

COVID-19 VACCINE PRODUCTION AND TARIFFS ON VACCINE INPUTS

INFORMATION NOTE¹

Key points:

- Among the top 27 vaccine manufacturing economies, Switzerland has the lowest average applied most-favoured-nation (MFN) tariff at 1.5 per cent for vaccine production inputs.
- Iran and Cuba have the highest applied MFN tariff at 11.9 per cent and 10.3 per cent, respectively.
- Using criteria of at least 5 per cent tariff for the product group as a "choke point" level, Argentina, India and Iran have all 13 product groups of vaccine inputs which can be considered sensitive/critical at varying levels, depending on the share of these product groups relative to total imported vaccine inputs.
- Of the 27 top manufacturers, 23 have at least 5 choke points.
- In Kazakhstan, the average tariff for the product group "vaccine ingredients" is almost 29 per cent, and this product group accounts for nearly one quarter of imported vaccine inputs.
- Among the different product groups, "vaccine ingredients" are the building blocks for vaccines and yet it is a tariff choke point for 17 manufacturing economies. On average, the lowest tariff is for "heat marker vaccine vial monitor", with the exception of Iran, which levies a tariff of 32 per cent (the highest average product group duty imposed by an individual economy).
- Tariffs on critical products to manufacture vaccines remain high, especially in some developing countries, and might impede the flow across borders. This is especially important when a high percentage of these inputs must be imported from other economies.
- Member cooperation at the WTO could support the elimination or significant reduction of tariffs on these vaccine inputs to reduce costs and to expand output from vaccine manufacturers meeting acute global needs.

1. INTRODUCTION

The analysis focused on the 27 top manufacturing economies listed in the July 2021 report using Airfinity data (see [sankey chart](#)). The list of inputs that were used in vaccine manufacturing were the Harmonized System (HS) six-digit codes in the Joint Indicative List of Critical COVID-19 Vaccine Inputs for Consultation², classified into 13 product groups. Using the identified HS six-digit subheading codes, the latest available MFN tariffs (2020 or most recent available) and 2020 imports of these products by the 27 top vaccine manufacturing economies were analysed to determine possible sensitive or choke points.

2. TECHNICAL DETAILS

The MFN applied tariffs were based on the dataset used for *World Tariff Profiles 2021*, and 2020 imports were based on the TDM dataset³. Even if the national tariff line data (i.e. eight-digit tariff

¹ This document has been prepared under the WTO Secretariat's own responsibility and is without prejudice to the positions of WTO members or to their rights and obligations under the WTO.

² Available at https://www.wto.org/english/tratop_e/covid19_e/vaccine_inputs_report_e.pdf.

³ Trade Data Monitor available at <https://tradedatamonitor.com>.

line codes) were available, beyond the standard HS six-digit level there is no uniformity of codes across national tariff nomenclatures. Thus, even if only a portion of the HS six-digit code pertains to the COVID-19 vaccine input, the data used in the analysis both for tariffs and imports were the six-digit MFN tariff average and the total six-digit imports from the world. Preferential tariffs were not taken into consideration and thus intra-EU imports, imports from partners of free trade agreements (FTAs) or any other preferential imports were treated as if MFN tariffs were levied. Furthermore, there was definitely an over-estimation of the import value of the inputs, since identification of the national breakdown pertaining to the actual product used in vaccine manufacturing cannot be easily done. Sometimes even within the most detailed national tariff line (or specific product) code available (eight digits or longer), the product coverage does not necessarily refer only to the specific vaccine input and includes non-vaccine-related inputs. While tariff estimates can be arguably good enough,⁴ the same cannot be said of the estimated imports value.

3. IDENTIFYING CRITICAL PRODUCTS AND POSSIBLE CHOKE POINTS

In the analysis, the MFN applied tariffs and total imports by product groups were estimated. In the Non-Agricultural Market Access (NAMA) negotiations, a proposal was made to eliminate low duties or nuisance tariffs (tariffs below 5 per cent as per one definition). Thus, for this analysis, any product group with an average MFN tariff weighted by imports of less than 5 per cent does not pose any market access barrier as far as the tariff is concerned. Tariffs of at least 5 per cent were considered consequential or non-negligible. Another "commonly accepted" definition is that any tariff greater than 15 per cent is already considered a tariff peak. These levels of tariff were assumed to influence the market access of the product. The impact of the tariff is also related to the share of imports of the specific product group. In this regard, five "arbitrary" critical levels were identified (see Table 1).

Table 1: Critical levels according to weighted MFN tariff and import share in all imported vaccine inputs

Level	Weighted MFN	Import share
Non-critical	Less than 5%	No limit
1	5-15%	Less than 10%
2	5-15%	10% or more
3	Greater than 15%	Less than 10%
4	Greater than 15%	10% or more

4. ANALYSIS AND RESULTS

The analysis shows that Switzerland at 1.5 per cent has the lowest tariffs among the 27 top vaccine producers, followed by the United States (2 per cent) and Japan (2.1 per cent) (see Table 2). The two highest average tariffs were levied by Cuba (10.3 per cent) and Iran (11.9 per cent), an acceding member. Belarus, another acceding member, has an average tariff of 5.2 per cent. Fifteen manufacturers have tariffs less than 5 per cent. The average tariffs of EU member States vary because of the differences in the type and value of vaccine inputs that they import. Belgium has the lowest average tariff among the eight EU member States in the vaccine manufacturers group.

Using the average tariff and import share of each product group, a level was assigned to each product category within each vaccine producing economy (see results). Any product group with an average tariff of at least 5 per cent was deemed a possible choke point. Using the assigned choke point levels, the results show that three economies (Argentina, India, Iran) have tariffs of 5 per cent or higher in all product groups. In contrast, Japan and the United States have average tariffs of less than 5 per cent across all 13 product groups and thus have no critical or possible choke point. Kazakhstan has one product group on the highest choke point level (i.e. tariff greater than 15 per cent and an import share greater than 10 per cent): the average tariff for "vaccine ingredients" is 28.6 per cent, and the product group accounts for almost a quarter of all imported vaccine inputs.

The number of manufacturing economies by number of choke points are shown in Table 3.

⁴ See https://www.wto.org/english/res_e/statis_e/wtp2020_special_topic_e.pdf.

Table 2: Weighted average MFN Tariff of the top vaccine manufacturing economies, ranked by lowest to highest tariff

Manufacturing economy	Weighted MFN average (%)
Switzerland	1.5
United States of America	2.0
Japan	2.1
Belgium	2.8
Israel	2.8
Australia	3.0
Russian Federation	3.2
Chinese Taipei	3.5
United Kingdom	4.0
Egypt	4.1
Germany	4.3
China	4.5
France	4.6
Czech Republic	4.8
Netherlands	4.9
Austria	5.1
Belarus	5.2
Spain	5.7
Italy	5.9
Korea, Republic of	6.2
Thailand	6.4
Brazil	6.8
India	8.5
Kazakhstan	8.9
Argentina	9.6
Cuba	10.3
Iran	11.9

Source: WTO Secretariat estimates.

Table 3: Number of manufacturing economies per choke point ranges

Number of choke points	Manufacturing economies	
	Number	Percentage
None	2	7.4%
1-4	2	7.4%
5-6	10	37.0%
7-8	5	18.5%
9-10	2	7.4%
11-13	6	22.2%

Of the 27 top manufacturers, 23 have at least 5 choke points. Japan and the United States have no choke point; but Switzerland, which has the lowest average tariff has one critical product ("metal crimp seals") levied an average tariff of 5.2 per cent even if the share of this product group among imported vaccine inputs is only 2 per cent.

Among the 13 different product groups, "vaccine ingredients" is the most important category of vaccine inputs group and understandably cover the widest range of products (see Table 4). There are 31 subheadings under this product group with an average tariff of 5.6 per cent across all vaccine manufacturing economies. Ethanol, a vaccine ingredient, is levied a tariff equivalent of 291 per cent

in Kazakhstan and Belarus (Table 5). Tariffs for vaccine ingredients are lowest in Israel (0.3 per cent), Switzerland (0.6 per cent) and Australia (0.7 per cent). There are 17 manufacturers for which the average tariff is at least 5 per cent, the limit to be considered a non-negligible duty. The product groups with the highest average MFN are "sterile connectors" (6.0 per cent), "sterile bottles" (5.9 per cent) and "bioreactor bags" (5.9 per cent) and are tariff choke points in 22 to 23 manufacturing economies. Import duty on vials is substantial for a large majority of manufacturers (23) even if the average tariff is only 4.6 per cent.

Table 4: Average and maximum MFN tariff by product group for the top 27 vaccine manufacturers

Product group	No. of manufacturers with a tariff of at least 5% (choke point)	Weighted MFN applied average (%)	Maximum MFN (%)	No. of distinct HS 6-digit subheadings in product group
Bioreactor	6	1.6	15	2
Bioreactor bags	22	5.9	18	3
Cell culture media & reagents	11	1.5	14	2
Erlenmeyer flasks	12	4.0	14	3
Filters	7	2.0	9	1
Heat marker vaccine vial monitor	9	1.3	32	2
Manufacturing equipment	7	2.7	15	6
Metal crimp seals	14	4.4	22	1
Sterile bottle	23	5.9	18	1
Sterile connector	22	6.0	15	1
Stoppers	13	4.2	11	1
Vaccine ingredients	17	5.6	291	31
Vials	23	4.6	25	1

Source: WTO Secretariat calculations.

The lowest average MFN among product groups refers to "heat marker vaccine vial monitor" even if it has the second highest maximum, which implies that the tariffs for this product group are generally low (except for Iran, which charges 32 per cent for the two subheadings classified under this group). This product group is duty free in the European Union, Japan, the Republic of Korea, Chinese Taipei, the United Kingdom and the United States of America. The product group "bioreactor" is least considered as a choke point – only six manufacturers have tariffs of at least 5 per cent for this group.

The results show that tariffs on these critical products to manufacture vaccines remain high, especially in some developing countries, and might impede the flow across borders. This is especially important when a high percentage of these inputs must be imported from other economies. Using the nuisance tariff level proposed during the NAMA negotiations to be any tariff below 5 per cent, any tariff of at least 5 per cent is thus non-negligible. With this criterion, all product groups in the three countries of Argentina, India and Iran have an average tariff of at least 5 per cent. Furthermore, 23 of the 27 top manufacturers have at least 5 choke points. Member cooperation under the WTO could support the elimination or significant reduction of tariffs on these vaccine inputs to reduce costs and to expand output from vaccine manufacturers meeting acute global needs.

Table 5. Identified HS 6-digit codes of inactive vaccine ingredients product group for which the estimated MFN tariff is greater than 50 per cent

Subheading	Description	Name	MFN (%)
170199	Chemically pure sucrose, in solid form	Austria	50.2*
		Belarus	63.8
		Belgium	50.2*
		Czech Republic	50.2*
		France	50.2*
		Germany	50.2*
		India	100.0
		Iran	55.0
		Italy	50.2*
		Kazakhstan	56.0
		Netherlands	50.2*
		Spain	50.2*
		Thailand	94.0
		United Kingdom (EU tariff)	50.2*
220710	Ethanol	Belarus	290.6
		India	150.0
		Kazakhstan	290.6
		Russian Federation	100.0
		Thailand	122.6

* *Ad valorem* equivalent for EU tariff of €41.9/100 kg.

The following [slides](#) show individual profiles of each vaccine manufacturing economy.

VACCINE PRODUCTION AND TARIFFS ON VACCINE INPUTS

VACCINE PRODUCTION

Target

Dec 2021

10+ billion doses
60+ facilities
27 economies

Belarus
United Kingdom
Austria & Germany
Belgium & Netherlands
Switzerland
Chinese Taipei

Germany

China

Netherlands
France

India

Thailand
Kazakhstan
Japan
Russia

Cuba
Argentina
Republic of Korea
Brazil
Czech Republic

United States

Europe

Asia

South America
Oceania
Africa

COVAX

North America

Current

Jul 2021

3.8 billion doses
28 facilities
17 economies

India

China

Kazakhstan
Argentina
Republic of Korea
Thailand
Japan

United States

Cuba
Germany
Russia
Switzerland
Belgium
Netherlands
United Kingdom
Australia
Belarus

Asia

Africa
South America
North America
Europe
Oceania

Production

Destination

Production

Destination

Sources: Airfinity; and WTO staff calculations.
Note: Not all production sites were included in the visualisation.

TARIFFS ON VACCINE INPUTS

Reporter (Click to see data)	Weighted average MFN tariff (%)	No. of product groups as possible choke points
Argentina	9.6	13
Australia	3.0	6
Austria	5.1	5
Belarus	5.2	8
Belgium	2.8	4
Brazil	6.8	12
China	4.5	11
Cuba	10.3	12
Czech Republic	4.8	5
Egypt	4.1	7
France	4.6	5
Germany	4.3	5
India	8.5	13
Iran	11.9	13
Israel	2.8	5
Italy	5.9	5
Japan	2.1	0
Kazakhstan	8.9	7
Korea, Republic of	6.2	10
Netherlands	4.9	5
Russian Federation	3.2	8
Spain	5.7	5
Switzerland	1.5	1
Chinese Taipei	3.5	8
Thailand	6.4	9
United Kingdom	4.0	5
United States of America	2.0	0

Possible choke points are defined as an MFN tariff of 5% or more.

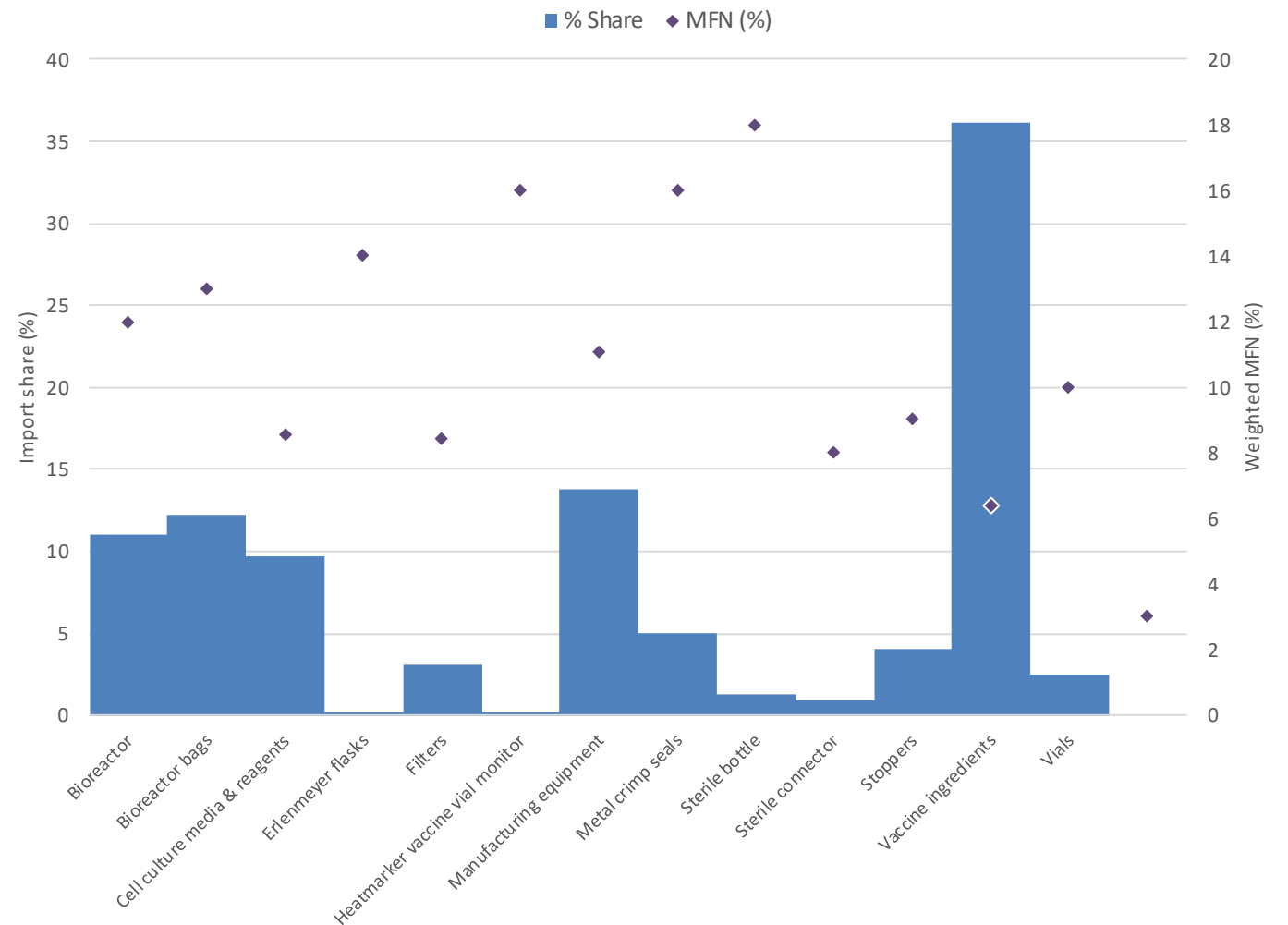
Source: WTO Secretariat.

ARGENTINA

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	9.6	100.0
Bioreactor	12.0	11.0
Bioreactor bags	13.0	12.2
Cell culture media & reagents	8.5	9.7
Erlenmeyer flasks	14.0	0.2
Filters	8.4	3.1
Heatmarker vaccine vial monitor	16.0	0.2
Manufacturing equipment	11.1	13.8
Metal crimp seals	16.0	5.0
Sterile bottle	18.0	1.2
Sterile connector	8.0	0.9
Stoppers	9.0	4.1
Vaccine ingredients	6.4	36.1
Vials	10.0	2.5

Import share and MFN duty, by vaccine inputs product group

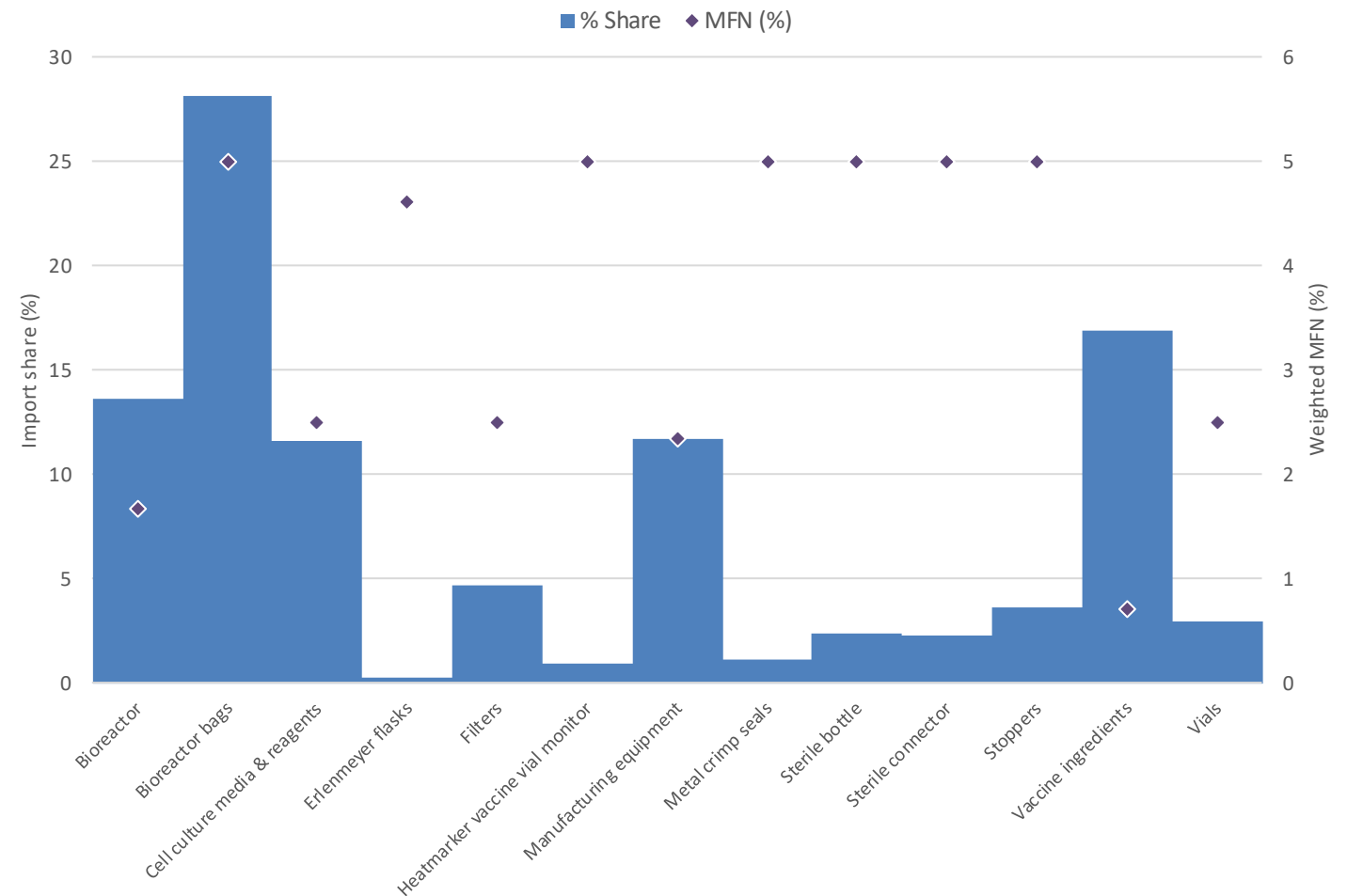


AUSTRALIA

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	3.0	100.0
Bioreactor	1.7	13.6
Bioreactor bags	5.0	28.1
Cell culture media & reagents	2.5	11.5
Erlenmeyer flasks	4.6	0.3
Filters	2.5	4.6
Heatmarker vaccine vial monitor	5.0	0.9
Manufacturing equipment	2.4	11.7
Metal crimp seals	5.0	1.1
Sterile bottle	5.0	2.4
Sterile connector	5.0	2.3
Stoppers	5.0	3.6
Vaccine ingredients	0.7	16.9
Vials	2.5	3.0

Import share and MFN duty, by vaccine inputs product group

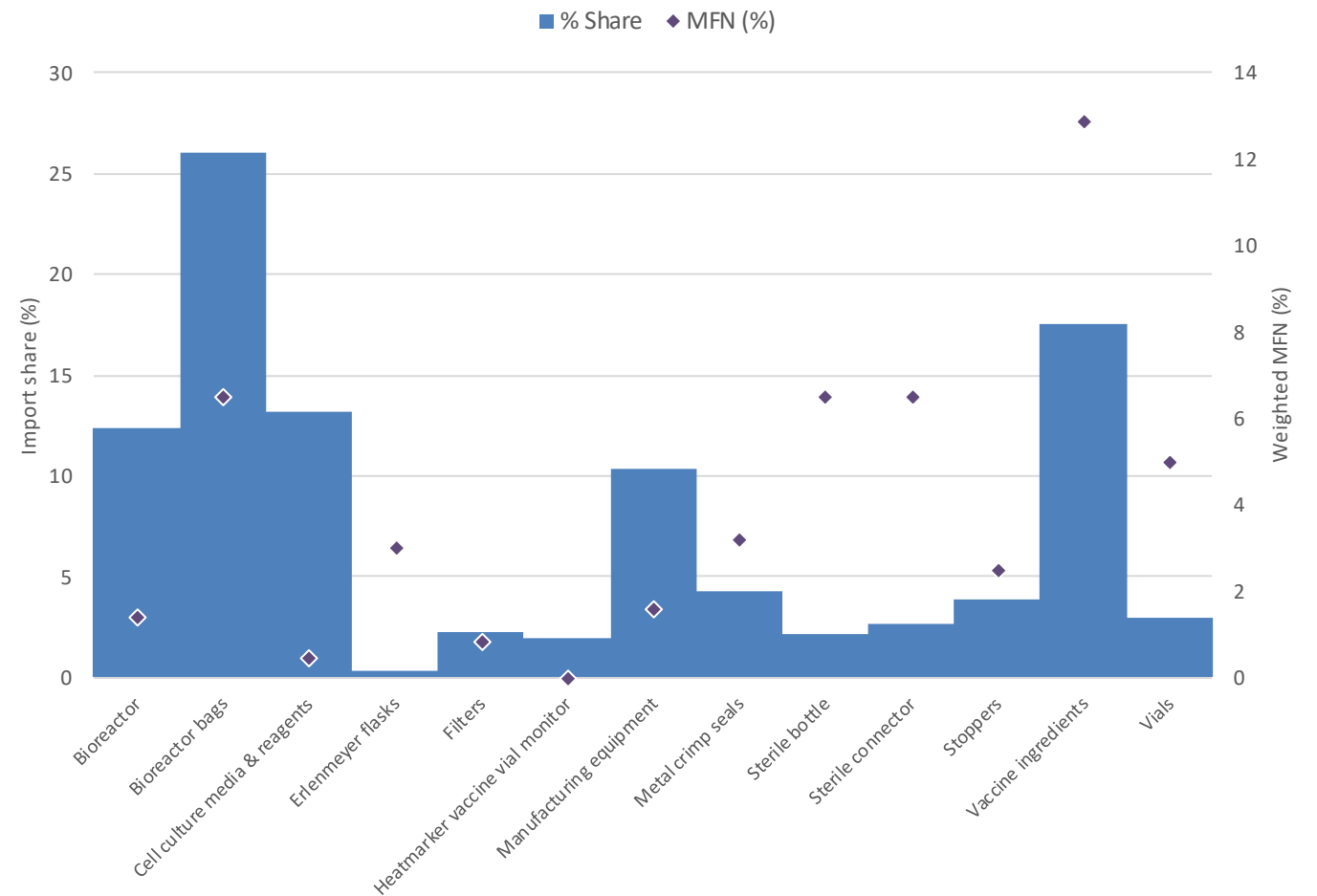


AUSTRIA

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	5.1	100.0
Bioreactor	1.4	12.4
Bioreactor bags	6.5	26.0
Cell culture media & reagents	0.5	13.1
Erlenmeyer flasks	3.0	0.4
Filters	0.9	2.2
Heatmarker vaccine vial monitor	0.0	1.9
Manufacturing equipment	1.6	10.3
Metal crimp seals	3.2	4.3
Sterile bottle	6.5	2.2
Sterile connector	6.5	2.7
Stoppers	2.5	3.9
Vaccine ingredients	12.9	17.5
Vials	5.0	3.0

Import share and MFN duty, by vaccine inputs product group

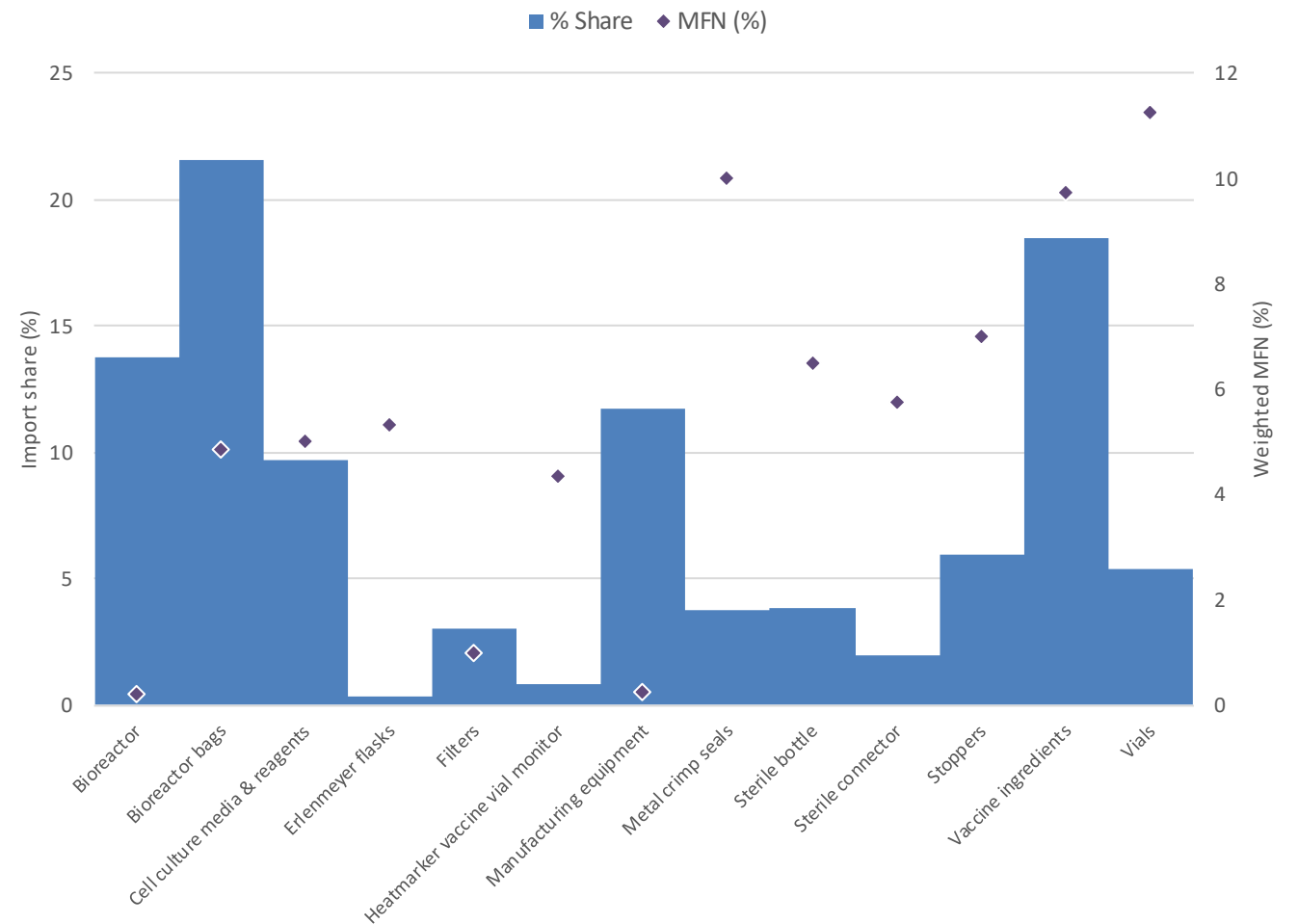


BELARUS

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	5.2	100.0
Bioreactor	0.2	13.8
Bioreactor bags	4.8	21.5
Cell culture media & reagents	5.0	9.7
Erlenmeyer flasks	5.3	0.3
Filters	1.0	3.0
Heatmarker vaccine vial monitor	4.4	0.8
Manufacturing equipment	0.2	11.7
Metal crimp seals	10.0	3.7
Sterile bottle	6.5	3.8
Sterile connector	5.8	1.9
Stoppers	7.0	5.9
Vaccine ingredients	9.7	18.5
Vials	11.3	5.3

Import share and MFN duty, by vaccine inputs product group

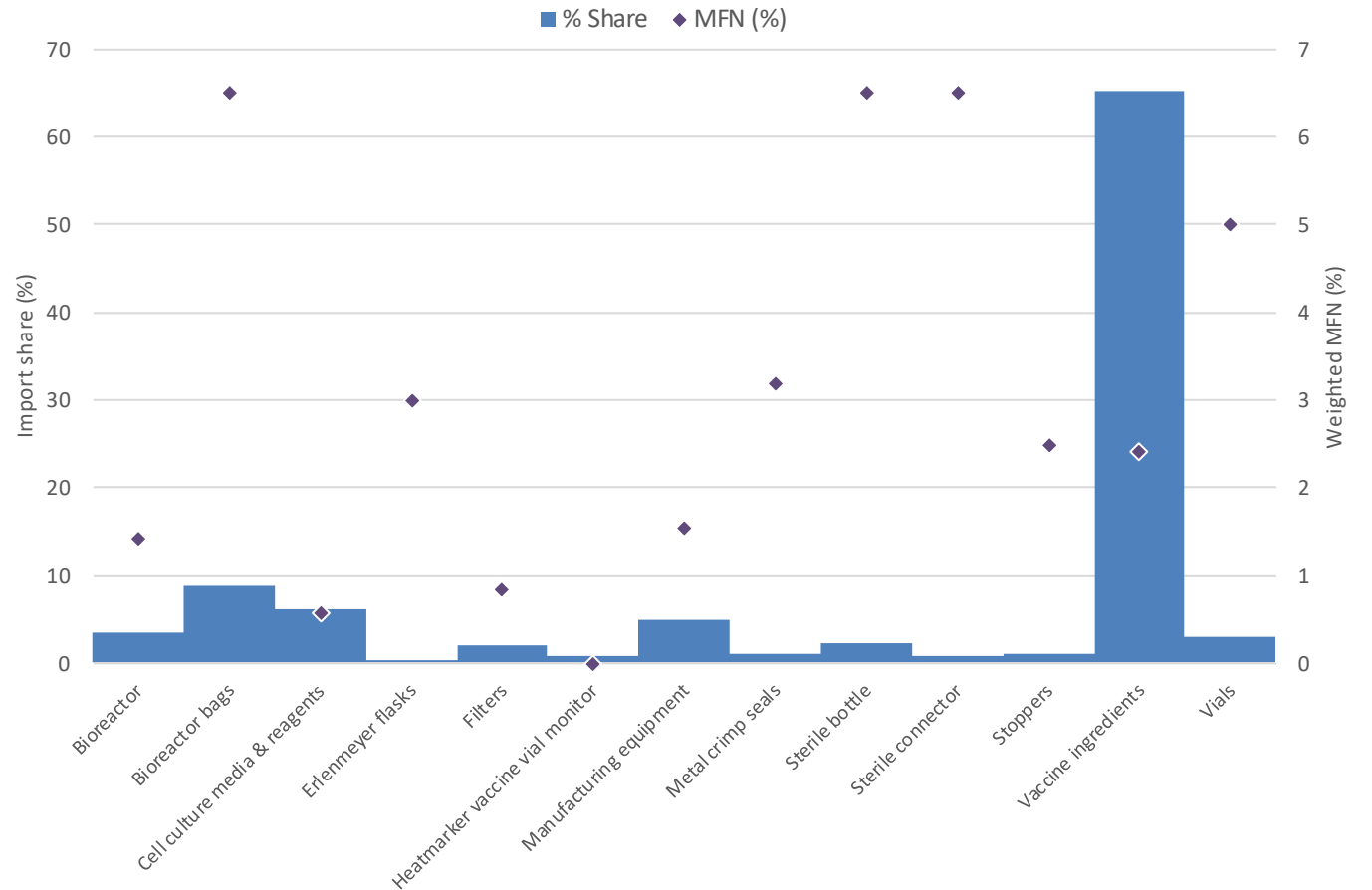


BELGIUM

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	2.8	100.0
Bioreactor	1.4	3.5
Bioreactor bags	6.5	8.9
Cell culture media & reagents	0.6	6.2
Erlenmeyer flasks	3.0	0.2
Filters	0.9	2.0
Heatmarker vaccine vial monitor	0.0	0.8
Manufacturing equipment	1.6	4.9
Metal crimp seals	3.2	1.0
Sterile bottle	6.5	2.3
Sterile connector	6.5	0.9
Stoppers	2.5	1.1
Vaccine ingredients	2.4	65.2
Vials	5.0	3.1

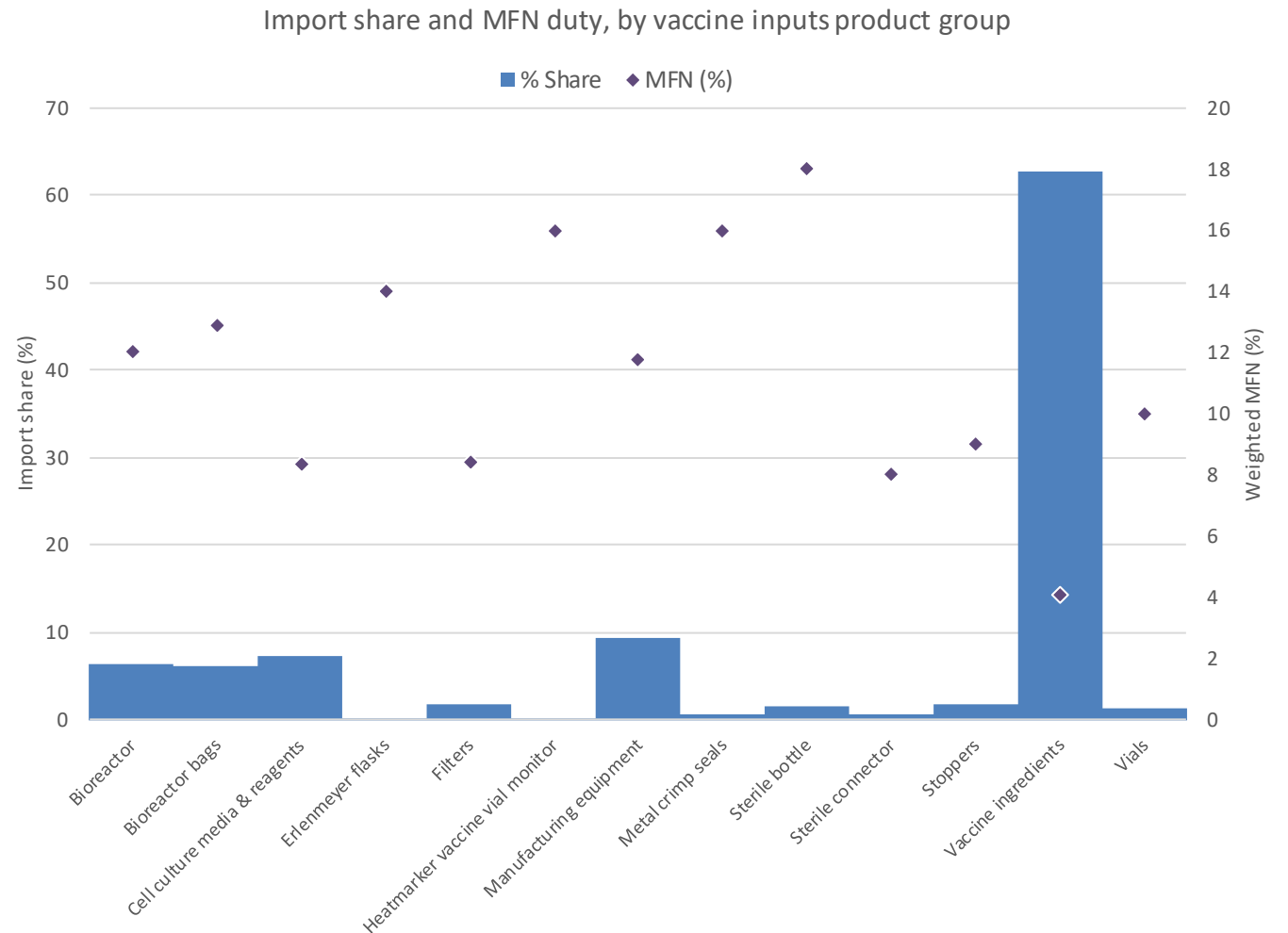
Import share and MFN duty, by vaccine inputs product group



BRAZIL

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	6.8	100.0
Bioreactor	12.0	6.4
Bioreactor bags	12.9	6.1
Cell culture media & reagents	8.4	7.2
Erlenmeyer flasks	14.0	0.1
Filters	8.4	1.8
Heatmarker vaccine vial monitor	16.0	0.1
Manufacturing equipment	11.8	9.4
Metal crimp seals	16.0	0.7
Sterile bottle	18.0	1.6
Sterile connector	8.0	0.7
Stoppers	9.0	1.8
Vaccine ingredients	4.1	62.7
Vials	10.0	1.3

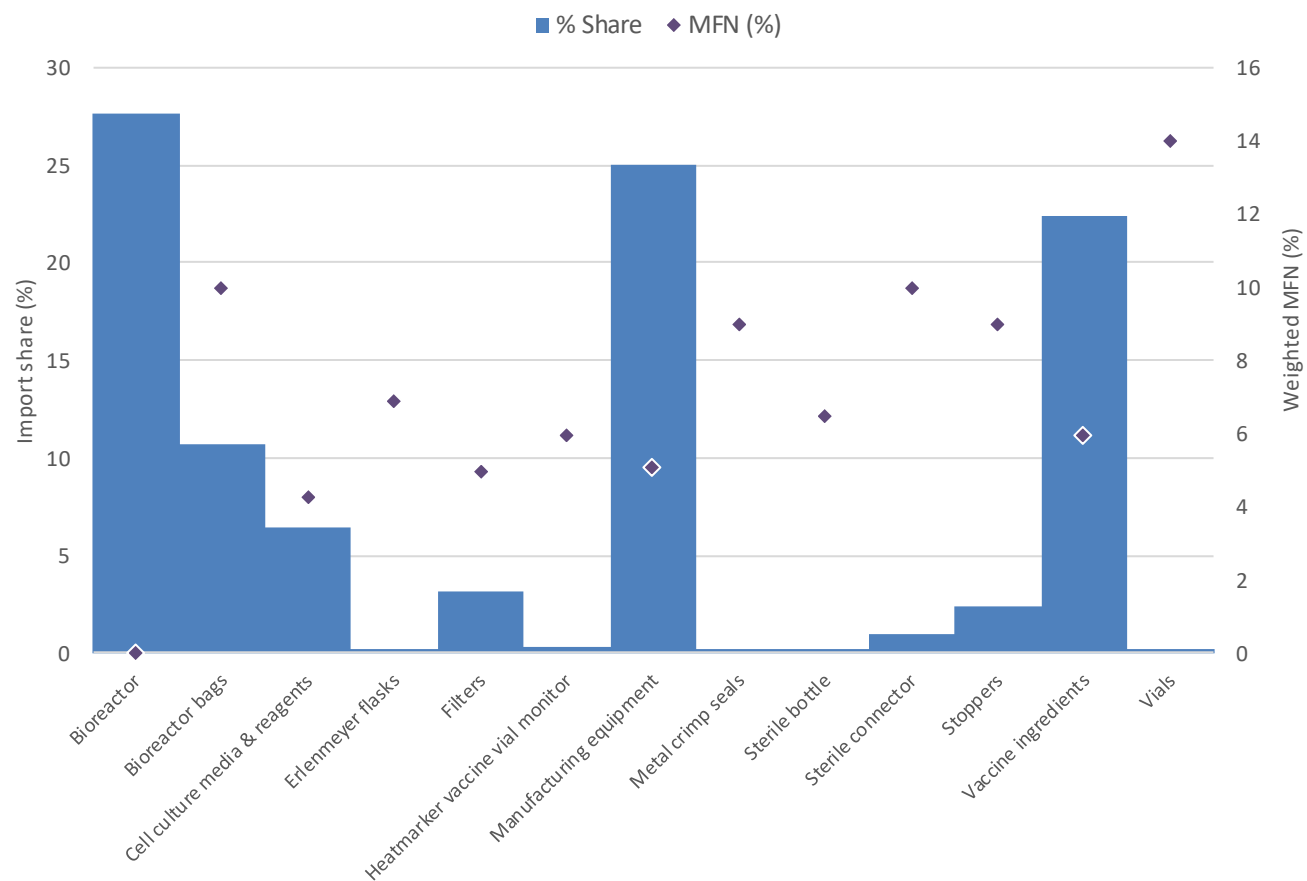


CHINA

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	4.5	100.0
Bioreactor	0.0	27.6
Bioreactor bags	10.0	10.7
Cell culture media & reagents	4.3	6.5
Erlenmeyer flasks	6.9	0.2
Filters	5.0	3.2
Heatmarker vaccine vial monitor	6.0	0.3
Manufacturing equipment	5.1	25.0
Metal crimp seals	9.0	0.3
Sterile bottle	6.5	0.2
Sterile connector	10.0	1.0
Stoppers	9.0	2.4
Vaccine ingredients	6.0	22.4
Vials	14.0	0.2

Import share and MFN duty, by vaccine inputs product group

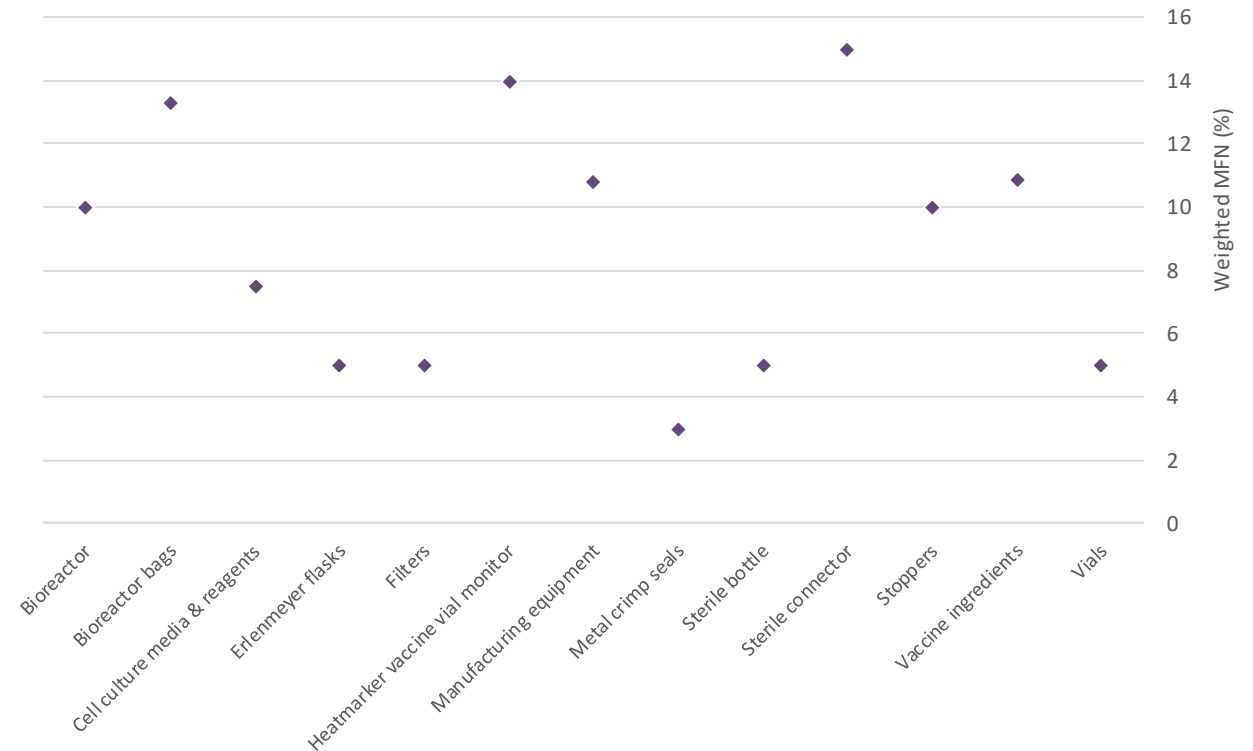


CUBA (no import data)

Cell shading by product group:		MFN	Imp Share		MFN	Imp Share
	MFN < 5%		< 10%		GT 15%	< 10%
	No limit imp share	5% - 15%	=> 10%			=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	10.3	
Bioreactor	10.0	
Bioreactor bags	13.3	
Cell culture media & reagents	7.5	
Erlenmeyer flasks	5.0	
Filters	5.0	
Heatmarker vaccine vial monitor	14.0	
Manufacturing equipment	10.8	
Metal crimp seals	3.0	
Sterile bottle	5.0	
Sterile connector	15.0	
Stoppers	10.0	
Vaccine ingredients	10.9	
Vials	5.0	

MFN duty, by vaccine inputs product group

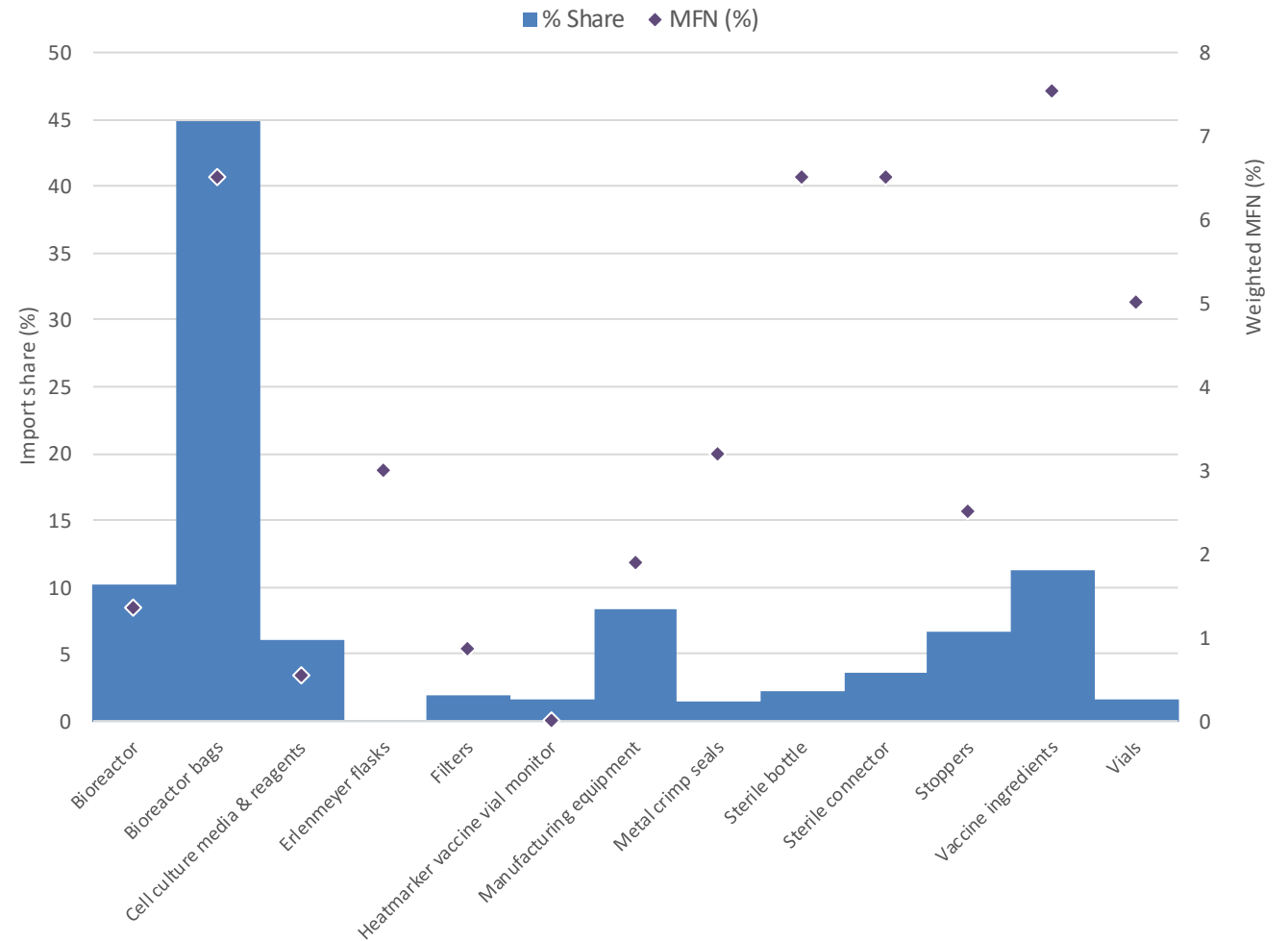


CZECH REPUBLIC

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	4.8	100.0
Bioreactor	1.3	10.2
Bioreactor bags	6.5	44.8
Cell culture media & reagents	0.5	6.0
Erlenmeyer flasks	3.0	0.1
Filters	0.9	1.9
Heatmarker vaccine vial monitor	0.0	1.7
Manufacturing equipment	1.9	8.4
Metal crimp seals	3.2	1.5
Sterile bottle	6.5	2.2
Sterile connector	6.5	3.6
Stoppers	2.5	6.7
Vaccine ingredients	7.5	11.3
Vials	5.0	1.6

Import share and MFN duty, by vaccine inputs product group

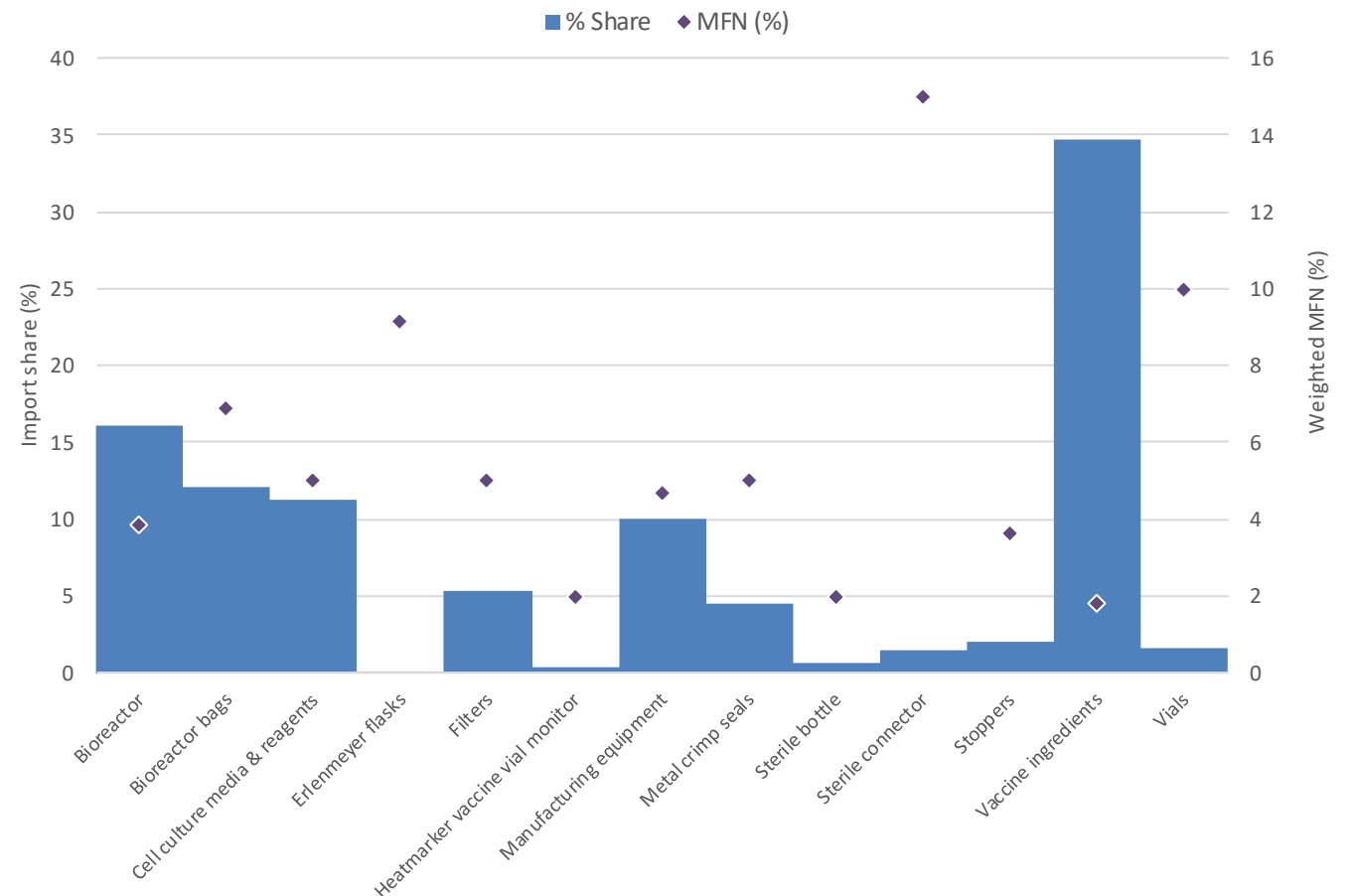


EGYPT

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	4.1	100.0
Bioreactor	3.9	16.1
Bioreactor bags	6.9	12.1
Cell culture media & reagents	5.0	11.2
Erlenmeyer flasks	9.2	0.1
Filters	5.0	5.4
Heatmarker vaccine vial monitor	2.0	0.4
Manufacturing equipment	4.7	10.0
Metal crimp seals	5.0	4.5
Sterile bottle	2.0	0.6
Sterile connector	15.0	1.4
Stoppers	3.6	1.9
Vaccine ingredients	1.8	34.8
Vials	10.0	1.5

Import share and MFN duty, by vaccine inputs product group

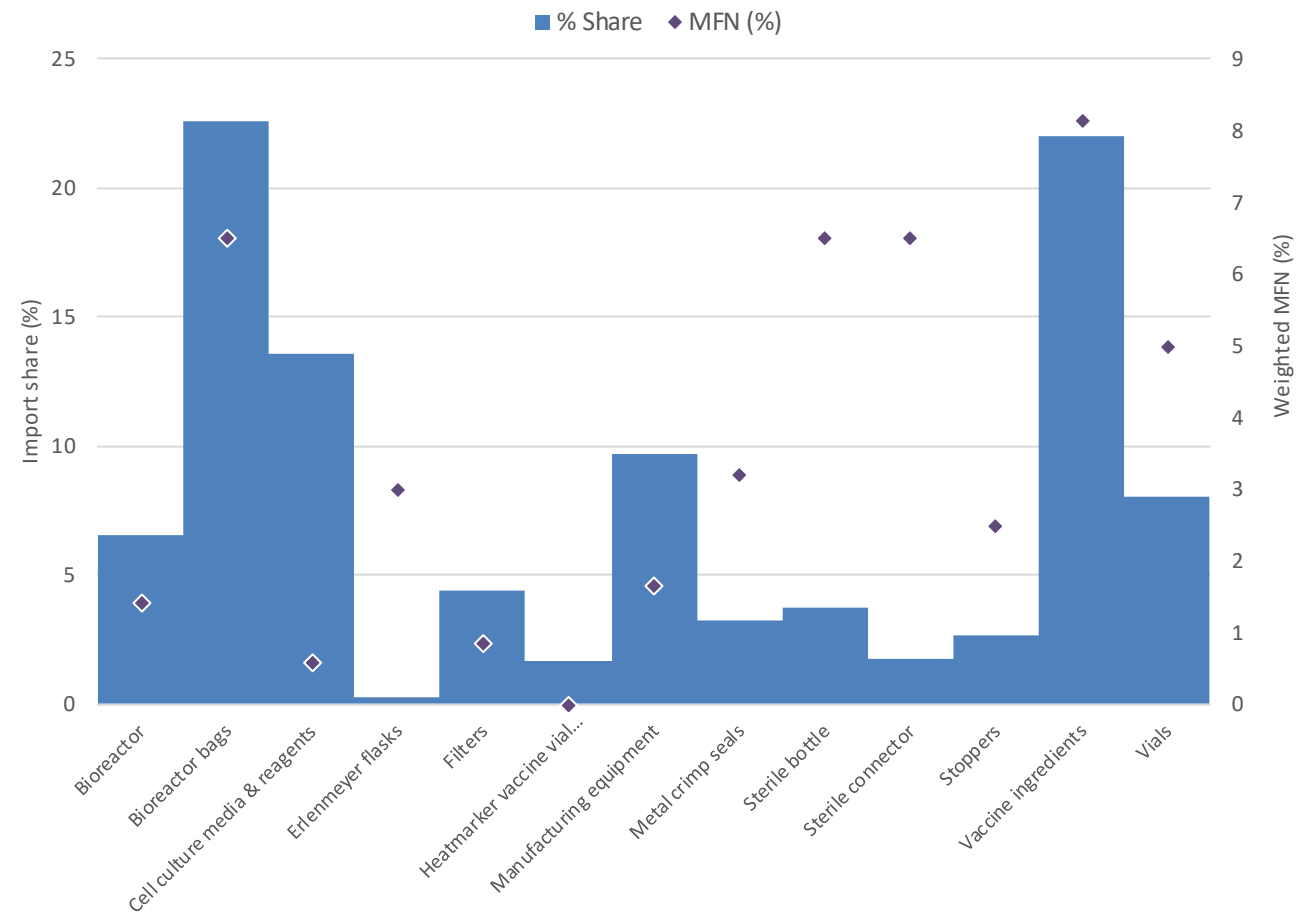


FRANCE

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	4.6	100.0
Bioreactor	1.4	6.5
Bioreactor bags	6.5	22.6
Cell culture media & reagents	0.6	13.5
Erlenmeyer flasks	3.0	0.3
Filters	0.9	4.4
Heatmarker vaccine vial monitor	0.0	1.7
Manufacturing equipment	1.7	9.7
Metal crimp seals	3.2	3.2
Sterile bottle	6.5	3.8
Sterile connector	6.5	1.8
Stoppers	2.5	2.6
Vaccine ingredients	8.1	22.0
Vials	5.0	8.0

Import share and MFN duty, by vaccine inputs product group

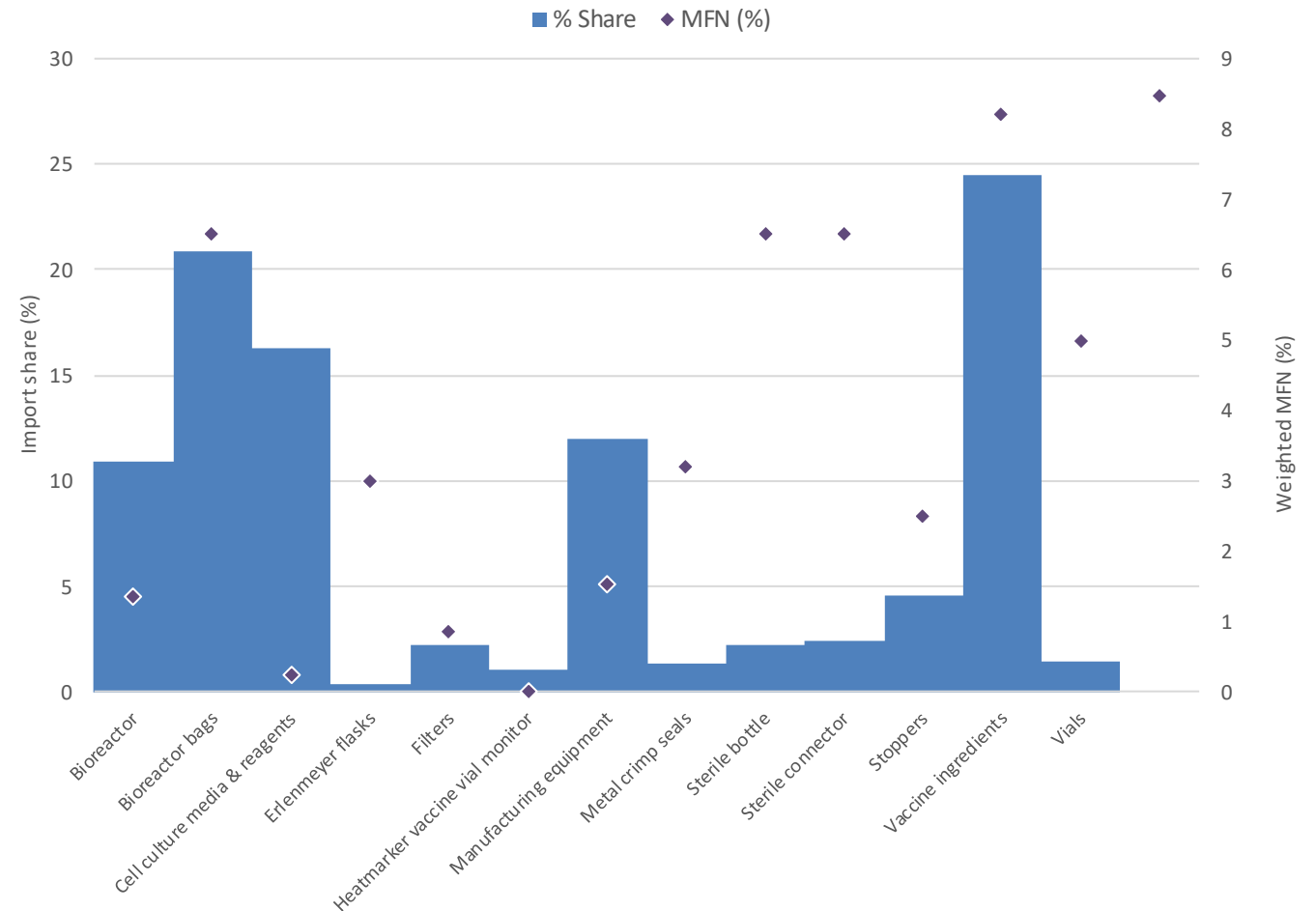


GERMANY

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	4.3	100.0
Bioreactor	1.4	11.0
Bioreactor bags	6.5	20.8
Cell culture media & reagents	0.2	16.3
Erlenmeyer flasks	3.0	0.3
Filters	0.9	2.2
Heatmarker vaccine vial monitor	0.0	1.0
Manufacturing equipment	1.5	12.0
Metal crimp seals	3.2	1.3
Sterile bottle	6.5	2.2
Sterile connector	6.5	2.4
Stoppers	2.5	4.5
Vaccine ingredients	8.2	24.5
Vials	5.0	1.5

Import share and MFN duty, by vaccine inputs product group

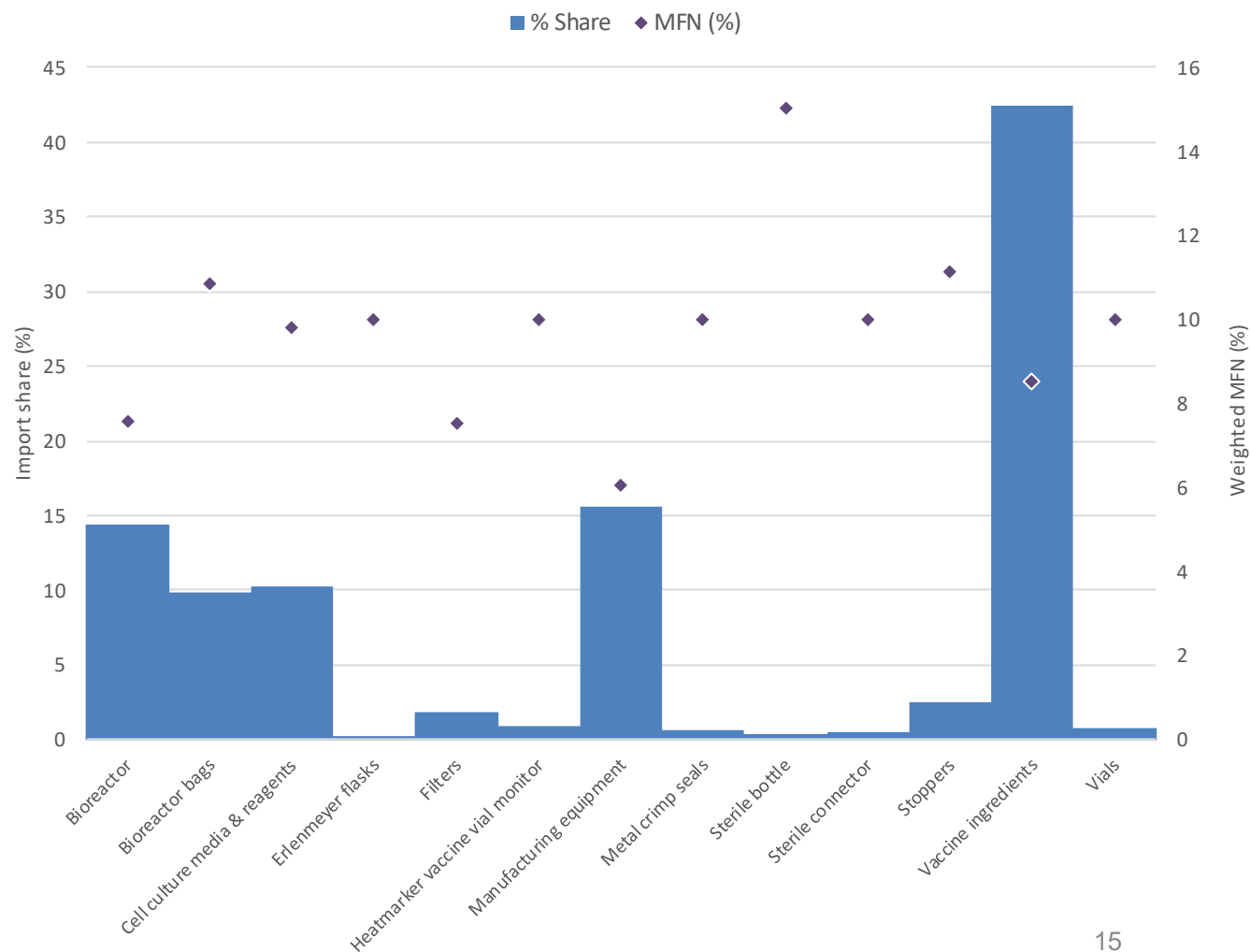


INDIA

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	8.5	100.0
Bioreactor	7.6	14.3
Bioreactor bags	10.8	9.8
Cell culture media & reagents	9.8	10.2
Erlenmeyer flasks	10.0	0.3
Filters	7.5	1.8
Heatmarker vaccine vial monitor	10.0	0.9
Manufacturing equipment	6.1	15.5
Metal crimp seals	10.0	0.6
Sterile bottle	15.0	0.4
Sterile connector	10.0	0.5
Stoppers	11.1	2.5
Vaccine ingredients	8.5	42.4
Vials	10.0	0.8

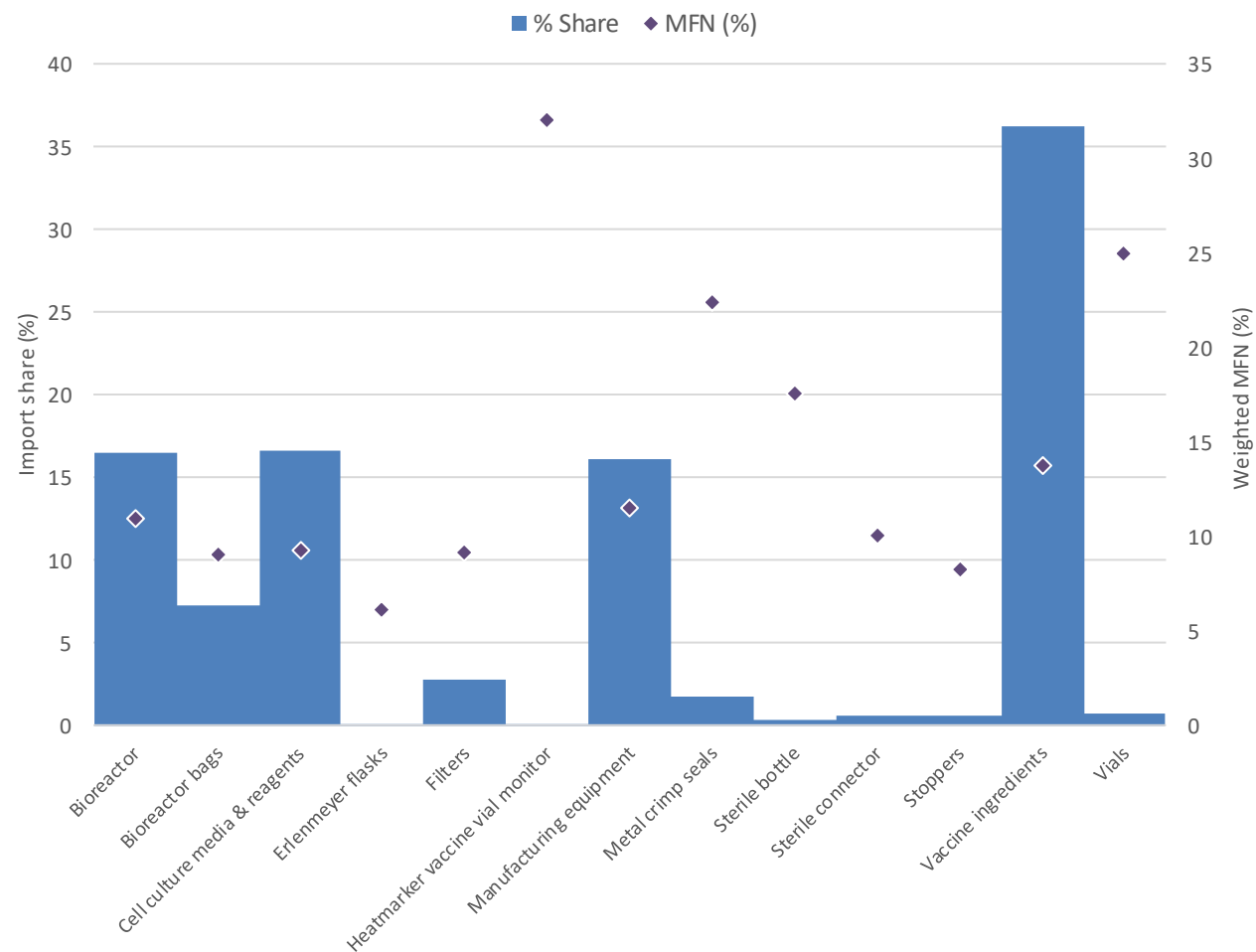
Import share and MFN duty, by vaccine inputs product group



Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	11.9	100.0
Bioreactor	10.9	16.5
Bioreactor bags	9.0	7.2
Cell culture media & reagents	9.2	16.6
Erlenmeyer flasks	6.1	0.1
Filters	9.2	2.8
Heatmarker vaccine vial monitor	32.0	0.1
Manufacturing equipment	11.5	16.2
Metal crimp seals	22.3	1.8
Sterile bottle	17.5	0.4
Sterile connector	10.0	0.6
Stoppers	8.3	0.6
Vaccine ingredients	13.8	36.2
Vials	25.0	0.7

Import share and MFN duty, by vaccine inputs product group

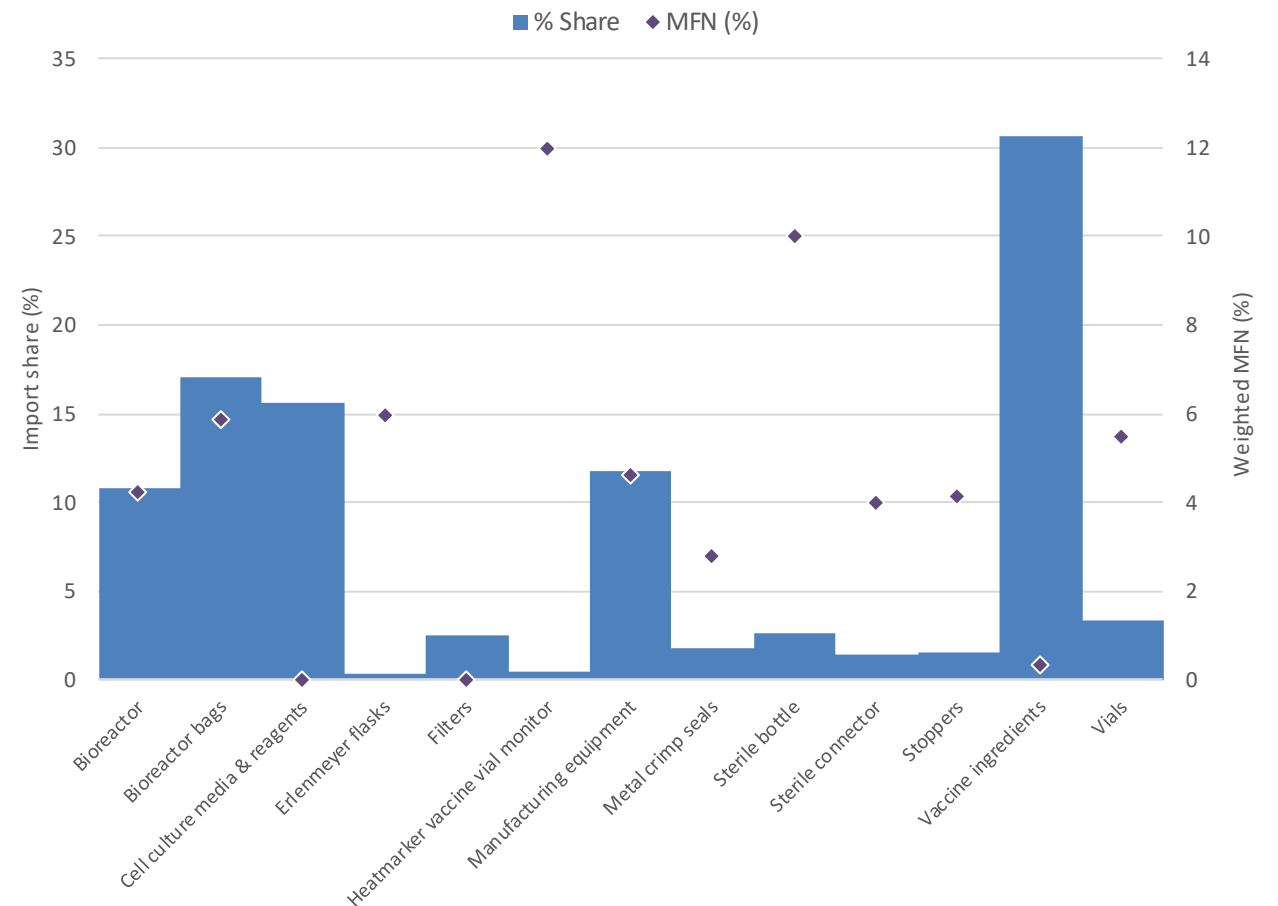


ISRAEL

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	2.8	100.0
Bioreactor	4.2	10.8
Bioreactor bags	5.9	17.1
Cell culture media & reagents	0.0	15.6
Erlenmeyer flasks	6.0	0.4
Filters	0.0	2.5
Heatmarker vaccine vial monitor	12.0	0.5
Manufacturing equipment	4.6	11.8
Metal crimp seals	2.8	1.7
Sterile bottle	10.0	2.6
Sterile connector	4.0	1.4
Stoppers	4.1	1.6
Vaccine ingredients	0.3	30.6
Vials	5.5	3.4

Import share and MFN duty, by vaccine inputs product group

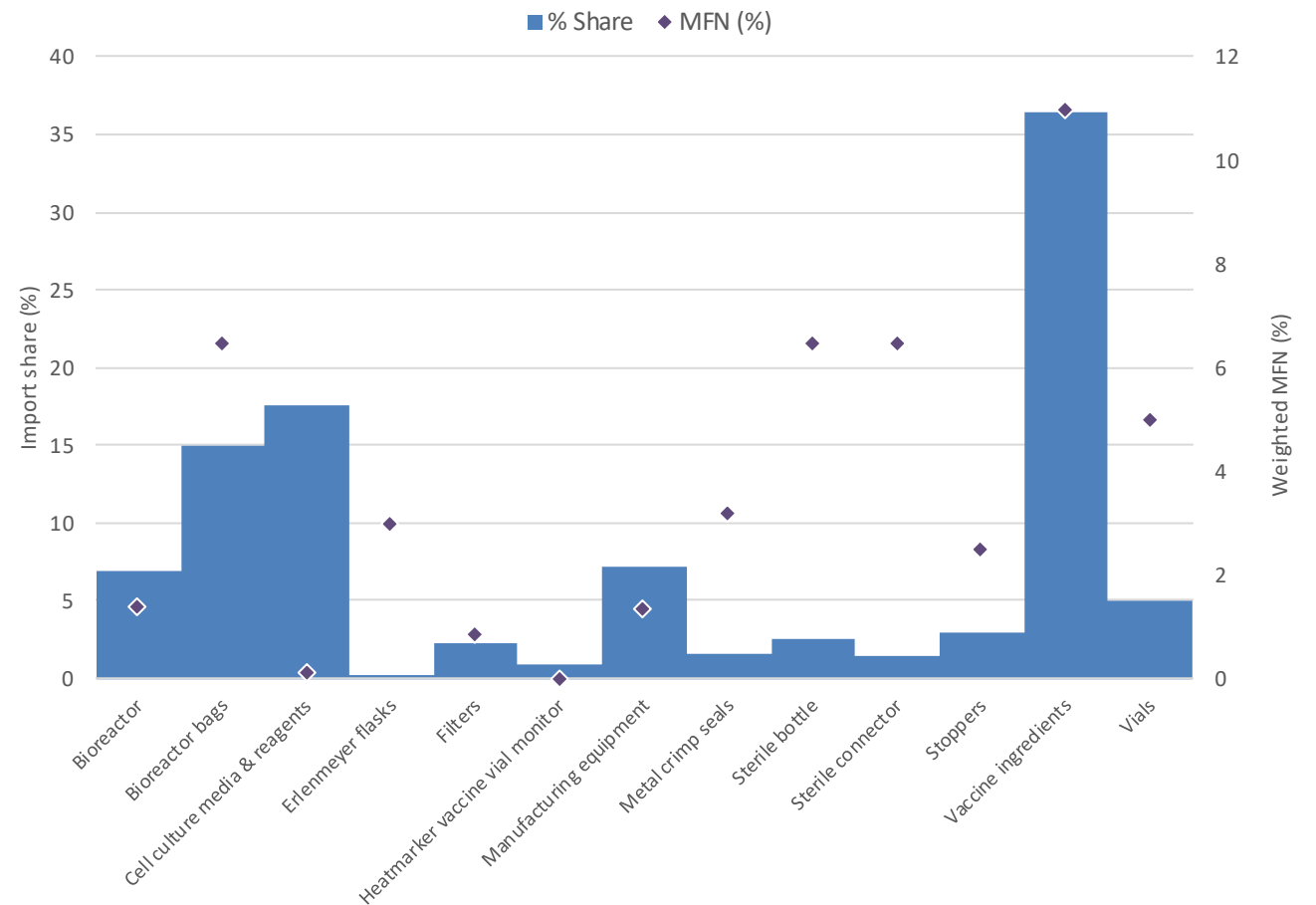


ITALY

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	5.9	100.0
Bioreactor	1.4	6.9
Bioreactor bags	6.5	14.9
Cell culture media & reagents	0.1	17.5
Erlenmeyer flasks	3.0	0.2
Filters	0.9	2.3
Heatmarker vaccine vial monitor	0.0	0.9
Manufacturing equipment	1.3	7.2
Metal crimp seals	3.2	1.6
Sterile bottle	6.5	2.6
Sterile connector	6.5	1.4
Stoppers	2.5	3.0
Vaccine ingredients	11.0	36.5
Vials	5.0	5.1

Import share and MFN duty, by vaccine inputs product group

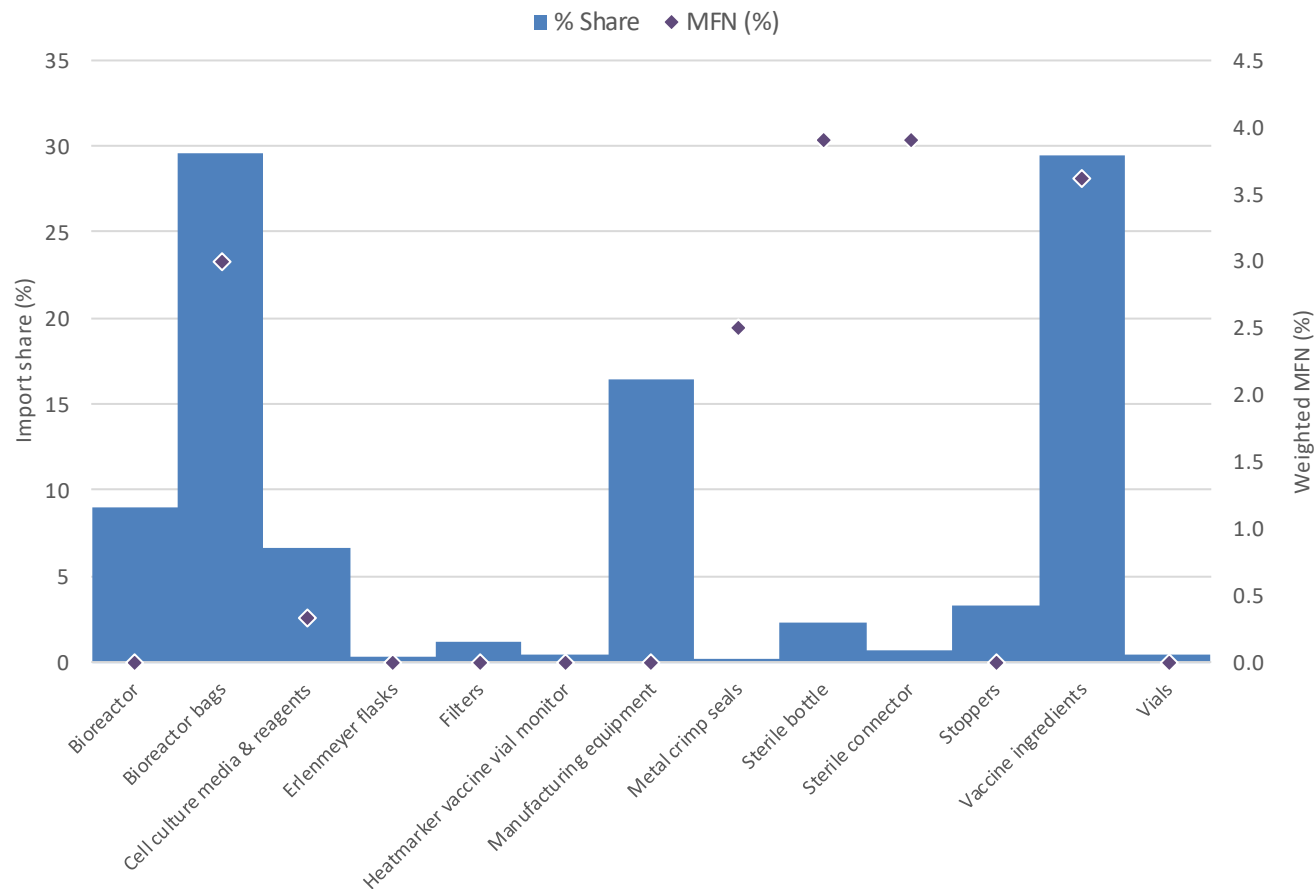


JAPAN

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	2.1	100.0
Bioreactor	0.0	9.0
Bioreactor bags	3.0	29.6
Cell culture media & reagents	0.3	6.7
Erlenmeyer flasks	0.0	0.3
Filters	0.0	1.2
Heatmarker vaccine vial monitor	0.0	0.4
Manufacturing equipment	0.0	16.4
Metal crimp seals	2.5	0.2
Sterile bottle	3.9	2.3
Sterile connector	3.9	0.7
Stoppers	0.0	3.3
Vaccine ingredients	3.6	29.4
Vials	0.0	0.5

Import share and MFN duty, by vaccine inputs product group

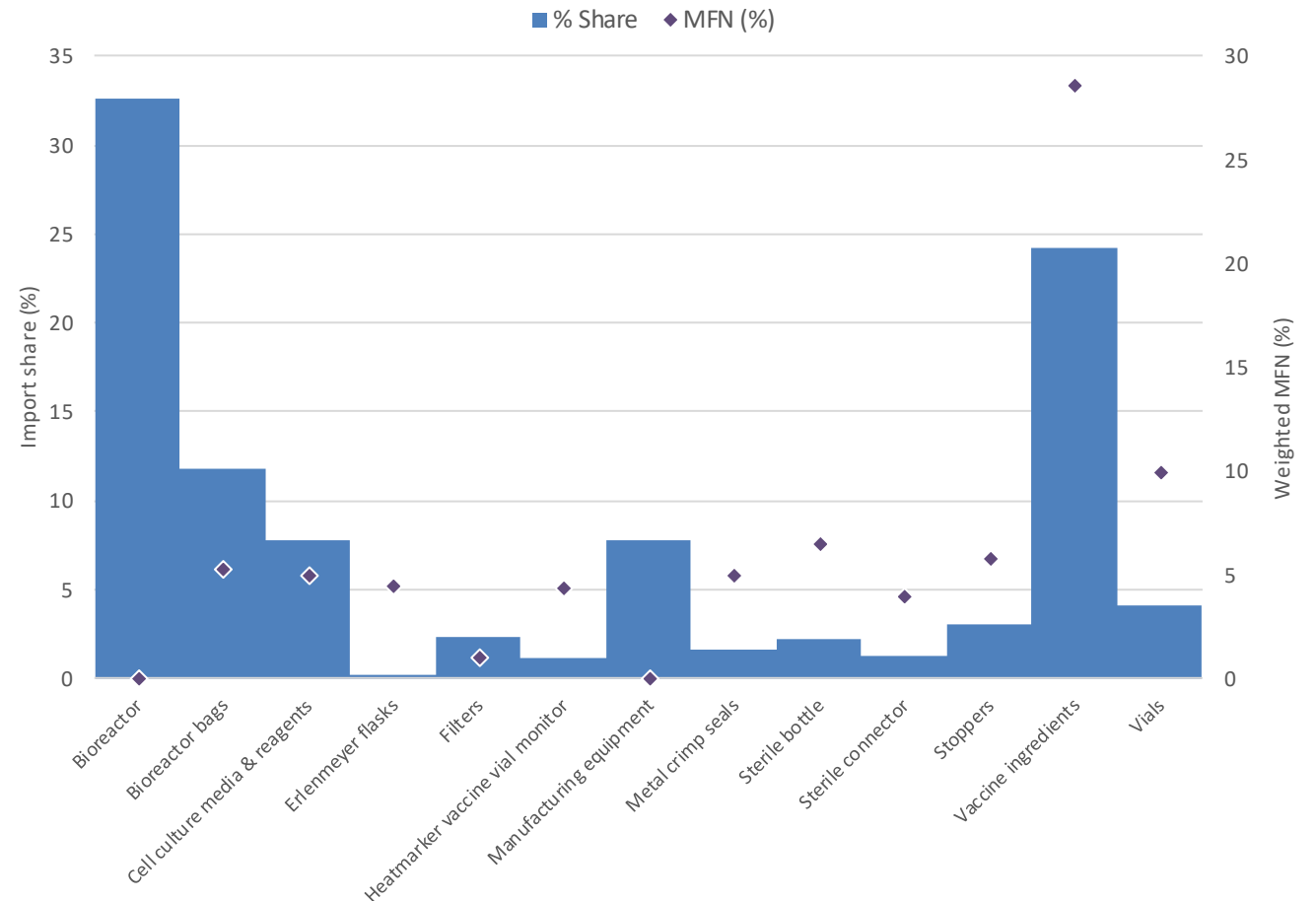


KAZAKHSTAN

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	8.9	100.0
Bioreactor	0.0	32.6
Bioreactor bags	5.3	11.8
Cell culture media & reagents	5.0	7.8
Erlenmeyer flasks	4.5	0.2
Filters	1.0	2.3
Heatmarker vaccine vial monitor	4.3	1.1
Manufacturing equipment	0.0	7.7
Metal crimp seals	5.0	1.6
Sterile bottle	6.5	2.2
Sterile connector	4.0	1.3
Stoppers	5.8	3.0
Vaccine ingredients	28.6	24.3
Vials	10.0	4.1

Import share and MFN duty, by vaccine inputs product group

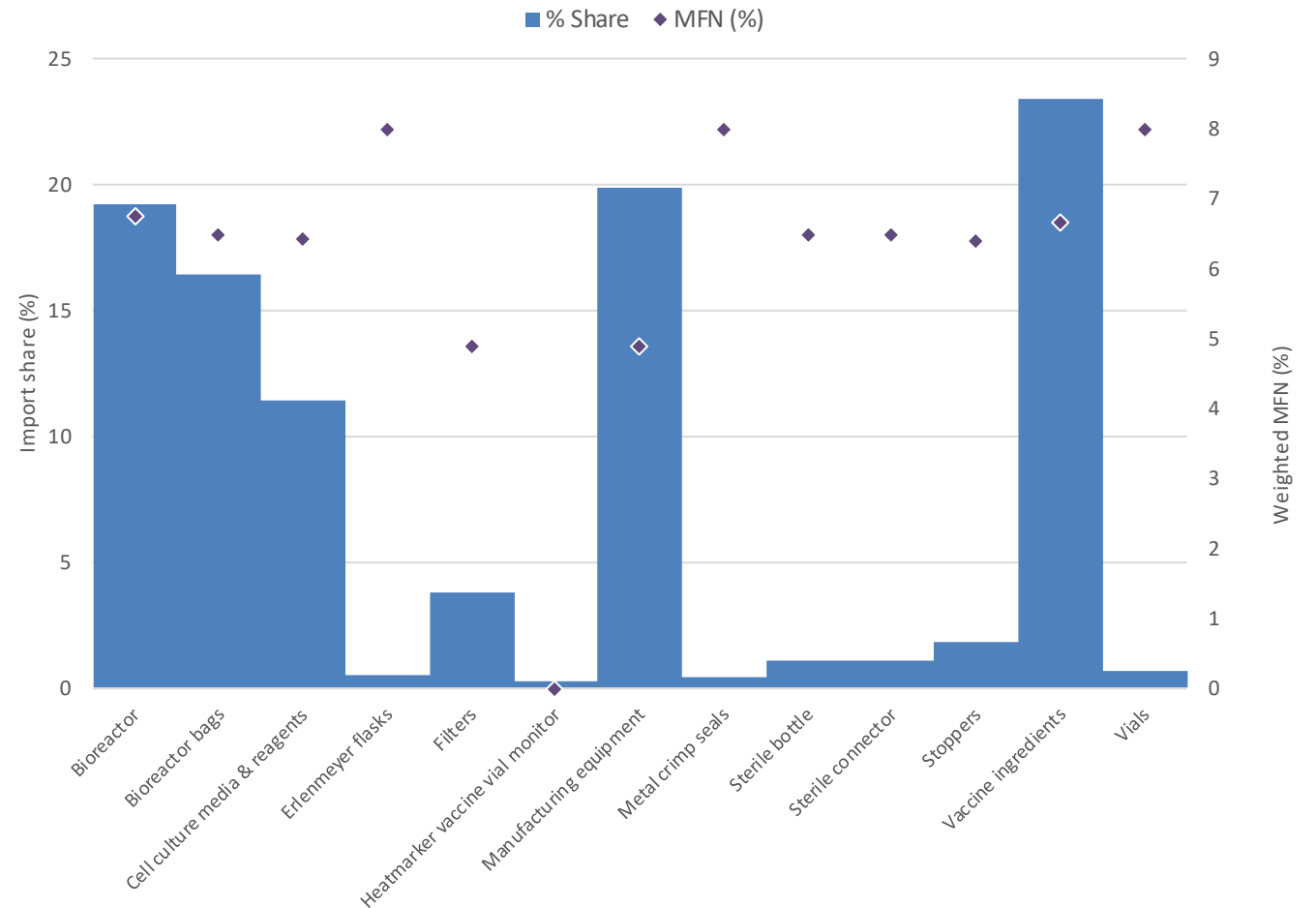


KOREA, Republic of

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	6.2	100.0
Bioreactor	6.8	19.2
Bioreactor bags	6.5	16.4
Cell culture media & reagents	6.4	11.4
Erlenmeyer flasks	8.0	0.5
Filters	4.9	3.8
Heatmarker vaccine vial monitor	0.0	0.2
Manufacturing equipment	4.9	19.9
Metal crimp seals	8.0	0.4
Sterile bottle	6.5	1.1
Sterile connector	6.5	1.1
Stoppers	6.4	1.8
Vaccine ingredients	6.7	23.4
Vials	8.0	0.7

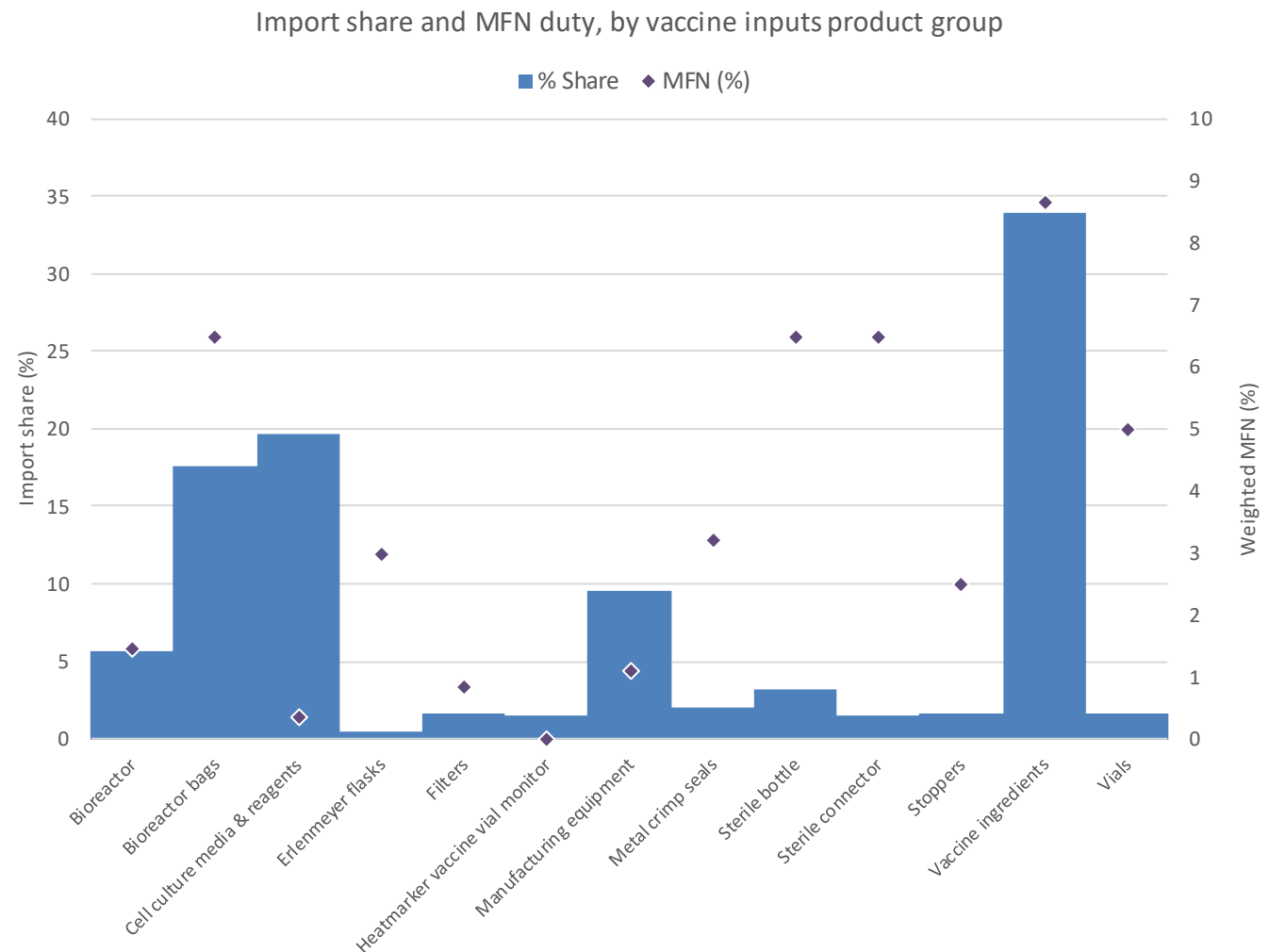
Import share and MFN duty, by vaccine inputs product group



NETHERLANDS

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	4.9	100.0
Bioreactor	1.4	5.7
Bioreactor bags	6.5	17.6
Cell culture media & reagents	0.4	19.7
Erlenmeyer flasks	3.0	0.4
Filters	0.9	1.7
Heatmarker vaccine vial monitor	0.0	1.5
Manufacturing equipment	1.1	9.5
Metal crimp seals	3.2	2.0
Sterile bottle	6.5	3.1
Sterile connector	6.5	1.6
Stoppers	2.5	1.6
Vaccine ingredients	8.6	33.9
Vials	5.0	1.6

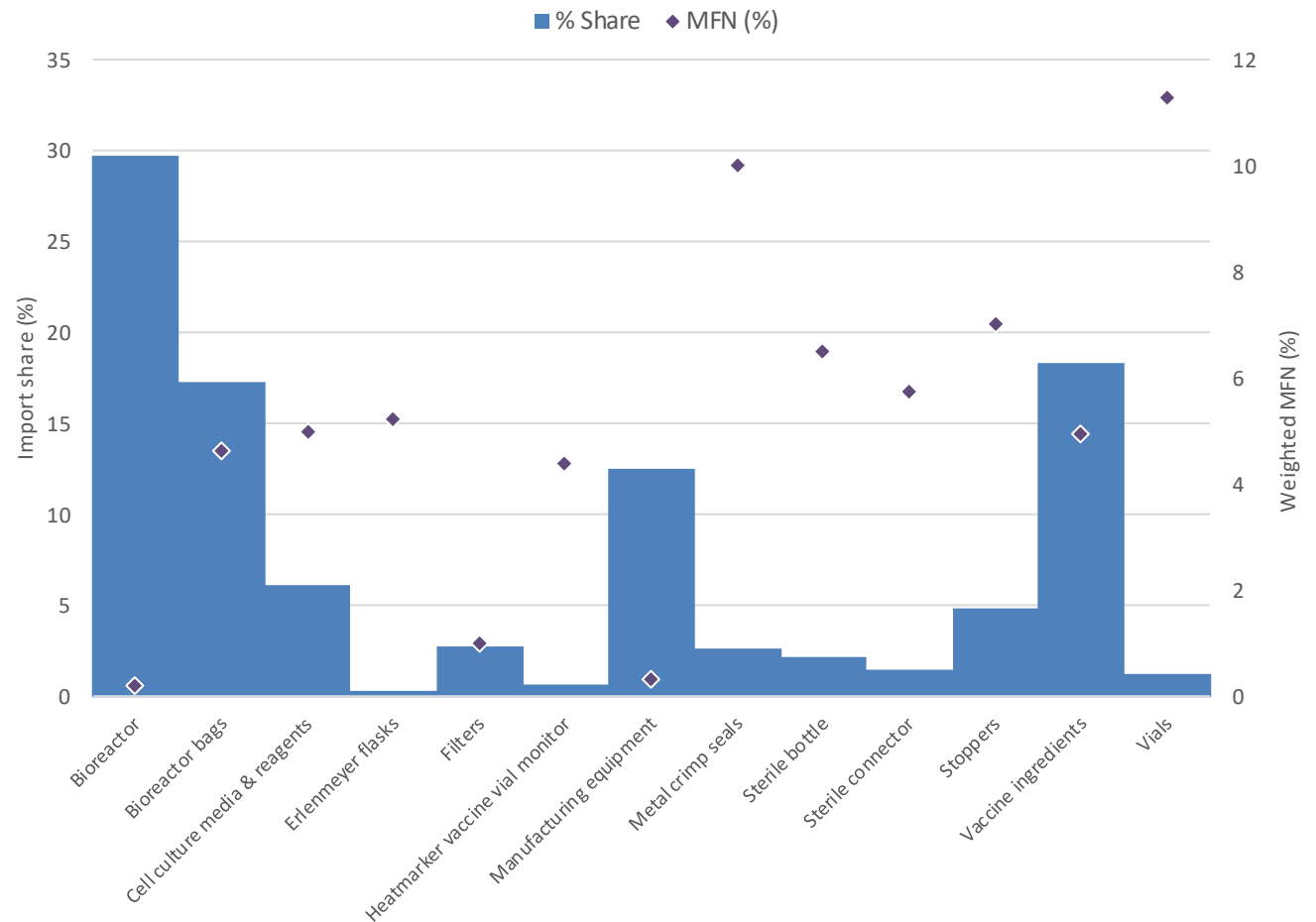


RUSSIAN FEDERATION

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	3.2	100.0
Bioreactor	0.2	29.7
Bioreactor bags	4.6	17.2
Cell culture media & reagents	5.0	6.1
Erlenmeyer flasks	5.2	0.3
Filters	1.0	2.7
Heatmarker vaccine vial monitor	4.4	0.7
Manufacturing equipment	0.3	12.5
Metal crimp seals	10.0	2.6
Sterile bottle	6.5	2.2
Sterile connector	5.8	1.5
Stoppers	7.0	4.8
Vaccine ingredients	5.0	18.4
Vials	11.3	1.2

Import share and MFN duty, by vaccine inputs product group

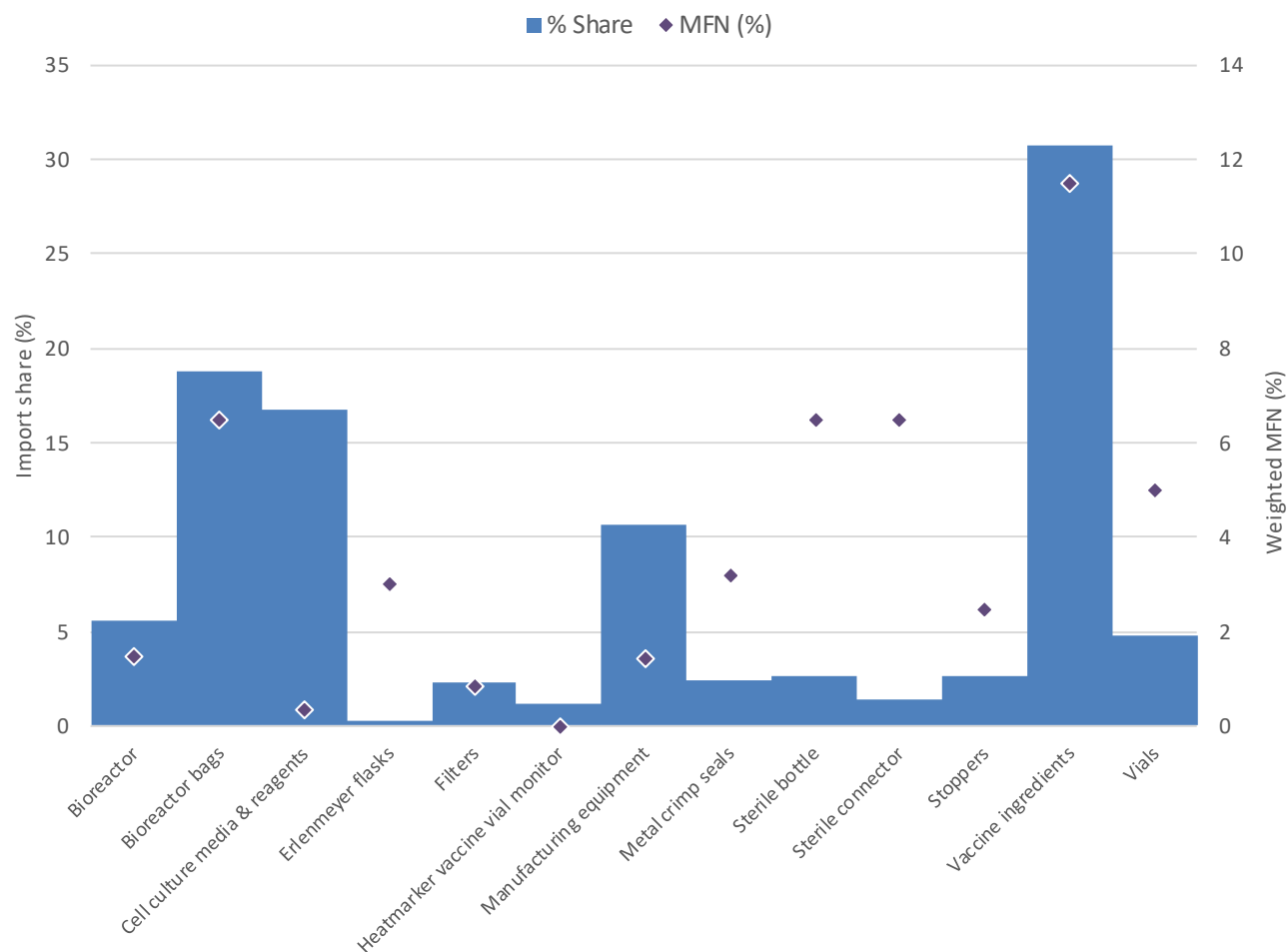


SPAIN

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	5.7	100.0
Bioreactor	1.5	5.6
Bioreactor bags	6.5	18.8
Cell culture media & reagents	0.4	16.8
Erlenmeyer flasks	3.0	0.3
Filters	0.9	2.3
Heatmarker vaccine vial monitor	0.0	1.2
Manufacturing equipment	1.4	10.6
Metal crimp seals	3.2	2.4
Sterile bottle	6.5	2.6
Sterile connector	6.5	1.4
Stoppers	2.5	2.7
Vaccine ingredients	11.5	30.7
Vials	5.0	4.8

Import share and MFN duty, by vaccine inputs product group

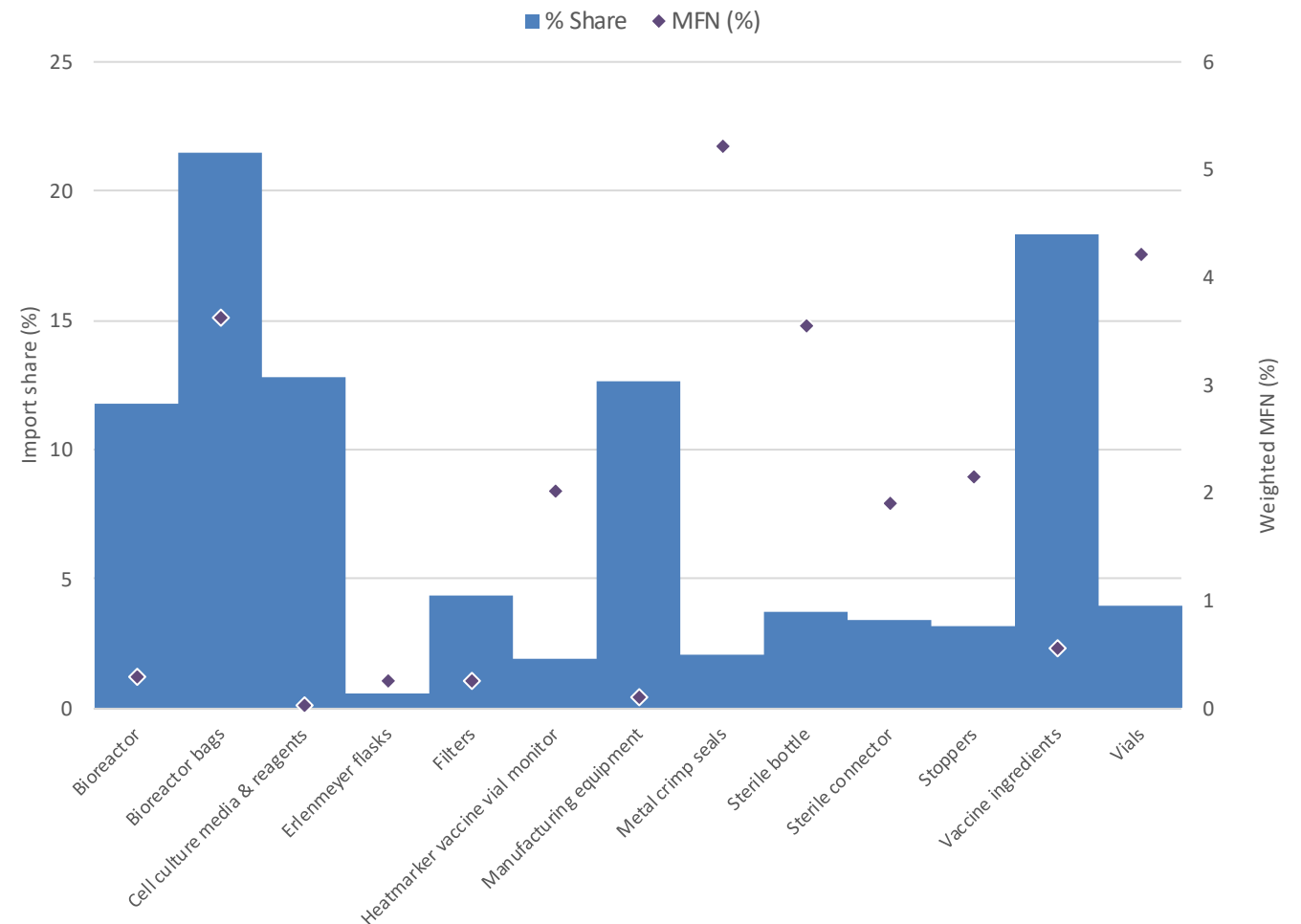


SWITZERLAND

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	1.5	100.0
Bioreactor	0.3	11.8
Bioreactor bags	3.6	21.5
Cell culture media & reagents	0.0	12.8
Erlenmeyer flasks	0.3	0.6
Filters	0.3	4.3
Heatmarker vaccine vial monitor	2.0	1.9
Manufacturing equipment	0.1	12.6
Metal crimp seals	5.2	2.0
Sterile bottle	3.6	3.7
Sterile connector	1.9	3.4
Stoppers	2.1	3.1
Vaccine ingredients	0.6	18.3
Vials	4.2	3.9

Import share and MFN duty, by vaccine inputs product group

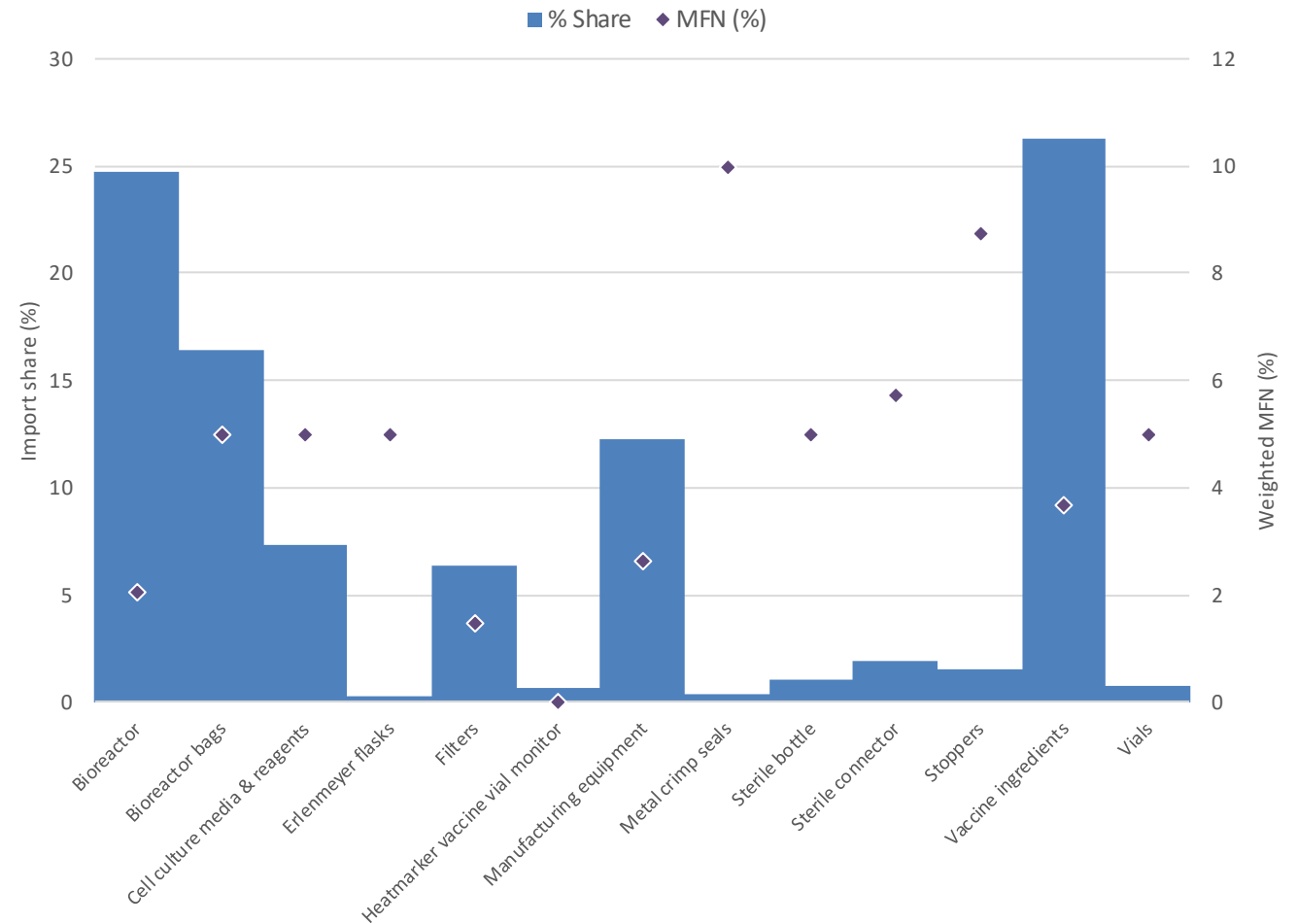


CHINESE TAIPEI

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	3.5	100.0
Bioreactor	2.1	24.8
Bioreactor bags	5.0	16.4
Cell culture media & reagents	5.0	7.3
Erlenmeyer flasks	5.0	0.3
Filters	1.5	6.3
Heatmarker vaccine vial monitor	0.0	0.7
Manufacturing equipment	2.6	12.3
Metal crimp seals	10.0	0.4
Sterile bottle	5.0	1.0
Sterile connector	5.8	1.9
Stoppers	8.8	1.5
Vaccine ingredients	3.7	26.2
Vials	5.0	0.8

Import share and MFN duty, by vaccine inputs product group

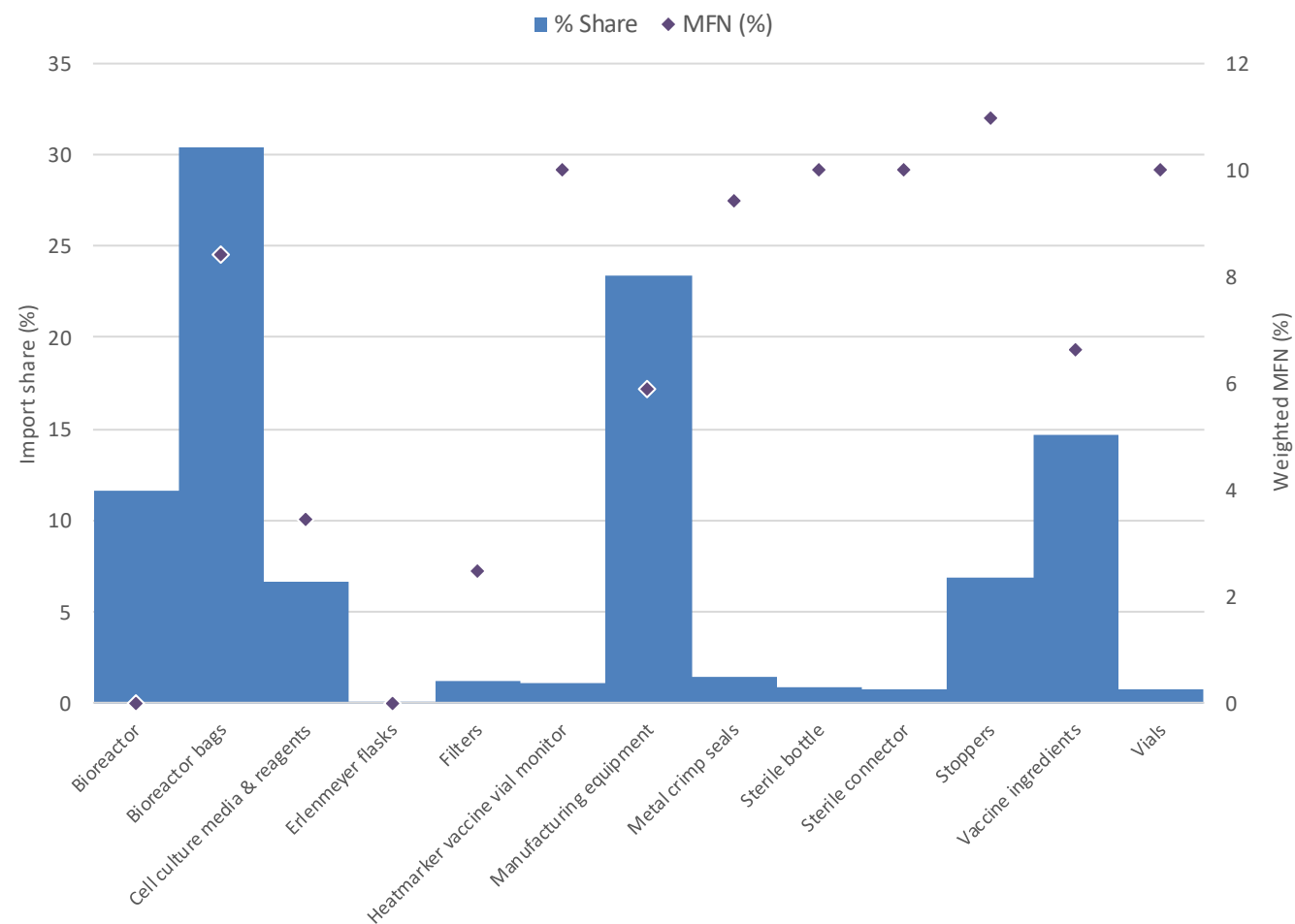


THAILAND

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	6.4	100.0
Bioreactor	0.0	11.6
Bioreactor bags	8.4	30.4
Cell culture media & reagents	3.5	6.6
Erlenmeyer flasks	0.0	0.1
Filters	2.5	1.2
Heatmarker vaccine vial monitor	10.0	1.2
Manufacturing equipment	5.9	23.4
Metal crimp seals	9.4	1.5
Sterile bottle	10.0	0.9
Sterile connector	10.0	0.8
Stoppers	11.0	6.9
Vaccine ingredients	6.6	14.7
Vials	10.0	0.8

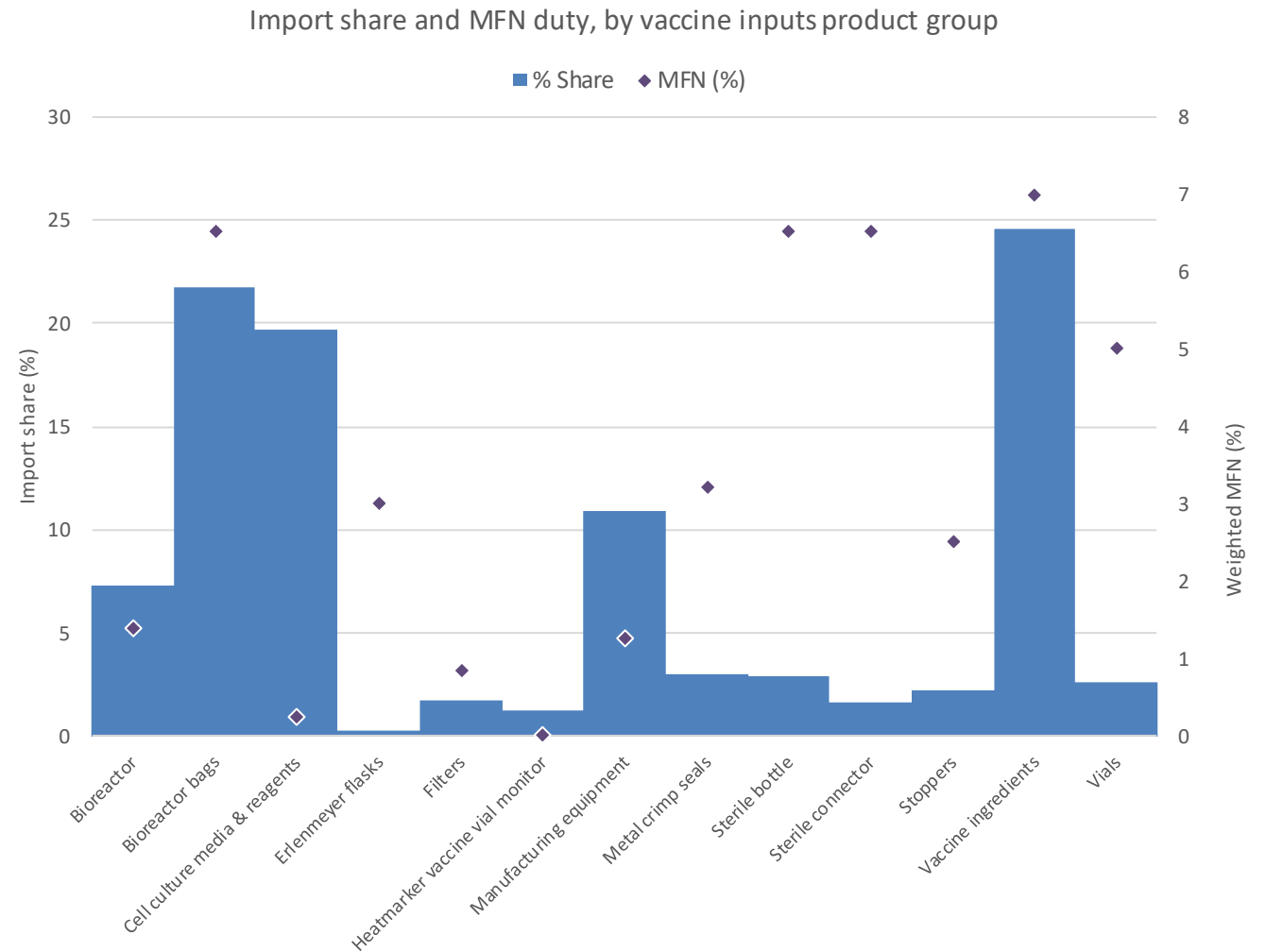
Import share and MFN duty, by vaccine inputs product group



UNITED KINGDOM

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
MFN < 5%		5% - 15%	< 10%	GT 15%	< 10%
No limit imp share			=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	4.0	100.0
Bioreactor	1.4	7.3
Bioreactor bags	6.5	21.8
Cell culture media & reagents	0.3	19.7
Erlenmeyer flasks	3.0	0.3
Filters	0.9	1.7
Heatmarker vaccine vial monitor	0.0	1.3
Manufacturing equipment	1.2	10.9
Metal crimp seals	3.2	3.0
Sterile bottle	6.5	2.9
Sterile connector	6.5	1.6
Stoppers	2.5	2.2
Vaccine ingredients	7.0	24.6
Vials	5.0	2.6



UNITED STATES

Cell shading by product group:		MFN	Imp Share	MFN	Imp Share
	MFN < 5%		< 10%	GT 15%	< 10%
	No limit imp share	5% - 15%	=> 10%		=> 10%

Product group	Weighted MFN (%)	Import share (%)
All vaccine inputs	2.0	100.0
Bioreactor	0.9	9.5
Bioreactor bags	3.7	23.1
Cell culture media & reagents	0.4	10.8
Erlenmeyer flasks	3.7	0.4
Filters	0.0	1.9
Heatmarker vaccine vial monitor	0.0	0.7
Manufacturing equipment	0.3	12.6
Metal crimp seals	2.6	1.4
Sterile bottle	3.0	2.2
Sterile connector	2.7	1.0
Stoppers	2.2	2.9
Vaccine ingredients	2.5	30.5
Vials	1.9	3.0

