

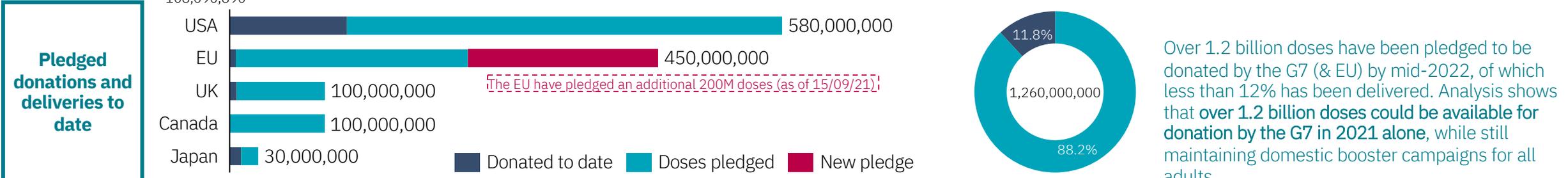
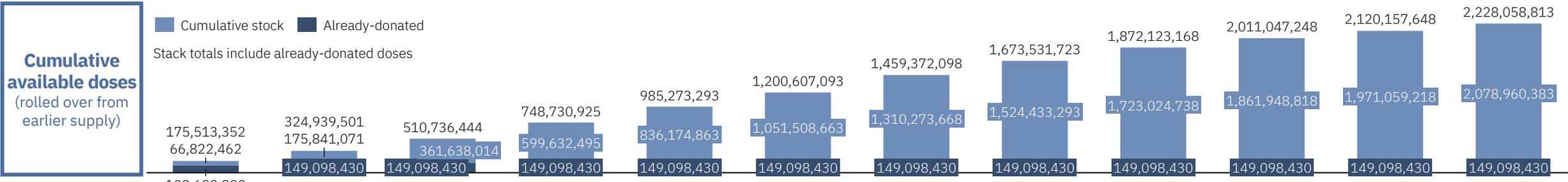
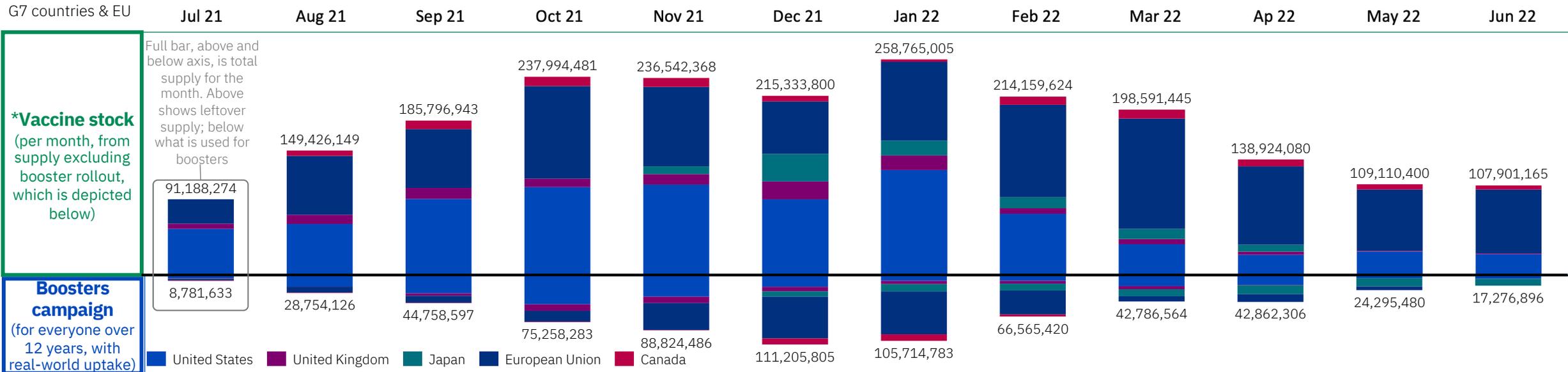
COVID-19 vaccine expiry forecast for 2021 and 2022

Airfinity analysis and forecasts on expiry of doses

September 20th

Analysis from 6th September report

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



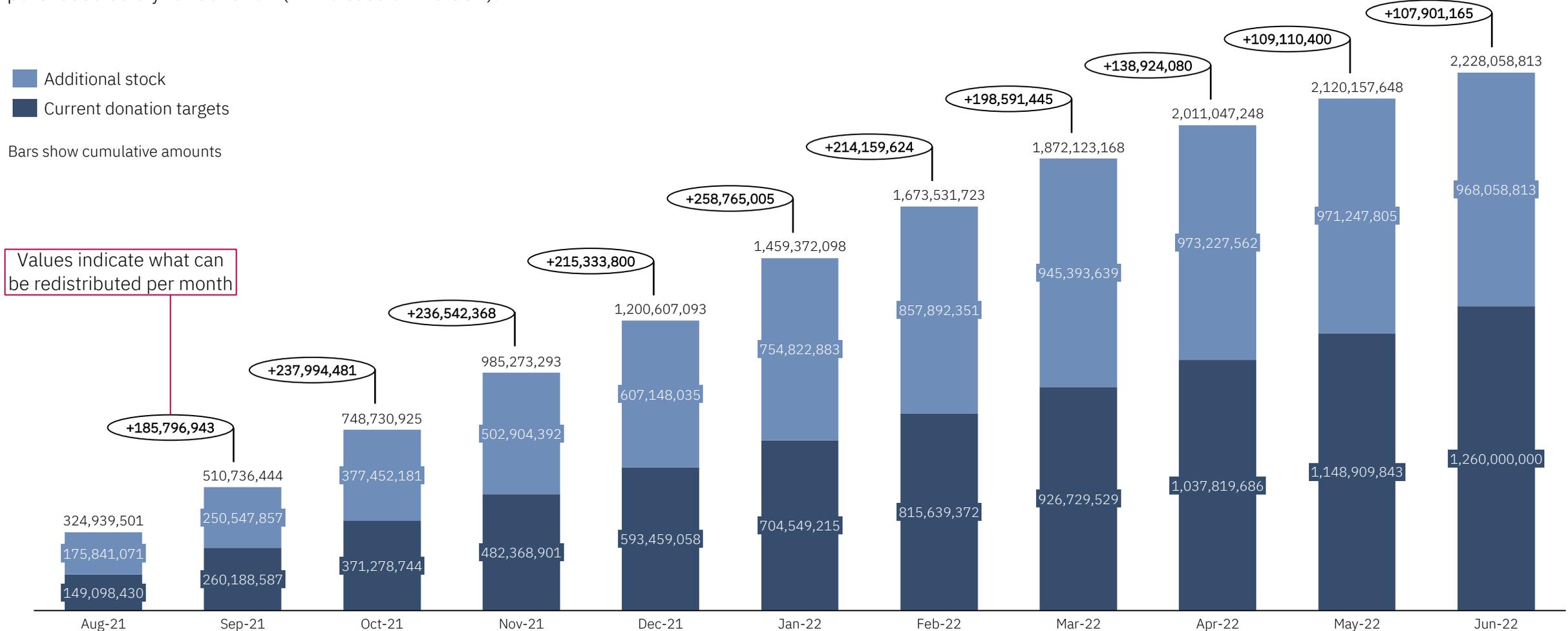
Over 1.2 billion doses have been pledged to be donated by the G7 (& EU) by mid-2022, of which less than 12% has been delivered. Analysis shows that over 1.2 billion doses could be available for donation by the G7 in 2021 alone, while still maintaining domestic booster campaigns for all adults.

*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)

G7 countries can achieve higher impact and easier distribution by initiating redistribution gradually

Monthly redistribution potential from G7, with current planned donations and additional available stock

The data shows how many doses could be distributed per month including currently pledged donations and additional available stock. Additional stock is in a greater proportion in the earlier months, suggesting countries can and should begin donating doses sooner, rather than waiting. The data includes all supply, including supply purchased solely for donation (in the case of the USA).



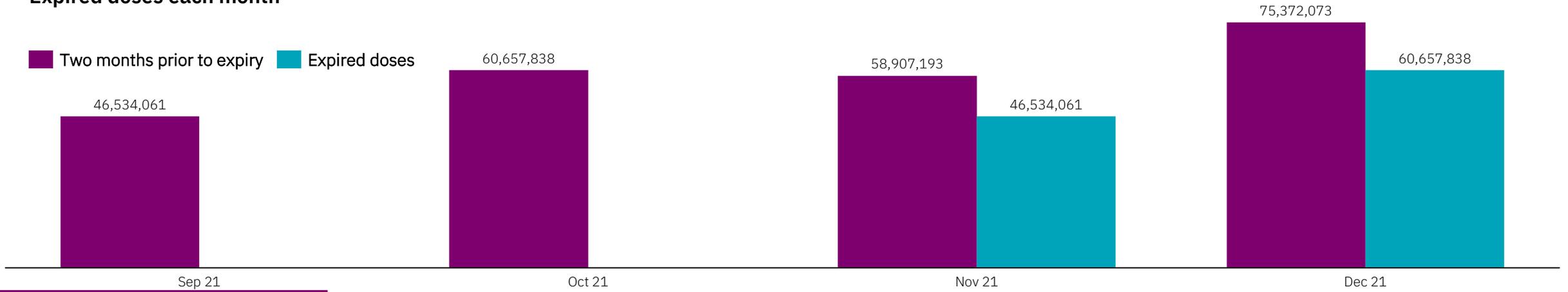
Breakdown for each country can be found in the supporting analysis

G7 could waste 241M doses by end of 2021 without immediate redistribution

Number of doses that will expire from G7 & EU supply after boosters and pledge donations are fulfilled

Expired doses each month

Two months prior to expiry Expired doses

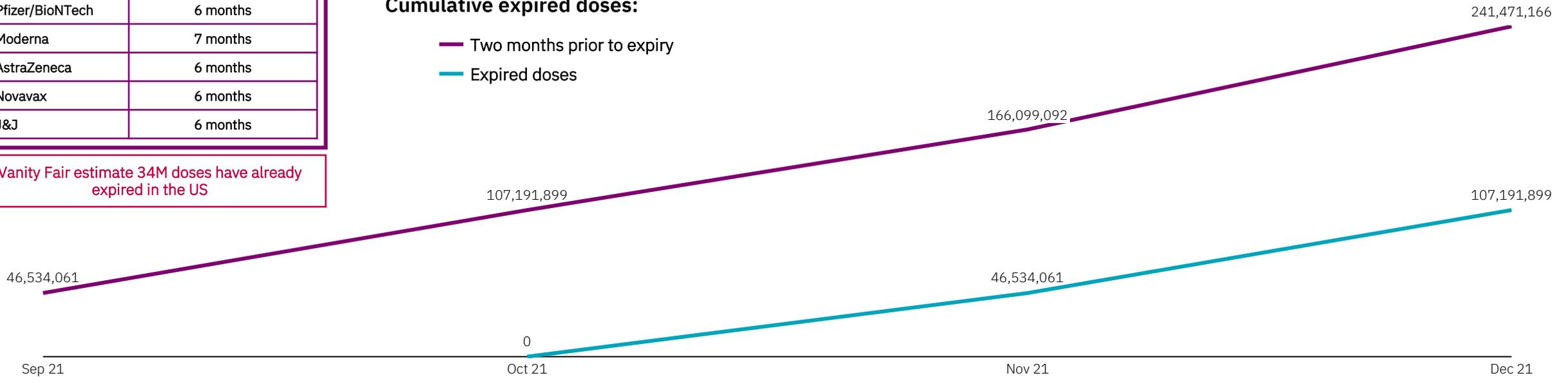


Vaccine	Shelf life/time to expiry
Pfizer/BioNTech	6 months
Moderna	7 months
AstraZeneca	6 months
Novavax	6 months
J&J	6 months

Vanity Fair estimate 34M doses have already expired in the US

Cumulative expired doses:

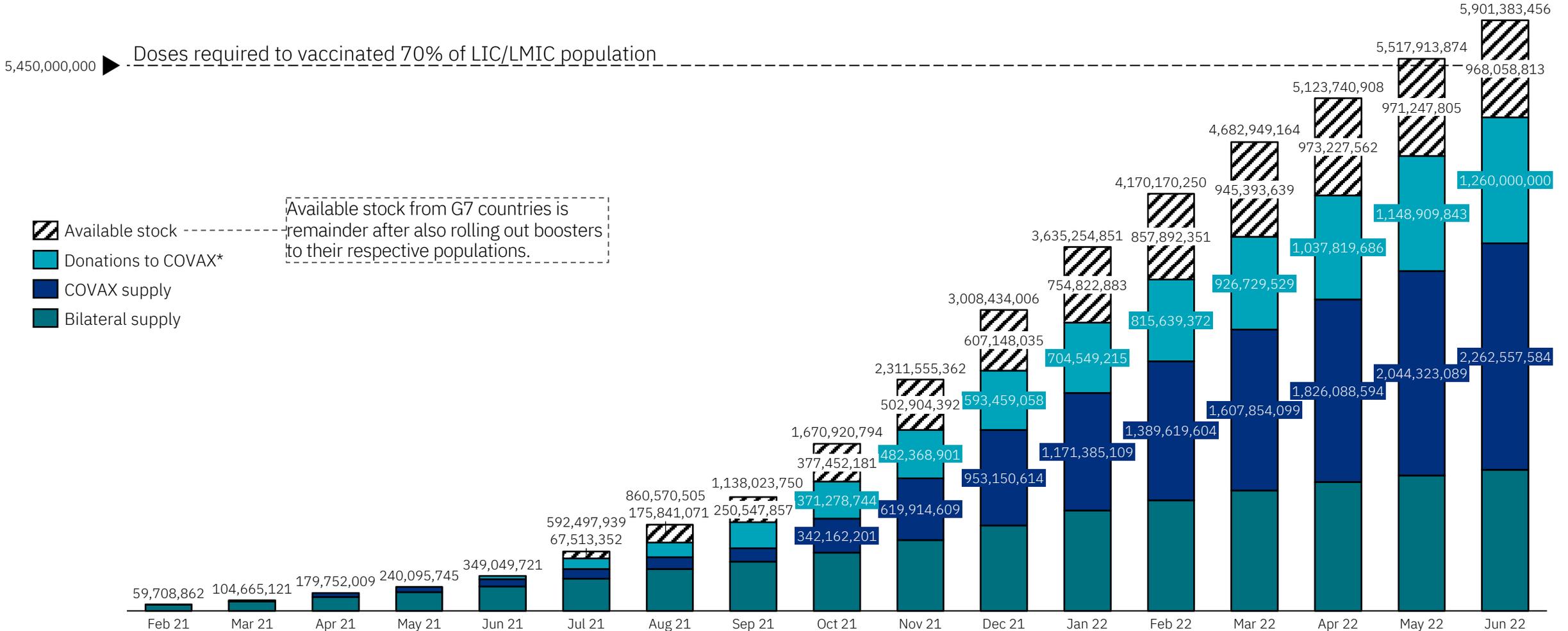
Two months prior to expiry Expired doses



Available stock from G7 could allow LIC/LMIC to have supply for 70 pct by May 2022

Potential supply to AMC countries from COVAX and bilateral supply, with donations from G7 and additional available stock

With currently agreed supply from COVAX & G7 pledged donations and bilateral deals LIC/LMICs collectively will not have enough doses to fully vaccinate 70% of their population. However, if additional supply – that would otherwise expire – from the G7 were donated to LIC/LMICs they could have sufficient doses for 70% of their populations by May 2022. This may then take some time to rollout, and vaccinating 70% may occur some time after this.



Highest impact in regions with low vaccine coverage and high case fatality rates

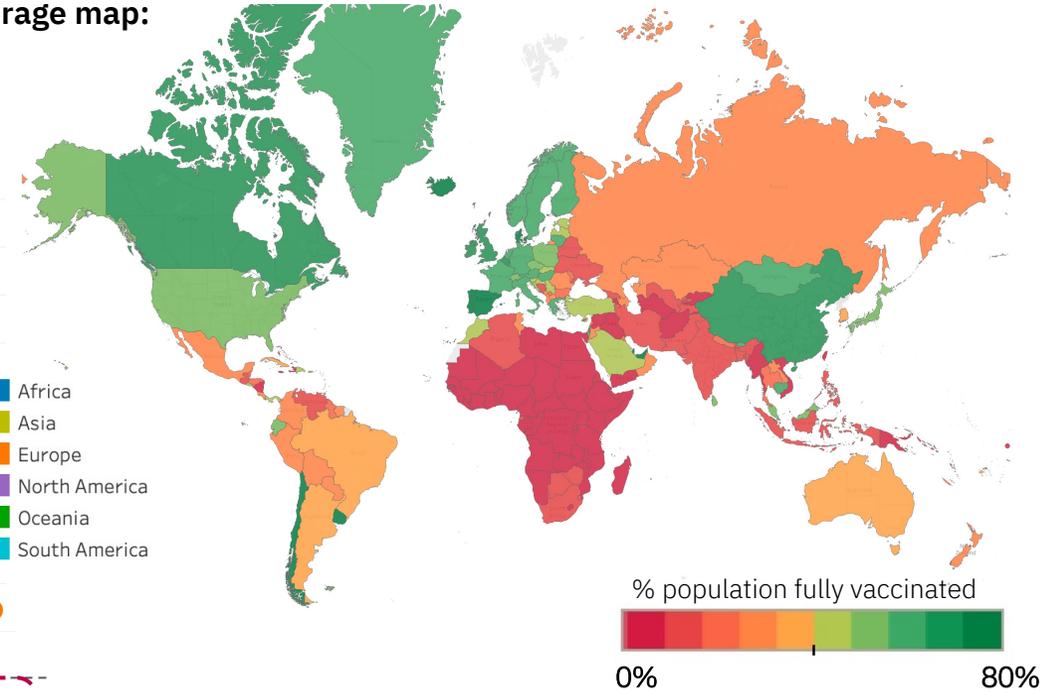
Analysis vaccine coverage and high case fatality rates

Countries with low vaccination rates have an urgent need for doses, which may otherwise expire

Vaccine coverage vs case fatality rates*:



Vaccine coverage map:



Countries that have high case fatality and low vaccine coverage are most in need for deliveries of additional doses.

Africa has the lowest vaccine coverage while recording some of the highest case fatality rates* - the continent has less than 4% of the population fully vaccinated, with many nations within Africa being even lower.

In **low-income countries** alone the proportion of people fully vaccinated is **less than 1%**.

*Case fatality rate is calculated from officially recorded cases and deaths.

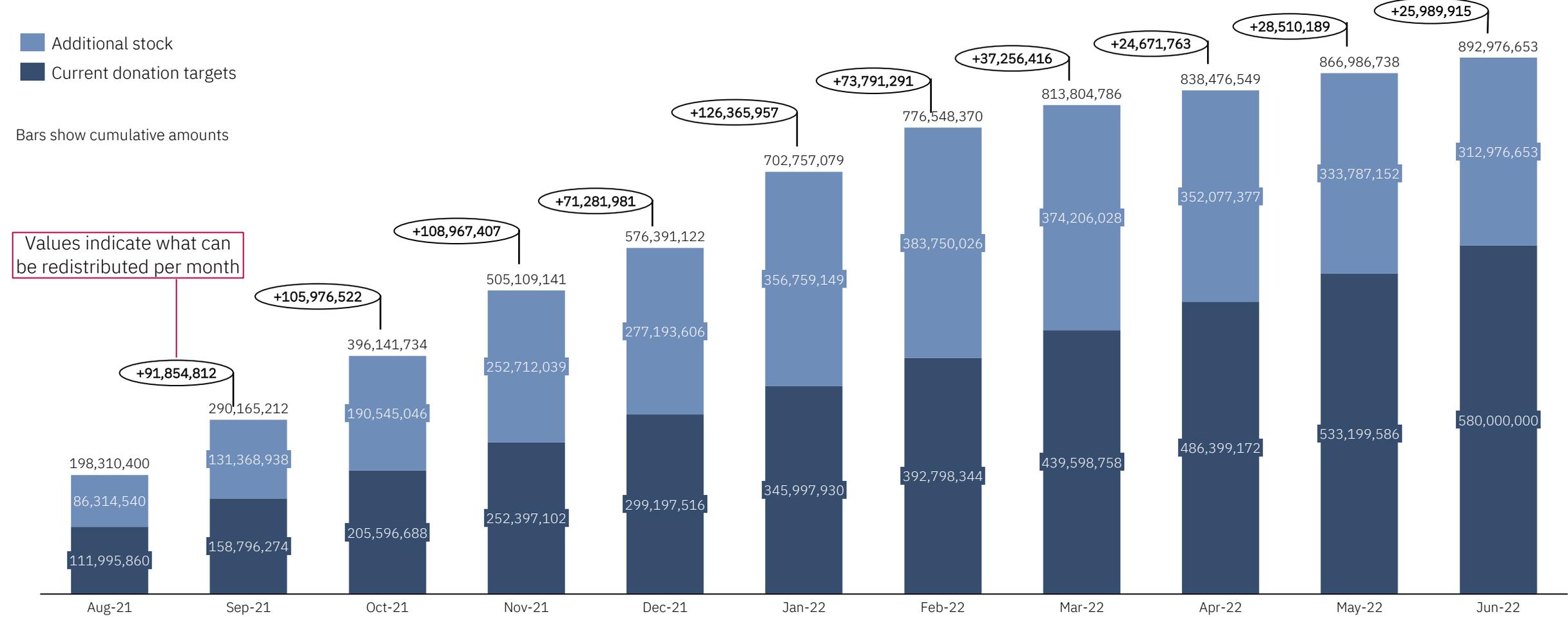
Supporting analysis

Redistribution potential per G7 country
Mortality forecasts and donations impact
Infection trajectories

United States

Monthly redistribution potential from the United States, with current planned donations and additional available stock

The data shows how many doses could be distributed per month including currently pledged donations and additional available stock. Additional stock is in a greater proportion in the earlier months, suggesting countries can and should begin donating doses sooner, rather than waiting. The data includes all supply, including supply purchased solely for donation.



United Kingdom

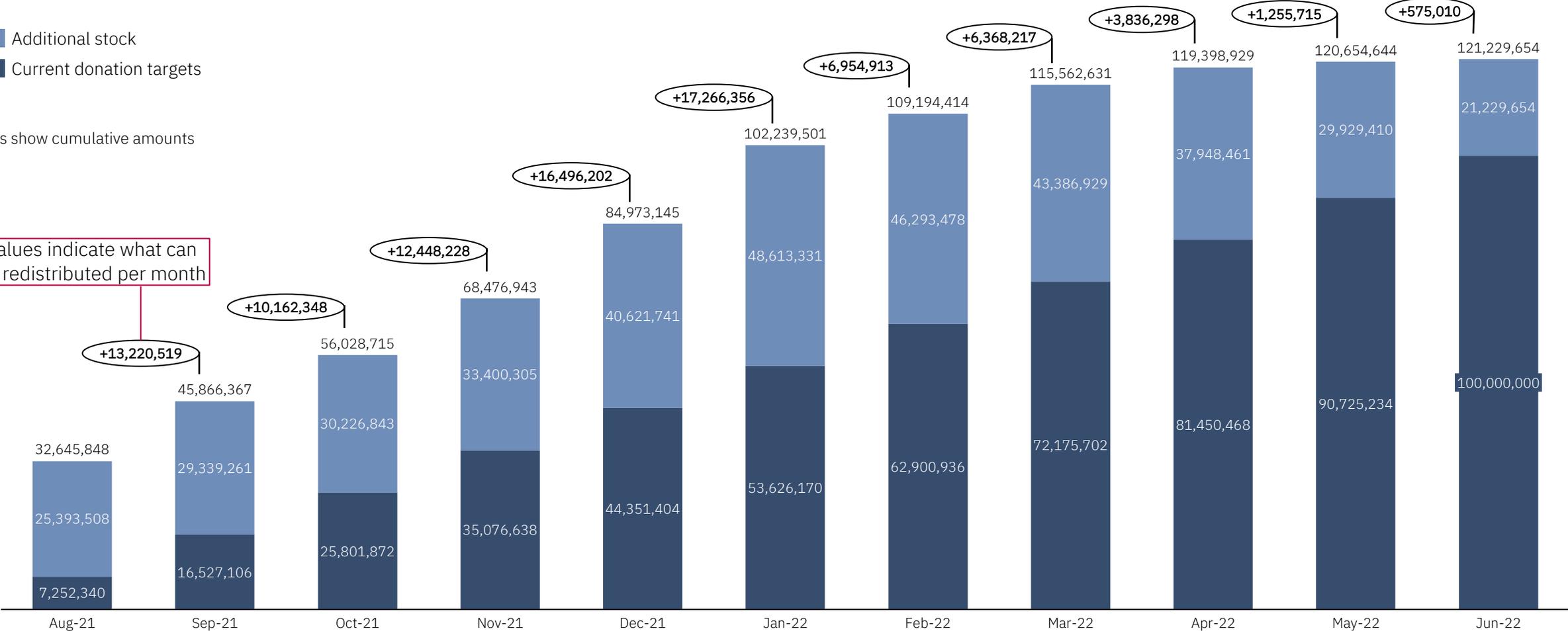
Monthly redistribution potential from the United Kingdom, with current planned donations and additional available stock

The data shows how many doses could be distributed per month including currently pledged donations and additional available stock. Additional stock is in a greater proportion in the earlier months, suggesting countries can and should begin donating doses sooner, rather than waiting. The data includes all supply, including supply purchased solely for donation.

- Additional stock
- Current donation targets

Bars show cumulative amounts

Values indicate what can be redistributed per month



European Union

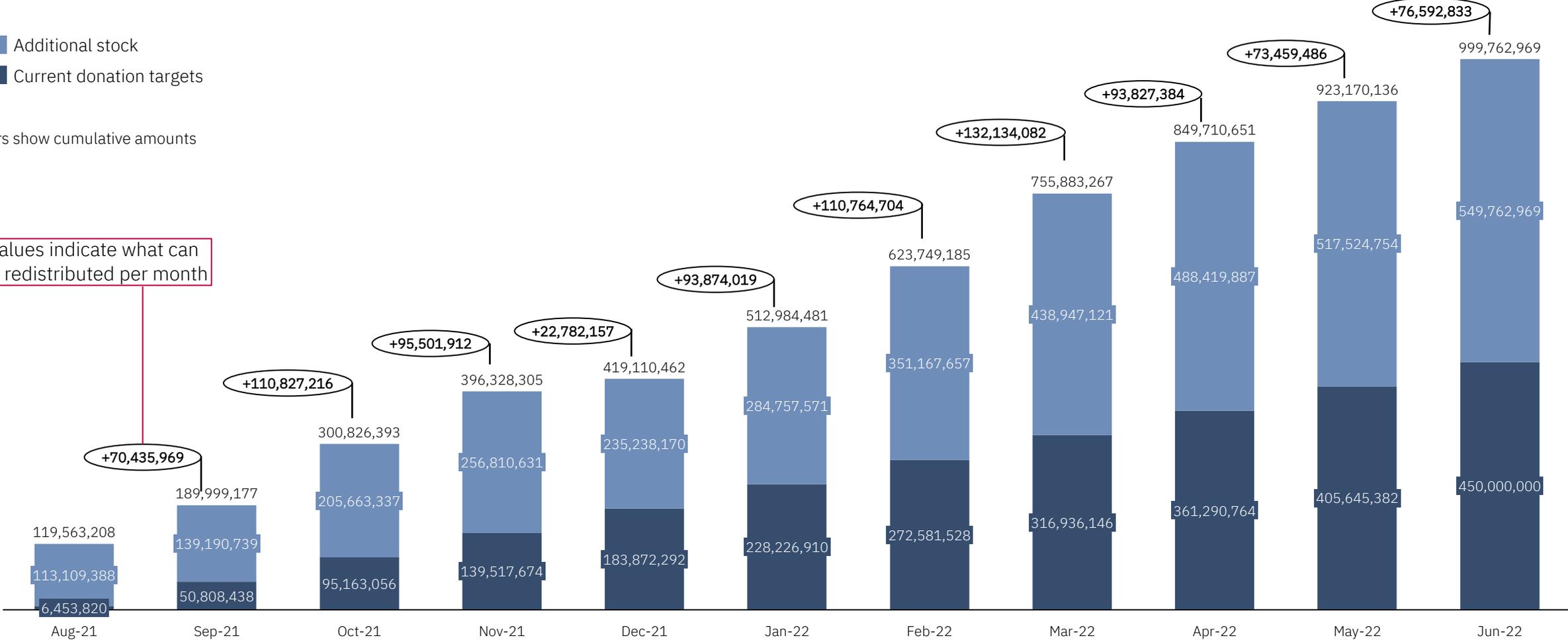
Monthly redistribution potential from the European Union, with current planned donations and additional available stock

The data shows how many doses could be distributed per month including currently pledged donations and additional available stock. Additional stock is in a greater proportion in the earlier months, suggesting countries can and should begin donating doses sooner, rather than waiting. The data includes all supply, including supply purchased solely for donation.

- Additional stock
- Current donation targets

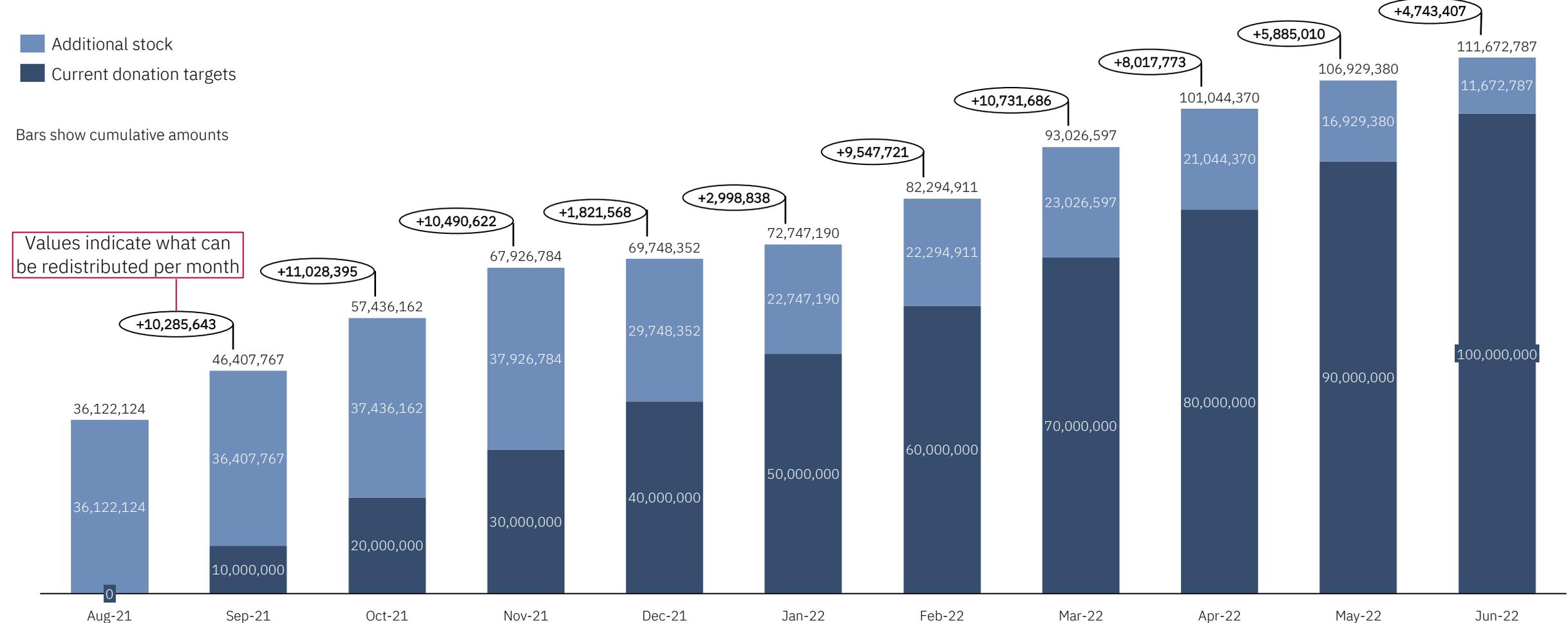
Bars show cumulative amounts

Values indicate what can be redistributed per month



Monthly redistribution potential from Canada, with current planned donations and additional available stock

The data shows how many doses could be distributed per month including currently pledged donations and additional available stock. Additional stock is in a greater proportion in the earlier months, suggesting countries can and should begin donating doses sooner, rather than waiting. The data includes all supply, including supply purchased solely for donation.



A large number of deaths will be averted by faster vaccine re-distribution, exact number uncertain

Estimates on deaths averted as of today and forecasted to mid-2022

Timeline estimates how many deaths could have already been avoided, had available unused doses already been donated and rolled out in July and August in low-income countries; it is estimated that 6,000 deaths may have been averted from available vaccines. Further analysis estimates the number of deaths that could potentially be averted by mid-2022 if available doses begin distribution as of today, and are rolled out in LICs & LMICs. This number will only increase as vaccines offer long-term protection.

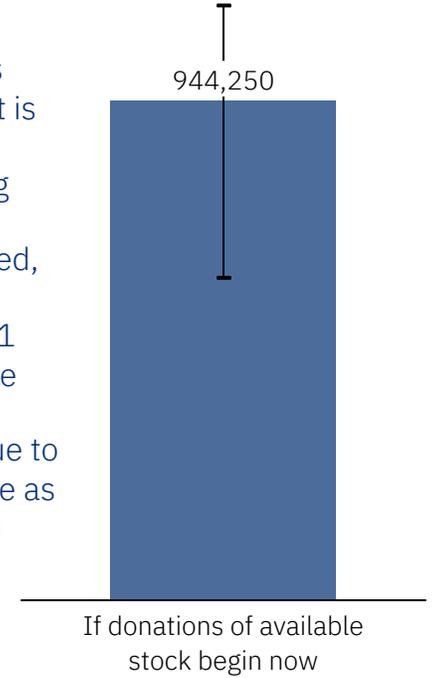
Deaths that could have been averted

If available currently unused vaccines from G7 countries had already been donated to LICs & LMICs, it is estimated that 6,000 deaths could have been avoided by today (16/09/21).



Potential future deaths that can be prevented

If vaccine stock that is available now and that is forecasted to be available, begins being donated now and continues to be donated, and rolls out, then it is estimated that nearly 1 million deaths could be averted by mid-2022. This figure will continue to increase into the future as future deaths are then also averted.



May-21 Jun-21 Jul-21 Aug-21 Sep-21 Oct-21 Nov-21 Dec-21 Jan-22 Feb-22 Mar-22 Apr-22 May-22 Jun-22

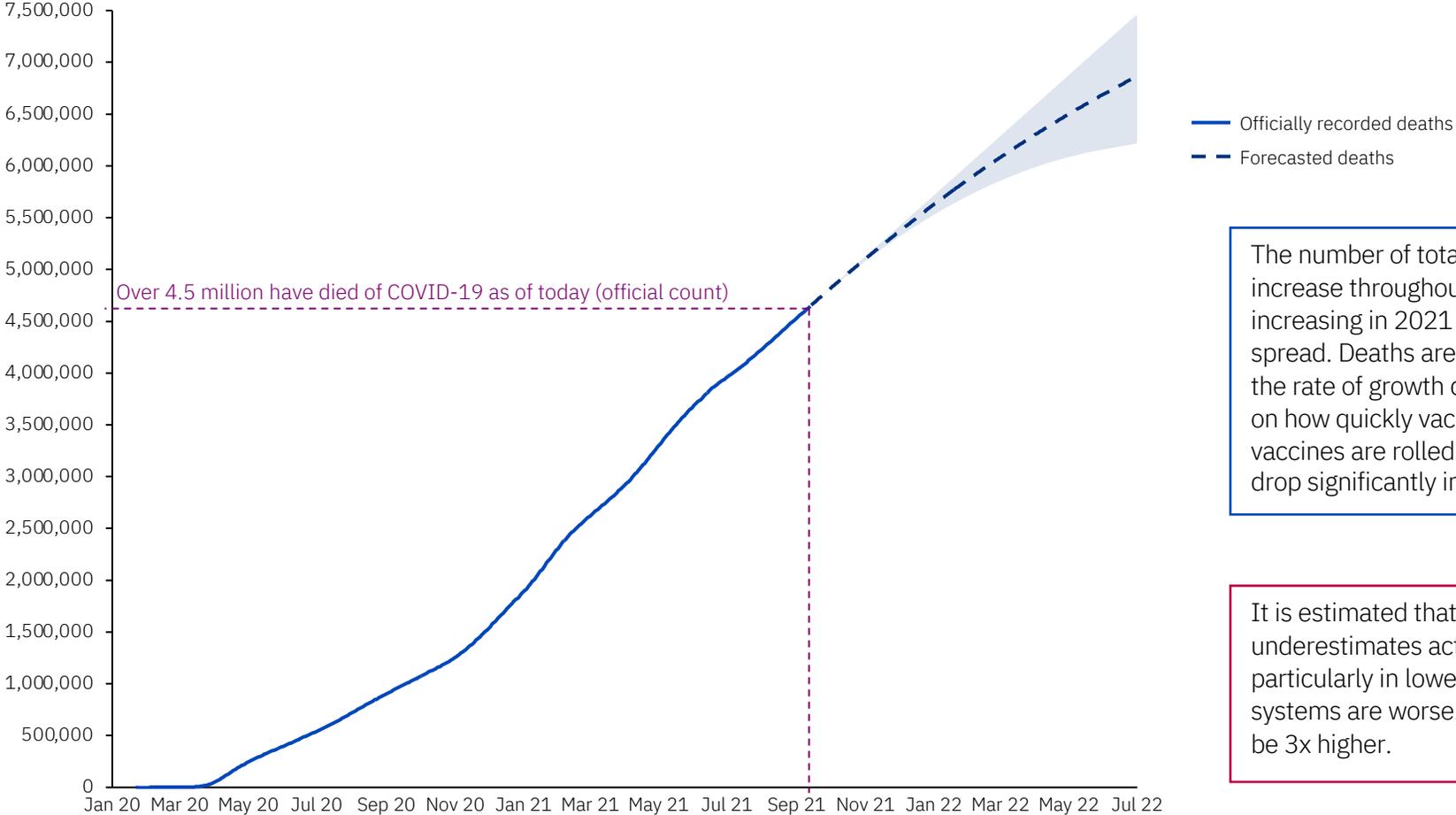
Today estimate assumes two dose vaccine schedule in Jul 21 and Aug 21, 15% shrinkage. Being vaccinated reduces susceptible population leading to a lower infection rate, which is multiplied by IFR to estimate deaths averted

Mid 2022 estimates build upon Hogan et al., Within-country age-based prioritisation, global allocation, and public health impact of a vaccine against SARS-CoV-2: A mathematical modelling analysis, Vaccine, Volume 39, Issue 22, 2021,

Deaths are rising and are forecasted to continue, growth rate could slow if more vaccines are administered

Global officially recorded cumulative COVID deaths and forecasts

Global cumulative deaths and forecasted deaths:

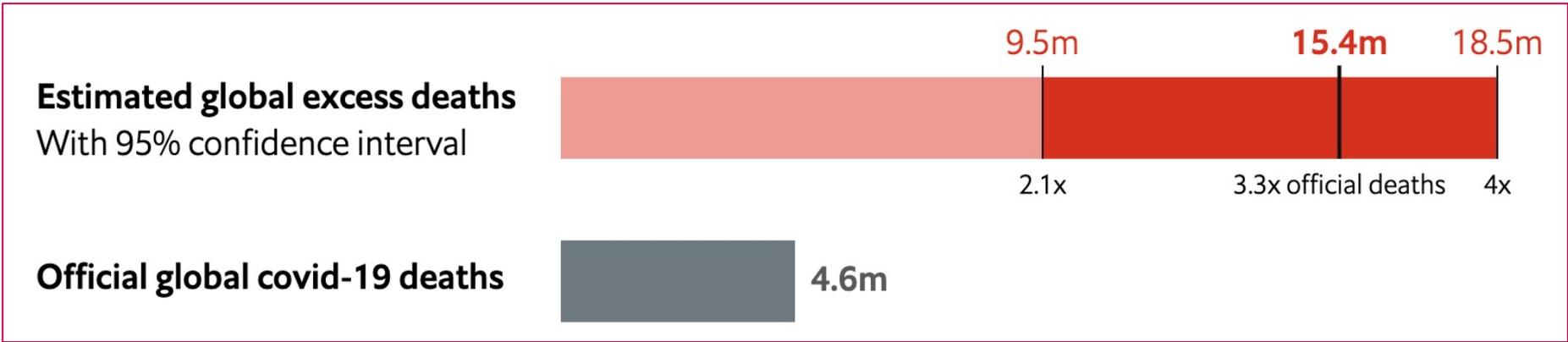


The number of total COVID deaths has continued to increase throughout the pandemic, with global rates increasing in 2021 as more transmissible variants have spread. Deaths are forecasted to continue rising, however, the rate of growth depends on infections rates, but largely on how quickly vaccines are rolled out globally. If effective vaccines are rolled out quickly then the deaths rate could drop significantly in coming months.

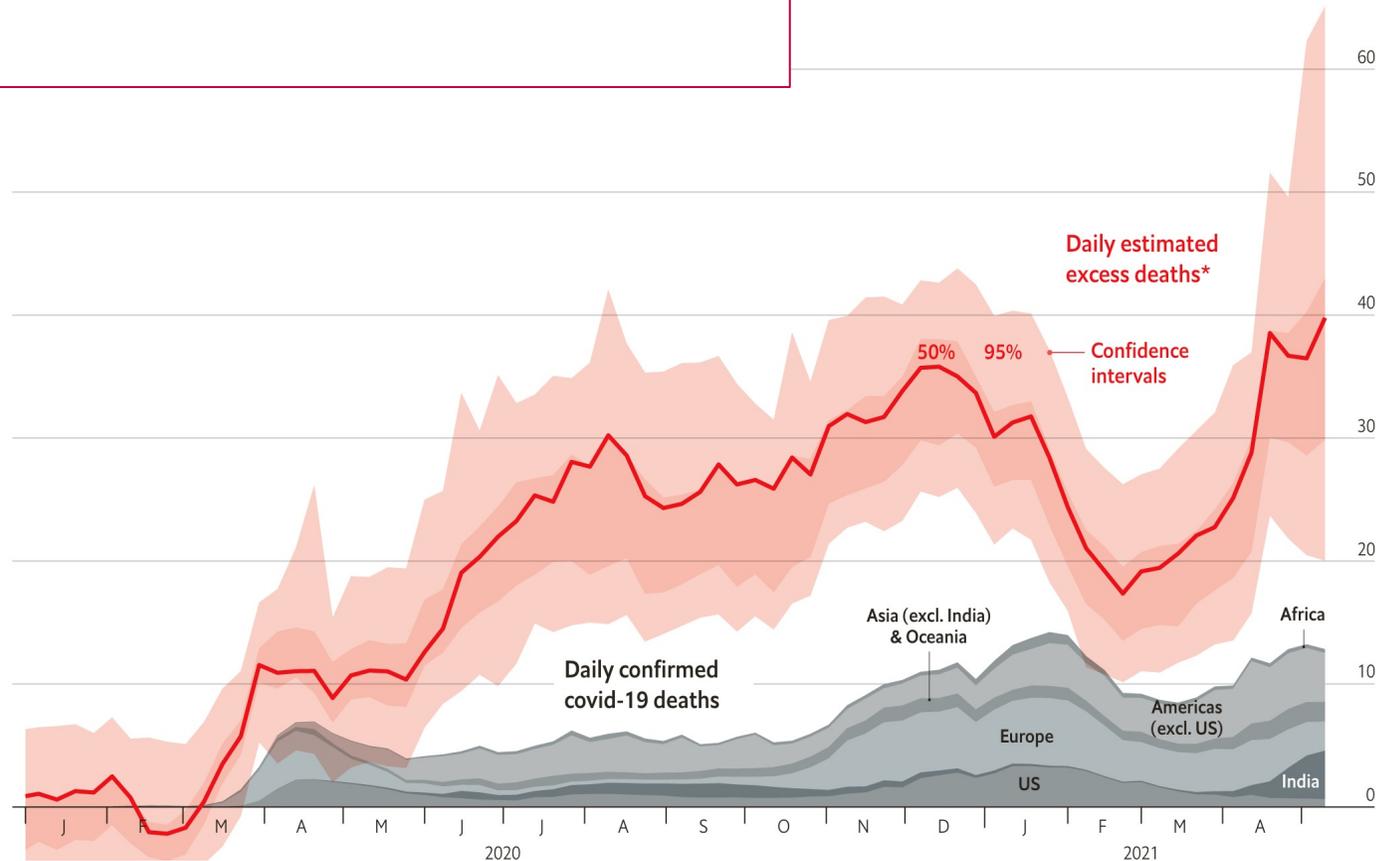
It is estimated that the official death count massively underestimates actual deaths caused by COVID-19, particularly in lower income countries, where reporting systems are worse. It is estimated that actual deaths could be 3x higher.

Actual COVID deaths could be 3x higher than the official count

Analysis of actual COVID deaths estimated from excess deaths vs official count of COVID deaths



Global estimated daily deaths* vs confirmed COVID-19 deaths:
(1000's)



*Deaths relative to expected deaths in a normal year

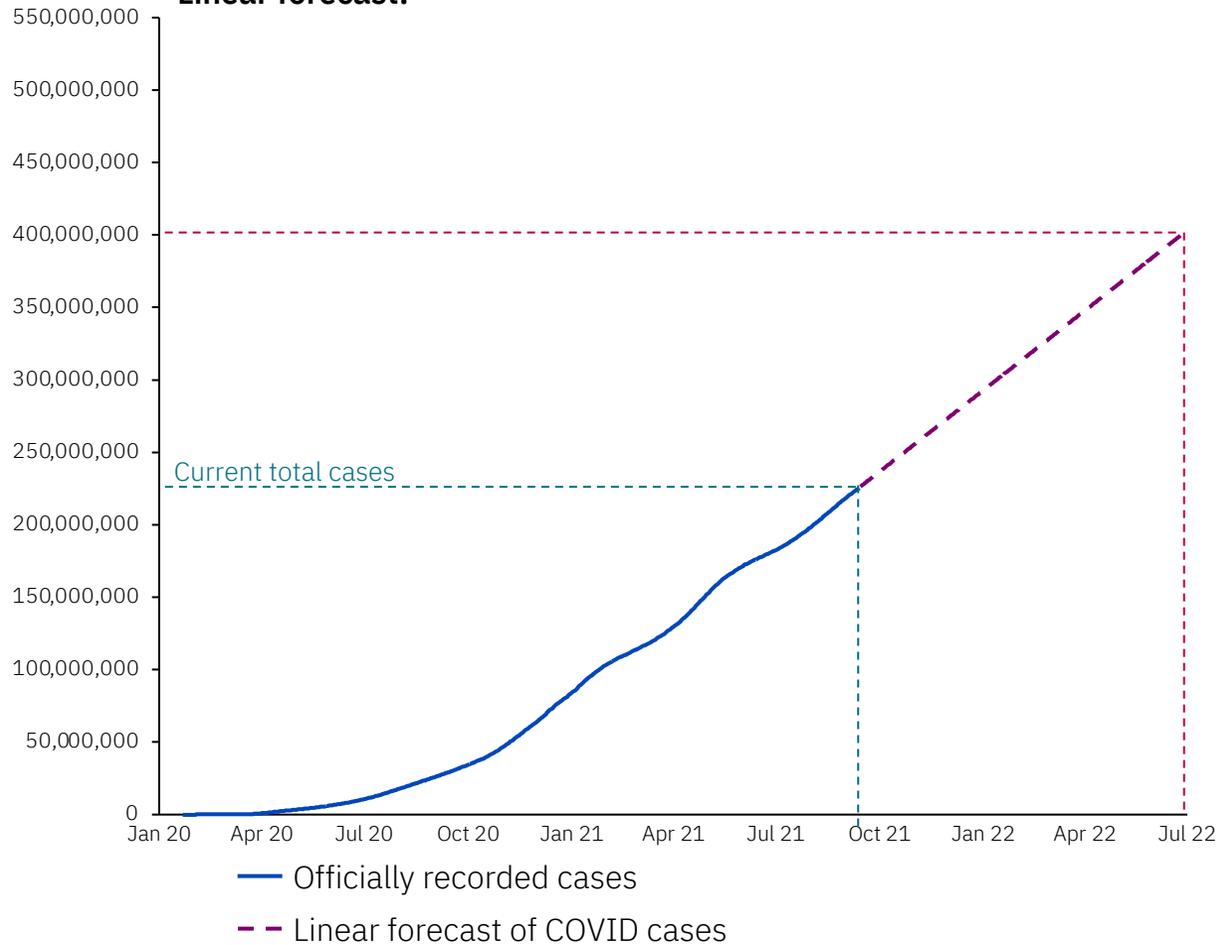
Source: The Economist, Sondre Ulvund Solstad

Cases likely to exceed 400M by mid-2022

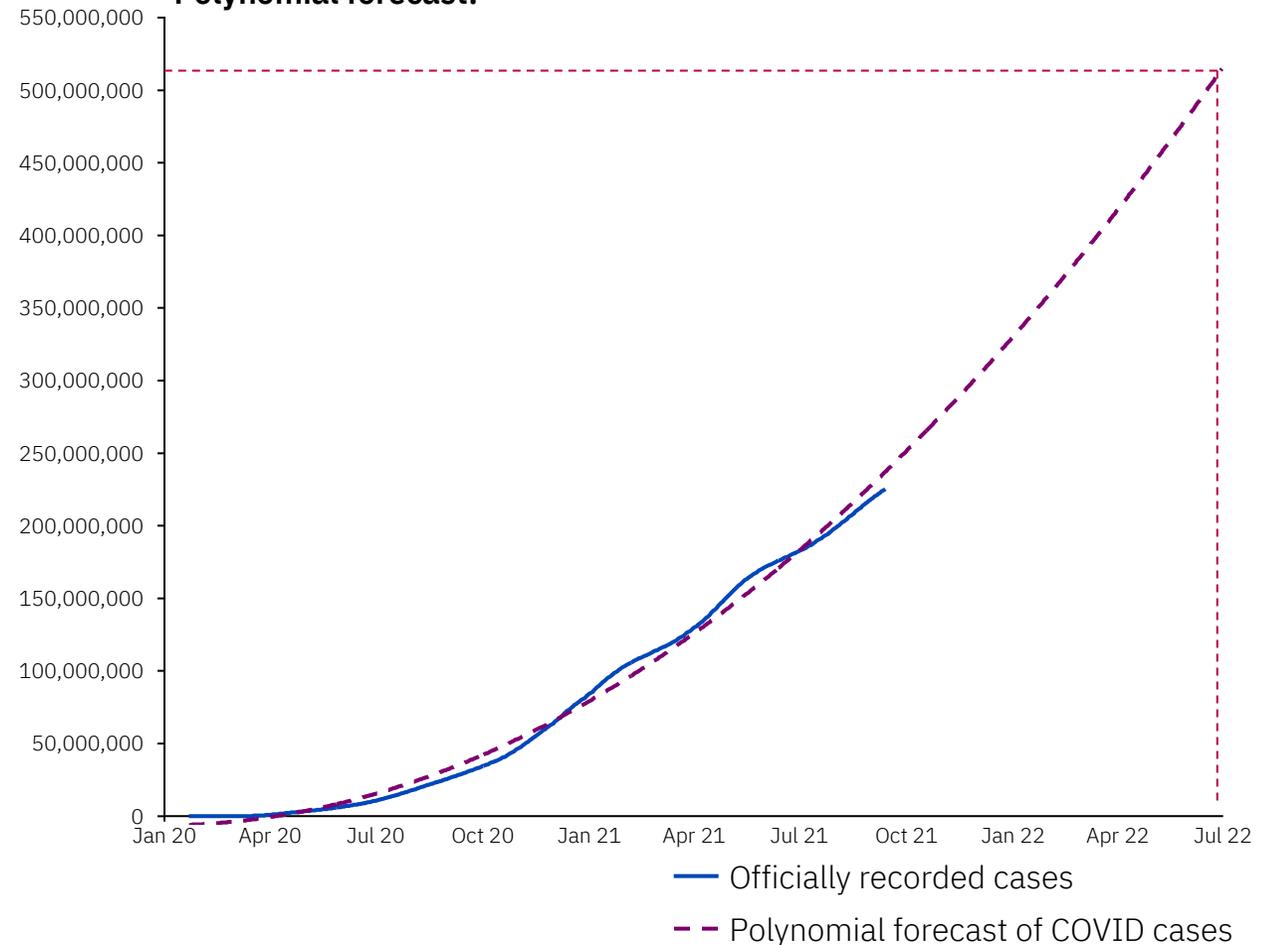
An analysis of the worldwide recorded and potential cases

So far, nearly 225M cases have been officially recorded globally. If total cases continue rise at the current rate, we could record 400M a total of cases by mid-2022. The rate of infections, however, appears to have increased with more transmissible variants spreading globally; fitting a polynomial forecast to cases shows that there could be over 500M recorded cases by mid-2022. The rollout of vaccines widely will help slow the spread of infections.

Linear forecast:



Polynomial forecast:



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
Pfizer/BioNTech	-80°C	6 months	Up to 1 month at refrigerator temperatures: 2°C-8°C (36°F-46°F)
Moderna	-20°C	7 months	Up to 1 month at refrigerator temperatures: 2°C-8°C (36°F-46°F)
AstraZeneca	Refrigerator temperatures: 2°C-8°C	6 months	Up to 6 hours at room temperature 9°C-25°C (47°F-77°F) (once removed from 2-8°C storage)
Novavax	Refrigerator temperatures: 2°C-8°C	6 months	Unknown
J&J	Refrigerator temperatures: 2°C-8°C	6 months	Up to 2 hours at room temperature 9°C-25°C (47°F-77°F)

*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

Dr Matt Linley

Lead Analyst

matt@airfinity.com

Press:

Sarah Harper

Media and Communications Manager

M: +44 (0) 777 365 9099

Sarah@airfinity.com

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THE WORLD'S TRUSTED COVID-19 PLATFORM

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

FEATURED IN MORE THAN 200 NEWSPAPERS, JOURNALS AND ON TV NETWORKS WORLDWIDE

Bloomberg

CNN

nature

FINANCIAL TIMES

FORTUNE


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