COVID-19

Trends and Insights Report

Updated 15 July 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 pandemic, 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.

Key insights

Infection Trends

- **Nationally, the weekly case rate was 13.1 per 1,000** population for the week ending 10 July. This is a 32% increase from the previous week, which was 9.9 per 1,000.
- **For the week ending 10 July**, estimates suggest that **2.9% (942/32,533) of healthcare workers and 2.3% (495/21,106) of border workers tested positive.** While these are not representative samples of New Zealanders, **border workers' risk is very similar to the general community risk** (but more reflective of the Auckland population).
- **Border worker comparisons with Auckland** case rates **suggest under ascertainment of cases (2.3% [23.5 per 1,000] versus 13.6 per 1,000**, respectively).
- **Levels of viral RNA in wastewater have increased in all regions.**
- Both case rates and wastewater viral RNA levels have increased for all regions in the past week, **strongly suggesting an increase in new infections nationwide.**
- In the past week, **all 18 Districts experienced an increase in case rates.**

Demographic Trends in Case Rates

- The **lowest case rates** continue to be in **Pacific Peoples (6.0 per 1,000);** case rates in this group have increased by **29% in the past week. Māori case rates have also increased** and are now at **7.7 per 1,000.**
- **For the 65+ age group,** case rates in the Northern region increased by 39.6%, Te Manawa Taki increased by 23.8%, Central increased by 34.9% and Te Waipounamu (Southern region) increased by 33.0% in the past week.
- Case rates for those at higher risk of complications or severe illness from COVID-19, those aged 45-64 and those aged 65+, were highest in European or Other (45-64 at 12.9 per 1,000 and 65+ at 11.6 per 1,000).

Whole Genomic Sequencing

- Omicron BA.2 was the dominant subvariant but has now been outcompeted by **BA.5, which made up about 47% 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 all sites. The upward rise of the BA.5 variant of Omicron is a key observation – it is estimated to make up 90% of cases by August.

- **It is likely that BA.5 is largely responsible for the current national increase in case rates.**
- As of 13 July, ESR received samples from and had processed 122 of the 554 PCR positive hospital cases with a report date in the two weeks to 08 July 2022. Of these, 57% had a BA.2 genome, 8% were BA.4, and 35% were BA.5.

Border Surveillance

- In the week ending 03 July, there were 57,349 border arrivals, of whom **90% (51,398) uploaded a RAT result upon arrival.** This is similar to 88% in the week prior.
- In the week ending 03 July, **4% of recent arrivals tested positive** via RAT, up from 3.5% in recent weeks.
- **Cases in border arrivals rose sharply after 20 June and are approaching a new steady state.** By 04 July, they were **between 150 and 400 reports per day**. While the increase is sudden, it is in line with expectations following the removal of pre-departure testing from 20 June and is still few compared to cases acquired in the community.
- In the week ending 03 July, the percentage of PCR positive border arrivals with Whole Genome Sequencing (WGS) complete was 30%. The figure will rise as more of the recent cases are processed: This figure was also low at 27.0% for the week ending 26 June, but much higher at 62.1% for the week ending 19 June.
- The number of samples available for genomic sequencing has increased sharply in the last week, and **now exceeds the target of 300 per week** needed for good detection of new variants.

Hospitalisation and Mortality

- For the week ending 10 July, the national hospital occupancy rate was 11.0 per 100,000 population, **an increase of 35% from the week prior.** Hospital occupancy rates increased across all regions in the past week. The Northern region (11.6 per 100,000) increased by 23%, Te Manawa Taki (10.5 per 100,000) increased by 41%, Central region (11.1 per 100,000) increased by 40% in the past week and Te Waipounamu (Southern region) (10.5 per 100,000) increased by 50%.
- As of 13 July 2022, there were 1,760 deaths with COVID-19 infection who died within 28 days of being reported as a case and/or with COVID-19 being the primary cause of death.
- Of the deaths that have been reviewed, **50% had COVID-19 as the main underlying cause**, and **COVID-19 contributed to 27%** of deaths. The remaining **23% were found to be due to unrelated causes**, such as accidents.

International and Scientific Insights

- Globally, the number of **new weekly cases has increased for the fifth consecutive week** after a declining trend since the last peak in March 2022. During the week of 4 to 10 July 2022, over 5.7 million cases were reported, a 6% increase as compared to the previous week.
- **The number of new weekly deaths was similar to the figure reported during the previous week**, with over 9800 fatalities reported to WHO.
- The Omicron VOC continues to be the dominant variant circulating globally, accounting for 84% of sequences reported to GISAID in the past 30 days.
- Globally, the Omicron lineages BA.2 and BA.2.12.1 show declining trends, while BA.4 and BA.5 show increasing trends.

- A comparison of sequences submitted to GISAID in epidemiological week 25 (19 to 25 June 2022) and week 26 (26 June to 7 July) shows a decline in BA.2 sequences from 7% to 4% and a decline in BA.2.12.1 sequences from 13% to 7%. Within the same period, the proportion of reported sequences of BA.4 has risen from 11% to 14% and BA.5 from 42% to 50%. BA.5 sequences have been reported
- The scientific insights section includes studies on outbreak management, economic evaluations, transmission dynamics and modelling studies.

Health System Capacity

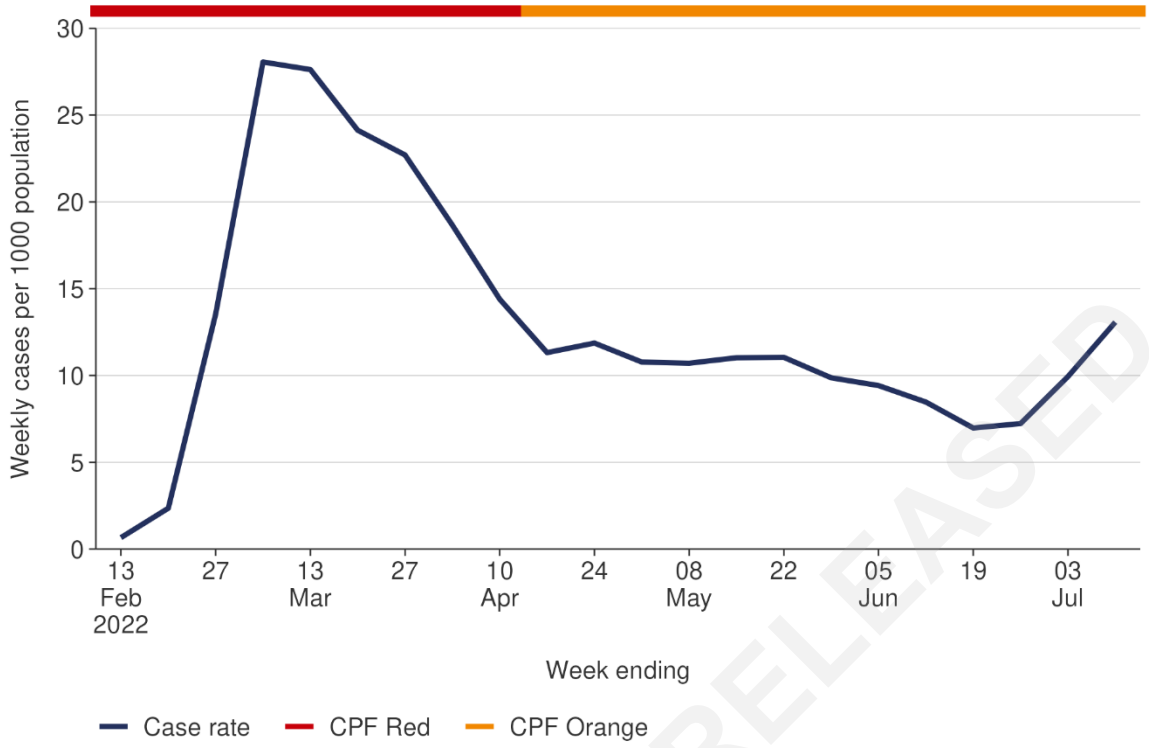
- For the week ending 07 July, there was a significant increase in the number of Aged Residential Care (ARC) cases, from 474 last week, to 581.
- Nationally, emergency department attendance volumes for the week ending 03 July decreased by 1.9%. For the first time, non-admitted Short Stays in Emergency Departments (SSED) for all patients seen and treated in **6 hours in ED** dropped below 80% and admitted SSED (patients admitted within 6 hours) dropped below 55%.
- Acute patients with a Length of Stay (LOS) 7 days or above increased this week to 1596, an increase of 153 patients since last week. The number of COVID-19 patients in hospital are the highest it has been since early April, with 522 patients hospitalised as at 06 July. The majority of the larger hospitals reported to be at over 90% occupancy, an increase from the 80% reported last week.
- **The percentage of FluTracking participants who reported fever and cough has steadily increased since mid-February, exceeding percentages observed in previous years for this time of year.** Activity remains high for this time of year; while this may be in part driven by the current COVID-19 Omicron outbreak, there is also evidence of increasing non-COVID-19 ILI activity throughout New Zealand.

Domestic epidemic outlook

Infection outlook

- NZ was in COVID Protection Framework Red from the start of the year until 14 April 2022 when it switched to Orange, where it continues to be **(Figure** 1**).** The rate of decline slowed after the week ending 17 April, after which a plateau with a slight decline to the week ending 19 June was observed.
- **However, community cases have increased for the past three weeks with an 82% increase in case rates from week ending 26 June to 10 July.** Comparisons of community cases against routine worker testing indicate a substantial under-ascertainment, with over half of community cases likely to not be reported.
- Wastewater quantification levels are at their highest or close to the levels seen during the March Peak across the motu, indicating a substantial increase in new infections.
- Cases in those over 65+ continue to increase substantially by 33% compared to the week ending 03 July 2022.
- WGS of BA.5 indicates that it now makes up 47% of community samples and has outcompeted BA.2 to become the new dominant subvariant. Models predict BA.5 will reach 90% of all community cases in early August.
- Thus far, there have been **6 reported cases of BA.2.75 within NZ** – all are associated with the border. As yet, there is no indication of community spread of BA.2.75.
- Due to the overlapping impacts of immune evasion characteristics of BA.5, changes in adherence to public health measures, and infections moving into previously protected communities at high risk of infections, continued substantial **increases in infections will result in the coming weeks**.
- Updated modelling predicts that we can expect to see around 21,000 daily cases from late July through early August. Modelling further predicts around 1,200 new hospitalisations per day for the same time period. Currently, daily counts are tracking around a week ahead of modelled predictions.

Figure 1: National weekly case rates and CPF level for 02 Jan – 10 July 2022



Source: Éclair/Episurv, 2359hrs 10 July 2022

Tertiary Care outlook

- **Inpatient test positivity for COVID-19 has been steadily increasing for the past month** and is now 43 per 1,000 inpatients.
- New CMA modelling scenarios predict a sharp rise in hospitalisations from BA.5 becoming the dominant variant in the community, estimated at 1200 hospitalisations a day.
- COVID-19 related hospital occupancy continues to increase substantially by 35%. Further increases are likely to impact planned care, as most hospitals are reporting they are over 90% occupancy for a majority of the week.
- Increasing trends in hospitalisations in the coming weeks are likely to exacerbate poor outcomes for at-risk populations such as those who are older, unvaccinated and/or have co-morbidities.

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Figures

Figure 25: Omicron Health Sector Clinical Indicators Dashboard summary, week ending 10 July 202242

Infection Trends

Summary of evidence for infection and case ascertainment trends

Currently, **the national border workforce case rates in the past week (23.5 per 1,000) were higher than the general population (13.1 per 1,000);** This suggest the **underlying level of infection are substantially higher than diagnosed rates**. Consistent with the trend in both border and health care workers, **general population case rates have increased in all regions.** This increase is consistent at a national level across all ethnicities and age groups.

Inpatient test positivity at tertiary hospitals across the motu has increased steadily in the past two weeks with approximately 4.3% (43 per 1000) of inpatients testing positive for COVID-19. This also confirms the increases seen in the general population.

Levels of viral RNA in **wastewater have increased in all regions in the past week.** At a third of all wastewater quantification collection sites, there has been a five-fold increase in levels compared to the previous month.

New COVID-19 Modelling Aotearoa (CMA) scenarios indicate under current public health measures settings, cases will peak at approximately 21,000 cases and 1200 hospitalisations daily in early August. However, community trends for cases and hospitalisations are tracking a week earlier than modelled scenarios.

Approximation of underlying infection incidence

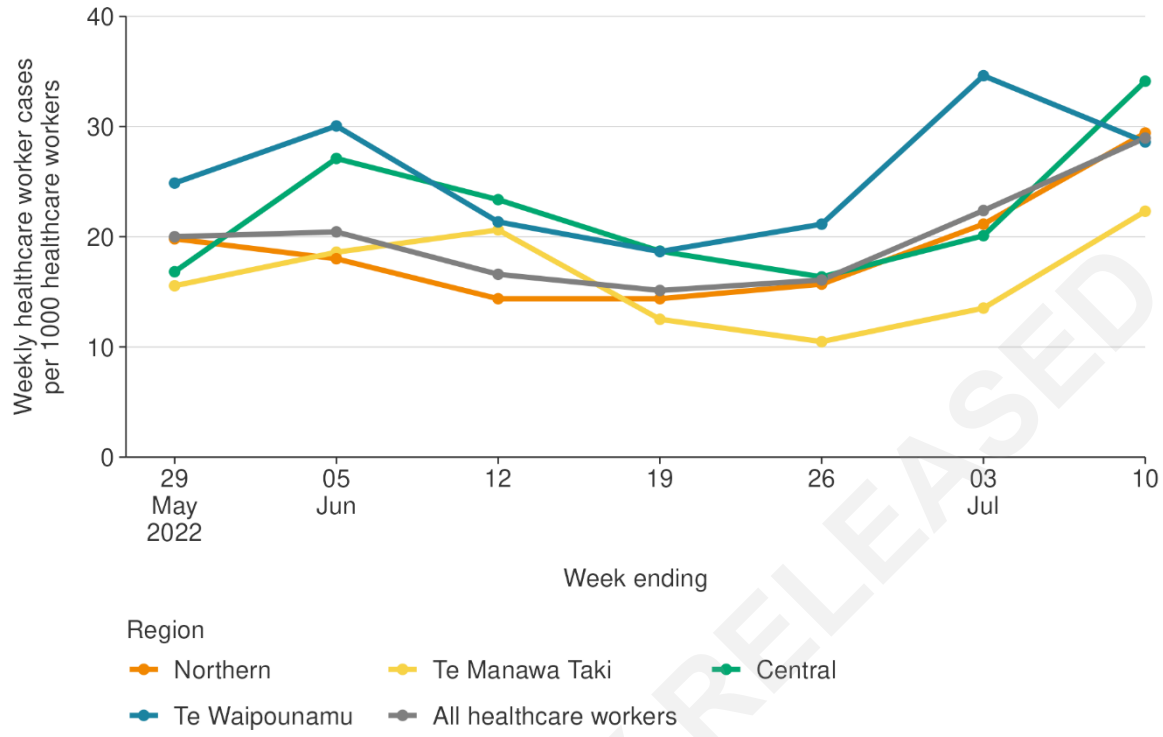
Underlying infection incidence has been estimated using case rates for routinely tested healthcare workers and border workers where there was evidence of regular testing.[1] While these workforces are not a representative sample of New Zealanders, **the border workers are now likely to have a similar risk to the general population (but more indicative of Auckland)** as their risk of infection from the community is likely to be much higher than the risk faced in their workplace.

For the week ending 10 July, estimates suggest that 2.9% (942/32,533) of healthcare workers (**Figure 2**) and 2.3% (495/21,106) of border workers[2] (**Figure 3**) have tested positive (for the first time). Border worker comparisons with Auckland case rates suggest under ascertainment of cases (2.3% [23.5 per 1,000] versus 13.6 per 1,000, respectively).

[1] 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.

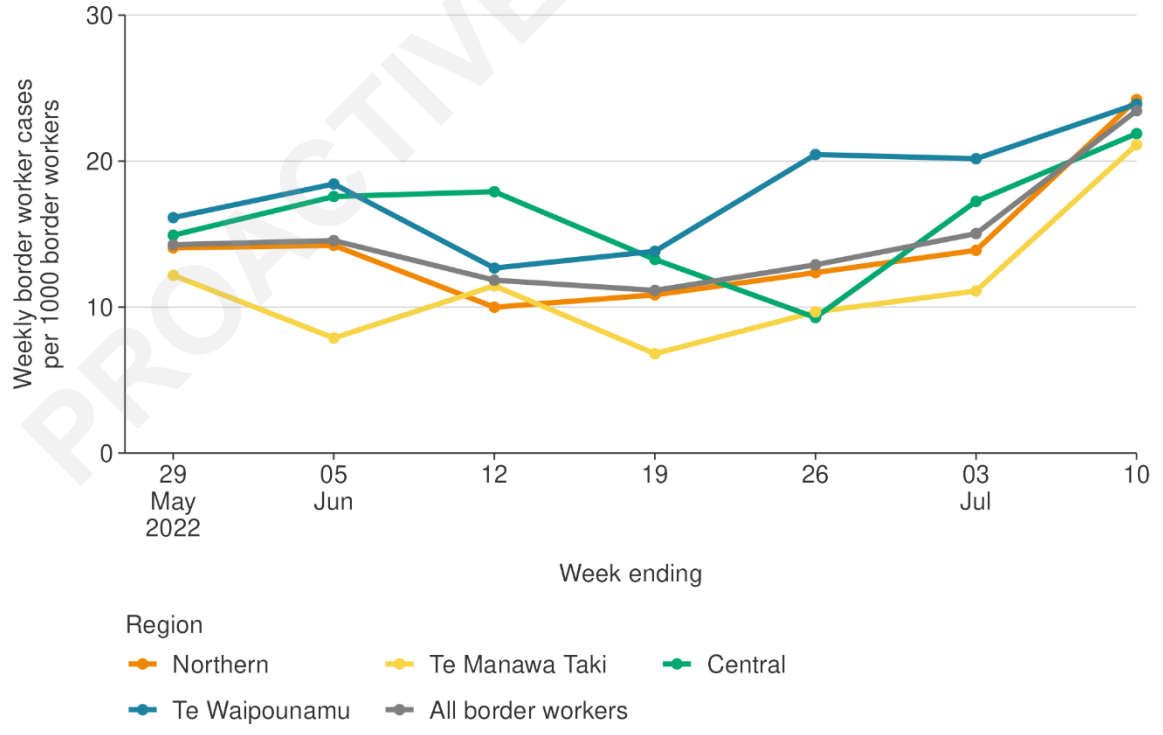
[2] This rate may be underestimated as not all border workers are rostered on and therefore not required to undertake testing.

Figure 2: Regional weekly case rates of health care workers for weeks 29 May – 10 July 2022



Source: Éclair/Episurv, 2359hrs 10 July 2022

Figure 3: Regional weekly case rates of border workers for weeks 29 May – 10 July 2022

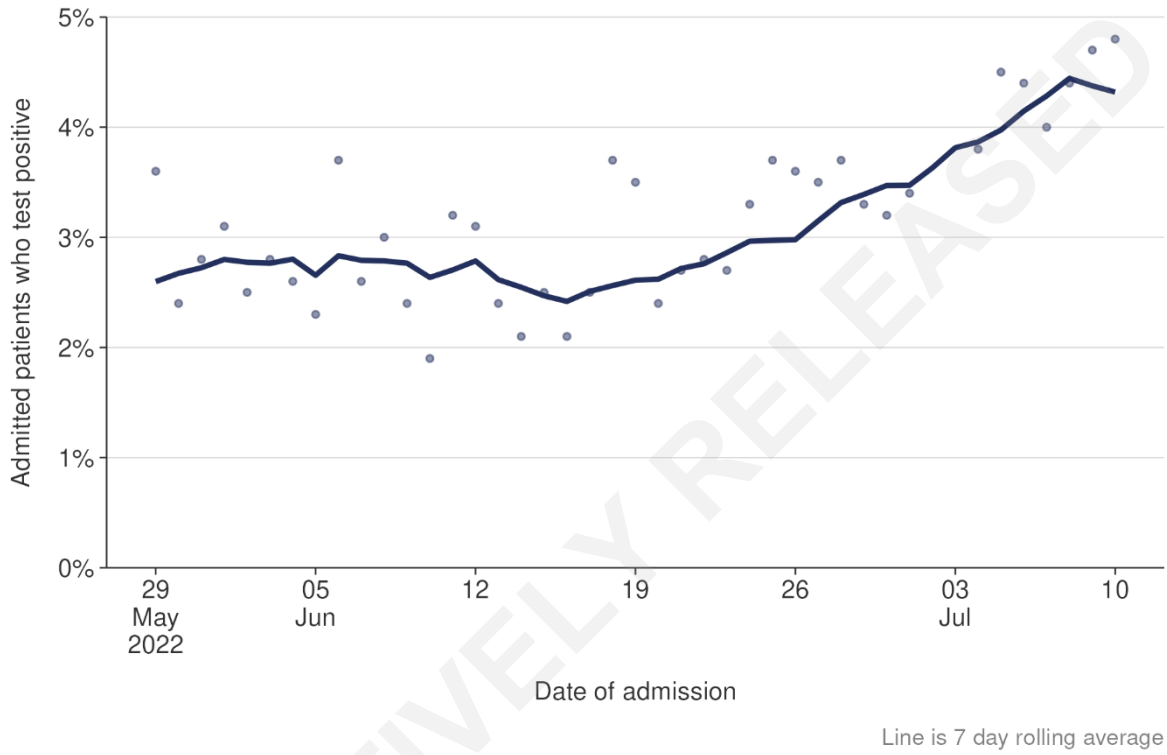


Source: Éclair/Episurv, 2359hrs 10 July 2022

Test positivity trends among tertiary hospital admissions

Inpatient test positivity trends for tertiary hospital admissions[3] is shown in **Figure 4**. **Tertiary hospital admission positivity has been steadily increasing** since mid-June with a 7-day rolling average of 4.3% (489/11,323) for the week ending 10 July. Preliminary analysis indicates a large majority of cases who are admitted to hospital, test positive and are confirmed as a case on the day of their hospitalisation.

Figure 4: Percent of tests positive among tertiary hospital admissions



Source: Tertiary hospitalisation data, NCTS & EpiSurv as at 2359hrs 10 July 2022

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

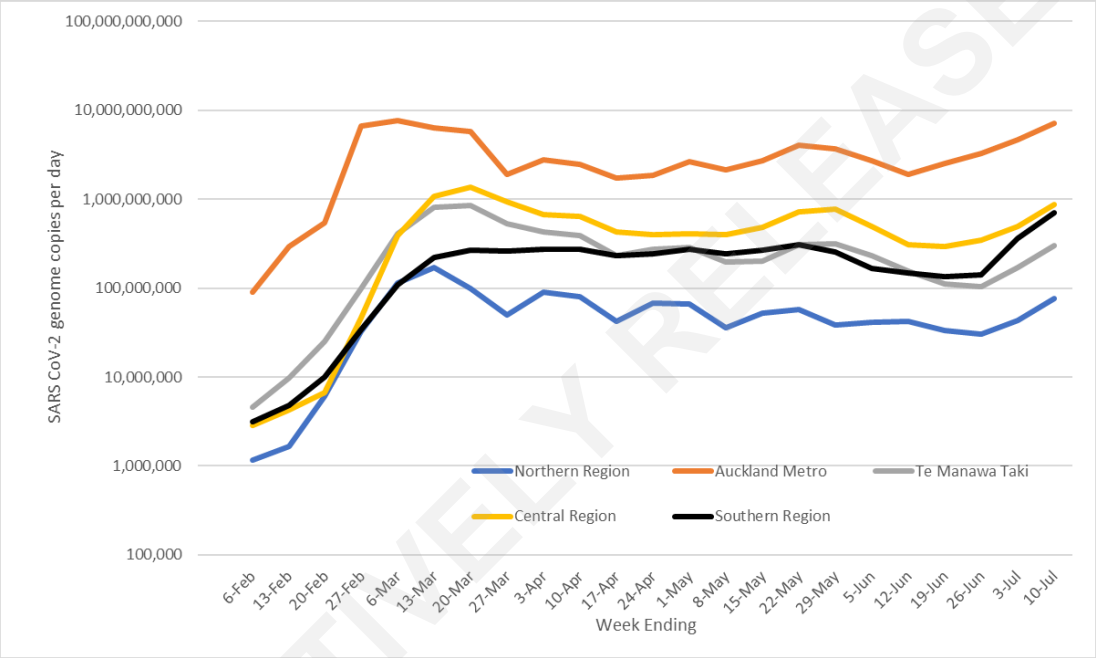
Wastewater quantification

Figure 5 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.

The SARS-CoV-2 RNA levels in wastewater in all regions have increased in the past weeks. In all regions, the wastewater levels are similar to the levels seen in March.

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 5: Regional wastewater trends in SARS-CoV-2 genome quantification for weeks 06 February – 10 July 2022



Source: ESR SARS-CoV-2 in Wastewater update for week ending 10 July 2022

Trends in diagnosed cases

Overall, **the weekly case rate was 13.1 per 1,000** population for the week ending 10 July. This is **a 32% increase from the previous week,** which was 9.9 per 1,000.

Figure 6 shows that case rates have increased across all regions in the past week. The Northern region rate (12.1 per 1,000) increased by 36% in the past week, Te Manawa Taki (10.0 per 1,000) increased by 34%, Central region (15.5 per 1,000) increased by 38% and Te Waipounamu (15.6 per 1,000) increased by 20%.

In the past week, **all 18 Districts experienced an increase in case rates**.

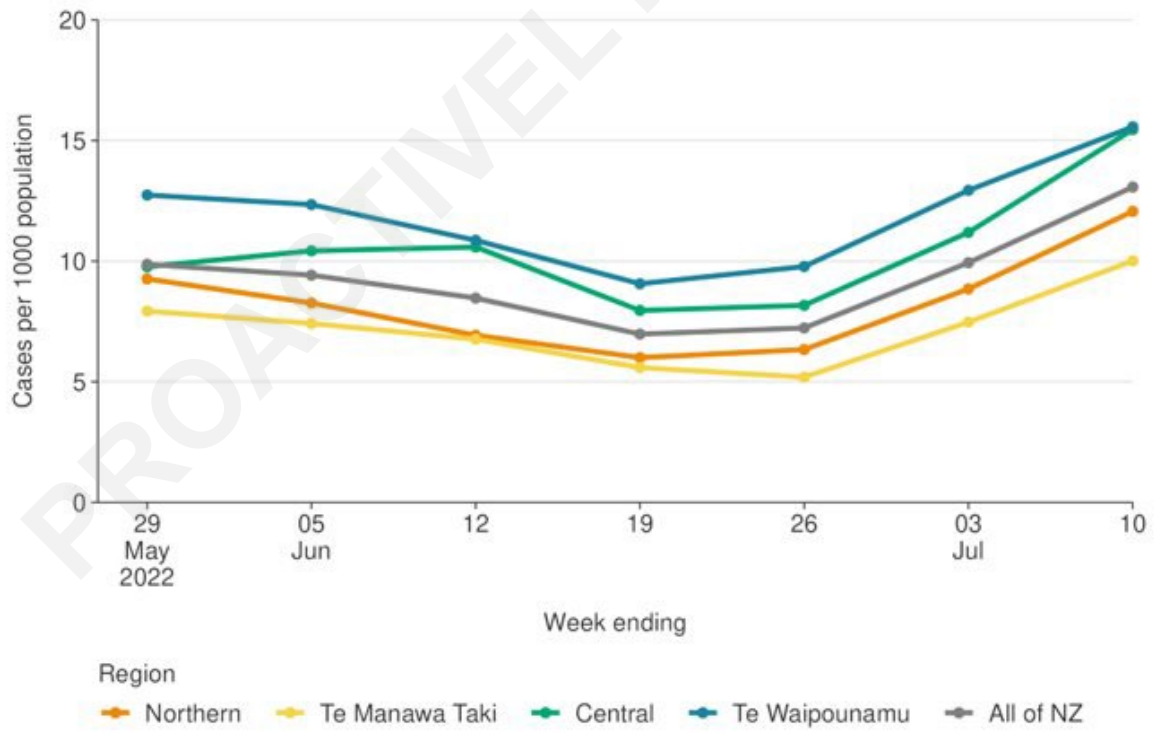
In the Northern region, the weekly case rate was highest for **Waitematā (14.2 per 1,000)** followed by Auckland District (13.6 per 1,000).

In Te Manawa Taki, weekly case rates were highest in **Taranaki (11.8 per 1,000)**, followed by Tairāwhiti District (10.4 per 1,000).

The highest weekly case rates in the Central region were in **Capital, Coast and Hutt Valley District (16.6 per 1,000)** followed by Hawke's Bay (16.2 per 1,000 respectively).

In Te Waipounamu, the highest case rates were in **Canterbury and West Coast District (17.1 per 1,000)** followed by Southern District (14.7 per 1,000). Nelson Marlborough and South Canterbury's case rates were 12.5 and 13.3 respectively.

Figure 6: Regional weekly case rates for weeks 05 June – 10 July 2022



Source: NCTS/EpiSurv as at 2359hrs 10 July 2022

Reinfection

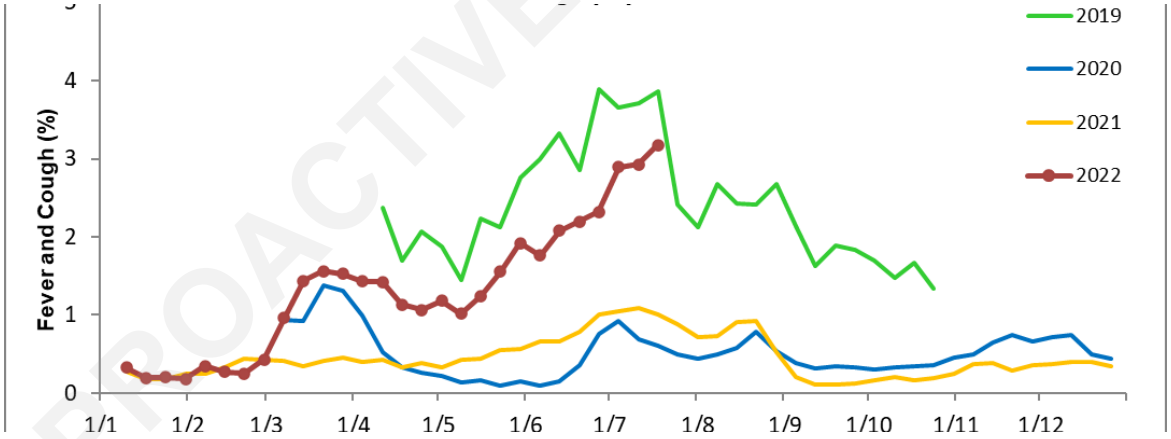
Analysis and interpretation of reinfection data is being developed and will be provided in the next report. However**, preliminary analysis indicated that 3.2% (2,164/66,905) of cases between 4-10 July were reinfections.** To date, 16.4% of those who were reported as a case prior to the August 2021 Delta outbreak, when case ascertainment was more complete, have reported a subsequent infection.

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, the previous guidance was not to test until 90 days after first infection. This in 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

Figure 7 shows self-reported FluTracking of Influenza-like Illness (ILI) symptoms. Percentage of fever and cough is trending above what was reported in 2020 and 2021, but just below what was reported for 2019. These data capture symptoms of fever and cough that are similar to all upper-respiratory viral infections such as COVID-19, influenza and respiratory syncytial virus (RSV). The reason for this is to track community symptoms of ILIs.

Figure 7: FluTracking Influenza-like illness symptoms



Source: Weekly FluTracking Report for week ending 10 July 2022

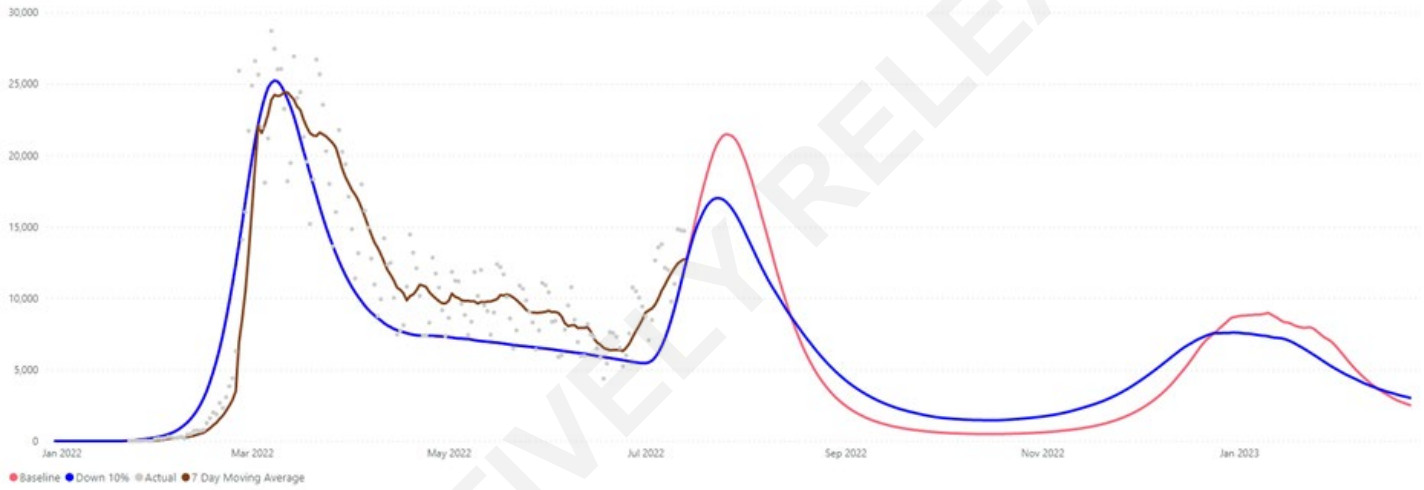
Modelled and actual cases

The COVID-19 Modelling Aotearoa group's modelling scenarios track beds occupied by people with COVID-19 infections. **Figure 8** compares cases with the new BA.5 scenarios. The baseline scenario assumes no change in policy or behaviour in the New Zealand population throughout the current BA.5 wave; hence that Covid-19 transmission remains the same. The "Down 10%" scenario assumes a reduction in Covid-19 transmission by 10%.

These scenarios are based on the current Omicron BA.5 variant. The peak is projected to occur between late July and early August with daily cases rising to approximately 21,000 a day.

Currently, cases are tracking quite closely to both scenarios. Next week we will likely be closer to the modelled peaks and will have better insight regarding which scenario the actual cases will track most closely to.

Figure 8: COVID Modelling Aotearoa scenarios compared with reported cases nationally (BA.5 scenarios)



Sources: COVID-19 Modelling Aotearoa Branching Process Model April 2022, and Ministry of Health reported case data 13 July 2022

Effective reproduction rate, and forecasts of cases and infections

This section has been removed this week.

Demographic trends in case rates

Ethnicity trends over time and by region

Figure 9 shows national case rates by ethnicity. **Figure 11** shows regional case rates by ethnicity.

In the past week, **case rates increased for all ethnicities.** Rates in Asian and European or Other ethnicities remain higher than those for Māori and Pacific Peoples. **European or Other continue to have the highest weekly case rate at 15.2 per 1,000** (up from last week's 11.4 per 1,000), followed by Asian at 12.9 per 1,000 (up from 10.6 per 1,000 last week). The **lowest case rate continues to be in Pacific Peoples (6.0 per 1,000),** which is a 29% increase from last week (4.6 per 1,000). The Māori case rate has also increased by 35%, from 5.7 per 1,000 in the previous week to 7.7 per 1,000.

Case rates in the Northern region for European or Other were 15.0 per 1,000 and rates for Asian were 12.2 per 1,000. Māori had the second lowest case rate at 7.0 per 1,000. Pacific Peoples (5.7 per 1,000) had the lowest case rates in this region.

Case rates for Te Manawa Taki were highest for European or Other (11.8 per 1,000), followed by Asian (9.5 per 1,000). Māori had the second lowest case rate at 6.2 per 1,000 followed closely by Pacific Peoples who had the lowest case rates at 4.5 per 1,000.

In the Central region, case rates were highest for European or Other (17.7 per 1,000), comparable to Asian (15.1 per 1,000). Māori had the second lowest case rate at 9.5 per 1,000 and Pacific Peoples had the lowest case rate at 7.2 per 1,000.

Case rates for Te Waipounamu were highest for Asian (17.0 per 1,000) and European or Other (16.2 per 1,000). Māori had the second lowest case rate at 10.1 per 1,000 and Pacific Peoples had the lowest case rates at 7.9 per 1,000.

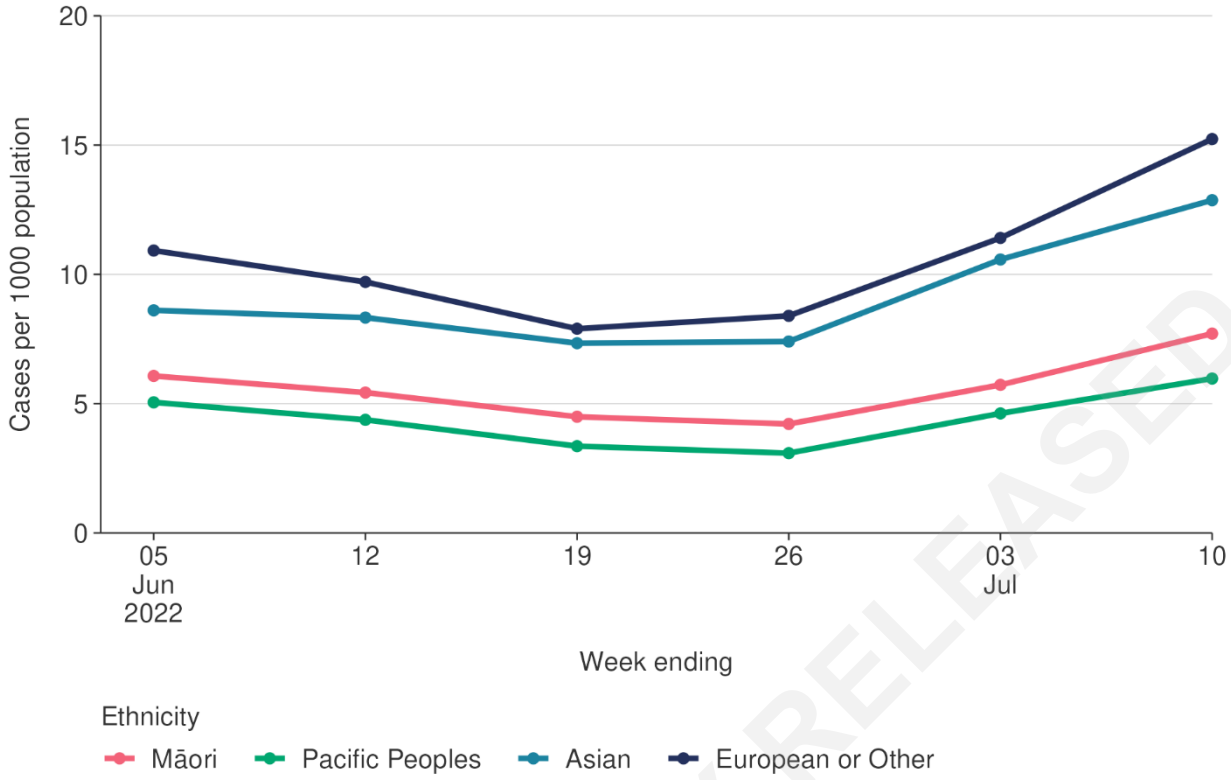
Figure 10 shows national case rates by ethnicity and a further breakdown by age group. The **highest case rates** out of any cohort were **within those aged 25-44 and 45-64 of European or Other ethnicity (17.4 and 17.8 per 1,000 respectively)** whilst the lowest case rates were in those aged 0-4 and 5-14 of Pacific Peoples ethnicity (3.0 and 2.6 per 1,000 respectively). For both Māori and Pacific Peoples, case rates were highest in the 25-44, 45-64 and 65+ age groups. For Asian people, case rates were highest in the 15-24, 25-44 and 45-64 age groups. For European or Other, case rates were highest in the 25-44, 45-64 and 65+ age groups.

Cases rates for all ethnicities aged 65+ increased over the past two weeks after stable trends in the past month. In the week ending 10 July, case rates for Asian aged 65+ were 9.2 per 1,000 (22% increase from week prior). Case rates for European or Other aged 65+ were 15.6 per 1,000 (33% increase from week prior). **Case rates in Māori aged 65+ were 11.9 per 1,000 (52% increase from week prior). Case rates in Pacific People aged 65+ were 6.9 per 1,000 (28% increase from week prior).**

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 17.8 per 1,000 and 65+ at 15.6 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 weekly case rates by ethnicity for weeks 05 June – 10 July 2022



Source: NCTS/EpiSurv as at 2359hrs 10 July 2022

Figure 10: National ethnicity-specific weekly case rates by age group for weeks 05 June – 10 July 2022

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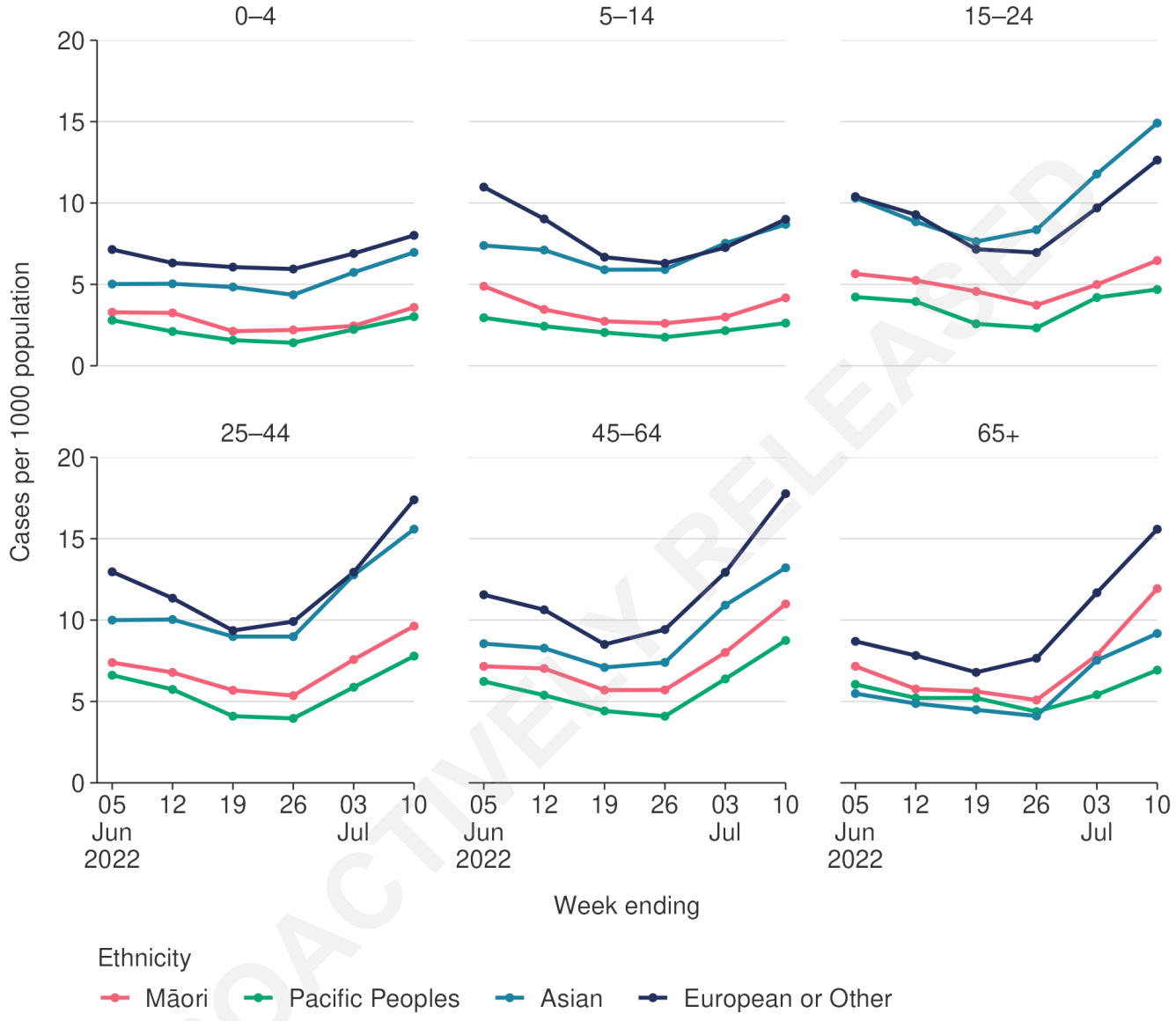
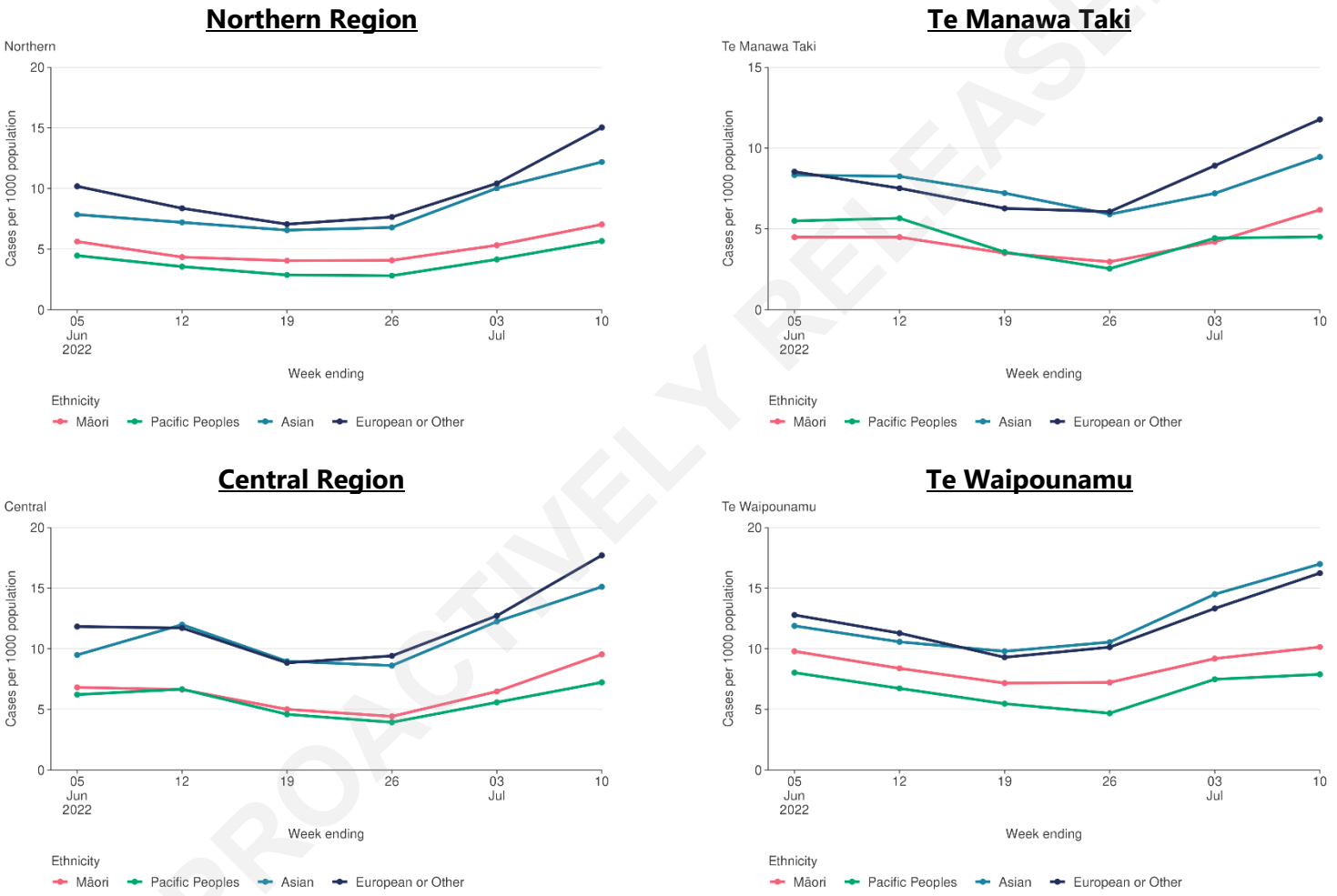


Source: NCTS/EpiSurv as at 2359hrs 10 July 2022

Figure 11: Regional weekly case rates by ethnicity for weeks 05 June – 10 July 2022



Source: NCTS/EpiSurv as at 2359hrs 10 July 2022

Age trends over time and by region

Figure 12 shows community cases by age nationally. Case rates in in those aged 15+ years have increased sharply, in the past week. Case rates in the youngest age groups (0-4 and 5-14) have also increased, but to a lesser extent. Nationally, case **rates in the 65+ age group increased 33% from last week, to 14.5 per 1,000.**

Nationally, case rates were relatively similar for 0-4 and 5-14 age groups (6.2 and 7.1 per 1,000 respectively); 25-44 and 45-64 age groups (15.2 and 15.9 per 1,000 respectively) in the past week. Those aged 0-4 continued to have the lowest weekly case rate at 6.2 per 1,000. **The 25-44 and 45-64 age groups had the highest case rates at 15.2 per 1,000 and 15.9 per 1,000** respectively in the past week.

For the 0-4 age group, case rates in the Northern region increased by 21.2%, Te Manawa Taki increased by 33.3%, Central increased by 30.5% and Te Waipounamu increased by 11.9%.

For the 5-14 age group, case rates in the Northern region increased by 16.7%, Te Manawa Taki increased by 34.6%, Central increased by 31.3% and Te Waipounamu increased by 23.0%.

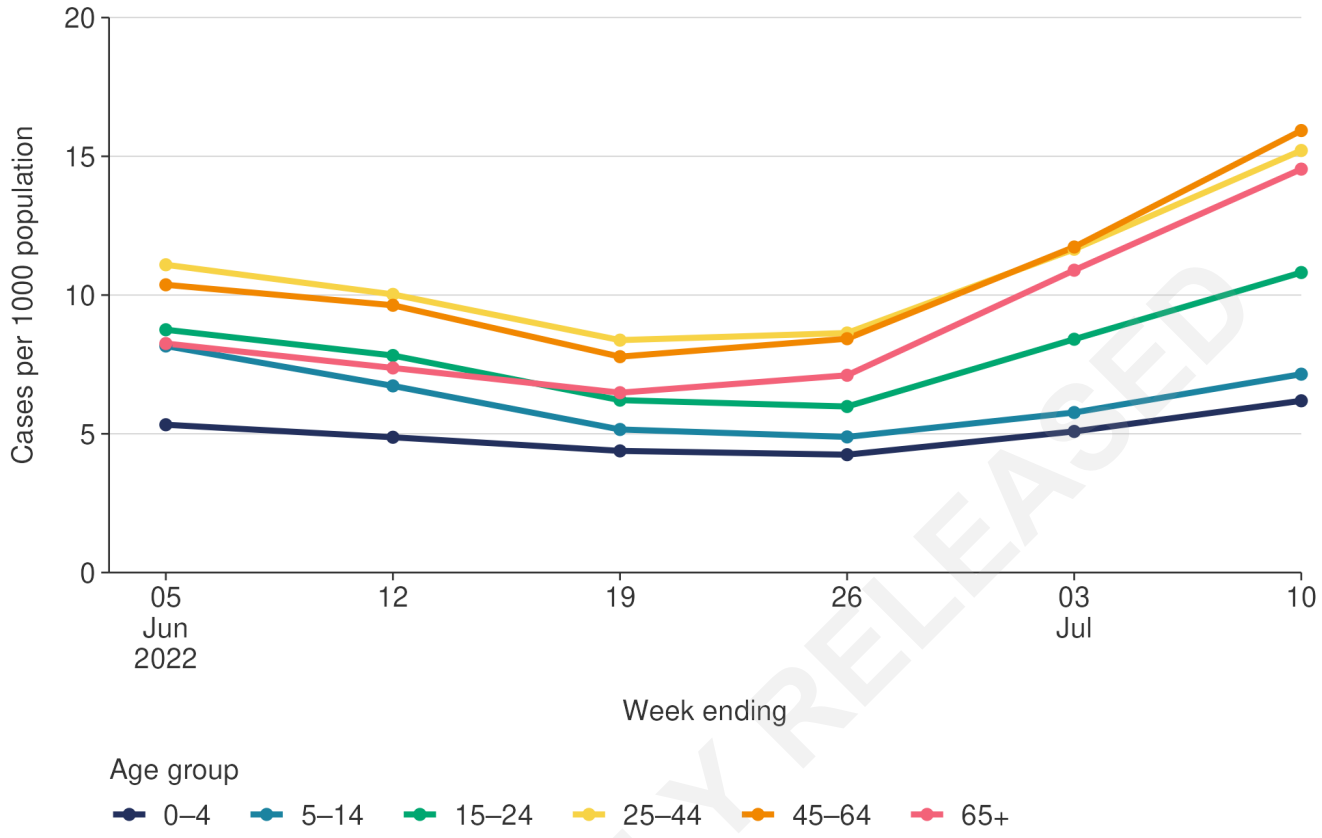
For the 15-24 age group, case rates in the Northern region increased by 30.3%, Te Manawa Taki increased by 34.2%, Central increased by 46.2% and Te Waipounamu increased by 12.6%.

For the 25-44 age group, case rates in the Northern region increased by 36.0%, Te Manawa Taki increased by 38.1%, Central increased by 33.8% and Te Waipounamu increased by 17.6%.

For the 45-64 age group, case rates in the Northern region increased by 44.8%, Te Manawa Taki increased by 37.4%, Central increased by 44.7% and Te Waipounamu increased by 19.0%.

For the 65+ age group, case rates in the Northern region increased by 39.6%, Te Manawa Taki increased by 23.8%, Central increased by 34.9% and Te Waipounamu increased by 33.0%.

Figure 12: National weekly case rates by age for weeks 29 May – 10 July 2022



Source: NCTS/EpiSurv as at 2359hrs 10 July 2022

Deprivation trends over time, by ethnicity and by region

Figure 13 shows 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, **case rates continued to be highest in the areas of least deprivation (16.6 per 1,000 population),** followed by areas of mid-range deprivation (13.7 per 1,000) and areas of most deprived (9.5 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 bias in case ascertainment associated with deprivation; however, data are not available to investigate case ascertainment. It is also feasible that lower case rates in areas of high deprivation could be partially explained by higher infection rates earlier in the year.

Comparison of national case rates of deprivation by ethnicity in the past week for areas most deprived shows that case rates were highest in the European or Other ethnicity followed by Asian ethnicity (12.6 and 11.4 per 1,000 respectively). Case rates in Pacific Peoples were the lowest in every deprivation level, while case in European or Other people were the highest in every deprivation level. European or Other had the highest case rates in areas least deprived at 17.6 per 1,000 followed by Asian (13.9 per 1,000).

For the most deprived areas, cases in Māori made up 17.5% of cases. The proportion of cases in the most deprived areas for Pacific Peoples was 7.8%, for Asian 16.1% and for European and Other, 58.6%. Following this, 81.6% of cases in areas of least deprivation were European and Other compared with 11.8% Asian, 5.1% Māori and 1.4% Pacific Peoples.

In the Northern region, case rates were highest in the least deprived areas (15.3 per 1,000 population) followed by areas of mid-range deprivation (13.5 per 1,000) and areas most deprived (7.5 per 1,000).

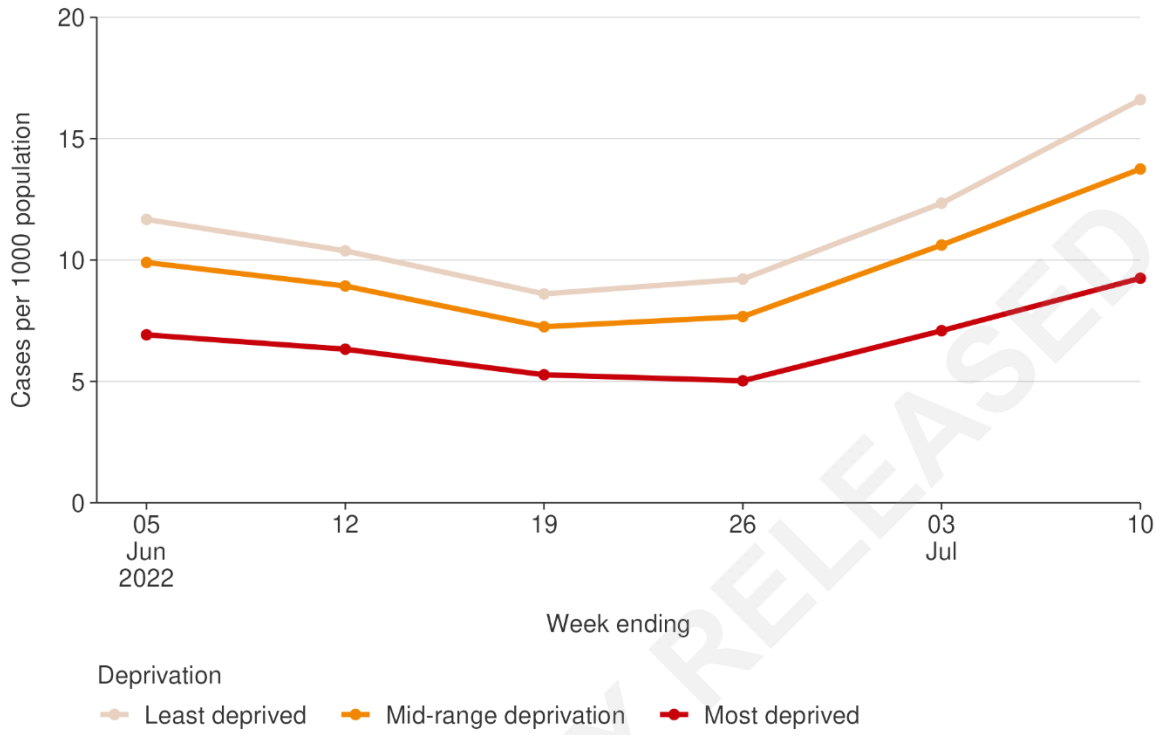
In Te Manawa Taki, case rates were highest in the least deprived areas (12.8 per 1,000) followed by areas of mid-range deprivation (10.7 per 1,000) and areas most deprived (8.0 per 1,000).

In the Central region, case rates were highest in the least deprived areas (19.4 per 1,000) followed by areas of mid-range deprivation (15.8 per 1,000) and areas most deprived (11.4 per 1,000).

In Te Waipounamu, case rates were highest in the least deprived areas (18.3 per 1,000) followed by areas of mid-range deprivation (15.0 per 1,000) and areas most deprived (12.9 per 1,000).

[4] Contents (otago.ac.nz)

Figure 13: National weekly COVID-19 case rates by deprivation status for weeks 05 June – 10 July 2022



Source: NCTS/EpiSurv as at 2359hrs 10 July 2022

Vaccination trends over time

This section has been removed this week.

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 rate 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 were again 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 WGS results strongly suggests that BA.4/5 are circulating within the wider NZ population. **The upward rise of the BA.5 variant of Omicron is a key observation – it is now the dominant variant.** There is high certainty that BA.5 is largely responsible for rising case numbers across the country (and internationally). Models predict it will reach 90% of all community cases in early August 2022.

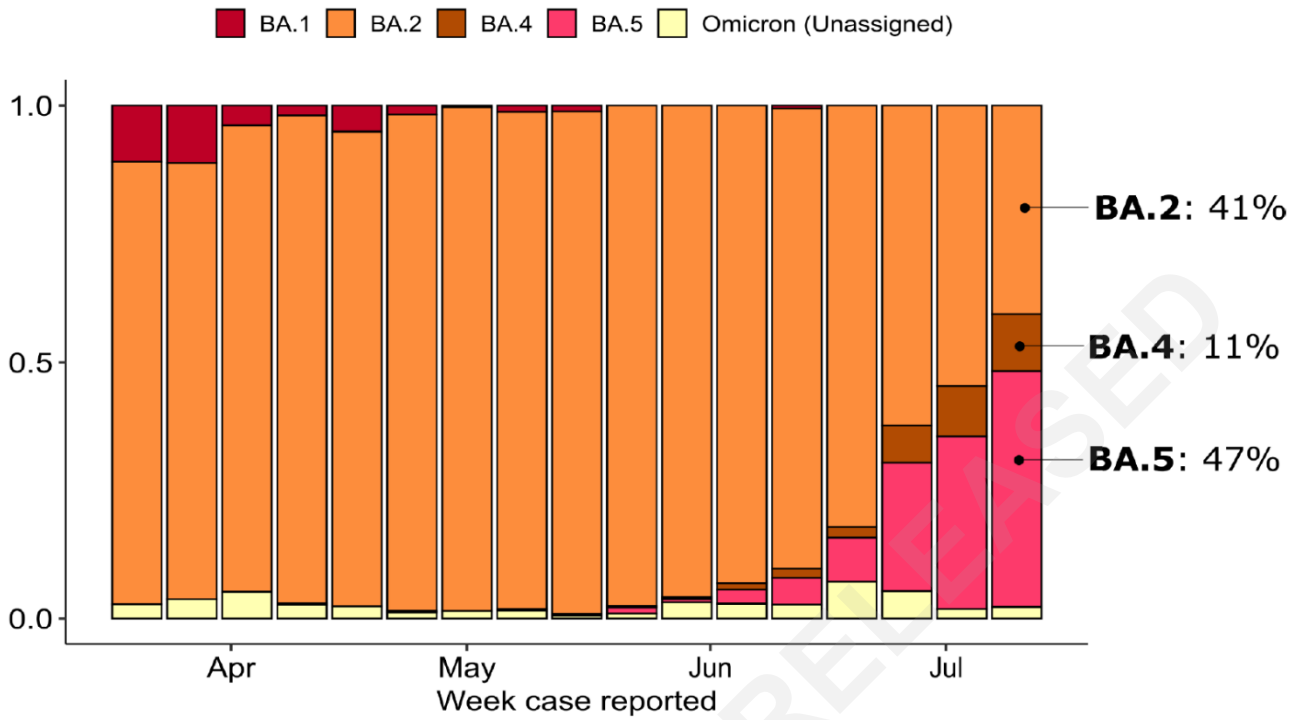
Omicron is the dominant variant in New Zealand having outcompeted Delta, which made up ~70% of all sequenced cases at the start of January 2022 but fell to less than 10% of sequenced cases by the end of January 2022.

Figure 14 shows that BA.5 made up about 47% of sequenced community cases in the past week. **Figure 14 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 is holding steady at approximately 10% of community cases.

A recent subvariant BA.2.75 looks to be gaining a global foothold. So far, there are 6 reported cases found within NZ – all are associated with the border. As yet, there is no indication of community spread of BA.2.75.

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

Figure 14: ***Frequency of Variants of Concern in community cases in New Zealand***



Source: ESR COVID-19 Genomics Insights Report #15, EpiSurv/Microreact 0900hrs 13 July 2022

Border Surveillance

Cases detected at the Air Border

Imported cases initially increased as travel volumes increased after the first stage of border reopening in March. Detected cases then remained roughly constant through May and June.

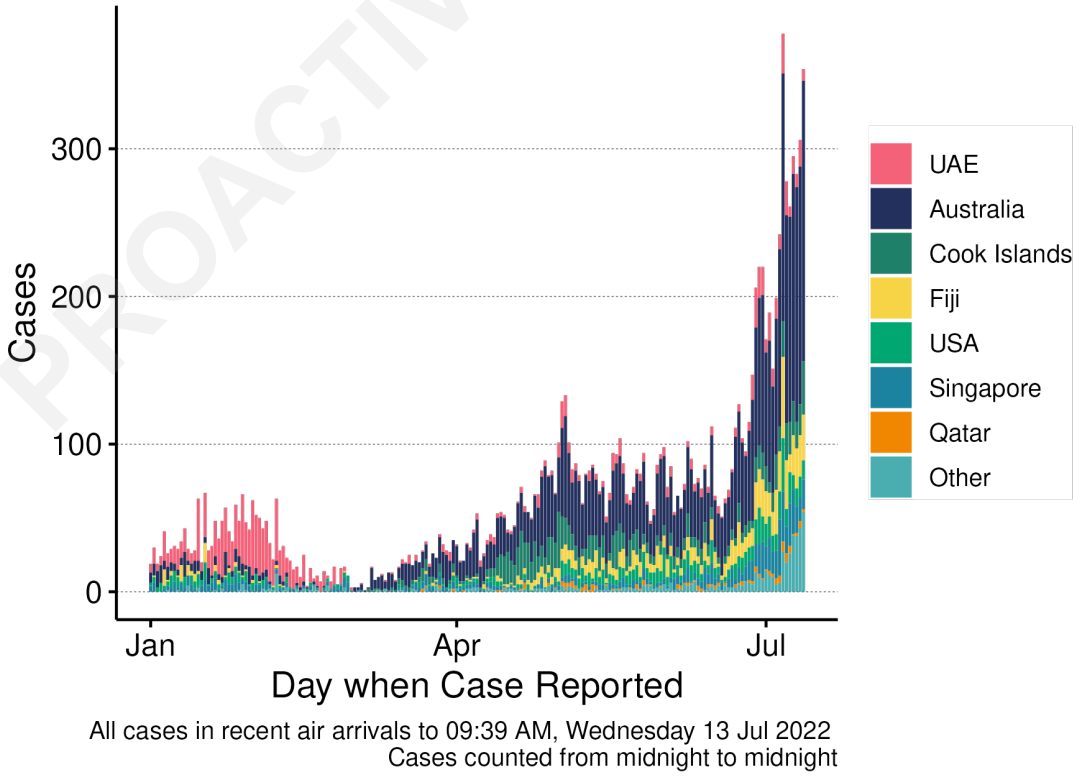
With the removal of pre-departure testing from 20 June, it appears that **detected cases have increased from most countries.** The increase is consistent with expectations that pre-departure testing halves the number of infected people boarding aircraft. Also, with increasing Omicron BA.5 prevalence in many source countries. By 03 July, 4% of recent arrivals were reporting a positive test.

Figure 15 shows the number of RAT-positive cases in arrivals since January 2022. Before Reconnecting New Zealand dropped most of the quarantine requirements, most active cases were on the long-haul flights via the 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, there has been an increase in cases detected on the flights **from Australia, 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 records only countries visited in the weeks before the Declaration is filled in.

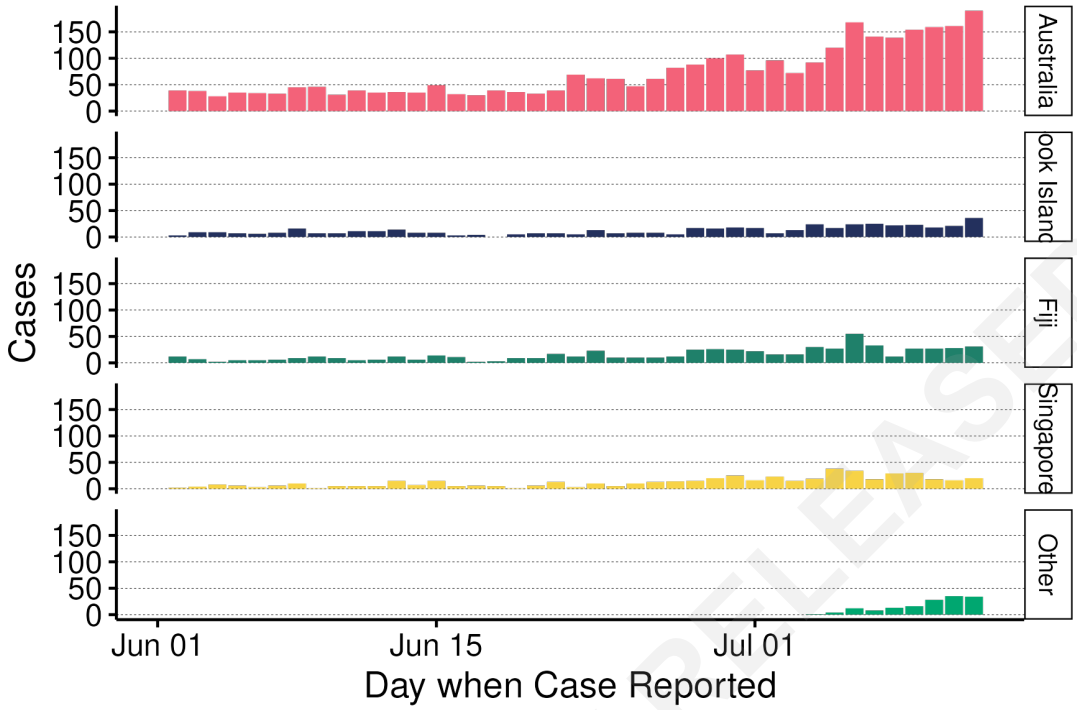
While the increase since 20 June was rapid, it is in line with expectations from the removal of pre-departure testing. Even with this increase, the total number of cases detected at the border is much less than the number reported each day in the community.

Figure 15: Cases reported in post-arrival testing by country of flight departure, 01 January – 12 July 2022



Source: NCTS/EpiSurv as at 2359hrs 12 July 2022

Figure 16: Cases reported in post-arrival testing, by the five flight-departure countries with most cases reported in the seven days to 12 July 2022



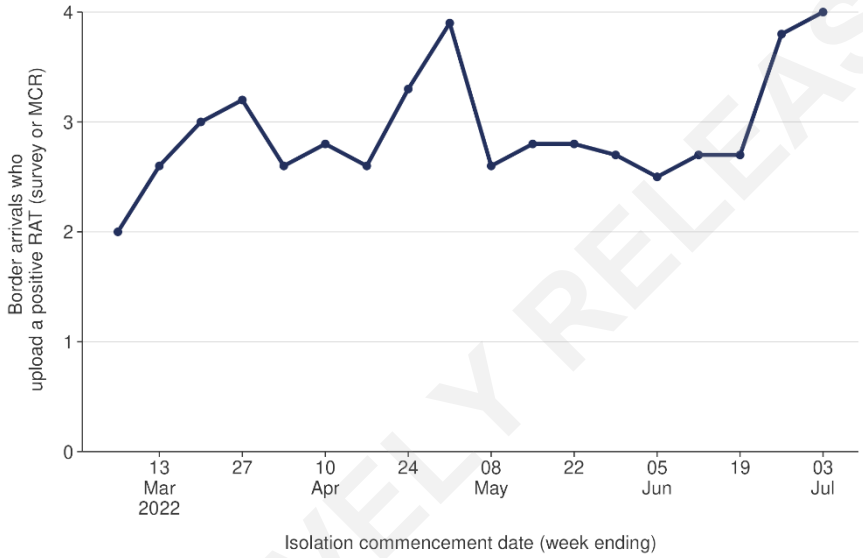
Most common flight origin of cases in recent air arrivals until 09:39 AM, Wednesday 13 Jul 2022
Cases counted from midnight to midnight

Testing of Border Arrivals

Figure 17 shows that the percentage of positive RATs in border arrivals who reported a test was mostly between 2 - 4% for the period 13 March – 03 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%, but in the past 2 weeks this has jumped to 4% (2,314 of 57,349 arrivals). We predicted that rates were likely to rise this week as more day 5 tests from recent arrivals are reported.

Rates per traveller are rising as expected in the fortnight after 20 June, when pre-departure tests were no longer required.

Figure 17: Percentage of positive tests in border arrivals who report RATs, 13 March – 03 July 2022



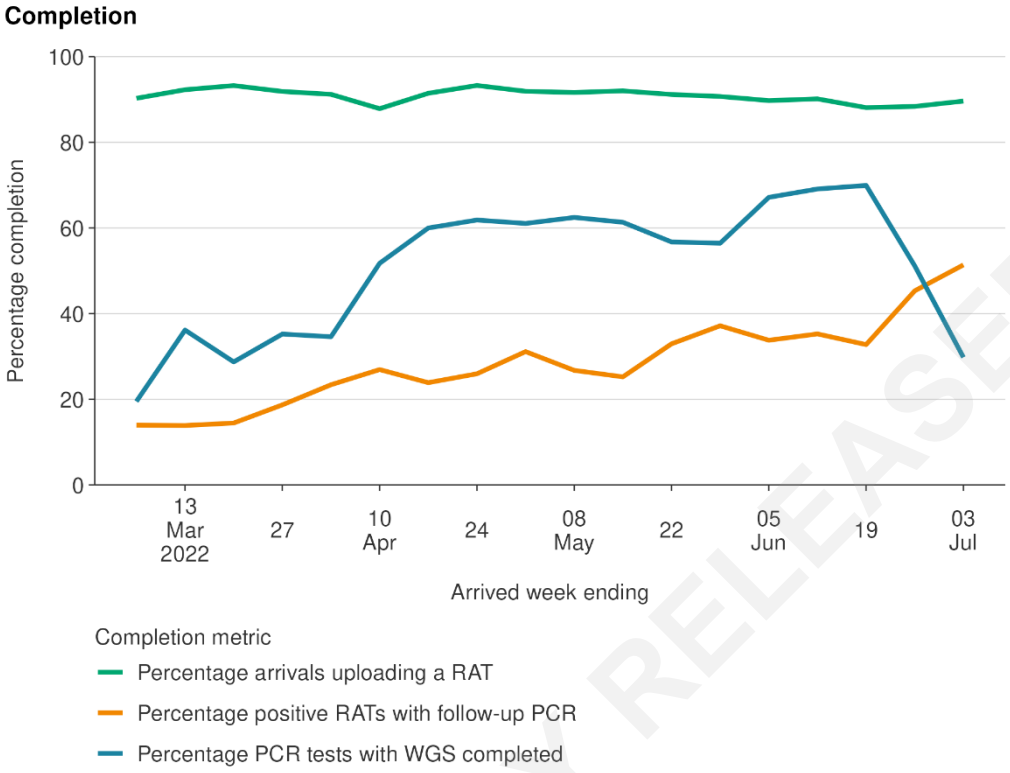
Sources: NCTS/EpiSurv/Éclair as at 2359hrs 03 July 2022

Whole Genomic Sequencing of Imported cases

Figure 18 shows the completion metrics for border returnee testing and WGS from 13 March to 03 July 2022. The percentage of arrivals uploading a RAT has been constant with an average of 90%. In the week ending 03 July, there were 57,349 border arrivals, of whom 90% (51,398) uploaded a RAT result upon arrival. This is similar to 88% in the week prior.

Genomic sequencing data is lagged by 1 or 2 weeks because of the time needed for recent arrivals to report a positive RAT, seek a follow-up PCR and for it to be processed by ESR.

Figure 18: Completion metrics for border returnee testing and WGS for arrivals, 13 March – 03 July 2022



Sources: NCTS/EpiSurv/Éclair as at 2359hrs 03 July 2022, ESR WGS 03 July 2022[5]

Figure 19 shows the border returnee testing and WGS metrics for arrivals. In the week ending 03 July, **51.4% of border arrivals who returned a positive RAT had a follow-up PCR test**. This is an increase compared to 45.3% the week prior and is the highest we have seen in months.

In the week ending 03 July, the percentage of PCR positive border arrivals with WGS complete was 30%. This figure is quite low, however, it should rise as more of the recent cases are processed. This figure was also low at 27.0% for the week ending 26 June, but much higher at 62.1% for the week ending 19 June. Figure 19 shows that **enough PCR swabs are being sent to ESR** to meet the genomic surveillance target of 300 sequences a week.

Over half of the genomes sequenced at the border in the past fortnight are the watchlist variants; BA.4/5. These cases include reports of BA.2.75 in travellers to New Zealand. This lineage has not yet been detected in cases unlinked to the border. As at 6:00pm 10 July, ESR had received samples from 824 of the 1574 PCR-positive border cases with a report date in the two weeks to 08 July. Twelve samples failed WGS and 455 have not yet been sequenced. Of the successfully sequenced samples, 55% were BA.5, 37% were BA.2, 8% were BA.4 and <1% BA.2.75.

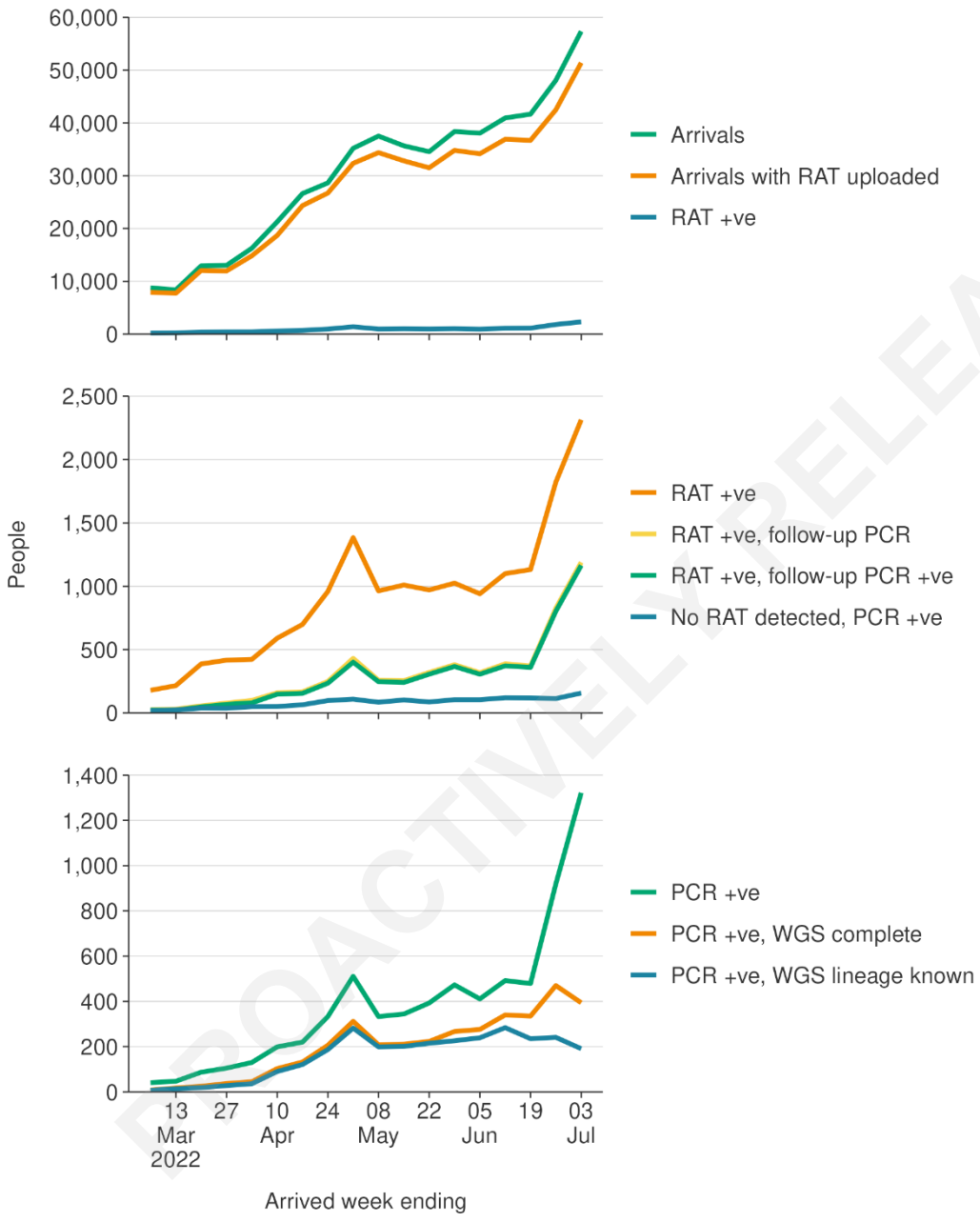
A case can only be referred to ESR for WGS if the traveller is referred to PCR testing and the lab then sends the PCR sample on.

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.

[5] 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 19: Border returnee testing and WGS metrics for arrivals, 13 March – 03 July 2022



Sources: NCTS/EpiSurv/Éclair as at 2359hrs 19 June 2022, ESR WGS 03 July 2022[6]

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

Hospitalisation and Mortality

Hospitalisation Rates

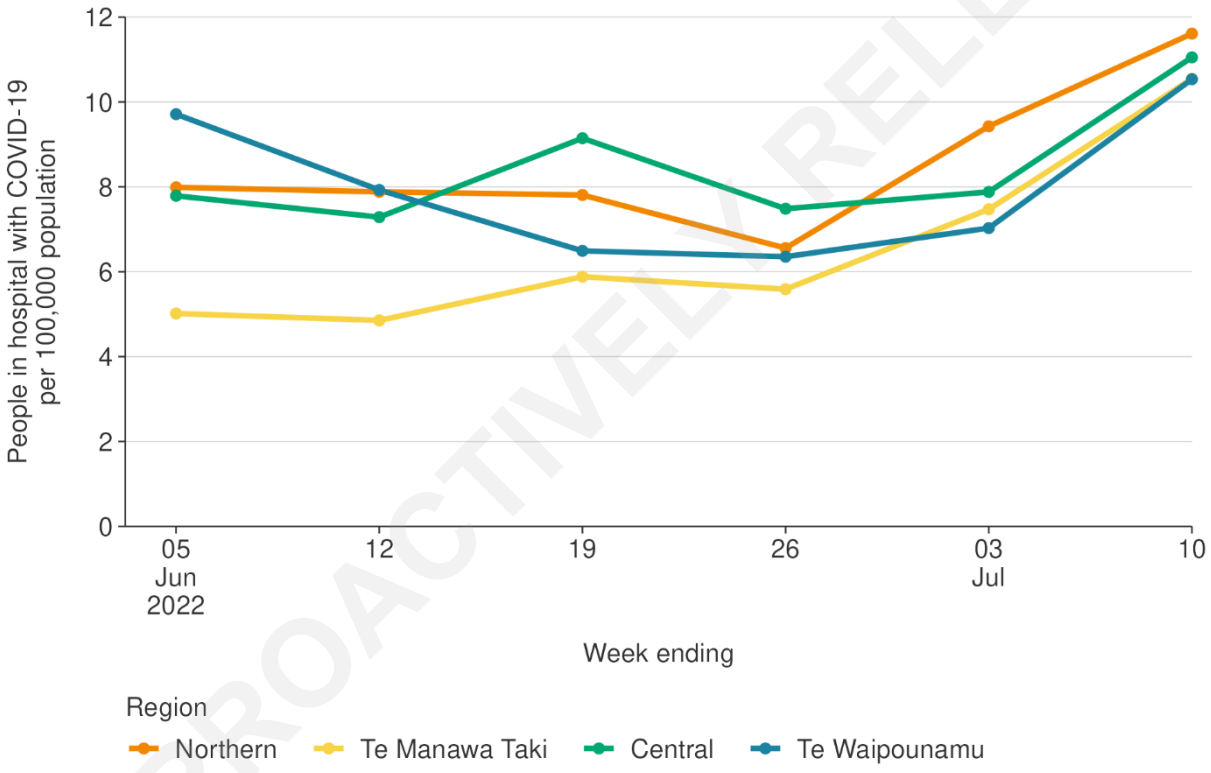
Due to varying definitions of an active case, there may be regional differences in the coding of COVID-19 infection status for hospitalisations.

Hospital Occupancy

For the week ending 10 July, the national daily average hospital occupancy for inpatients with COVID-19 was 11.0 per 100,000 population, an increase of 35% from the week prior **(Figure 20)**.

Hospital occupancy average rates increased across all regions in the past week. The Northern region (11.6 per 100,000) increased by 23%, Te Manawa Taki (10.5 per 100,000) increased by 41%, Central region (11.1 per 100,000) increased by 40% in the past week and Te Waipounamu (10.5 per 100,000) increased by 50%.

Figure 20: Regional weekly hospital occupancy average per 100,000 population, 05 June – 10 July 2022



Source: Daily hospital questionnaire as of 10 July 2022

Whole Genomic Sequencing of hospitalised cases

As of 13 July, ESR received samples from and had processed 122 of the 554 PCR positive hospital cases with a report date in the two weeks to 08 July 2022. Of these, 57% had a BA.2 genome, 8% were BA.4, and 35% 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 ICU or HDU.

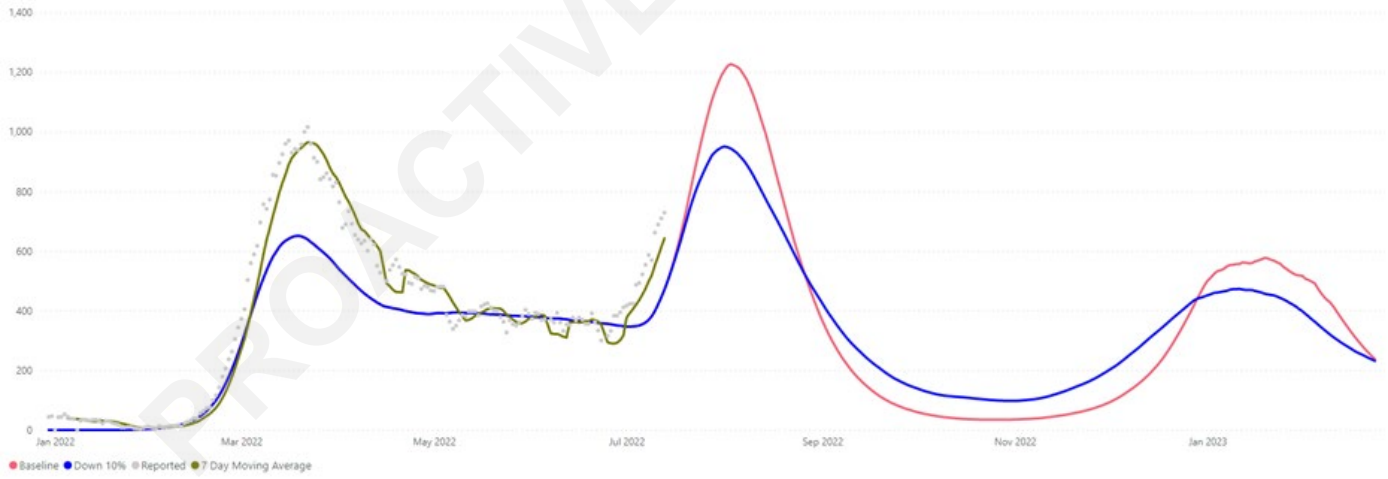
Modelled and actual hospital occupancy rate

The COVID-19 Modelling Aotearoa group's modelling scenarios track beds occupied by people with COVID-19 infections. **Figure 21** compares hospital occupancy with the new BA.5 scenarios. The baseline scenario assumes no change in policy or behaviour in the New Zealand population throughout the current BA.5 wave; hence that Covid-19 transmission remains the same. The "Down 10%" scenario assumes a reduction in Covid-19 transmission by 10% in the modelled scenario.

These scenarios are based on the current Omicron BA.5 variant. The peak is projected to occur between late July and early August with daily hospitalisations rising to approximately 1,200 a day.

The number of hospital beds occupied by people with confirmed COVID-19 infections was approximately between 13 and 14 per 100,000 population in the last week; **this has steadily been trending upward since early July**. This count includes infected people hospitalised for any reason, and at a national level is tracking close to both scenarios. It is likely in the next week we will have a better understanding of our trajectory of whether hospital occupancy peaks closer to the baseline or the "transmission down 10%" scenario.

Figure 21: CMA hospital occupancy scenarios compared to actual hospital occupancy



Sources: COVID-19 Modelling Aotearoa (CMA) Branching Process Model April 2022, and District reports to TAS of daily hospital occupancy (all COVID-19 positive people admitted as inpatients) as of 13 July 2022.

Mortality

Figure 22 shows the 7-day rolling average of deaths within 28 days of case report by date of death, which was 15.7 as of 10 July 2022. The rolling average has trended upward in the past fortnight, from 11.1 as of 27 June.

Figure 23 shows **COVID-19 related deaths by cause over time**. From March 2020 to 13 July 2022, there were 1,760 deaths with COVID-19 infection who died within 28 days of being reported as a case and/or with COVID-19 being the primary cause of death. Of these deaths that have been formally coded by cause of death, 741 **(50%) were determined to have COVID-19 as the main underlying cause**. COVID-19 **contributed to a further 395 deaths (27%).** Another 340 people died of a separate, unrelated cause (23%).

Figure 24 shows mortality by age and ethnicity for all deaths with or after Covid-19 infection to 12 July 2022. The trend is as expected across all ethnicities, with older populations dying with COVID-19 at a higher rate than younger people. The **mortality rate for those aged 90+ is highest at 20.2 per 1,000 population.** The mortality rate for those aged 80-89 is 5.0 per 1,000; and for those aged 70-79 is 1.2 per 1,000. The mortality rate for younger age groups is <1 per 1,000 population: ages 0-49: 0.03 per 1,000; ages 50-59: 0.1 per 1,000; ages 60-69: 0.3 per 1,000.

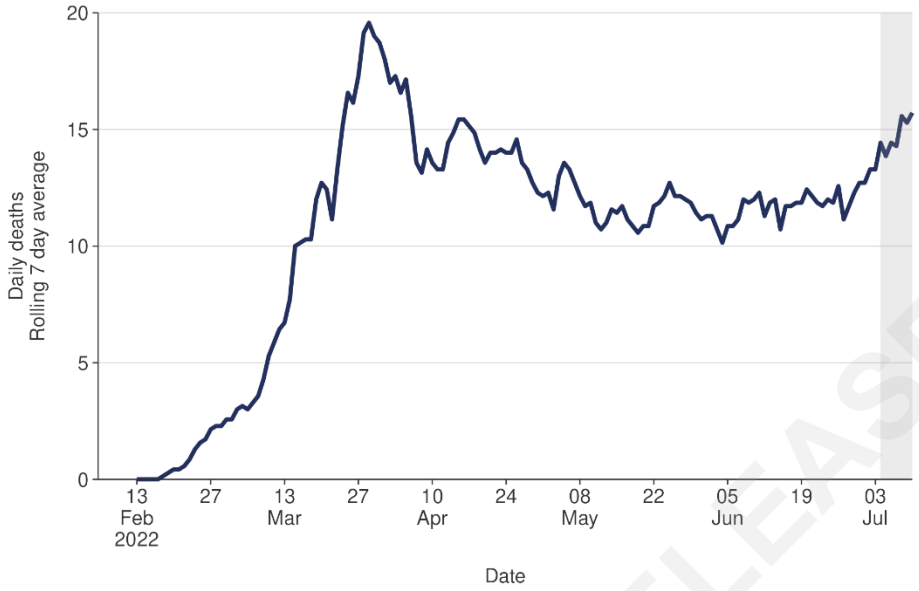
Across age groups, **Pacific and Māori have consistently higher mortality than Asian and European or Other** ethnicities. However, these age-stratified deaths by ethnicity are based on small numbers of events meaning that some rates have wide confidence intervals (CI)[7] and are not statistically significantly different from other rates.

Of people aged 90+, Pacific Peoples had the highest mortality rate at 66.1 per 1,000 population (95% CI 38.5 – 105.9 per 1,000), while Asian ethnicity had the lowest rate at 10.9 per 1,000 (95% CI 4.4 – 22.4).

For people aged 80-89, Pacific Peoples had the highest mortality rate at 17.5 per 1,000 population (95% CI 13.0 – 23.1), while Asian was again the lowest at 2.4 per 1,000 (95% CI 1.4 – 3.8).

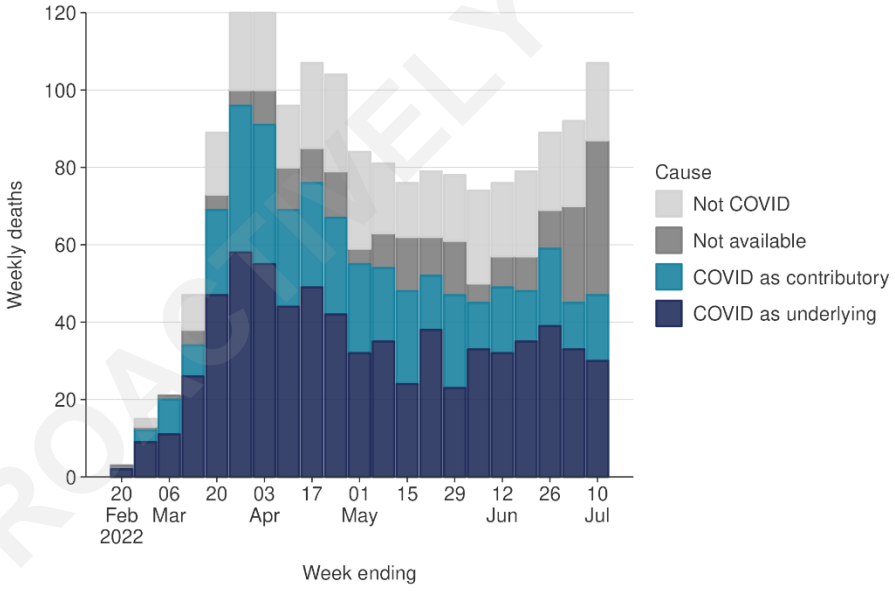
[7] *Mortality data, even based on complete counts, may be affected by random variation—that is, the number of deaths that actually occurred may be considered as one of a large series of possible results that could have arisen under the same circumstances. When the number of deaths is small, perhaps fewer than 100, random variation tends to be relatively large.* (Excerpt from https://stacks.cdc.gov/view/cdc/79486 - page 72). Confidence intervals allow us to give a reasonable range for our rates which are based on a small number of events. They account for the natural, random variation inherent in deaths and illnesses (See Brillinger 1986 - The Natural Variability of Vital Rates and Associated Statistics). A 95% confidence interval means we are 95% confident that the rate would fall within the given interval if we were to measure the number of deaths again under the same circumstances.

Figure 22: 7-day rolling average of deaths within 28 days of being reported as a COVID-19 case, by date of death, 13 February – 10 July 2022



Source: NCTS/EpiSurv as of 10 July 2022[8]

Figure 23: Deaths by cause, 20 February – 10 July 2022



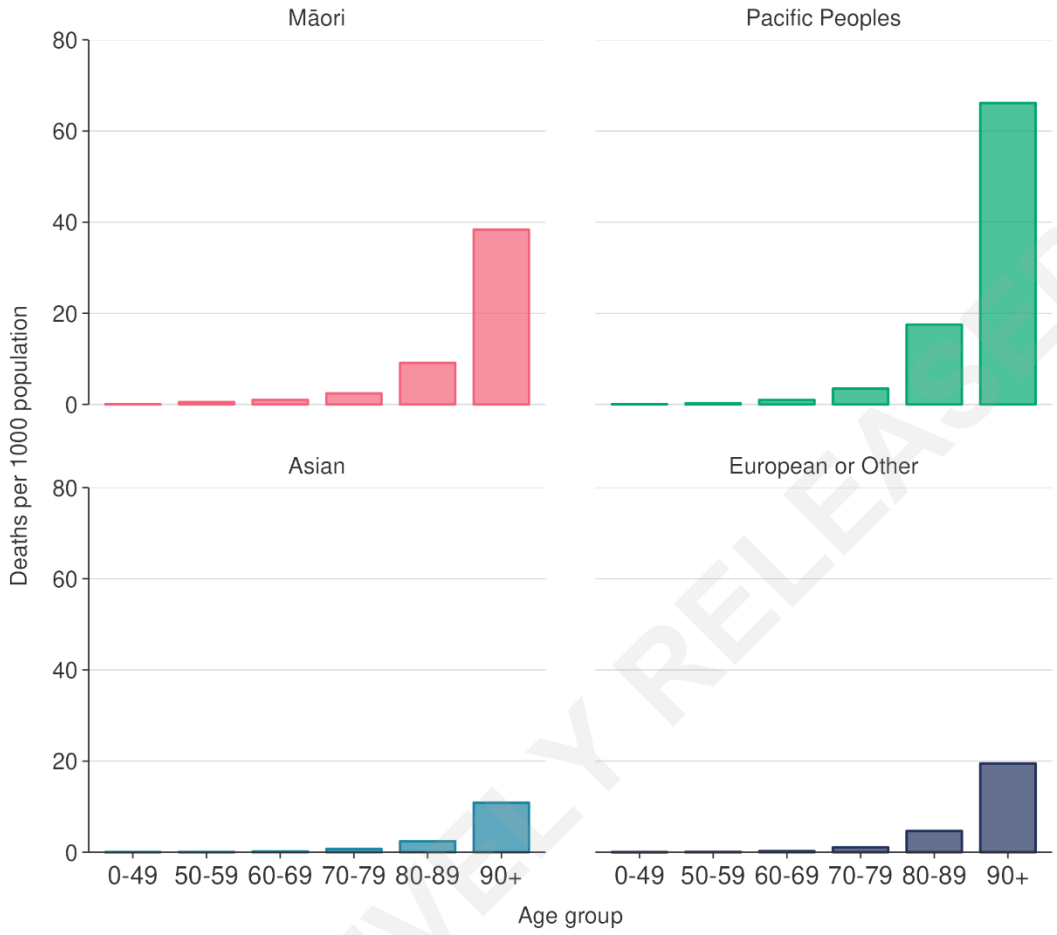
Source: Ministry of Health, all 2022 deaths by date of death within 28 days of report as COVID-19 case, and all other 2022 deaths where COVID-19 was the underlying or a contributory cause

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 with an existing health condition combined with COVID-19.

[8] In the shaded grey area, additional deaths may still be pending report.

Figure 24: Rates of all deaths with or after COVID-19 infection per 1000 population, by age and ethnicity, 01 March – 12 July 2022



Source: NCTS/EpiSurv as of 12 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.

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, the number of new weekly cases has increased for the fifth consecutive week after a declining trend since the last peak in March 2022. During the week of 4 to 10 July 2022, over 5.7 million cases were reported, a 6% increase as compared to the previous week.
- The number of new weekly deaths was similar to the figure reported during the previous week, with over 9800 fatalities reported to WHO.
- At the regional level, the number of new weekly cases increased in the Western Pacific Region (+28%), the Eastern Mediterranean Region (+25%), the South-East Asia Region (+5%), while it decreased in the African Region (-33%) and remained similar to last week's number in the European Region (+4%) and the Region of the Americas (-1%).
- The number of weekly deaths increased in the Eastern Mediterranean Region (+78%) and the South-East Asia Region (+23%), while it decreased in the African Region (17%) and the Western Pacific Region (-10%). The Region of the Americas and the European Region both reported similar figures as compared to the previous week.
- The Omicron VOC continues to be the dominant variant circulating globally, accounting for 84% of sequences reported to GISAID in the past 30 days.
- Globally, the Omicron lineages BA.2 and BA.2.12.1 show declining trends, while BA.4 and BA.5 show increasing trends.
- A comparison of sequences submitted to GISAID in the week ending 25 June and the week ending 7 July shows a decline in BA.2 sequences from 7% to 4% and a decline in BA.2.12.1 sequences from 13% to 7%. Within the same period, the proportion of reported sequences of BA.4 has risen from 11% and 14% and BA.5 from 42% to 50%. BA.5 sequences have been reported.

United Kingdom

- The Office for National Statistics (ONS) infection survey found the percentage of people testing positive across the UK is increasing, likely due to the BA.4/5 variants.
- Scotland and Northern Ireland had the highest average percentage of the population testing positive out of all the UK countries at 5.94% and 5.36% respectively. This continues the trend of increasing test positivity from the previous week, where positivity was 4.76% for Scotland and 3.26% for Northern Ireland.

France

- An average of 123,634 cases per day were reported in France in the last week (as of 13 July). Cases have increased by 45% from the average seen two weeks ago. Deaths have also increased by 113%.
- As of 13 July, the average number of new daily hospitalisations was 1,479 people, a 27% increase from the previous week.

United States

- Following a period in which new reports of cases were relatively stable, the number of cases seen in the US each day is beginning to rise
- The rising case numbers come as the BA.5 variant, believed to be the most transmissible COVID-19 variant yet, is emerging as the country's dominant virus strain. The US CDC reports that the BA.4/5 sublineages of Omicron now make up over 80% of variants in the US.
- Hospitalisations are also rising; this pattern is similar to the hospitalisation surges seen in May/June in countries where BA.5 first began to circulate. On average more than 37,000 people are in US hospitals with COVID-19, an increase of 17% since the start of the month.

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 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 was 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 study of 39,000 people with reinfections were compared against 257,000 people who had one infection and 5,396,855 of those who had no infection. Those who experienced a reinfection had increased post-viral sequelae of pulmonary and extrapulmonary organ systems including cardiovascular disorders, coagulation and hematologic disorders, fatigue, gastrointestinal disorders, kidney disorders, diabetes, musculoskeletal disorders, and neurological disorders. This suggests that for people who already had a first infection, prevention of a second infection may protect from additional health risks, and therefore prevention of infection and reinfection with SARS-CoV-2 should continue to be the goal of public health policy.
- 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

Health System Capacity

Omicron Dashboard

The Omicron dashboard (**Figure 25**) describes how the health system is being impacted by the Omicron outbreak, using data from many clinical and health sector indicators. The following page shows key indicators for the week ending 10 July 2022.

Figure 25: Omicron Health Sector Clinical Indicators Dashboard summary, week ending 10 July 2022

Sector	Summary of data
General Practice	There continues to be higher demand than previous years for General Practice. The weekly count of General Practice Qualifying Encounter day rate (GPQEDs) on 3 July was 7.7% higher than at the same time last year. For the first time since March, encounter rates for those aged 60-69 years were significantly higher than previous years being 9.5% higher than the same week last year, which is consistent with the increase in COVID-19 cases in this age range.
Flu Tracking	Community influenza like illness (ILI) activity (as measured by calls to HealthLine and ILI consultations through HealthStat practices) has remained elevated in the week ending 24 June. The most common organism identified in the previous seven weeks is influenza A. Between the weeks of 25 June to July 1 21,660 flu vaccinations were administered, with 1,987 for Māori and 1,178 for Pacific Peoples.
Aged Residential Care	There has been a significant increase in the number of Aged Residential Care (ARC) cases this week, from 474 last week, to 581. This week, the top three regions for case numbers are Canterbury (consistently high), Bay of Plenty and Southern.
Pacific Health	Providers have reported that the Sports Strategy incentivisation approach is having a positive impact in boosting Pacific vaccination rates, particularly in enabling providers to vaccinate more Pacific people that they initially found difficult to reach.
Emergency Ambulance Service	There continues to be sustained pressure on the ambulance sector from COVID-19 and winter illnesses. However, last week there was a drop in total EAS incident volume. St John reports a drop in 111 call volumes which it attributes to the 111-call attenuation campaign. Planning underway is progressing initiatives to take pressure off ambulance services.
ED	Nationally ED attendance volumes for the week ended 3 July decreased by 1.9%. For the first time, non-admitted SSED (patients discharged within 6 hours) has dropped below 80% and admitted SSED (patients admitted within 6 hours) has dropped below 55%.
Hospital	Acute patients with a Length of Stay (LOS) 7 days or above increased this week to 1596 – an increase of 153 patients since last week. COVID-19 patients in hospital is the highest it has been since early April, with 522 patients hospitalised as at 6 July. The majority of the bigger hospitals reported to be over 90% occupancy more than 80% of the time last week.
Planned Care (Hospital)	Regions continue to report that planned care is not able to be fully delivered due to staffing shortages and bed availability. Urgent cases and cancer procedures are going ahead across all regions. There are significant waiting lists for ultrasound in most areas, and MRI in others. Total waiting lists remain high, with demand outstripping capacity of workforce and equipment in all areas.
Pharmacy	COVID-19 related staff absence continues to impact on pharmacy opening hours. Pharmacy portfolio managers are monitoring the situation within their districts.
Home and Community Services	We continue to see a reduction in total numbers of employees compared with October to December last year (9% decline) and a decline in total services delivered compared with October to December last year (4% decline).
COVID care in the community	The percentage of cases contacted has remained consistent in the past four weeks and has been constantly over 98%. For the past week (25 June to 01 June 2022), the prioritised case interview completion rate was on average 4% higher than the non-prioritised cases (a 2.5% increase compared to the week prior).
Critical Care Workforce	Critical care workforce absences due to COVID-19 continue to fluctuate across the motu. Auckland City Hospital critical care was the most impacted over the past week, with increases in absences also noted at Hawke's Bay Hospital and Wellington Hospital.
Health workforce	All regions continue to report issues with both COVID-19 related absences and long term staffing vacancies. There continues to be a focus on increasing the health workforce across all professions.

Sources: Omicron Health Sector Clinical Indicators Dashboard, 07 July 2022

Care in the Community

This section has been removed this week.

Glossary

Data Sources

Community Cases

Data on community cases is 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 reflects 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.