 to 24% in 2022, driven by significant increase in volumes of PCV, MR and Td-containing vaccines.

New technology platforms played an important role in scaling up COVID-19 vaccine production. The current market is highly dependent on only nine manufacturers (10% of the total number of manufacturers) that have more than five vaccines and distribute vaccines globally and across multiple technology platforms. Together, those manufacturers provided approximately 70% of global supply in 2022, excluding COVID-19 vaccines (Fig. 5). Of those manufacturers, three are located in India (South-East Asia Region), four are located in the Region of the Americas and the European Region, and one is located in the Western Pacific Region.

Fig. 5. Top 10 manufacturers by volume, portfolio size and number of technology types used

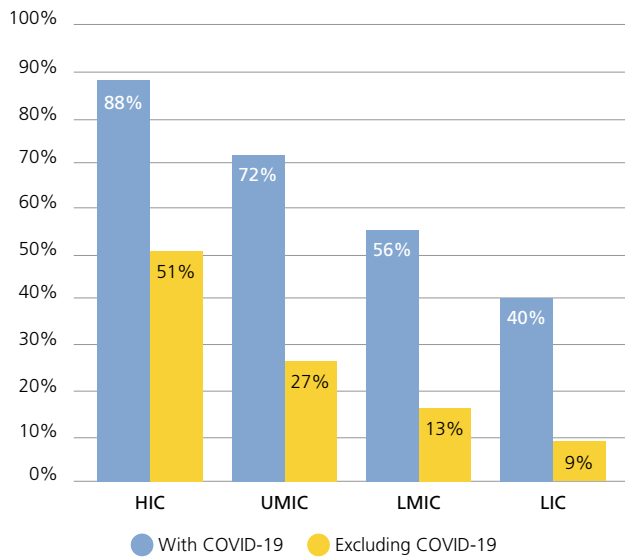


Global distribution

Vaccination throughout the life course is one of the strategic priorities of the global strategy of the Immunization Agenda 2030 (IA 2030).⁵ As of 2022, and whereas many HICs used vaccines for adults as well as children, many lower-income countries have not extended vaccination across the life course (Fig.

6). Adult vaccines account for 9% of doses of vaccines used in low-income countries (LICs). This pattern is very consistent with what has been documented since 2019, with LIC percentages ranging from 8% to 9%. More specifically, 88% of HICs (compared to no LICs) report having a seasonal influenza vaccine.

Fig. 6. Proportion of doses of vaccines used in each income group that is classified as “Adult”, 2022



Besides lack of access to specific vaccines, stock-outs have historically remained a problem for countries, with 82 reporting at least one national stock-out in 2022. Despite the increase compared to previous years, stock-outs have been consistent year-on-year (Fig. 7a). Countries reported stock-outs for all vaccine types, with most of them occurring for OPV, BCG and DTP-containing vaccines. Procurement delays as well as funding delays related to disbursements are the most frequent reasons for national stock-outs (Fig. 7b).

Fig. 7a. Countries reporting a national stock-out of at least one vaccine⁶

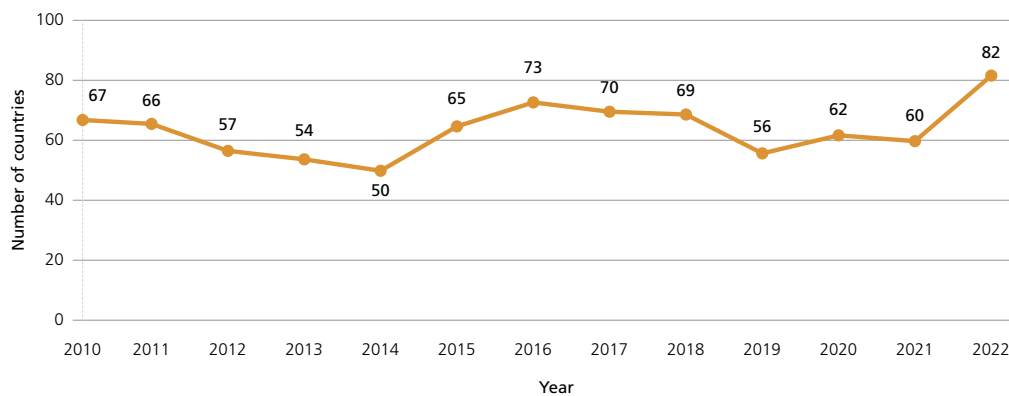
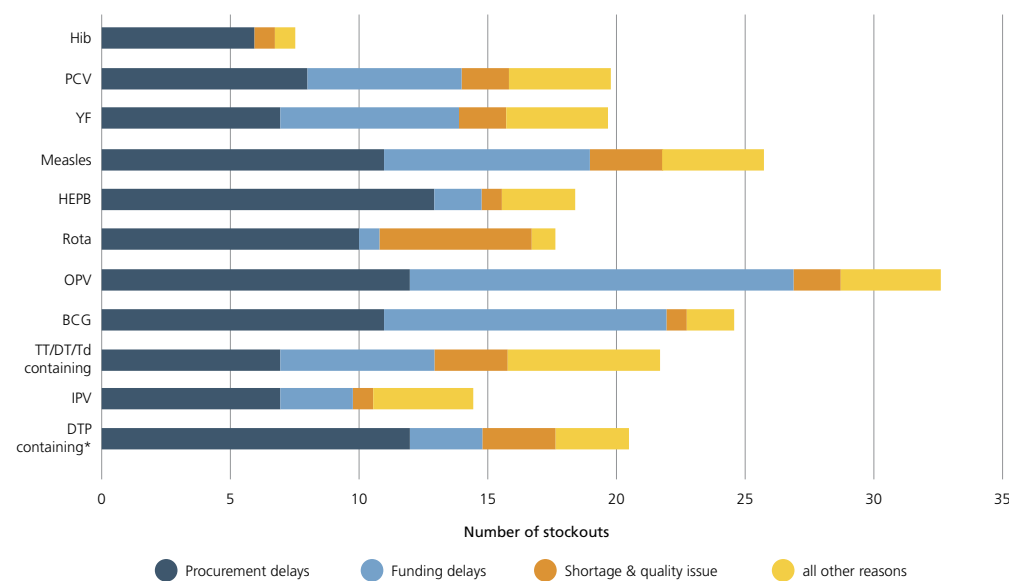
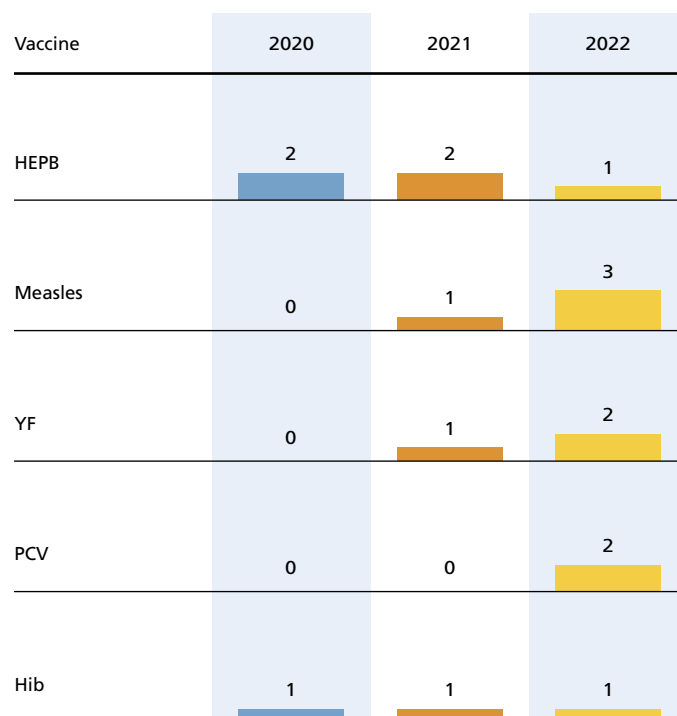
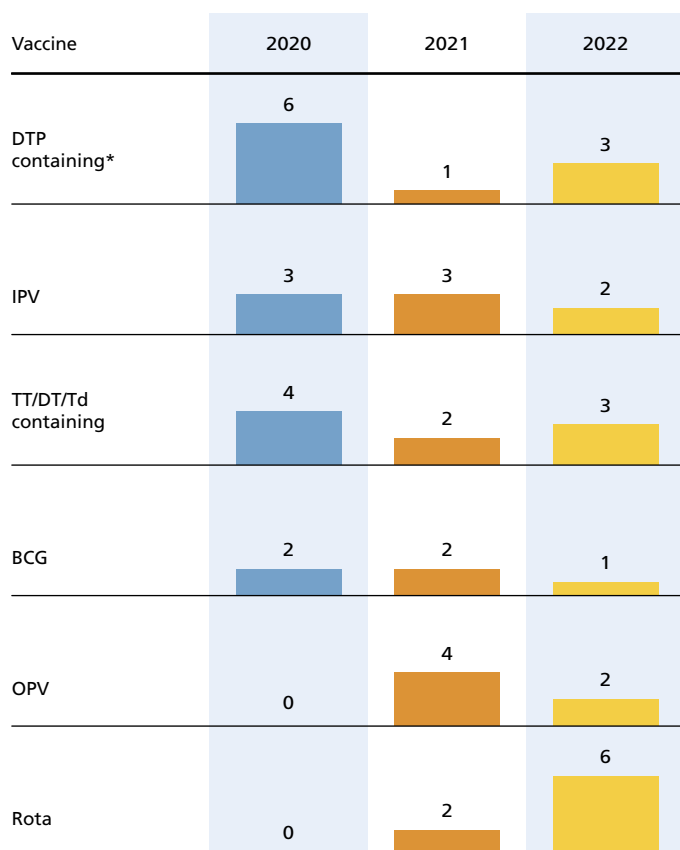


Fig. 7b. Reasons for stock-out reported by vaccine



Shortages or quality concerns were reported as reasons for stock-outs for a range of vaccines, and more frequently for rotavirus vaccines in 2022, as depicted in Fig. 8. Known manufacturing concerns, delays in the product availability and product switches corroborate these findings.

Fig. 8. Number of countries reporting shortage or quality concerns



Regional supply security

Several regions continue relying almost exclusively on manufacturers headquartered outside the region for their vaccine supplies. Responding to the regional supply insecurity that exacerbated the consequences of the COVID-19 pandemic, the African Union called for a New Public Health Order for Africa – targeting health and economic security in the continent, including through regional manufacturing of vaccines, diagnostics and therapeutics.

Fig. 9 suggests that Chinese manufacturers accounted for 13% of total volumes purchased in 2022 – a stark reduction compared to 2021 (30%) (driven by a decrease in COVID-19 vaccine sales). More than 60% of the production is consumed nationally, and the rest is distributed to other countries across regions.

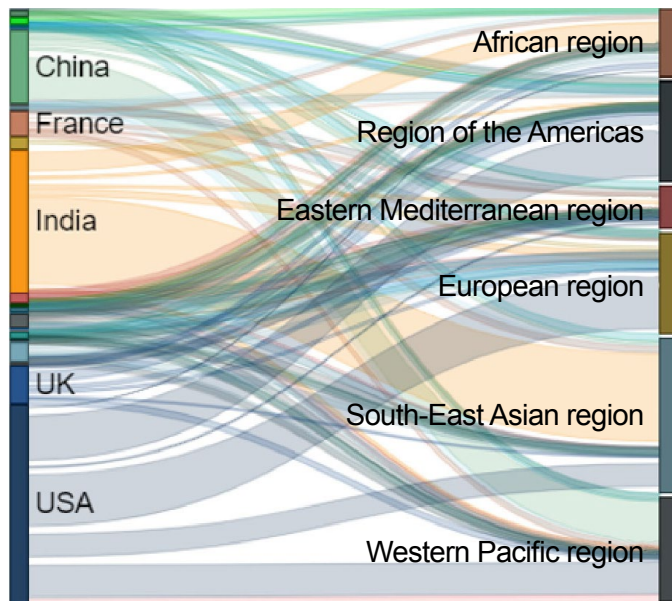
Indian manufacturers produced 25% of total volumes purchased, with 60% consumed nationally, and significant portions delivered to the WHO African Region, accounting for approximately 20% of India's exports.

United States manufacturers produced 35% of volumes purchased globally, distributing to the WHO Region of the Americas, South-East Asia Region, European Region and Western Pacific Region.

The WHO African Region accounts for 12% of the receiving volumes, while African production accounts for 1% of global volumes. It is consumed domestically.

Similarly, the WHO Eastern Mediterranean Region relies on vaccine imports from vaccine manufacturers outside the region for more than 90% of its regional consumption.

Fig. 9. Global distribution of vaccine volumes (%) from manufacturer country to region



Pricing and procurement

Vaccines procured by self-procuring middle-income countries (MICs) historically amount to the largest volumes among other procurement mechanisms, representing almost 50% of the market (Fig. 10). This is mainly attributed to the fact that China, India and Indonesia are included in the group. In 2022, vaccines procured by HICs represented 63% of the value of the market, driven by high prices. Vaccines self-procured by HICs and MICs represent roughly 90% of the market in value, driven by higher prices than in other groups.

Fig. 10. Volume and value by procurement mechanism, 2022

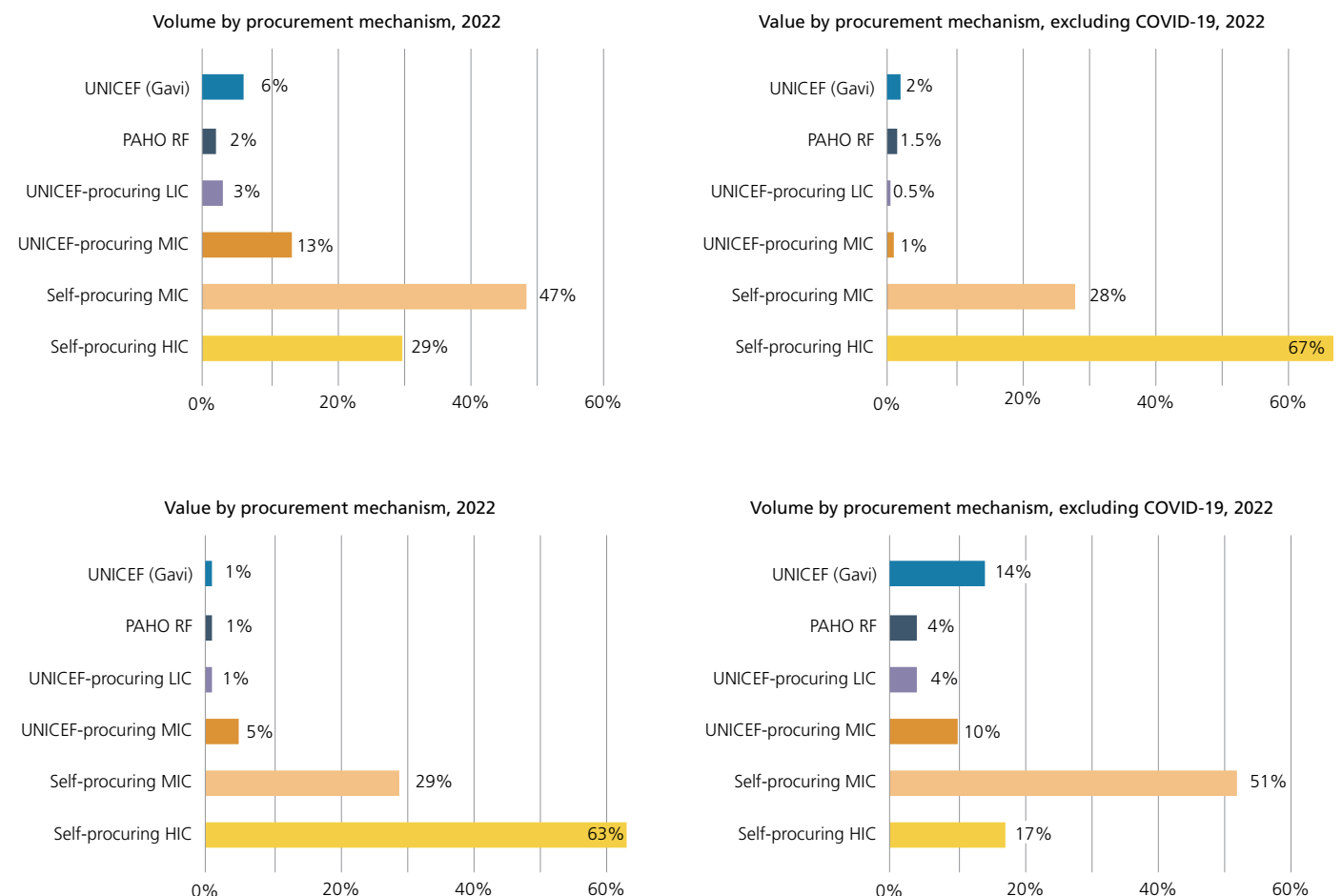


Fig. 11 provides a deep-dive into pricing, as reported by countries, portraying results that are consistent with previous years.

HICs consistently pay the highest prices across all vaccines. They also have access to the broadest range of vaccines. At the same time, COVID-19, vaccines that contain acellular pertussis (aP-containing vaccines), HPV, PCV are the highest-priced vaccines across different procurement mechanisms and income groups. Specifically for COVID-19 and aP-containing vaccines, tiering is limited across different procurement mechanisms and income groups. Pooled procurement

mechanisms, both through UNICEF and PAHO RF, result in important savings when compared to other procurement categories. As an example, in 2022, HPV procured through the PAHO RF cost approx. USD 10 per dose, while the price ranges from an average of USD 21 per dose to USD 67 per dose for self-procuring MICs and HICs, respectively. Similar conclusions can be drawn for important vaccines like PCV and rotavirus vaccine (Rota). Finally, there is significant price differential between income groups for Tetanus, diphtheria (Td) (100x), Hepatitis B (HepB) (25x), HPV (18x), PCV (17x) and rotavirus vaccine (Rota) (15x).

Fig. 11. Median price (USD per dose) by procurement mechanism, 2019-2022

Weighted average price for UNICEF (Gavi) and PAHO RF

		2022																			
Procurement Mechanism		UNICEF (Gavi)				PAHO RF				UNICEF-procuring LIC				MIC				HIC			
Income Group		2019	2020	2021	2022	2019	2020	2021	2022	2019	2020	2021	2022	2019	2020	2021	2022	2019	2020	2021	2022
Year																					
GVMR primary use		Vaccine																			
Adult	COVID-19					3.5	3.3	3.9	3.2					6.6	6.7			6.9	6.2		15.1
	Seasonal Influenza																	4.2	3.5	4.8	4.7
	Shingles																				
	Td containing					0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Children/adolescents	Tdap containing					14.2	13.0	12.8	15.8									18.9	15.6		
	HPV	4.5	4.5	4.5	4.5	9.5	10.0	10.0	10.5					4.6	6.7			7.5	6.0	47.7	25.0
	DTaP boosters					15.4	12.5	16.5	10.9									18.9	18.4		
	DTaP primary					19.8	21.1	16.5	20.3					22.5				30.3	21.8		
HIC Ped	MMR					3.2	3.7	3.6	4.1	1.3				1.4	1.6			2.2	1.9	2.3	2.9
	Seasonal Influenza					2.7	1.8	1.9	2.7									3.9			
	Varicella					16.9	16.5	13.8	17.9												
	BCG					0.2	0.2	0.3	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
LMIC Ped	DT					0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
	DTwP					0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5
	Measles	0.3	0.3	0.3	0.3													0.3	0.3	0.4	0.5
	MR	0.7	0.6	0.7	0.8	0.9	1.6	1.2	2.6									0.7	0.8	0.8	0.7
Local/sporadic	OPV					0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2
	Rabies					13.4	9.5	10.4	10.1									7.5	8.0	10.3	10.8
	YF	1.2	1.0	1.2	1.2	1.5	1.4	1.4	1.6									1.0	1.4	1.4	1.7
	HepB					0.3	0.4	0.4	0.5	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.6	0.5	2.2
WW Ped	IPV	2.3	2.4	2.1	2.1	5.2	4.6	4.6	3.2					2.8	2.4	2.4	2.2	3.4	2.8	1.9	3.0
	PCV	3.0	3.0	3.0	2.9	13.8	13.0	13.7	14.5					4.3	4.3	4.8	3.7	25.0	45.9	21.7	24.0
	Rota	2.1	1.9	1.6	1.7	6.2	6.4	6.2	6.1					1.5	2.2	1.6	1.6		18.0	18.9	14.0

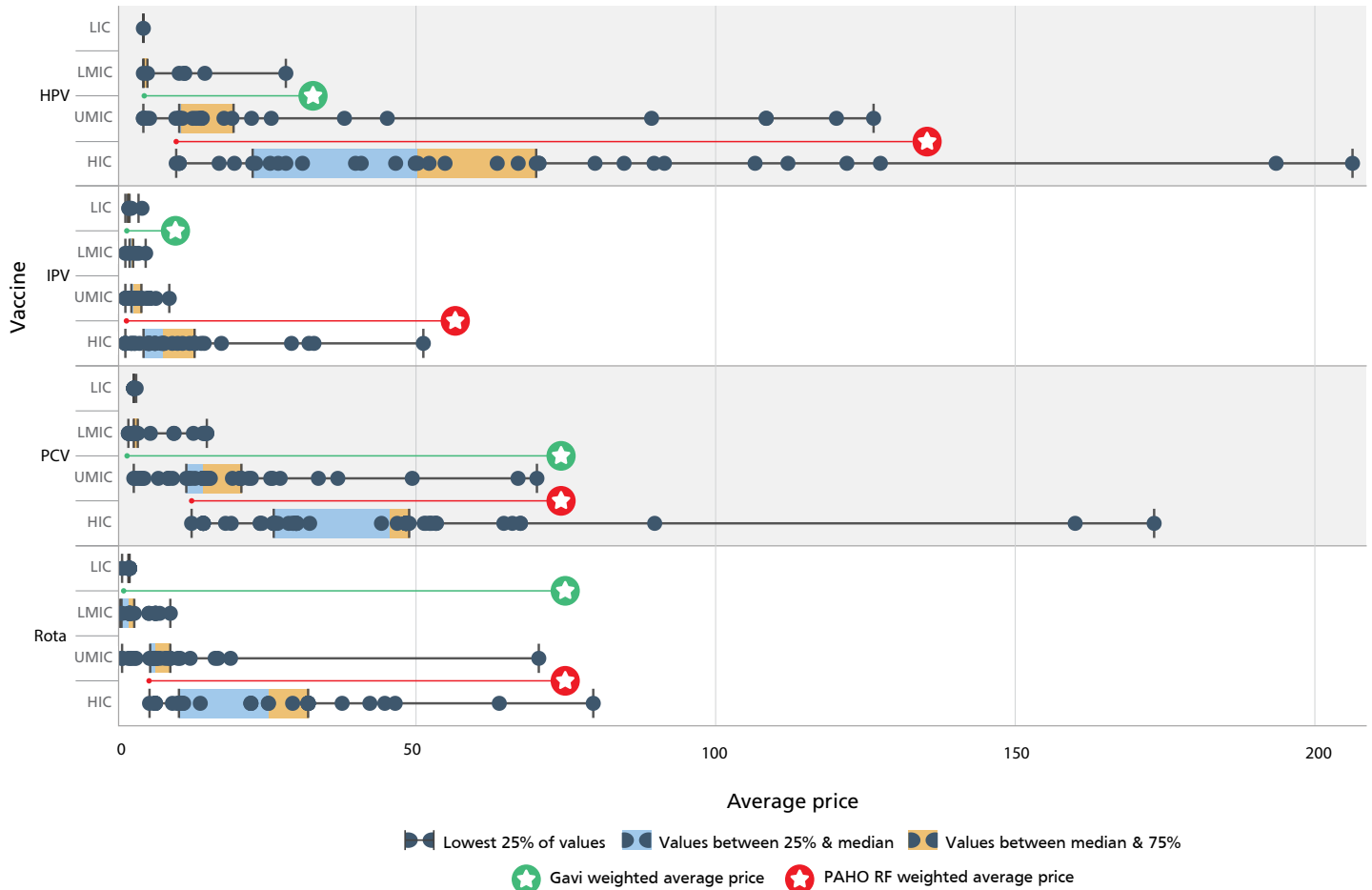
Procurement Mechanism		Self-procuring							
Income Group		MIC				HIC			
Year		2019	2020	2021	2022	2019	2020	2021	2022
GVMR primary use		Vaccine							
Adult	COVID-19					9.3	6.5		10.9
	Seasonal Influenza	3.8	3.7	3.7	4.8			7.4	8.2
	Shingles					101.9	109.2	103.2	150.1
	Td containing	0.3	0.2	0.5	0.2	10.1	10.1	8.4	9.2
Children/adolescents	Tdap containing	13.6	15.1	15.1	14.4	17.7	21.0	18.9	16.8
	HPV	12.6	13.2	16.9	20.9	51.2	63.6	75.2	67.1
	DTaP boosters	15.6	17.2	18.2	17.4	18.4	24.5	21.9	19.2
	DTaP primary	20.9	23.6	24.0	26.1	30.4	32.9	33.9	31.6
HIC Ped	MMR	4.0	4.1	6.6	4.5	8.8	9.0	9.8	8.5
	Seasonal Influenza	4.5	2.7	3.5	3.4	7.4	11.6	13.1	16.0
	Varicella	25.7	33.6	36.4	31.5	25.3	35.5	33.9	29.6
	BCG	0.2	0.2	0.3	0.2	1.2	1.6	1.4	2.2
LMIC Ped	DT	0.3	0.4	0.4	0.2	1.1	2.8	0.8	0.6
	DTwP	0.2	0.2	0.2	0.2	3.0	1.6	0.7	0.5
	Measles	0.7	0.7	0.6	0.7	3.9	3.9	4.3	4.3
	MR	1.1	1.0	1.2	0.9	25.0	6.1	28.0	
Local/sporadic	OPV	0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.3
	Rabies	10.5	17.5	9.1	7.5	26.5	27.0	35.7	23.1
	YF	19.1	23.8	20.6	9.1	20.1	21.1	29.6	22.1
	HepB	1.3	1.1	1.8	1.4	11.3	12.3	12.9	12.7
WW Ped	IPV	4.5	3.8	4.8	3.1	10.1	7.6	12.2	12.2
	PCV	18.1	19.6	20.6	17.8	35.9	48.4	48.0	46.9
	Rota	7.9	7.7	9.1	7.3	26.3	28.7	24.1	25.4

Low  high

The median prices stated in the table are taken across products for the same antigen. The data used for the median calculation are reported by countries, might contain errors, and the reporting countries are solely responsible for their accuracy.

Fig. 12 makes it more evident that, although LICs and low- and middle-income countries (LMICs) benefit from tiered prices across vaccines, the case is not the same for upper middle-income countries (UMICs), which often exhibit wider price ranges, more limited tiering, and price overlaps with HICs.

Fig. 12. Vaccine prices (US\$ per dose) tiering by World Bank income group, 2022



The prices depicted in Fig. 12 are as reported by countries through the electronic Joint Reporting Form and those of UNICEF, PAHO Revolving Fund and COVAX. Only Gavi-supported vaccines are shown in the UNICEF (Gavi) mechanism.

Annexes

Annex 1: Vaccines included in the Global Vaccine Market Report (GVMR) dataset

Primary use category (abbreviation)	Abbreviation of the vaccine used in the GVMR	Long name of vaccine and detailed types of vaccine
Worldwide paediatric (WW ped)	1. HepB	Hepatitis B
	2. Hib	Haemophilus influenzae type B
	3. IPV	Inactivated polio
	4. PCV	Pneumococcal conjugate: PCV10, PCV13, PCV15
	5. Rota	Rotavirus: RV1, RV5
Low- and middle-income country paediatric (LMIC Ped)	6. BCG	Bacillus Calmette-Guérin (for tuberculosis)
	7. DT	Diphtheria and tetanus
	8. DTwP	Diphtheria, tetanus and whole cell pertussis
	9. DTwP primary	DTwP-HepB-Hib (penta); DTwP-HepB-Hib-IPV (hexa)
	10. Malaria	Malaria: RTS,S
	11. Measles	Measles monovalent
	12. MenA conj.	Meningococcal A conjugate
	13. MenAC conj.	Meningococcal A and C conjugate
	14. MenAC Ps	Meningococcal A and C polysaccharide
	15. MR	Measles and rubella
	16. OPV	Oral polio (all types)
	17. TCV	Typhoid conjugate
	18. Typhoid Ps	Typhoid polysaccharide
High-income country paediatric (HIC Ped)	19. DTaP primary	DTaP-HepB-IPV; DTaP-Hib-IPV; DTaP-HepB-Hib-IPV (hexa)
	20. DTaP boosters	DTaP; DTaP-IPV
	21. HepA	Hepatitis A
	22. MMR	Measles, mumps, rubella
	23. MMRV	Measles, mumps, rubella, varicella
	24. Varicella	Varicella
Children / adolescents	25. HPV	Human papillomavirus: HPV2, HPV4, HPV9
	26. MenACYW-135 conj.	Meningococcal A, C, Y, W conjugate
	27. MenB	Meningococcal B
	28. MenC conj.	Meningococcal C conjugate
Adult	29. COVID-19	COVID-19 or SARS-CoV-2; individual manufacturer names
	30. HepA+B	Hepatitis A and B combined
	31. PPV23	Pneumococcal polysaccharide
	32. Seasonal influenza	Seasonal influenza; Adult, Adult TIV, Adult QIV, Ped, Ped TIV, Ped QIV, Adult adjuvanted, LAIV
	33. Shingles	Varicella zoster
	34. Td containing	Tetanus, diphtheria (reduced antigen content)
	35. TdaP containing	Tetanus, diphtheria, acellular pertussis
	36. TT	Tetanus toxoid
Local/sporadic	37. Anthrax	Anthrax
	38. OCV	Oral cholera vaccine
	39. Ebola	Ebola
	40. EV71	Enterovirus 71
	41. HepE	Hepatitis E
	42. JE	Japanese encephalitis: inactivated Adult, inactivated Ped, live-attenuated
	43. MenACYW-135 PS	Meningococcal A, C, Y W polysaccharide
	44. Rabies	Rabies
	45. Smallpox/Mpox	Smallpox/Mpox
	46. TBE	Tick-borne encephalitis
	47. YF	Yellow fever

Annex 2: Data sources

The electronic Joint Reporting Forms (eJRFs)

were the primary source of country-reported information, including for vaccine stock-out data. Data on procurement and prices of non-COVID-19 vaccines are submitted annually to WHO by Member States under the Procurement & Pricing tab of the eJRFs. The data include information on the types of vaccines procured, the presentation size and format, the names of the vaccine manufacturers, the number of doses procured, the procurement mechanism, the price per dose of vaccine, and other information on the nature of the procurement contract. *eJRF data are reported by countries and, as such, might contain errors. The reporting countries are solely responsible for their accuracy.*

For 2022, data on **COVID-19 vaccines** were submitted monthly to WHO by Member States and some non-Member States – including information on the type of vaccine procured, the names of the vaccine manufacturers, the number of doses procured, and the number of doses received, the price per dose of the vaccine, and the procurement mechanism. All reported data were included except prices of COVAX-procured vaccines and prices of donated vaccines; these were imputed from the UNICEF COVID price list.⁷

The Global Vaccine Market Model (GVMM) was used to supplement volume information where not reported elsewhere.⁸

China lot release data were accessed from public websites of the releasing regulatory authorities in China and translated. In a few cases where no lot size data were available, an average was used based on other vaccines from the same manufacturer.⁹

UNICEF Supply Division (SD) pricing information was used to supplement price,¹⁰ while procured volume

information was used to validate doses-distributed datapoints in the GVMR dataset.¹¹ Market based information contained in Market Notes for nine vaccines were used as part of the data validation activities.¹²

PAHO Revolving Fund pricing information was used to supplement price information where not reported in the eJRF.¹³

International Coordinating Group (ICG) for vaccine provision volume shipped data for oral cholera vaccine were used to supplement country-reported vaccine use.¹⁴

Publicly reported sales for 2022 were sourced directly from reports of 23 companies.^v

World Bank gross national income (GNI) per capita data were used to determine the country income level. The most recently income level classification is used for the country even if it has changed between 2019 and 2022.¹⁵

Gavi, the Vaccine Alliance (Gavi) eligibility criteria for 2022 were used to determine the status of each country.¹⁶ Compared to the 2021 eligibility, India, Nicaragua and Uzbekistan transitioned to “Former Gavi”. Gavi Market Shaping Roadmaps for 10 vaccines were used as part of the data validation activities performed during the GVMR dataset cleaning.¹⁷

Our World in Data was referenced as a source of volume information for COVID-19 vaccines.¹⁸

US Centers for Disease Control Vaccines Price List for US public and private sector prices. The final list published in each calendar year was referenced.¹⁹

United Nations Office for Project Services (UNOPS) exchange rates for converting prices to US\$ were sourced from exchange rates for 31 December 2022.²⁰

^v Abbott, Aim Vaccine Co., Astra Zeneca, BN, BioNTech, Dynavax, Emergent, GlaxoSmithKline, Hualan, Janssen, KM Bio, Mitsubishi Tanabe, Moderna, Merck/MSD, Pfizer, Sanofi, CSL, Sinovac, Valneva, VBI Vaccines, Walvax, Zhefif.

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