Trends and Insights Report

Updated 19 August 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

Reported case rates have continued to decrease nationally. Wastewater levels also continued to decrease nationally.

As of last week, hospitalisations and mortality have followed the trend in cases, also decreasing nationally, which has released some of the pressure on the healthcare system. This trend is expected to continue through August based on modelling and observed trends.

BA.5 is the dominant subvariant accounting for an estimated 91% of cases; this is consistent with wastewater findings. New variants BA.2.75 and BA.4.6 have been detected in the community at low levels. 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."

For the next few weeks, it is probable that infections, hospitalisations and mortality will continue to decrease and eventually plateau. However, as viral immunity decreases over time or if a new variant becomes prevalent, we expect fluctuations in case rates into the future.

Key insights

National Trends

Cases	The 7-day rolling average of reported case rates was 0.9 per 1,000 population for the week ending 14 August. This is a 20% decrease from the previous week, which was 1.1 per 1000.
Wastewater	Wastewater quantification indicates a decreasing trend nationally.
Hospitalisations	The COVID-19 hospital admissions rate has been decreasing since mid-July, to a 7-day rolling average of 0.015 per 1,000 at 07 August.
ICU Occupancy	The weekly averages of daily ICU hospital occupancy decreased across all regions except in Central for the week ended 14 August.
Mortality	As of 14 August, there were 1,750 deaths attributed to COVID-19.
Variants of Concern	BA.5 make up 91% and BA.4 makes up 4% of sequenced community cases.
Border	In the week ending 07 August, there were approximately 68,000 border air arrivals, of whom 87% uploaded a RAT. Test positivity decreased to about 3%, from 4% in recent weeks, reflecting international infection trends. Prevalence of variants at the border generally reflects that in the community.

Māori

Cases	The 7-day rolling average of reported case rates was 0.7 per 1,000 population for the week ending 14 August, lower than for European/Other, but there are likely case ascertainment biases.
Hospitalisations	Māori hospitalisation rate for COVID-19 was 2.5 times higher than both Asian and European or Other.
Mortality	The mortality rate for Māori was 2.2 times higher than European or Other.

Pacific Peoples

Infection	The 7-day rolling average of reported case rates was 0.6 per 1,000 population for the week ending 14 August.
Hospitalisations	Pacific Peoples had the highest cumulative rate of hospitalisation with COVID-19 which was approximately 3.3 times higher than both Asian and European or Other.
Mortality	Pacific Peoples had the highest risk of any ethnicity, 2.9 times that of European or Other.

International Insights

Globally, in the week ending 14 August 2022, the number of weekly cases decreased by 24% with 5.4 million new cases reported. The number of new weekly deaths decreased by 6% compared to the previous week, with over 15,000 fatalities reported.
Globally, between 15 July to 15 August 2022, 172,042 SARS-CoV-2 sequences were submitted to GISAID, with Omicron accounting for 99% of sequences

MANATŪ HAUORA
MINISTRY OF HEALTH

Contents

Figures

Infection trends

Summary of evidence for infection and case ascertainment trends

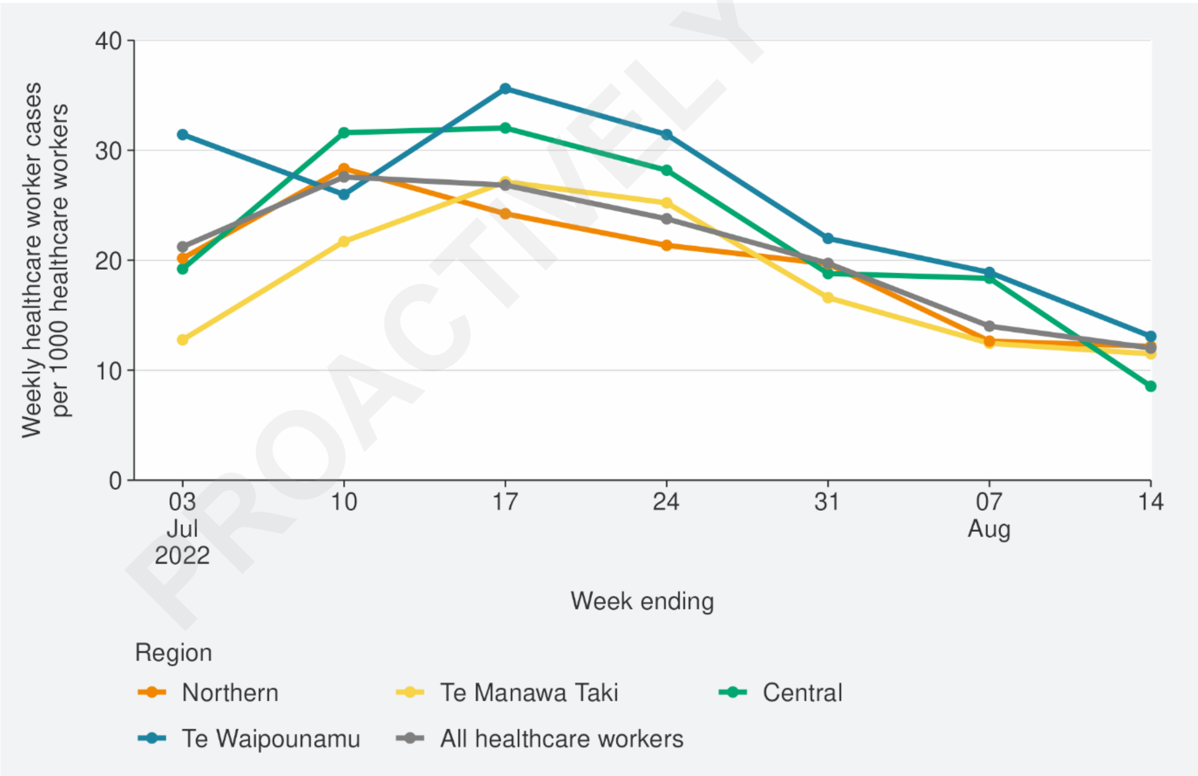
All evidence supports continued declining incidence in the community: reported case rates in both healthcare workers and the general population have declined in the past four weeks; inpatient COVID-19 test positivity at tertiary hospitals reduced during this period and levels of viral ribonucleic acid (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 14 August (12.0 per 1,000) remain higher than the general population (6.0 per 1,000). This continues to indicate that the underlying level of infection is higher than reported rates.

Approximation of trends in underlying infection incidence

For the week ending 14 August, estimates suggest that 12.0 per 1,000 (416/34,628) of healthcare workers[1] (**Figure 1**) tested positive (for the first time). While the healthcare work force is not representative of the general population, 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 weekly case rates of health care workers for weeks 03 July – 14 August 2022



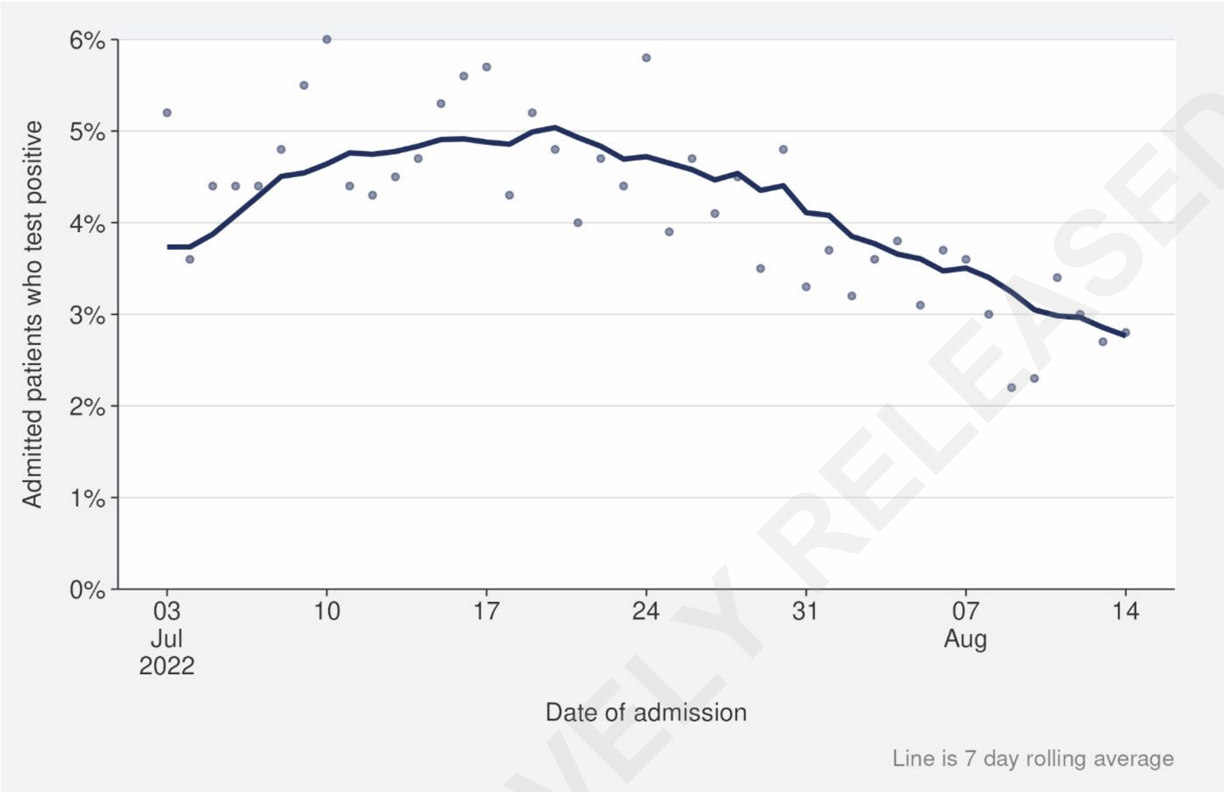
Source: Éclair/Episurv, 2359hrs 14 August 2022

[1] The population has been identified based on surveillance codes used in the healthcare workforce and the presence of previous testing data in 2022. A sensitivity check was run using at least 3 tests and while these numbers reduced, the incidence estimates remained very similar.

Test positivity trends among tertiary hospital admissions

Inpatient test positivity trends for tertiary hospital admissions[2] is shown in **Figure 2**. Tertiary hospital admission positivity has declined with a 7-day rolling average[3] of 3% (442/15,982) for the week ending 14 August.

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



Source: Tertiary hospitalisation data, NCTS and EpiSurv as at 2359hrs 14 August 2022

[2] 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, Waitemata, and Northland.

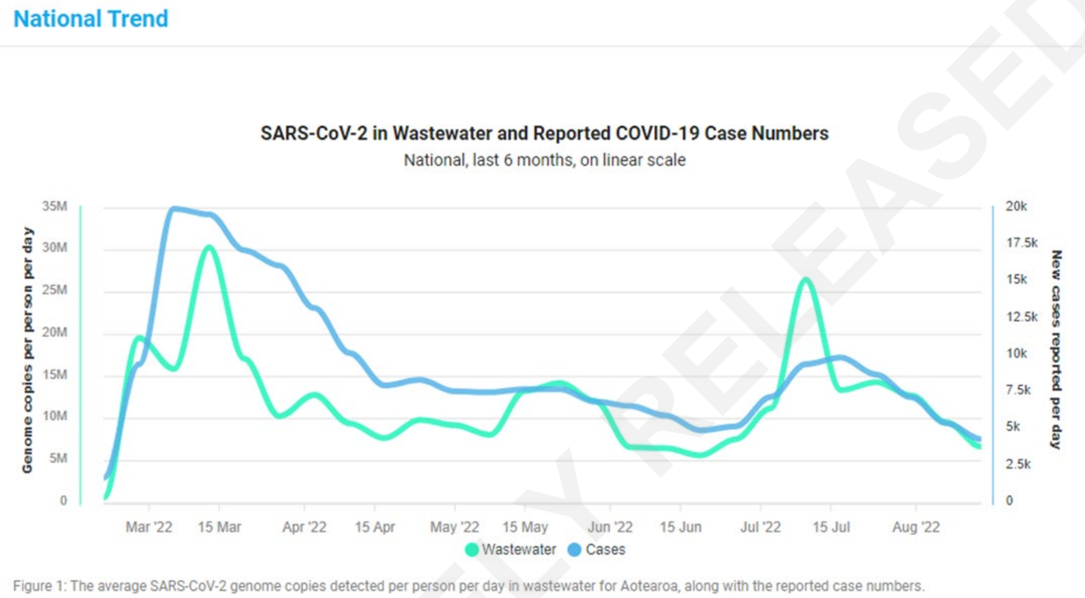
[3] A 7-day rolling average is an average of the daily values over the past seven days inclusive. This report uses both 7-day rolling averages and weekly rates; these differ in that the 7-day rolling average rate is on a daily scale and the weekly rate is on a weekly scale – hence, weekly rates are higher 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 indicated trends in the underlying infection rates.

Wastewater quantification indicates a decreasing trend nationally and across all regions.

Figure 3: National weekly wastewater trends in SARS-CoV-2 genome copies per person per day and 7-day average for cases



Source: ESR SARS-CoV-2 in wastewater update for week ending 14 August 2022

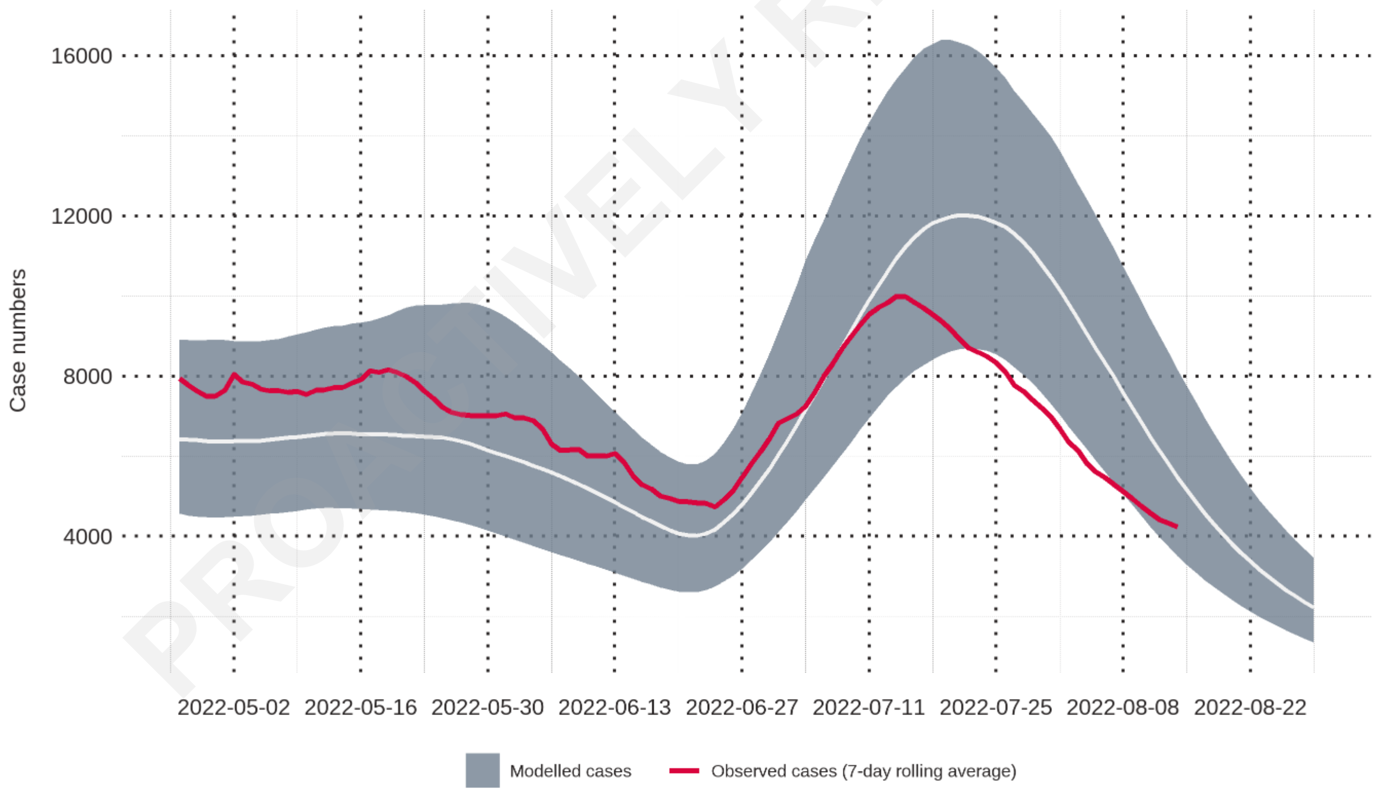
Modelled and observed trends in reported cases

Figure 4 compares the latest COVID-19 Modelling Aotearoa group's predictive model scenarios for the number of reported cases with the observed number of cases. The white line is the median prediction and grey areas indicate the upper and lower ranges of the prediction, and the red line indicates the observed cases.

The 'July' scenario assumes previous infection provides greater protection against reinfection and severe disease, consistent with emerging international evidence. It also incorporates updated data and future projections of uptake of second boosters, and an earlier transition to BA.5, consistent with the timing of cases and hospitalisations in New Zealand.

A peak was projected to occur in mid-July with daily cases rising to approximately 12,000 a day; however, the observed peak in reported cases was slightly earlier and was lower than the median projection. Case numbers have continued to track near the lower bound of the model prediction, for the week ending 14 August there was an average of 4,230 cases reported daily, equivalent to a rate of 0.9 per 1,000 population. This is a 20% decrease from the previous week, which was 1.1 per 1,000.

Figure 4: COVID-19 Modelling Aotearoa scenarios compared with reported cases nationally (BA.5 scenarios)



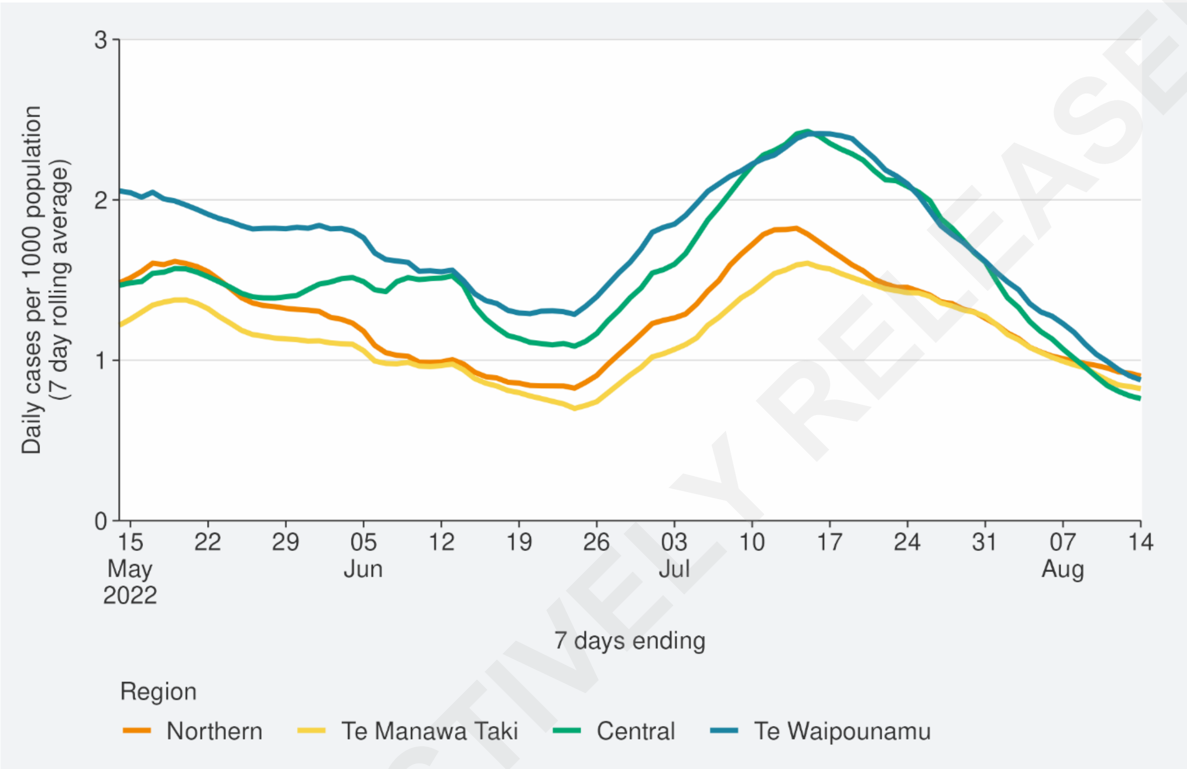
Sources: COVID-19 Modelling Aotearoa Branching Process Model August 2022, and Ministry of Health reported case data 14 August 2022

Regional trends in reported cases

Figure 5 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 (0.9 per 1,000) decreased by 11% in the past week, Te Manawa Taki (0.8 per 1,000) decreased by 17%, Central region (0.8 per 1,000) decreased by 29% and Te Waipounamu (0.9 per 1,000) decreased by 29%.

All 18 Districts experienced decreases of between 3% and 37% in the past week. The highest rate was in the South Canterbury District (1.1 per 1,000) and the lowest rate was in the Tairawhiti District (0.7 per 1,000).

Figure 5: Regional 7-day rolling average of reported case rates for weeks 15 May – 14 August 2022



Source: NCTS/EpiSurv as at 2359hrs 14 August 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 New Zealand entered Phase 3 of the Omicron response on 24 February 2022, the majority of testing has been through rapid antigen tests (RATs) rather than polymerase chain reaction (PCR) testing. RATs are self-administered and therefore require the individual to self-report their results, which may result in under-reporting of infections and of negative test results. The level of case ascertainment has also likely reduced due to active contact tracing becoming unsustainable early in the Omicron wave. As PCR testing is now only used in specific situations, PCR testing rates and positivity data are not representative of the current testing state of New Zealand, therefore demographic differences in case ascertainment cannot be evaluated.

Many infections are unreported, and the proportion of infections diagnosed and reported ('reported cases') may differ by age, ethnic and/or deprivation group. This means any difference must be interpreted with substantial caution.

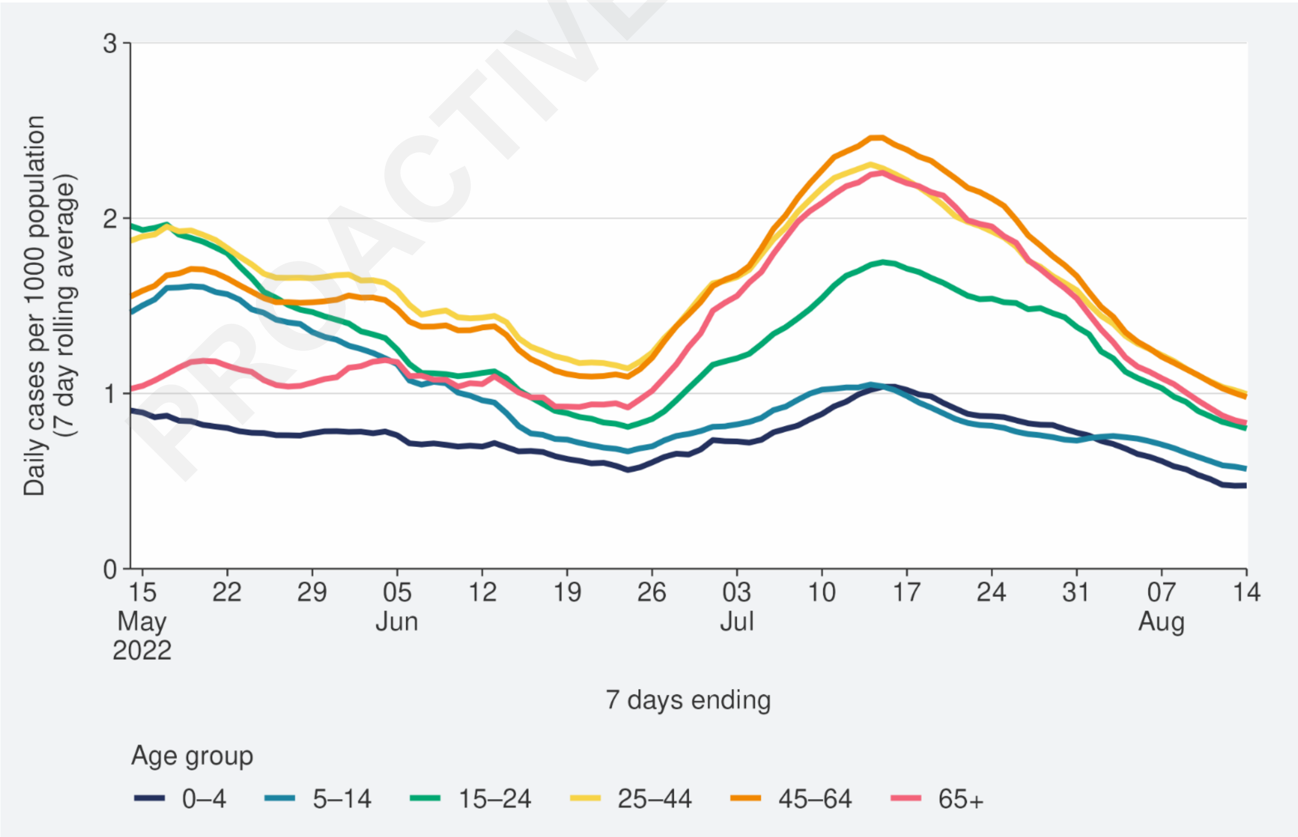
Age trends over time

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. Nationally, reported case rates in the 65+ age group, those most at risk of poor health outcomes after infection, decreased 24% from the previous week to 0.8 per 1,000 in the week ending 14 August.

Among the other age groups, rates in the past week were lowest in the 0-4 and 5-14 age groups (0.5 and 0.6 per 1,000, respectively). The rate for the 15-24 age group was 0.8 per 1,000. The 25-44 and 45-64 year age groups had the highest rates (both 1.0 per 1,000).

Figure 6: National reported case rates (7-day rolling average) by age for weeks 15 May - 14 August 2022



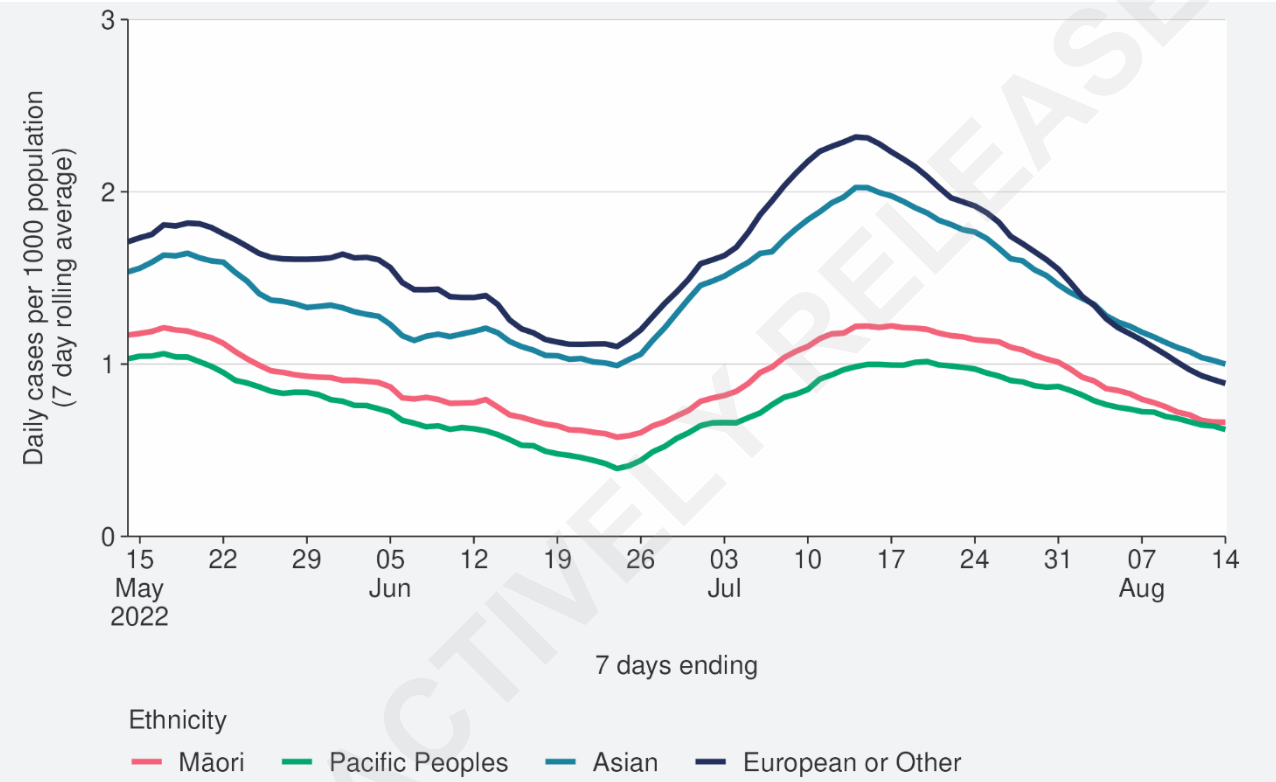
Source: NCTS/EpiSurv as at 2359hrs 14 August 2022

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 European or Other (22%) and the smallest decrease was seen in Pacific Peoples (14%). Rates in Asian (1.0 per 1,000) and European or Other (0.9 per 1,000) ethnicities remained higher than those for Māori (0.7 per 1,000) and Pacific Peoples (0.6 per 1,000).

Figure 7: National 7-day rolling average of reported daily case rates by ethnicity for weeks 15 May – 14 August 2022



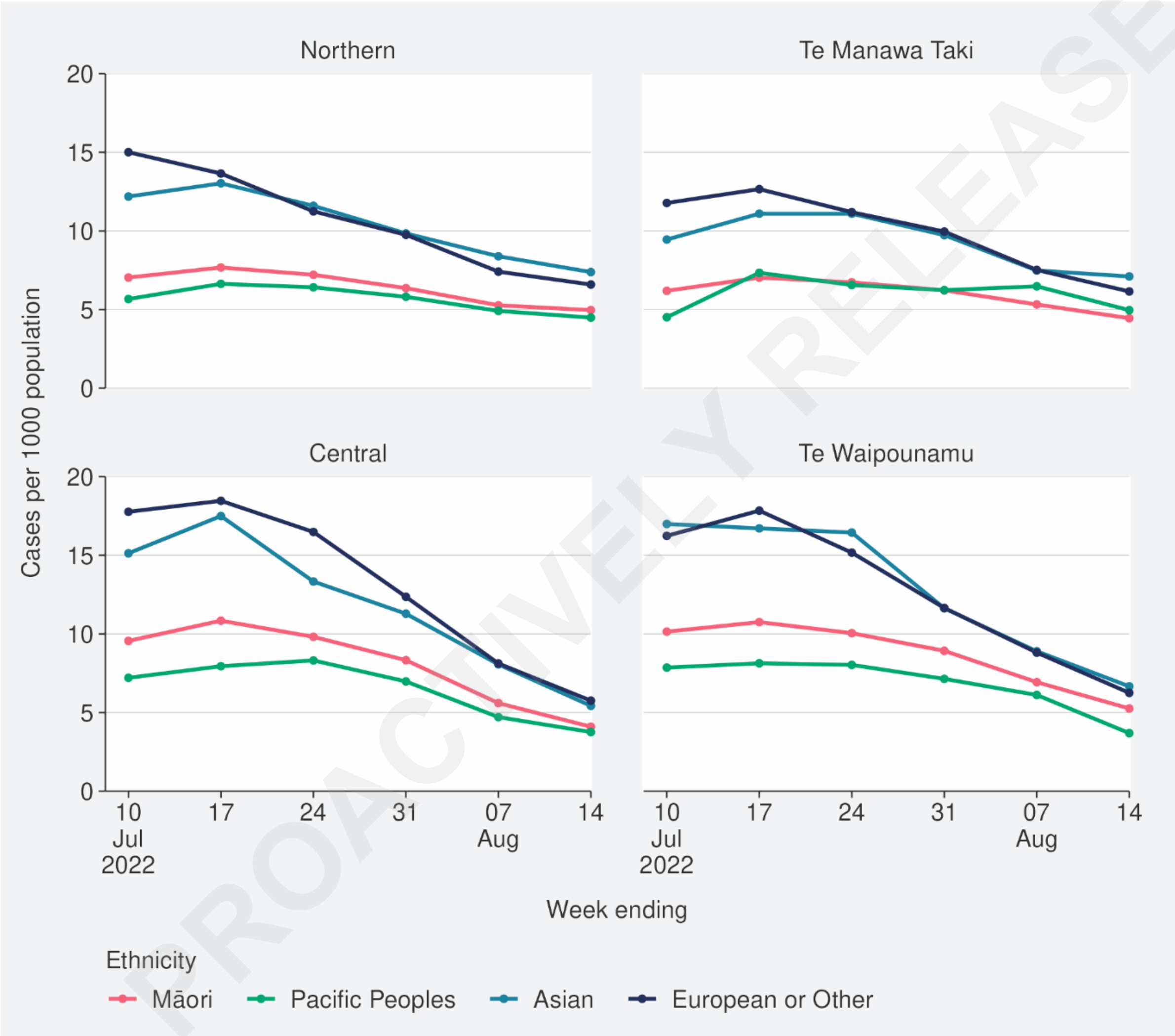
Source: NCTS/EpiSurv as at 2359hrs 14 August 2022

Figure 8 shows the regional weekly average of reported case rates by ethnicity.

Trends in all regions were similar: rates were highest in Asian and European or Other ethnicities, and rates decreased across all ethnicities in all regions.

Reported *weekly* case rates for the week ending 14 August for Asian people ranged from 7.4 per 1,000 in the Northern region to 5.4 per 1,000 in the Central region. European and Other rates ranged from 6.6 per 1,000 in the Northern region to 5.8 per 1000 in the Central region. For Māori the range was 5.3 per 1,000 in Te Waipounamu to 4.1 per 1,000 in the Central region. Among Pacific Peoples the range was 4.9 per 1,000 in Te Manawa Taki to 3.7 per 1,000 in Te Waipounamu.

Figure 8: Regional reported weekly case rates by ethnicity for weeks 10 July – 14 August 2022



Source: NCTS/EpiSurv as at 2359hrs 14 August 2022

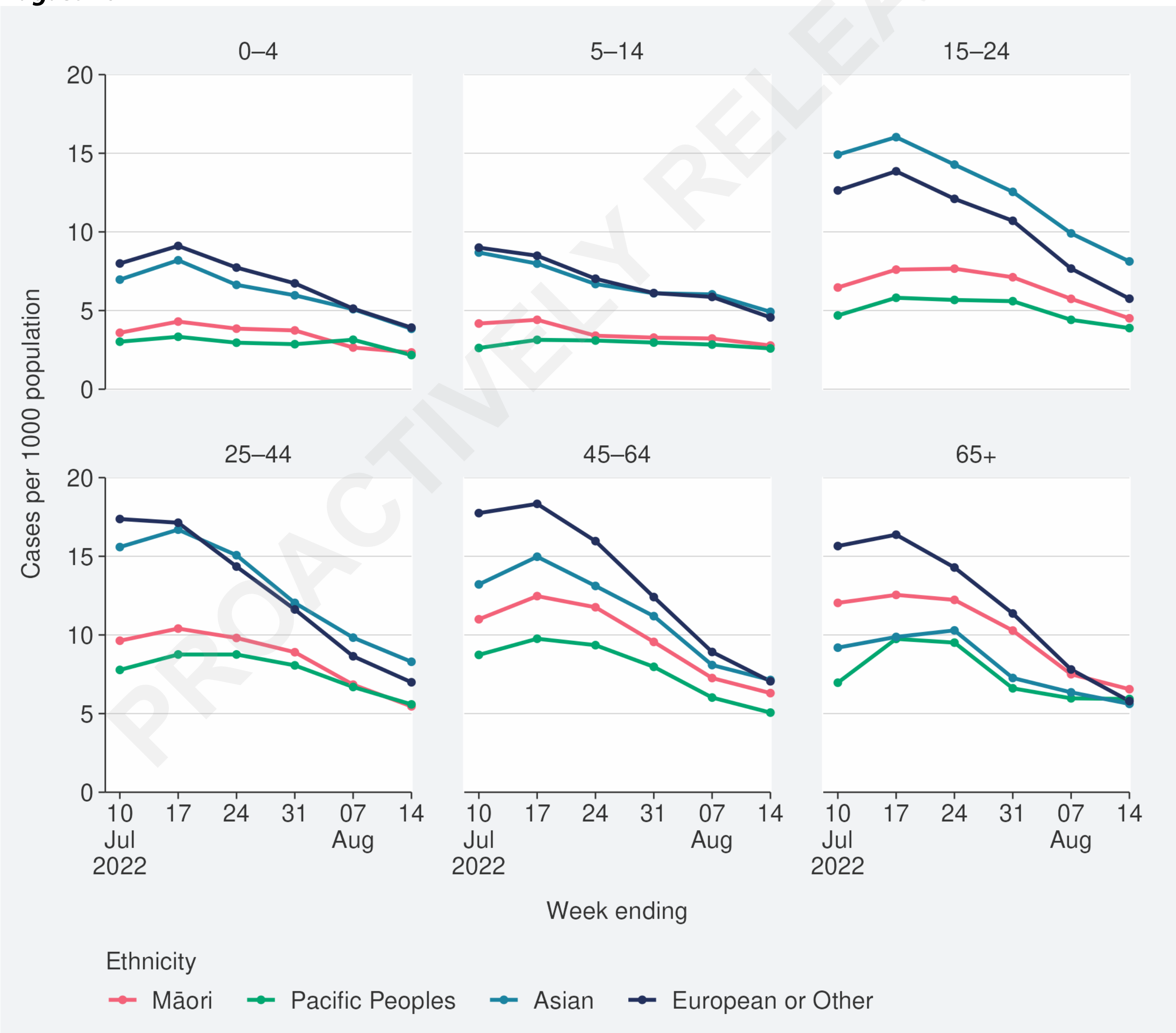
Figure 9 shows national reported weekly case rates by ethnicity and age group.

In those under 65 years, trends were similar across all ethnicities and age groups: all rates decreased, and rates were highest in Asian and European or Other ethnicities. The rate in Asian people was notably higher than all other ethnicities in those aged 15-24 (8.1 per 1,000), and the highest reported rate for any age group was also among Asian people (8.3 per 1,000 in 25-44 year olds). The lowest reported case rates were in Māori and in Pacific Peoples aged 0-4 (2.3 and 2.2 per 1,000, respectively).

Unlike other age groups, in 65+ the highest rate was in Māori at 6.5 per 1,000; followed by Pacific Peoples at 5.9 per 1,000 (the only group who did not experience a decreased in rate from the previous week); then European or Other at 5.8 per 1,000; and the lowest in Asian people at 5.6 per 1,000.

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 reported weekly case rates by age group for weeks 10 July – 14 August 2022



Source: NCTS/EpiSurv as at 2359hrs 14 August 2022

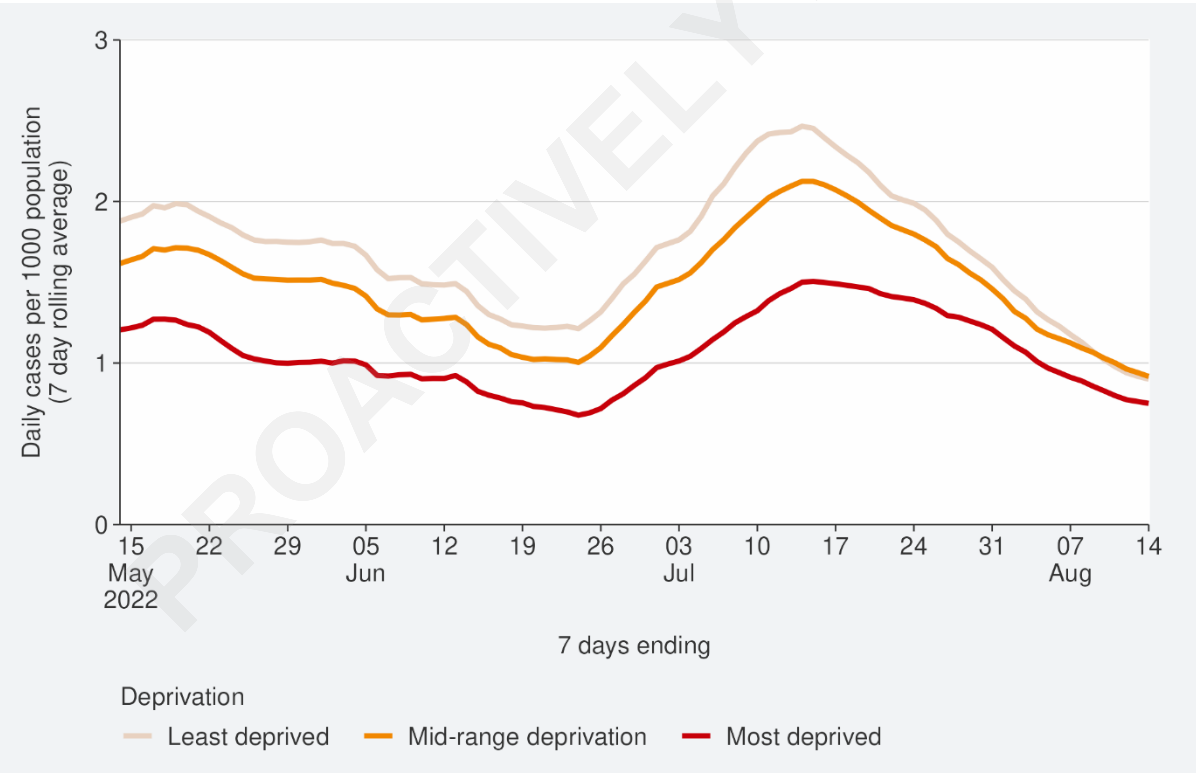
Deprivation trends over time

Figure 10 shows the 7-day rolling average for reported case rates by deprivation level (based on NZDep2018[4]). This is an area, not individual, based measure. 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.

Case rates have been highest in the least deprived areas for the past few months, but in the past week converged to a similar rate as areas of mid-range deprivation. Rates for all deprivation levels have continued to decrease; the 7-day rolling average to 14 August was highest in areas of least and mid-range deprivation (both 0.9 per 1,000 population), followed by most deprived areas (0.7 per 1,000).

Behavioural insights evidence[5] indicates 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 the registering of a positive test. These issues could be exacerbated in areas of higher deprivation. Thus, it could be that the trends are affected by deprivation-associated bias in case ascertainment and are not a true reflection of underlying infection rates by deprivation level; however, data to investigate this are not currently available. It is also feasible that lower reported case rates in areas of high deprivation could be partially explained by higher infection rates earlier in the year.

Figure 10: National reported 7-day rolling average COVID-19 case rates by deprivation status for weeks 15 May – 14 August 2022



Source: NCTS/EpiSurv as at 2359hrs 14 August 2022

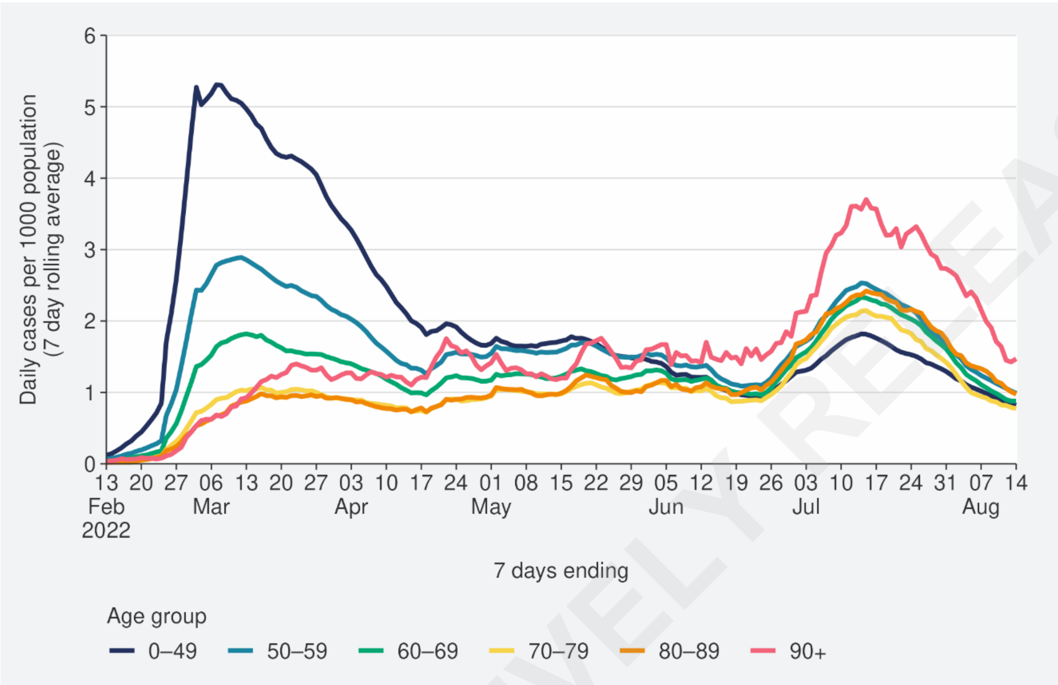
[4] Contents (otago.ac.nz)

[5] Information available on request

Trends in hospitalisation

Risk of hospitalisation (and mortality) is strongly linked with increasing age; recently there have been decreases in reported case rates in those aged over 60 years, after substantial increases in early July, particularly in those aged 90+ (**Figure 11**). Consequently, there has been a decrease in the recent numbers of hospitalisations (**Figure 12**).

Figure 11: Reported case rates (per 1000) with focus on those aged over 50 years, 13 February to 14 August 2022



Source: NCTS/EpiSurv as at 2359hrs 14 August 2022

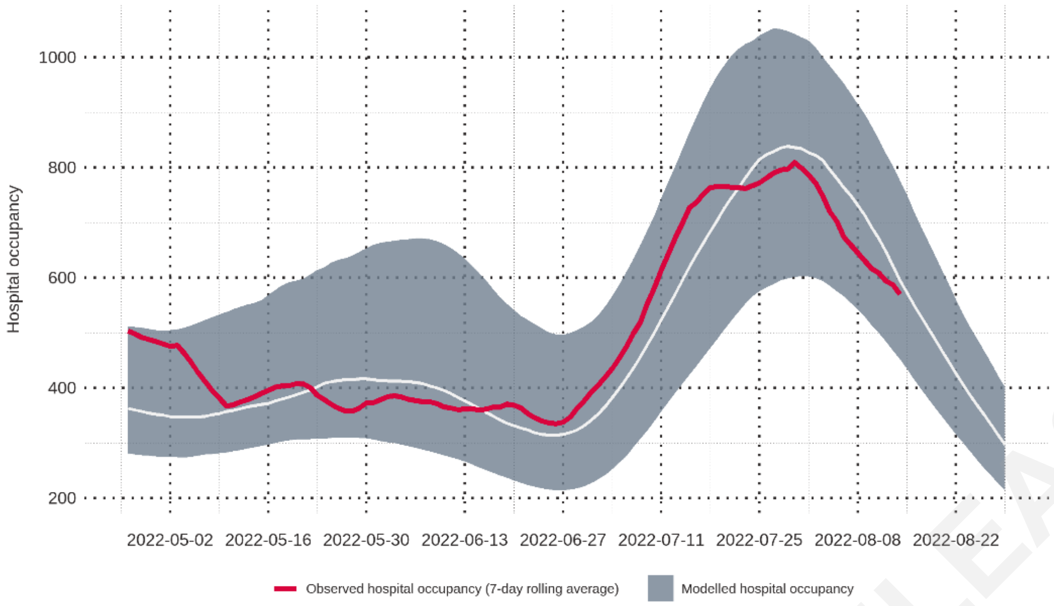
Modelled and observed trends in hospital occupancy

Figure 12 compares the latest COVID-19 Modelling Aotearoa group's scenarios for hospital occupancy with observed occupancy. The white line is the median prediction and grey areas indicate the upper and lower ranges of the prediction, and the red line indicates the observed occupancy.

The 'July' scenario assumes previous infection provides greater protection against reinfection and severe disease, consistent with emerging international evidence. It also incorporates updated data and future projections of uptake of second boosters, and an earlier transition to BA.5, consistent with the timing of cases and hospitalisations in New Zealand.

The peak was projected to occur between late July and early August with daily hospitalisations rising to approximately 800 a day. The observed hospital occupancy rate has been similar to the median prediction; in the week ending 14 August the average daily occupancy was 588, equivalent to a rate of 11.9 per 100,000 population This was a decrease of 11% from the week prior.

Figure 12: COVID-19 Modelling Aotearoa hospital occupancy compared with observed occupancy

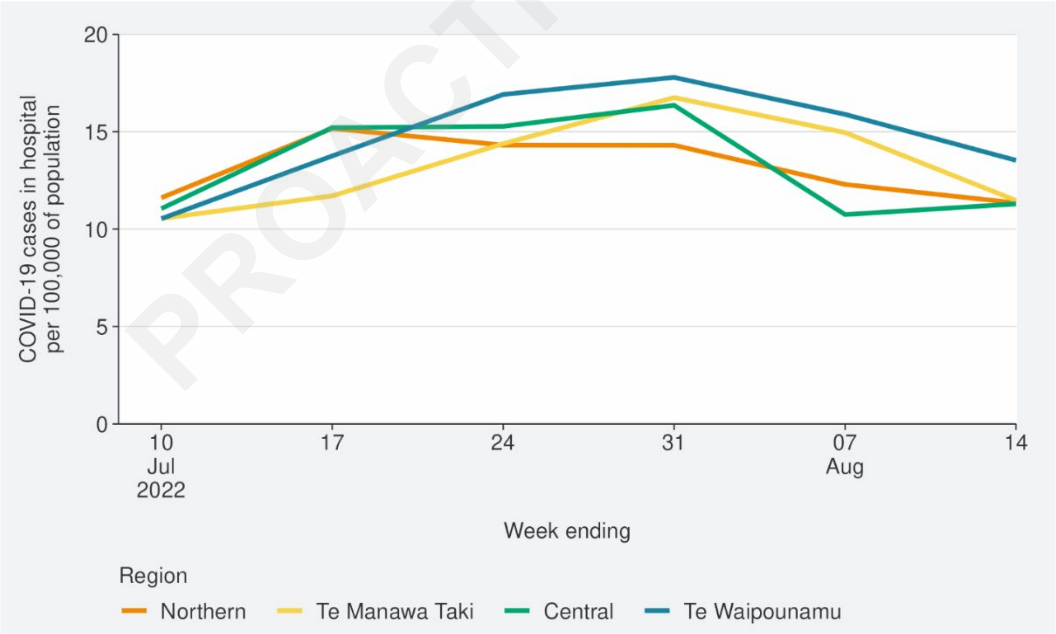


Sources: COVID-19 Modelling Aotearoa (CMA) Branching Process Model August 2022, hospital occupancy (all COVID-19 positive people admitted as inpatients) from Daily hospital questionnaire as of 14 August 2022.

Regional time trends in hospital occupancy

The weekly averages of daily hospital occupancy[6] decreased across all regions except in Central for the week ended 14 August (**Figure 13**). The Northern region (11.3 per 100,000) decreased by 8%, Te Manawa Taki (11.5 per 100,000) decreased by 23%, Central region (11.3 per 100,000) increased by 5% in the past week and Te Waipounamu (13.5 per 100,000) decreased by 15%.

Figure 13: Regional daily hospital occupancy averaged per week, 10 July – 14 August 2022



Source: Daily hospital questionnaire as of 14 August 2022

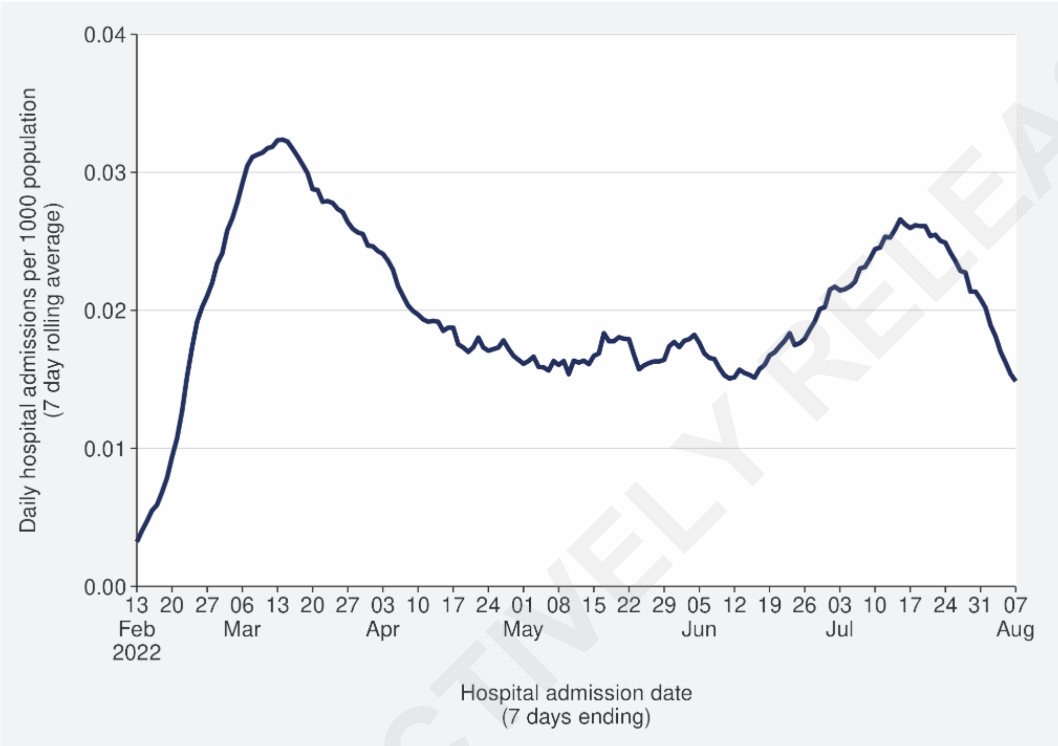
[6] Due to varying definitions of an active case, there may be regional differences in the coding of COVID-19 infection status for hospitalisations.

Hospital admission trends over time

As seen in **Figure 14**, the COVID-19 hospital admissions rate with COVID-19[7] has been decreasing since mid-July, to a 7-day rolling average of 0.015 per 1,000 for the week ending 07 August. Preliminary analysis indicates that 56% of cases are only reported as a case on the day of their hospitalisation.

Hospital admission rates by age group (**Figure 15**) were highest for those who are 90 years and older (1.8 per 1,000 of population), followed by those who are 80-89 years old (0.8 per 1,000) and those who are 70-79 years old (0.3 per 1,000). Admission rates among these age groups have continued to decline, decreasing by 28%, 35% and 13%, respectively, compared with the previous weeks ending 31 July.

Figure 14: COVID-19 hospital admissions[8] rate, 13 February to 07 August 2022

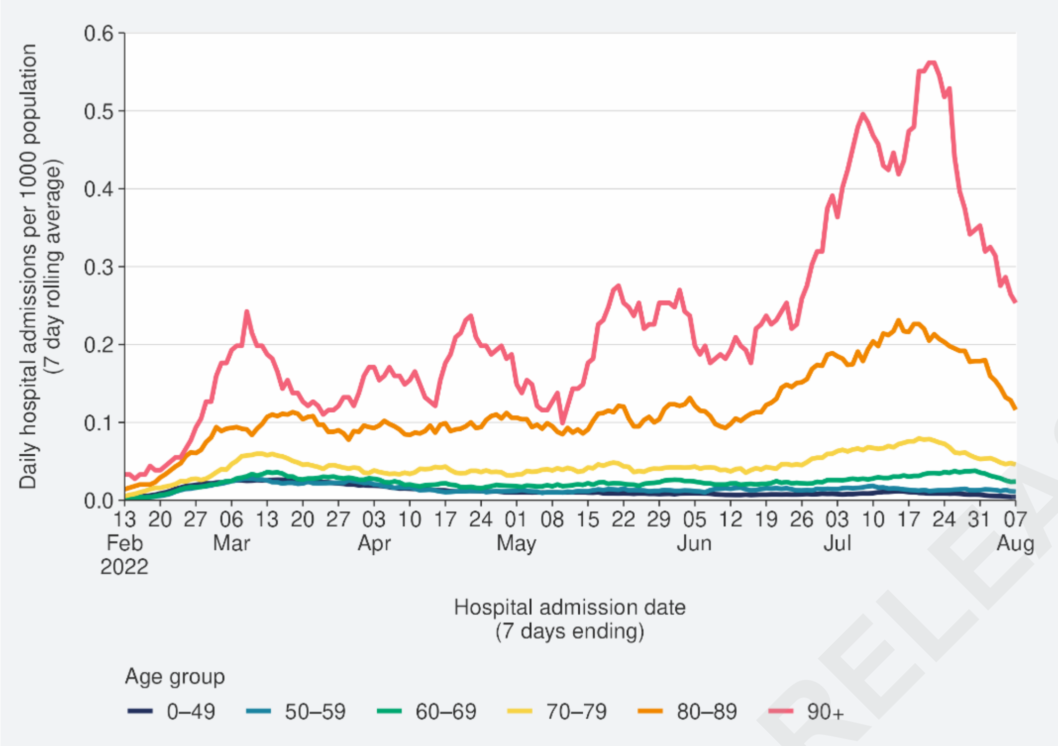


Source: NMDS/Inpatients admissions feed as of 14 August 2022 data up to 07 August 2022

7 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.

8 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 15: Hospital admission rates by age group, 13 February to 07 August 2022



Source: NMDS/Inpatients admissions feed as of 14 August 2022 data up to 07 August 2022

Hospital Admission Risk

Unadjusted and age-adjusted risk: disparities in hospitalisation risk by ethnicity and deprivation are more clearly observed after adjusting (age-standardising[9]) for differences in age demographics.

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 in age on average. As older age is also a strong risk for poor outcomes, the risk by ethnicity and deprivation can be masked. Therefore, the hospitalisation risk for these communities must be adjusted for age in order to make a more accurate comparison.

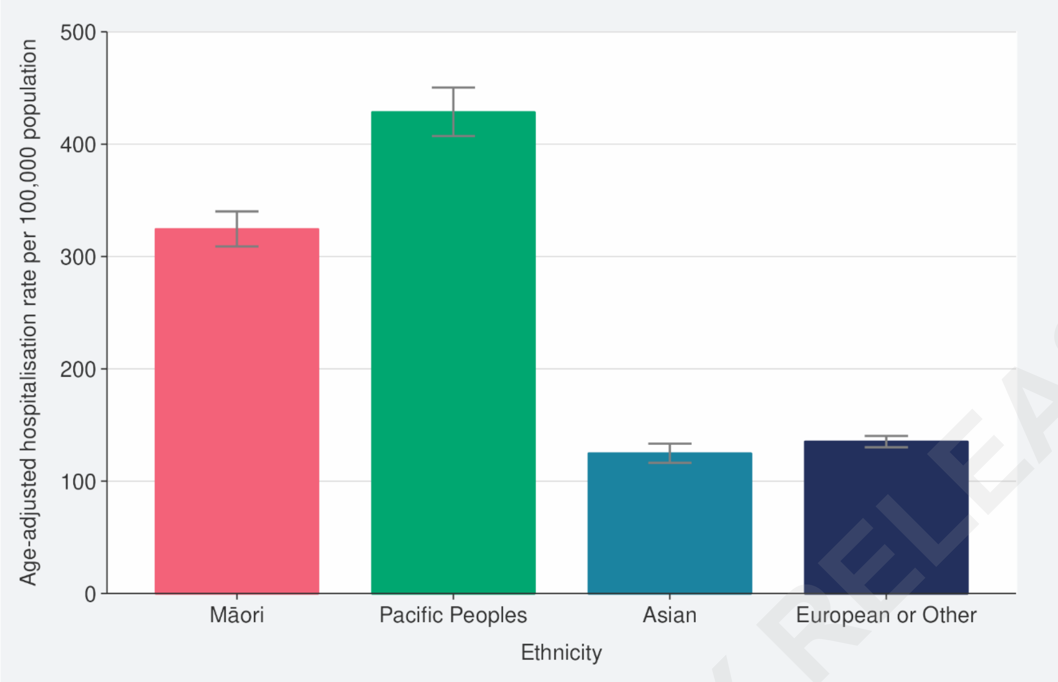
Figure 16 and 17 show age-standardised rates of hospitalisation with COVID-19 by ethnicity and by deprivation, respectively, for the time period of March 2020 to 14 August 2022. Rates are standardised to the Māori population age structure. Data are limited to districts with tertiary hospitals in the inpatient dataset and exclude incidental hospital admissions.

Pacific Peoples had the highest cumulative rate of hospitalisation with COVID-19 which was 3.3 times higher than both Asian and European or Other. Māori had the next highest rate which was 2.5 times higher than both Asian and European or Other (**Figure 16**). There was no significant difference between the hospitalisation rates of Asian compared with European or Other.

Those most deprived had the highest rate of hospitalisation with COVID-19 (2.5 times that of the least deprived) followed by those of mid-range deprivation (1.4 times that of the least deprived) **(Figure 17**).

[9] 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 16: Age-standardised cumulative incidence (and 95% confidence intervals[10]) of non-incidental[11] hospitalisation with COVID-19 by ethnicity, March 2020 to 14 August 2022

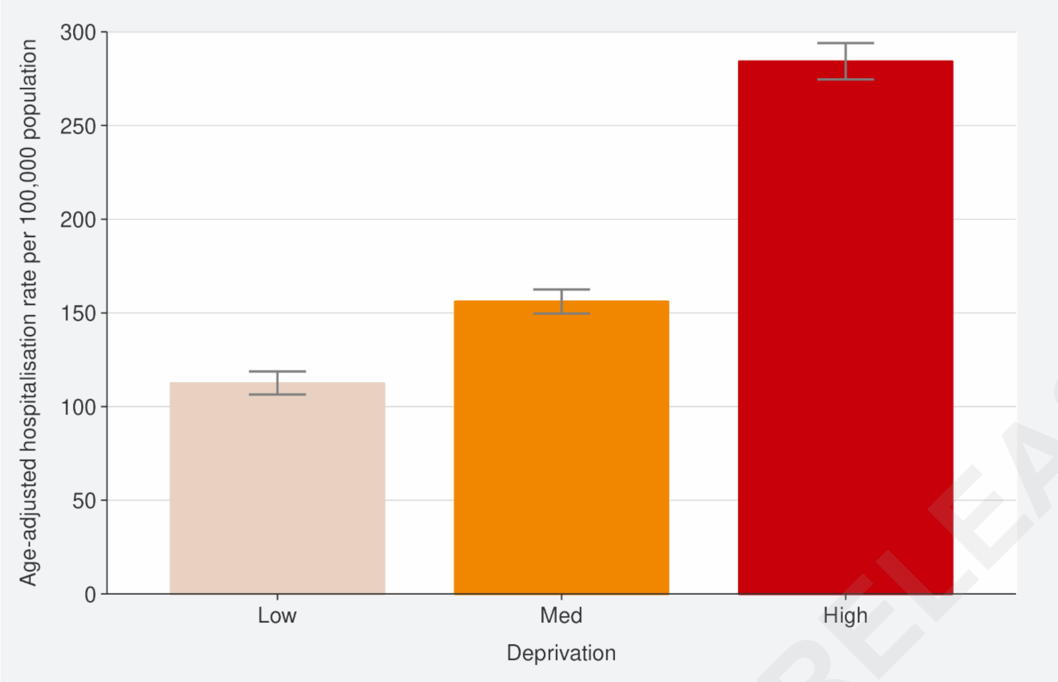


Source: NCTS/EpiSurv, NMDS, Inpatient Admissions dataset and CVIP population estimates, March 2020 to 14 August 2022

[10] 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.

[11] Non-incidental hospitalisations for COVID-19 refer to covid cases who have been hospitalised while an active covid case and have identified as like to be covid related. For further detail please refer to the glossary at the end of this report.

Figure 17: Age-standardised cumulative incidence (and 95% confidence intervals) of non-incidental hospitalisation with COVID-19 by deprivation, March 2020 to 14 August 2022



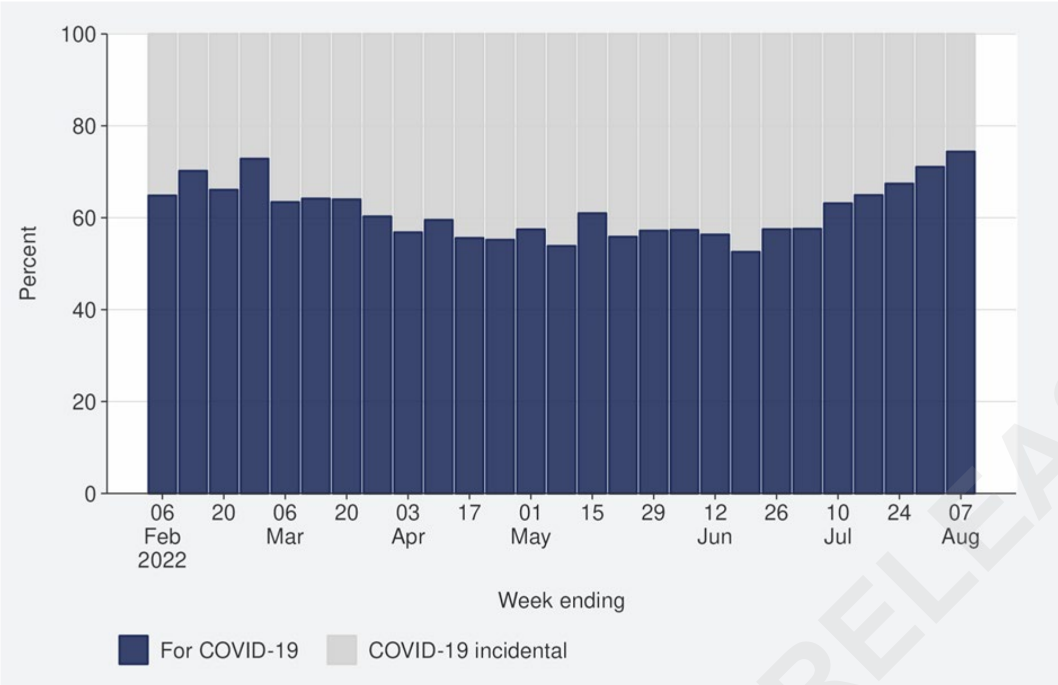
Source: NCTS/EpiSurv, NMDS, Inpatient Admissions dataset and CVIP population estimates, March 2020 to 14 August 2022

Hospital admission data source and admissions due to COVID-19

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. **Figure 18** shows hospital admissions with COVID-19 and the proportion which could be for COVID-19. The latest trends indicate that 74% were for COVID-19 and the rest were COVID-19 incidental in the week ending 07 August 2022.

Figure 18: Percentage of hospital admission for COVID-19 and incidental for COVID-19, 06 February – 07 August 2022



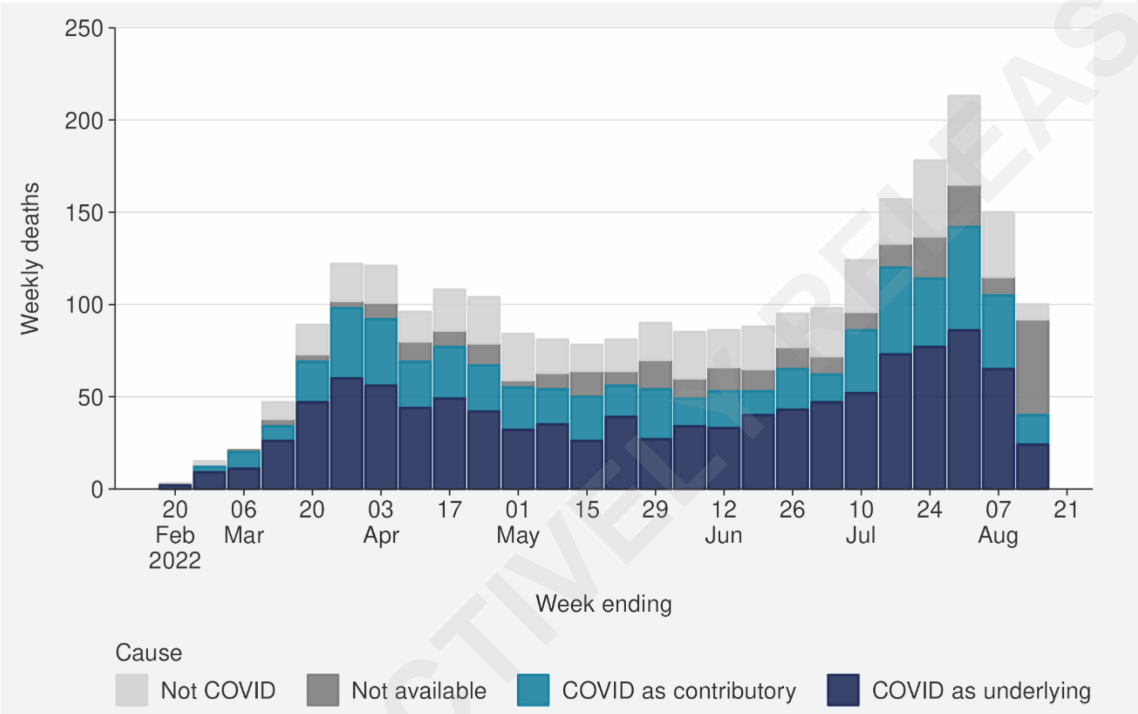
Source: NMDS/Inpatients admissions feed, 07 August 2022

Trends in mortality

Time trends in the number of deaths

From March 2020 to 14 August 2022, there were 2,497 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; of the deaths that have been formally coded by cause of death[12], 1,123 (49%) were determined to have COVID-19 as the main underlying cause. COVID-19 contributed to a further 627 (28%) deaths, another 521 (23%) people died of a separate, unrelated cause.

Figure 19: Weekly death counts by cause of death, 20 February to 14 August 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.

Mortality risk

Figure 20 and 21 show age-standardised[13] cumulative rates of mortality in the population that have been attributed COVID-19 by ethnicity and by deprivation, from March 2020 to 14 August 2022.

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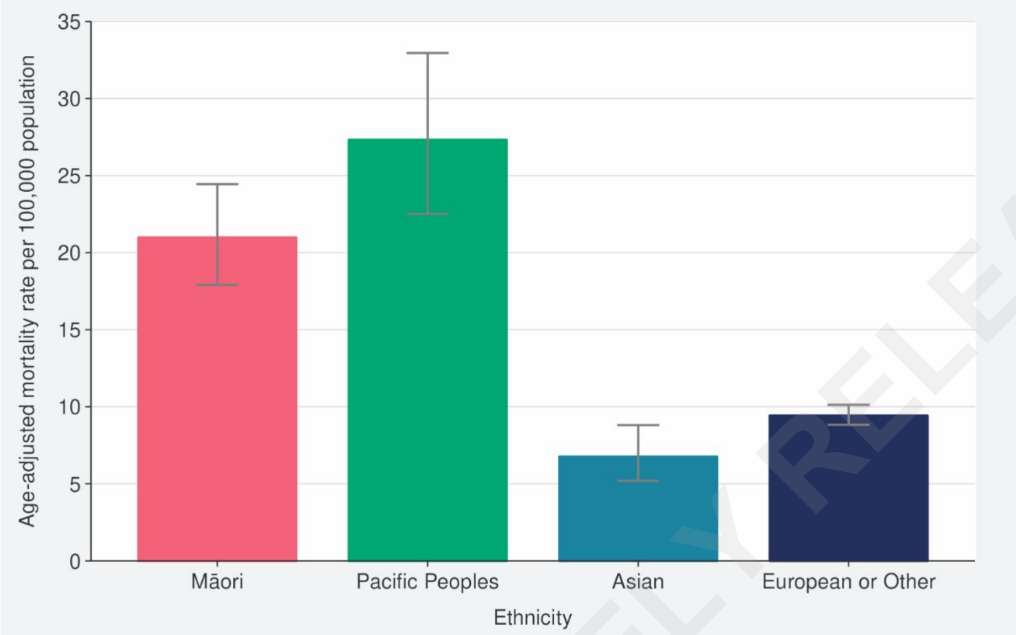
[12] All of the deaths within 28 days of a positive test report are fast-tracked for clinical/mortality coding to determine whether the infection was the underlying cause of the death, contributed to the death, or was unrelated to the death. An example of an unrelated death is a car accident; an example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

[13] 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.

Pacific Peoples had the highest risk of any ethnicity, 2.9 times that of European or Other. Rates for Māori were 2.2 times higher than European or Other, Asian rates were slightly lower than European or Other (**Figure 20)**.

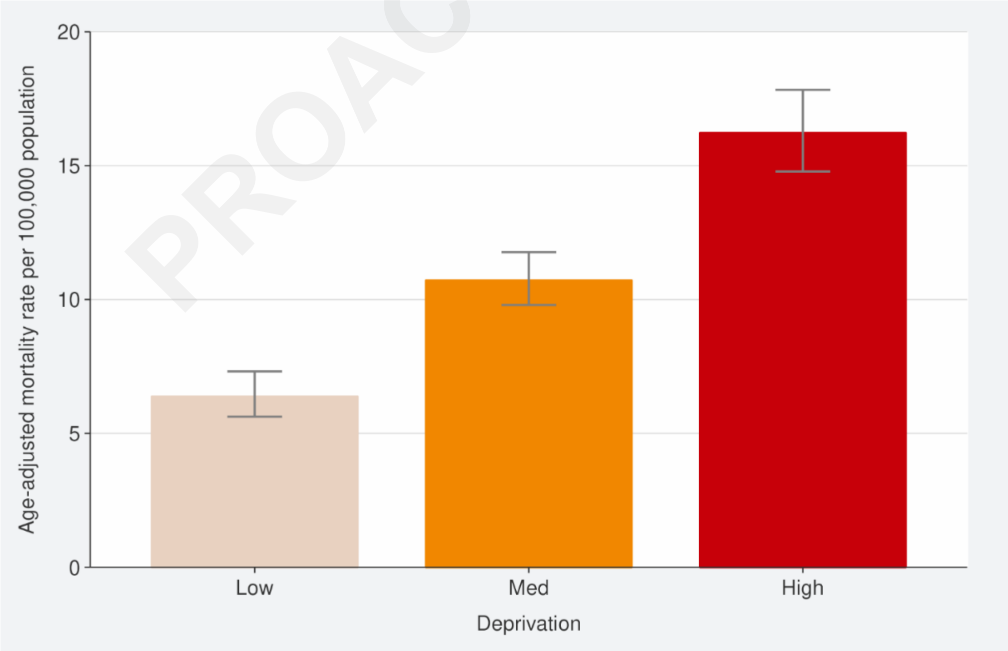
Being from deprived areas also carried high mortality risk: the most deprived had 2.5 times higher risk than the least deprived, with mid-range deprivation 1.7 times higher than the least deprived (**Figure 21)**.

Figure 20: Age-standardised cumulative incidence (and 95% confidence intervals) of mortality attributed to COVID-19 by ethnicity, March 2020 to 14 August 2022



Source: EpiSurv, Death Documents, The Healthcare User database, Mortality Collections database and CVIP population estimates, March 2020 to 14 August 2022

Figure 21: Age-standardised cumulative incidence (and 95% confidence intervals) of mortality attributed to COVID-19 by deprivation, March 2020 to 14 August 2022



Source: EpiSurv, Death Documents, The Healthcare User database, Mortality Collections database and CVIP population estimates, March 2020 to 14 August 2022

Whole Genomic Sequencing in community acquired cases

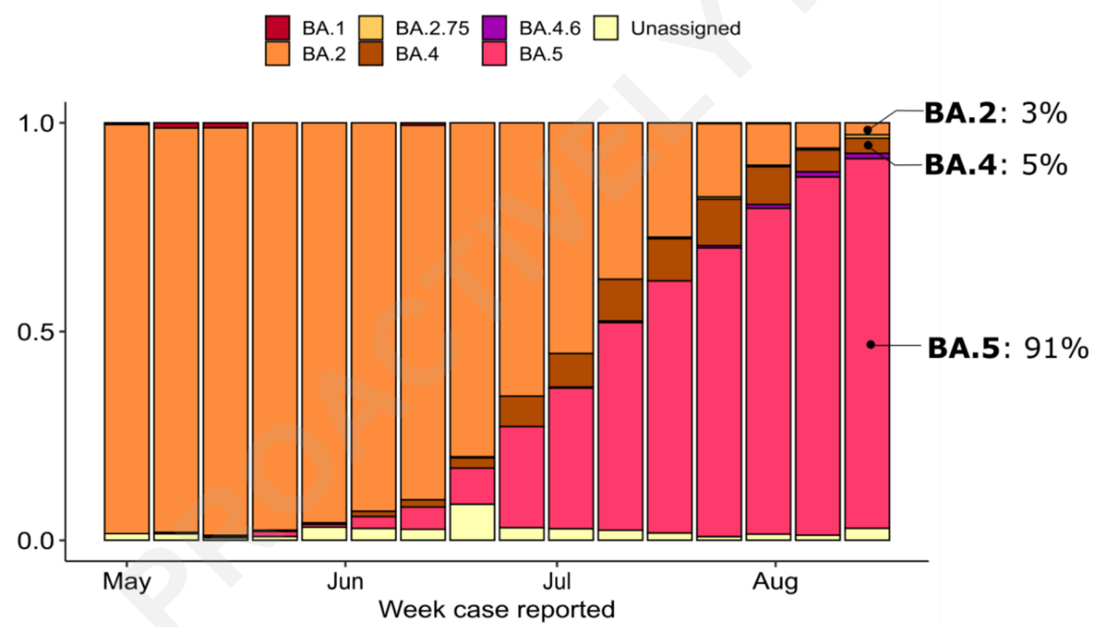
Whole Genomic Sequencing of community cases

Omicron is the dominant variant in New Zealand having outcompeted Delta, which made up ~70% of all cases that had undergone Whole Genome Sequencing (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 12 August, variants BA.4, BA.4.6, and BA.5 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 four and nine cases respectively reported in the two weeks to 12 August. 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 22** shows that BA.5 made up about 91% of sequenced community cases in the past week. **Figure 22** also shows the increasing frequency of BA.5 in community samples over the past few weeks. As expected, we see a (relative) growth advantage of BA.5 over other variants. BA.4 has decreased this week, making up 5% of cases.

Figure 22: Frequency of Variants of Concern in community cases in New Zealand



Source: ESR COVID-19 Genomics Insights Report #20, EpiSurv/Microreact 0900hrs 15 August 2022

Whole Genomic Sequencing of hospitalised cases

As of 15 August, ESR received samples from and had successfully processed 177 of the 664 PCR positive hospital cases with a report date in the two weeks to 12 August 2022. Of these 177 samples **7% were BA.2, 8% were BA.4, and 85% 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 have decreased in the past few weeks to below 200 per day.**

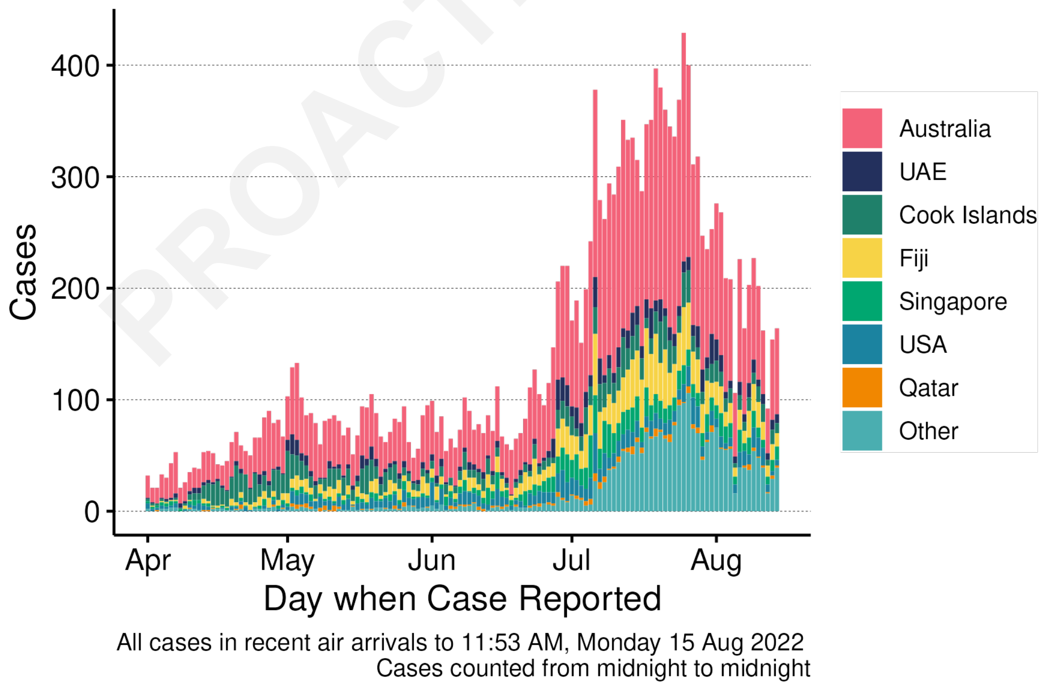
With the removal of pre-departure testing from 20 June, it appears that detected cases increased from most countries. The increase was consistent with expectations that pre-departure testing halves the number of infected people boarding aircraft, and with increasing Omicron BA.5 prevalence in many source countries. In the past month, 3% to 5% of recent arrivals were reporting a positive test.

Figure 23 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, the United States of America, the United Arab Emirates, Singapore, the Cook Islands and Fiji.

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 23: Reported cases reported in post-arrival testing by country of flight departure, 01 April – 14 August 2022

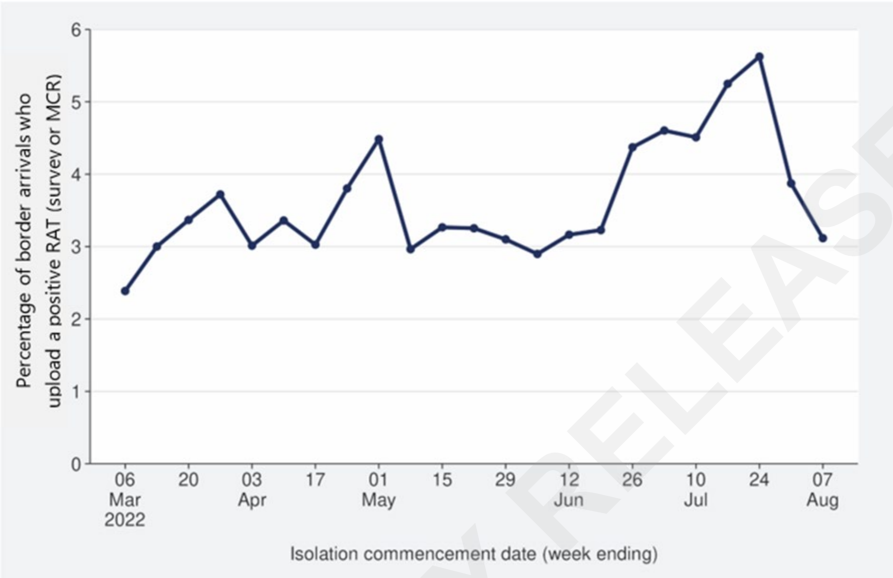


Source: NCTS/EpiSurv as at 2359hrs 14 August 2022

Testing of border arrivals

Figure 24 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 3% (1,868 of 58,950 arrivals who uploaded a test result) for the week ending 07 August.

Figure 24: Percentage of positive tests in border arrivals who report RATs, 06 March – 07 August 2022



Sources: NCTS/EpiSurv/Éclair as at 2359hrs 07 August 2022

Whole Genomic Sequencing of imported cases

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 25 shows the completion metrics for border returnee testing[14] and WGS from 06 March to 07 August 2022. The percentage of arrivals uploading a RAT has been relatively constant and was 87% (58,950 of 68,038 arrivals) in the week ending 07 August.

In the week ending 07 August, 49% of border arrivals who returned a positive RAT had a follow-up PCR test. This is similar to 51% the week prior. 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, approximately 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 07 August, the percentage of PCR positive border arrivals with WGS complete was 34%. This figure is very low, however, it should rise as more of the recent cases are processed. From mid-April to late June, this figure was between 40%-70%.

[14] 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.

Figure 25: Completion metrics for border returnee testing and WGS for arrivals, 06 March – 07 August 2022

Sources: NCTS/EpiSurv/Éclair as at 2359hrs 07 August 2022, ESR WGS 14 August 2022[15]

Over 90% of the genomes sequenced at the border in the past fortnight were BA.4/5 variants. These cases include reports of BA.2.75 and BA.4.6 in travellers to New Zealand. As at 9:00am 15 August, ESR had received samples from 589 of the 2,832 PCR-positive border cases with a report date in the two weeks to 12 August. Of the successfully sequenced samples, **85% were BA.5, <5% were BA.2, 8% were BA.4 and <3% were BA.2.75.** These proportions are similar to those seen in the community; see the community WGS section on **page 24**. In this reporting window, 19 BA.2.75 cases (3%) and 22 BA.4.6 cases (4%) were detected at the border – this is higher than the 0.5% of BA.2.75 cases and 1% of BA.4.6 cases found in the community during the same reporting window.

[15] 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

Globally

- Globally, in the week ending 14 August 2022, the number of weekly cases decreased by 24%, with 5.4 million new cases reported.
- The number of new weekly deaths decreased by 6% compared to the previous week, with over 15,000 fatalities reported.
- At the regional level, the number of reported new weekly cases decreased across all six regions: the African Region (-38%), the European Region (-38%), the Eastern Mediterranean Region (-30%), the Western Pacific Region (-18%), the Region of the Americas (-17%), and the South-East Asia Region (-11%).
- The number of new weekly deaths increased in the Western Pacific Region (+31%) and the South-East Asia Region (+12%), while it decreased or remained stable in the African Region (-33%), the European Region (-25%), the Eastern Mediterranean Region (-7%), and the Region of the Americas (-4%).
- Globally, 15 July to 15 August 2022, 172,042 SARS-CoV-2 sequences were submitted to GISAID. Among these sequences, the Omicron variant of concern (VOC) remains the dominant variant circulating globally, accounting for 99.3% (170,905) of sequences.
- Notably, BA.1.X, BA.2.X (incl. BA.2.12.1 and BA.2.75) and BA.3.X have a prevalence of <1%, 3% and <1%, respectively in the week ending 30 July 2022. The prevalence of BA.4.X is 8%, representing a declining trend as compared to previous weeks. BA.5 and its descendent lineages continue to rise in relative prevalence as compared to other descendent lineages and account for 74% of submitted sequences in the week ending 6 August 2022.
- Genetic diversification of BA.5 has also resulted in multiple descendent lineages, with additional mutations in both the spike and non-spike regions.
- Among all BA.5 descendent lineages, the relative proportions of BA.5.1, BA.5.2 and BA.5.2.1 are rising, accounting for 29%, 22% and 30% of submitted sequences, respectively in the week ending 6 August 2022. BA.5.2.1 is the most prevalent variant in all six WHO regions in the week ending 13 August 2022.
- Among the Omicron descendent lineages that continue to emerge is BA.2.75, with the earliest sequences reported in May 2022. This variant, currently an Omicron subvariant under monitoring, has nine additional mutations in the spike as compared to its parent lineage BA.2; four of these mutations are within the receptor binding domain (RBD), and at least one of these RBD mutations has been associated with immune escape in previous variants.
- Preliminary laboratory-based studies indicate a relative growth advantage of BA.2.75 as compared to BA.2 and BA.5. Further, there is an indication of higher fusogenicity, more efficient replication in lung cells and more pathogenicity in a hamster model as compared to BA.2. More studies are required to confirm these preliminary findings.

Sources: World Health Organisation: Weekly epidemiological update on COVID-19 - 17 August 2022

Australia

- In the 14 days up to 16 August 2022, there were 1,439 new cases per 100,000 population. This is a decrease from the week prior (14 days up to 09 August 2022) where there were 1,951 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 up to early August.
- As at 16 August 2022, there are 3,807 current cases in hospital with 122 in ICU. This is a decrease from when last reported (03 August 2022) where there were 4,343 hospitalised cases. The majority of these cases were in New South Wales (2,115), Queensland (439) and Victoria (518) a continuation of the distribution observed when last reported. However, all three states continue to steadily decrease with regards to hospitalised cases.

Sources: Australian Government: Coronavirus (COVID-19) common operating picture

United Kingdom

- Between 6 August 2022 and 12 August 2022, 40,027 people had a confirmed positive test result. This shows a decrease of -21% compared to the previous 7 days.
- Between 10 August 2022 and 16 August 2022, there have been 941,123 tests. This shows a decrease of -9% compared to the previous 7 days.
- Between 6 August 2022 and 12 August 2022, there have been 744 deaths within 28 days of a positive coronavirus test. This shows a decrease of -20% compared to the previous 7 days. The death rate per 100,000 is now 1.3.
- Of the 19,780,734 total cases in England, 1,218,453 are reinfections and 18,562,281 are first infections.
- In the week up to and including 15 August, there were 6,005 COVID-19-related admissions to hospital, a decrease of -10% compared to the week prior.
- In the week up to an including 12 August, 17.976 received a first dose of vaccine, 40,589 received a second dose and 28,949 received a booster or third dose.
- The cases for Northern Ireland (-12%), Scotland (-18%) and Wales (-15%) have all decreased in the week up to 12 August.

Sources: Coronavirus (COVID-19) Data: UK

Japan

- Japan continues to be the country with the highest number of new cases with a 7-day rolling average of 186,653 as at 17 August. However, this is a decrease from the August 9 peak of 215,444.
- Deaths are increasing with a 7-day rolling average of 232 deaths. The previous peak in deaths was from an early wave in late February and was 234 deaths. As the current rate of deaths does not appear to be decreasing, it is likely it will surpass the previous wave's peak in the coming week.

- 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.
- Mass infections at facilities for the elderly may be responsible for the increase in deaths occurring alongside a decrease in infections generally.

Sources: Our World in Data: Japan

South Korea

- Following a peak in late March 2022, South Korea experienced a decline in cases. However, from late June onwards, cases have begun to rise again.
- The current 7-day rolling average for confirmed cases as at 17 August is 125,447.
- The 7-day rolling average for confirmed deaths is 53. While this is lower than the March peak where the 7-day rolling average for deaths reached a peak at 359, it is unclear when this will begin to plateau.
- Amidst its current situation, South Korea has updated it's vaccination advice to recommend boosters for all those aged 18 and over as well as vulnerable children aged 12-17 if their infection was more than three months ago. Previously, their advice was limited to those who have not had an infection. This change is in a bid to address the level of reinfections currently being driven by the immune-evasive BA.5 Omicron subvariant.

Sources: Our World in Data: South Korea

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 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. Implementing all the interventions has a synergistic effect on controlling the COVID-19 epidemic, even if the impact of each intervention is moderate. Additional public health measures for children could further help the mitigation.
- 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.

Modelling

- 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.

MANATŪ HAUORA
MINISTRY OF HEALTH

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, Waitemata 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.