Trends and Insights Report

Updated 16 September 2022

Purpose of report

This report comments on trends in the New Zealand COVID-19 outbreak, including cases, hospitalisations and mortality. It also comments on international COVID-19 trends and the latest scientific insights related to outbreak management. The report relies on data that may be subject to change or are incomplete. An unknown proportion of infections are not reported as cases, this proportion may differ by characteristics such as ethnic or deprivation group. Therefore, any differences in reported case rates must be interpreted with caution.

Executive Summary

Overall, all key measures of the outbreak have been declining for the last two and a half months. Trends are tracking to levels seen in late February 2022. Reported case rates have continued to decrease nationally. Wastewater levels also continue to decline. The numbers of those who have been hospitalised and who have died have also continue to decrease.

BA.5 is the dominant subvariant accounting for an estimated 86% of cases; this is consistent with wastewater findings. In the two weeks to 02 September, variants BA.5, BA.4, BA.2, BA.4.6 and BA2.75 were detected in community samples. While we may see one of these sub-variants slowly predominate over the next few months, they are not expected to cause a distinct wave.

Modelling conducted for the update of epidemic notice and changes in public health measures indicated a high level of uncertainty from the effect of changes. In general, the short-term peak in cases and hospitalisations can be mitigated by phasing policy changes over a longer period of time. Easy access to testing and encouraging use of testing will also support mitigation of negative outcomes in the long term.

Over the next couple of weeks, it is probable that cases, hospitalisations and mortality will continue to decrease at a slower rate. However, as immunity decreases over time or if a substantially more transmissible variant emerges, there may be fluctuations in case rates in the future.

Key insights

National Trends

Cases	The 7-day rolling average of reported case rates was 29.8 per 100,000 population for the week ending 11 September. This was a 16.8% decrease from the previous week, which was 35.8 per 100,000.
Wastewater	Wastewater quantification indicates a decreasing trend nationally.
Hospitalisations	The COVID-19 hospital admissions rate has been decreasing since the mid-July 7-day rolling average peak of 2.5 per 100,000, to a 7-day rolling average of 0.9 per 100,000 at 04 September.
Mortality	As of 11 September, there were 1,950 deaths attributed to COVID-19. The number of deaths attributed to COVID-19 appears to be continuing with a decreasing trend.
Variants of Concern	BA.5 makes up 86% and BA.4 makes up 7% of sequenced community cases.
Border	In the week ending 28 August, 82% of air border arrivals uploaded a RAT. Test positivity decreased to 2.1%.

Māori

Cases	The 7-day rolling average of reported case rates was 24.3 per 100,000 population at 11 September, lower than for European or Other, however there may be case ascertainment biases.
Hospitalisations	The age-standardised Māori hospitalisation rate for COVID-19 is 2.1 times higher than European or Other.
Mortality	The age-standardised cumulative mortality rate for Māori is 2.0 times higher than European or Other.

Pacific peoples

Cases	The 7-day rolling average of reported case rates was 22.9 per 100,000 population at 11 September; there is likely ascertainment bias, but also to note that this rate is not age adjusted.
Hospitalisations	Pacific peoples have the highest cumulative rate of hospitalisation with COVID-19 which is approximately 2.9 times higher than European or Other.
Mortality	Pacific peoples have the highest age-standardised cumulative mortality risk of any ethnicity, 2.6 times that of European or Other.

International Insights

Globally, in the week ending 11 September, the number of new weekly cases decreased by 28%, with over 3.1 million new cases reported. The number of new weekly deaths decreased by 22% compared to the previous week, with just under 11,000 fatalities reported.
Globally, from 12 August to 12 September 2022, 123,400 SARS-CoV-2 sequences were shared through GISAID, with Omicron accounting for 99.2% of sequences.

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Infection trends

Summary of evidence for infection and case ascertainment trends

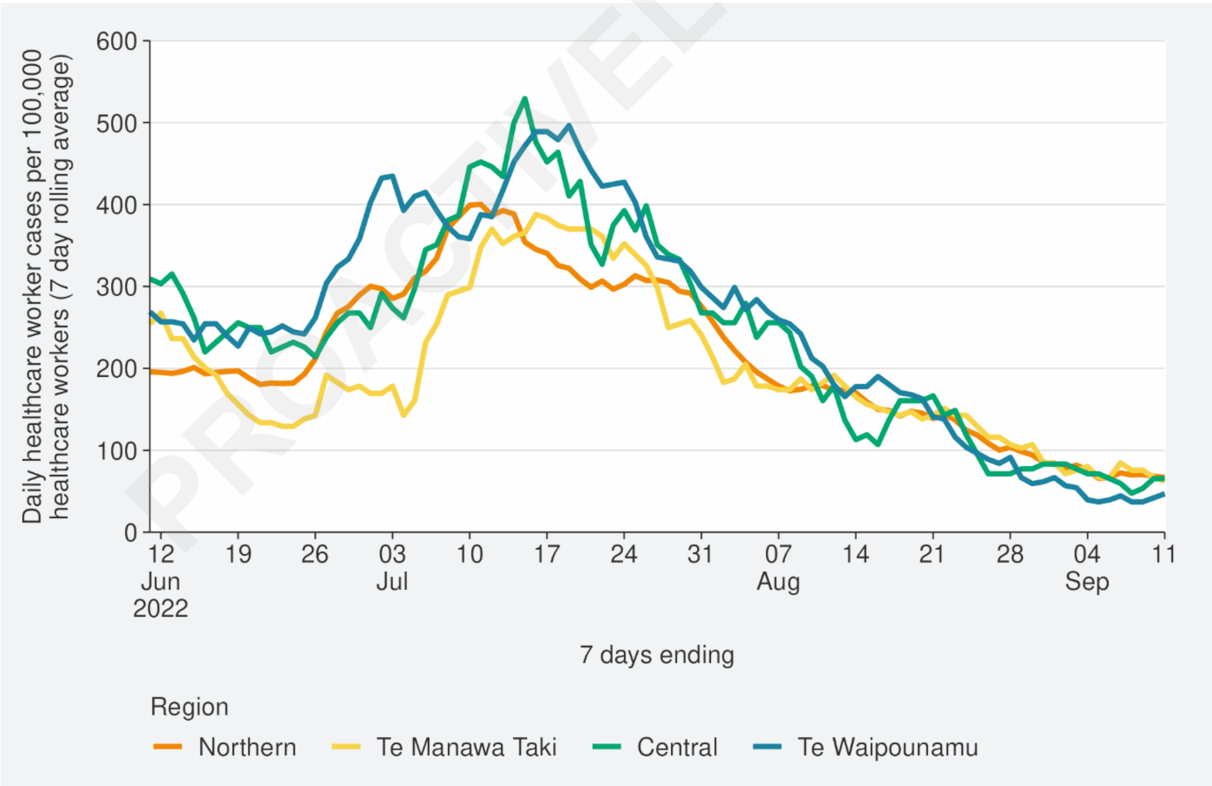
All evidence continues to support decline in incidence in the community: reported case rates in both healthcare workers and the general population have declined in the past two and a half months; inpatient COVID-19 test positivity at tertiary hospitals reduced during this period and levels of viral ribonucleic acid (RNA) in wastewater have also been declining in all regions for the past few weeks. The weekly healthcare workforce reported case rates in the week ending 11 September (63.2 per 100,000) remain higher than the general population (29.8 per 100,000).

Approximation of trends in underlying infection incidence

For the week ending 11 September, the national 7-day rolling average case rate for healthcare workers was 63.2 per 100,000 **(Figure 1**). All Districts experienced decreases in the past week, the highest rate was Northern (67.0 per 100,000), second was Central (65.4 per 100,000), then Te Manawa Taki (62.4 per 100,000), and lowest was Te Waipounamu (46.9 per 100,000).

The healthcare work force is not representative of the general population, however, they are required to routinely test and report infection, so their trends in reported cases are more likely to reflect their underlying infection incidence.

Figure 1: Regional reported 7-day rolling average case rates of health care workers for weeks 12 June – 11 September 2022

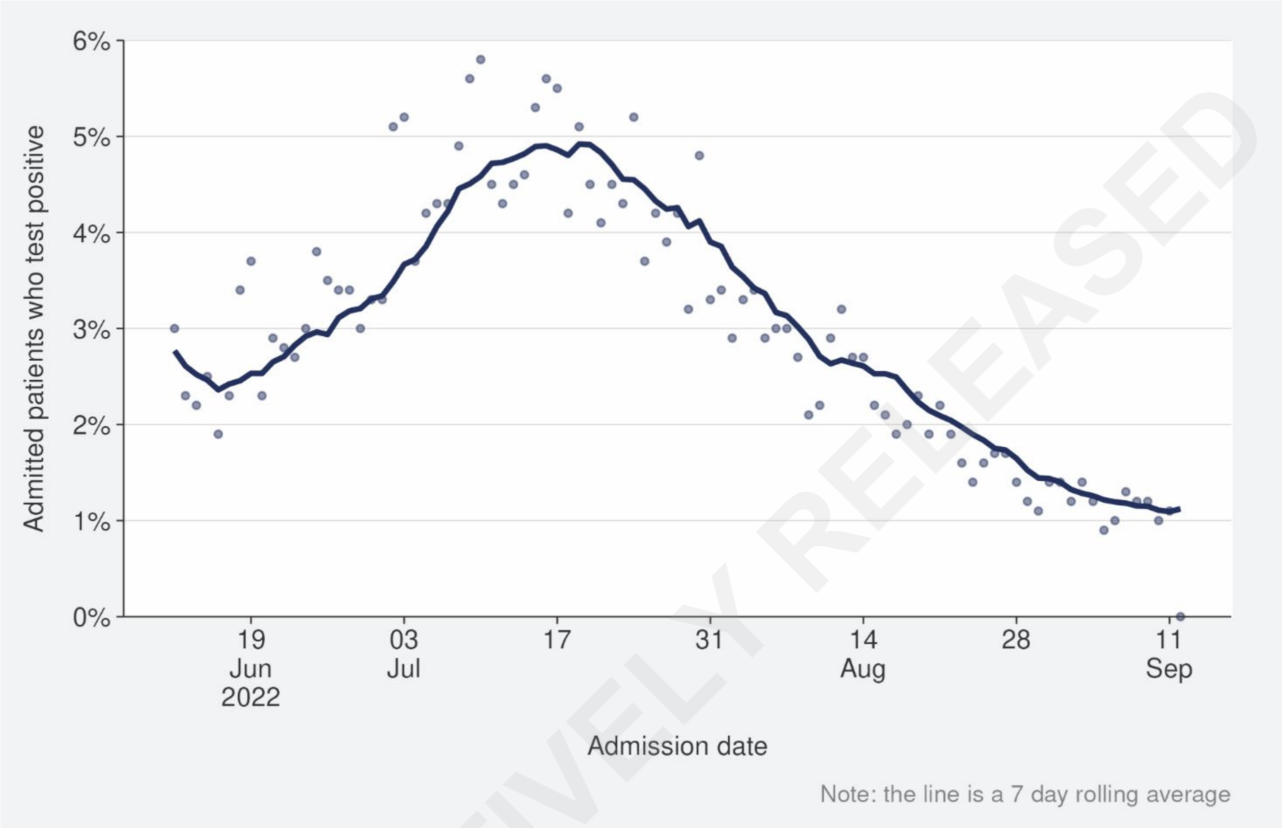


Source: Éclair/Episurv, 2359hrs 11 September 2022

Test positivity trends among tertiary hospital admissions

Inpatient test positivity trends for tertiary hospital admissions[1] is shown in **Figure 2.** Tertiary hospital admission positivity is steadily declining with a 7-day rolling average[2] of 1.1% for the week ending 11 September.

Figure 2: Percent of tests positive among tertiary hospital admissions.



Source: Tertiary hospitalisation data, NCTS and EpiSurv as at 2359hrs 11 September 2022

[1] These are hospital admissions who had COVID at the time of admission or while in hospital. These data are from Districts with tertiary hospitals; these Districts are Auckland, Canterbury, Southern, Counties Manukau, Waikato, Capital and Coast, Waitematā, and Northland.

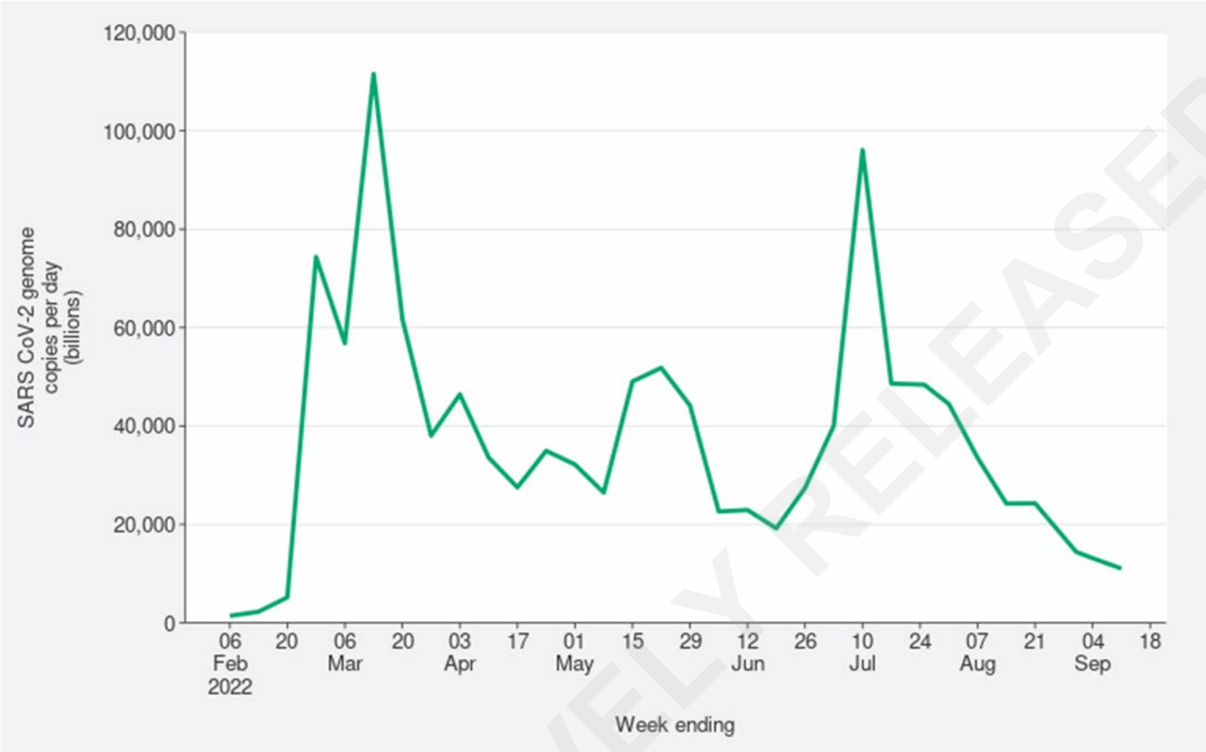
[2] A 7-day rolling average is an average of the daily values over the past seven days inclusive. This report uses both 7-day rolling averages and weekly rates; these differ in that the 7-day rolling average rate is on a daily scale and the weekly rate is on a weekly scale – hence, weekly rates are higher as they cover a longer time period.

Wastewater quantification

Figure 3 provides an overview of wastewater results nationally. Note that wastewater levels cannot be used to predict numbers of cases reliably as yet, but does indicate trends in the underlying infection rates.

Wastewater quantification indicates a decreasing trend nationally.

Figure 3: National weekly wastewater trends in SARS-CoV-2 genome copies per day



Source: ESR SARS-CoV-2 in wastewater update for week ending 11 September 2022

Modelled and observed trends in reported cases

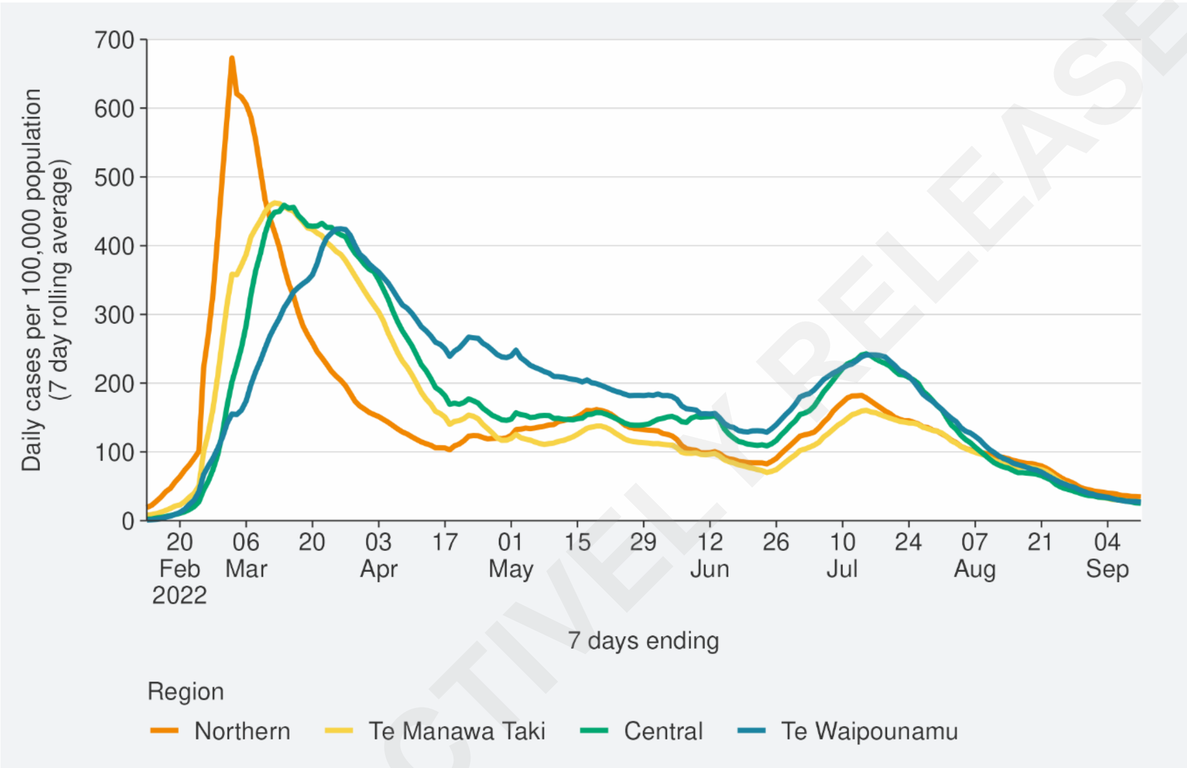
This section has been removed for this week as modelling scenarios are being currently updated.

Regional trends in reported cases

Figure 4 shows that case rates have decreased across all regions in the past week. The 7-day rolling average rate of reported cases for the Northern region (34.7 per 100,000) decreased by 13.6% in the past week, Te Manawa Taki (27.8 per 100,000) decreased by 14.4%, Central region (25.3 per 100,000) decreased by 22.0% and Te Waipounamu (27.2 per 100,000) decreased by 19.9%.

All Districts experienced decreases, between 1.9% and 38.1%, except in the Nelson Marlborough District where cases increased 4.6% in the past week. The highest rate was in the Waitemata District (38.4 per 100,000) and the lowest rate was in the Hawke's Bay District (16.3 per 100,000).

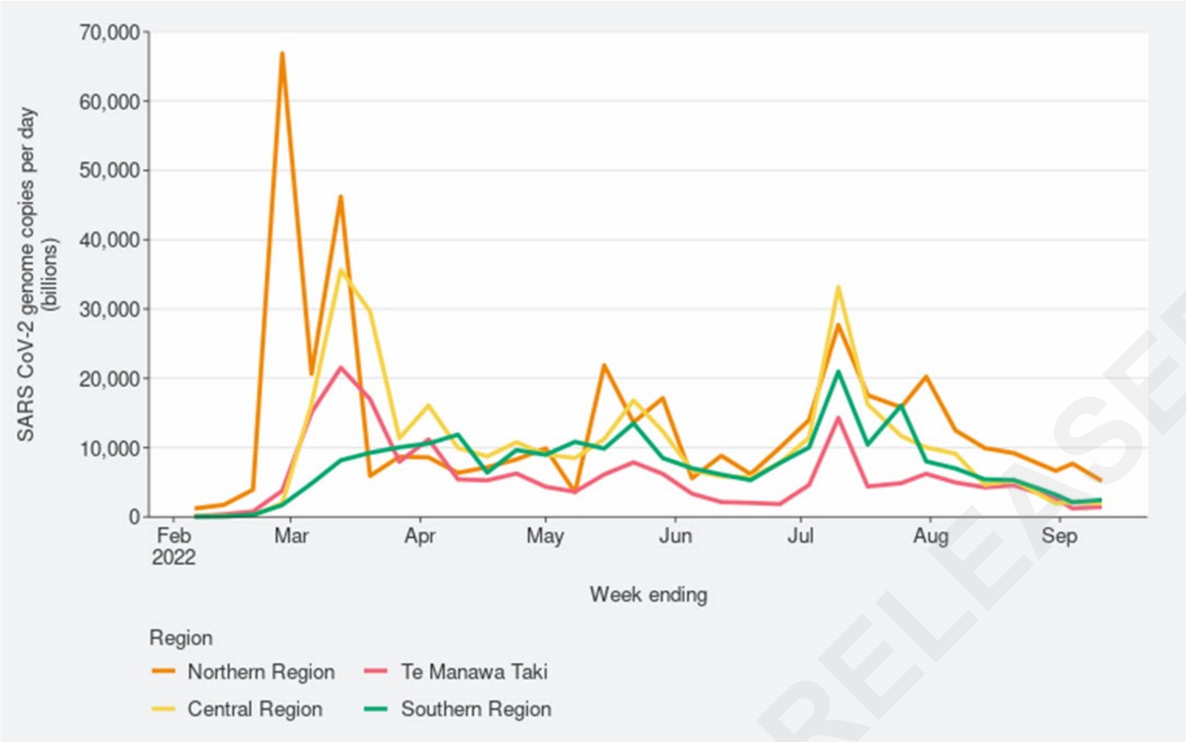
Figure 4: Regional 7-day rolling average of reported case rates from February to 11 September 2022



Source: NCTS/EpiSurv as at 2359hrs 11 September 2022

Figure 5 shows that regional wastewater trends are plateauing in all regions, except Northern.

Figure 5: Regional weekly wastewater trends in SARS-CoV-2 genome copies per day



Source: ESR SARS-CoV-2 in wastewater update for week ending 11 September 2022

Reinfection

Analysis and interpretation of reinfection data are being developed.

It is important to note that these data come with several significant limitations: (1) Reinfections can only be identified if the previous infection was also reported. (2) Guidance on when to test after first infection was changed on June 30 prior to which the guidance was not to test until 90 days after first infection. This is now 28 days and, consequently, early reinfections were under-reported prior to June 30. (3) Those who have already had a first infection may be less likely to test during their second infection. (4) Reinfections are possibly more likely to be mild or asymptomatic.

Demographic trends in reported case rates

Since February 2022, the majority of testing has been through self-administered rapid antigen tests (RATs) which also require the individual to self-report their results. Therefore, it is likely that many infections are not detected or reported, and the proportion of infections reported ('reported cases') may differ by age, ethnic and/or deprivation group. For example, there is evidence that not knowing where to report RAT results, financial issues from having to isolate, inability to take time off work and not having a place to isolate safely impact registering of a positive test. [3] These issues could be more substantial for certain groups in society, especially those with lower socio-economic status, and so trends in reported cases are not a true reflection of differences in the underlying infection rates by deprivation level.

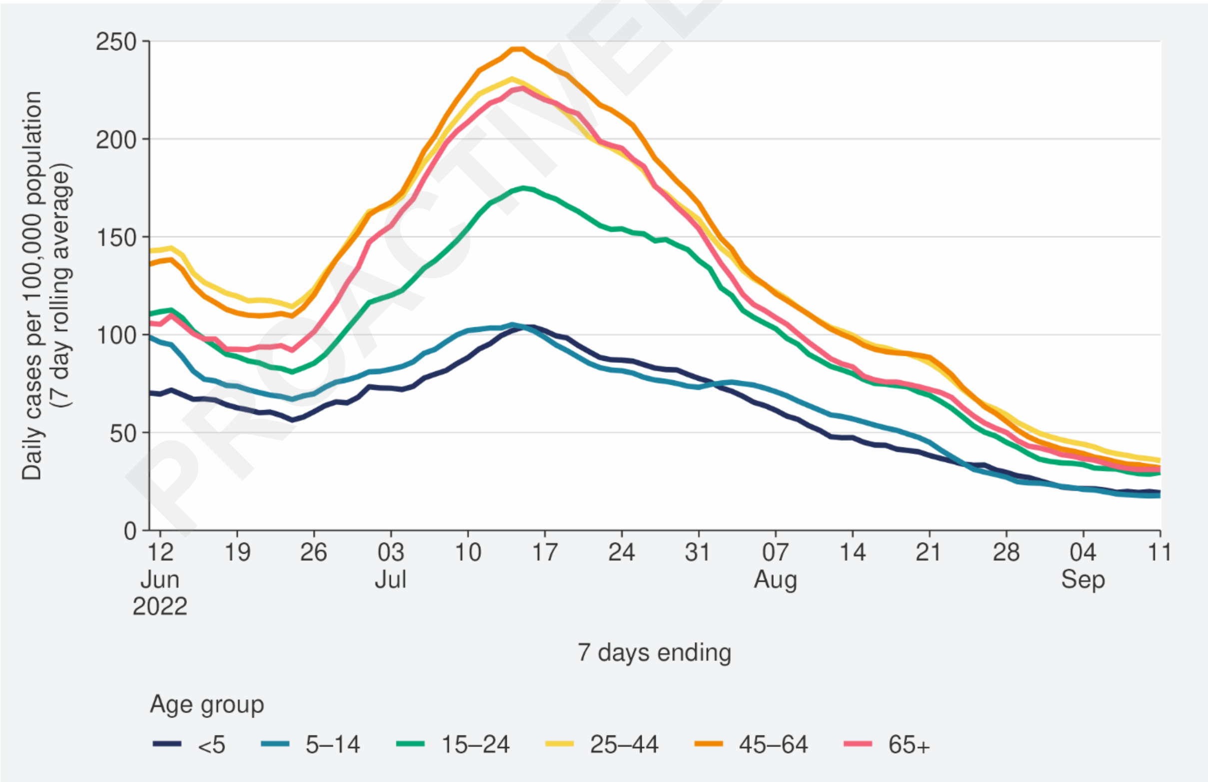
This means any difference in reported case rates must be cautiously interpreted.

Age trends over time

Figure 6 shows the 7-day rolling average rate for reported cases by age.

Reported case rates have decreased across all age groups in the past week. Rates in the 65+ age group, those most at risk of poor health outcomes after infection, decreased 15% from the previous week to 31.1 per 100,000 in the week ending 11 September. Among the other age groups, rates in the past week were lowest in the <5 and 5-14 age groups (19.3 and 17.8 per 100,000, respectively). The rate for the 15-24 age group was 29.6 per 100,000. The 25-44 and 45-64 age groups had the highest rates, (35.6 and 31.9 per 100,000, respectively).

Figure 6: National reported case rates (7-day rolling average) by age for weeks 12 June – 11 September 2022



Source: NCTS/EpiSurv as at 2359hrs 11 September 2022

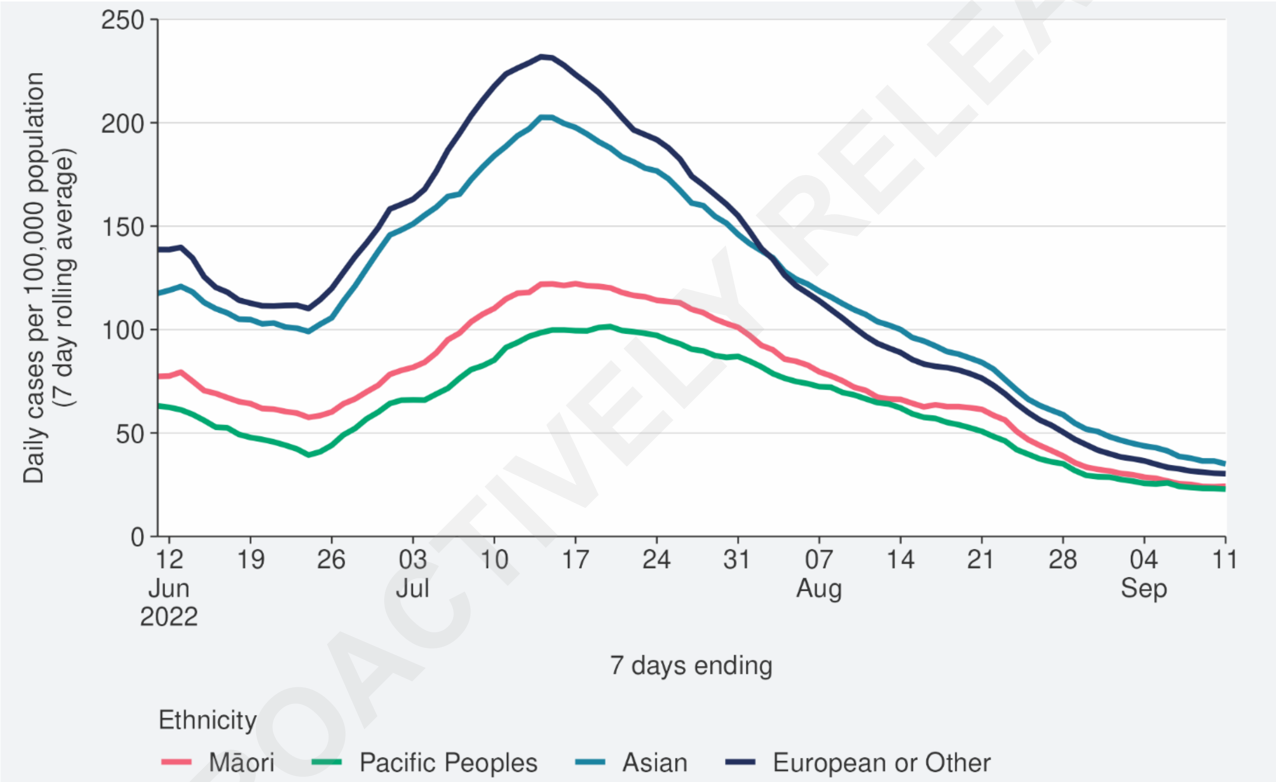
[3] Information available on request

Ethnicity trends over time, by region and by age group

Figure 7 shows the national 7-day rolling average rate of reported cases by ethnicity.

In the past week, reported case rates decreased for all ethnicities. The largest decrease was seen in Asian peoples (19.8%) and the smallest decrease was seen in Pasific peoples (10.8%). Rates in Asian (35.1 per 100,000) and European or Other (30.3 per 100,000) ethnicities remained higher than those for Māori (24.3 per 100,000) and Pacific peoples (22.9 per 100,000). The differences in reported rates by ethnicity were greatest during the most recent peak, but these differences have been reducing since late July. It should be noted that these rates were not adjusted for the differing age structures in the communities, refer to **Figure 9** for age-stratified rates.

Figure 7: National 7-day rolling average of reported daily case rates by ethnicity for weeks 12 June – 11 September 2022

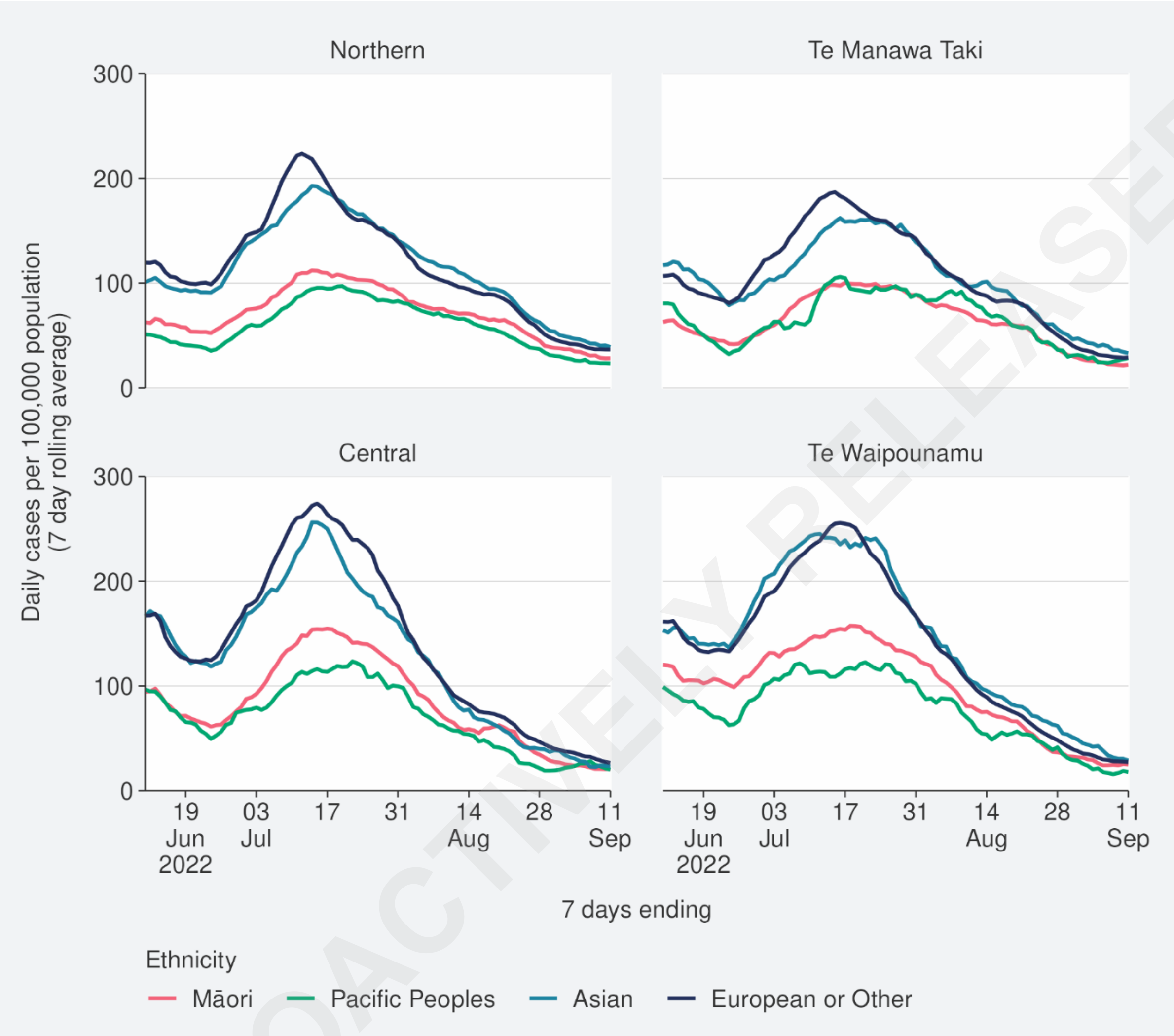


Source: NCTS/EpiSurv as at 2359hrs 11 September 2022

Figure 8 shows the regional 7-day rolling average rate of reported cases by ethnicity.

Trends in all regions continue to decrease. Rates were highest in Asian and European or Other ethnicities, and rates decreased across all ethnicities and regions, between 2% and 31.7%, in the past week.

Figure 8: Regional 7-day rolling average of reported daily case rates by ethnicity for weeks 12 June – 11 September 2022



Source: NCTS/EpiSurv as at 2359hrs 11 September 2022

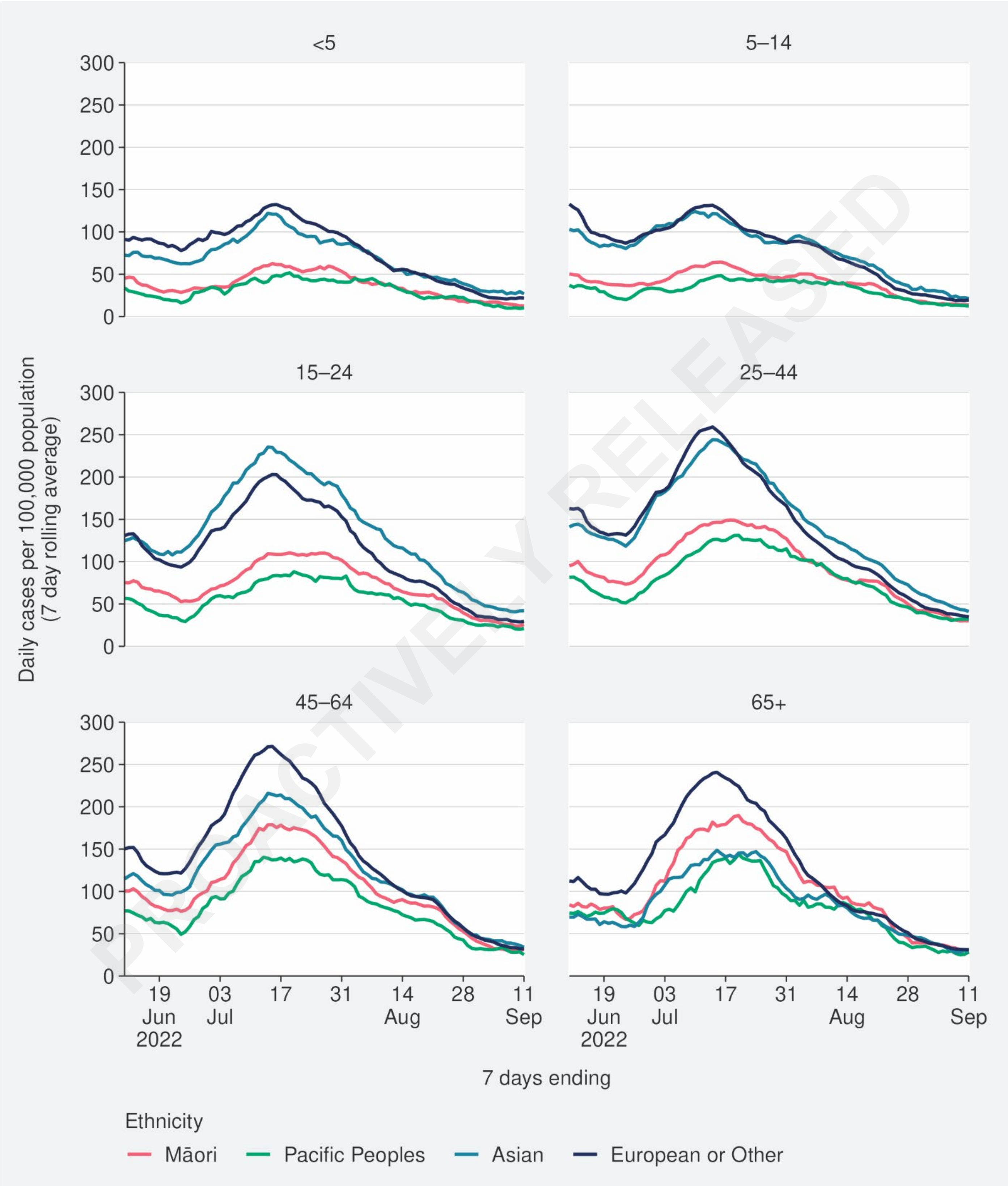
Figure 9 shows national 7-day rolling average rate of reported cases by ethnicity and age group.

In all age groups, trends were similar across all ethnicities: all rates decreased, between 0.9% and 27.8%, except for the 65+ age group; in Pacific peoples, which increased by 2%. The rate in Asian people aged 15-24 (42.1 per 100,000) was notably higher than all other ethnicities in this age group; with other ethnicities ranging between 20.9 and 29.4 per 100,000. The highest reported rate for any age group was also among Asian people (42.1 per 100,000 in 15-24 years olds). The lowest reported case rates were in Pacific peoples aged <5 (10.3 per 100,000).

In 65+ age groups, the highest rate was in European or Other ethnicities at 31.1 per 100,000; followed by Māori at 30.9 per 100,000; the second lowest was in Asian peoples at 29.4 per 100,000 and the lowest was in Pacific peoples at 28.4 per 100,000.

As Māori and Pacific peoples have lower life expectancies than other ethnicities in Aotearoa New Zealand, they are likely to have a higher risk for COVID-19 complications at a younger age than other ethnicities.

Figure 9: National ethnicity-specific 7-day rolling average of reported case rates by age group for weeks 12 June – 11 September 2022



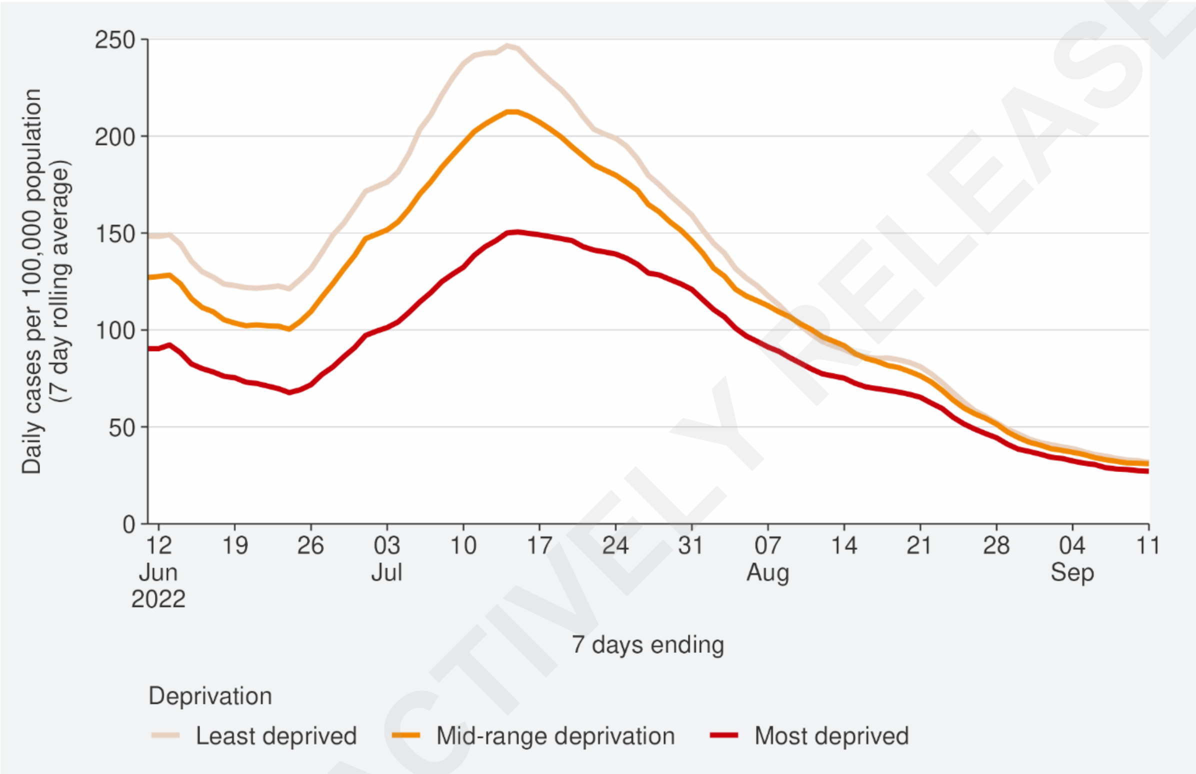
Source: NCTS/EpiSurv as at 2359hrs 11 September 2022

Deprivation trends over time

Figure 10 shows the 7-day rolling average for reported case rates by residential area deprivation level (based on NZDep2018[4]).[5]

Reported case rates have been highest in the least deprived areas for the past few months, but have converged to similar rates since late July. Rates for all deprivation levels have continued to decrease; the 7-day rolling average to 11 September was highest in areas of least and mid-range deprivation (31.7 and 31.0 per 100,000 population respectively), followed by most deprived areas (27.1 per 100,000).

Figure 10: National reported 7-day rolling average COVID-19 case rates by deprivation status for weeks 12 June – 11 September 2022



Source: NCTS/EpiSurv as at 2359hrs 11 September 2022

[4] Atkinson J, Salmond C, Crampton P (2019). NZDep2018 Index of Deprivation, Final Research Report, December 2020. Wellington: University of Otago

[5] Areas of high deprivation are ones where there is poor access to the internet, low incomes, higher number of welfare recipients, increased unemployment, single parent families and higher prevalence of people living in rented accommodation and/or in homes that are overcrowded and damp.

Trends in hospitalisation

Risk of hospitalisation (and mortality) is strongly linked with increasing age; since mid-July there have been decreases in reported case rates in those aged over 60 years, after substantial increases in early July, particularly in those aged 80+. Reported case rates in over 65s continue to be lower in the past week than seen at any time since mid-March (**Figure 6**). Consequently, hospital occupancy and hospital admissions (**Figure 13**) have continued to decrease over the past month.

The occupancy data include all people who have COVID-19, these data do not take into account the reason for admission, which may not be "For" COVID-19 but for other reasons e.g., due to injury and incidentally also infected with SARS-CoV-2. Data on hospital admissions have been limited to admissions "For" COVID-19. Of those admitted to hospital with COVID-19, approximately 74.7% were "For" COVID-19 in the week ending 04 September. This proportion "For" COVID-19 is likely to reduce as more accurate data is made available. Therefore, in the past month the proportion "For" is likely to be slightly overestimated.

Modelled and observed trends in hospital occupancy

This section has been removed for this week as modelling scenarios are being currently updated.

Hospital admission trends over time, overall and by age-group

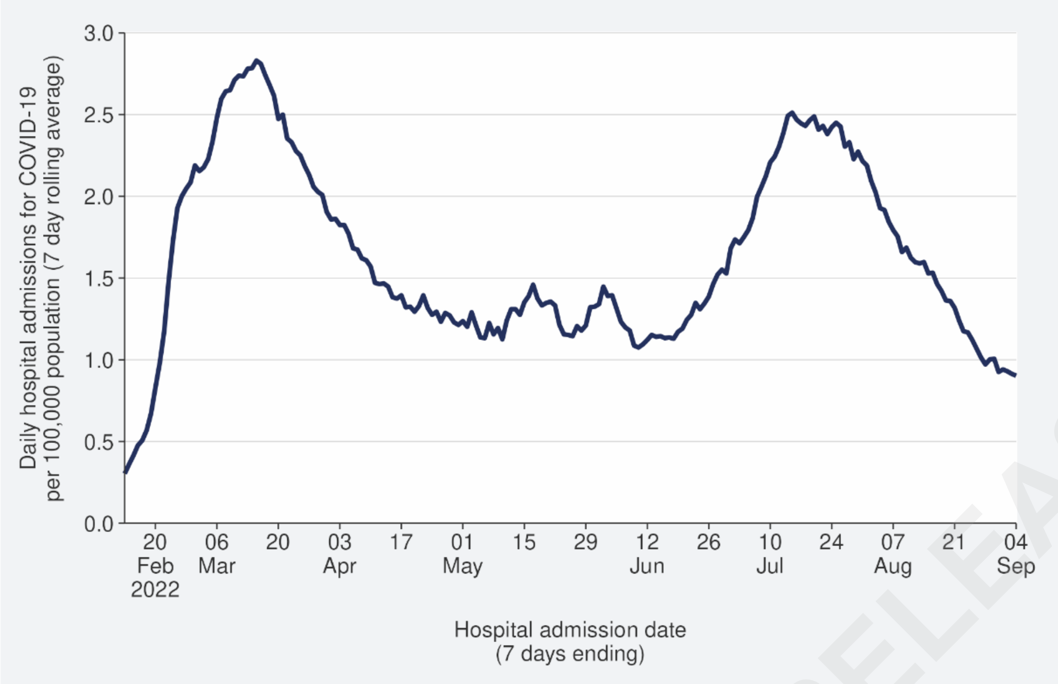
As seen in **Figure 11**, the COVID-19 hospital admissions rate "For" COVID-19[6] has been decreasing since mid-July, to a 7-day rolling average of 0.9 per 100,000 of population at 04 September.

Hospital admission rates by age group (**Figure 12**) were highest for those who are 80 years and older (8.8 per 100,000 population), followed by those who are 70-79 years old (2.9 per 100,000), those who are 60-69 years old (1.1 per 100,000) and were lowest for those who are <60 years old (0.4 per 100,000).

Admission rates among all age groups have continued to decline or remained stable.

[6]New hospital admissions who had COVID at the time of admission or while in hospital; excluding hospitalisations that were admitted and discharged within 24hrs. These data are from districts with tertiary hospitals, the districts are Auckland, Canterbury, Southern, Counties Manukau, Waikato, Capital and Coast, Waitematā and Northland.

Figure 11: COVID-19 hospital admissions[7] rate, 13 February to 04 September 2022

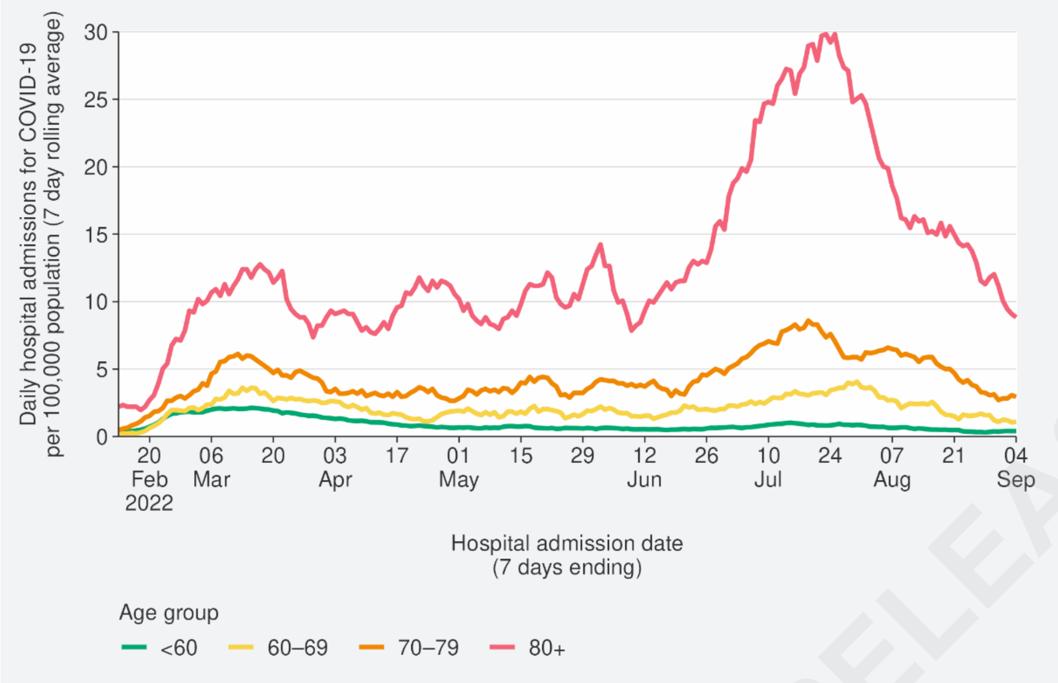


Source: NMDS/Inpatients admissions feed as of 05 September 2022 data up to 04 September 2022

[7] Hospital admission data comes from a combination of two data sources – the inpatient admission (IP) dataset (which only includes data from hospitals in certain districts) and the National Minimum Dataset (NMDS), which is a more comprehensive dataset, however, it is only available for two or more months after discharge. The IP records are provisional and overwritten by NMDS records as soon as the NMDS records become available. Please see Glossary for further details.

We can estimate the number of hospitalisations where COVID-19 could be the reason for the hospital admission. The 'For' measure excludes those who are identified as incidental. Recent trends are subject to revision. Please see glossary for further caveats. Coding of reasons for admission from the National Minimum dataset suggests that around 60% of people who were hospitalised with COVID-19 were hospitalised for a reason relating to their COVID-19 infection. These data are from districts with tertiary hospitals, the districts are Auckland, Canterbury, Southern, Counties Manukau, Waikato, Capital and Coast/Hutt, Waitematā and Northland.

Figure 12: Hospital admission rates by age group, 13 February to 04 September 2022



Source: NMDS/Inpatients admissions feed as of 12 September 2022 data up to 04 September 2022

Hospital admission trends by ethnicity and deprivation

Age is strongly associated with risk of hospitalisation with COVID-19, consequently it can mask other factors. Priority populations (Pacific peoples, Māori and those living in areas of high deprivation) that are at higher risk of experiencing poor health outcomes also tend to be systematically younger on average. Therefore, disparities in hospitalisation risk by ethnicity are more clearly observed after either stratifying by age group or adjusting (age-standardising[8]) for differences in age demographics.

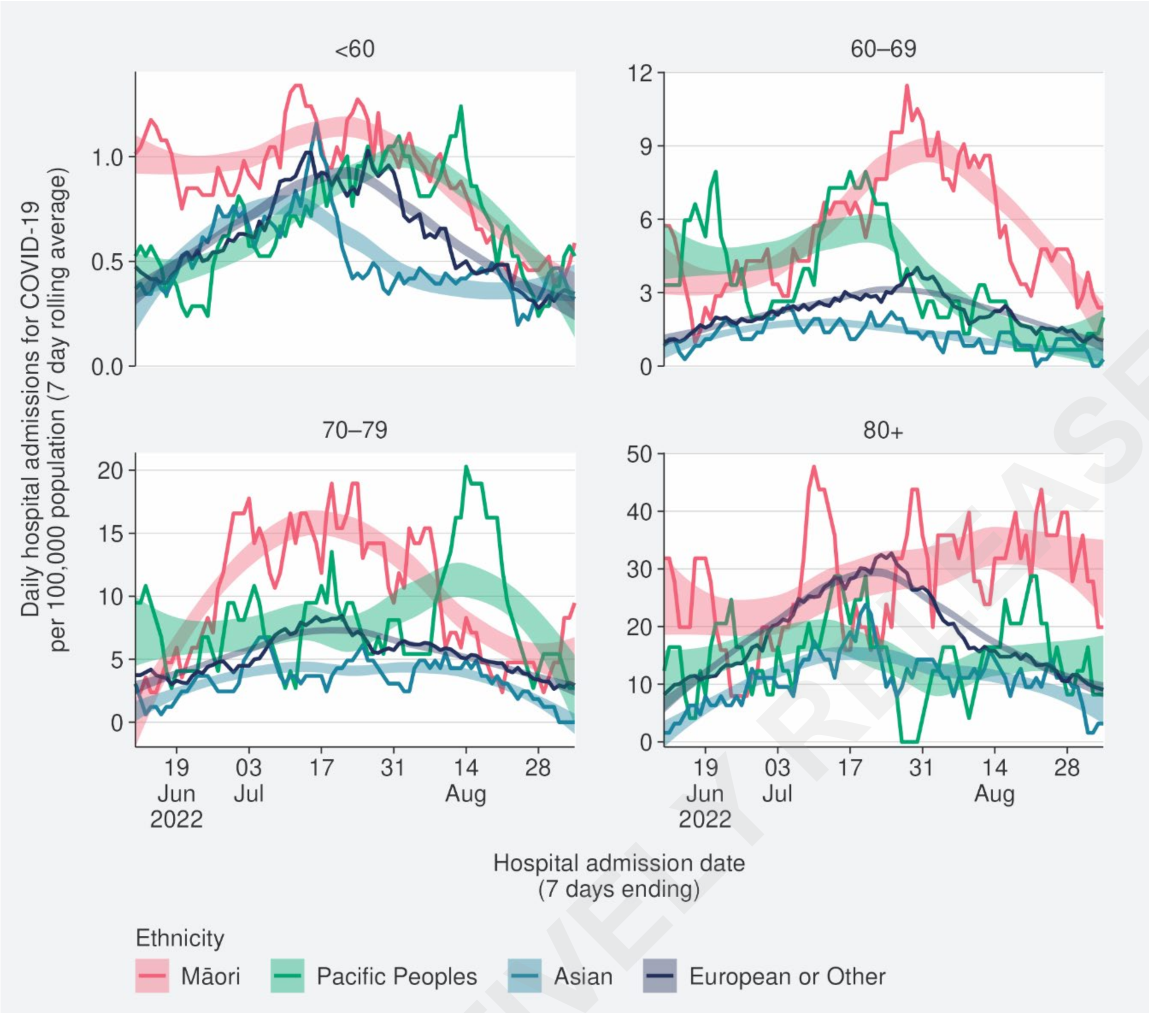
Figure 13 shows the 7-day rolling average for hospital admission rates stratified by age and ethnicity, per 100,000 population (note that the transparent bands are the result of Locally Weighted Scatterplot Smoothing (Loess)[9]; this creates a smooth trend line through the data points). During the late-July, early August peak in COVID-19 hospital admissions, rates in Māori were highest in most age groups; Pacific peoples were second highest for under 60, 60-69 and 70–79-year-olds. European or Other had the second highest rates in the 80 years and over and Asian people have consistently had the lowest rates across all age groups in that period.

Figure 14 shows the 7-day rolling average for hospital admission rates by age and deprivation, per 100,000. Consistently those in the highest deprivation have had the highest admission rates across time in all four age groups, and those in the lowest deprivation have had the lowest rates.

[8] An age-standardised rate is a weighted average of the age-specific rates per 100,000 persons, where the weights are the proportions of persons in the corresponding age groups of the Māori population.

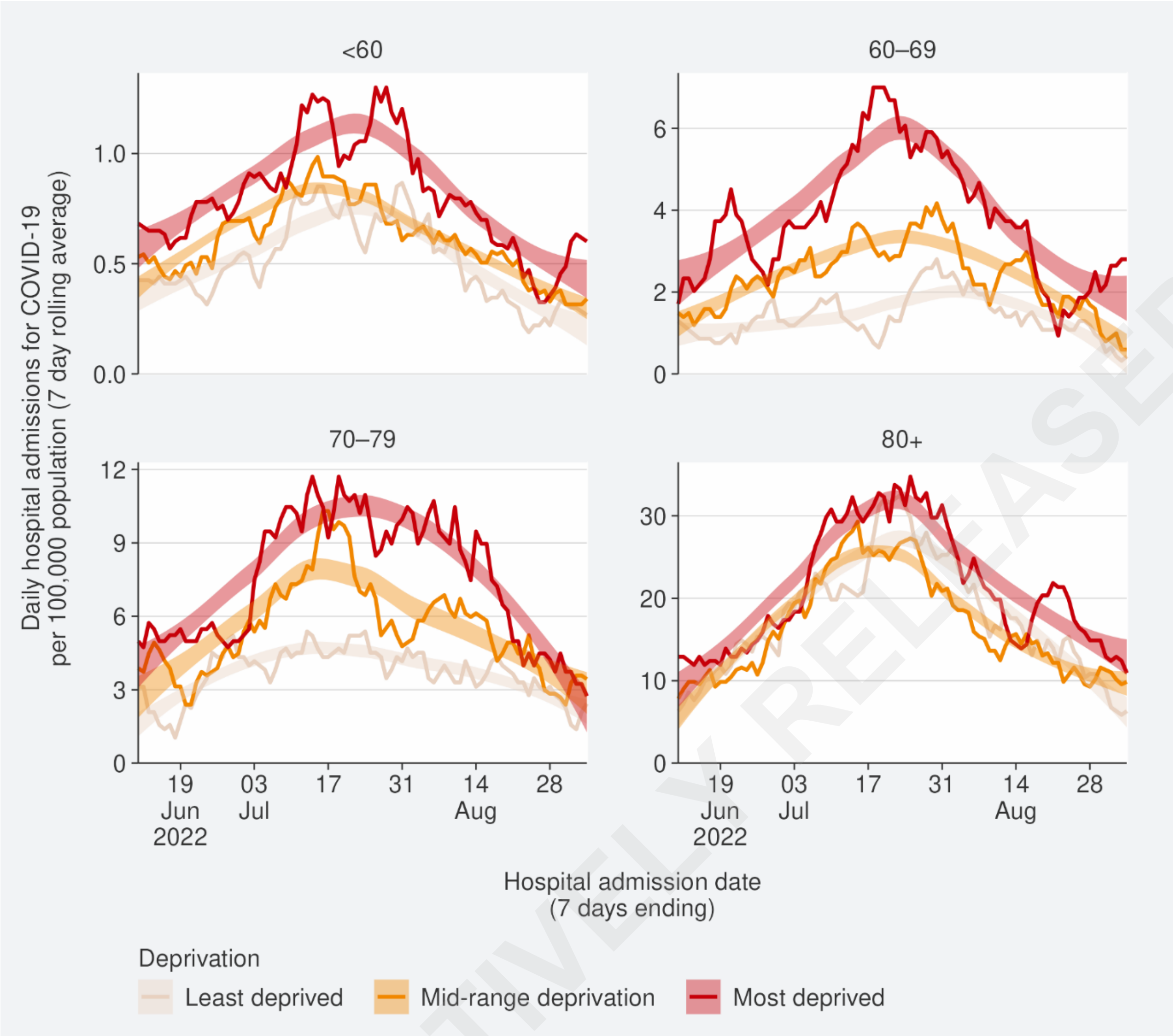
[9] http://r-statistics.co/Loess-Regression-With-R.html

Figure 13: Hospital admission rates for COVID-19 by age and ethnicity, 12 June to 04 September 2022



Source: NMDS/Inpatients admissions feed as of 12 September 2022 data up to 04 September 2022

Figure 14: Hospital admission rates by age and deprivation, 12 June to 04 September 2022

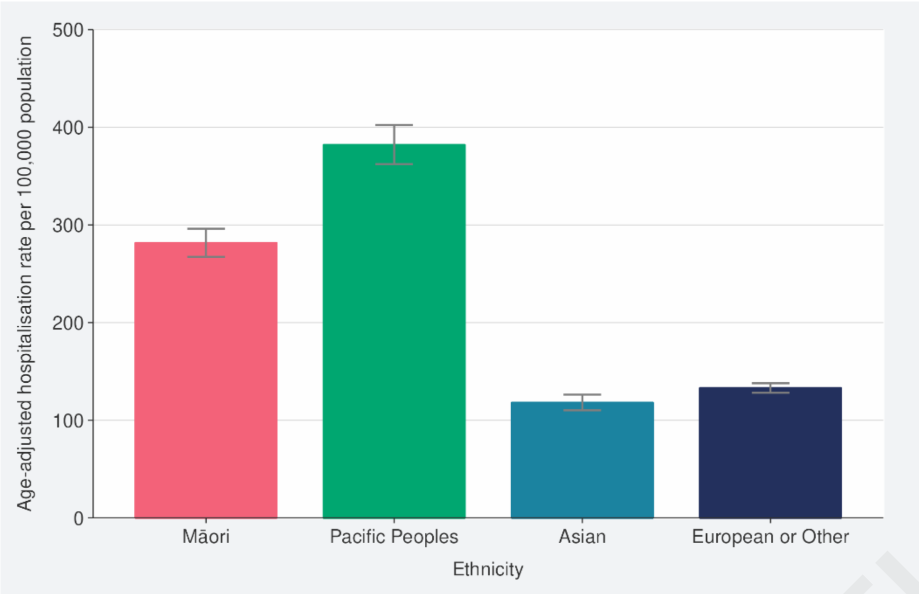


Source: NMDS/Inpatients admissions feed as of 12 September 2022 data up to 04 September 2022

Figure 15 shows age-standardised total rates of hospitalisation for COVID-19 by ethnicity for the time period of 01 January 2022 to 11 September 2022. Pacific peoples had the highest age-standardised rate, 2.9 times higher than European or Other. Māori had a rate 2.1 times higher than European or Other. There was no significant difference between the hospitalisation rates of Asian compared with European or Other.

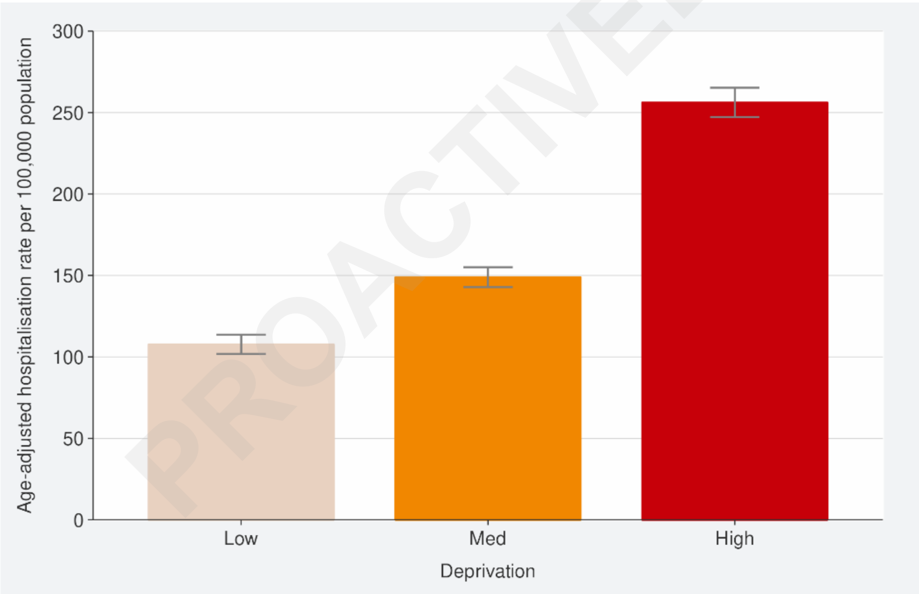
Figure 16 shows age-standardised total rates of hospitalisation for COVID-19 by deprivation level for the time period of 01 January 2022 to 11 September 2022. Those most deprived had the highest age-standardised rate of hospitalisation with COVID-19 (2.4 times that of the least deprived) followed by those of mid-range deprivation (1.4 times that of the least deprived).

Figure 15: Age-standardised[10] cumulative incidence (and 95% confidence intervals[11]) of hospitalisation for COVID-19 by ethnicity, 01 January 2022 to 11 September 2022



Source: NCTS/EpiSurv, NMDS, Inpatient Admissions dataset and CVIP population estimates, 01 January 2022 to 11 September 2022

Figure 16: Age-standardised cumulative incidence (and 95% confidence intervals) of hospitalisation for COVID-19 by deprivation, 01 January 2022 to 11 September 2022



Source: NCTS/EpiSurv, NMDS, Inpatient Admissions dataset and CVIP population estimates 01 January 2022 to 11 September 2022

[10] All age-standardized rates have been standardized to the Māori population structure.

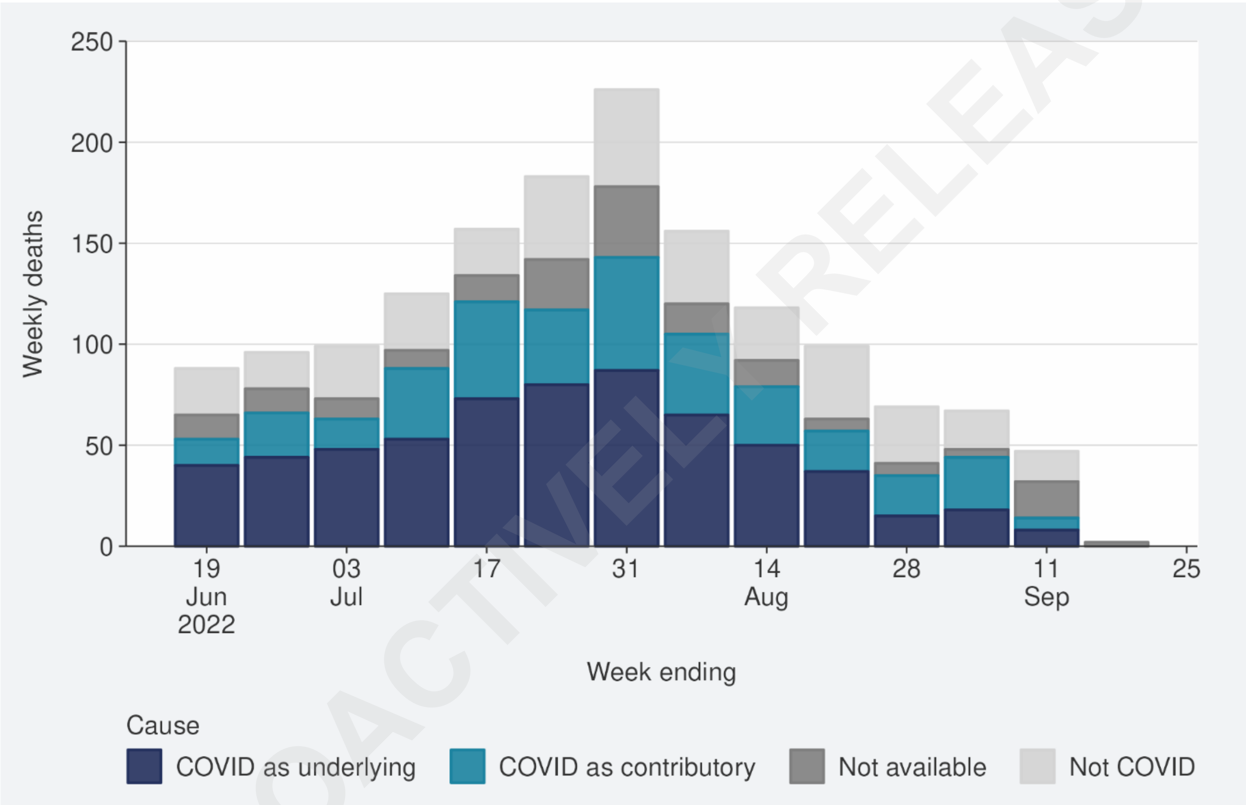
[11] Hospitalisation and Mortality data, even based on complete counts, may be affected by random variation—hence, we use confidence intervals to account for the random variation inherent in these data. A 95% confidence interval means we are 95% confident that the rate would fall within the interval if we were to measure the number of hospitalisations/deaths again under the same circumstances.

Trends in mortality

Time trends in the number of deaths

From March 2020 to 11 September 2022, there were 2,830 deaths among people who died within 28 days of being reported as a case and/or with the cause being attributable to COVID-19 (that is an underlying or contributory cause). Not all deaths have been formally coded by cause of death[12]; of the deaths that have been formally coded by cause of death, 1,235 (44%) were determined to have COVID-19 as the main underlying cause. COVID-19 contributed to a further 715 (25%) deaths, another 639 (23%) people died of an unrelated cause. Deaths have been declining after peaking in the last week of July, when almost 150 people died with COVID-19 as their underlying or a contributing cause.

Figure 17: Weekly death counts by cause of death[13], 19 June to 11 September 2022



Source: Ministry of Health. All deaths where someone has died within 28 days of being reported as having a positive test result for COVID-19 are reported. This approach aligns with countries such as the United Kingdom; it ensures that all cases of COVID-19 who die are formally recorded to help provide an accurate assessment of the impact of COVID-19.

[12] All of the deaths within 28 days of a positive test report are fast-tracked for clinical/mortality coding to determine whether the infection was the underlying cause of the death, contributed to the death, or was unrelated to the death. An example of an unrelated death is a car accident; an example of a COVID-19 contributing is a person who dies who also has a pre-existing health condition.

[13] Data are lagged and will be updated, interpretating with cautions of the most recent weeks.

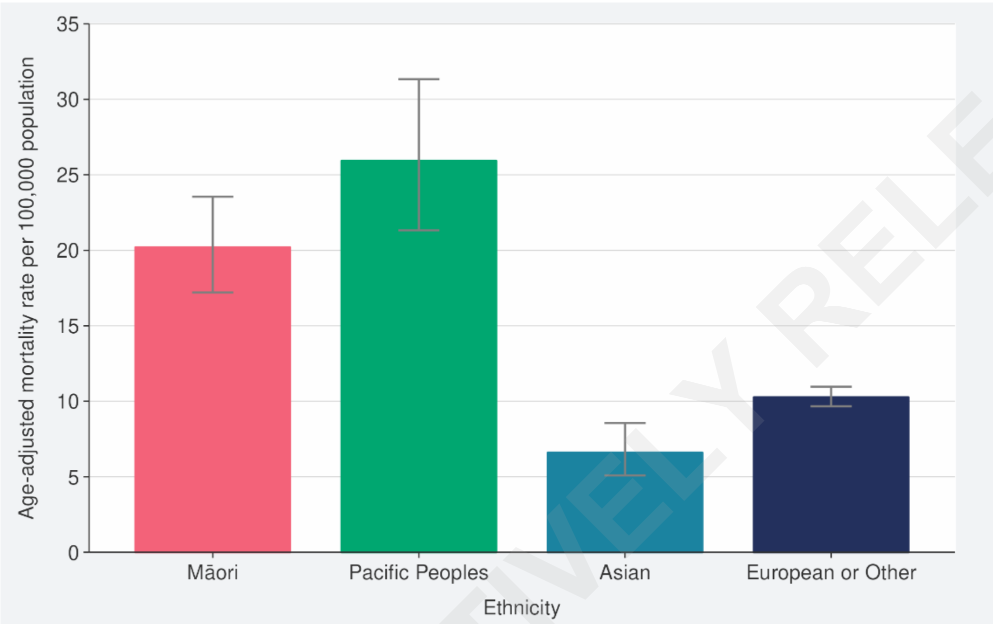
Age-standardised mortality risk for 01 January to 04 September 2022

Figure 18 and 19 show age-standardised[14] cumulative rates of COVID-19 attributed mortality in the population by ethnicity and by deprivation, from 01 January 2022 to 11 September 2022.

Pacific peoples had the highest risk of any ethnicity, 2.6 times that of European or Other. Rates for Māori were 2.0 times higher than European or Other, while Asian rates were lower than European or Other (**Figure 18)**.

Those most deprived had the highest rate of COVID-19 attributed mortality (2.4 times that of the least deprived) followed by those of mid-range deprivation (1.7 times that of the least deprived) (**Figure 19)**.

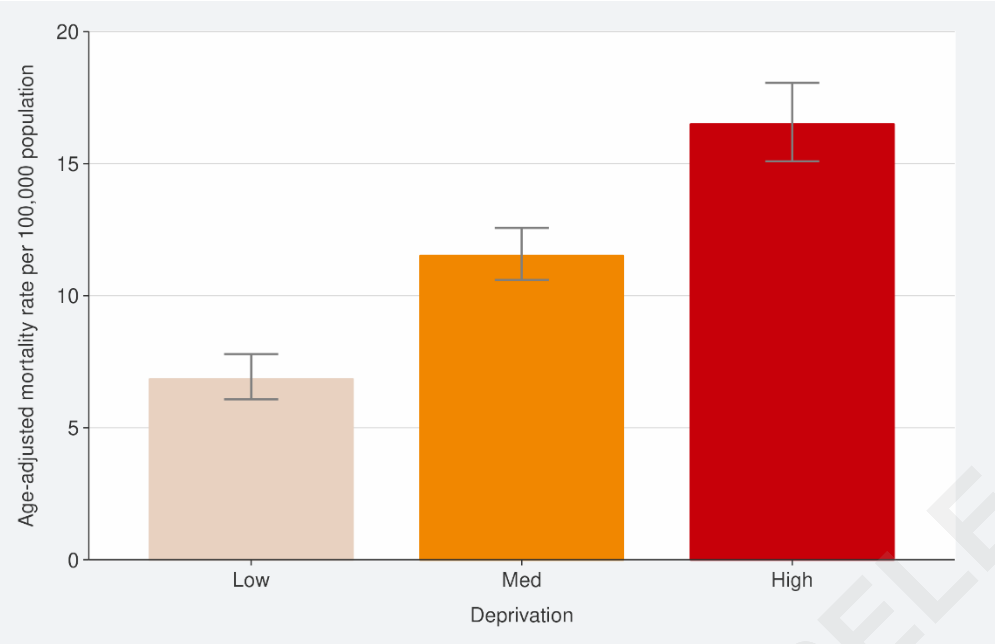
Figure 18: Age-standardised cumulative incidence (and 95% confidence intervals) of mortality attributed to COVID-19 by ethnicity, 01 January 2022 to 11 September 2022



Source: EpiSurv, Death Documents, The Healthcare User database, Mortality Collections database and CVIP population estimates, 01 January 2022 to 11 September 2022

[14] An age-standardised rate is a weighted average of the age-specific rates per 100,000 persons, where the weights are the proportions of persons in the corresponding age groups of the Māori population.

Figure 19: Age-standardised cumulative incidence (and 95% confidence intervals) of mortality attributed to COVID-19 by deprivation, 01 January 2022 to 11 September 2022



Source: EpiSurv, Death Documents, The Healthcare User database, Mortality Collections database and CVIP population estimates, 01 January 2020 to 11 September 2022

Whole Genomic Sequencing in community acquired cases

Whole Genomic Sequencing of community cases

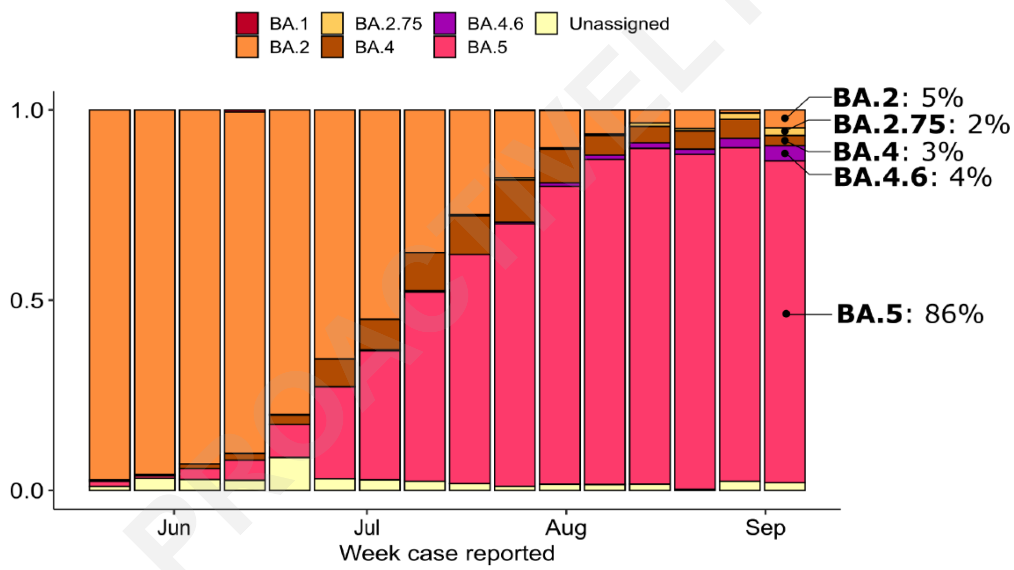
As of the 02 September, Whole Genomic Sequencing (WGS) for cases will be updated bi-weekly. This week's section is up to the week ending 02 September, as at 14 September.

Omicron is the dominant variant in New Zealand having outcompeted Delta, which made up ~70% of all cases that had undergone WGS at the start of January 2022 and decreased to less than 10% of sequenced cases by the end of January.

In the two weeks to 02 September, variants BA.5, BA.4, BA.2, BA.4.6 and BA2.75 were detected in community samples (first detected in late May/early June). In the past week BA.4/5 was detected at all wastewater sites; these two data sources confirm that BA.4/5 variants are circulating within the wider population. A small number of variant BA.2.75 and BA.4.6 cases continue to be detected in the community with six and ten cases respectively reported in the two weeks to 02 September. It is probable that small numbers of these sub-variants are circulating in the community, but they are unlikely to have a growth advantage over BA.5.

There is high certainty that BA.5 was largely responsible for the recent surge in case numbers across the country (and internationally). **Figure 20** shows that BA.5 made up about 86% of sequenced community cases in the past week. As expected, we see a (relative) growth advantage of BA.5 over other variants. BA.4 has remained quite steady this week, making up 3% of cases.

Figure 20: Frequency of Variants of Concern in community cases in New Zealand



Source: ESR COVID-19 Genomics Insights Report #22, EpiSurv/Microreact 0900hrs 02 September 2022

Whole Genomic Sequencing of hospitalised cases

As of 02 September, ESR received samples from and had successfully processed 105 of the 442 PCR positive hospital cases with a report date in the two weeks to 02 September 2022. Of these 105 samples **3% were BA.2, 9% were BA.4** (including BA4.6)**, 2% were BA.2.75 and 87% were BA.5.**

Please refer to the border surveillance section for information on WGS of imported cases.

Please see the caveats in the Glossary at the end of this document.

Border surveillance

Cases detected at the air border

Imported cases initially increased as travel volumes increased following the first stage of border reopening in March 2022. Detected cases then remained fairly constant through May and early to mid-June before rising again in late June. New Zealand's borders re-opened to all tourists and Visa holders on the 31st of July 2022. **Detected cases decreased below 100 for the first time since late June on 28 August; as of 11 September daily cases are between 50 – 100.**

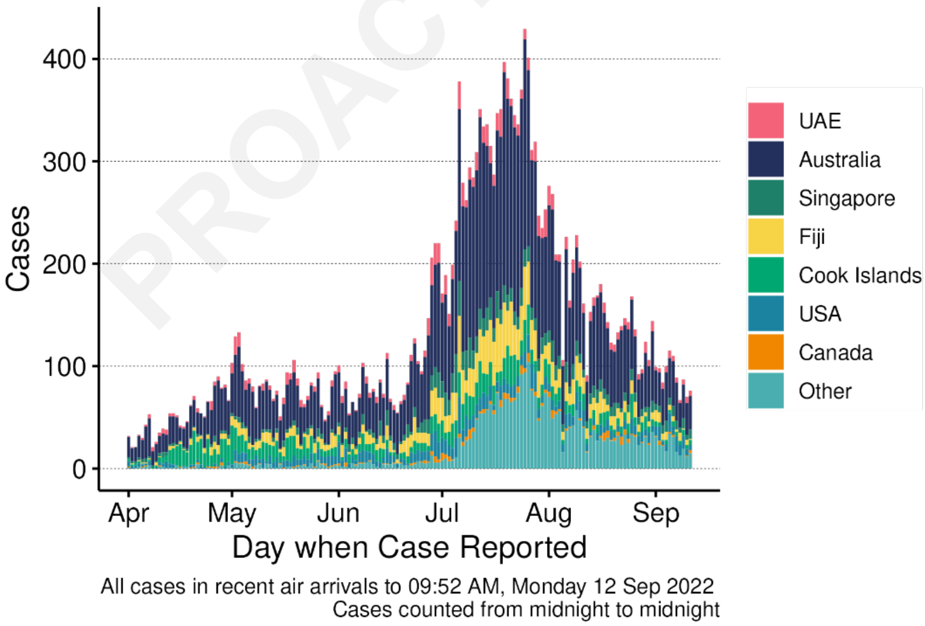
With the removal of pre-departure testing from 20 June, it appears that detected cases increased from most countries. The increase was consistent with expectations that pre-departure testing halves the number of infected people boarding aircraft, and with increasing Omicron BA.5 prevalence in many source countries. In the past month, 2% to 4% of recent arrivals were reporting a positive test.

Figure 21 shows the number of RAT-positive cases in arrivals since April 2022. While pre-departure tests were required (before 20 June), most cases arrived on flights from Australia followed by the Cook Islands and Fiji, and then the United States of America. Since 20 June, most cases have been detected on flights from Australia.

Flights from Australia include both short-haul trans-Tasman flights and long-haul flights that transit through an Australian airport. It is no longer possible to accurately track the first country in a multi-stage voyage, as arrival cards are no longer scanned and data in the New Zealand Traveller Declaration system only records countries visited in the weeks before the Declaration is filled in.

While the increase in imported cases after 20 June was rapid, it was in line with expectations from the removal of pre-departure testing. Even at the peak of this increase, the total number of cases detected at the border was much less than the number reported each day in the community.

Figure 21: Reported cases reported in post-arrival testing by country of flight departure, 01 April – 11 September 2022

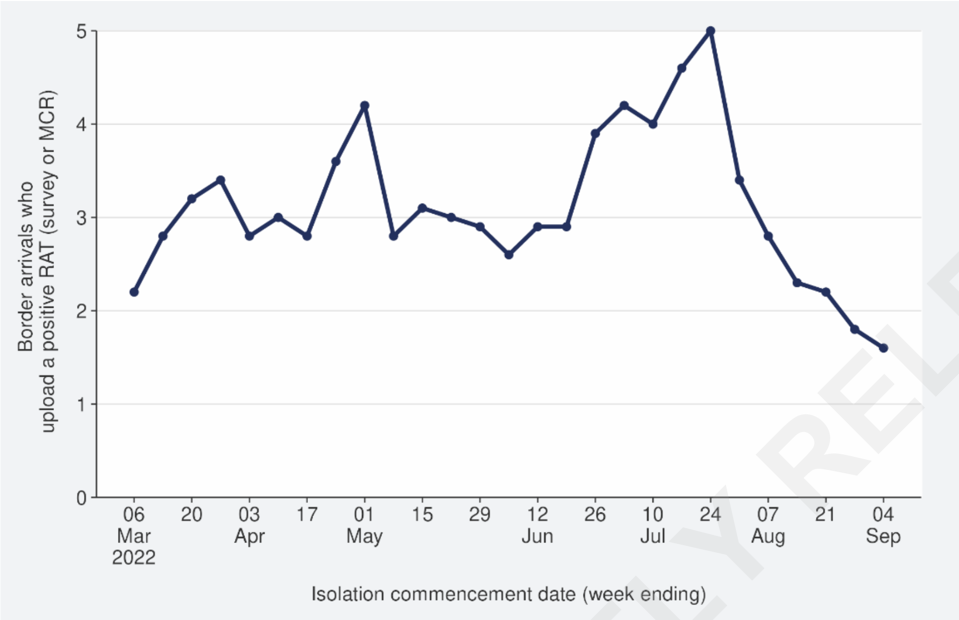


Source: NCTS/EpiSurv as at 2359hrs 11 September 2022

Testing of border arrivals

Figure 22 shows that the percentage of positive RATs in border arrivals who reported a test was between 2 – 6% for the period 6 March – 31 July 2022. The percentage of border arrivals returning positive RATs has decreased in recent weeks and was 1.9% (1,153 of 59,173 arrivals who uploaded a test result) for the week ending 04 September.

Figure 22: Percentage of positive tests in border arrivals who report RATs, 06 March – 04 September 2022



Sources: NCTS/EpiSurv/Éclair as at 2359hrs 04 September 2022

Whole Genomic Sequencing of Recent Arrivals

Over 92% of the genomes sequenced at the border over the two-week period, ending 02 September, were BA.4/5 variants. These cases include reports of BA.2.75 and BA.4.6 in travellers to New Zealand. During the current reporting window of 20 August to 02 September, ESR had received samples from 446 of the 1,748 PCR-positive border cases. Of the successfully sequenced samples, **86% were BA.5, 2% were BA.2, 3% were BA.4, 4% were BA.4.6 and 5% were BA.2.75.** These proportions are similar to those seen in the community; see the community WGS section on **page 26**. In this reporting window, 7 BA.2.75 cases and 15 BA.4.6 cases were detected at the border – these are similar to case proportions found in the community during the same reporting window, however, there tends to be more cases of BA.4.6 at the border compared to the community.

Genomic sequencing data are lagging by 1 or 2 weeks because of the time required for recent arrivals to report a positive RAT, seek a follow-up PCR and have processing completed by ESR.

Figure 23 shows the completion metrics for border returnee testing[15] and WGS from 06 March to 04 September 2022. The percentage of arrivals uploading a RAT had been steadily decreasing, however, in the

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[15] Testing and reporting at the border are a “high-trust” model and it is not expected that there will be 100% compliance with testing amongst travellers.

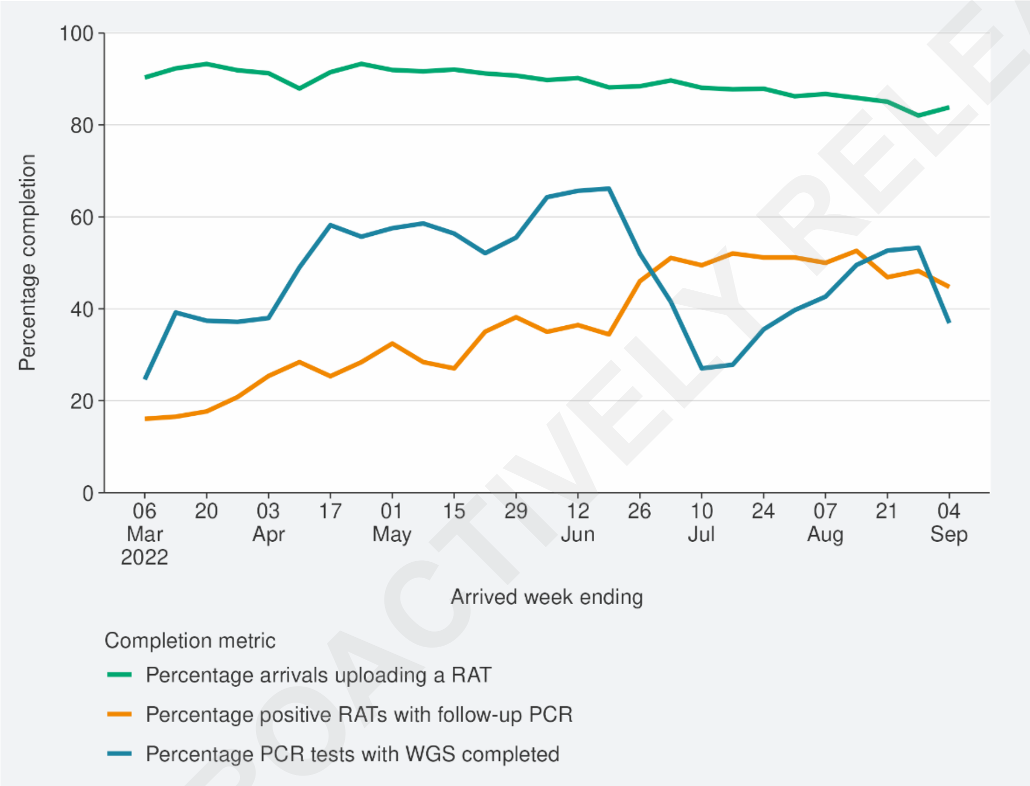
Labs are notified of all positive RAT results that are known to be from recent arrivals. However, some recent arrivals may not be reporting RAT results.

week ending 04 September it was 83.0% (58,620 of 70,586 arrivals). This is an increase from the previous week at 81.2%.

In the week ending 04 September, 44.8% of border arrivals who returned a positive RAT had a follow-up PCR test. This is a decrease from the previous week, at 48.3%. A case can only be referred to ESR for WGS if the traveller is referred for PCR testing and the lab sends the PCR sample for sequencing. Recently, less than half of the reported RAT positive border arrivals were having a follow-up PCR test, and less than half of those PCR samples are having WGS completed.

In the week ending 04 Septmeber, the percentage of PCR positive border arrivals with WGS complete was 36.9%. This figure is lower to those seen from mid-April to late June; between 40%-70%. This figure is expected to rise, as more of the recent cases are processed.

Figure 23: Completion metrics for border returnee testing and WGS for arrivals, 06 March – 04 September 2022



Sources: NCTS/EpiSurv/Éclair as at 2359hrs 04 September 2022, ESR WGS 08 September 2022[16]

[16] Please note that WGS may not be completed/uploaded yet for more recent cases

International and scientific insights

Please note, global trends in cases and deaths should be interpreted with caution as several countries have been progressively changing COVID-19 testing strategies, resulting in lower overall numbers of tests performed and consequently lower numbers of cases detected.

Overseas waves and the likely impacts of new variants, policy changes, notifiable disease and waning immunity

Global

- Globally, in the week ending 11 September, the number of new weekly cases decreased by 28%, with over 3.1 million new cases reported.
- The number of new weekly deaths decreased by 22% compared to the previous week, with just under 11,000 fatalities reported.
- Globally, as of 11 September 2022, over 605 million confirmed cases and over 6.4 million deaths have been reported.
- At the regional level, the number of newly reported weekly cases decreased across all six regions: the Western Pacific Region (-36%), the African Region (-33%), the Region of the Americas (-27%), the South-East Asia Region (-20%), the Eastern Mediterranean Region (-19%) and the European Region (-15%).
- The number of new weekly deaths decreased across five of the six regions: the European Region (-31%), the South-East Asia Region (-25%), the Region of the Americas (-22%), the Western Pacific Region (-11%), the Eastern Mediterranean Region (-10%); while it increased in the African Region (+10%).
- Globally, from 12 August to 12 September 2022, 123,400 SARS-CoV-2 sequences were shared through GISAID. Among these, 122,374 sequences were the Omicron variant of concern (VOC), accounting for 99.2% of sequences reported globally in the past 30 days.
- The prevalence of BA.2 descendent lineages (BA.2.X) increased in week 35 compared to week 34 (2.3% in week 34 and 3.2% in week 35). BA.2.75 is an Omicron descendent lineage under monitoring that continues to show low prevalence globally (1.0% and 2.2% in weeks 34 and 35 respectively).
- BA.5 Omicron descendent lineages continue to be dominant globally, with an increase in weekly prevalence from 82.4% to 90.0%.

Sources: Weekly epidemiological update on COVID-19 - 14 September 2022 (who.int)

Australia

- In the 14 days up to 13 September 2022, case rate was 499 per 100,000 population. This is a decrease from the week prior (14 days up to 06 September 2022) which was 634 per 100,000 population.
- All states and territories saw decreases in rates of new cases compared to the previous week.
- Cases in Aboriginal and Torres Strait Islanders continue to steadily decrease after increasing in early August.

- As at 13 September 2022, there are 2,105 current cases in hospital with 60 in ICU. This is a decrease from when last reported (06 September 2022) where there were 2,489 hospitalised cases. The majority of these cases were in New South Wales (1,370), Victoria (203), Western Australia (182) and Queensland (180). All four states continue to decrease with regards to hospitalised cases.

Sources: Coronavirus (COVID-19) common operating picture – 13 September 2022 (health.gov.au)
Australian Bureau of Statistics

England

- Between 28 August 2022 and 3 September 2022 in England, 24,880 people had a confirmed positive test result. This shows an increase of 0.5% compared to the previous 7 days.
- Between 31 August 2022 and 6 September 2022 in England, there have been 570,558 tests. This shows a decrease of 26.0% compared to the previous 7 days.
- Between 28 August 2022 and 3 September 2022 in England, there have been 384 deaths within 28 days of a positive COVID-19 test. This shows a decrease of 24.9% compared to the previous 7 days.
- In the week up until and including 5 September 2022, there were 3,628 COVID-19-related admissions to hospital, a decrease of 12.0% compared to the week prior.
- In the week up to and including 7 September 2022, 45,243,079 received a first dose of vaccine, 42,653,942 received a second dose and 33,534,629 received a booster or third dose.

Sources: Coronavirus (COVID-19) Data: UK / GOV.UK

Japan

- Japan continues to be the country with the highest number of new cases with a 7-day rolling average of 97,230 as at 12 September, down from 122,909 the previous week. Infections have been decreasing since late August.
- Since an all-time high in early September, deaths appear to have peaked in Japan but have decreased since then. The 7-day rolling average was 212 deaths as of 12 September, compared to the previous week, at 291 deaths.
- The National Institute of Infectious Diseases has reported the occupancy rates of hospital beds for COVID-19 patients has risen and is affecting quality of care due to temporary closures of hospital wards and infected healthcare workers.
- As of 07 September, the total hospital bed occupancy was 47.8%, down from 56.2% the week prior.

Sources: Our World in Data: Japan / Ministry of Health, Labour and Welfare

South Korea

- Following their first large peak in cases during late March 2022, South Korea experienced a second smaller peak during mid to late August. Since then, cases have steadily decreased.
- The 7-day rolling average for confirmed cases is 56,093 as at 12 September, down from 77,938 as at 06 September.
- Since the most recent peak in late August, the 7-day rolling average for confirmed deaths has been declining, and as of 12 September is 48.6 per day, compared to the previous week, at 69.3 deaths.
- Reinfections continue to be driven by the immune-evasive BA.5 Omicron subvariant.

Source: Our World in Data: South Korea

United States of America

- Infection trends have plateaued since end of May 2022 after peaking in January 2022
- The 7-day rolling average of daily new cases was 235.9 per 1,000,000 population as at 12 September 2022.
- Since the end of April, the 7-day rolling average for confirmed deaths rates have plateaued with the rates between 0.77 and 1.73 per 1,000,000 population, and as of 12 September was 1.3 per 1,000,000 population.

Source: Our World in Data: United States of America

Primary evidence on effectiveness of public health and outbreak control measures

This section outlines some of the available literature about the effectiveness of public health and outbreak control measures. It is not intended to be a systematic review of all available evidence, but to provide an overview of available evidence.

Outbreak Management

- A qualitative study on addressing COVID-19 testing inequities among underserved populations found that upstream barriers identified were related to accessibility of testing sites, weak social safety nets, and lack of testing supplies and staffing. These factors were found to heighten individual fears surrounding the testing process and limited knowledge on testing availability.
- A investigation on concordance of testing results self collected swabs versus those done by a healthcare worker found that self-collection school-aged children and adolescents, following simple instructions, demonstrated high agreement with results following collection by health care workers.
- A behavioural study from New Zealand looking at the impact of Compliance with COVID-19 measures found that it is important to look at the strength of individuals' motivation and their beliefs about the advantages and disadvantages of policy outcomes and policy measures. They found this differentiation was useful in predicting an individual's possible behavioural responses to a measure.
- A review of Taiwan's mitigation and containment strategy found that non-pharmaceutical interventions, including public masking and social distancing, coupled with early and aggressive identification, isolation, and contact tracing to inhibit local transmission were optimal policies for public health management of COVID-19 and future emerging infectious diseases.
- A study on behavioural decisions and risk perception through monitoring the flows of information from both physical contact and social communication found that maintaining focus on awareness of risk among each individual's physical contacts promotes the greatest reduction in disease spread, but only when an individual is aware of the symptoms of a non-trivial proportion of their physical contacts.
- A commentary in the Lancet on face masks suggests that mass masking would be of particular importance for the protection of essential workers who cannot stay at home. As people return to work, mass masking might help to reduce a likely increase in transmission.

- A research article on the efficacy of non-pharmaceutical interventions for COVID-19 in Europe found that the population prevention and control measures implemented by the government had an impact on the change in the reproduction rate. Furthermore, that most effective factors in individual level prevention were a reduction of mobility/mixing.
- A survey of COVID-19 in public transportation looking at the risk of transmission and the impact of mitigation measures found that social distancing, density limits, masking and improving ventilation were effective at reducing the risk of transmission. Reff decreased by 20% after the introduction of targeted testing and by 18% after extension of face-mask rules, reducing Reff to 0.9 and suppressing the outbreak.
- A evidence brief on the properties of the Omicron variants and how it affects public health measures effectiveness found that the effects of early isolation, adult-focused reduction of interpersonal contact, and vaccination have different sites of action in infection spread dynamics and their combination can work synergistically.
- A Canadian wastewater research paper has noted that the lack of a quantitative framework to assess and interpret the wastewater data generated has been a major hurdle in translating wastewater data into public health action.
- An observational study on the impact of contact tracing and testing on controlling COVID-19 without lockdown in Hong Kong.

Economic, Social and Health Impacts

- A research article on COVID-19 testing and mortality outcomes between countries found that countries that developed stronger COVID-19 testing capacity at early timepoints, as measured by tests administered per case identified, experienced a slower increase of deaths per capita.
- A preprint study has noted that reinfections of COVID-19 are associated with an increase of risk of all-cause mortality, hospitalisation, and adverse health outcomes.
- A population study using a surveillance dataset that records all results of SARS-CoV-2 tests in France found a positive social gradient between deprivation and the risk of testing positive for SARS-CoV-2.
- An evaluation of COVID-19 policies in 50 different countries and territories considers both pharmaceutical and non-pharmaceutical interventions and assesses a jurisdiction's success at containing COVID-19 both prior to and after vaccination.
- Systematic review of economic evaluations of COVID-19 interventions
- A cross-sectional study comparing OECD countries in evaluating economic outcomes found that non-pharmaceutical interventions effectively contained the outbreaks and had positive impacts in lowering unemployment rates.
- An research article on the disease-economy trade-offs under different epidemic control strategies found that using targeted isolation would result in the best outcome for minimising both the risk of an epidemic and the economic downturn which accompanies (an epidemic).

Modelling

- A modelling study look at preventing a cluster from becoming a new wave in settings with zero community COVID-19 cases found that individual restriction or control strategy reduces the risk of an outbreak. They can be traded off against each other, but if too many are removed there is a danger of accumulating an unsafe level of risk. This has a particular impact on increasing downstream risks with increasing international travel.

- A modelling study looking at the impact of non-pharmaceutical interventions on controlling COVID-19 outbreak without lockdowns in Hong Kong found that delays in implementing control measures had significant impact on disease transmission.
- A mathematical modelling study assessing the impact of public compliance on non-pharmaceutical interventions with a cost-effectiveness analysis.
- A modelling study points to the role of super-spreader events in the contribution of novel variant predominance from a public health perspective, the results give weight to the need to focus NPIs on preventing large super-spreader events (10 or 20 secondary infections from single infected individual).
- A preprint study on social gatherings and transmission found that small gatherings, due to their frequency, can be important contributors to transmission dynamics.

Summary of indicative modelling on impact of changes in public health measures.

- Modelling has considered the impact of not renewing the Epidemic Preparedness (COVID-19) Notice.
- This modelling extends the modelling presented in the recent cabinet paper on the future of the COVID-19 Protection Framework. It provides multiple scenarios reflecting the uncertain impact of policy changes.
- These modelling results have been produced rapidly to help inform policy advice. They should be considered as indicative as there are significant uncertainty around the impact of policy changes and the level of immunity in the population.

Key points:

- There is significant uncertainty around both the effect of not renewing the Epidemic Notice and the level of immunity in the population over the coming months.
- Modelling has considered a range of scenarios to reflect this uncertainty.
- Within the first month, not renewing the Epidemic Notice is modelled to **increase hospitalisations by roughly 250 to 500 and increase deaths by 30 to 60**, relative to no change in policy. Over a year, these **increases are 1,500 to 2000 for hospitalisations and 400 to 600 for deaths**.
- Across the scenarios**, for-COVID-19 hospital occupancy peaks at between 200 and 250 beds**, compared to a peak of 700 beds in the BA.5 wave. When looking at the high confidence limit of these estimates, for-COVID-19 hospital occupancy still peaks below the BA.5 wave peak at around 400 to 450 beds.
- In general, the short-term peak in cases and hospitalisations can be mitigated by phasing policy changes over a longer period of time.

Equity

- An important caveat is the equity impacts of these changes have not been modelled, in part due to limited available data. However, based on discussion with the modelling team and understanding of other public health issues, moving some settings from mandates to guidance is **likely to have inequitable outcomes**.
    - Māori and Pacific peoples are more at risk of severe negative health outcomes than non-Māori non-Pacific of the same age.

- Shifting to guidance is likely to disproportionately affect those who do not have the ability to choose to follow the guidance. This may include: people in precarious employment, those unable to work from home, workers with limited sick leave and populations with other socioeconomic disadvantage.
- Additional supports for people to isolate effectively (such as additional sick leave and leave support) could help mitigate these inequitable outcomes.

How do reductions in the share of cases choosing to isolate affect the reproductive number?

Modelling has considered how two factors affect the reproductive number (i.e., speed of transmission):

- A reduction in the share of infections taking any action to reduce transmission. This could be due to people ignoring their positive result or choosing not to test in the first case.
- A reduction in the average effectiveness of action to reduce transmission. This could be due to people isolating for a shorter period of time, or only avoiding high risk settings.

The table below shows the increase in the reproductive number for a range of different assumptions. Assuming no reduction in case isolation gives an increase of 11.4%, which is the increase associated with removing mask mandates and contact quarantine with testing only when symptomatic. Percentage increases beyond that vary significantly from 15% to 26%. In general, having a large share of cases taking some action is more effective than some cases taking significant action.

		Reduction effectiveness of actions			
		0%	**25%**	**50%**	**75%**
Reduction in proportion of people taking action	**0%**	11.4%	15.2%	18.1%	20.5%
	25%	16.0%	18.5%	20.4%	22.1%
	50%	20.0%	21.7%	22.9%	24.0%
	75%	24.0%	24.5%	25.2%	25.6%

How does an increase in the reproductive number affect cases, hospitalisations and deaths?

Because of the significant uncertainty in how people respond to a removal mandated case isolation, modelling has considered three scenarios:

- Scenario 1, with an 8.5% increase in the reproductive number.
- An optimistic scenario, with a 17% increase in the reproductive number.
- A middle scenario, with a 20.5% increase in the reproductive number.
- A pessimistic scenario, with a 24% increase in the reproductive number.

Factors that would shifting us closer to the optimistic scenario could include:

- Achieving high levels of testing in the community.
- Maintaining strong norms that people should work from home if unwell.
- High voluntary adherence to mask and case isolation guidance.

Policy changes that increase transmission will tend to have two effects:

- In the short-term, a large increase in cases, hospitalisations and deaths. The absolute size of this change will be driven by the level of immunity in the population. This impact wanes over time as infection-induced immunity increases.

- In the long-term, a slightly higher steady state level of cases, hospitalisations and deaths. This impact is smaller in percentage terms but is persistent over time.

In general, the short-term peak in cases and hospitalisations can be mitigated by phasing policy changes over a longer period of time. This smooths out the peak and also allows decision makers to adjust their approach if the path of the outbreak differs from modelled projections.

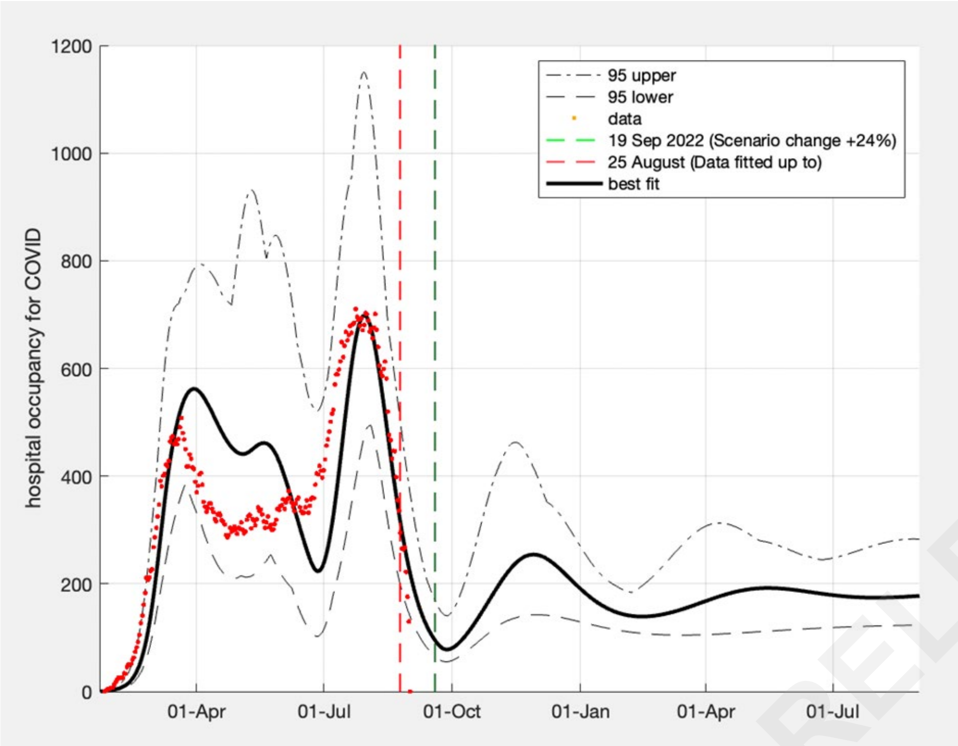
The table below shows the increase in cases, hospitalisations and deaths under these scenarios. In the short-term, there is a large relative increase in cases, hospitalisations and deaths. However, the absolute increases may be smaller than expected with hospitalisations increasing by roughly 250 to 500 over a month and deaths increasing by 30 to 60. Relative increases are smaller over the long-term, but larger in absolute terms, with hospitalisations increasing by roughly 1,500 to 2,000 and deaths increasing by roughly 400 to 600.

	Short-term impact (cumulative from 15 days after implementation to 45 days after implementation)			**Long-term impact (cumulative for a year after implementation)**			**Peak hospital occupancy**
	*Cumulative **cases***	*Cumulative hospital admissions*	*Cumulative deaths*	*Cumulative cases*	*Cumulative hospital admissions*	*Cumulative deaths*	
Status quo (0%)	29737	246	58	809817	6625	1461	162
Scenario 1 (8.5%)	43174 (+45%)	355 (+44%)	71 (+22%)	886977 (+10%)	7407 (+12%)	1672 (14%)	164 (+1%)
Optimistic scenario (17%)	63330 (+113%)	520 (+111%)	90 (+55%)	955575 (+18%)	8123 (+23%)	1874 (+28%)	190 (+17%)
Middle scenario (20.5%)	74202 (+150%)	609 (+148%)	100 (+72%)	981754 (+21%)	8401 (+27%)	1954 (+34%)	214 (+32%)
Pessimistic scenario (24%)	86865 (+192%)	713 (+190%)	112 (+93%)	1006948 (+24%)	8671 (+31%)	2032 (+39%)	245 (+51%)

Figure 24: Impact of pessimistic scenario on for-COVID-19 hospital occupancy shows for-COVID-19 hospital occupancy for the pessimistic scenario (other scenarios shown further below). Note these figures may not align reported in the Ministry of Health press release, as those figures include with-COIVD-19 hospitalisations.

The model projects hospital occupancy falling to around 100 occupied beds in late September. The policy change results in an increase in hospitalisations over the following months. The best fit of the model peaks at roughly 250 beds, however the uncertainty around this peak ranges from around 450 occupied beds on the high end, to under 200 beds on the low end. Despite the large increase in transmission, the modelling suggests that accumulated immunity would keep peak hospitalisations below the BA.5 wave peak.

Figure 24: Impact of pessimistic scenario on for-COVID-19 hospital occupancy



Source: COVID-19 Modelling Aotearoa Ordinary Differential Equation Model August 2022 and Ministry of Health reported case data 08 September 2022

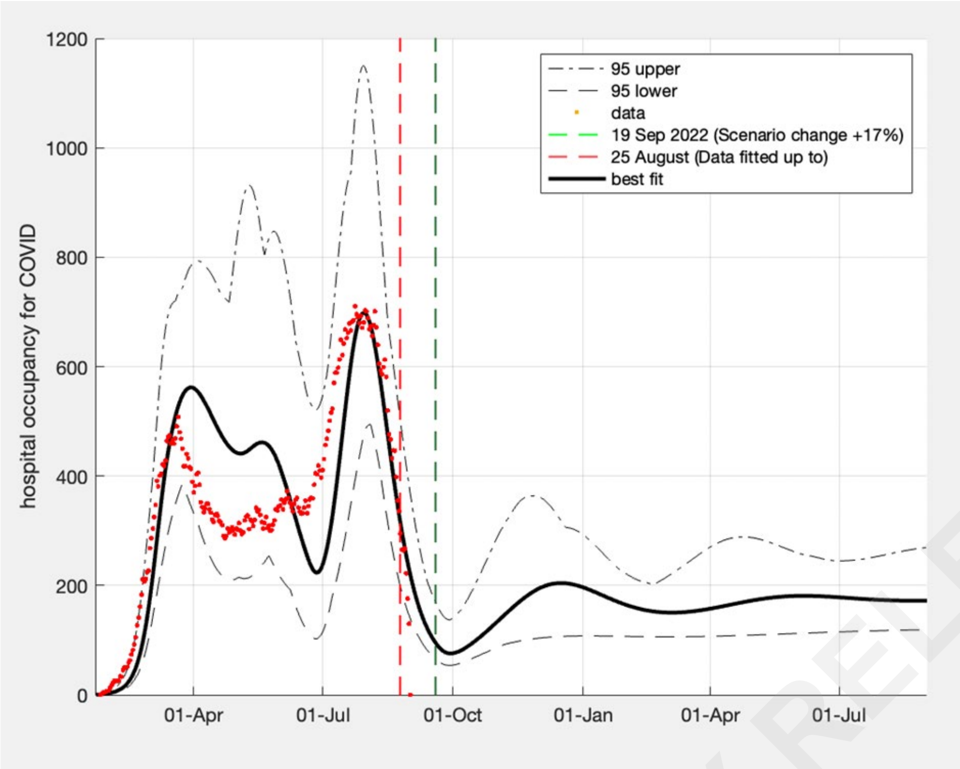
The shape of the hospital occupancy curve is broadly similar for the optimistic and middle scenarios (shown further below), but with peak hospital occupancy being around 50 beds (optimistic) and 30 beds lower (middle) than the pessimistic scenario.

Assumptions

This modelling uses a large number of assumptions that are important to keep in mind:

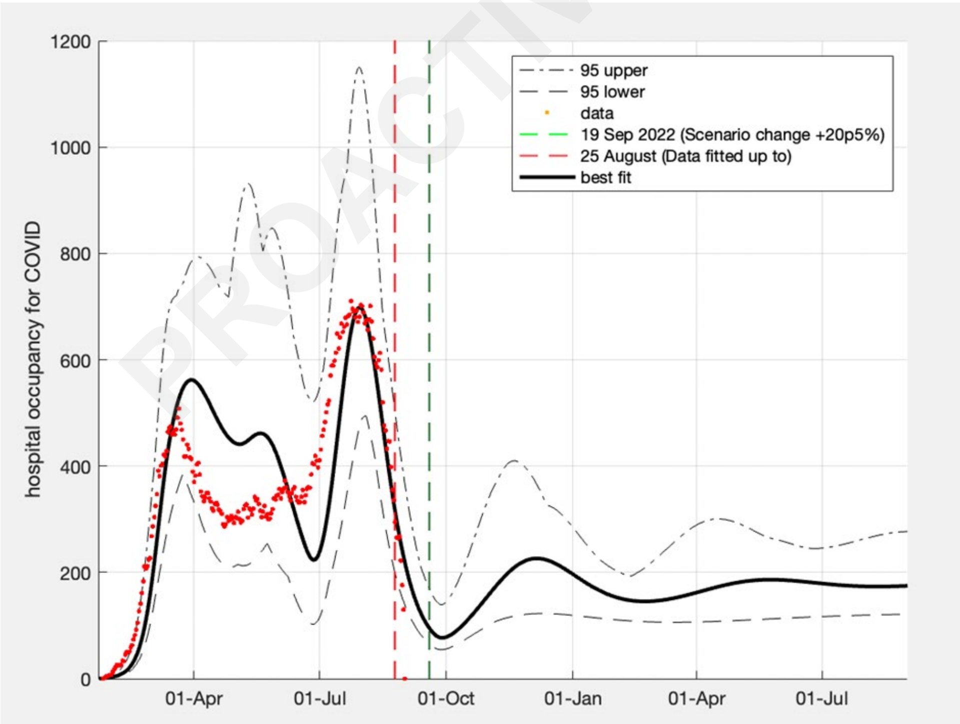
- **Mask mandate assumptions**. Mask mandates are assumed to reduce mask usage that in turn causes a roughly 20% reduction in transmission outside the home.
- **Contact quarantine assumptions**. This modelling uses very similar assumptions to those used in the August monthly review of case isolation and contact quarantine.
- **Case isolation assumptions**. With mandated 7-day isolation, it is assumed that 90% of transmission for identified cases is prevented.
- **Long-term trajectory assumptions**. The model assumes that BA.5 is the prevalence variant for the next 12 months and no changes to vaccination eligibility (e.g., third boosters, second boosters for more groups) and no change in available therapeutics.
- **Peaks and troughs assumptions.** Because this is a single national model, it may not capture the different size, shape and timing of peaks at a district or regional level. Therefore, the model may overestimate peaks and underestimate troughs, if outbreaks in different population groups are not aligned.
- **Uncertainty around modelled estimates.** The scenarios provide confidence intervals around estimates of cases, hospitalisations and deaths. This range reflects unknowns such as the share of infections detected and the speed of waning immunity. The model has data fitted to 08 September, which reduces some of this uncertainty.

Figure 25: Impact of optimistic scenario on for-COVID-19 hospital occupancy



Source: COVID-19 Modelling Aotearoa Ordinary Differential Equation Model August 2022 and Ministry of Health reported case data 08 September 2022

Figure 26: Impact of middle scenario on for-COVID-19 hospital occupancy



Source: COVID-19 Modelling Aotearoa Ordinary Differential Equation Model August 2022 and Ministry of Health reported case data 08 September 2022

Glossary

Data Sources

Community Cases

Data on community cases are sourced from a combination of the National Contact Tracing Service (NCTS) and EpiSurv (New Zealand's public health surveillance platform).

Whole Genome Sequencing (WGS)

All information on WGS is sourced from the ESR COVID-19 Genomics Insights (CGI) Report, a weekly overview of SARS-CoV-2 genomic surveillance across the country.

Prevalence Estimates

National estimates of underlying infection incidence are based on the weekly test positivity in routinely asymptomatically tested populations, assuming therefore that their positivity rates are indicative of their underlying infection rates. The populations identified for these estimates using surveillance codes provided for testing data are border, emergency and healthcare work forces, as well as hospital inpatients. Inpatient estimates are also produced based on a direct data feed from Tertiary hospitals rather than identifying inpatients in the national testing database; they are therefore more accurate than the national figures.

Wastewater quantification

Wastewater quantitation is a measure of the levels of virus circulating in the community. Because infectious individuals tend to shed vastly more viral particles than non-infectious individuals (particularly later on in the infection), the wastewater quantitation results are driven largely by infectious individuals, in the first 5-6 days of their infection. Although people can shed detectable virus for some weeks that can be detected by PCR testing, these individuals are unlikely to have a large impact on the quantitation curves.

Wastewater is analysed by ESR's Kenepuru and Christchurch Laboratories.

Data limitations

Prevalence estimates based on routinely tested populations

- The groups of routine testers that have been identified (healthcare, border and emergency workers, and hospital inpatients) are not a representative sample of New Zealanders, overall, they are higher risk of COVID-19 infection than the general population.
- The identification of these groups at a national level is based on surveillance codes, which may not be completed accurately, particularly since the introduction of RAT testing.
- The national estimate is for people who have uploaded at least one test result in the week, so will be an over-estimate if negative test results are not being recorded for these groups.
- National level estimates will be masking differing trends by region.
- Tertiary hospital inpatient data, while likely to be more accurate than the national level data, still reflect a higher-risk group, and neither the estimates nor the trends are generalisable to the rest of the population.
- The identification of these groups is based on surveillance codes, which may not be completed accurately, particularly since the introduction of RAT testing.
- The population has been identified based on ever having a surveillance code related to the respective workforce and having at least 2 tests (at least one of which was negative) in 2022. A sensitivity check was run using at least 3 tests and while these numbers reduced, the incidence estimates remained very similar.

Wastewater quantification

- Approximately 1 million people in New Zealand are not connected to reticulated wastewater systems.
- Samples may be either grab or 24-hour composite samples. Greater variability is expected with grab samples.
- While a standard method is being used, virus recovery can vary from sample to sample.
- SARS-CoV-2 RNA concentrations should not be compared between wastewater catchments.
- Day-to-day variability in SARS-CoV-2 RNA concentrations especially in smaller catchment is to be expected.

Hospital admissions data

- The Ministry will begin reporting COVID-19 hospitalisations using two datasets: the inpatient admission (IP) dataset – that only includes data from hospitals in certain regions – and the National Minimum Dataset (NMDS). Both of these datasets are patient-level, so they allow demographic and vaccination breakdowns to be calculated.
- Of the two databases, the IP is the more up-to-date data source for admissions. The data provided include a preliminary assessment of hospitalisations where COVID-19 may potentially play a role in the hospitalisation, based on the health specialty associated with the hospitalisation. The IP dataset does not have national coverage; it only covers hospitals in Auckland, Canterbury, Southern, Counties Manukau, Waikato, Capital and Coast, Waitematā and Northland. The IP dataset can be incomplete and provisional; it is subject to revision as the more comprehensive and more accurate NMDS data become available. One caveat is that the IP dataset does not have a reliable discharge date field. As such, it should only be used to report on admissions, not occupancy.
- The NMDS has several advantages: It provides national coverage and is a rich source of data, including data on demographics and an evaluation of the disease conditions associated with the hospital stay (including whether the admission was incidental, i.e., not related to COVID-19). However, the NMDS is only available after a significant data lag. The time lag for hospitalisation data can vary but can be approximately 60 days or more.
- Therefore, we are using a combination of these two databases for hospitalisation: the IP records are included as a provisional tally of more recent COVID-19 hospitalisations for a collection of hospitals, and then these records are overwritten by NMDS records, as soon as the NMDS records are available
- Note that the definition used for 'hospitalisation for COVID-19' in both the IP and NMDS tends to be inclusive. For the IP provisional data, the health specialty associated with the hospitalisation is used to estimate whether the hospital stay might be related COVID-19; hospitalisations that are highly unlikely to be related to COVID-19 are ruled out, as opposed to identifying hospitalisations that are likely to be COVID-related. As NMDS data become available, the clinical codes that retrospectively evaluate the reasons for the hospital stay are used to estimate if the stay was potentially related to COVID-19. The NMDS data are more robust estimation of hospitalisations 'for' COVID-19.

- This new method of data collection for COVID-19 has several advantages over the previous method, as it provides more robust data in a timely manner, using an automated method that is less burdensome and more reliable, and provides access to more detailed data. Most importantly, the new data method provides a timely and reliable way to estimate the number of hospitalisations where COVID-19 could be the reason for the hospital stay (admissions 'for' COVID-19, with some caveats). Moving forward, the majority of the reporting on hospitalisation will use the 'for COVID' definition as described above from the new databases.
- Nonetheless, we are also still able to estimate the number of hospitalisations 'with' COVID-19, i.e., an estimate of the number of hospitalisations that are associated with a positive test within 28 days of admission. Hence, in conjunction with the new hospitalisation data, we can also estimate the proportion of the total COVID-19 hospitalisations that are 'for' versus 'with'. Previous analysis has shown that the proportion of the total COVID-19 hospitalisations that are 'for' COVID-19 is about 68%.
- In addition, the new system also allows us to estimate the rate of COVID-19 hospital admissions per case or per capita.
- However, the new data feed cannot be used to estimate the proportion of all hospitalisations nationally that are associated with COVID-19. This is because we do not know the total number of patients that currently are in hospital in New Zealand for any reason at any given time (this information exists in NMDS, but only with a lag of a couple of months). Without this denominator data, we cannot calculate the proportion of all hospitalisations are associated with COVID-19.

Mortality Data

- Mortality data is lagged as to account for death coding delays and recent trends should be interpretated with caution.