

COVID-19 Monitor

COVID-19 vaccines, cases, hospitalisations, deaths and variants

15 July 2021

Background

- Jurisdictions globally are facing different situations when it comes to COVID-19 cases, distribution of new variants, patient outcomes and vaccine rollout. It is important to understand how these variables interplay as the pandemic progresses. This information can provide insights for NSW going forward.

Evidence

- In countries with high vaccination rates such as [Canada](#), [Israel](#) and the [United States](#), low rates of new infections are being reported in vaccinated people.(1-3)
- Albeit small numbers, most of the published phase three COVID-19 vaccine trials report 100% efficacy against COVID-19 related [hospitalisation](#).(4)
- Real world effectiveness data on hospitalisations and mortality following vaccination (namely [Pfizer](#), [AstraZeneca](#) and [Moderna](#)) show vaccines are up to 98% effective at preventing COVID-19 related hospitalisation, and up to 97% effective at preventing COVID-19 related death.(5-7)
- Viruses constantly change through mutation and, over time, [new variants](#) of a virus are expected to occur. Some variants have characteristics that have a significant impact on transmissibility, severity of disease and the effectiveness of vaccines.(8)
- For SARS-CoV-2, there are currently [four variants of concern](#) as determined by the World Health Organization (WHO).(9)

The [four variants of concern](#) include:

- Alpha (B.1.1.7), which originated in the United Kingdom. Currently 151 countries are reporting detection of the variant.
 - Beta (B.1.351), which originated in South Africa. Currently 102 countries are reporting detection of the variant.
 - Gamma (B.1.1.28.1 or P.1), which originated in Brazil. Currently 62 countries are reporting detection of the variant.
 - Delta (B.1.617.2), which originated in India. Currently 92 countries are reporting detection of the variant. [Delta-AY.1](#) (Delta with K417N) has been recently reported.(10, 11)
- There is emerging evidence on the impact of COVID-19 vaccines on variants. Generally, vaccines are effective at [neutralising Alpha](#), while there is reduced [neutralisation for Gamma](#), [Beta](#) and [Delta](#). All variants elicit [cross-reactive neutralising antibodies](#).(9, 12-15)

Table 1. Vaccination rates (select countries) as at 13 July 2021

Country	Average daily vaccine doses*	Population covered (%)**	Time to cover 75% of the population***
Australia	127,763	17.9%	7 months
United Kingdom	245,396	60.5%	3 months
United States	527,353	52.3%	9 months
Canada	480,281	56.9%	1 month
Israel	13,564	60.3%	6 months
India	4,030,399	13.9%	14 months
Taiwan	149,569	7.6%	7 months
Vietnam	22,961	2.1%	>10 years
More than 3.44 billion doses have been administered across 180 countries.			

* Average daily vaccine doses based on the last seven days.

** Population covered divides the doses administered for each vaccine type by the number of doses required for full vaccination.

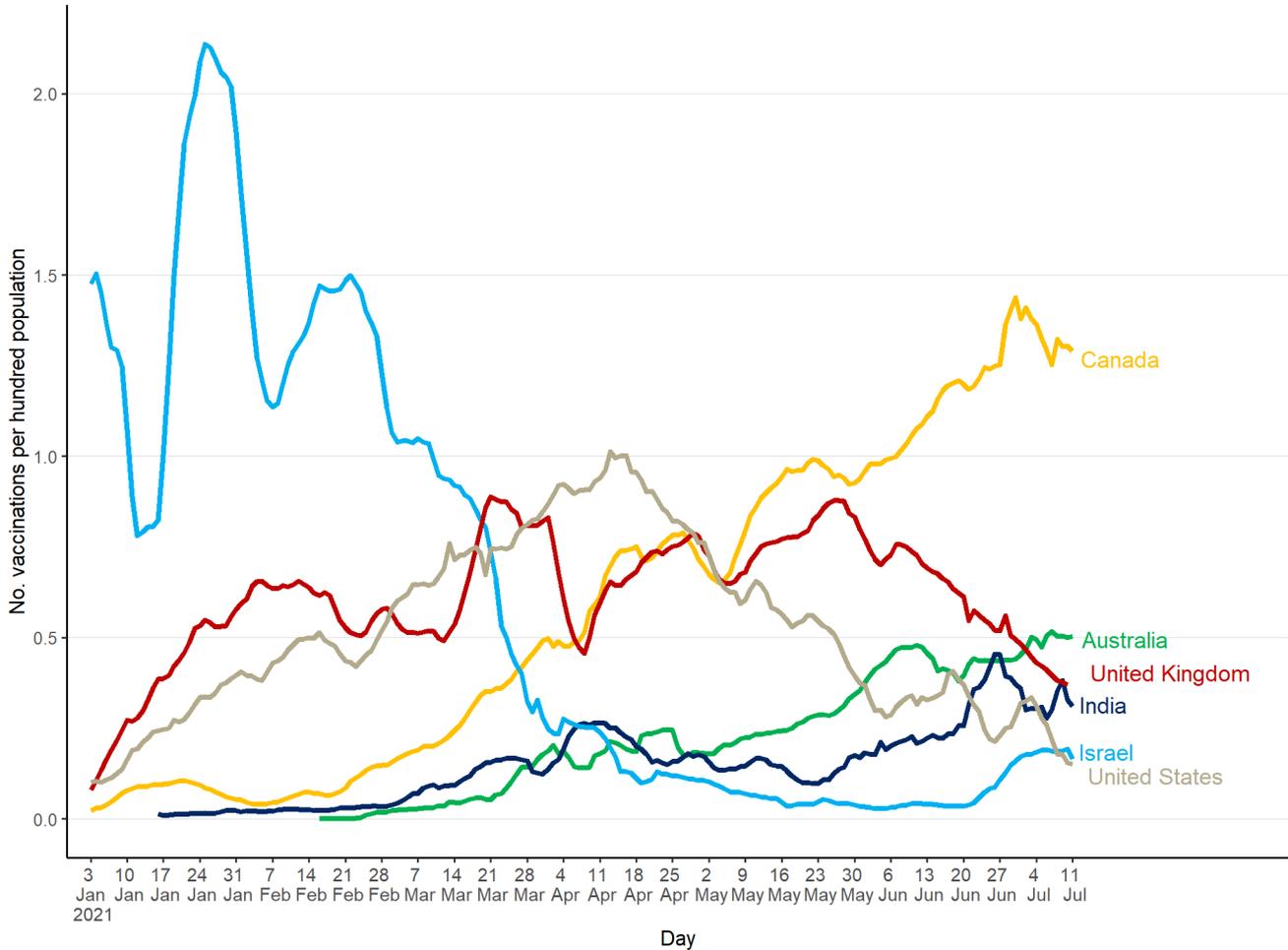
*** Time to cover 75% of the population based on the number of doses required and the current average daily vaccine doses.

Source: [Bloomberg COVID-19 Vaccine Tracker](#). Accessed 13 July 2021.(16)

COVID-19 vaccination rates

The following graph shows the daily (rolling seven-day average) vaccination rates in Australia, the United Kingdom, United States, Canada, Israel and India, from January to July 2021.

Figure 1. Daily vaccination rates (select countries), January – July 2021

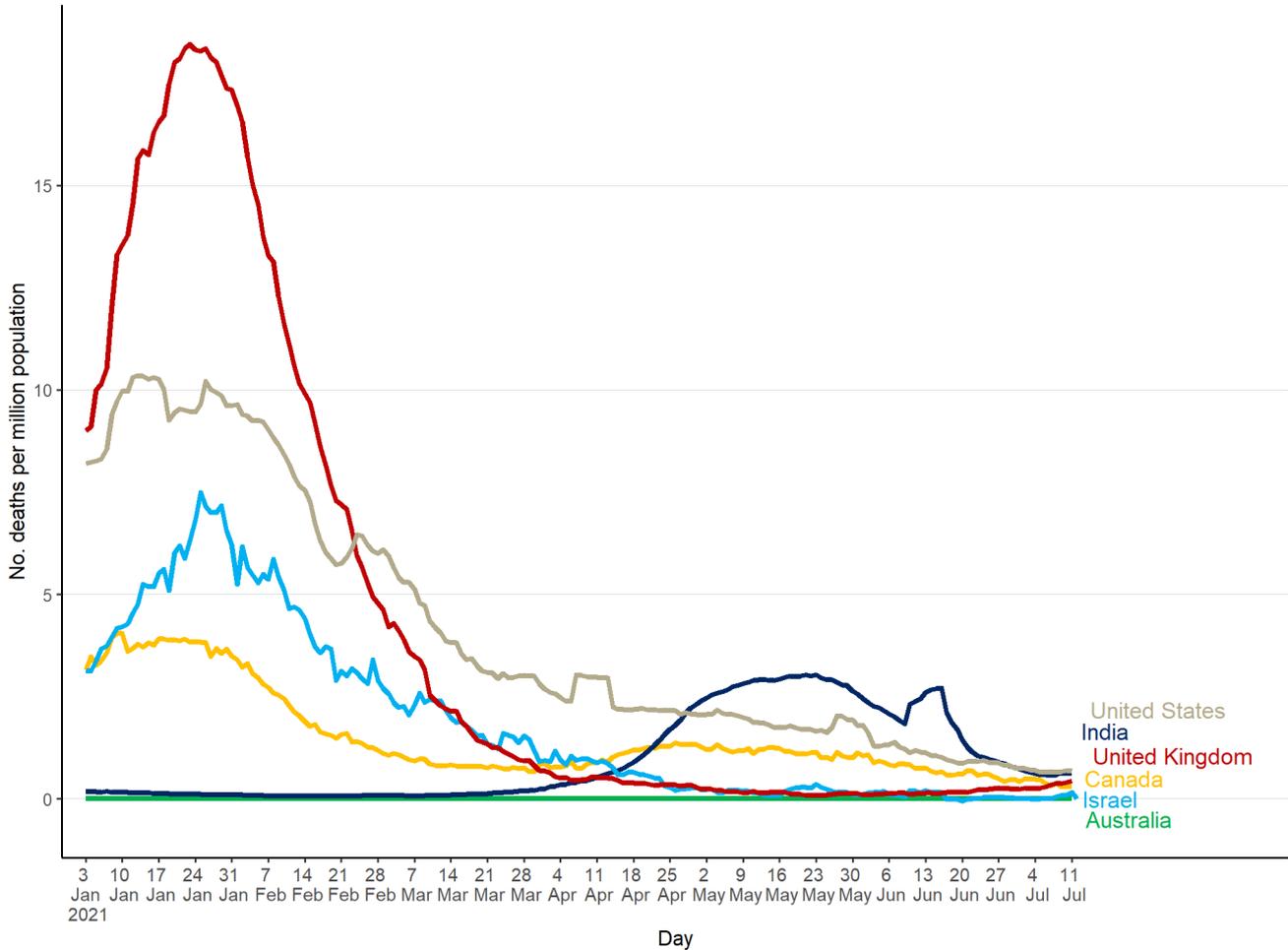


Source: [Our World in Data](#). Accessed 13 July 2021.(17)

COVID-19 mortality rates

The following graph shows the daily (rolling seven-day average) mortality rates in Australia, the United Kingdom, United States, Canada, Israel and India, from January to July 2021.

Figure 2. Daily mortality rates (select countries), January – July 2021



Note: Limited testing and challenges in the attribution of the cause of death means that the number of confirmed deaths may not be an accurate count of the true number of deaths from COVID-19.

Source: [Our World in Data](#). Accessed 13 July 2021.(17)

COVID-19 vaccines, cases, hospitalisations, deaths and variants

The following graphs (figures 3-7) show COVID-19 cases and vaccination rates, hospitalisation and death rates, and the variant distribution for specific countries, namely Australia, the United Kingdom, the United States, Canada and Israel.

Series (a): COVID-19 cases and vaccinations

The graphs in series (a) show COVID-19 cases and vaccination rates specific for each of these countries, including the daily number of confirmed COVID-19 cases; the cumulative number of people who have received at least one vaccine dose (per 100 population); and the cumulative number of people fully vaccinated (per 100 population) from January to July 2021.

These graphs should be interpreted with caution as there are other factors that may influence the number of cases in addition to vaccine rates, including the level of social restrictions. The number of people fully vaccinated in Australia is only available from late May 2021 onwards.

Note, there is variation in x axis scales and some gaps in time series across these graphs due to missing data.

Series (b): COVID-19 hospitalisation and death rates

The graphs in series (b) show COVID-19 hospitalisation and death rates for each of these countries. Specifically, they show the daily number of hospitalised patients (per million population), and the daily number of new deaths (per million population) from January to July 2021.

Series (c): COVID-19 variant distribution

The graphs in series (c) show the COVID-19 variant distribution for each of these countries. Specifically, they show COVID-19 variant distribution for cases sequenced, and the percentage of total COVID-19 cases sequenced, from January to July 2021.

For most countries, weekly counts are shown; however, only monthly counts were available for Canada. Note, there is variation in x axis scales.

Figure 3a. COVID-19 cases and vaccinations, Australia, January – July 2021

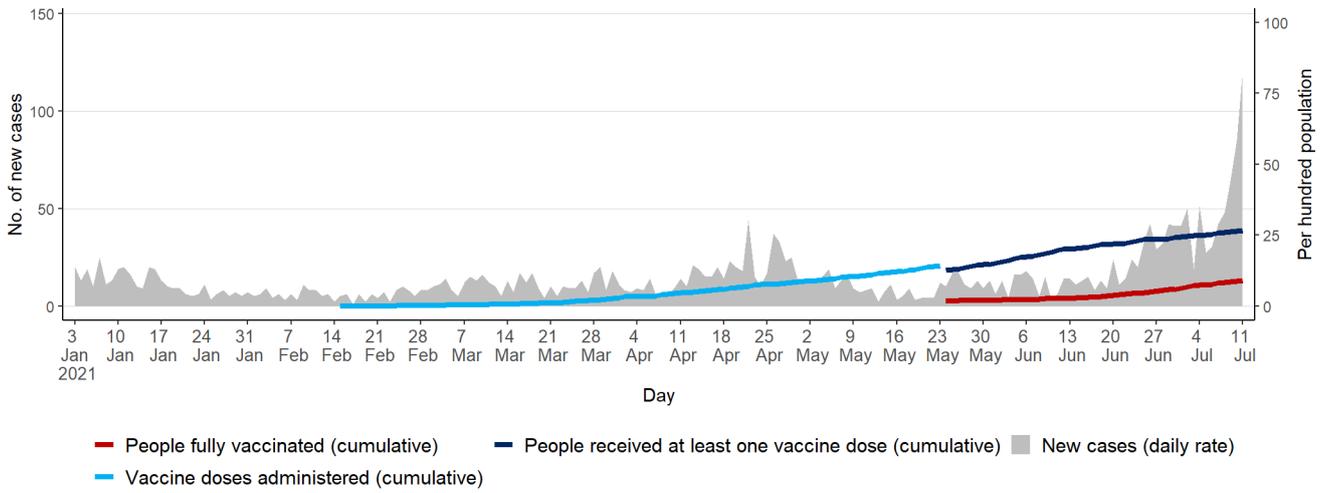


Figure 3b. COVID-19 hospitalisation and mortality rates, Australia, January – July 2021

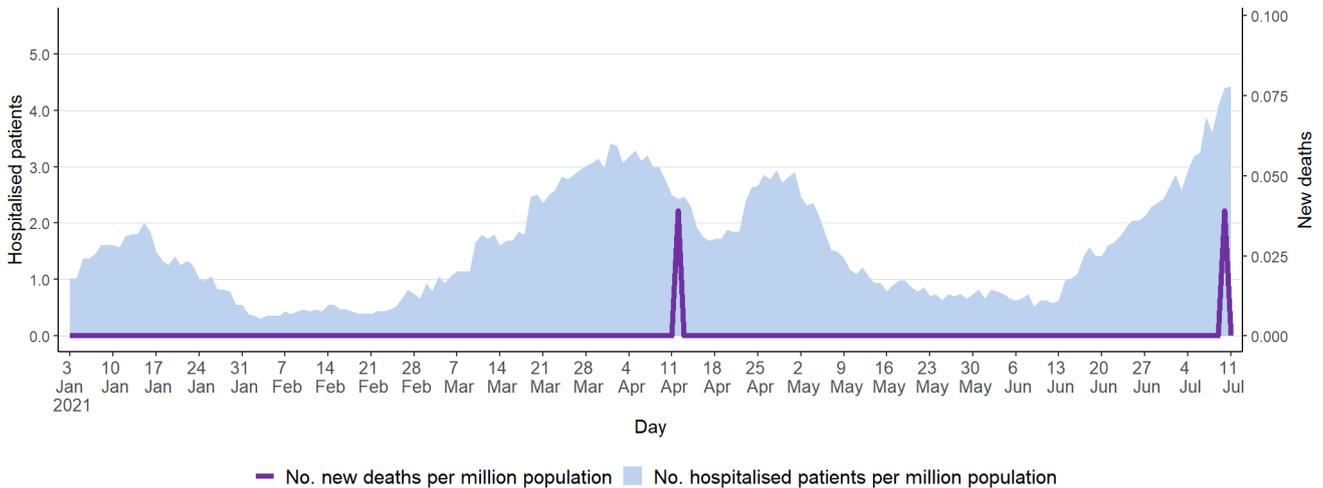


Figure 3c. COVID-19 variant distribution for a sample of cases that have been sequenced, Australia, January – July 2021

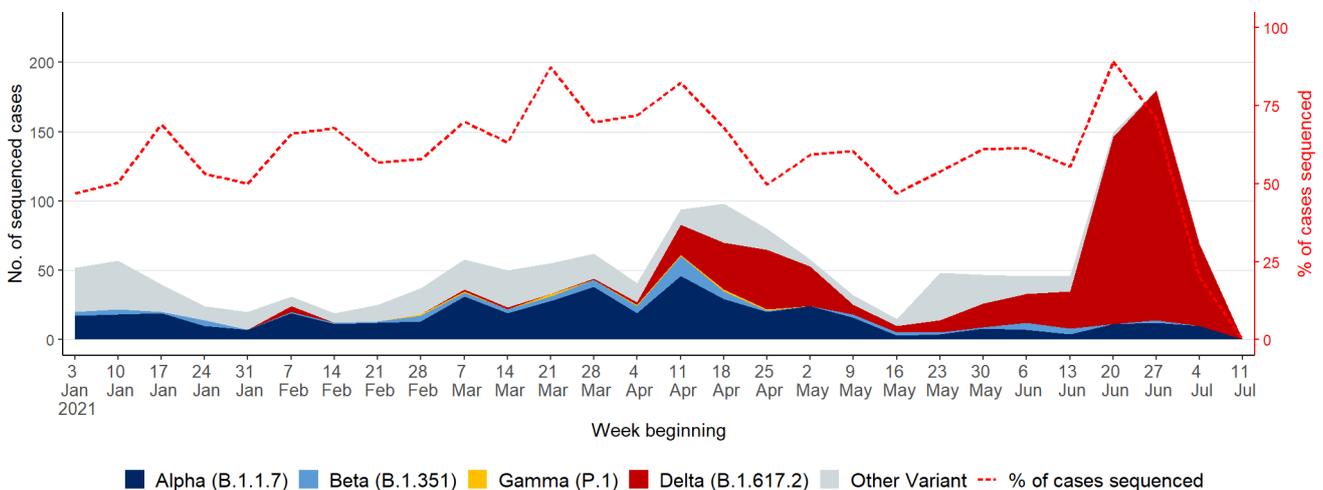


Figure 4a. COVID-19 cases and vaccinations, United Kingdom, January – July 2021

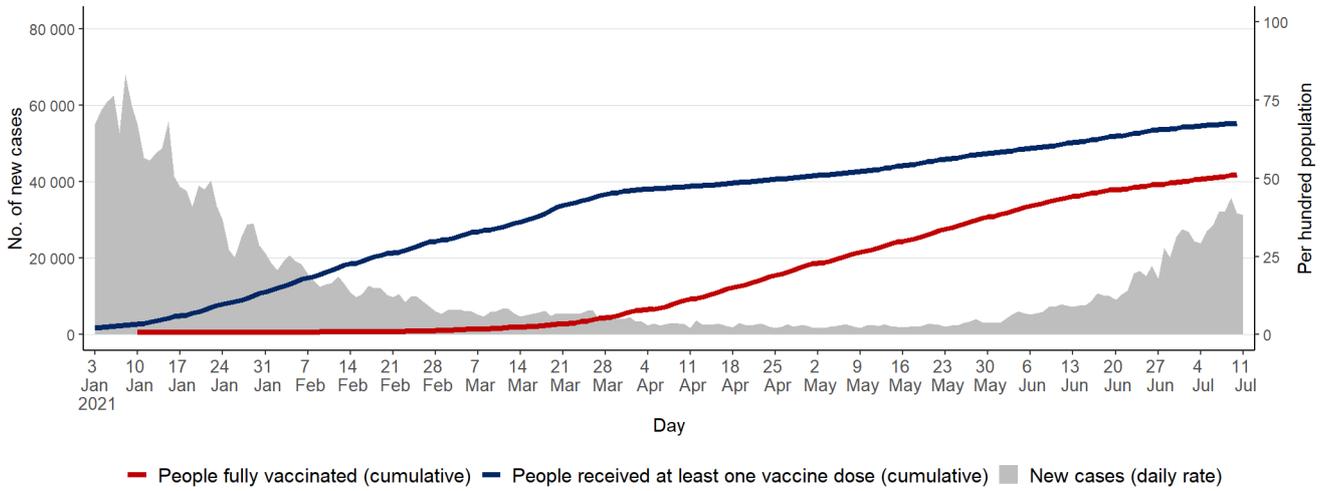


Figure 4b. COVID-19 hospitalisation and mortality rates, United Kingdom, January – July 2021

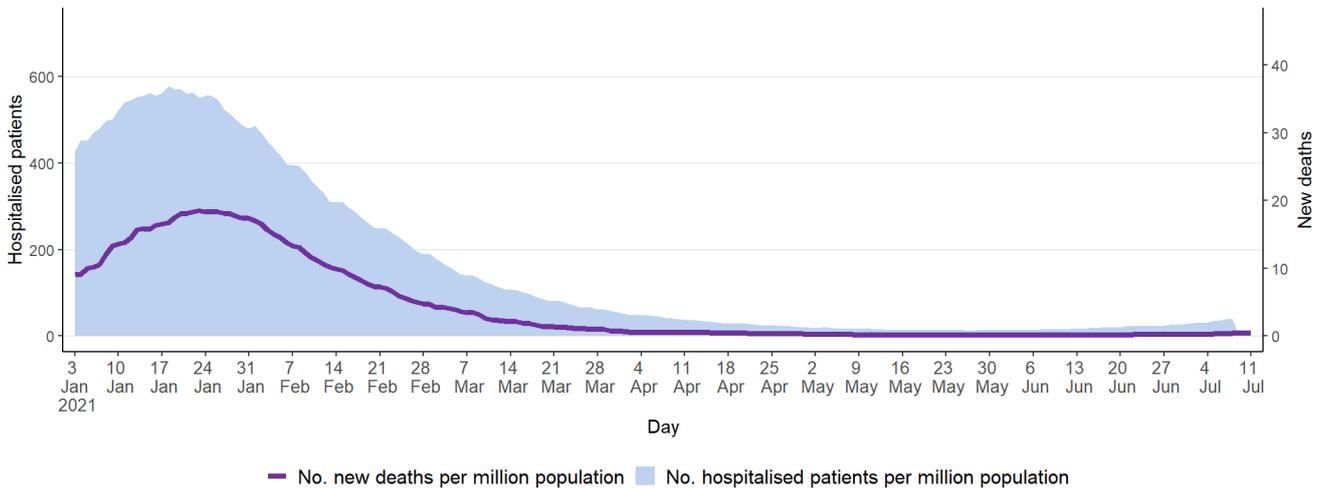


Figure 4c. COVID-19 variant distribution for a sample of cases that have been sequenced, United Kingdom, January – July 2021

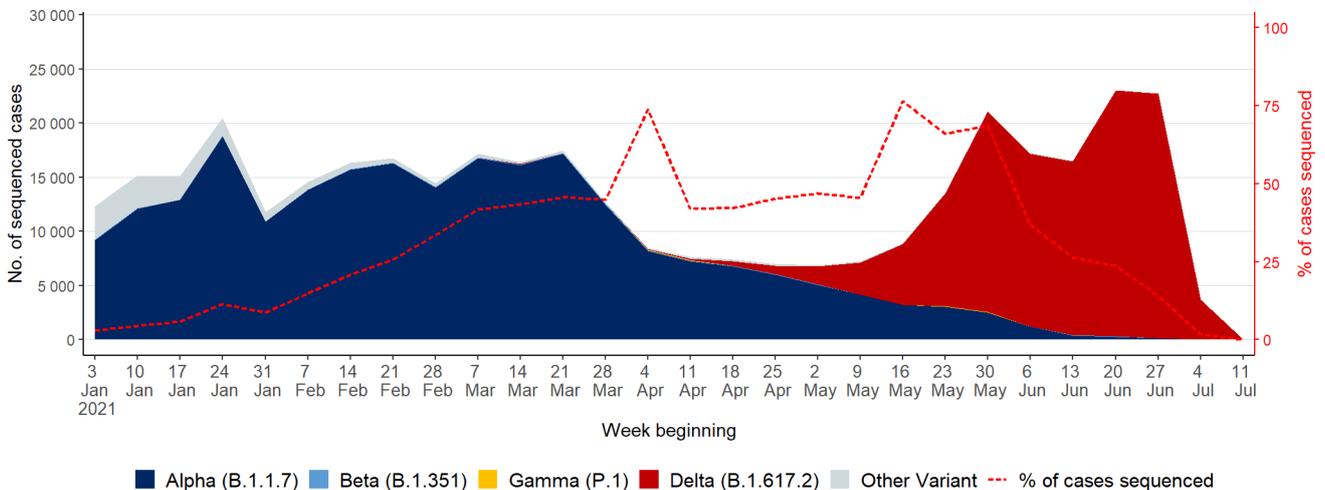


Figure 5a. COVID-19 cases and vaccinations, United States, January – July 2021

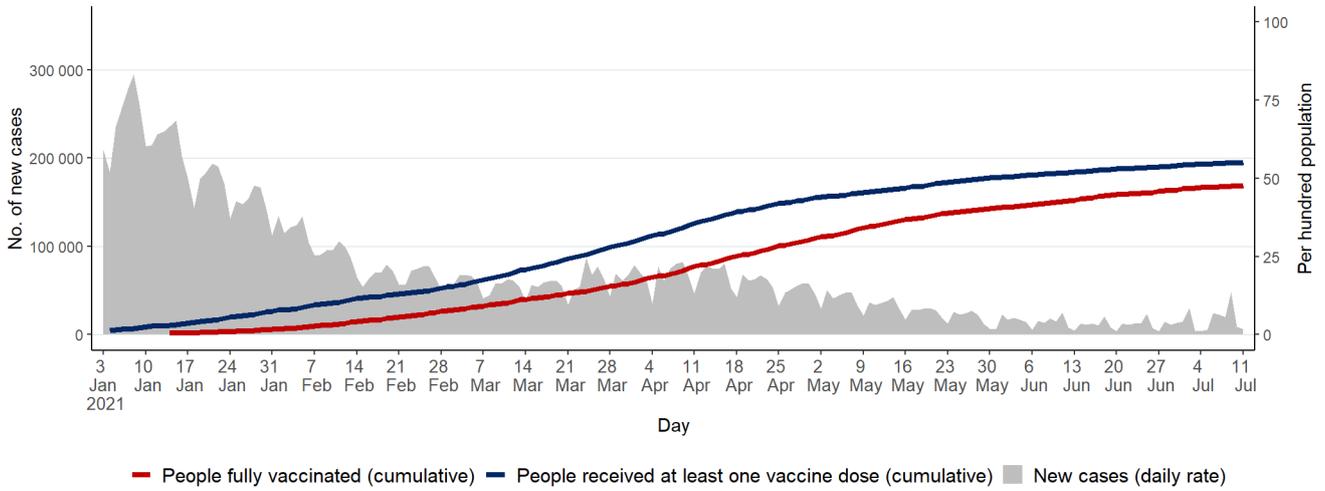


Figure 5b. COVID-19 hospitalisation and mortality rates, United States, January – July 2021

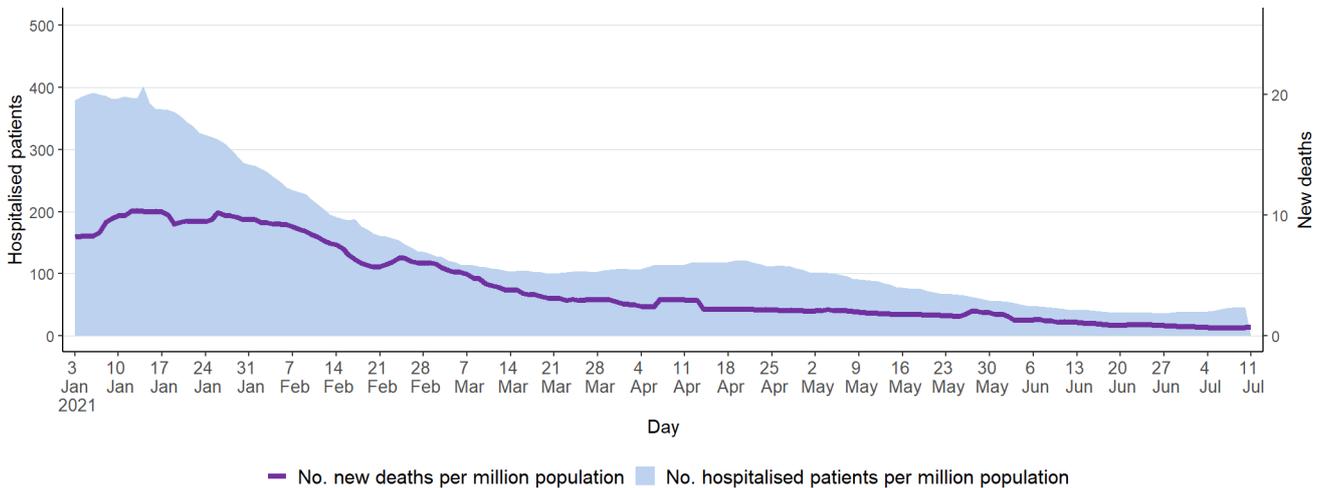


Figure 5c. COVID-19 variant distribution for a sample of cases that have been sequenced, United States, January – July 2021

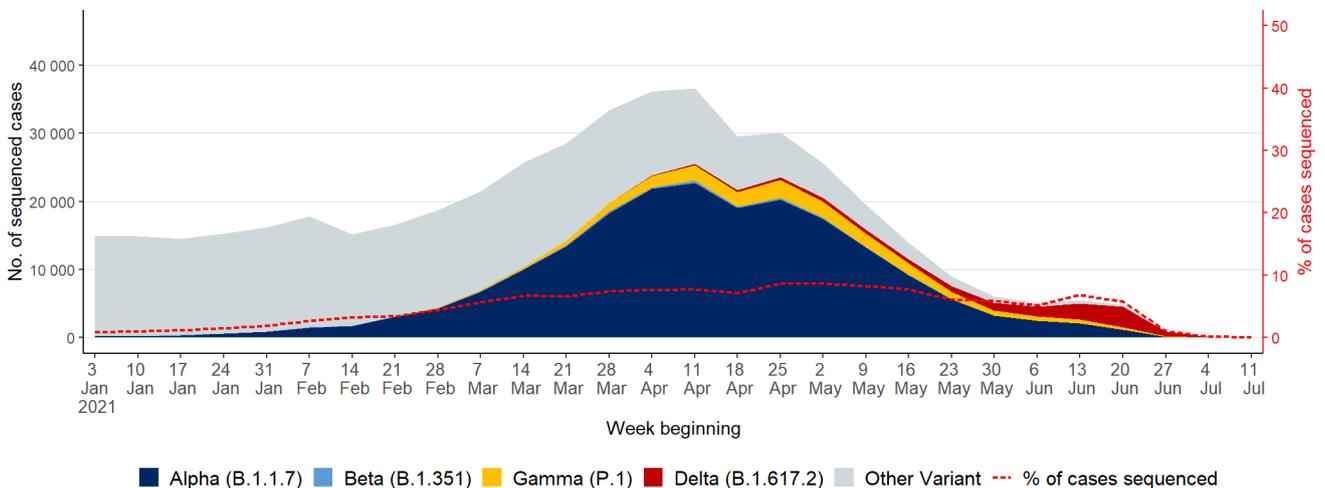


Figure 6a. COVID-19 cases and vaccinations, Canada, January – July 2021

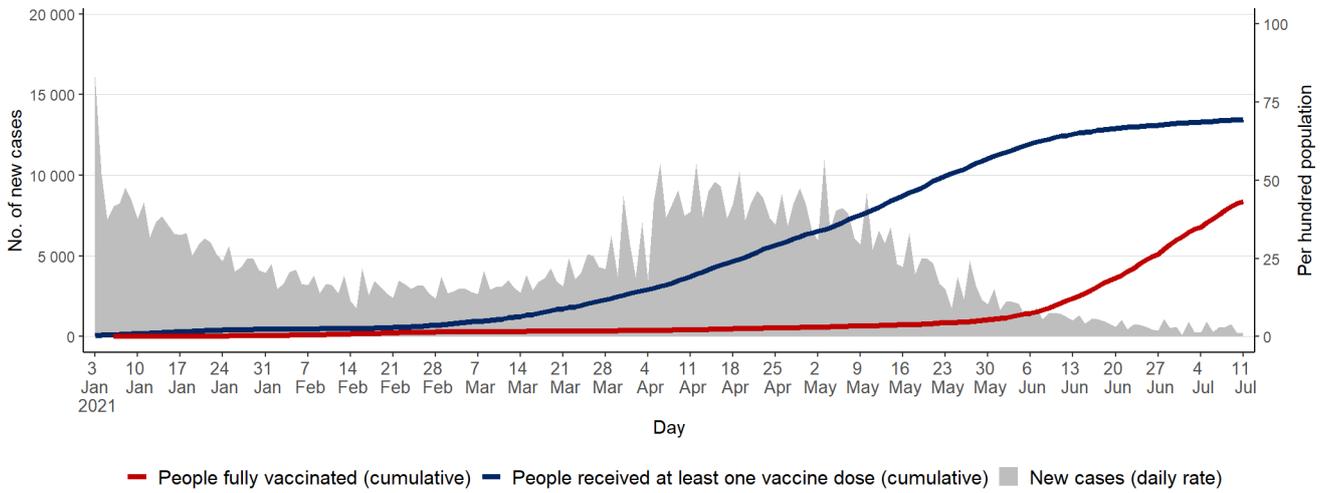


Figure 6b. COVID-19 hospitalisation and mortality rates, Canada, January – July 2021

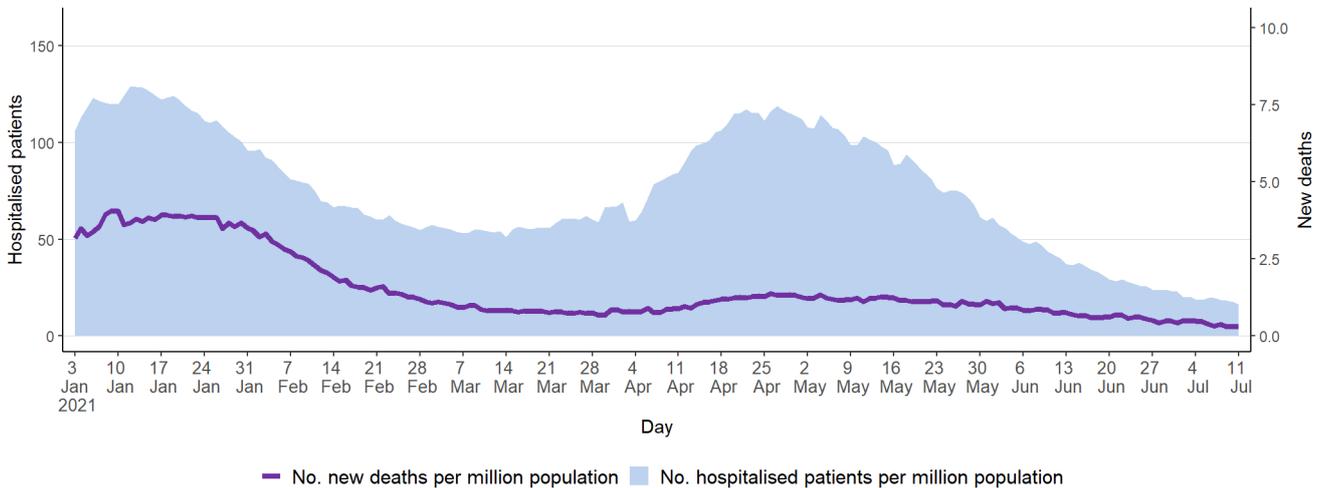


Figure 6c. COVID-19 variant distribution for a sample of cases that have been sequenced, Canada, January – July 2021

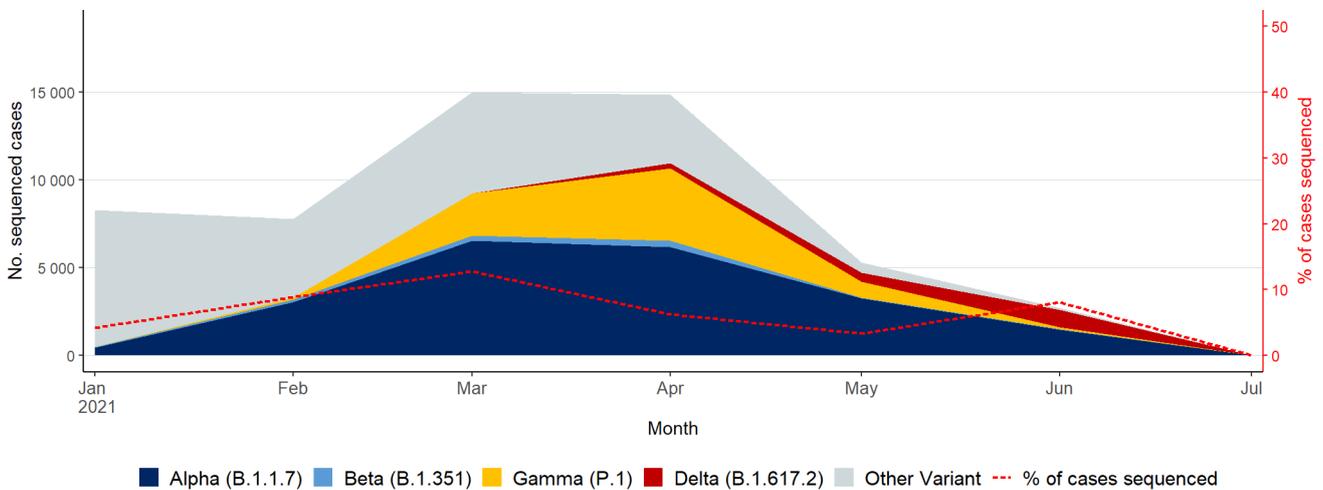


Figure 7a. COVID-19 cases and vaccinations, Israel, January – July 2021

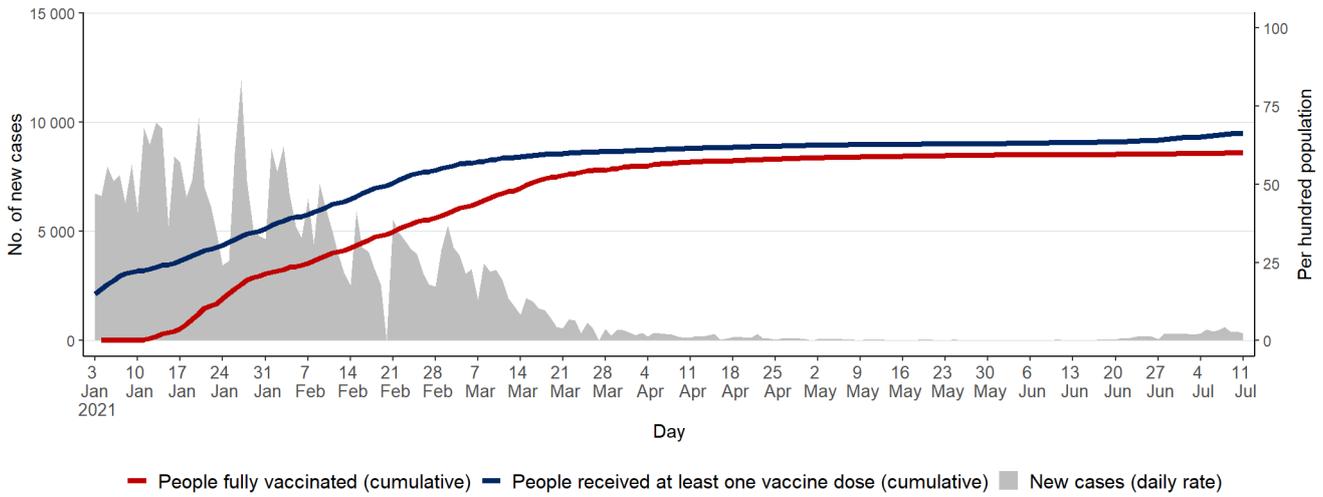


Figure 7b. COVID-19 hospitalisation and mortality rates, Israel, January – July 2021

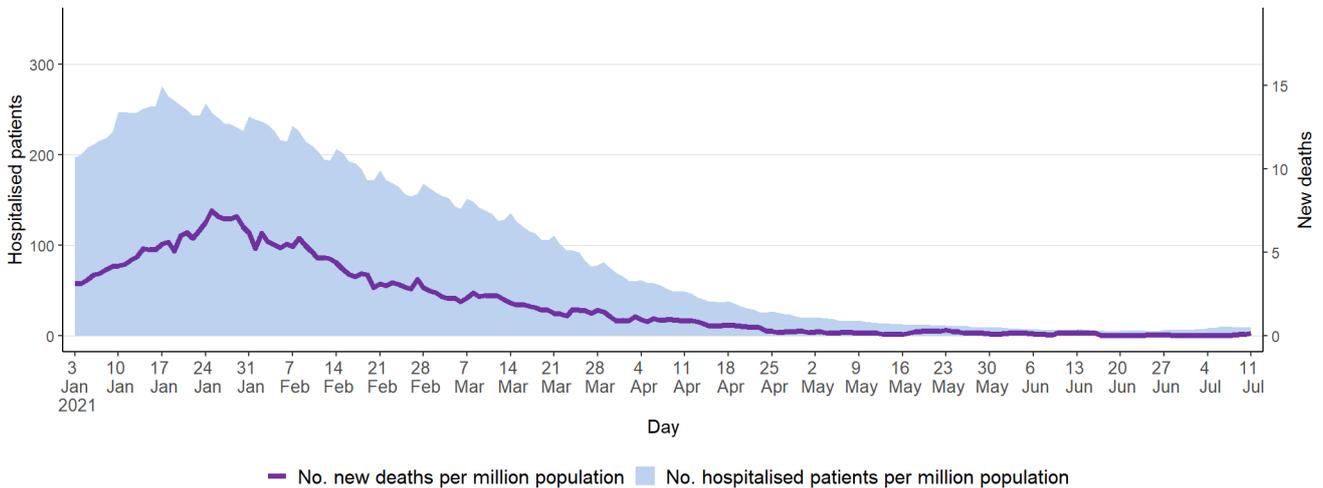
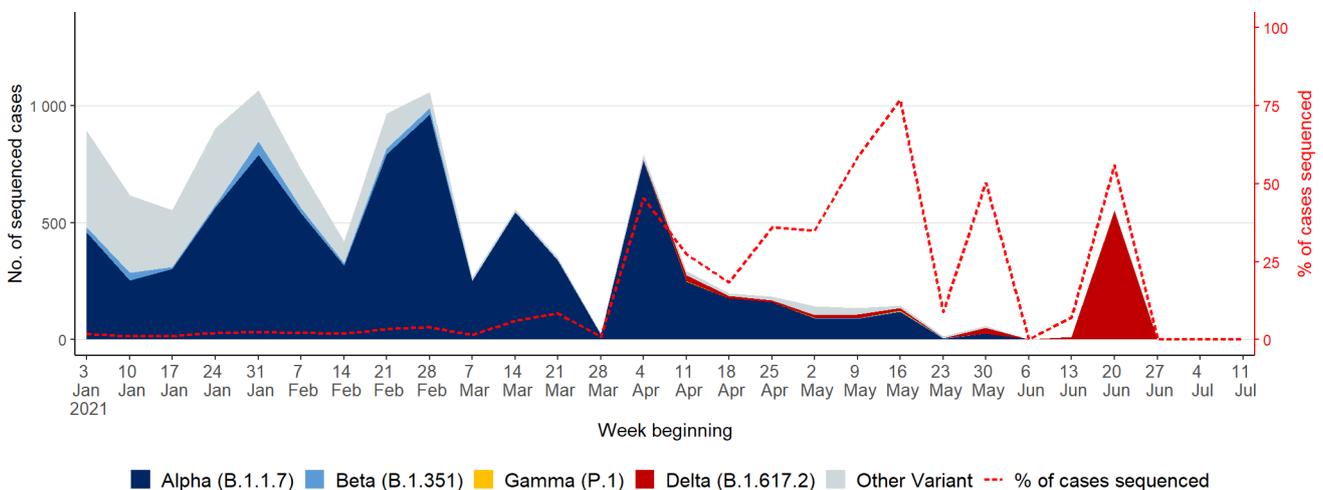


Figure 7c. COVID-19 variant distribution for a sample of cases that have been sequenced, Israel, January – July 2021



Notes:

- With regards to the above figures on COVID-19 variants, all SARS-CoV-2 sequences were downloaded from the [GISAID EpiCOV™ Database](#). PANGO lineage (variant) classification for each individual sequence was provided by GISAID.(18)
- Dates displayed are based on the sample collection date. Sequences with collection dates specifying the year only were excluded, while collection dates specifying the year and month were assigned to the 15th of that month.
- Sequences with lengths $\leq 20,000$ base pairs were removed from the analysis as were non-human hosts.
- Only a non-random sample of cases are sequenced and for many countries the proportion of cases sequenced is very low. As a result, this report does not indicate the true prevalence of the variants but rather a best estimate currently available.
- All data used to generate these graphs is subject to the GISAID [terms and conditions](#).(19)

Sources:

- Data on variants enabled by [GISAID](#). Accessed 13 July 2021.(18)
- Data on total number of cases and vaccinations sourced from [Our World in Data](#); accessed 13 July 2021.(20)
- Data on number of hospitalisations and new deaths for the United Kingdom, the United States, Canada and Israel sourced from [Our World in Data](#); Data on number of hospitalisations and new deaths for Australia sourced from Australian State and Territory Government Health Departments; accessed 13 July 2021.(20)

Method

The NSW Health Critical Intelligence Unit maintains living evidence tables on [COVID-19 vaccines](#) and [SARS-CoV-2 variants](#). To inform this brief, a review of the evidence included in the living tables was undertaken on 27 April 2021 and updated on 30 June 2021. Supplementary Google searches using the terms COVID-19 vaccines, surges and variants were also undertaken.

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