

COVID-19 vaccine stock forecast for 2021 and 2022

Airfinity analysis and forecast

Embargo until Sunday the 5th of September, 2021 at 00:00 BST

Summary version – full report to be released as part Global Media Briefing with IFPMA on Tuesday 7th of September, 2021 at 13:30 BST

Q: How many doses in total will be produced by end of year according to your projections?

Airfinity forecasts a total global production of 12.2B doses for 2021 of which 6.5B are Western and 5.7B are Chinese vaccines.

Q: How many doses will the key Western countries have available in stock September?

A: USA, EU, UK and Canada is projected to have a total of 500m doses available end of September including already earmarked donations and 360m excluding already earmarked donations. These numbers exclude Chinese vaccines.

Q: How many doses will the key Western countries have available in stock end of 2021?

A: USA, EU, UK and Canada is projected to have a total of 1.2m doses available end of September (including already earmarked donations) and 1.06B excluding already earmarked donations. These numbers exclude Chinese vaccines.

Q: What vaccine and booster scenario is assumed for availability calculations?

A: We assume that the countries will vaccinate 80% of population over 12 and that boosters will be given to all after 6 months and have similar uptake to observed vaccination uptake. This is a conservative estimate that is likely to overstate actual needs and allows for excess safety stock.

Q: What production assumptions are behind the forecast?

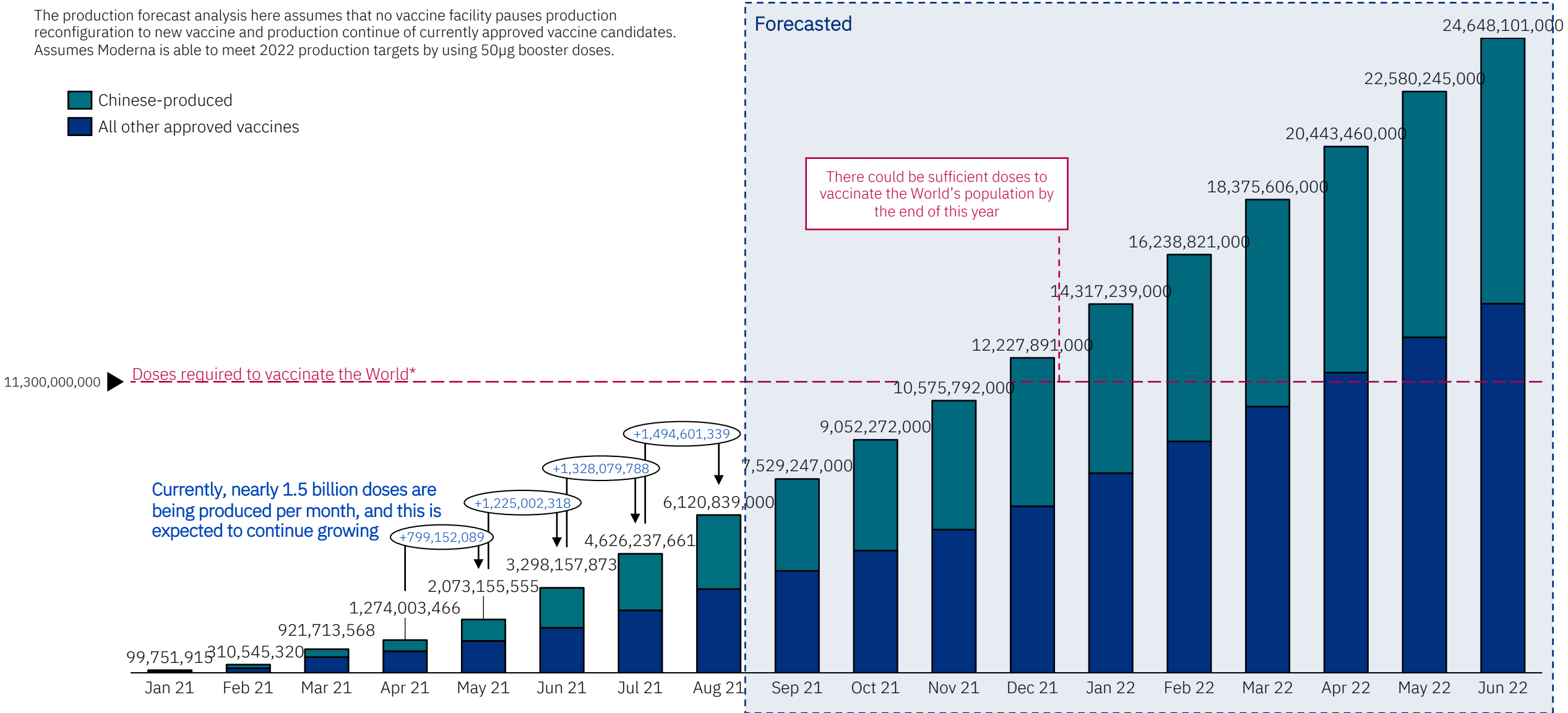
A: We assume steady rate of production based on current factory level outputs. We assume that there will be no shift to next generation vaccines this fall.

Production has scaled quickly and is expected to continue growing

Vaccine production forecast split by Western and Chinese vaccines, showing approved vaccines only +

The production forecast analysis here assumes that no vaccine facility pauses production reconfiguration to new vaccine and production continue of currently approved vaccine candidates. Assumes Moderna is able to meet 2022 production targets by using 50µg booster doses.

- Chinese-produced
- All other approved vaccines



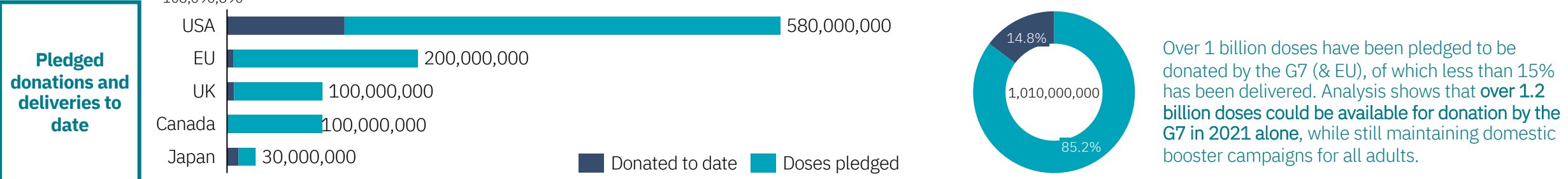
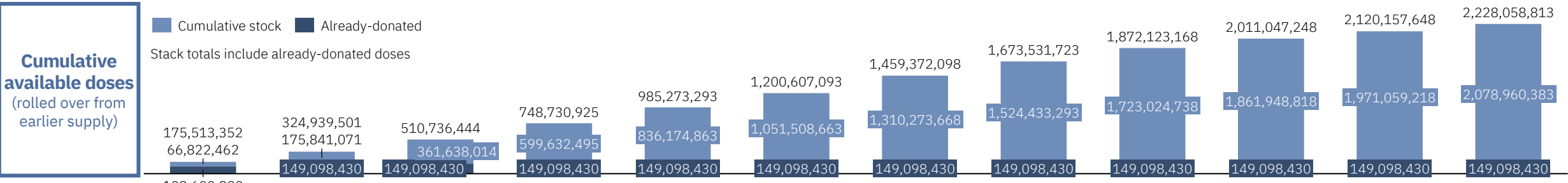
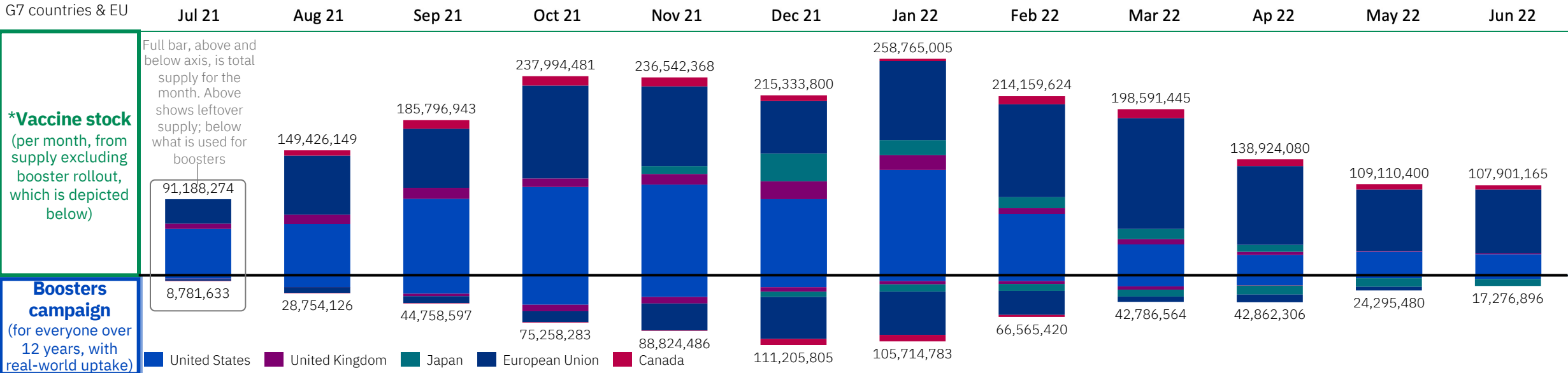
Forecasted on 24/08/2021

*80% of the population aged 12 and over. Sufficient doses to fully vaccinate population once; excludes the use of any boosters.

+only vaccines approved by a regulatory authority are included (and Novavax)

Western countries can provide booster shots and still have more than a 1.2 doses in 2021 to redistribute

Available supply per month, split into booster allocation for eligible and willing adults & teens and remaining supply of +SRA authorised vaccines only



*Vaccine availability analysis is not exclusive of already-pledged doses; this is shown in cumulative stock graph, and is broken down per country in appendix
 +SRA authorised vaccines only: only vaccines approved by a Stringent Regulatory Authority are included (+ Novavax)

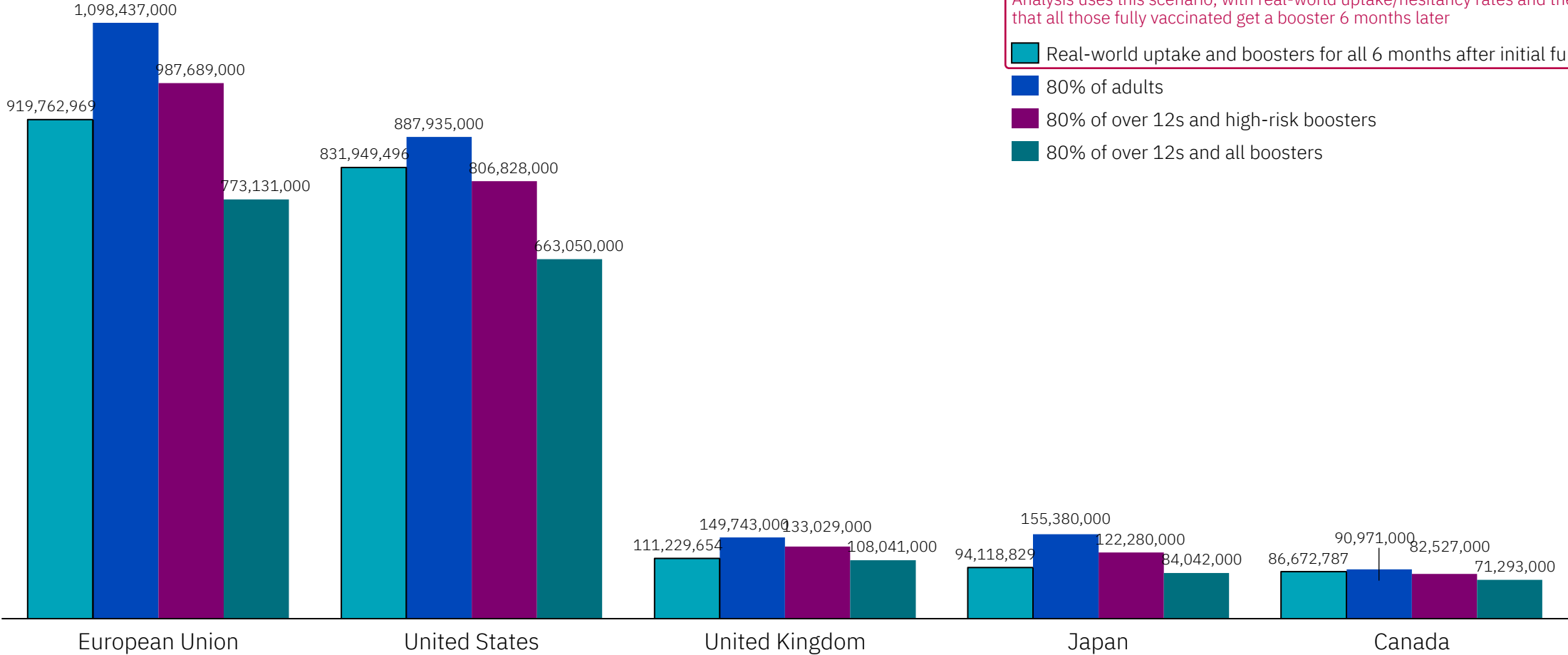
Decisions on boosters impact availability, but all booster scenarios leave high stock levels

Estimated redistribution doses following the vaccination of 80% of adults, teenagers and following boosters up until mid-2022

Available dose for redistribution analysis is calculated using Airfinity supply forecasts to each country, which are based on production scale-up forecasts. Surplus doses scenarios firstly account for initial vaccination campaigns – sufficient doses to fully vaccinate all eligible people – before then accruing supply for boosters, with the remaining supply being counted as available for redistribution. The following scenarios are calculated from supply to mid-2022. The scenarios shows the real-world uptake of vaccines and boosters for all (based on current data) and then compares this against an 80% uptake rate under different vaccination and booster scenarios, to show how many doses could be remaining from agreed supply of approved vaccines.

Analysis uses this scenario, with real-world uptake/hesitancy rates and then assumes that all those fully vaccinated get a booster 6 months later

- Real-world uptake and boosters for all 6 months after initial full vaccination
- 80% of adults
- 80% of over 12s and high-risk boosters
- 80% of over 12s and all boosters



Supporting analysis

Country stock breakdown

Which vaccines will be available?

Methodology and forecast accuracy

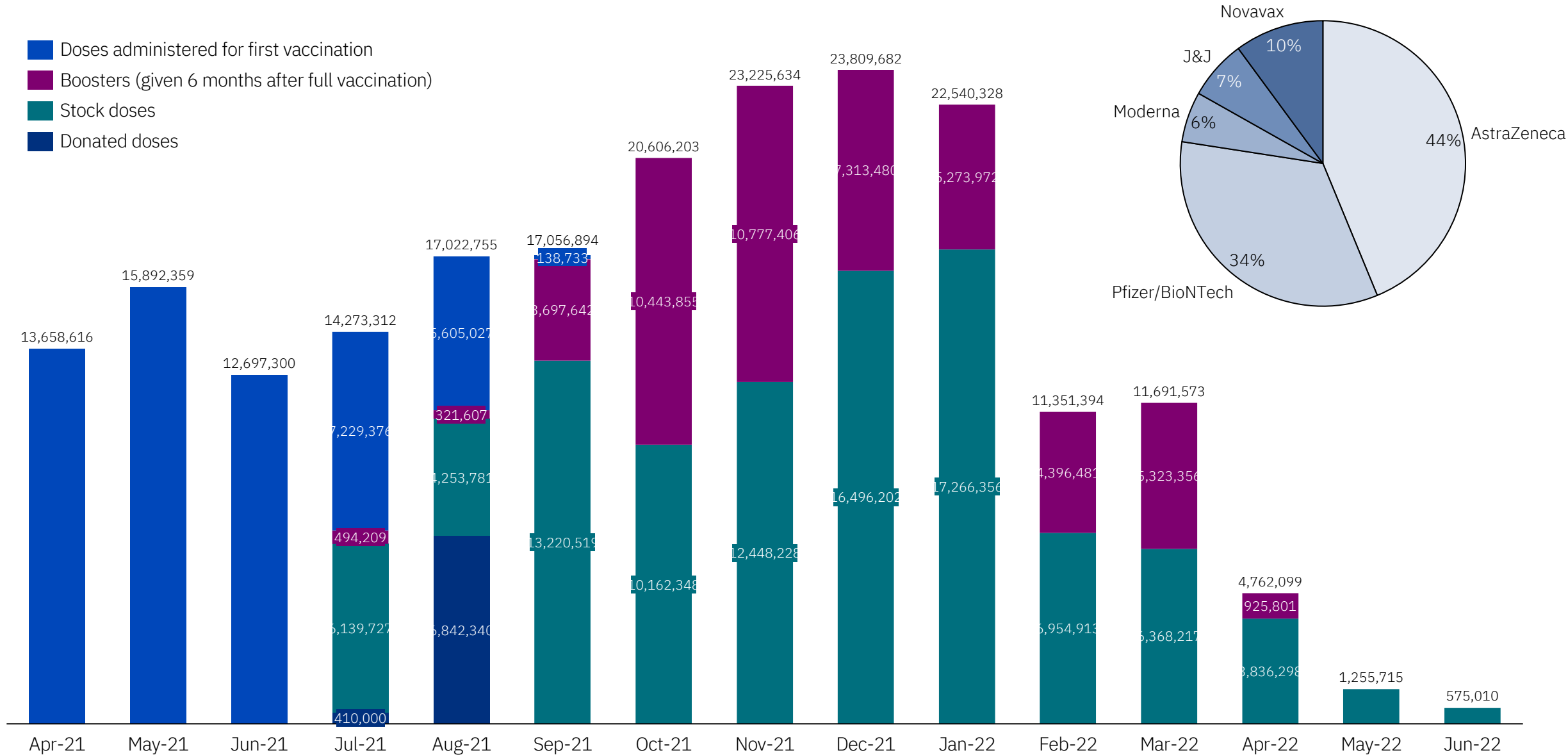
Production shifting time to new vaccines

Vaccine overview and potential lives saved consideration

UK stock availability forecast assuming boosters given to all adults 6 months following vaccination

UK scenario (in millions of doses) of doses delivered per month show AZ dominate available stock

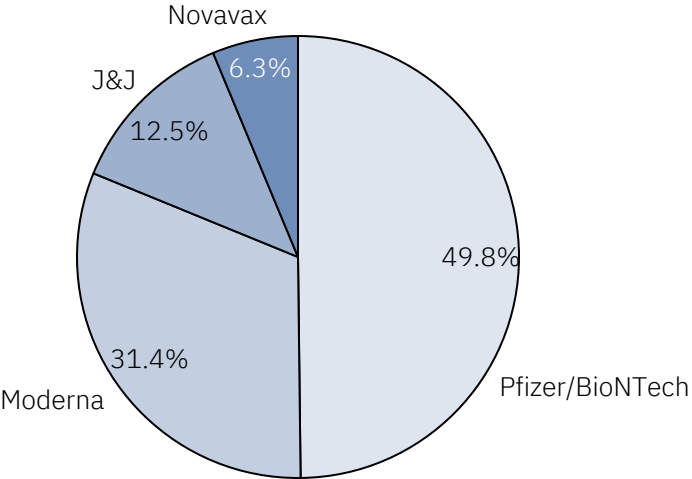
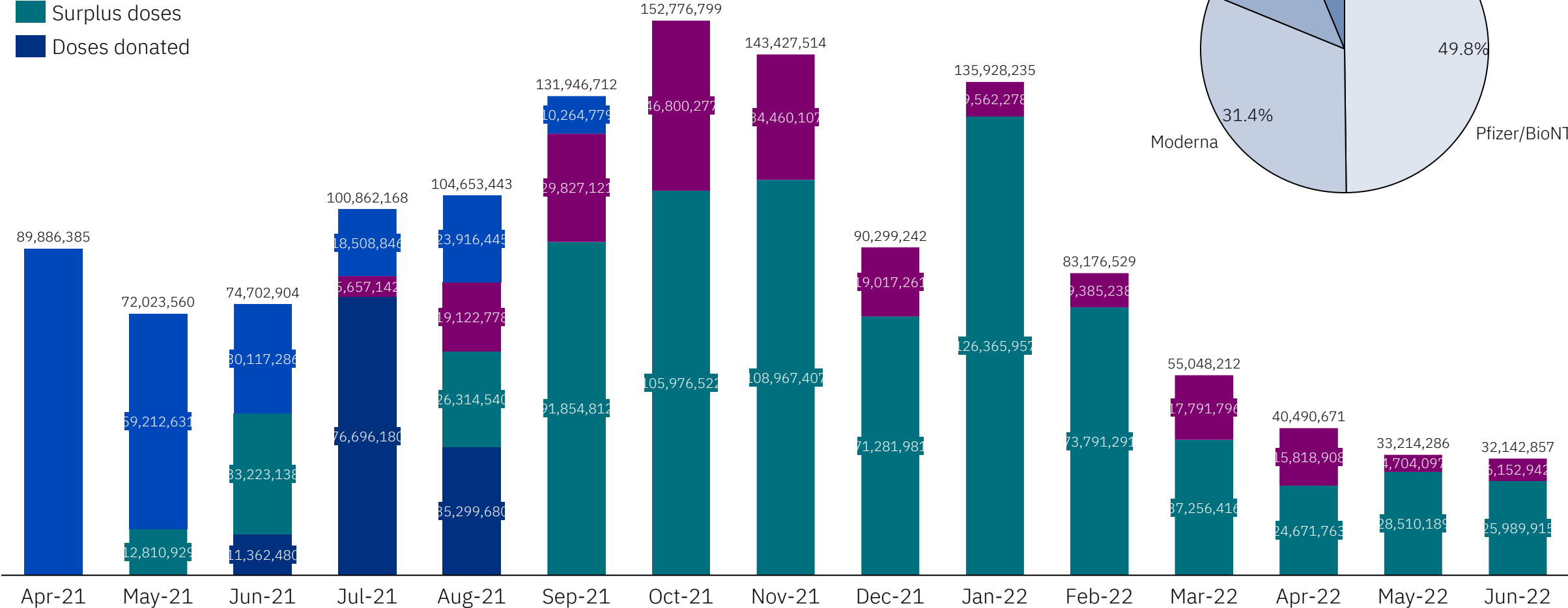
- Doses administered for first vaccination
- Boosters (given 6 months after full vaccination)
- Stock doses
- Donated doses



US stock availability assuming boosters given to all adults 6 months following vaccination

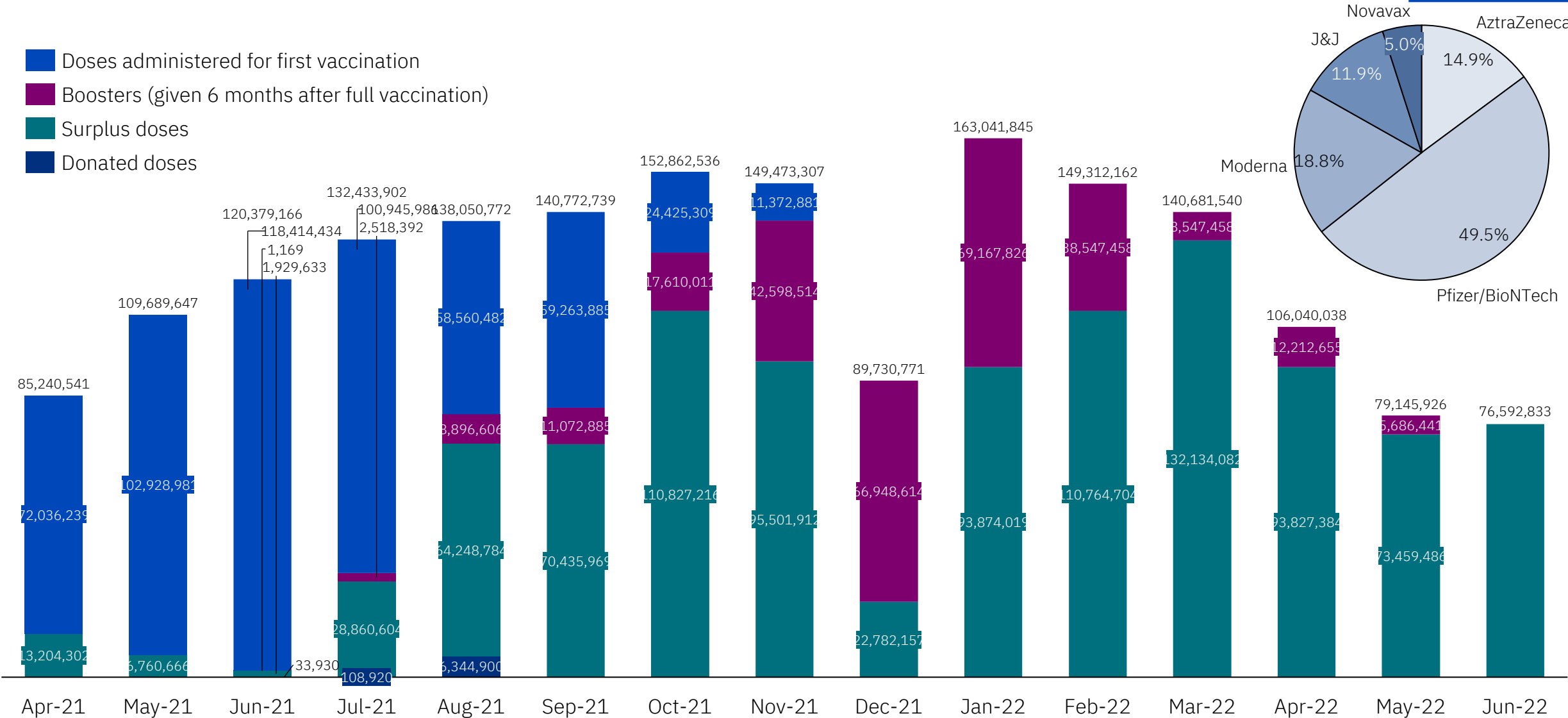
US scenario (in millions of doses) of doses delivered per month show mRNA vaccines dominate the available stock

- Doses administered for first vaccination
- Boosters (given 6 months after full vaccination)
- Surplus doses
- Doses donated



EU stock availability assuming boosters given to all 6 months after vaccination

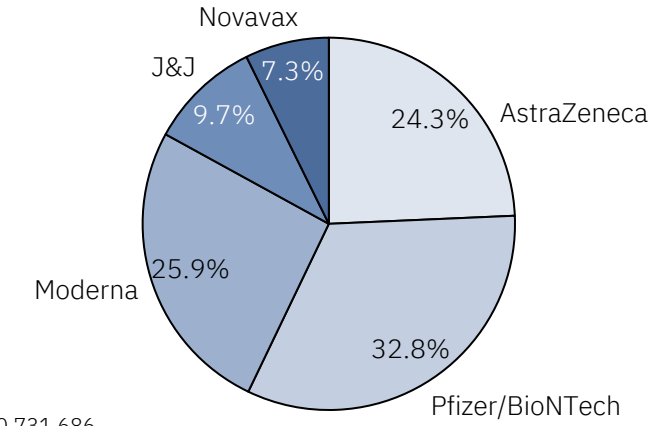
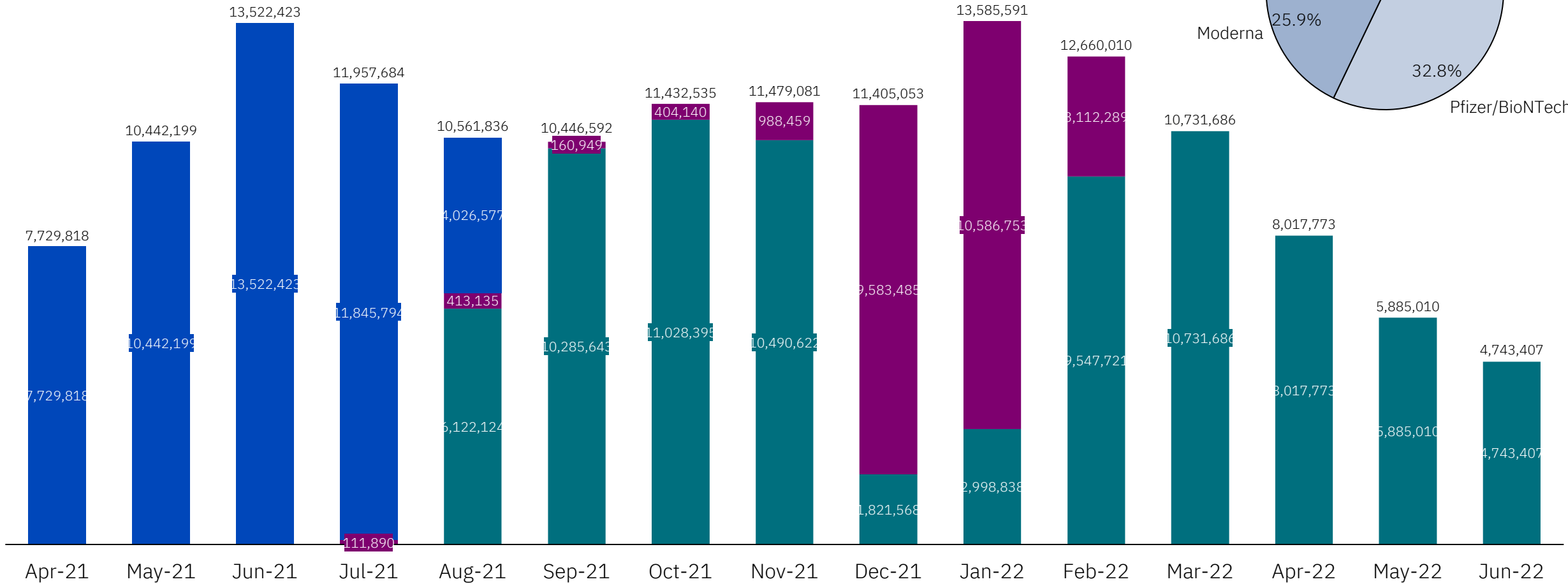
EU scenario (in millions of doses) of doses delivered per month show mRNA, AZ and J&J vaccine availability



Canada stock availability assuming boosters given to all adults 6 months following vaccination

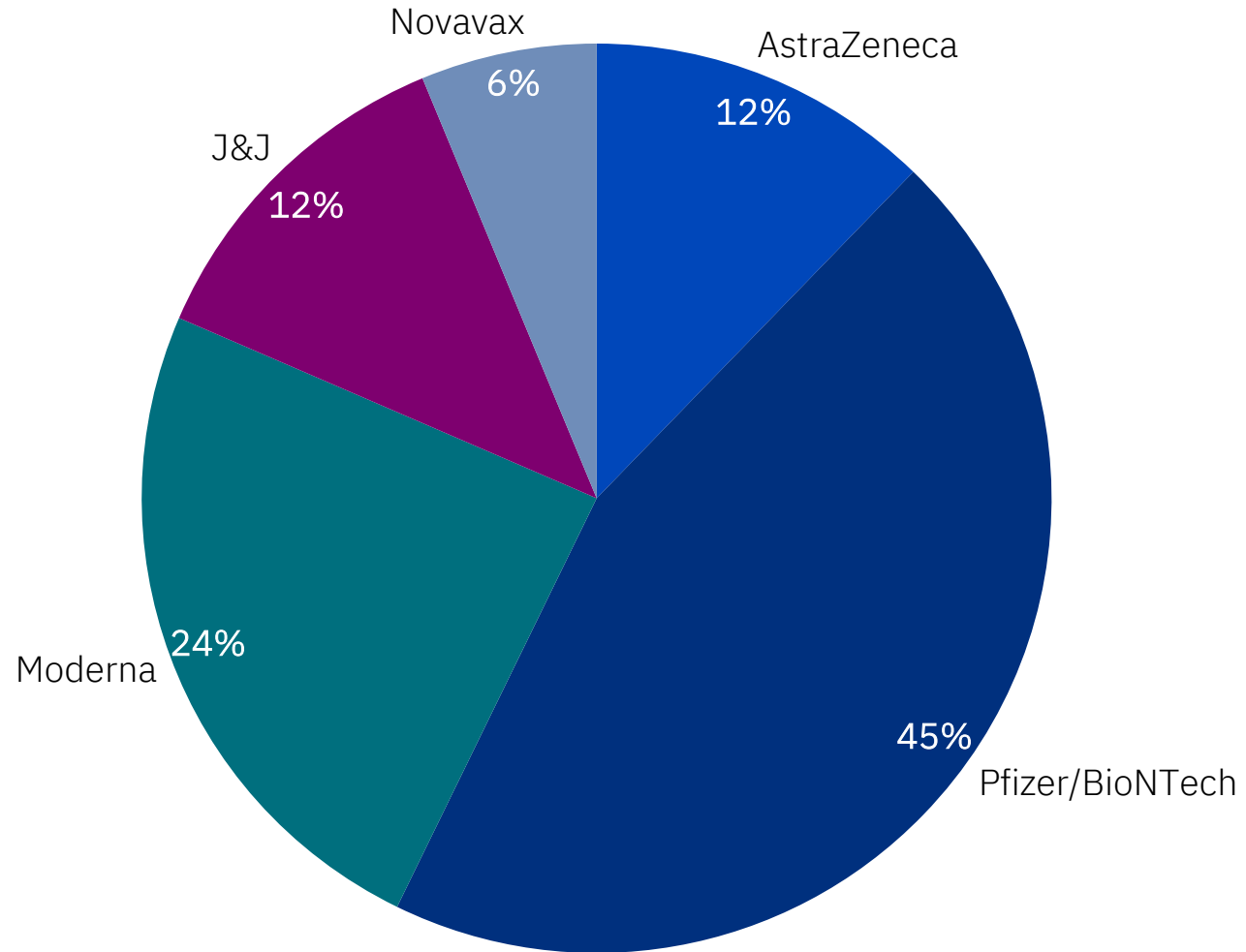
Canada scenario (in millions of doses) of doses delivered per month show stock availability of mRNA and AZ and J&J vaccines

- Doses administered for first vaccination
- Boosters (given 6 months after full vaccination)
- Surplus doses



The distribution potential mainly consist of mRNA vaccines

Forecast of available doses split by vaccine*



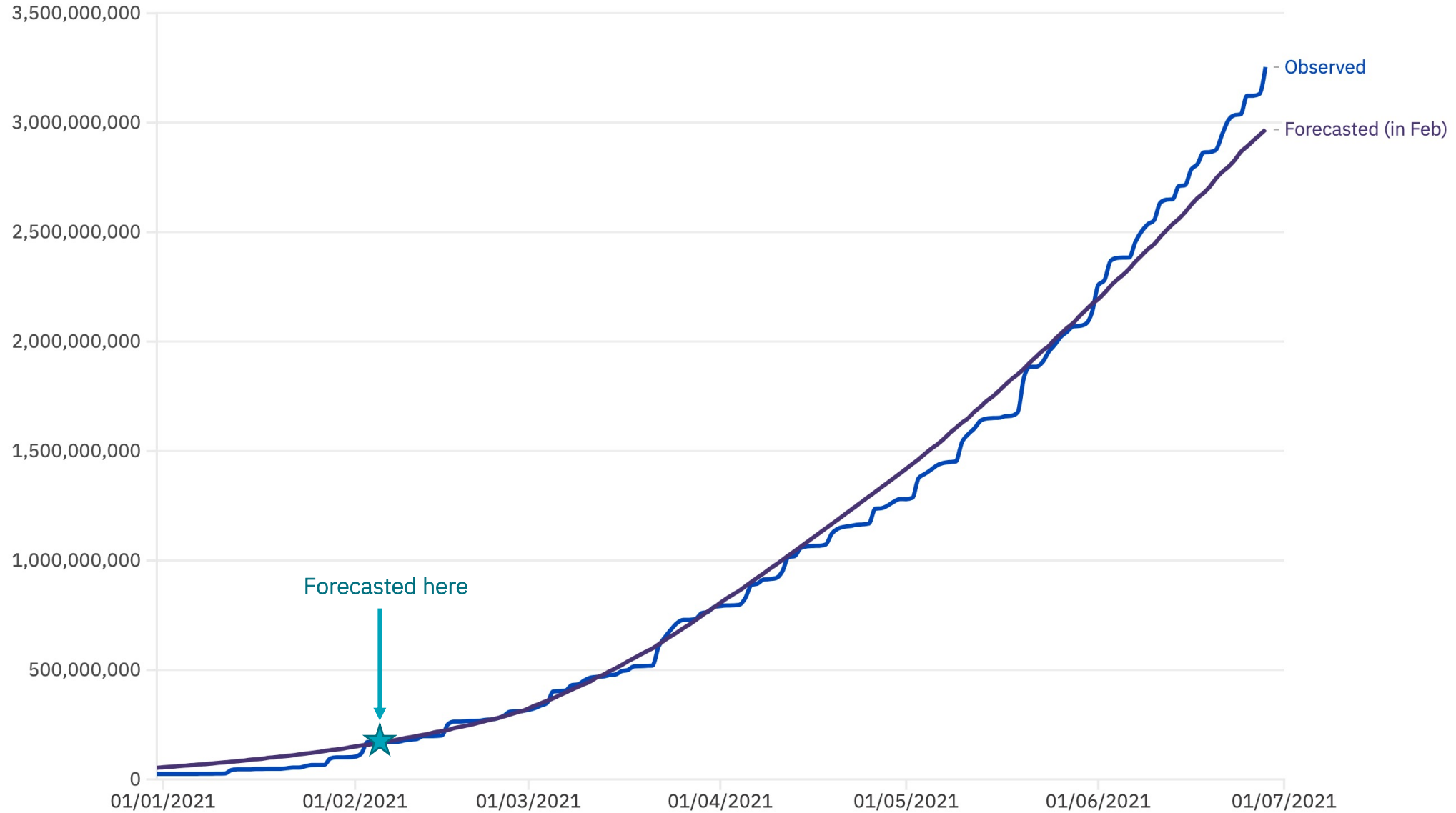
mRNA vaccines from Moderna and Pfizer/BioNTech require cold storage distribution facilities which needs to be factored in when devising distribution plan.

*These are surplus doses calculated from secured supplies from governments, not surplus doses produced by companies in 2021

- ➔ Forecasted supply is calculated from purchased doses only and excludes any call option (i.e. the option to expand the deal)
- ➔ Only approved vaccines have been included (plus Novavax, which is expected to be granted approval soon)
- ➔ The analysis runs to mid-2022, therefore excludes prepurchase agreements due to be delivered to these countries in H2 2022
- ➔ Analysis assumes that no vaccine facility pauses production to reconfiguration of an updated variant-targeting vaccine (that are yet to be approved)
- ➔ Analysis uses scenario where eligible populations (in most cases everyone over 12 years old) are offered a vaccine and are then given a booster at least 6 months after completing initial full vaccination course, with a real-world uptake rate of (ranging from 65-85%) of the eligible population.

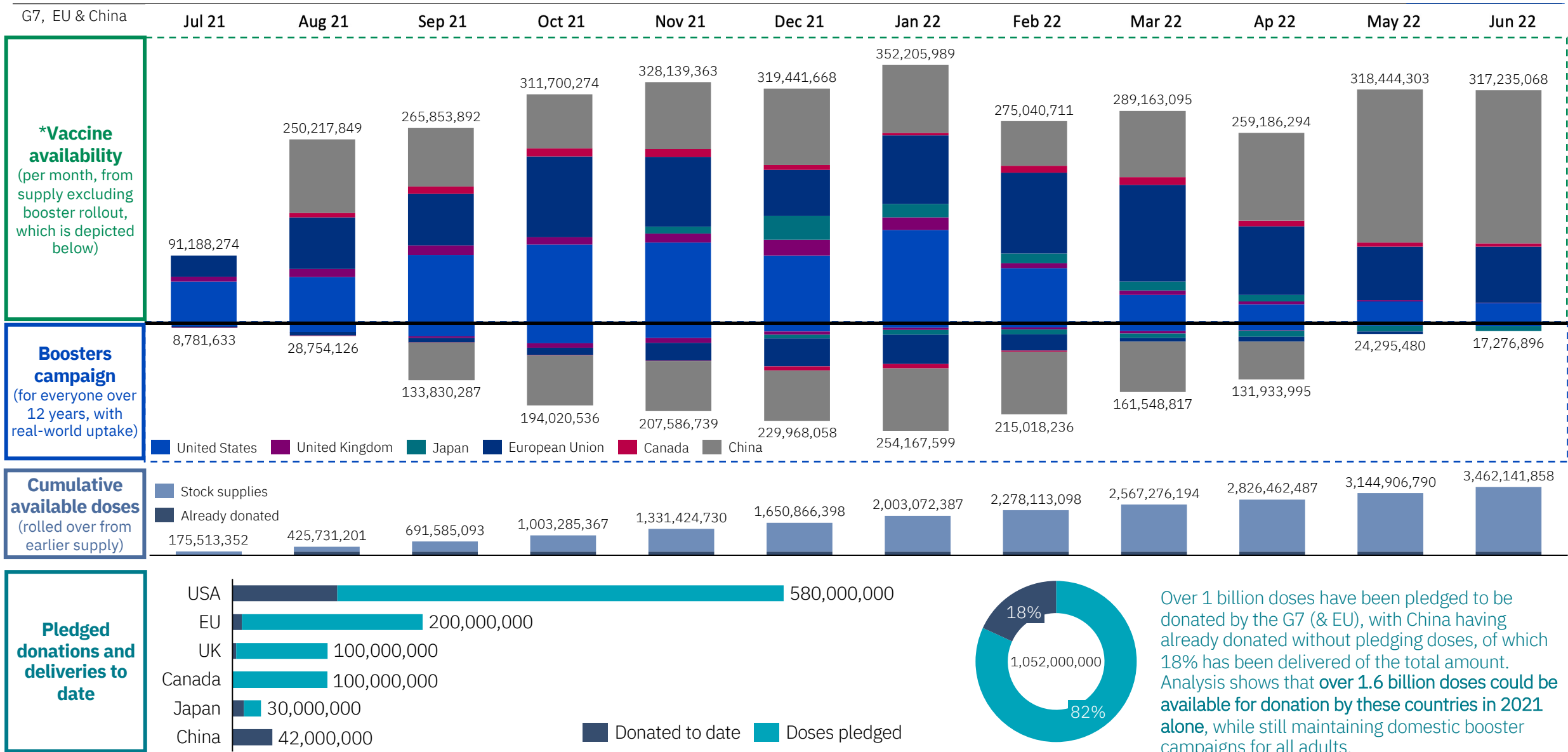
Airfinity forecasts have been realistic to observed production

Comparison of Airfinity forecasts (made in early February) vs observed production up until July



Western countries incl. China could provide booster shots & will still have >1.6B in available doses in 2021

Available supply per month, split into booster allocation for all adults & teens and remaining supply of +SRA authorised vaccines only

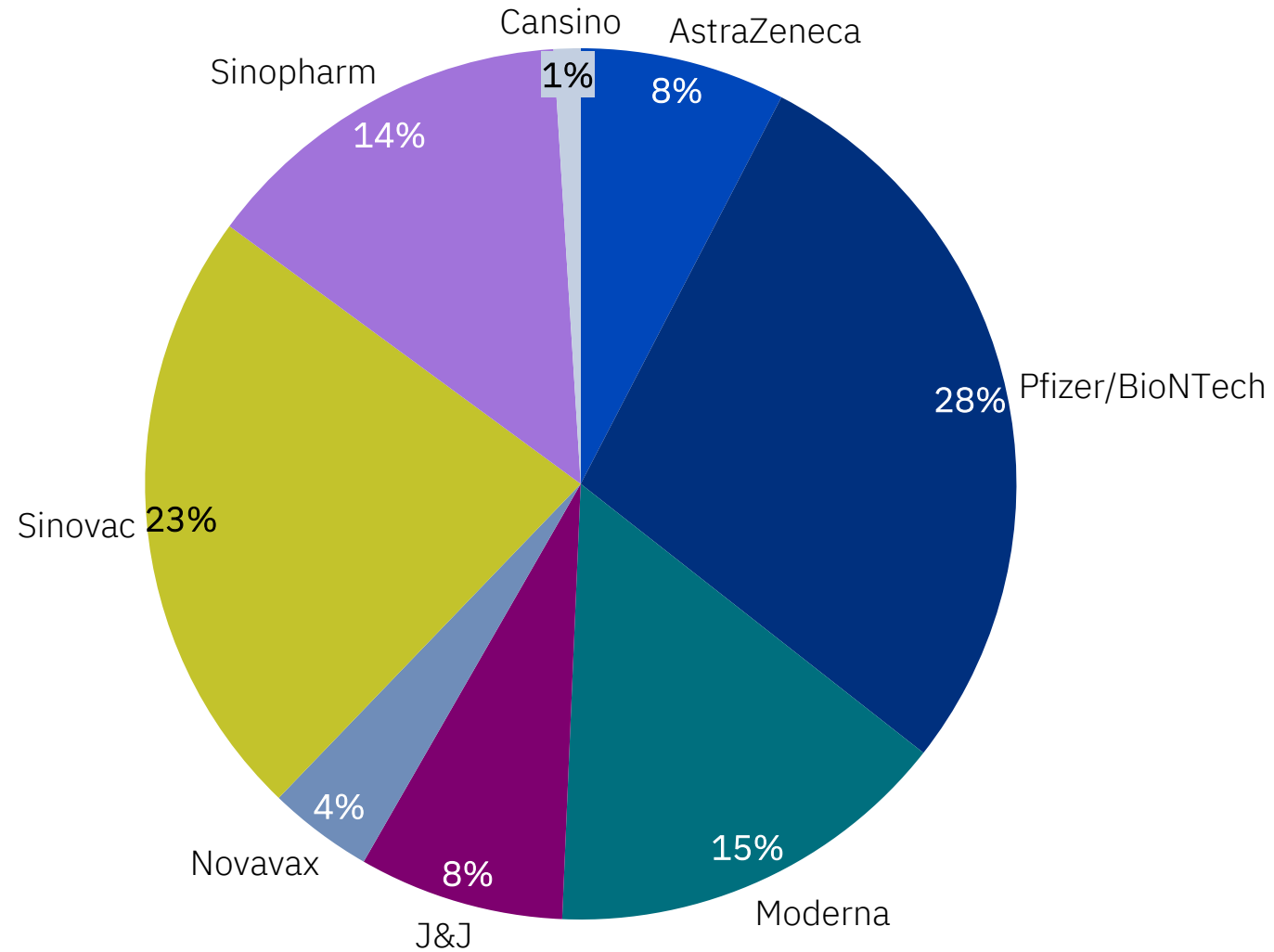


*Redistribution potential analysis is not exclusive of already-pledged doses included (+ Novavax)

+SRA authorised vaccines only: only vaccines approved by a Stringent Regulatory Authority are

The available stock mainly consist of either mRNA vaccine or Chinese-produced

Forecast of available doses split by vaccine*



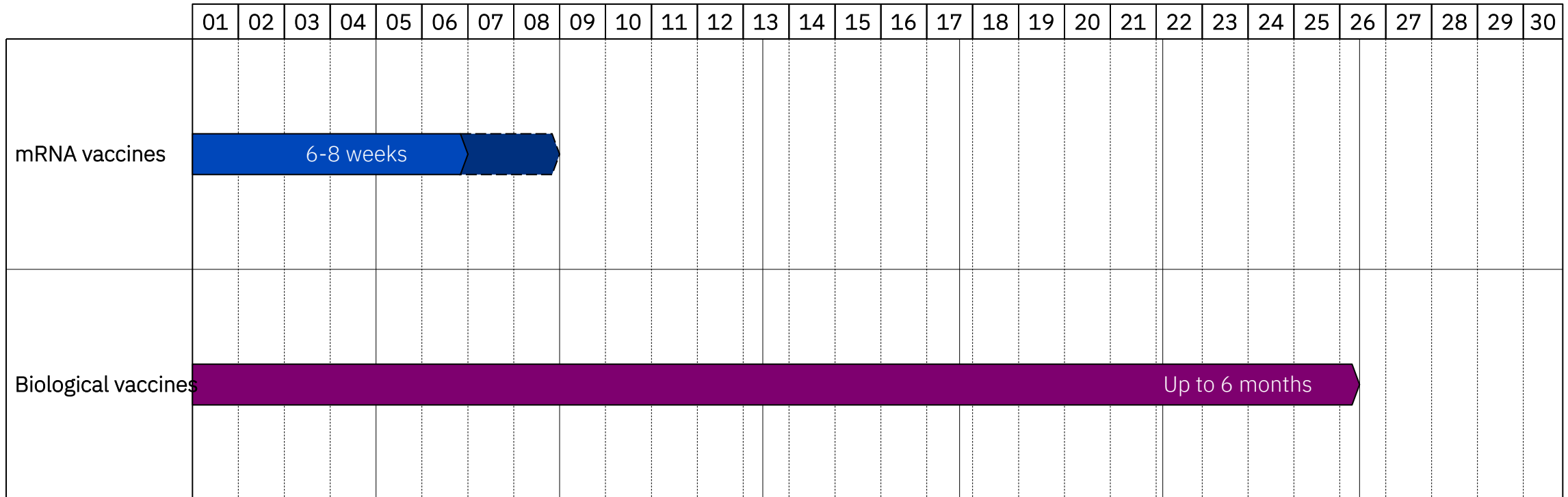
*These are surplus doses calculated from secured supplies from governments, not surplus doses produced by companies in 2021

Switching to new generation vaccines could pause production for week to months, mRNA has clear advantage

An analysis of number of doses produced if at maximum capacity in time frame it would take to switch over to a booster dose

Time taken to reconfigure a vaccine against a specific variant or mutation is expected to be between 6-8 weeks for an mRNA candidate and 6 months for a biological candidate.

Reconfiguration time:



Storage temperatures, shelf lives, and efficacies of vaccines to determine suitability for different countries

With current efficacy numbers, a separate analysis by Airfinity shows between 100,000 and 225,000 lives could be saved per 100 million doses donated*

Vaccine	Storage temperature	Shelf life	Non-cold storage shelf life	Efficacy (against symptomatic / mild disease)
Pfizer/BioNTech	-80°C	6 months	Up to 1 month at refrigerator temperatures: 2°C-8°C (36°F-46°F)	88.7%
Moderna	-20°C	7 months	Up to 1 month at refrigerator temperatures: 2°C-8°C (36°F-46°F)	92.2%
AstraZeneca	Refrigerator temperatures: 2°C-8°C (36°F-46°F)	6 months	Up to 6 hours at room temperature 9°C-25°C (47°F-77°F) (once removed from 2-8°C storage)	75%
Novavax	Refrigerator temperatures: 2°C-8°C (36°F-46°F)	6 months	Unknown	80.1%
J&J	Refrigerator temperatures: 2°C-8°C (36°F-46°F)	6 months	Up to 2 hours at room temperature 9°C-25°C (47°F-77°F)	66.9%
Sinopharm	Refrigerator temperatures: 2°C-8°C (36°F-46°F)	24 months	N/A	72.8%
Sinovac	Refrigerator temperatures: 2°C-8°C (36°F-46°F)	12 months	42 days at room temperature 25°C (77°F)	59.2%
Cansino	Refrigerator temperatures: 2°C-8°C (36°F-46°F) or freezer storage at -20°C	12 months	N/A	65.7%
Sputnik-V	-18°C	6 months	Up to 2 months at refrigerator temperatures: 2°C-8°C (36°F-46°F)	91.6

*There are high levels of uncertainty to the numbers of lives saved, with main driver also being infection rates that are difficult to accurately predict. A deep dive can be provided on request.

MORE INFORMATION

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Airfinity is a predictive life science analytics company. Working with some of the world's largest pharma companies, government agencies, corporates and investors, it has established itself as an authoritative provider of new predictive insights and accurate independent information.

Airfinity has built the world's leading COVID-19 science and market intelligence platform.

The company is headquartered in London and partners with organisations worldwide.

Airfinity's COVID-19 data was seen by more than 2 billion people in 2020.

"Airfinity has been instrumental in our country's COVID response"

Head of Government Vaccine Task Force

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