Trends and Insights Report

Updated 12 August 2022

This report is classified as "in confidence" and should only be distributed beyond the intended recipients on a need-to-know basis.

Purpose of report

This report comments on national and regional quantitative trends in the New Zealand COVID-19 outbreak, including infections, diagnosis, 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. Many cases are unreported and the proportion of missing cases may differ by ethnic or deprivation group. This means any difference must be interpreted with substantial caution.

Key insights

Infection Trends

- Nationally, the reported weekly case rate was 7.5 per 1,000 population for the week ending 07 August. This is a 24.4% decrease from the previous week, which was 9.9 per 1,000.
- For the week ending 07 August, estimates suggest that 1.4% (483/34,307) of healthcare workers (HCW) tested positive.
- Comparisons of reported case rates in HCW to general community indicate a minimum of 50% of community infections are not being reported (14.1 per 1,000 vs 7.5 per 1,000).
- Levels of viral RNA in wastewater levelled out with an increase in Auckland Metro and Te Manawa Taki and decrease in Northern, Central and Te Waipounamu.
- Contradictory to decreasing trends among reported case rates and those among HCW, wastewater levels indicate that there have been no substantial decreases in the level of new infections.
- In the past week, all 18 Districts experienced a decrease in reported case rates.

Demographic Trends in Case Rates

- The lowest reported daily case rates (7-day rolling average) continue to be in Pacific Peoples (0.7 per 1,000); reported case rates in this group have decreased by 17% in the past week. The daily 7-day rolling average of reported case rates among Māori have also decreased and are now at 0.8 per 1,000.
- For the 65+ age group, reported case rates in the Northern region decreased by 24%, Te Manawa Taki decreased by 25.1%, Central decreased by 39% and Te Waipounamu decreased by 31.3% in the past week.
- Reported case rates for those at higher risk of complications or severe illness from COVID-19, for those aged 45-64 and those aged 65+, were highest in European or Other (45-64 at 8.9 per 1,000), followed by Asian (45-64 at 8.1 per 1,000).

Hospitalisation and Mortality

- Pacific Peoples had the highest cumulative incidence rate of hospitalisation with COVID-19, which was 1.4 times higher than Māori ethnicity, 3.4 times higher than European or Other ethnicity and 3.6 times higher than Asian Peoples.
- The most deprived areas had the highest rate of hospitalisation with COVID-19 (269.6 per 100,000) followed by areas of mid-range deprivation (145.5 per 100,000) and the least deprived areas (101.6 per 100,000).

- For the week ending 31 July, the national daily average hospital occupancy for inpatients with COVID-19 was 16.0 per 100,000 population, an increase of 5.7% from the week prior. Average hospital occupancy rates increased across all regions, except for the Northern region in the past week. The Northern region (14.3 per 100,000) remained the same, Te Manawa Taki (16.8 per 100,000) increased by 16.5%, Central region (16.4 per 100,000) increased by 7.1% and Te Waipounamu (17.8 per 100,000) increased by 5.2%.
- As of 08 August 2022, there were 2,391 deaths with COVID-19 infection 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).
- Of the deaths that have been reviewed, 49% had COVID-19 as the main underlying cause, and COVID-19 contributed to 28% of deaths. The remaining 23% were found to be due to unrelated causes, such as accidents.

Whole Genomic Sequencing

- Omicron BA.5 was the dominant subvariant accounting for about 86% of sequenced community cases in the past week.
- This week, watchlist variants (BA.4 and BA.5) were again detected in community samples and wastewater data detected BA.4/5 at almost all sites. The rise of the BA.5 variant of Omicron is a key observation.
- As of 08 August, ESR received samples from and had processed 195 of the 655 PCR positive hospital cases with a report date in the two weeks to 05 August 2022. Of those that successfully produced a genome, 13% had a BA.2 genome, 6% were BA.4 and 81% were BA.5.

Border Surveillance

- In the week ending 31 July, there were 70,079 border arrivals, of whom 86.1% (60,356) uploaded a RAT result upon arrival. This is a decrease compared to 88% in the week prior.
- In the week ending 24 July, 3.3% of recent arrivals tested positive via RAT, a decrease from 4.9% in recent weeks.
- Cases in border arrivals have decreased after a steady increase beginning mid-July. By 31 July, there were 200-300 reports per day. In general, the increase trend is in line with expectations following the removal of pre-departure testing from 20 June and is still low compared to cases acquired in the community.
- The percentage of PCR positive border arrivals with WGS complete was 8.4%. This figure is quite low; however, it is expected to rise as more of the recent cases are processed. In the previous three months, this figure was between 40% and 70%.

International and Scientific Insights

- Globally, in the week ending 07 August 2022, the number of weekly cases remained stable to the previous week, with 6.9 million new cases reported. The number of new weekly deaths remained stable with 14,000 deaths reported.
- Globally, from 8 July to 8 August 2022, 175,384 sequences were collected and uploaded to GISAID. The Omicron VOC remains the dominant variant circulating accounting for 99% (174,089) of sequences.
- A comparison of sequences submitted to GISAID in the week ending 30 July and the week ending 29 July shows that BA.5 Omicron descendent lineages continued to be dominant globally, with the weekly prevalence increasing from 68.9% to 69.7%. Conversely, within the same time period, BA.4, BA.2.12.1 and BA.2 sequences showed a decline from 10.8% to 9.1%, 2.4% to 1.3% and from 1.4% to 1.0%, respectively.
- The scientific insights section includes studies on outbreak management, economic evaluations, transmission dynamics and modelling studies.

Health System Capacity

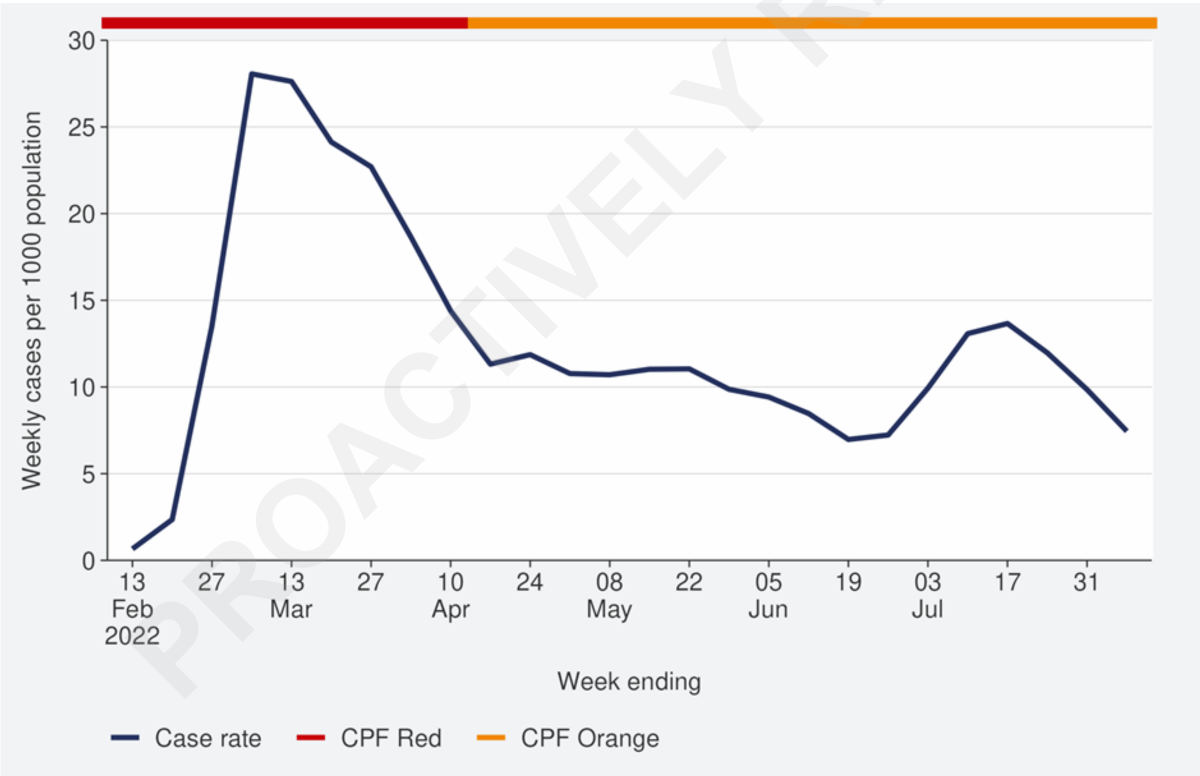
- Aged residential care (ARC): As at 11 August, 413 cases were reported in ARC facilities. This has reduced from 519 at 03 August.
- Daily hospital occupancy: As at 11 August, the national daily hospital occupancy metrics show overall ICU/HDU (critical care) occupancy at 76.5%, with 16.9% of ventilators in use and 88.7% of ward beds occupied.

Domestic epidemic outlook

Infection outlook

- NZ was in COVID Protection Framework Red from the start of the year until 14 April 2022 when it moved to Orange, where it remains (**Figure 1**).
- The rate of decline for cases slowed after the week ending 17 April, after which a plateau with a slight decline to the week ending 19 June was observed.
- Following this, cases increased for four weeks to the week ending 24 July, driven by increasing growth of the BA.5 variant which outcompeted the previous dominant variant BA.2.
- Currently, reported community cases have continued to decline for the past four weeks.
- Wastewater quantification levels continue to indicate slower rate of decrease in new infections across the motu compared to trends in reported cases. Levels have plateaued overall.
- These trends continue to be driven by Omicron subvariant BA.5. Modelling previously predicted that BA.5 would reach 90% of all community cases in early August; Whole Genome Sequencing indicates that BA.5 was responsible for 86% case rates (as of ESR report, 8 August).
- Of all COVID-related hospitalisations, over 60% are *for* COVID-19 and the rest are COVID-19 incidental.

Figure 1: National weekly case rates and CPF level for 13 February – 07 August 2022



Source: Éclair/Episurv, 2359hrs 07 August 2022

Tertiary Care outlook

- Inpatient test positivity for COVID-19 has tapered to between 30-40 per 1,000 inpatients in the past week.
- Attributable risk analysis indicates, in addition to being of an older age, being Māori or Pacific Peoples, being in the most deprived areas or having less than 2 doses of vaccine increases risk for hospitalisation. This is especially true for risk of hospitalisation in those aged under 60 years.
- Although hospitalisations appear to be decreasing, the risk for severe outcomes remains for populations such as those who are older, unvaccinated and/or have co-morbidities.

Case ascertainment and data quality issues

- Community case ascertainment is likely to be affected by a number of factors including prior infections, barriers to access and uploading of test results, financial issues from having to isolate, inability to take time off work and not having a place to isolate safely.
- These issues could be exacerbated in areas of higher deprivation and for younger age groups.
- Thus, it could be that some of the difference is explained by deprivation-associated bias in case ascertainment; however, data to investigate this are not yet available.

Contents

Figures

Infection Trends

Summary of evidence for infection and case ascertainment trends

The healthcare workforce reported case rates in the past week (14.1 per 1,000) were higher than the self-reported general population (7.5 per 1,000). This suggests that the underlying level of infection is higher than diagnosed rates. Reported case rates in healthcare workers have declined in the past four weeks. These trends were consistent with general population reported case rates which have also decreased for the past four weeks.

Inpatient COVID-19 test positivity at tertiary hospitals across the motu reduced further in the past week to 31 per 1,000, supporting evidence that there has been a true decrease in incidence in the community.

Levels of viral RNA in wastewater have plateaued overall. 33% of sites have increased SARS-CoV-2 levels compared to the previous week, and 38% decreased levels. When compared to a month ago, 21% of sites show an increase and 65% of sites a decrease.

EpiNow forecasting indicates the median estimate of effective R (Reff) nationally is 0.8. This means cases are likely to decrease in the coming week.

Approximation of underlying infection incidence

Please note that we have removed data related to Border Worker reported case rates and testing as the underlying surveillance data are under review due to the end of the legal requirement for routine testing.

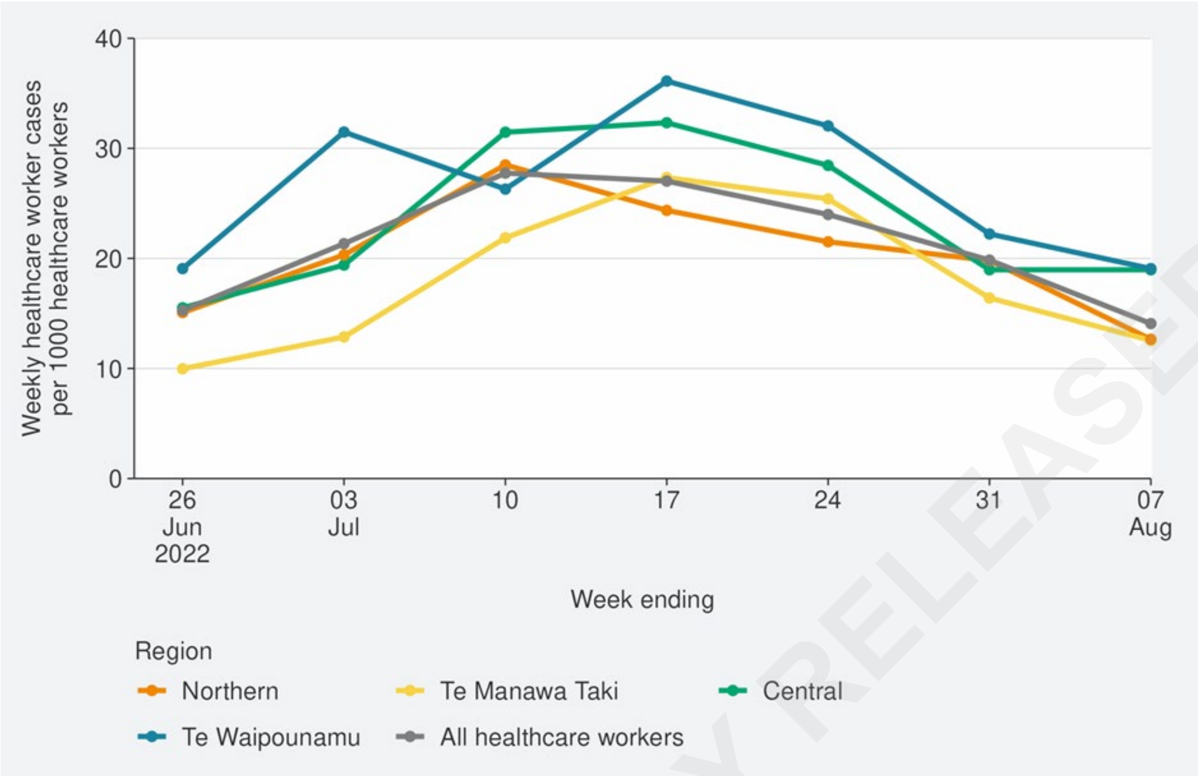
Please note that the Healthcare worker has been audited and found to be not generalisable to the NZ population.

Underlying infection incidence has been estimated using reported case rates for routinely tested healthcare workers where there was evidence of regular testing.[1]

For the week ending 07 August, estimates suggest that 14 per 1,000 (483/34,307) of healthcare workers **(Figure 2**) tested positive (for the first time).

[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.

Figure 2: Regional reported weekly case rates of health care workers for weeks 26 June – 07 August 2022

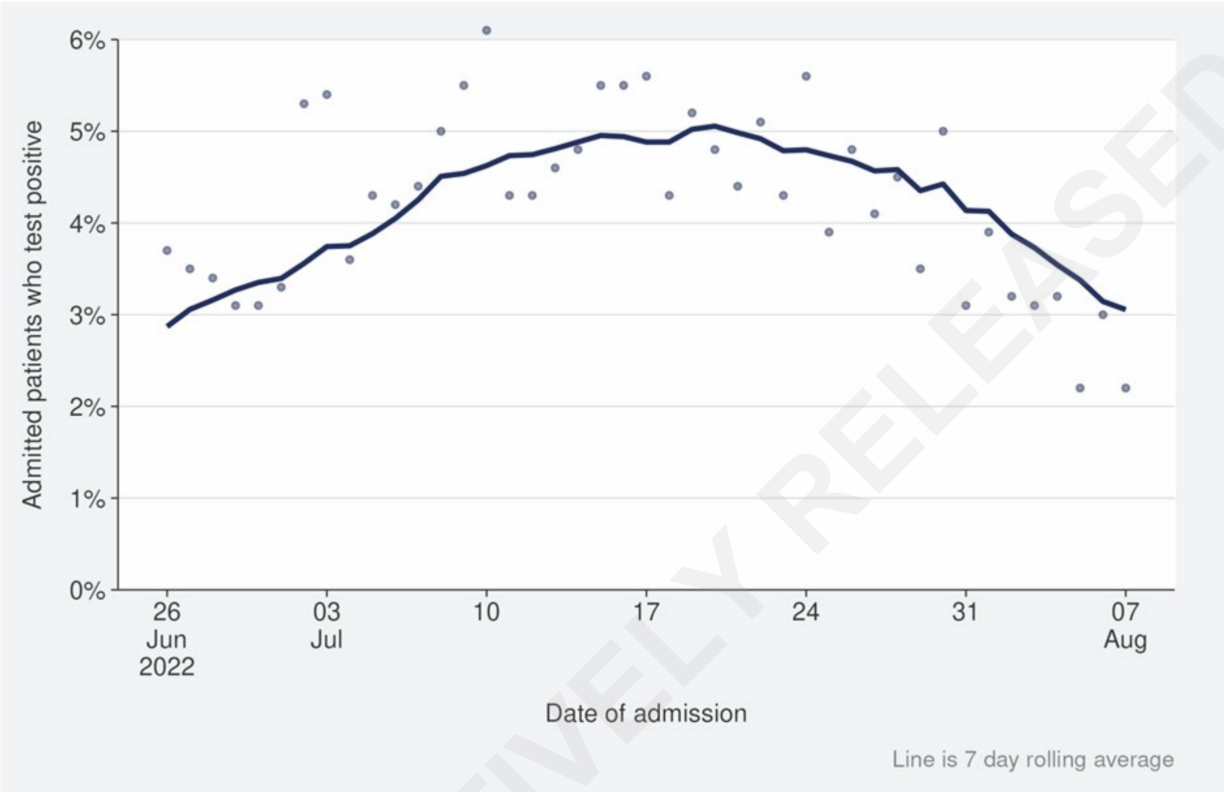


Source: Éclair/Episurv, 2359hrs 07 August 2022

Test positivity trends among tertiary hospital admissions

Inpatient test positivity trends for tertiary hospital admissions[2] is shown in **Figure 3**. Tertiary hospital admission positivity has declined with a 7-day rolling average of 3.1% (426/13,994) for the week ending 31 July. Preliminary analysis indicates that most cases who are admitted to hospital, test positive and are confirmed as a case on the day of their hospitalisation.

Figure 3: Percent of tests positive among tertiary hospital admissions.



Source: Tertiary hospitalisation data, NCTS and EpiSurv as at 2359hrs 07 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.

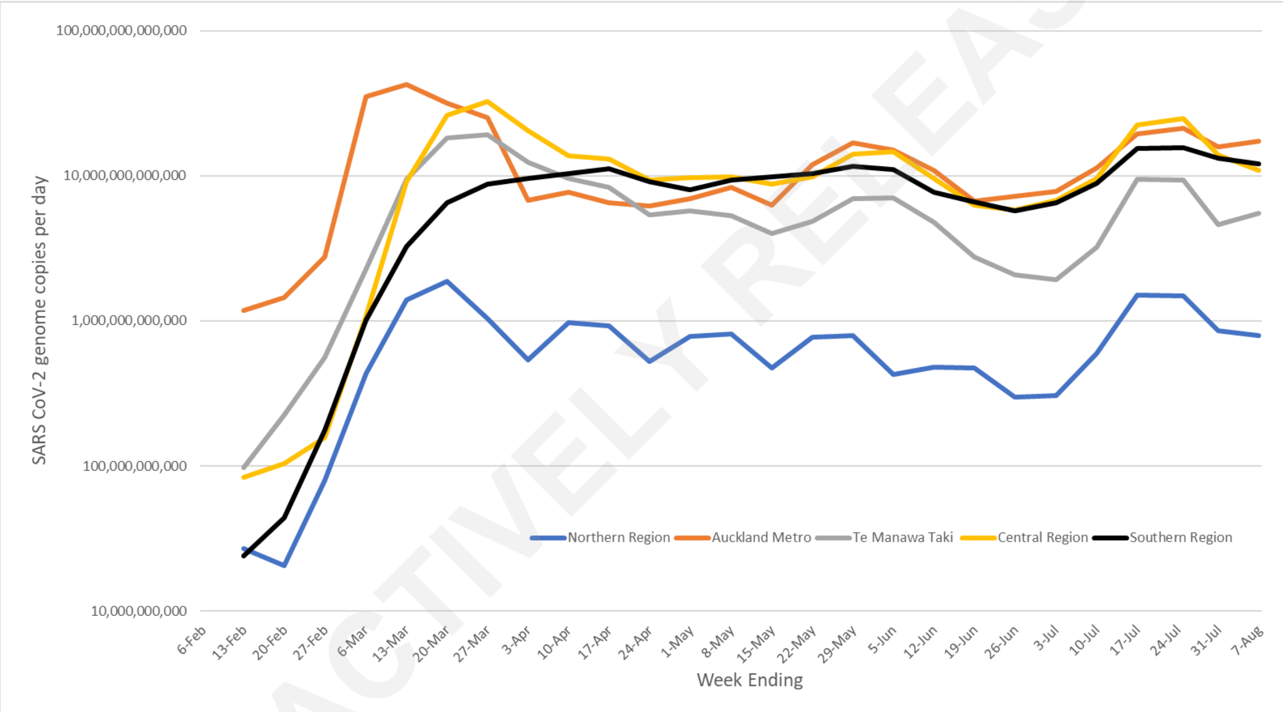
Wastewater quantification

Figure 4 provides an overview of wastewater results by region. Please note that it is not appropriate to compare SARS-CoV-2 absolute levels by region; this figure can only be used to assess the trends *within* each region.

Wastewater quantification indicates a mixed trend across the regions, with decreases in Northern, Central and Te Waipounamu regions and slight increases in Te Manawa Taki and Auckland Metro regions compared with the previous week.

The trends in each catchment area are not necessarily consistent within each region; within-region trends are available in ESR's weekly wastewater report.

Figure 4: Regional wastewater trends in SARS-CoV-2 genome quantification per day (2-week rolling average) for weeks 06 February – 7 August 2022



Source: ESR SARS-CoV-2 in Wastewater update for week ending 7 August 2022

Trends in diagnosed cases

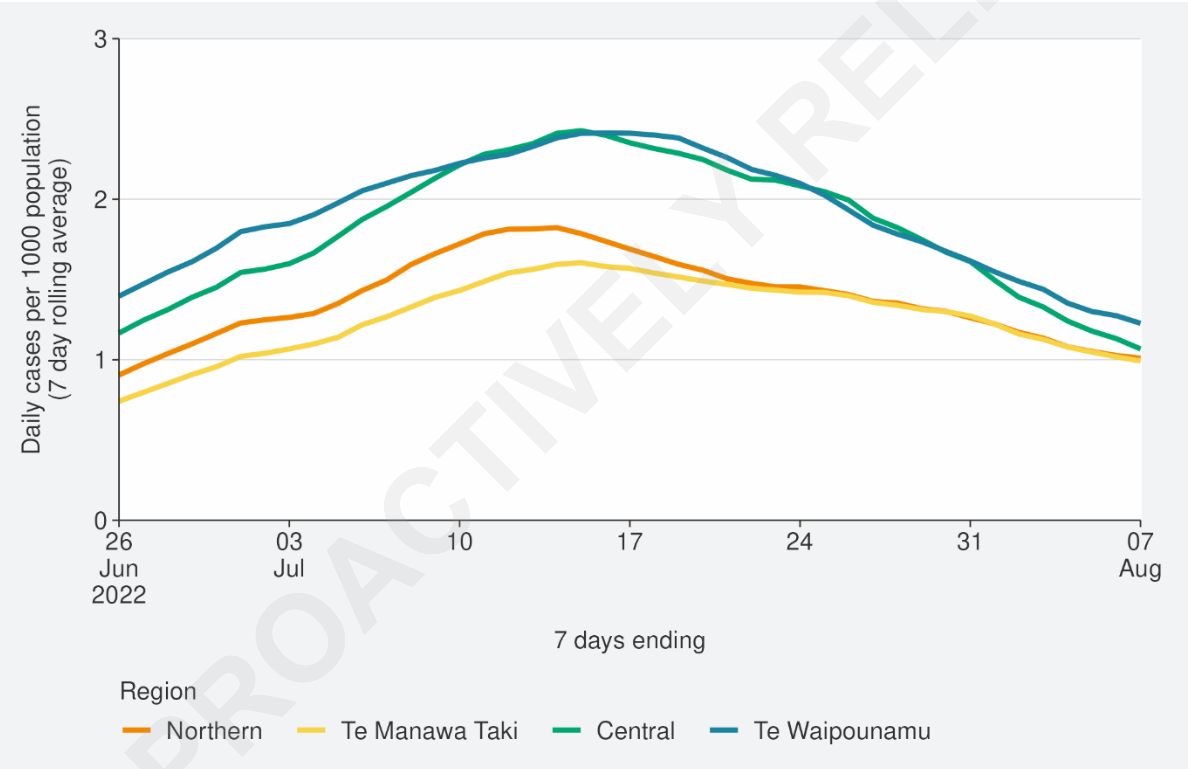
Overall, the 7-day rolling average of reported case rates was 1.1 per 1,000 population for the week ending 07 August. This is a 21% decrease from the previous week, which was 1.4 per 1,000.

Figure 5 shows that daily reported case rates have decreased across all regions in the past week. The Northern region rate (1.0 per 1,000) decreased by 20% in the past week, Te Manawa Taki (1.0 per 1,000) decreased by 22%, Central region (1.1 per 1,000) decreased by 33.8% and Te Waipounamu (1.2 per 1,000) decreased by 24.1%.

In the past week, all 18 Districts experienced a decrease in reported case rates. There was a decrease of between 15% and 40% this week.

The highest 7-day rolling average of reported daily case rate was in the Canterbury District (1.5 per 1,000) and the lowest rate was in Northland District (0.8 per 1,000)

Figure 5: Regional 7-day rolling average of reported daily case rates for weeks 26 June – 07 August 2022



Source: NCTS/EpiSurv as at 2359hrs 07 August 2022

Reinfection

Analysis and interpretation of reinfection data are being developed and will be provided in upcoming reports.

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.

Trends in Influenza-like Illness symptoms

This measure is under review and is not available for this week.

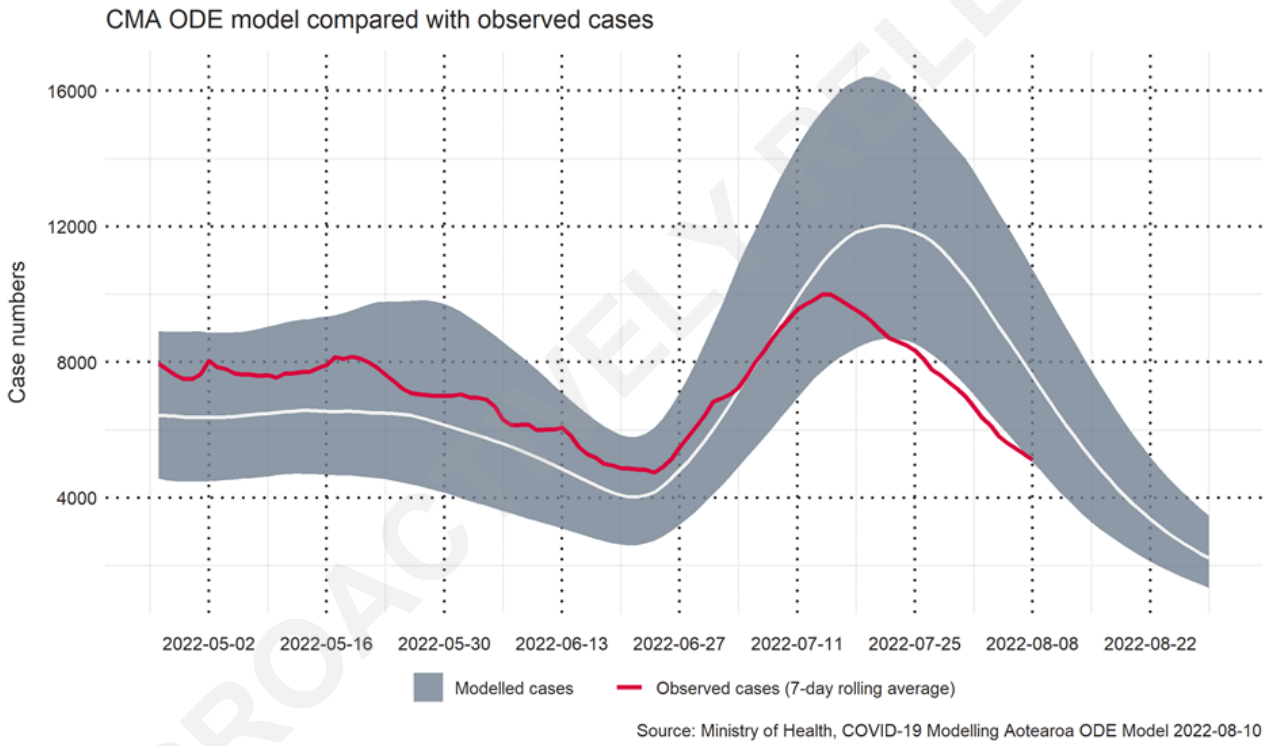
Modelled and actual cases

The COVID-19 Modelling Aotearoa (CMA) group compare predictive model scenarios for the number of reported cases with the actual number of cases. **Figure 6** compares cases with the latest modelling scenario. The white line is the median prediction and grey areas indicate the upper and lower ranges of the prediction.

This new scenario assumes that 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 around the middle of July with daily cases rising to approximately 12,000 a day; however, the observed peak in reported cases was slightly earlier and lower than the median projection. Case numbers continue to track to the lower bound of the model prediction.

Figure 6: 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 10 August 2022

Effective reproduction rate, and forecasts of cases and infections

Please note EpiNow is under review due to consistent underestimation of forecast.

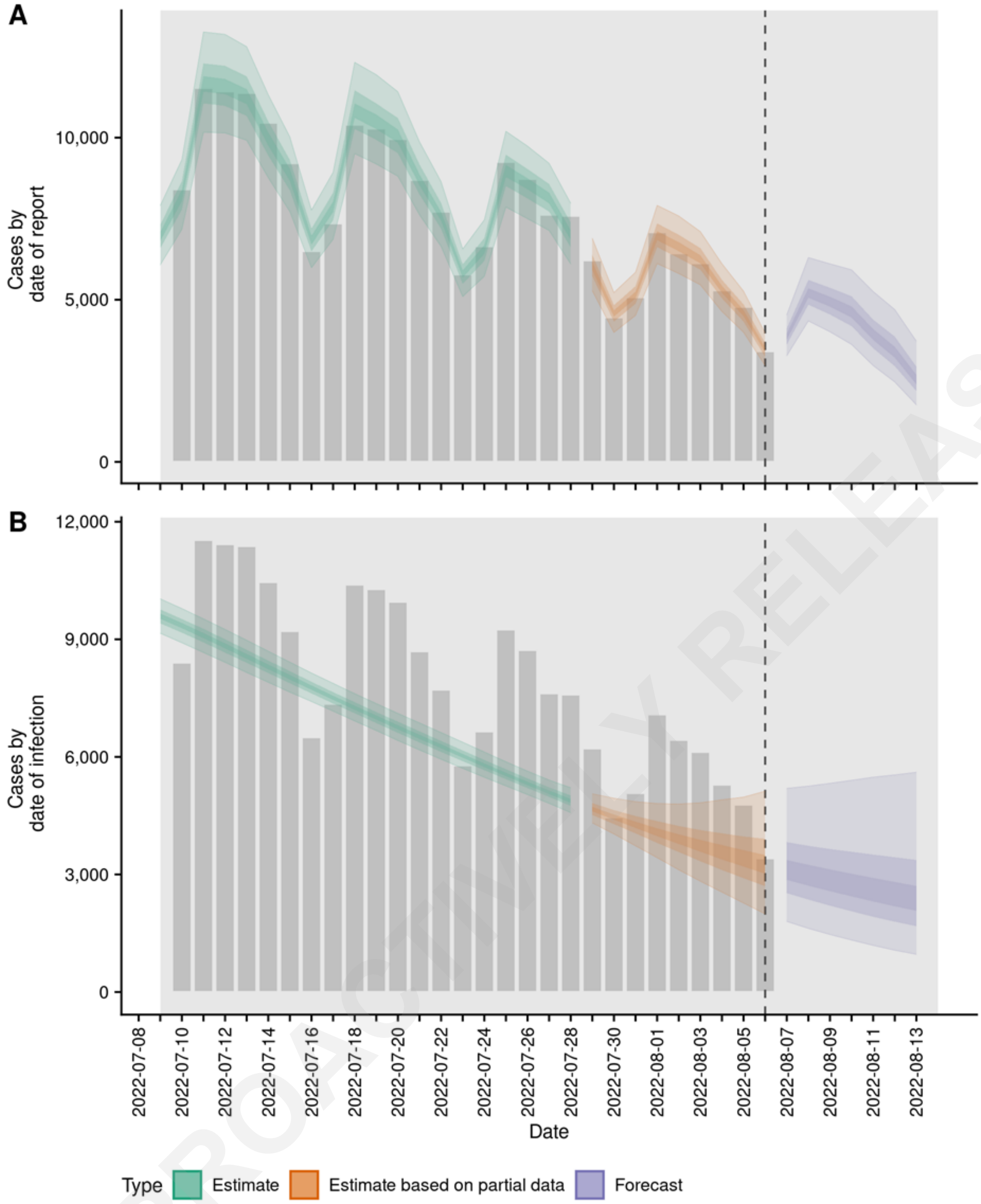
These estimates used the EpiNow package on 08 August using data to 06 August[3]. The median estimate of **effective R (Reff) nationally is 0.8** (90% Credible Interval [CI]: 0.7-1.1) for cases to 06 August, after adjusting for data lags; this remains similar to the previous two weeks. The confidence interval indicates a low to moderate level of uncertainty for this estimate.

Figure 7 compares the previous week's model median estimate for 06 August 2022 of 3,712 cases per day, with a 50% credible interval of 3,210– 4,294, to the actual reported cases of 4,894. This was a large underestimation, with the actual number being well outside of the 50% credible interval.

The model's median estimate is that national reported cases could be 2,537 cases per day by 13 August (50% credible interval: 2,185 – 2,938). However, the credible intervals for the projected cases would be even wider if the possibility of continuing trend changes in effective R were included.

[3] The EpiNow package 'now-casts' and forecasts cases to measure current, past and future transmission nationally by calculating and then extrapolating the effective reproduction number, Reff. The model does not consider several factors that may impact transmission, such as rapid changes in public health measures, population behaviour, mobility, or school holidays. This model requires sustained daily cases before it can make predictions. It only counts cases that become confirmed at some stage.

Figure 7: Projected national cases by (A) date of report and (B) date of infection



Source: EpiNow 08 August 2022, based on NCTS and EpiSurv cases

Demographic trends in reported case rates

Ethnicity trends over time and by region

Figure 8 shows national 7-day rolling average of reported daily case rates by ethnicity. **Figure 10** shows regional reported weekly case rates by ethnicity.

In the past week, reported case rates witnessed a decrease for all ethnicities. Rates in Asian and European or Other ethnicities remain higher than those for Māori and Pacific Peoples. Asian Peoples had the highest 7-day rolling average of reported daily case rate at 1.2 per 1,000 (down from last week's 1.5 per 1,000), followed by European or Other at 1.1 per 1,000 (down from 1.6 per 1,000 last week). The lowest reported case rate continues to be in Pacific Peoples (0.7 per 1,000), which is a 17% decrease from last week (0.9 per 1,000). The Māori reported case rate has also decreased by 21%, from 1.0 per 1,000 in the previous week to 0.8 per 1,000.

Reported weekly case rates in the Northern region were highest for Asian (8.4 per 1,000), followed by European or Other (7.4 per 1,000). Māori had the second lowest reported case rate at 5.3 per 1,000 and Pacific Peoples (4.9 per 1,000) had the lowest reported case rates in this region.

Reported weekly case rates for Te Manawa Taki were highest for both European or Other and Asian (7.5 per 1,000). Pacific Peoples had the second lowest case rate at 6.5 per 1,000 and Māori had the lowest reported case rate at 5.3 per 1,000.

In the Central region, reported weekly case rates were highest for both European or Other and Asian (8.1 per 1,000). Māori had the second lowest reported case rate at 5.6 per 1,000 and Pacific Peoples (4.7 per 1,000) had the lowest reported case rate in this region.

Reported weekly case rates for Te Waipounamu were highest for Asian (8.9 per 1,000), compared to European or Other (8.8 per 1,000). Māori had the second lowest reported case rate at 6.9 per 1,000 and Pacific Peoples had the lowest reported case rates at 6.1 per 1,000.

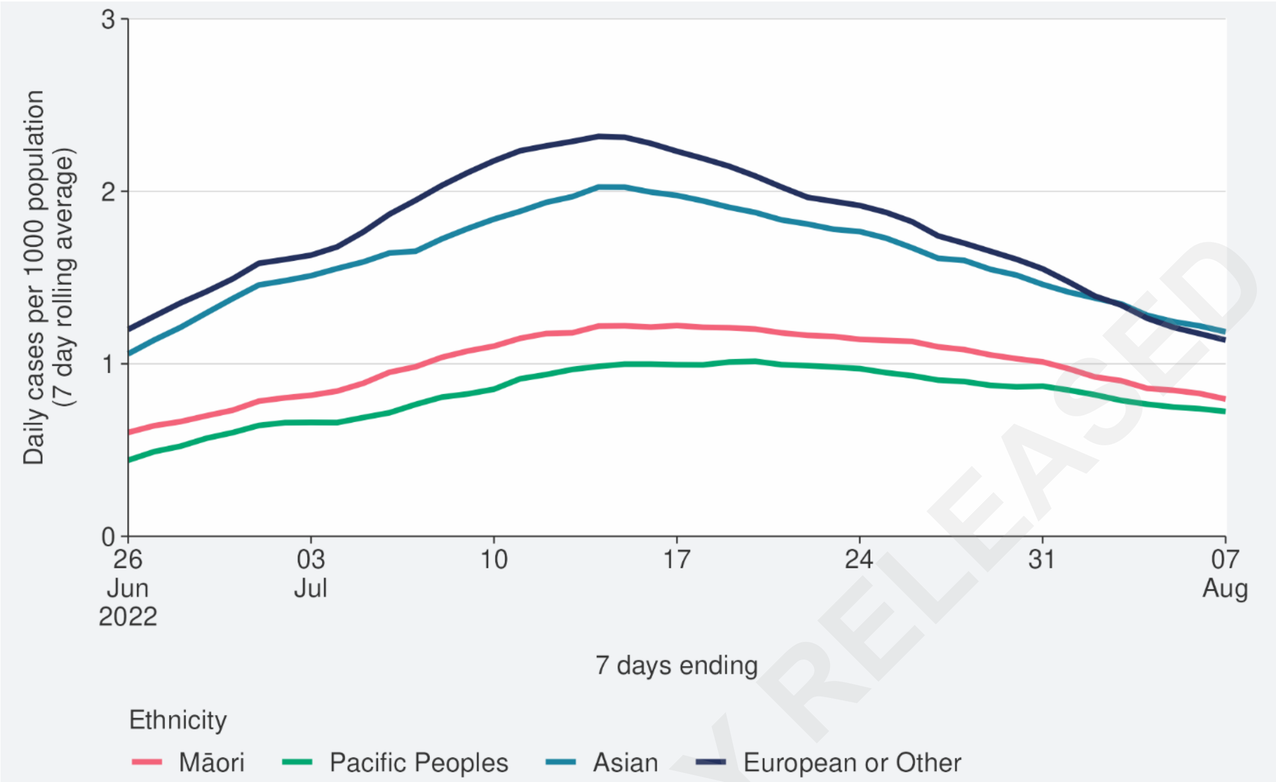
Figure 9 shows national reported weekly case rates by ethnicity and a further breakdown by age group. The highest reported case rates out of any cohort were within those aged 15-24 and 25-44 of Asian ethinicty (9.9 and 9.8 per 1,000 respectively) whilst the lowest reported case rates were in those aged 0-4 of Māori ethnicity and 5-14 of Pacific Peoples (2.6 and 2.8 per 1,000 respectively). For Māori reported case rates were highest in the 65+, 45-64 and 25-44 age groups. For Pacific Peoples, reported case rates were highest in the 25-44, 45-64 and 65+ age groups. For Asian Peoples, reported case rates were highest in the 15-24, 25-44 and 45-64 age groups. For European or Other, reported case rates were highest in the 45-64, 25-44 and 65+ age groups.

Cases rates for all ethnicities aged 65+ decreased in the past week. In the week ending 07 August, reported case rates for Asian aged 65+ were 6.4 per 1,000 (12.4% decrease from week prior). Reported case rates for European or Other aged 65+ were 7.8 per 1,000 (31.6% decrease from week prior). Reported case rates in Māori aged 65+ were 7.5 per 1,000 (26.8% decrease from week prior). Reported case rates in Pacific People aged 65+ were 5.9 per 1,000 (10.2% decrease from week prior).

Reported case rates for those at higher risk of complications or severe illness from COVID-19, for those aged 45-64 and those aged 65+, were highest in European or Other (45-64 at 8.9 per 1,000), followed by Asian (45-64 at 8.1 per 1,000).

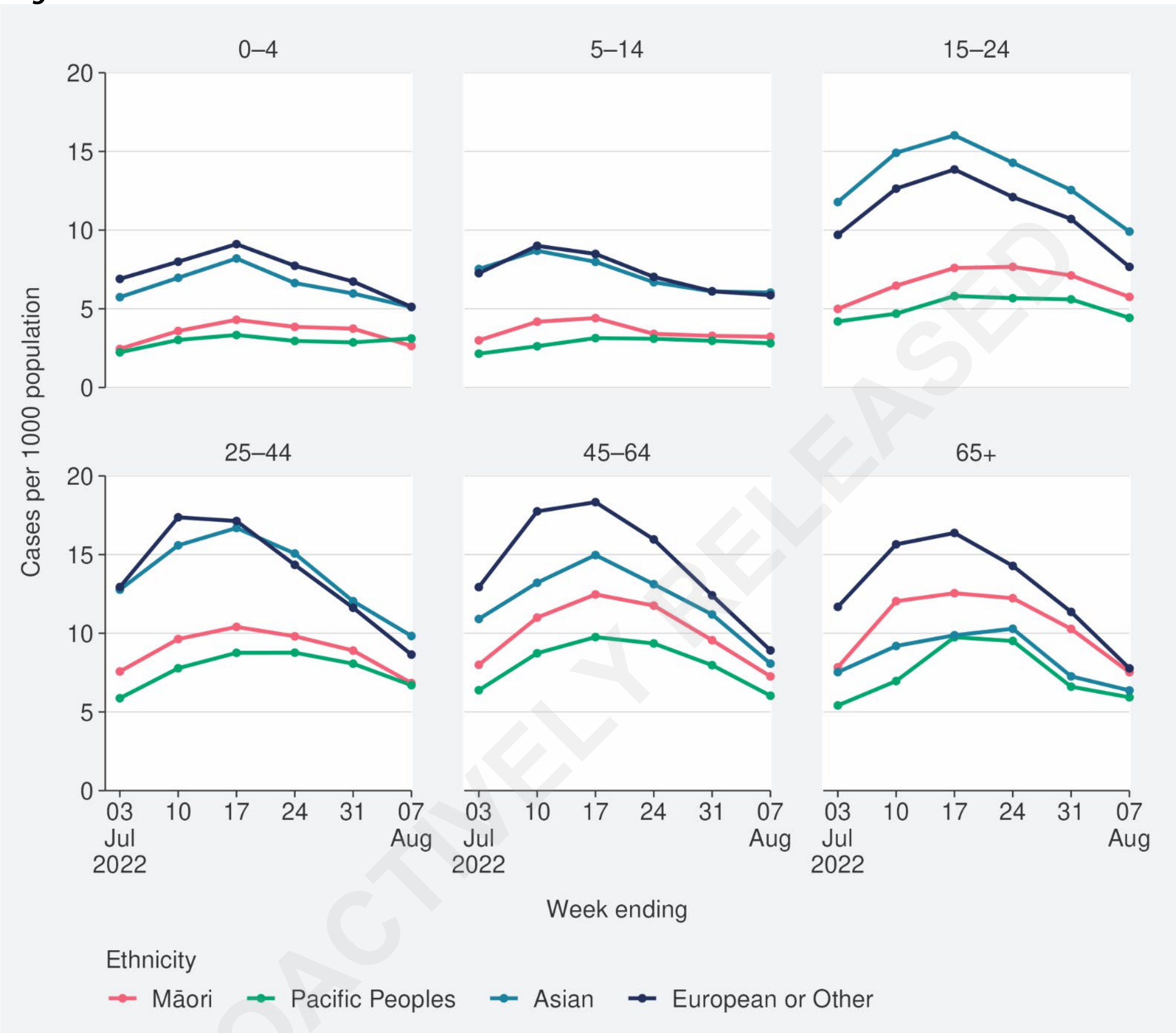
As Māori and Pacific Peoples have lower life expectancies than other ethnicities in Aotearoa New Zealand, they are likely to have a higher risk for COVID-19 complications at a younger age than other ethnicities.

Figure 8: National 7-day rolling average of reported daily case rates by ethnicity for weeks 26 June – 07 August 2022



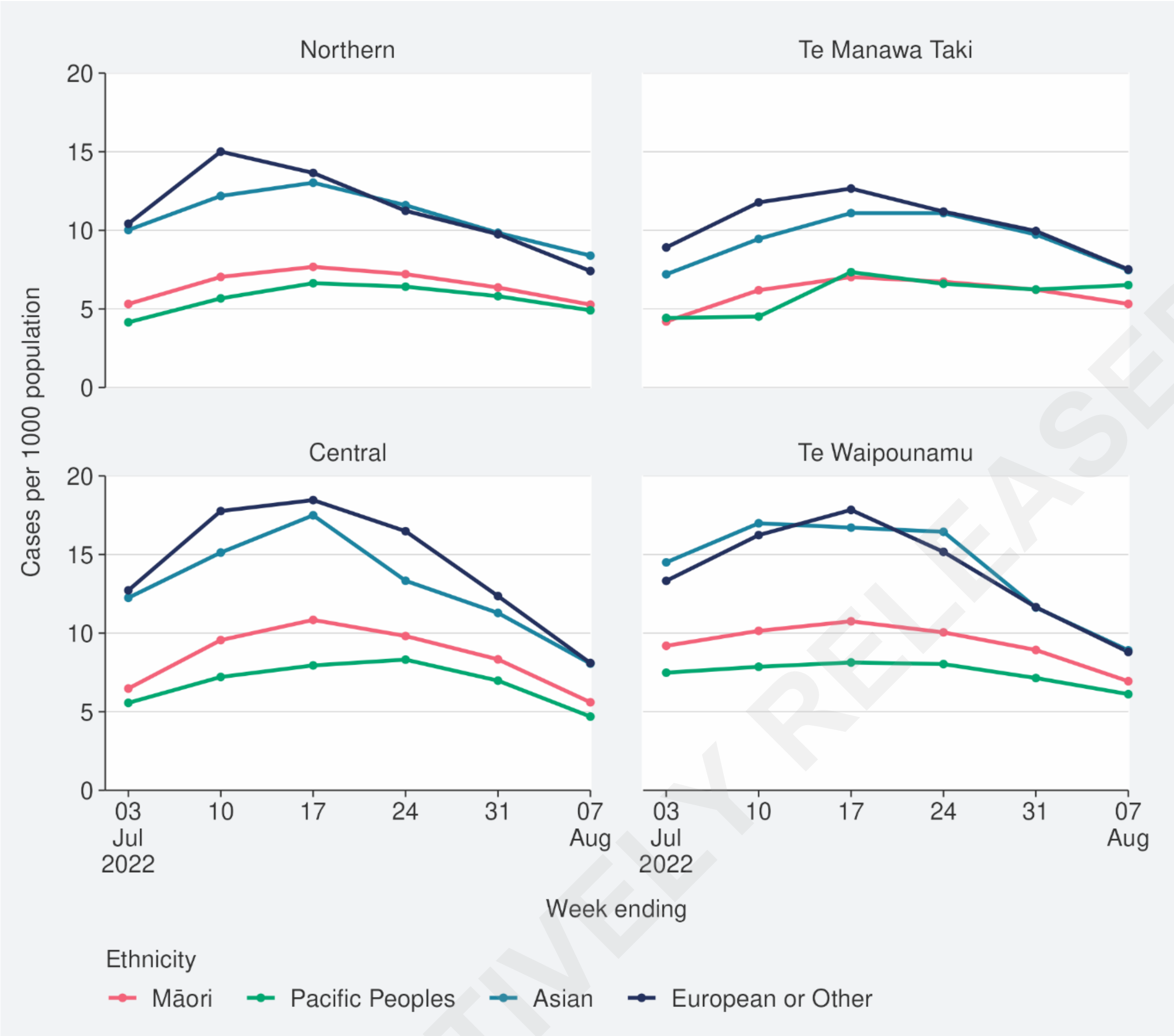
Source: NCTS/EpiSurv as at 2359hrs 07 August 2022

Figure 9: National ethnicity-specific reported weekly case rates by age group for weeks 03 July – 07 August 2022



Source: NCTS/EpiSurv as at 2359hrs 07 August 2022

Figure 10: Regional reported weekly case rates by ethnicity for weeks 03 July – 07 August 2022



Source: NCTS/EpiSurv as at 2359hrs 07 August 2022

Age trends over time and by region

Figure 11 shows community weekly cases by age nationally. Reported case rates have decreased across all age groups in the past week. Nationally, reported case rates in the 65+ age group decreased 29.7% from last week to 7.6 per 1,000.

Nationally, reported case rates were relatively similar for 0-4 and 5-14 age groups (4.3 and 5.0 per 1,000 respectively) The reported case rate for the 15-24 age groups was 7.2 per 1,000; The 25-44 and 45-64 age groups had the reported highest case rates at 8.5 per 1,000 in the past week, followed by 65+ age group at 7.6 per 1,000. Those aged 0-4 had the lowest weekly case rate at 4.3 per 1,000.

For the 0-4 age group, reported case rates in the Northern region decreased by 4.6%, Te Manawa Taki decreased by 28.5%, Central decreased by 36.7% and Te Waipounamu decreased by 22.3%.

For the 5-14 age group, reported case rates in the Northern region increased by 2.1%, Te Manawa Taki increased by 3.1%, Central decreased by 16.2% and Te Waipounamu decreased by 4.1%.

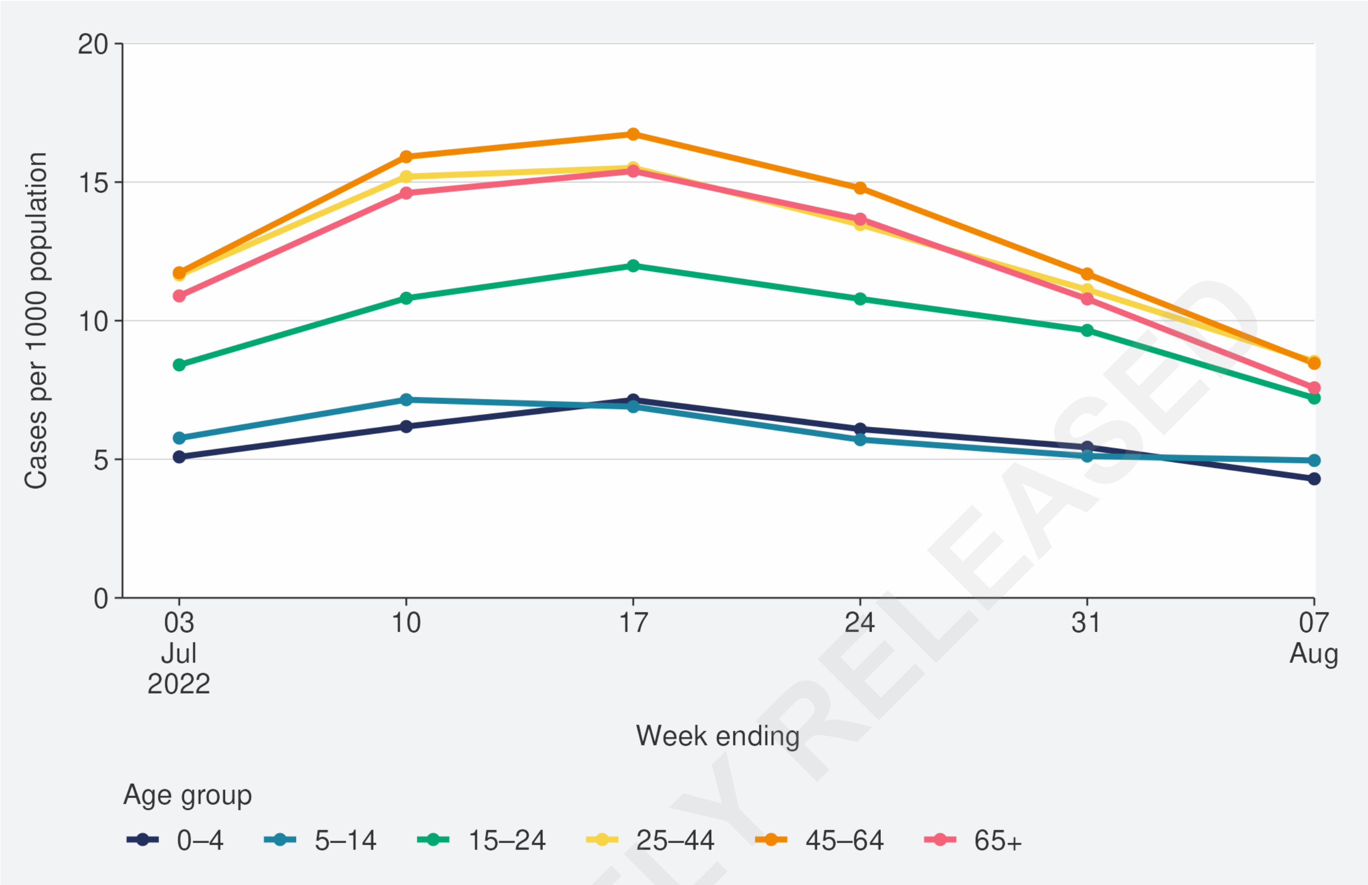
For the 15-24 age group, reported case rates in the Northern region decreased by 25.3%, Te Manawa Taki decreased by 18.9%, Central decreased by 34.6% and Te Waipounamu decreased by 21.4%.

For the 25-44 age group, reported case rates in the Northern region decreased by 17.9%, Te Manawa Taki decreased by 22.0%, Central decreased by 32.5% and Te Waipounamu decreased by 24.8%.

For the 45-64 age group, reported case rates in the Northern region decreased by 25.8%, Te Manawa Taki decreased by 25.8%, Central decreased by 35.3% and Te Waipounamu decreased by 24.7%.

For the 65+ age group, reported case rates in the Northern region decreased by 24.0%, Te Manawa Taki decreased by 25.1%, Central decreased by 39% and Te Waipounamu decreased by 31.3%.

Figure 11: National reported weekly case rates by age for weeks 03 July - 07 August 2022



Source: NCTS/EpiSurv as at 2359hrs 07 August 2022

Deprivation trends over time, by ethnicity and by region

Figure 12 shows reported weekly case rates based on the NZDep2018[4]. Deprivation is a structural determinant of COVID-19 both in terms of risk of infection and poor outcomes. 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. These factors impact the ability to sustain self-isolation for cases and their household members.

Overall, in the past week, reported weekly case rates continued to be highest in the least deprived areas (8.2 per 1,000 population), followed by areas of mid-range deprivation (7.9 per 1,000) and most deprived areas (6.4 per 1,000).

Behavioural insights evidence 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 some of the difference is explained by deprivation-associated bias in case ascertainment; 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.

Reported weekly case rates in Pacific Peoples or Māori were the lowest in every deprivation level, while reported case rates in European or Other or Asian people were the highest in every deprivation level. Comparison of national reported weekly case rates of deprivation by ethnicity in the past week for areas most deprived shows that reported case rates were highest in the Asian ethnicity, followed by European or Other (8.1 and 7.7 per 1,000 respectively). European or Other had the highest reported case rates in areas least deprived at 8.3 per 1,000, followed by Asian (8.2 per 1,000).

For the most deprived areas, Māori made up 21.2% of cases, which is less than the proportion of the Māori population in deprived areas. The proportion of cases in the most deprived areas for Pacific Peoples was 10.6%, for Asian 16.5% and for European and Other, 51.7%. Following this, 77.7% of cases in areas of least deprivation were European and Other compared with 14.2% Asian, 6.2% Māori and 1.9% Pacific Peoples.

In the Northern region, reported case rates were highest in the mid-range deprived areas (7.8 per 1,000) followed by areas of least deprivation (7.7 per 1,000) and areas most deprived (5.6 per 1,000).

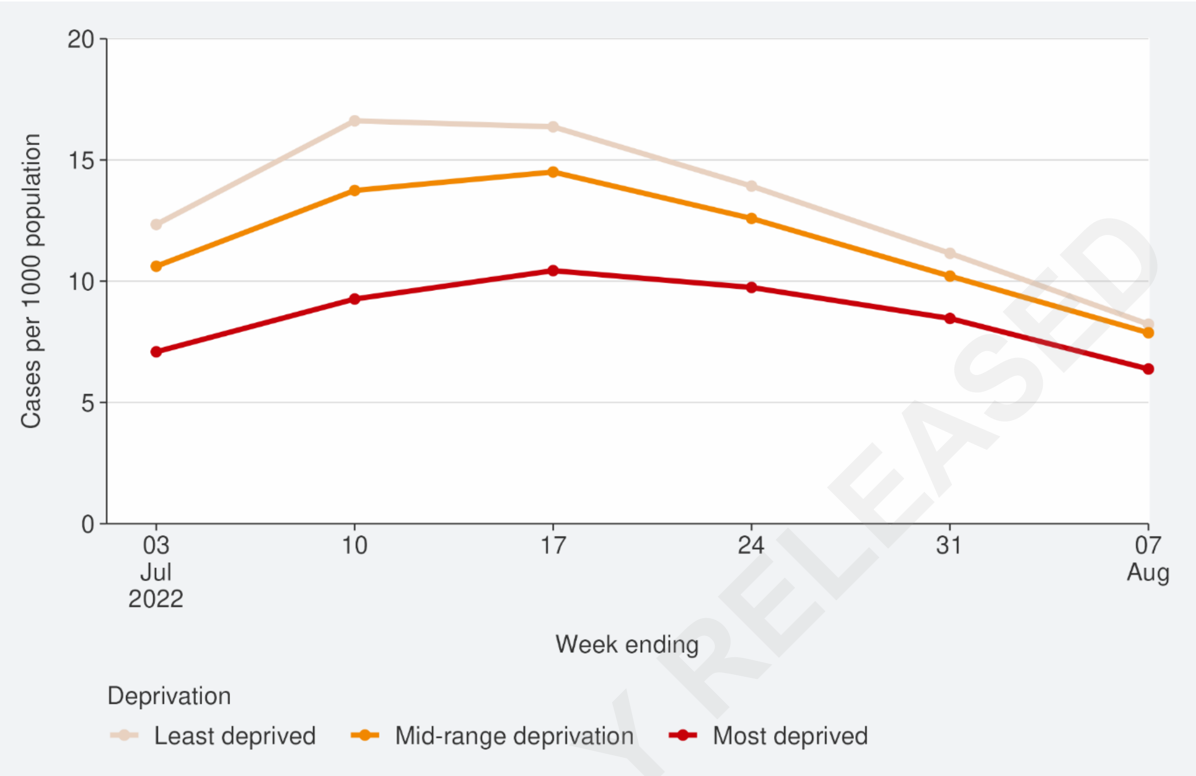
In Te Manawa Taki, reported case rates were highest in the least deprived areas (7.6 per 1,000) followed by areas of mid-range deprivation (7.1 per 1,000) and areas most deprived (6.5 per 1,000).

In the Central region, reported case rates were highest in the least deprived areas (8.4 per 1,000) followed by areas of mid-range deprivation (8.0 per 1,000) and areas most deprived (6.1 per 1,000).

In Te Waipounamu, reported case rates were highest in the least deprived areas (9.0 per 1,000) followed by areas of mid-range deprivation (8.5 per 1,000) and areas most deprived (8.3 per 1,000).

[4] Contents (otago.ac.nz)

Figure 12: National reported weekly COVID-19 case rates by deprivation status for weeks 03 July – 07 August 2022



Source: NCTS/EpiSurv as at 2359hrs 07 August 2022

Vaccination trends over time

This section has been removed this week. Please see hospitalisation and mortality rates by vaccination in the Hospitalisation and Mortality section.

PCR and RAT testing trends

Since New Zealand entered Phase 3 of the Omicron response, the majority of testing has been by rapid antigen tests (RATs) rather than PCR tests. RATs are self-administered and therefore require the individual to self-report their results, which may result in under-reporting. In addition, RATs are more likely than PCR tests to return a false-positive or false-negative result, especially if used during early periods of infection. On the other hand, increased availability of RATs may mean that more people have tested than would have otherwise had PCR tests continued to be the main surveillance method. Test positivity for RATs would require data on the total number of RATs used, especially negative results. As PCR testing is only used to monitor priority populations and confirm positive RATs in specific situations, these rates and positivity data are not fully representative of the current testing state of New Zealand.

Whole Genomic Sequencing of Community cases

This week, watchlist variants BA.4 and BA.5, including the recent subvariant BA.4.6, were detected in community samples (first detected in late May/early June). Wastewater data also detected BA.4/5 at all sites in the past week. Wastewater data coupled with community case Whole Genome Sequencing (WGS) results show that BA.4/5 are circulating within the wider NZ population. The BA.5 variant of Omicron remains the key observation – it is the dominant variant. There is high certainty that BA.5 is largely responsible for the recent surge in case numbers across the country (and internationally).

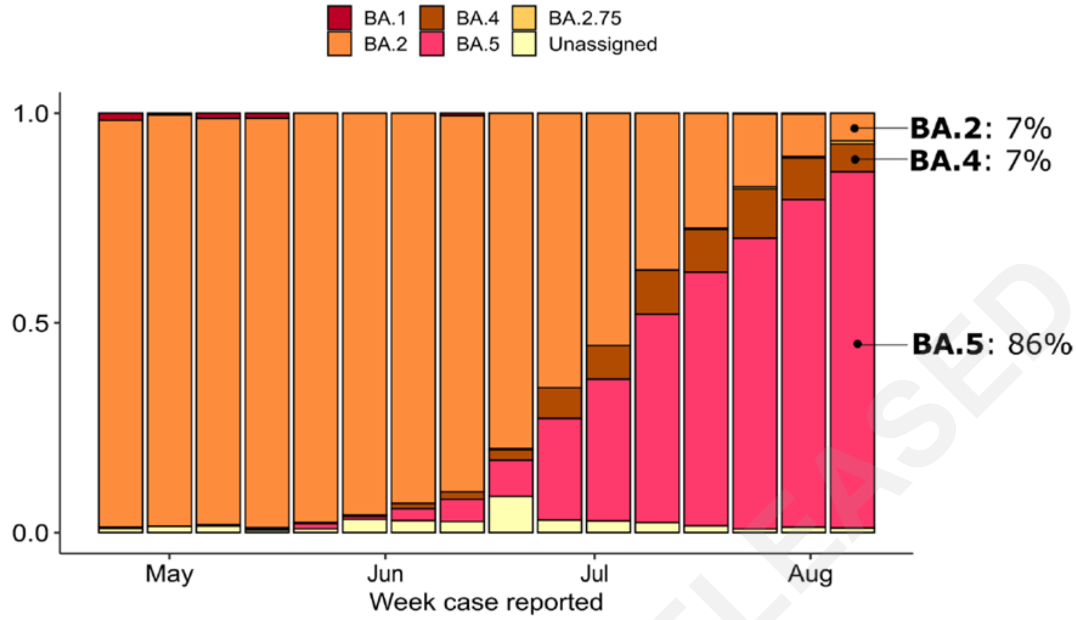
Omicron is the dominant variant in New Zealand having outcompeted Delta, which made up ~70% of all sequenced cases at the start of January 2022 but fell to less than 10% of sequenced cases by the end of January 2022.

Figure 13 shows that BA.5 made up about 86% of sequenced community cases in the past week. **Figure 13** also shows the increasing frequency of BA.5 in community samples over the past few weeks. As expected, in NZ we see a (relative) growth advantage of BA.5 over other variants. BA.4 has decreased this week, making up 7% of cases.

A very small number of recent subvariant BA.2.75 continue to be detected in the community and border with fifteen cases reported in the two weeks since 23 July. It is probable that small numbers of BA.2.75 are transmitting within the NZ community, but it is unlikely to have a substantial growth advantage compared to BA.5. Since mid-June ESR have detected a total of 46 BA.4.6 cases in New Zealand, with 25 detected in the previous fortnight (8 community, 17 at the border)

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

Figure 13: Frequency of Variants of Concern in community cases in New Zealand

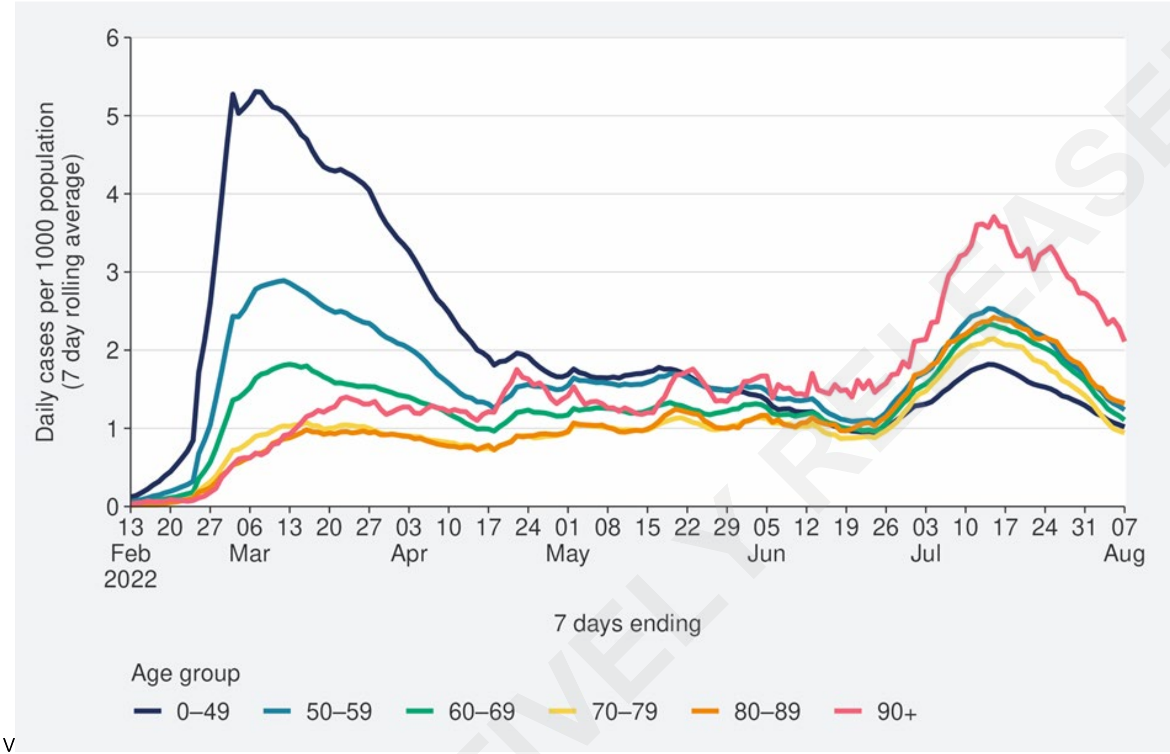


Source: ESR COVID-19 Genomics Insights Report #18, EpiSurv/Microreact 0900hrs 08 August 2022

Hospitalisation and Mortality

Hospitalisation and mortality risk is strongly linked with increasing age; there have been decreases in reported case rates in those aged over 60 years during the past 3 weeks **(Figure 14**), and consequently a decrease in the weekly numbers of deaths in the past 3 weeks (see **Figure 23**: Weekly death counts by cause of death, 20 February to 07 August 2022).

Figure 14: Reported case rates (per 1000) in those aged over 50 years, 13 February to 07 August 2022



v

Source: NCTS/EpiSurv as at 2359hrs 07 August 2022

Hospital Admissions Rates

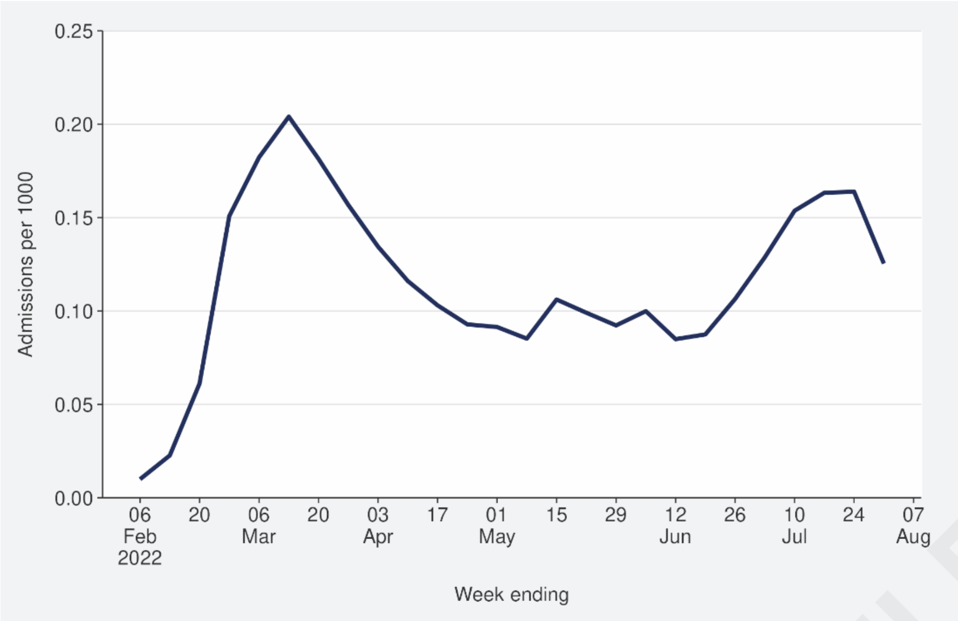
This is new hospital admission data that comes from a combination of two data sources – the inpatient admission (IP) dataset (which only includes data from hospitals in certain regions) and the National Minimum Dataset (NMDS), which is a more detailed dataset, however, it is only available for two or more months after discharge. The IP records are included as a provisional tally of more recent COVID-19 hospitalisations for a collection of hospitals, and these records are overwritten by NMDS records as soon as the NMDS records are available. Please see Glossary for further details.

As seen in **Figure 15**, the COVID-19 hospital admissions rate[5] decreased in the week ending 31 July.

Hospital admission rates by age group (**Figure 16**) was highest for those who are 90 years and older, followed by those who are between 80-89 years old and those who are 70-79 years old. Admission rates among these age groups decreased slightly after reaching the highest they have been this year in the week prior.

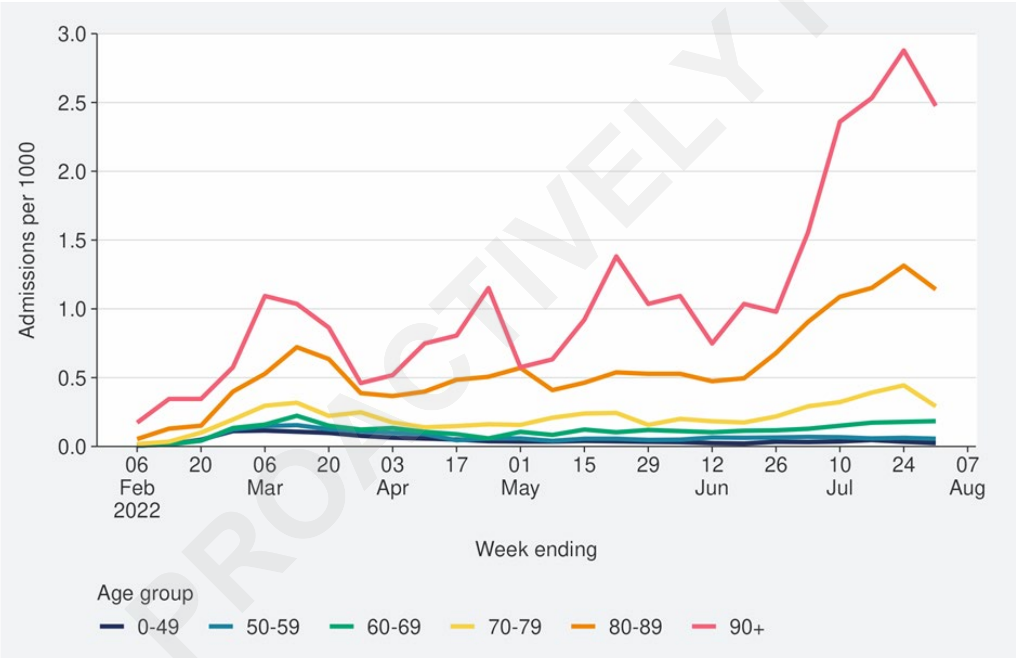
[5] New hospital admissions who had COVID at the time of admission or while in hospital; excluding hospitalisations that were admitted and discharged within 24hrs. These data are from districts with tertiary hospitals, the districts are Auckland, Canterbury, Southern, Counties Manukau, Waikato, Capital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

Figure 15: COVID-19 hospital admissions[6] rate per 1,000, 06 February to 31 July 2022



Source: NMDS/Inpatients admissions feed, 31 July 2022

Figure 16: Hospital admission rates by age group, 06 February to 31 July 2022



Source: NMDS/Inpatients admissions feed, 31 July 2022

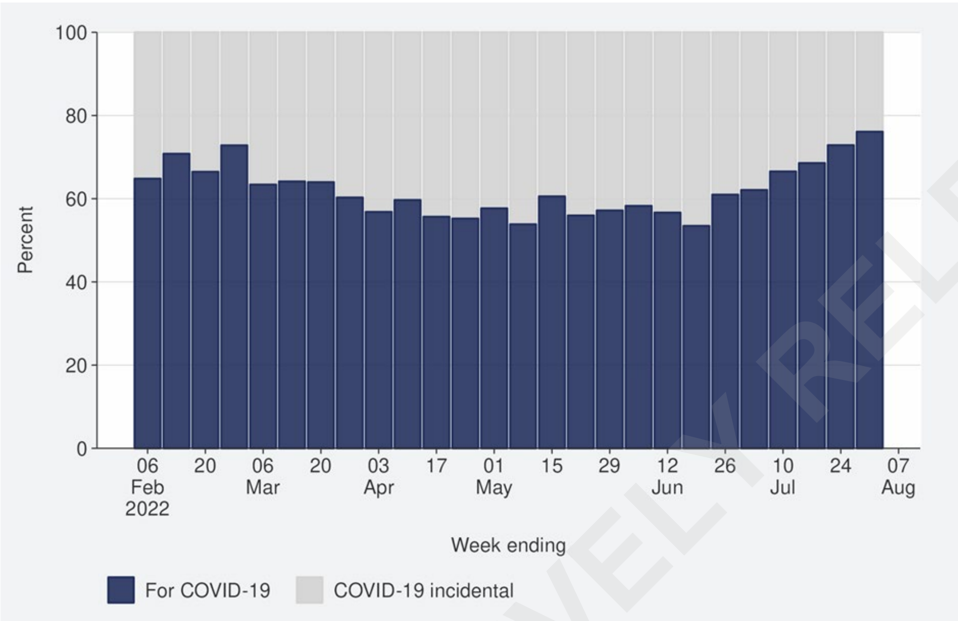
[6] New hospital admissions who had COVID at the time of admission or while in hospital; excluding hospitalisations that were admitted and discharged within 24hrs. These data are from districts with tertiary hospitals, the districts are Auckland, Canterbury, Southern, Counties Manukau, Waikato, Capital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

Hospital admissions For COVID-19 and Incidental for COVID-19

The new hospital admission data also allow us to 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.

The following data show hospital admissions of all COVID-19 related hospitalisations. The latest trends indicate that 76.1% were *for* COVID-19 and the rest COVID-19 was incidental in the week ending 24 July 2022 (**Figure 17**).

Figure 17: Percentage of hospital admission for COVID-19 and incidental for COVID-19, 06 February – 31 July 2022



Source: NMDS/Inpatients admissions feed, 31 July 2022

Hospitalisation Risk

Unadjusted and age-adjusted risk: Disparities in hospitalisation risk by ethnicity, deprivation and vaccination are clearly observed after adjusting (age-standardising[7]) for differences in age demographics.

Priority populations (namely ethnic groups) that are at higher risk of experiencing severe outcomes also tend to be systematically younger in age on average. As older age is also a strong risk for severe outcomes, the risk by ethnicity, deprivation and vaccination can be masked. Therefore, the hospitalisation risk for these communities must be adjusted for age in order to make an accurate comparison.

Figure 18-21 show age-standardised rates of hospitalisation with COVID-19 broken down by ethnicity, deprivation and vaccination, for the time period of March 2020 to 31 July 2022. Rates are standardised to the Māori population age structure. **Non-overlapping confidence intervals between any two groups suggests the difference between those two groups is statistically significant.** Data come from tertiary hospitals in the inpatient dataset. These data include people admitted to hospital with COVID-19 but excludes those that were admitted to hospital for a reason unrelated to COVID-19.

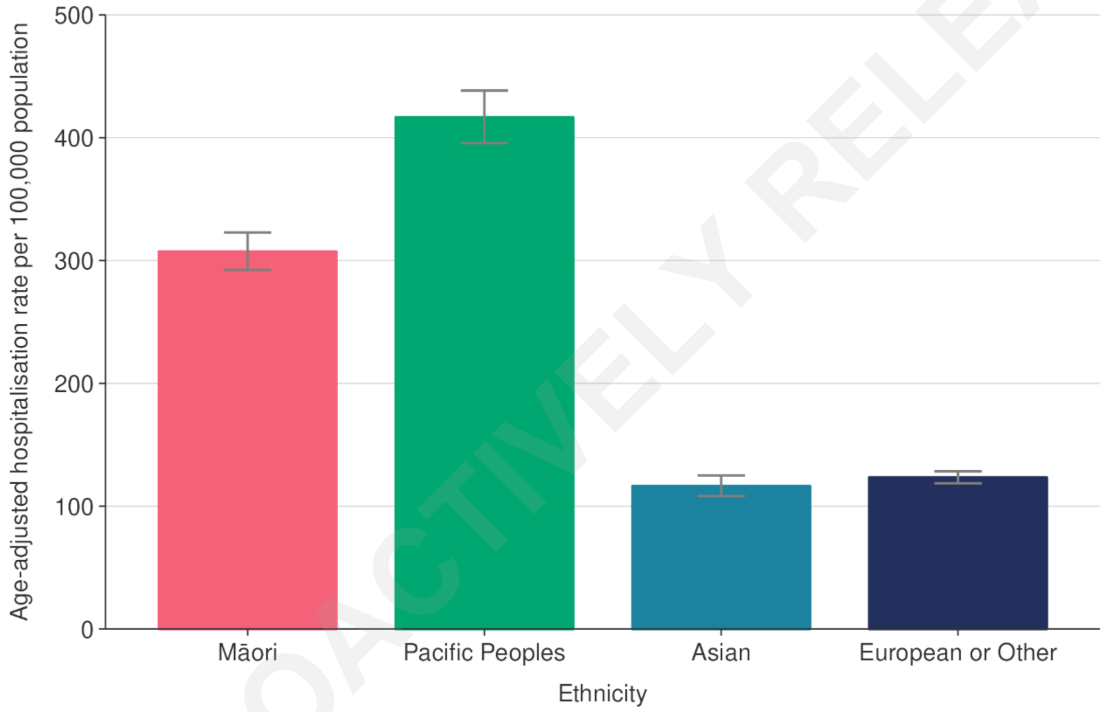
[7] An age-standardised rate is a weighted average of the age-specific rates per 100,000 persons, where the weights are the proportions of persons in the corresponding age groups of the Maori population.

Pacific Peoples had the highest cumulative incidence rate of hospitalisation with COVID-19 which was 1.4 times higher than Māori ethnicity, 3.4 times higher than European or Other ethnicity and 3.6 times higher than Asian Peoples (**Figure 18**).

The most deprived areas had the highest rate of hospitalisation with COVID-19 (269.6 per 100,000) followed by areas of mid-range deprivation (145.5 per 100,000) and the least deprived areas (101.6 per 100,000) **(Figure 19**).

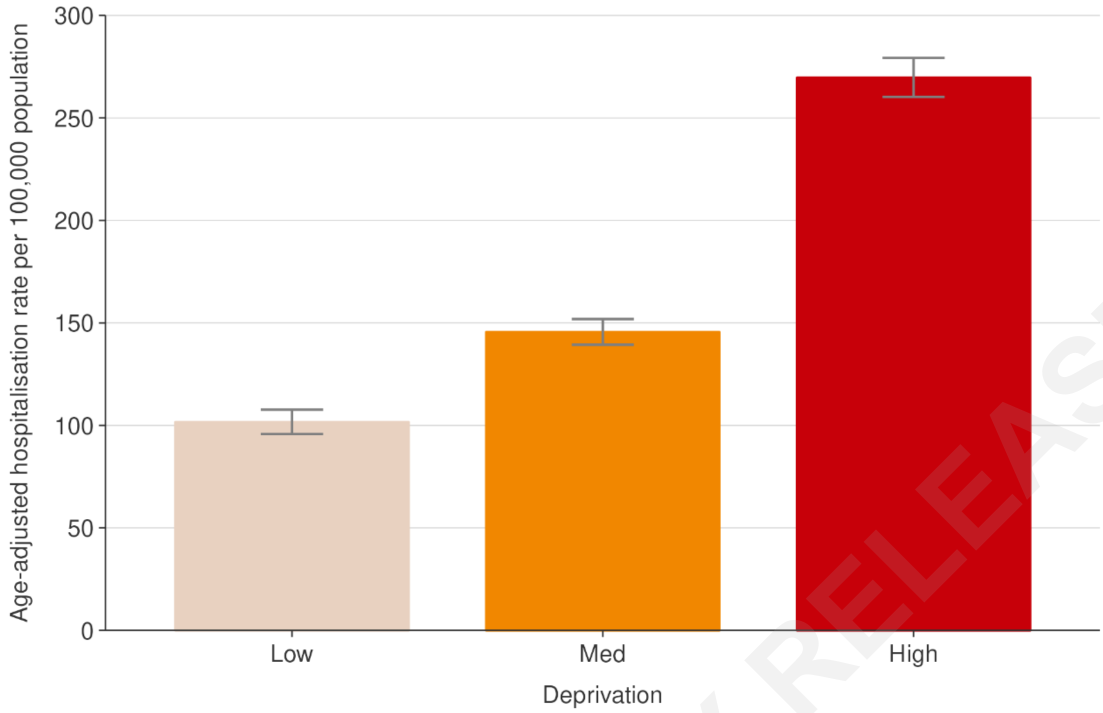
The hospitalisation rate for people with more than 2 doses (96 per 100,000) was significantly lower compared to people with 2 or less doses. The hospitalisation rate for those with more than 2 doses was 2.5 times lower than those with 2 doses and 2.9 times lower than those with less than 2 doses. The difference in hospitalisation rate between people with 2 doses and people with less than 2 doses was also statistically significant (**Figure 20**).

Figure 18: Age-standardised cumulative incidence (and 95% confidence intervals) of hospitalisation with COVID-19 by ethnicity, March 2020 to 31 July 2022



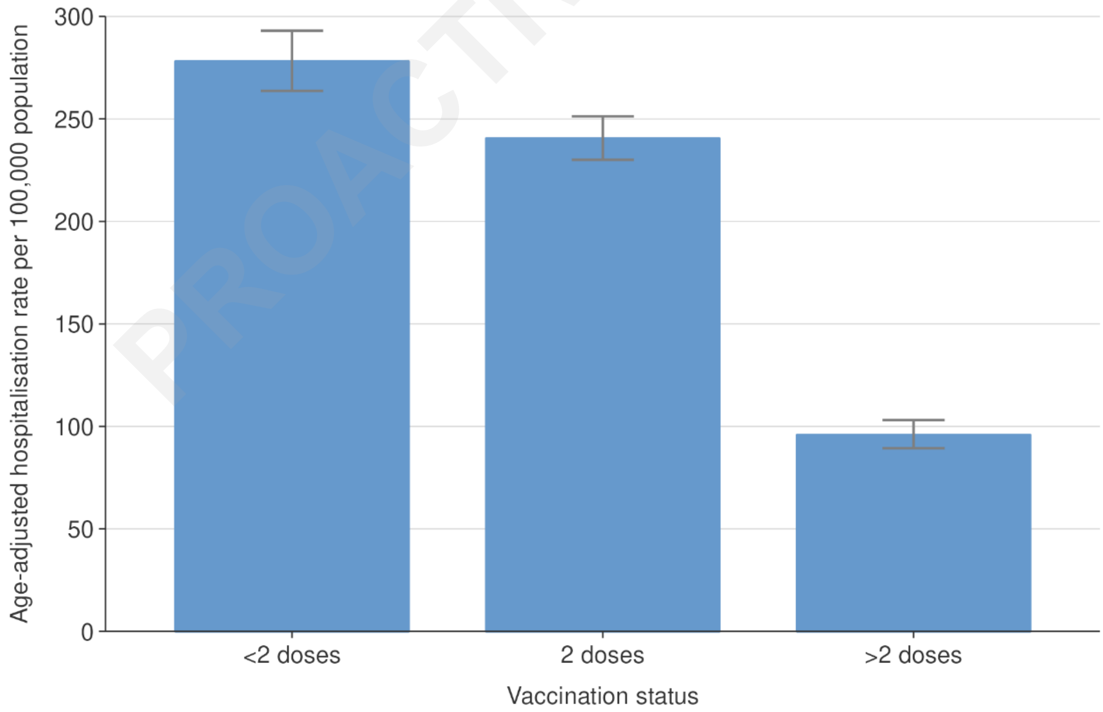
Source: NCTS/EpiSurv, NMDS, Inpatient Admissions dataset and CVIP population estimates, March 2020 to 31 July 2022

Figure 19: Age-standardised cumulative incidence (and 95% confidence intervals) of hospitalisation with COVID-19 by deprivation, March 2020 to 31 July 2022



Source: NCTS/EpiSurv, NMDS, Inpatient Admissions dataset and CVIP population estimates, March 2020 to 31 July 2022

Figure 20: Age-standardised cumulative incidence (and 95% confidence intervals) of hospitalisation with COVID-19 by vaccination status, March 2020 to 24 July 2022



Source: NCTS/EpiSurv, NMDS, Inpatient Admissions dataset and CVIP population estimates, March 2020 to 31 July 2022

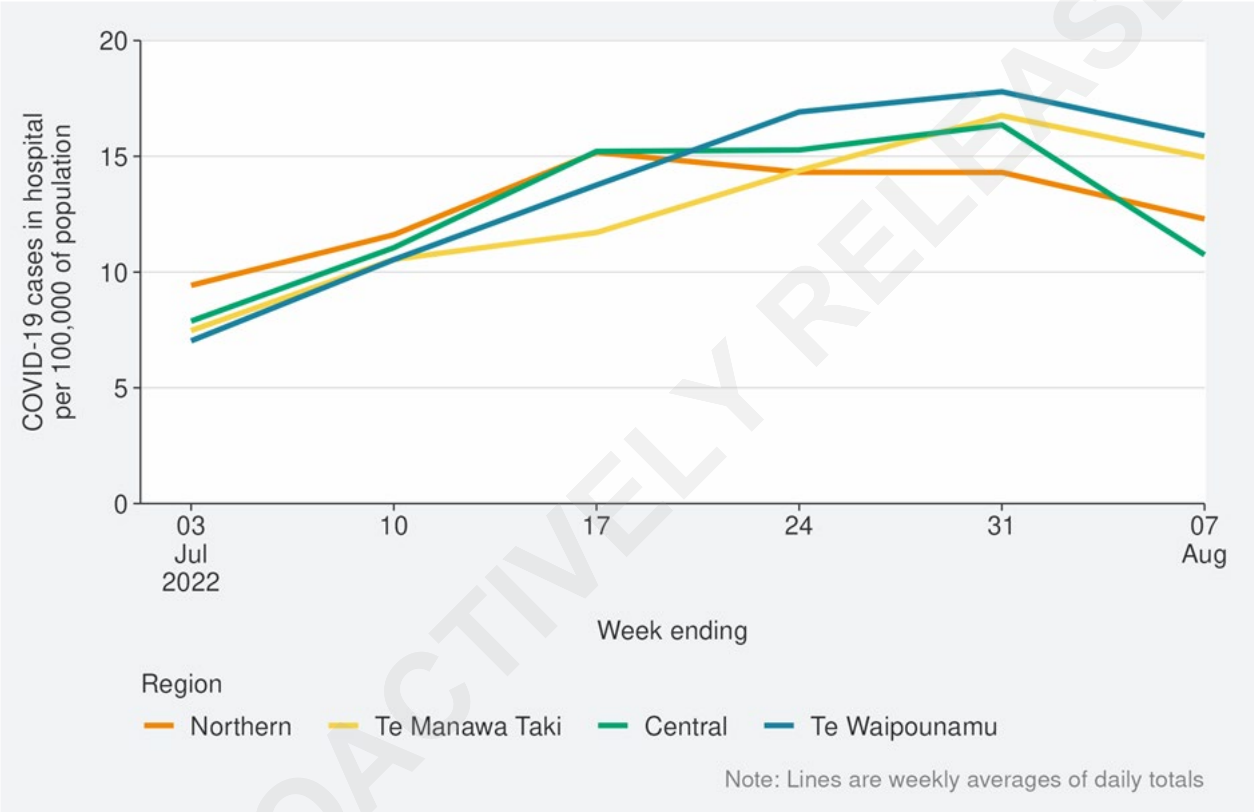
Hospital Occupancy

For the week ending 07 August, the national daily average hospital occupancy for inpatients with COVID-19 was 13.4 per 100,000 population, a decrease of 16.4% from the week prior (**Figure 21**).

The daily hospital occupancy average per week decreased across all regions in the past week. The Northern region (12.3 per 100,000) decreased by 14%, Te Manawa Taki (15.0 per 100,000) decreased by 10.7%, Central region (10.7 per 100,000) decreased by 34% in the past week and Te Waipounamu (15.9 per 100,000) decreased by 10.7%.

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

Figure 21: Regional daily hospital occupancy averaged per week, 03 July – 07 August 2022



Source: Daily hospital questionnaire as of 07 August 2022

Whole Genomic Sequencing of hospitalised cases

As of 08 August, ESR received samples from and had processed 195 of the 655 PCR positive hospital cases with a report date in the two weeks to 05 August 2022. Of those that successfully produced a genome, 13% had a BA.2 genome, 6% were BA.4, and 81% were BA.5.

ESR receives a daily list of active COVID-19 cases who tested positive in the past 14 days and were hospitalised in the past 7 days. ESR is working with the Ministry of Health to receive information indicating which cases have been admitted to intensive care unit (ICU) or high dependency unit (HDU).

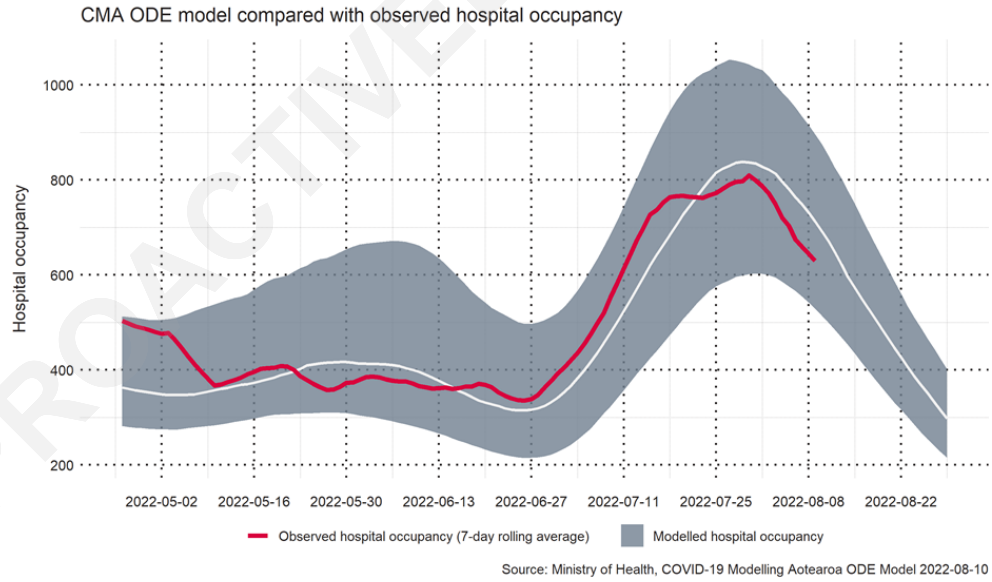
Modelled and actual hospital occupancy rate

The COVID-19 Modelling Aotearoa group's modelling scenarios track beds occupied by people with COVID-19 infections. **Figure 22** compares hospital occupancy with the latest modelling scenario. The white line is the median prediction and grey areas indicate the upper and lower ranges of the prediction.

This is a new scenario that assumes that 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. Currently the actual peak of hospitalisations are tracking just under the median prediction.

Figure 22: COVID-19 Modelling Aotearoa hospital occupancy scenarios compared to actual hospital occupancy

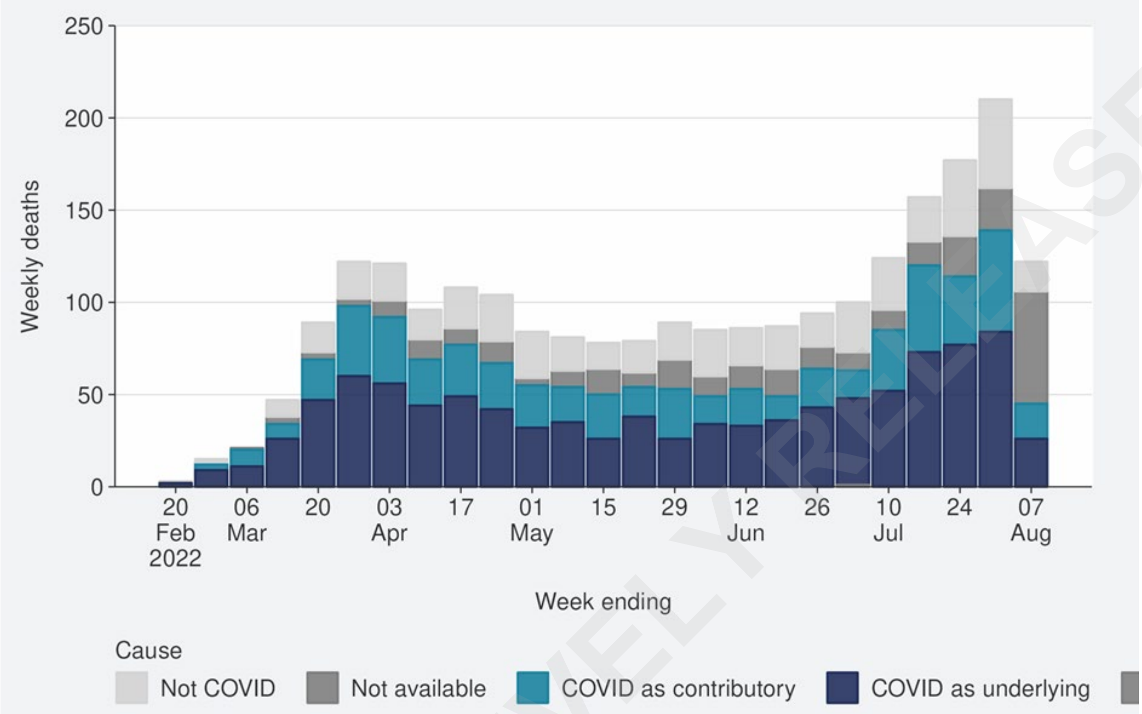


Sources: COVID-19 Modelling Aotearoa (CMA) Branching Process Model August 2022, hospital occupancy (all COVID-19 positive people admitted as inpatients) as of 10 August 2022.

Mortality

From March 2020 to 07 August 2022, there were 2,447 deaths with COVID-19 infection 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). Of these deaths that have been formally coded by cause of death, 1,108 (49%) were determined to have COVID-19 as the main underlying cause. COVID-19 contributed to a further 618 (28%) deaths, another 515 (23%) people died of a separate, unrelated cause.

Figure 23: Weekly death counts by cause of death, 20 February to 07 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.

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.

Comparisons in COVID-19 Mortality

Unadjusted and age-adjusted risk: Disparities in mortality risk by ethnicity, deprivation and vaccination are clearly observed after adjusting for differences in age demographics.

The ethnic and deprivation groups that tend to be associated with higher mortality risk also tend to be systematically younger in age on average. Therefore, the mortality risk for these communities must be adjusted for age in order to make an accurate mortality comparison.

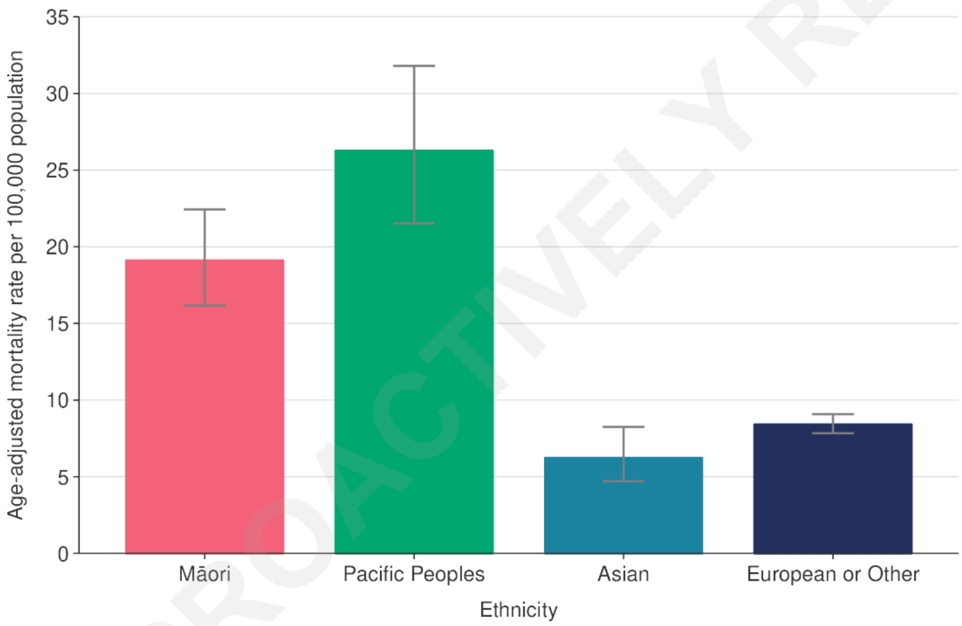
Figure 24 – 27 show age-standardised rates of mortality with COVID-19 broken down by ethnicity, deprivation and vaccination, for the time period of March 2020 to 31 July 2022. Rates are standardised to the Māori population age structure. **Non-overlapping confidence intervals between any two groups suggests the difference between those two groups is statistically significant.** Data include all deaths attributed to Covid-19.

Figure 24 shows that for total COVID-19 attributed mortality rates by ethnicity, Pacific Peoples had the highest rate which was 1.4 times higher than Māori ethnicity, 3.1 times higher than European or Other ethnicity and 4.2 times higher than Asian ethnicity. Confidence intervals overlapped between Māori and Pacific People; and between Asian and European or Other, which suggests that the difference in mortality rates between those groups is not significant. Mortality rates for Asian and European or Other are significantly lower than mortality rates for Māori and Pacific Peoples.

Figure 25 shows that for total COVID-19 attributed mortality rates by deprivation, the most deprived areas had the highest rate (15.0 per 100,000), followed by mid-range deprivation areas (9.6 per 100,000) and the lowest rate was in the least deprived areas (5.9 per 100,000).

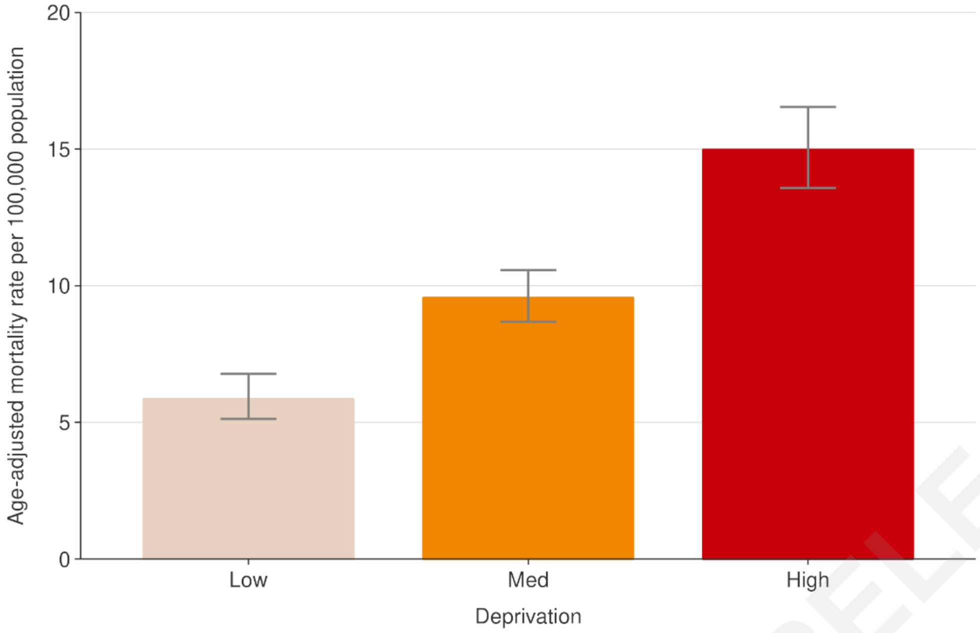
Figure 26 shows that mortality rate for people with more than 2 doses (9.2 per 100,000) was significantly lower compared to people with 2 or less doses. The mortality rate for those with more than 2 doses was 2.6 times lower than those with 2 doses and 2.2 times lower than those with less than 2 doses. Confidence intervals overlapped between the "less than 2 doses" and the "2 doses" groups which suggests that the difference in mortality rates between those two groups is not significant.

Figure 24: Age-standardised cumulative incidence (and 95% confidence intervals) of mortality attributed to COVID-19 by ethnicity, March 2020 to 31 July 2022



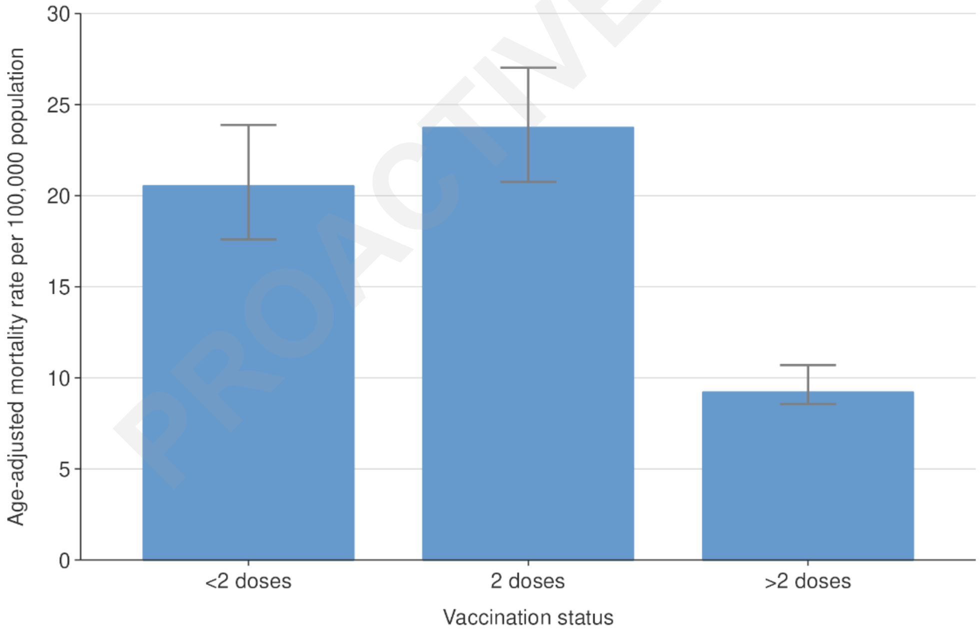
Source: EpiSurv, Death Documents, The Healthcare User database, Mortality Collections database and CVIP population estimates, March 2020 to 31 July 2022

Figure 25: Age-standardised cumulative incidence (and 95% confidence intervals) of mortality attributed to COVID-19 by deprivation, March 2020 to 31 July 2022



Source: EpiSurv, Death Documents, The Healthcare User database, Mortality Collections database and CVIP population estimates, March 2020 to 31 July 2022

Figure 26: Age-standardised cumulative incidence (and 95% confidence intervals) of mortality attributed to COVID-19 by vaccination, March 2020 to 31 July 2022



Source: EpiSurv, Death Documents, The Healthcare User database, Mortality Collections database and CVIP population estimates, March 2020 to 31 July 2022

All cause death rates

Details and methods are published by Statistics NZ at https://www.stats.govt.nz/experimental/covid-19-data-portal under "Total death rates" in the "Health" section of its COVID-19 data portal.

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. Detected cases then remained fairly constant through May and early to mid-June before rising again in late June. Detected cases have decreased in the past few weeks to below 250 per day.

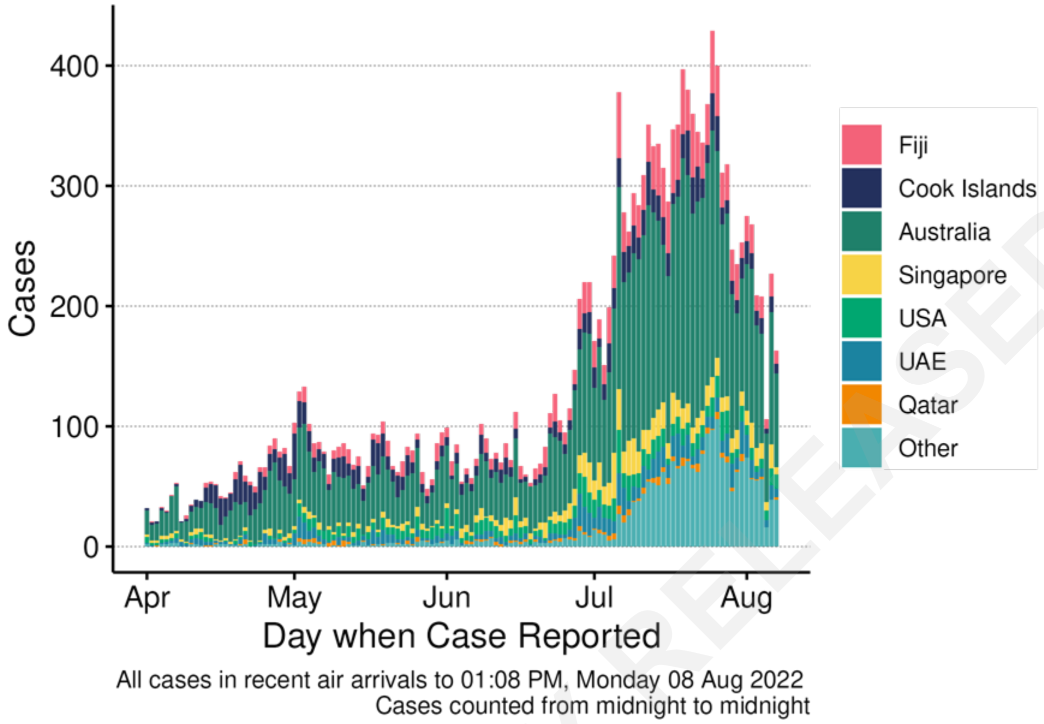
With the removal of pre-departure testing from 20 June, it appears that detected cases have increased from most countries. The increase is consistent with expectations that pre-departure testing halves the number of infected people boarding aircraft, and with increasing Omicron BA.5 prevalence in many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

Figure 27 shows the number of RAT-positive cases in arrivals since January 2022. Before Reconnecting New Zealand removed most of the quarantine requirements, most active cases were on the long-haul flights via the United Arab Emirates (UAE). From then until 19 June, while pre-departure tests were required, most cases arrived on flights from Australia followed by the Cook Islands and Fiji, and then the USA. Since 20 June, most cases have been detected on flights from Australia, United Arab Emirates, Singapore, the Cook Islands and Fiji (**Figure 28**).

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 record countries visited in the weeks before the Declaration is filled in.

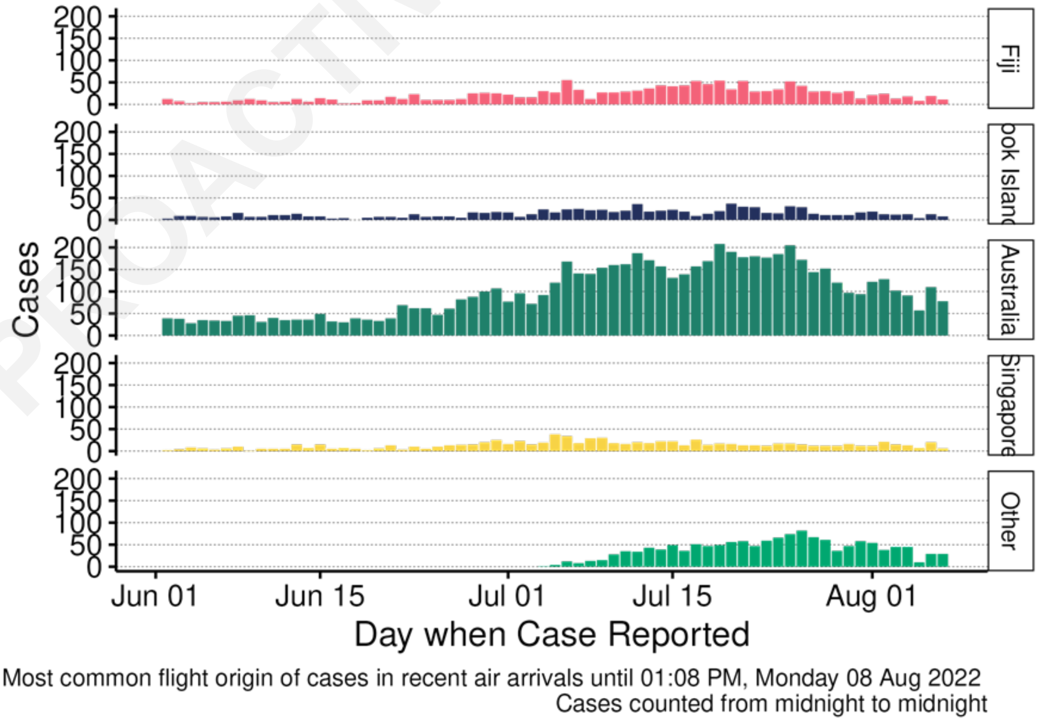
While the increase since 20 June was rapid, it was in line with expectations from the removal of pre-departure testing. Even at the peak of this increase, the total number of cases detected at the border was much less than the number reported each day in the community.

Figure 27: Reported cases reported in post-arrival testing by country of flight departure, 01 April – 07 August 2022



Source: NCTS/EpiSurv as at 2359hrs 07 August 2022

Figure 28: Reported cases reported in post-arrival testing, by the five flight-departure countries with most cases reported in the seven days to 07 August 2022



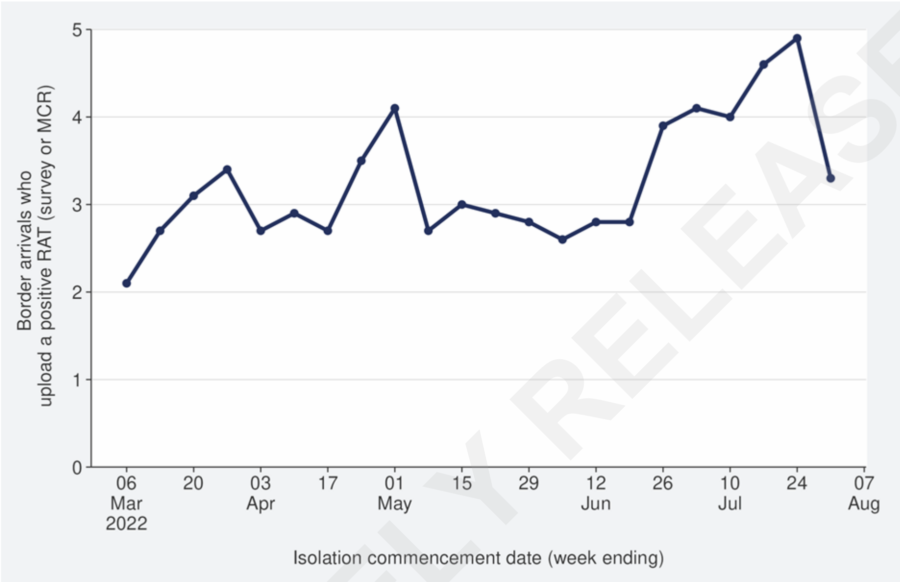
Source: NCTS/EpiSurv as at 2359hrs 07 August 2022

Testing of Border Arrivals

Figure 29 shows that the percentage of positive RATs in border arrivals who reported a test was between 2 – 5% for the period 6 March – 31 July 2022. From early May to the week ending 19 June, the percentage of border arrivals returning positive RATs through either the survey or My COVID Record had been holding steady between 2% and 3%. In July this figure surpassed 4%. The percentage of border arrivals returning positive RATs was 3.3% (2,281 of 70,079 arrivals) for the week ending 31 July.

Rates have risen as expected since 20 June, when the requirement for pre-departure tests were removed.

Figure 29: Percentage of positive tests in border arrivals who report RATs, 6 March – 31 July 2022



Sources: NCTS/EpiSurv/Éclair as at 2359hrs 31 July 2022

Whole Genomic Sequencing of Imported cases

Figure 30 shows the completion metrics for border returnee testing and WGS from 06 March to 31 July 2022. The percentage of arrivals uploading a RAT has been constant with an average of approximately 90%. In the week ending 31 July, there were 70,079 border arrivals, of whom 86.1% (60,337) uploaded a RAT result upon arrival. This is consistent to 88% in the week prior.

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 30: Completion metrics for border returnee testing and WGS for arrivals, 06 March – 31 July 2022

Sources: NCTS/EpiSurv/Éclair as at 2359hrs 13 July 2022, ESR WGS 31 July 2022[8]

Figure 31 shows the border returnee testing and WGS metrics for arrivals. In the week ending 31 July, 50.8% of border arrivals who returned a positive RAT had a follow-up PCR test. This is similar to 51.2% the week prior and is the highest we have seen in months.

In the week ending 31 July, the percentage of PCR positive border arrivals with WGS complete was 8.4%. This figure is very low, however, it should rise as more of the recent cases are processed. From mid-April to mid-June, this figure was between 40%-70%.

Over half of the genomes sequenced at the border in the past fortnight were the watchlist variants; BA.4/5. These cases include reports of BA.2.75 in travellers to New Zealand. As at 9:00am 08 August, ESR had received samples from 751 of the 3,963 PCR-positive border cases with a report date in the two weeks to 05 August. Of the successfully sequenced samples, 83% were BA.5, 6% were BA.2, 10% were BA.4 and <2% were BA.2.75.

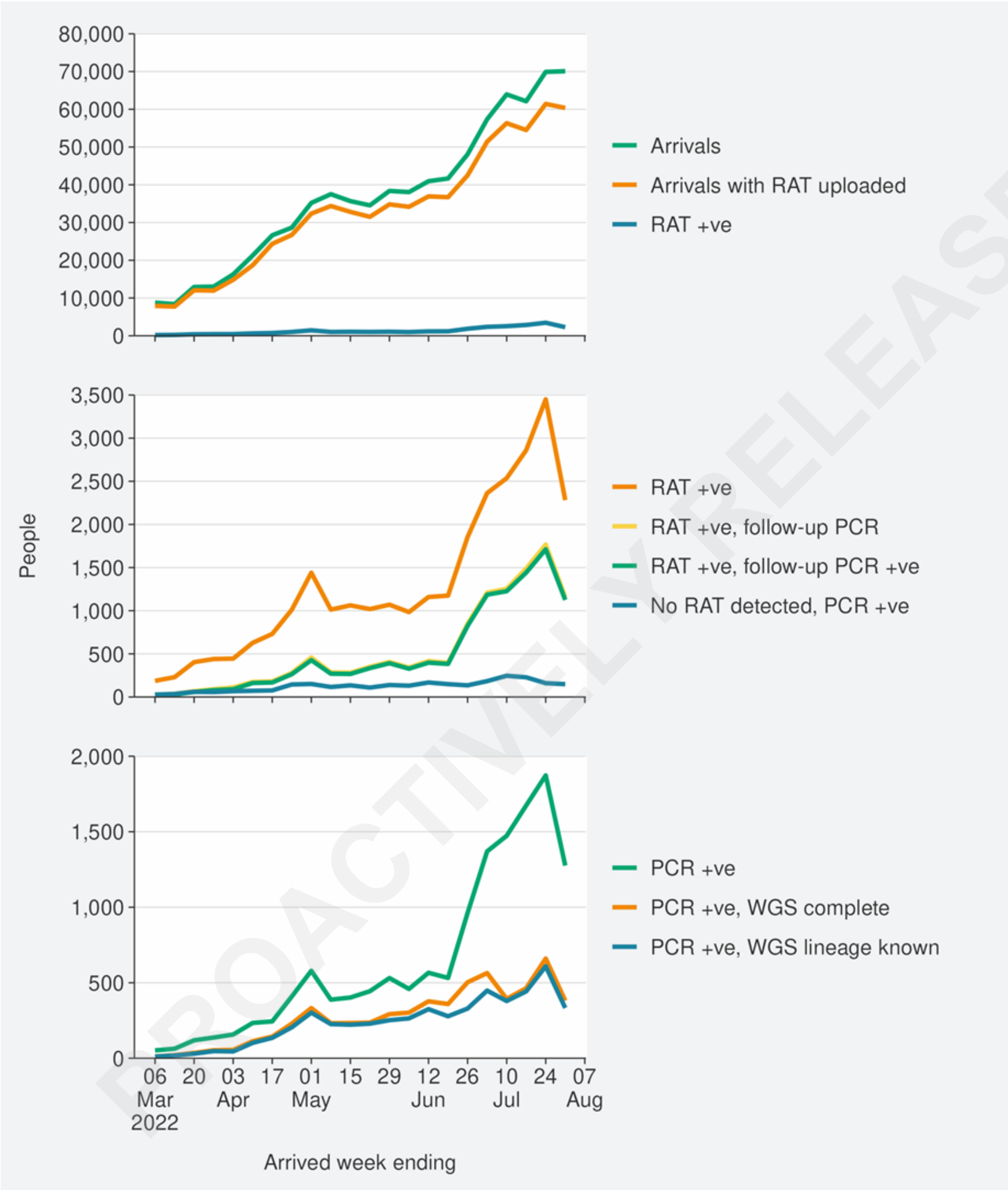
A case can only be referred to ESR for WGS if the traveller is referred for PCR testing and the lab sends the PCR sample for sequencing.

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.

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

Labs are notified of all positive RAT results that are known to be from recent arrivals. However, up to 10% of arrivals have not completed a New Zealand Traveller Declaration that enables data linkage, and others may not be reporting RAT results.

Figure 31: Border returnee testing and WGS metrics for arrivals, 06 March – 31 July 2022



Sources: NCTS/EpiSurv/Éclair as at 2359hrs 19 June 2022, ESR WGS 07 August 2022[9]

[9] 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 07 August 2022, the number of weekly cases remained stable to the previous week, with 6.9 million new cases reported.
- The number of new weekly deaths decreased by 9% compared to the previous week, with over 14,000 fatalities reported.
- At the regional level, the number of reported new weekly cases increased in the Western Pacific Region (+29%) and; at the same time, it decreased or remained stable in the African Region (-46%), the European Region (-7%), the Eastern Mediterranean Region (-22%), the South-East Asia Region (-3%) and the Region of the Americas (-22%).
- The number of new weekly deaths increased in the Eastern Mediterranean Region (+19%), while it decreased in the African Region (-73%), the European Region (-15%), the Region of the Americas (-10), the South-East Asia Region (-1%), and Western Pacific Region (+4%).
- Globally, from 8 July to 8 August 2022, 175,384 sequences were collected and uploaded to GISAID. The Omicron VOC remains the dominant variant circulating accounting for 99% (174,089) of sequences.
- A comparison of sequences submitted to GISAID in the week ending 30 July and the week ending 29 July shows that BA.5 Omicron descendent lineages continued to be dominant globally, with a weekly prevalence that increased from 68.9% to 69.7%. Conversely, within the same time period, BA.4, BA.2.12.1 and BA.2 sequences showed a decline from 10.8% to 9.1%, 2.4% to 1.3% and from 1.4% to 1.0%, respectively.
- BA.5 descendent lineage (BA.5.X) are increasing in diversity, with additional mutations in spike and non-spike regions.

Australia

- In the 14 days up to 09 August 2022, there were 1,951 new cases per 100,000 population. This is a decrease from the week prior (14 days up to 02 August 2022) where there were 2,517 per 100,000 population.
- All states and territories saw decreases in rates of new cases compared to the previous week.
- Following an increasing trend in weekly notifications since early July 2022, there was a 19% decrease in Aboriginal and Torres Strait Islander cases notified in the last week compared to the week prior (as at 7 August 2022).
- As at 10 August 2022, there are 4,343 current cases in hospital with 125 in ICU. This is a decrease from when last reported (03 August 2022) where there were 4,861 hospitalised cases. The majority of these cases were in New South Wales (2,212), Queensland (656) and Victoria (610) which was a continuation of the distribution observed when last reported. However, all three states continue to see reductions in hospitalised cases with Queensland considerably decreasing (-27%).

- Hospitalisations are now rapidly decreasing after cases appear to have peaked in July 2022. However, the latest BA.4/5 wave resulted in the highest ever number of hospitalisations in the country, resulting in a stretched healthcare system. While there is a decline in hospitalisation, they remain high.
- Modellers from the Actuaries Institute COVID-19 Mortality Working Group estimated that from the start of January to the end of July, there were 7,100 deaths where COVID-19 was the primary cause. This indicates that so far in 2022 COVID-19 will be Australia's third most common cause of death (following heart disease and dementia).

United Kingdom

- The latest Office for National Statistics (ONS) Infection survey results (not dependent on testing) show that infection rates continue to decrease in England (4.83% to 3.86%), Wales (5.14% to 3.58%), and Scotland (5.17% to 4.95%); the trend remains uncertain in Northern Ireland (6.18% to 5.98%) (week ending 26 July).
- Wales observed the largest weekly decrease in the proportion of its population testing positive for COVID-19 out of the UK countries (decreasing by 1.56% to 3.58%). Infections decreased in all English regions and and in all age groups, with the largest decreases being observed in those aged between 11 and 34 years.
- The overall hospital admission rate of COVID-19 confirmed patients in England continued to decrease to 12.12 per 100,000 people, while the ICU and HDU admission rate decreased to 0.37 per 100,000 people in the week ending 31 July 2022. Hospital admission rates decreased across most age groups and regions.
- The number of deaths involving COVID-19 in the UK increased from 864 to 921 in the latest week (ending 29 July 2022). Deaths involving COVID-19 accounted for 7.3% of all deaths in the latest week; this is an increase from 6.9% in the previous week. The number of deaths involving COVID-19 in England increased in groups aged 25 years to 64 years and remained similar in those aged under 25 years.
- The NHS is preparing to launch a combined flu vaccine and COVID-19 booster campaign, despite the number of COVID-19 cases falling in the UK. This is amid concerns that COVID-19 cases may surge again in autumn and winter, and potentially coincide with a severe flu season.

Japan

- The infection rate in Japan is now over double that of the previous peak in February 2022, although there are signs that infection rates are slowing.
- Cases in Japan continue to increase with cumulative COVID-19 cases at 14.6 million (as at 11 August 2022). As at 09 August 2022, daily new confirmed cases were at 172,998 and appear to be decreasing after a peak last week (253, 392 seen on 5 Aug). The current surge in cases is due to the BA.5 omicron subvariant.
- There is some evidence to suggest that the unvaccinated youth in the country are driving the current wave along with the population having not previously been mass exposed to SARS-CoV-2.
- As at 09 Aug, daily deaths were at 1.46 per million people as a 7-day rolling average, increasing from 0.90 per million people recorded the previous week.

- Japan's focus is on supporting regional authorities to manage their local situations rather than imposing a national response. The city of Osaka has advised elderly people to avoid non-essential outings and Tokyo is encouraging frequent testing of residents and mask-wearing, including offering free testing centres at train stations.

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.

- 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 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 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 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 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 20.3% after the introduction of targeted testing and by 17.5% 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 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 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.
- 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.
- A mathematical modelling study assessing the impact of public compliance on non-pharmaceutical interventions with a cost-effectiveness analysis.
- 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.
- An observational study on the impact of contact tracing and testing on controlling COVID-19 without lockdown in Hong Kong.
- 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.
- 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.
- Systematic review of economic evaluations of COVID-19 interventions

Isolation modelling

CMA have performed a number of simulations with different combinations of case isolation and contact quarantine requirements. This was for a period (May 2022) with decreasing case numbers, and a different sub-variant (BA.2), so the absolute numbers are not reliable, but the relative magnitude of impact especially between case and contact rules is informative.

The network contagion model (NCM) is used to estimate the short-term (around one month) impact. The requested scenario results are summarised in Table 1. The following modelling assumes there are no additional public health precautions after release from isolation/quarantine, or instead of quarantine, that further mitigate transmission.

Based on evidence from studies looking at viral load (CT value) through time, and studies looking at live viral culture, CMA have produced an updated estimate of the duration of the infectious period for the Omicron variant (referred to in **Table 1** as default).

Based on the recent paper published by Boucau et al (2022), a 'longer' infectious period distribution has also been produced, which can be thought of as an upper bound which would apply for symptomatic cases (referred to in **Table 1** as (NEJM)).

Table 1: Short term results for cases (impact approx. one month following any change)

	Isolation requirements	**% of cases infectious at release default vs. (NEJM)**
Scenario 0	**Cases:** Baseline (7-day isolation)	15% (41%)
Scenario 1	**Cases:** Maintain 7-day isolation plus one negative RAT to release (**maximum 10-day isolation**)	9% (30%)
Scenario 2	**Cases:** Reduce isolation to 5-day minimum plus one negative RAT to release (**maximum 7-day isolation**)	21% (50%)
Scenario 3	**Cases:** Reduce isolation to 5-day minimum plus one negative RAT to release (**maximum 10-day isolation**)	18% (43%)
Scenario 4	**Cases:** Increase isolation to 10-days	5% (20%)

Health System Capacity

Aged Residential Care[10]*:* As at 11 August, 413 cases were reported in ARC facilities. This has reduced from 519 at 03 August.

Daily hospital occupancy[11]: As at 11 August, the national daily hospital occupancy metrics show overall ICU/HDU (critical care) occupancy at 76.5%, with 16.9% of ventilators in use, and 88.7% of ward beds occupied.

[10] Oral updates from PHUs indicate that this is a large undercount due to challenges in uploading positive RAT results. Work is being done to enable uploading, which will result in a more complete picture of the data.

[11] Occupancy figures are reported to the Ministry of Health at 0830hrs Monday to Friday for the previous day as at 2359hrs.

Care in the Community

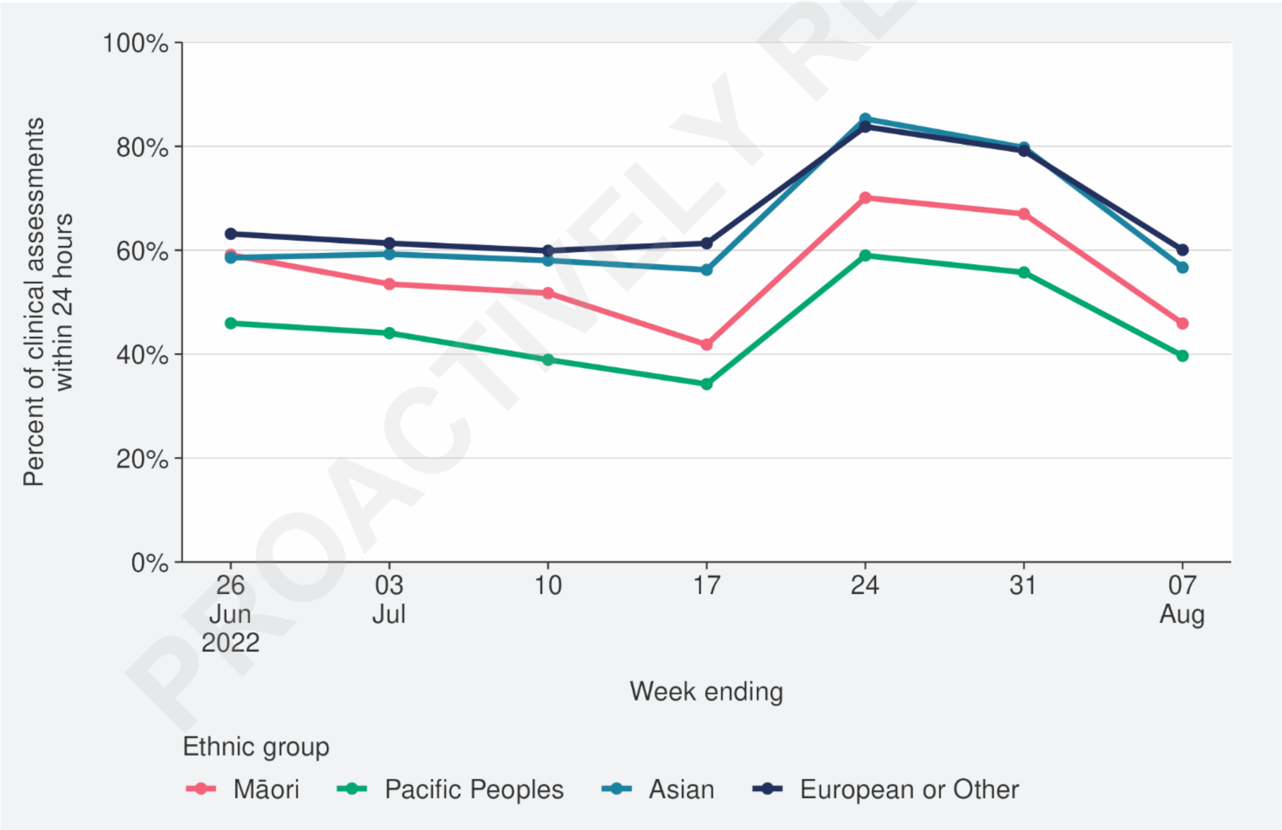
Health System Indicators

The Ministry of Health and the Ministry of Social Development collaborated to develop COVID-19 Care the Community (CitC). This program is to provide support for people in self-isolation and is regionally coordinated through Care Coordination Hubs. Each hub brings together local providers of public health and welfare support, including district health boards, public health teams, general practice teams, Ministry of Social Development, welfare providers, iwi, Māori and Pacific providers.

Figure 32 shows the percentage of clinical assessment completed within 24 hours by ethnicity. In the week ending 07 August, 45.9% of Māori, 39.7% of Pacific Peoples, 56.7% of Asians and 60.1% of European or Other had clinical assessment completed within 24-hours. This trend decreased for all ethnic groups for the two weeks.

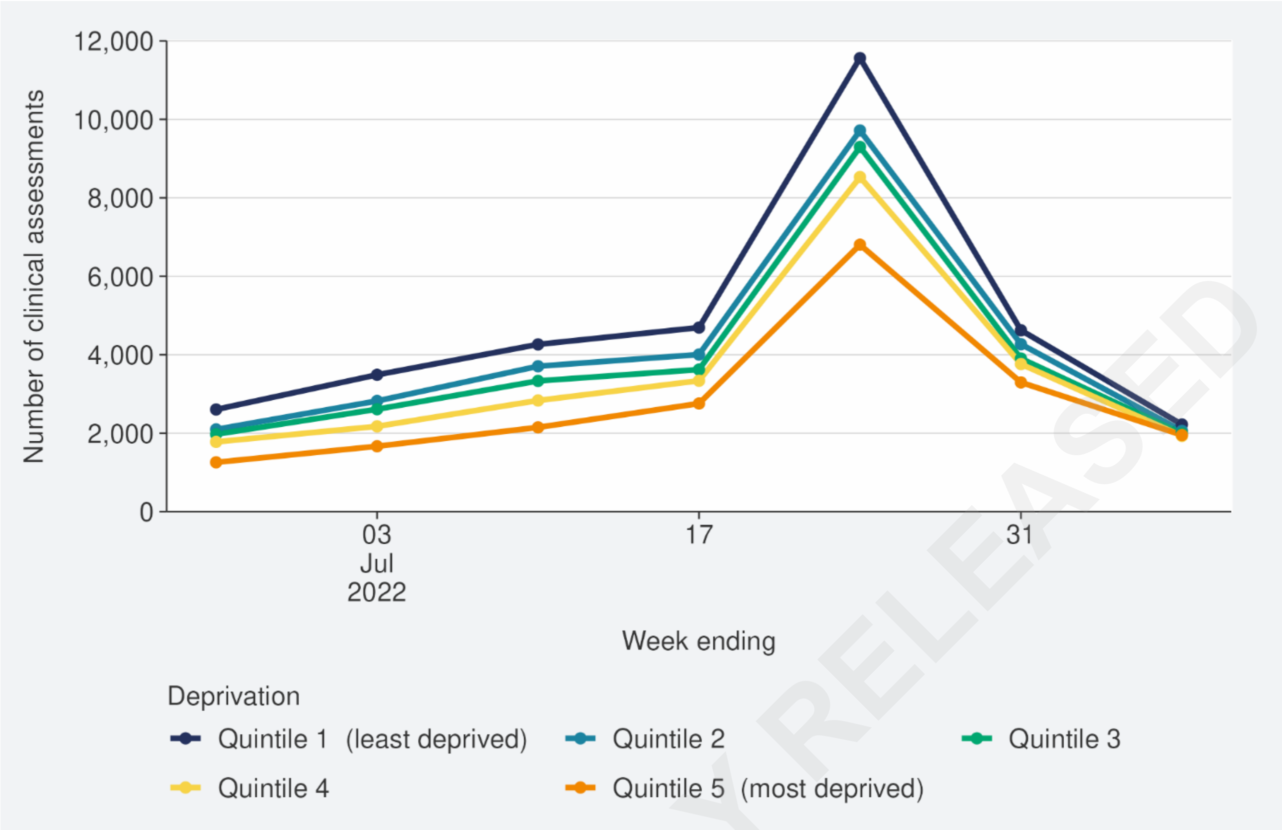
Figure 33 shows the number of clinical assessments by deprivation. Last week, people residing in the least deprived areas had a higher number of completed clinical assessments compared to those living in the most deprived areas, a difference of 269.

Figure 32: Percent of initial clinical assessment completed within 24 hours of positive case by ethnicity, 26 June – 07 August 2022



Sources: CCCM/QLIK, Socrates 07 August 2022

Figure 33: Number of clinical assessments by deprivation 26 June – 7 August 2022



Glossary

<u>Data Sources</u>

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.

<u>Data limitations</u>

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.