COVID-19

Trends and Insights Report

Updated 10 June 2022

Please note that this report should only be distributed beyond the intended recipients on a need-to-know basis and is not for public consumption.

Purpose of report

This report focuses on a broad national and regional overview with key insights based on the quantitative trends in the New Zealand COVID-19 pandemic, including the trends and scale of infection and diagnosis as well as morbidity and mortality. In interpreting and using these data, readers need to be aware of surveillance data limitations.

Key insights from past 7 days

Infection Trends

- **Nationally, the weekly case rate was 9.3 per 1,000** population for the week ending 05 June. This rate has decreased from 9.6 per 1,000 population in the previous week.
- **For the week ending 15 May**, the estimates suggest that **2.1% (636/30,241) of healthcare workers** and **1.4% (294/20,502) 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 **substantial under ascertainment of cases (1.4% [14 per 1,000] versus 9.0 per 1,000**, respectively).
- Levels of viral RNA in **wastewater have decreased slightly in all regions, except Northland**; however, **the decreases are not as substantial** as seen in the overall case rates.
- Contradictory to other evidence, **this could indicate there was no substantial decrease in any region in the underlying level of new infections for the past 2 months.**
- In the past week, **five out of 19 DHBs had an increase in case rates.** All were in the Central region: a 7% increase in Capital and Coast; 1% in Hawke's Bay, 11% in Hutt Valley, 9% in MidCentral, and 9% in Whanganui.

Demographic Trends in Case Rates

- The **lowest case rates** are in **Pacific peoples (4.8 per 1,000)**; case rates in this group have decreased by **15% in the past week. Māori case rates have also declined** and are now **5.8 per 1,000.**
- **For the 65+ age group,** case rates in the Northern region increased by 8.1%, Te Manawa Taki increased by 13.3%, Central increased by 17.7% and Southern increased by 4.6% 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 11.5 per 1,000 and 65+ at 8.6 per 1,000). **Cases rates for all ethnicities aged 65+ have been stable in the past month, but have increased slightly in the past week**.

Whole Genome Sequencing

- **This week marks the detection of all three watchlist variants (BA.2.12.1, BA.4 and BA.5) in community samples. Wastewater data continues to detect BA.4/5 and BA.2.12.1 in a number of sites.**
- Among Omicron cases, BA.1 was the dominant subvariant (~60% at the start of February 2022) but has since been outcompeted by BA.2, which made up about 98% of sequenced community cases in the past two weeks.
- Based on WGS data generated over the course of the Omicron wave, **ESR estimates that 84% of all community cases (~1.18 million cases) reported since 20 January 2022 have been the BA.2 variant.**
- As of 05 June, ESR had received samples from 100 of the 259 PCR positive cases who were hospitalised in the two weeks to 03 June 2022. Of these, 88% had a BA.2 genome, 2% were BA.3, 9% failed WGS and 1% were BA.5.

Border Surveillance

- In the week ending 29 May, there were 38,369 border arrivals, of which **90.6% (34,753) uploaded a RAT result upon arrival.** This is slightly lower than the 91.8% from the week prior.
- In the week ending 22 May, about 2-3% of arrivals tested positive (via RAT). Both the number and rate of active cases are falling, even while total arrivals are increasing.
- In the week ending 29 May, the percentage of PCR positive border arrivals with WGS complete was 45.7%. However, please note that WGS can be incomplete for recent cases. **This percentage was 58.2% for the week ending 22 May and 64.9% for the week ending 15 May.**

Hospitalisation and Mortality

- For the week ending 05 June, the national hospital occupancy rate was 7.8 per 100,000 population, **an increase of 7% in the past week.** Hospital occupancy rates have continued to vary across regions in the past week. Central region (7.8 per 100,000) remained the same and Southern (9.7 per 100,000) increased by 5%, while the Northern region (8.0 per 100,000) increased by 11% and Te Manawa Taki (5.0 per 100,000) increased by 13% in the past week.
- As of 08 June 2022, **1,294 people have died** with or after COVID-19 infection. Of these, **1,240 have died within 28 days** of being reported as a case.
- Deaths by cause are reported for the first time this week. Of deaths reviewed so far, 21% of deaths within 28 days of an infection were found to be due to unrelated causes, such as accidents. **52% had COVID-19 as the main underlying cause**, and COVID-19 contributed to the remaining 27% of deaths.

International and Scientific Insights

- **Globally, the number of new weekly cases has continued to decline** since a peak in January 2022. In the week ending 5 June 2022, over 3.3 million cases were reported, a 12% decrease compared to the previous week. **The number of new weekly deaths also continues to decline**, with over 7,600 fatalities reported, a 22% decrease compared to the previous week.
- The scientific insights section includes studies on outbreak management, economic evaluations, transmission dynamics and modelling studies.

Health System Capacity

- For the week ending 02 June, **20% of the 656 Aged Residential Care (ARC) facilities have at least one active COVID-19 case (132 of 656 facilities).**
- **ED attendance for the week ending 02 June is among the highest since reporting commenced.** Number of ED presentations show the same pattern as number of admitted patients.

Domestic epidemic outlook

Infection outlook

- Since the March peak, case rates were declining leading up to the week of 17 April, after which a plateau has been observed in national case trends.
- The overall national picture shows a slight decrease in cases in past two weeks compared to the past four weeks of plateau; driven by decrease in Northern and Te Manawa Taki regions. However, cases in Central region have increased by 6% in the previous week compared to all other regions and cases in Southern are still 30% higher than overall national case rates.
- The current changes in cases seen across the motu is unlikely to be related to testing behaviours as a similar change has been observed in border workers who undergo routine testing and there were also slight decreases in the wastewater RNA levels.
- Infection levels are likely to be higher than the self-reported cases indicate as wastewater RNA has not decreased since early April up until the slight decrease in the past week, despite an overall substantial decrease in case rates since the March peak.
- Fatigue from following public health orders, misconception about level of infection risk and infection trends from reported cases could be impacting infection prevention and control behaviours and public health measures, which may be increasing risk of infection, especially among vulnerable populations.
- The combined effects of the reduction in mandated public health measures e.g. mask wearing in some settings with the move to Orange and the return of schools from term break on 04 May could explain the net increase of 16% in cases rates among 5–14 year-olds in the past three weeks ending 29 May 2022 compared to previous three weeks ending 08 May 2022. However, cases are back to similar levels compared to week ending 08 May.
- Cases have increased in 65+ across the motu by 11% compared to the previous week. This is likely from the impact of infections moving from younger age groups to older age groups over time.
- There continues to be detection of **BA.4, BA.5 and BA.2.12.1 in the community both in wastewater and in community WGS.** Current levels are likely to increase in the coming months.

Tertiary Care outlook

- There is substantial risk for the elderly as infection have begun to increase in the older age groups
- It is likely the highest case hospitalisation and mortality risk will be for at-risk populations such as those residing in aged residential care, with co-morbidities or in conditions of high deprivation.

Outbreak Management Outlook

- Given COVID-19 vaccine waning immunity, reduced vaccine uptake for booster dose, and uncertainty around the impact of other respiratory illnesses, the importance of other public health measures should continue to be emphasised.
- The domestic epidemic outlook is affected by the interactions of both modifiable and non-modifiable risk (and protective) factors. Modifiable factors are ones that can be influenced or more directly changed. Non-modifiable factors cannot be regulated or are very difficult to regulate.
    - **Modifiable factors** – masking, gathering limits, contact tracing, testing, isolation, welfare and income to enable adherence to PH measures.

- **Non-modifiable factors** – winter seasons, variants, other respiratory pathogens, behavioural changes in adherence to public health measures and social mixing (e.g. school and university terms commencing).

Contents

Figures

Infection Trends

Summary of evidence for infection and case ascertainment trends

Currently, **the national border workforce case rates in the past week (14.3 per 1,000) are higher than the general population (9.3 per 1,000);** these rates were similar when comparing border workforce rates in the Northern region among 25-44 year-olds at 12.6 per 1000 (where the greatest proportion of the workforce is concentrated). This continues to suggest the **underlying level of infection could be substantially higher than diagnosed rates**. Consistent with the trend in general population diagnoses **at a national level, rates have again decreased slightly in the previous week and are now lower than they were at the beginning of May**.

There was a slight decrease in case rates, border worker rates have also decreased slightly, suggesting that this decrease is not an artifact of testing behaviours. Levels of viral RNA in **wastewater have decreased everywhere expect Northland** reversing the trend seen in the past month; however, **the decreases are not as substantial** as seen in the case rates. Contradictory to other evidence, **this could indicate there was no substantial decrease in any region in the underlying level of new infections for the past 2 months.**

Case rates are tracking closely to 'C', the worst-case scenario which assumes an increase in transmission as people return towards pre-COVID levels of social and work mixing after the initial Omicron peak. The **effective R had increased to 1.0** (90% CI: 0.9-1.1) at 4 June, suggesting that cases are likely to remain at current levels for the next week or so.

Approximation of underlying infection incidence

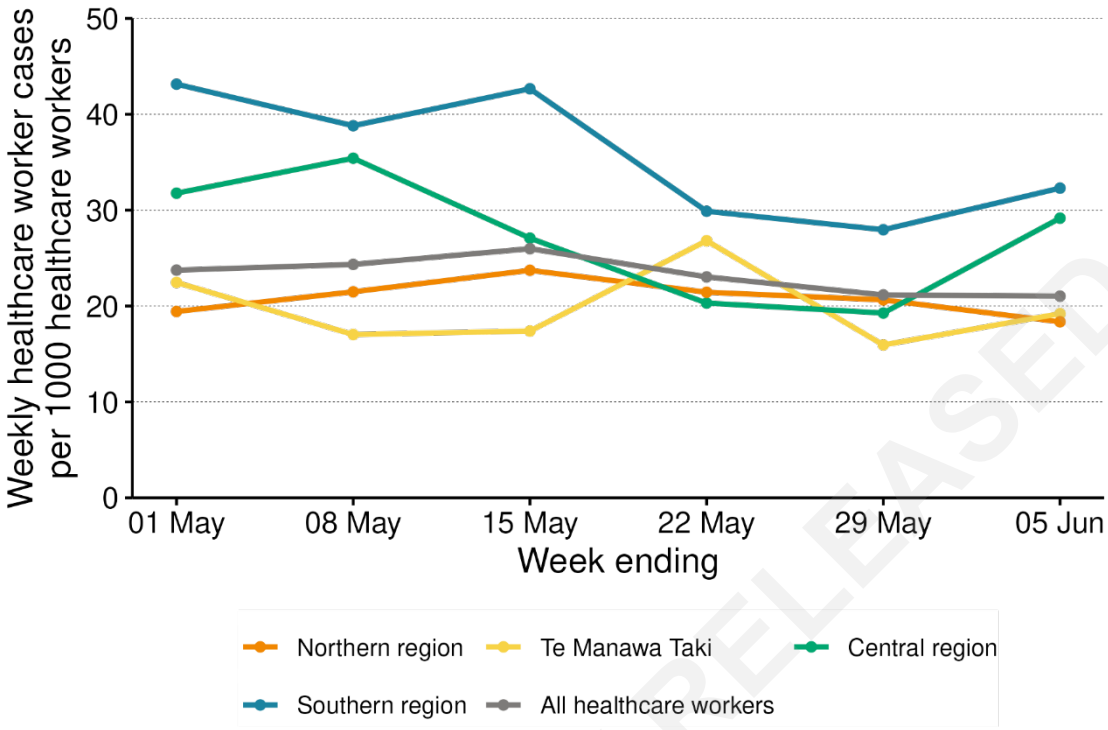
Underlying infection incidence has been estimated using case rates for routinely tested healthcare workers and border workers where there was evidence of regular testing.[1] While these workforces are not a representative sample of New Zealanders, **the border workers are now likely to have a similar 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 05 June, estimates suggest that 2.1% (636/30,241) of healthcare workers (**Figure 1**) and 1.4% (294/20,502) of border workers[2] (**Figure 2**) have tested positive (for the first time). The border workforce is concentrated in the Nothern region (56% of the total workforce) in the 25-to-44-year age group; the rate for Northern border workers in this age group was 1.3%.

[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.

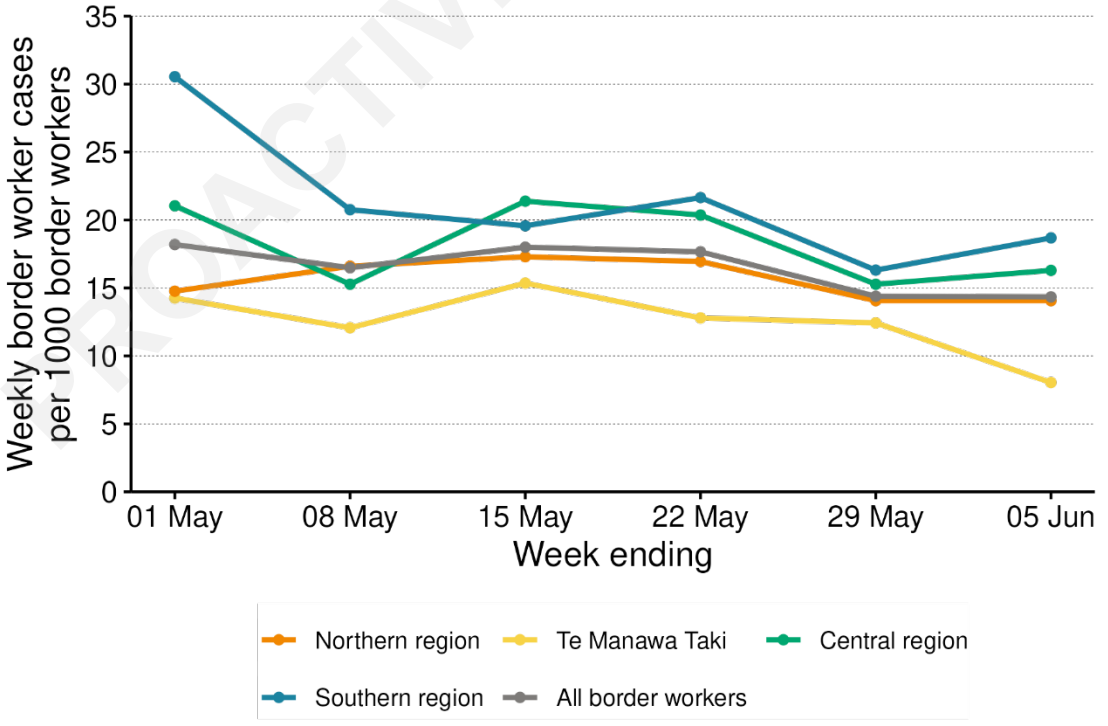
[2] This rate may be underestimated as not all border workers are rostered on and therefore not required to undertake testing.

Figure 1: ***Regional weekly case rates of health care workers for weeks 01 May – 05 June 2022***



Source: Éclair/Episurv, 2359hrs 05 June 2022

Figure 2: ***Regional weekly case rates of border workers for weeks 01 May – 05 June 2022***

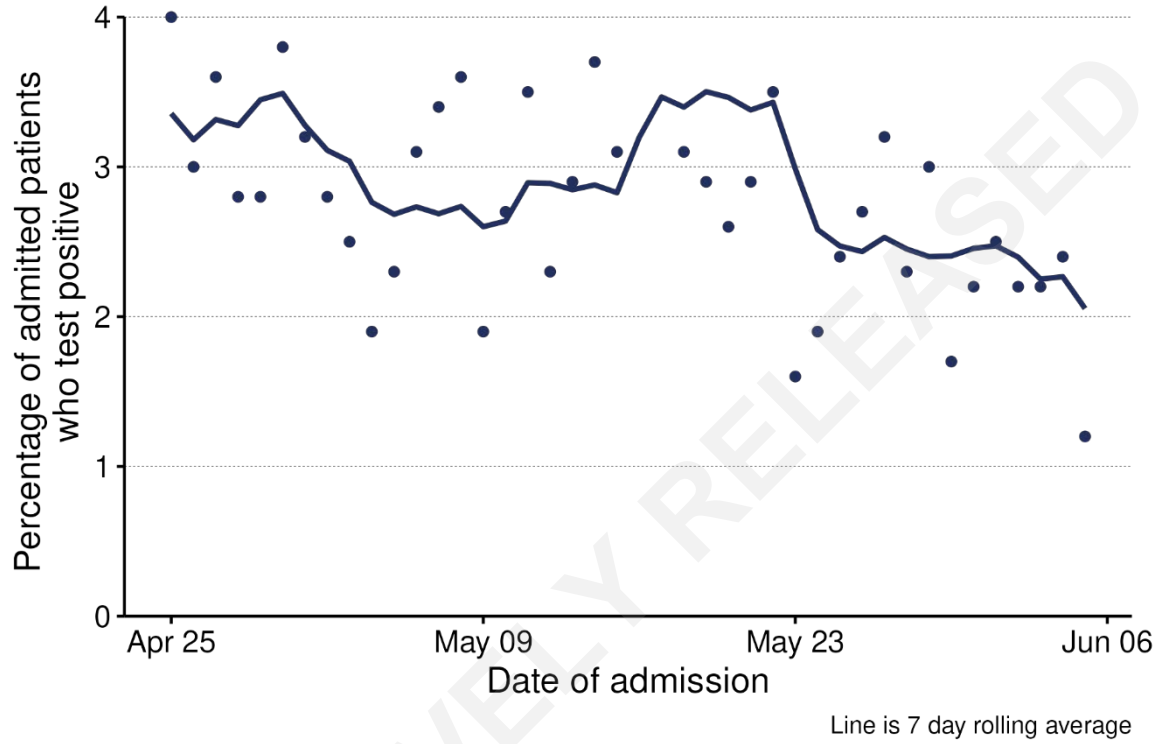


Source: Éclair/Episurv, 2359hrs 05 June 2022

Test positivity trends in Northern region hospital admissions

The Northern region inpatient positivity is shown in **Figure 3**. Since **peaking at ~15% in early March,** the Northern region hospital admissions **positivity has declined** with a 7-day rolling average of 2.4% (188/7831) in the week ending 29 May to 2.1% (160/7789) in the week ending 05 June.

Figure 3: ***Percent of tests positive among Northern region hospital admissions***



Source: Northern Region hospitalisation data, NCTS & EpiSurv as at 2359hrs 05 June 2022

Wastewater quantification

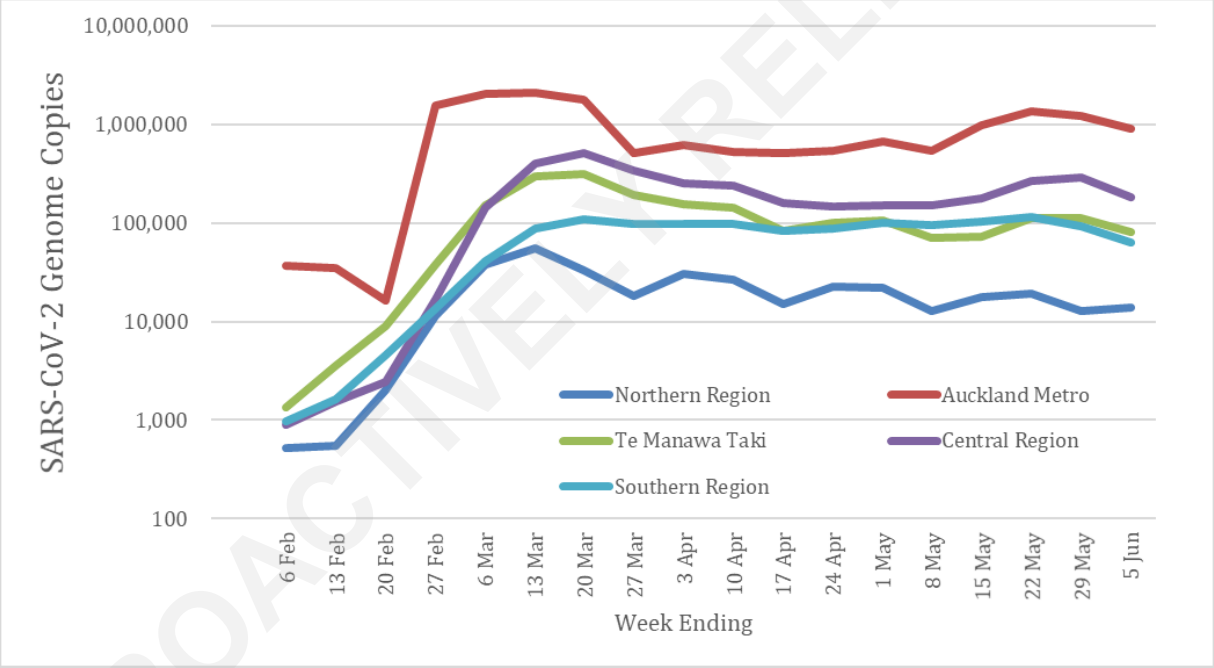
Figure 4 provides an overview of wastewater results by region. Please note that it is not appropriate to compare SARS-CoV-2 absolute levels by region; this figure can only be used to assess the trends *within* each region.

The SARS-CoV-2 RNA levels in wastewater **in the Northern region** (excluding Auckland Metro) **have had small variations since peaking in mid-March, but overall have followed a slight downward trend. Auckland Metro** rates peaked in mid-May and have **decreased slightly** since, to the week ending June 05.

Te Manawa Taki and Central region have remained relatively steady since mid-April but have decreased in the past week. Southern region wastewater trends have been stable for the past two months but have also decreased in the past two weeks.

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 for weeks 06 February – 05 June 2022***



Source: ESR SARS-CoV-2 in Wastewater update for week ending 05 June 2022

Trends in diagnosed cases

Overall, **the weekly case rate was 9.3 per 1,000** population for the week ending 05 June. This is a **decrease from the previous week,** which was 9.6 per 1,000.

Figure 5 shows that case rates have decreased across all regions except Central in the past week. Northern region (8.2 per 1,000) and Te Manawa Taki (7.3 per 1,000) decreased by 12% and 7% respectively. Southern region (12.2 per 1,000) decreased by 3% while Central region (10.2 per 1,000) increased by 6%.

In the past week, **five out of 19 DHBs experienced an increase in case rates**. These were all DHBs in the Central region except Wairarapa DHB. There was a 7% increase in Capital and Coast; a 1% increase in Hawke's Bay; an 11% increase in Hutt Valley; a 9% increase in MidCentral; and a 9% increase in Whanganui.

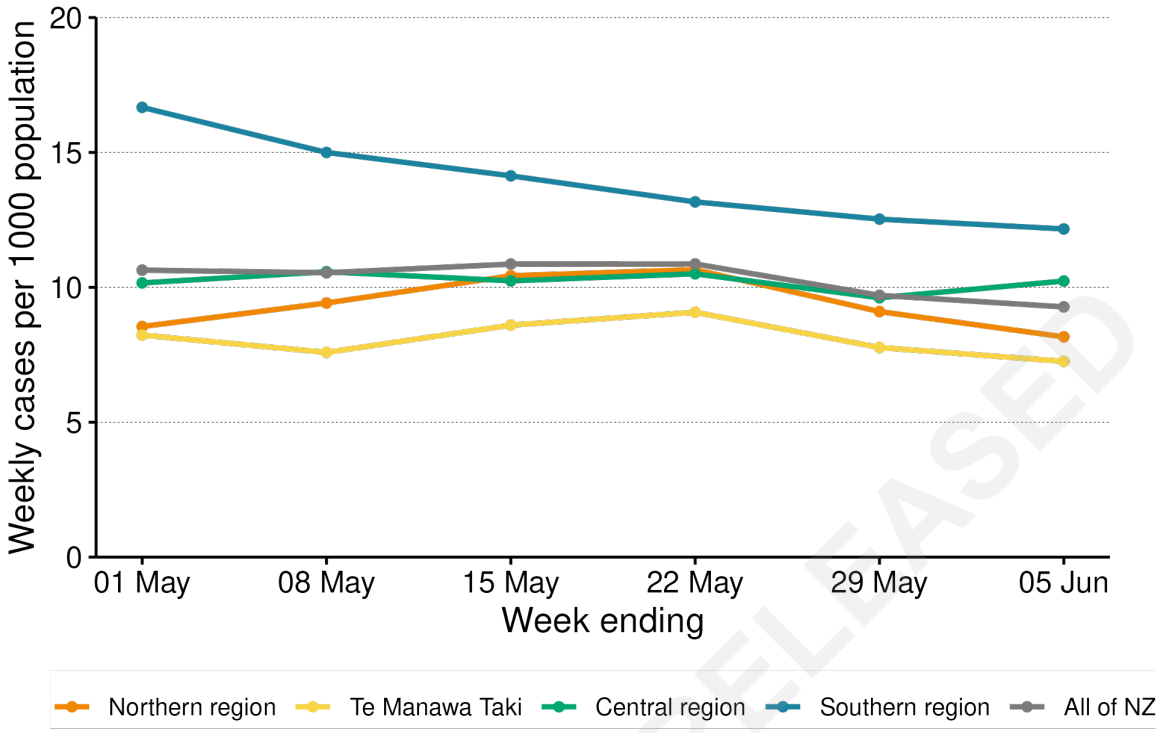
In the Northern region, the weekly case rate was highest for **Waitematā (9.7 per 1,000)** followed closely by Auckland DHB (9.0 per 1,000).

In Te Manawa Taki, weekly case rates were highest in **Taranaki (10.1 per 1,000)**, followed by Waikato DHB (8.3 per 1,000). Other DHBs in Te Manawa Taki had weekly case rates between 5 and 6 per 1,000.

The highest weekly case rates in the Central region were in **Capital and Coast (13.0 per 1,000)**. Other DHBs in the Central region had weekly case rates between 7 and 11 per 1,000.

In the Southern region, the highest case rates were in **West Coast (15.6 per 1,000)** followed by South Canterbury DHB (13.3 per 1,000) and Canterbury DHB (13.0 per 1,000).

Figure 5: ***Regional weekly case rates for weeks 01 May – 05 June 2022***



Source: NCTS/EpiSurv as at 2359hrs 05 June 2022

Modelled and actual cases

COVID-19 Modelling Aotearoa (CMA) have published three "April" scenarios for how case prevalence may develop during the rest of 2022. The three scenarios cover different possibilities for how transmission may develop as the population responds to easing of public health interventions after the March 2022 national peak (**Figure 6**). The scenarios are:

A. Small increase in mixing after the national peak in cases
B. Medium increase in mixing after the national peak in cases
C. Large increase in mixing after the national peak in cases and a shift in the distribution of cases towards older groups at the beginning of July, which has significant flow-on effects on hospitalisation and fatalities.

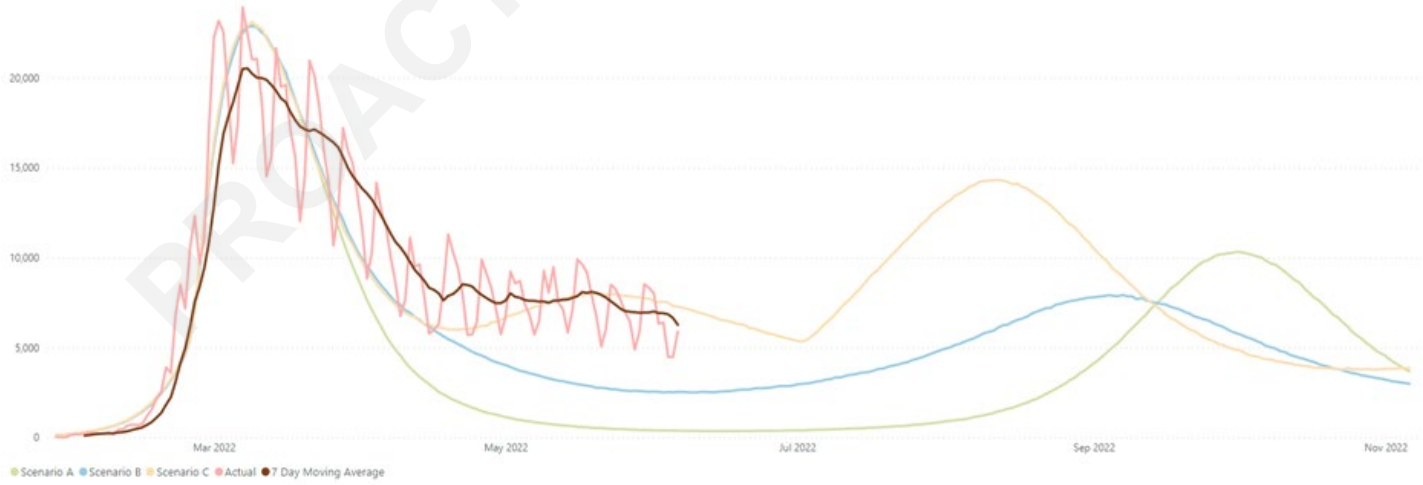
These scenarios allow for waning immunity after vaccination and/or infection. This addition in the modelling scenario leads to a second wave sometime from July. Increase in transmission will occur from waning immunity, which also interacts with changes in population behaviour and adherence to public health measures.

The size and timing of a second wave will be affected by a combination of changes in modifiable exposure risk factors such as gathering size limits, masking, contact tracing, testing and isolation along with pharmaceutical interventions such as boosters and anti-virals. Furthermore, changes in the distribution of infections in older and more at-risk populations will also impact the size and timing of the second wave.

These scenarios are based on the current Omicron BA.2 variant. Any significant changes in the virus could cause significantly different case numbers. Scenarios for BA.4 and BA.5 are similar to the increase in transmission in the existing Scenario C. Scenarios for possible future Variants of Concern (VoC) have been included in the VoC Strategy workstream.

Currently cases are tracking closely to 'C', the scenario with the largest increase in transmission after the March peak.

Figure 6: *COVID Modelling Aotearoa scenarios compared with reported cases nationally*



Sources: COVID-19 Modelling Aotearoa Branching Process Model April 2022, and Ministry of Health reported case data 06 June 2022

Effective reproduction rate, and forecasts of cases and infections

These estimates used the *EpiNow* package[2] on 08 June using data to 04 June.[3] The median estimate of **effective R (R_{eff}) nationally is 1.0** (90% Credible Interval [CI]: 0.9-1.1) for cases to 04 June, after adjusting for data lags; this is a slight increase from 0.9 the week prior. The confidence interval indicates a low to moderate level of uncertainty for this estimate.

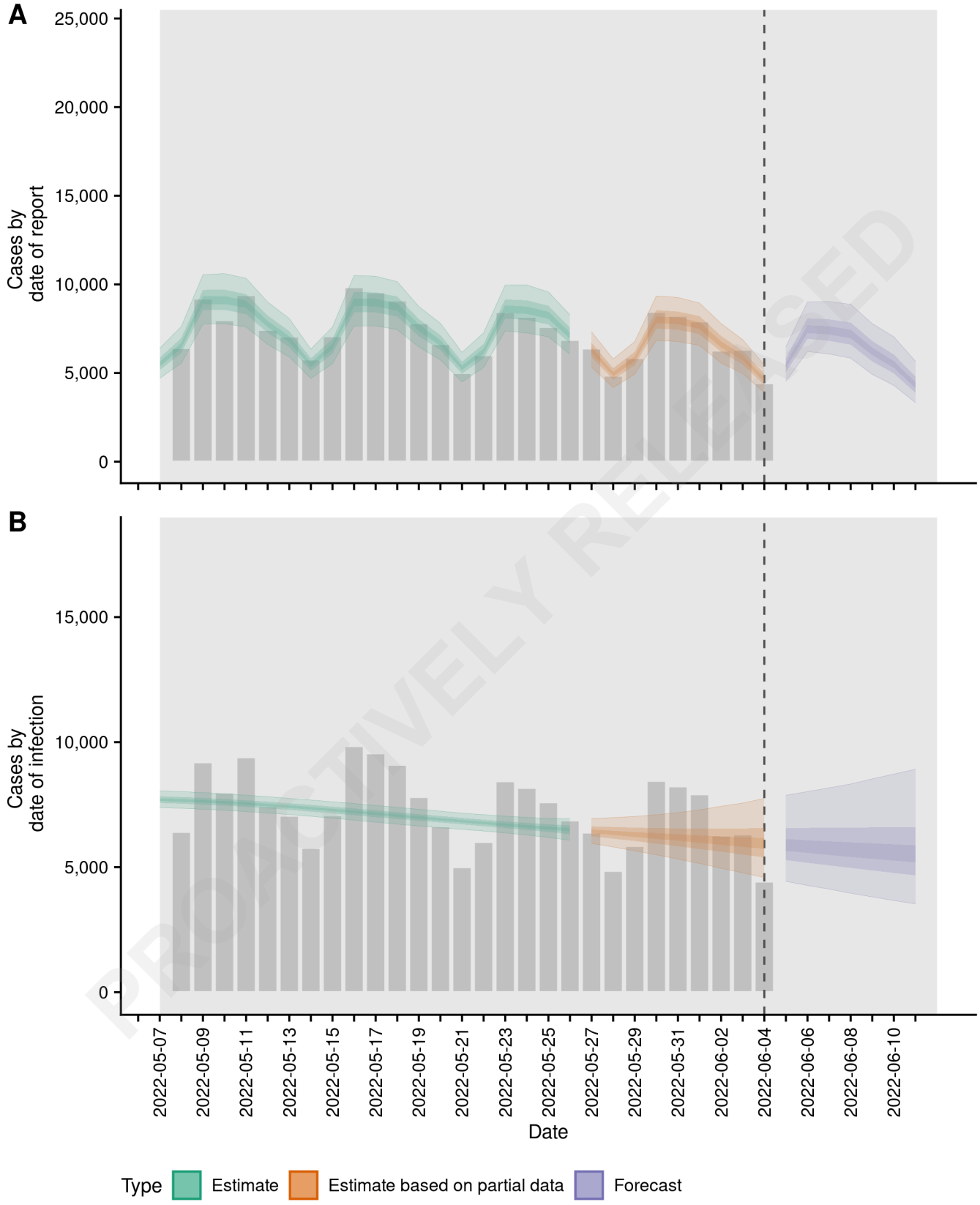
Figure 7 compares the previous week's model median estimate for 04 June 2022 of 4,262 cases per day with a 50% credible interval of 3,778 – 4,793 to the actual reported cases of 4,609. This was an 8% underestimate of the actual number, but within the 50% credible interval.

For most Public Health Units (PHU) the model is estimating a **median R_{eff} of 0.9 or 1.0.** The exceptions are Nelson Marlborough (0.8), Hawkes Bay (1.2), and Regional Public Health (1.1).

The model's median estimate is that national reported cases could be 4,306 cases per day by 11 June (50% credible interval: 3,883 - 4,789). 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, R_{eff}. 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 04 June 2022

Demographic trends in case rates

Ethnicity trends over time and by region

Figure 8 shows national case rates by ethnicity. **Figure 10** shows regional case rates by ethnicity.

In the past week, **case rates declined 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 10.8 per 1,000,** which is a decrease from last week (11.1 per 1,000). The **lowest case rates continue to be in Pacific Peoples (4.8 per 1,000)** which is a 15% decrease from last week (5.5 per 1,000). Māori have decreased by 6%, from 6.2 per 1,000 in the previous week to 5.8 per 1,000.

Case rates in the Northern region for European or Other were 10.1 per 1,000 and rates for Asian were 7.8 per 1,000. Māori had the second lowest case rate at 5.4 per 1,000. Pacific Peoples (4.3 per 1,000) continued to have the lowest case rates in this region.

Case rates for Te Manawa Taki were highest for European or Other (8.5 per 1,000), comparable to Asian (8.2 per 1,000). Pacific Peoples had the second lowest case rate at 5.2 per 1,000 and Māori (4.2 per 1,000) continued to have the lowest case rates in this region.

The overall increase in Central region case rates is largely being driven by increases in the European or Other and Pacific Peoples groups. The rate for European or Other (11.7 per 1,000) has increased by 8% compared to the previous week and the rate for Pacific Peoples (5.9 per 1,000) has increased by 6%. Central region rates for Asian (9.4 per 1,000), have decreased slightly from last week's 9.8 per 1,000, and Māori case rates have increased slightly from 6.3 per 1,000 in the previous week to 6.5 per 1,000.

In the Southern region, case rates were highest for European or Other (12.6 per 1,000) and Asian (11.8 per 1,000). Pacific Peoples continue to have the lowest case rate at 7.5 per 1,000. Māori have the next lowest case rate at 9.4 per 1,000.

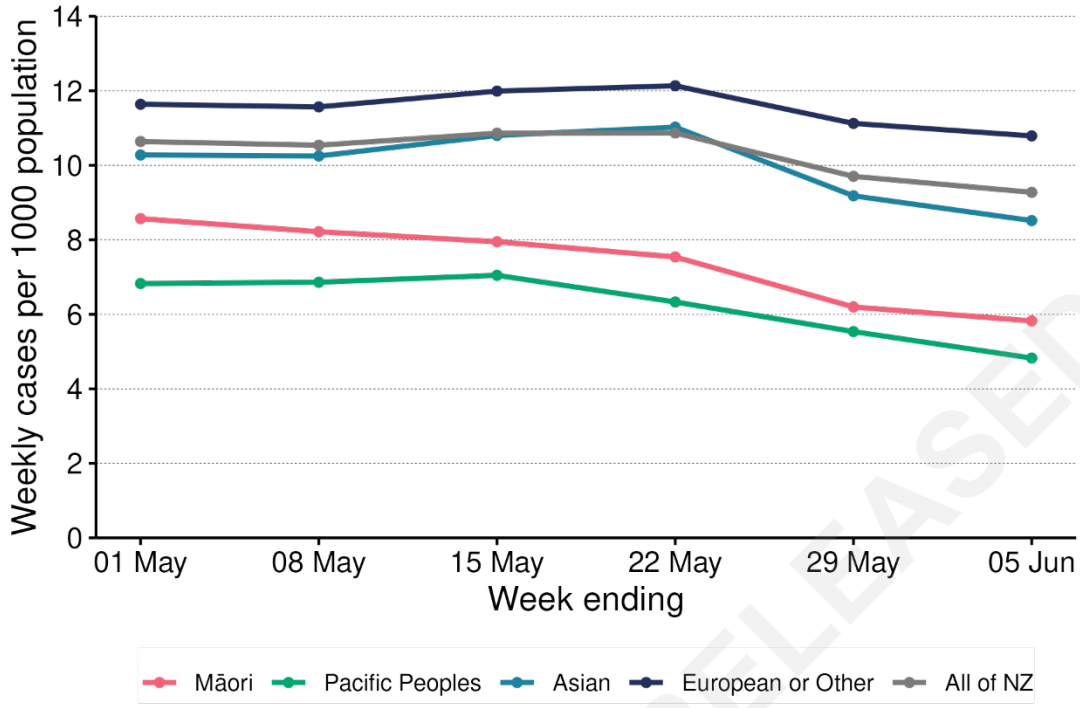
Figure 9 shows national case rates by ethnicity and further breakdown by age group. The **highest case rates** out of any cohort were **within those aged 25-44 of European or Other ethnicity (12.8 per 1,000)** whilst the lowest case rates were in those aged 0-4 of Pacific Peoples ethnicity (2.7 per 1,000). For both Māori and Pacific Peoples, case rates are highest in the 25-44, 45-64 and 65+ age groups. For Asian people, case rates are highest in the 15-24 and 25-44 age groups. For European or Other, case rates are highest in the 25-44 and 45-64 age groups.

Cases rates for all ethnicities aged 65+ have been quite stable in the past month, **but have increased slightly** in the past week. Case rates for Asians aged 65+ were 5.5 per 1,000 in the week ending 05 June. Case rates for European or Other aged 65+ were 8.6 per 1,000 in the week ending 05 June. Case rates in Pacific People aged 65+ were 5.8 per 1,000 in the week ending 05 June, **an 18% increase from last week**. Case rates in Māori aged 65+ were 7.1 per 1,000.

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 11.5 per 1,000 and 65+ at 8.6 per 1,000).

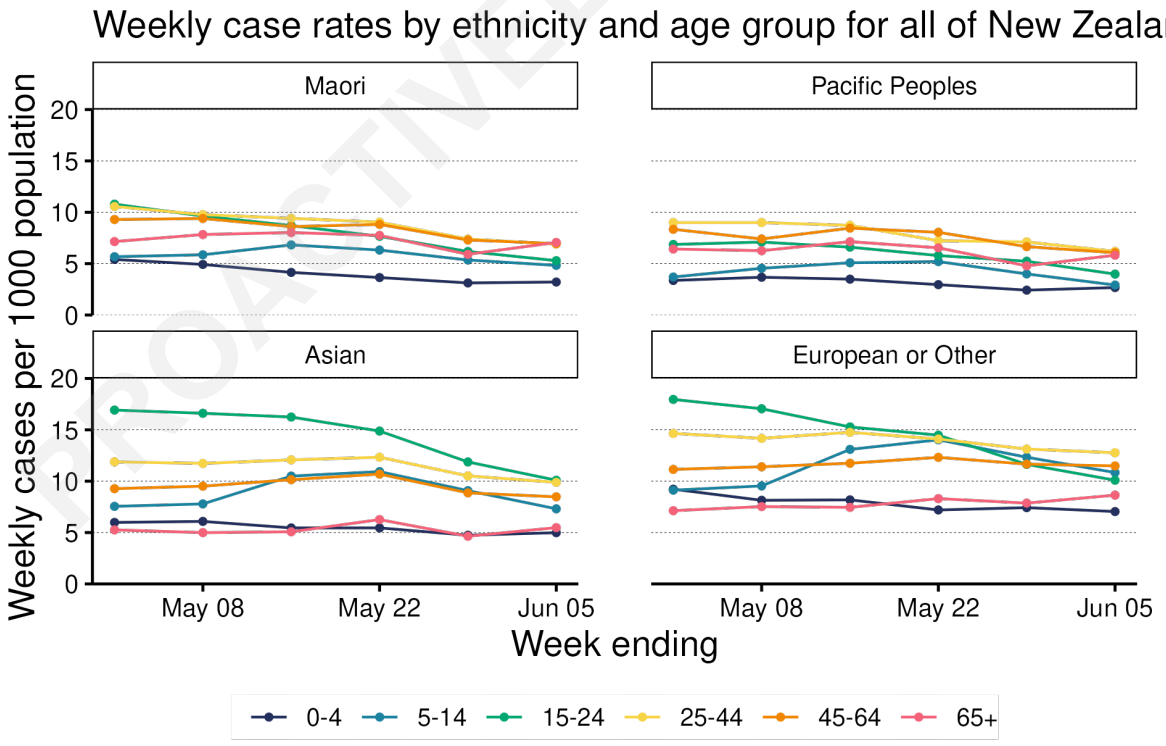
As Māori and Pacific Peoples have lower life expectancies than other ethnicities in Aotearoa New Zealand, they are likely to have a higher risk for COVID-19 complications at a younger age than other ethnicities.

Figure 8: ***National weekly case rates by ethnicity for weeks 01 May – 05 June 2022***



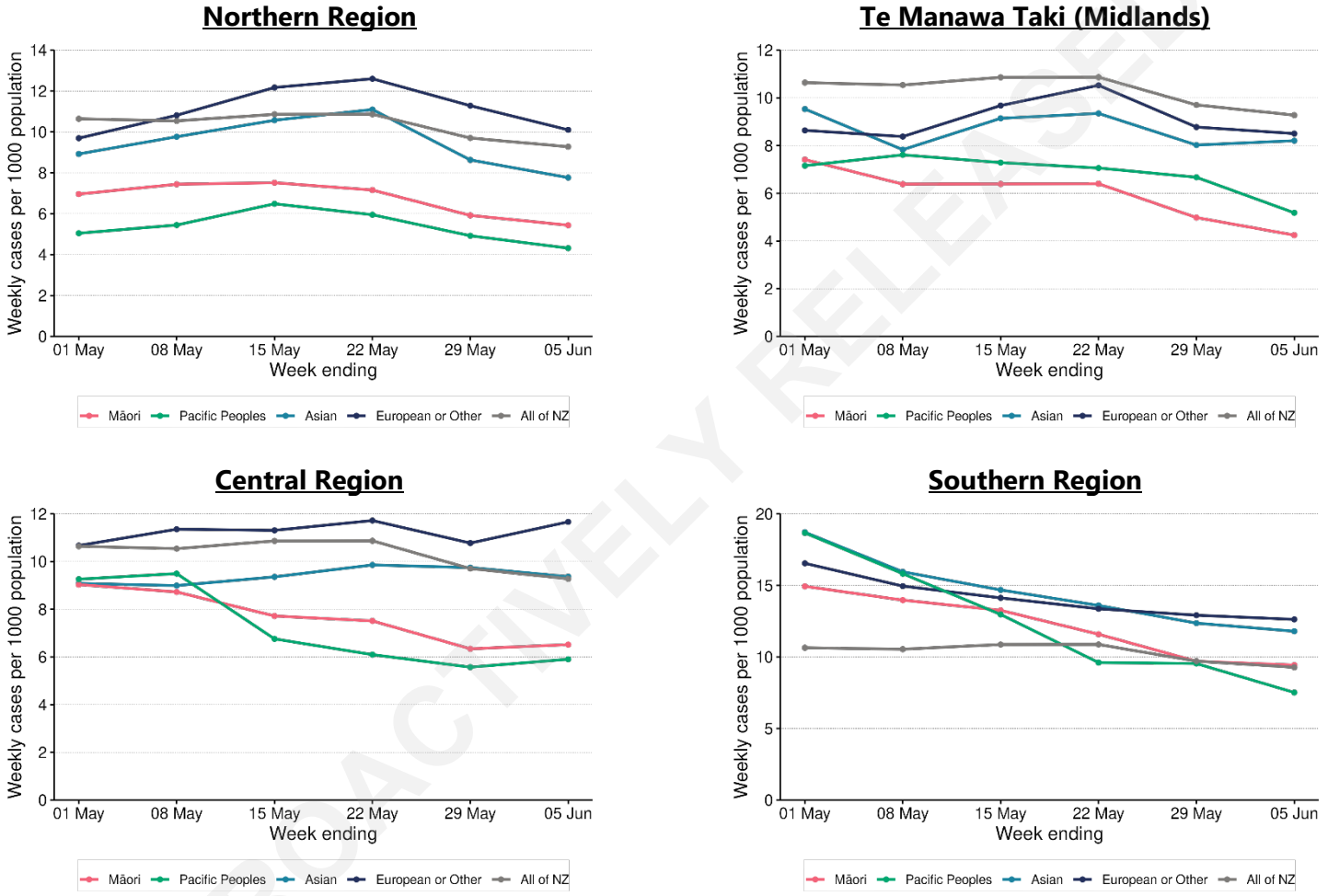
Source: NCTS/EpiSurv as at 2359hrs 05 June 2022

Figure 9: ***National ethnicity-specific weekly case rates by age group for weeks 01 May – 05 June 2022***



Source: NCTS/EpiSurv as at 2359hrs 05 June 2022

Figure 10: ***Regional weekly case rates by ethnicity for weeks 01 May – 05 June 2022***



Source: NCTS/EpiSurv as at 2359hrs 05 June 2022

Age trends over time and by region

Figure 11 shows community cases by age nationally. Case rates in all age groups except 65+ have decreased in the past week.

Nationally, **case rates were relatively similar for 5-14, 15-24 and 65+ age groups (8.1, 8.5 and 8.2 per 1,000 respectively)** in the past week. Those aged 0-4 continued to have the lowest weekly case rate at 5.2 per 1,000. The 25-44 and 45-64 age groups had the highest case rates at 10.9 per 1,000 and 10.3 per 1,000 respectively in the past week.

Regional patterns of age group infection were similar to the pattern observed nationally, with case rates for most groups trending between 5 per 1,000 and 15 per 1,000 since late April.

For the 0-4 age group, case rates in the Northern region decreased by 7.3%, Te Manawa Taki increased by 3%, Central increased by 4% and Southern decreased by 1.2% in the past week.

For the 5-14 age group, case rates in the Northern region decreased by 28.9%, Te Manawa Taki decreased by 22.1%, Central increased by 8.6% and Southern decreased by 16.1% in the past week.

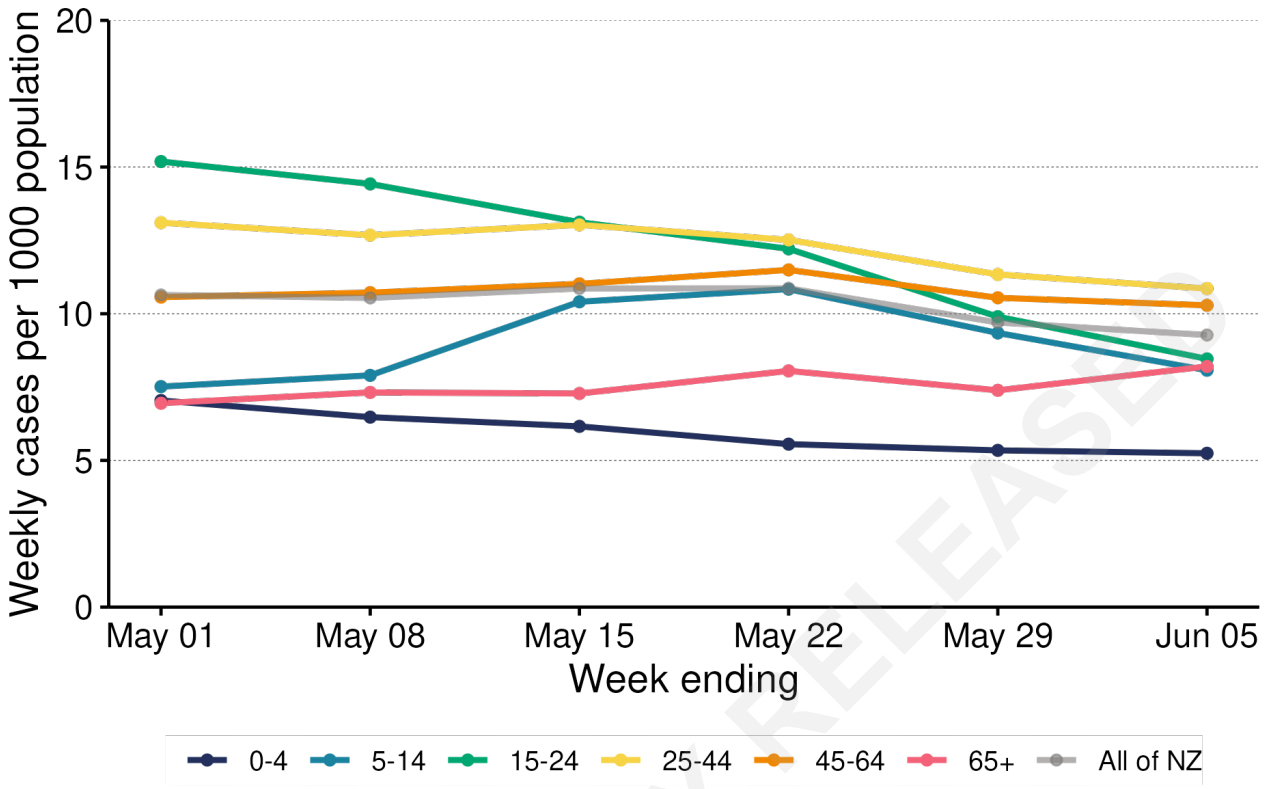
For the 15-24 age group, case rates in the Northern region decreased by 23.9%, Te Manawa Taki decreased by 15.7%, Central decreased by 11.4% and Southern decreased by 13.4% in the past week.

For the 25-44 age group, case rates in the Northern region decreased by 7.1%, Te Manawa Taki decreased by 11.3%, Central increased by 6.4% and Southern decreased by 4.4% in the past week.

For the 45-64 age group, case rates in the Northern region decreased by 13.7%, Te Manawa Taki decreased by 2.5%, Central increased by 6.9% and Southern increased by 3.8% in the past week.

For the 65+ age group, case rates in the Northern region increased by 8.1%, Te Manawa Taki increased by 13.3%, Central increased by 17.7% and Southern increased by 4.6% in the past week.

Figure 11: ***National weekly case rates by age for weeks 01 May – 05 June 2022***



Source: NCTS/EpiSurv as at 2359hrs 05 June 2022

Deprivation trends over time, by ethnicity and by region

Figure 12 shows case rates based on the NZDep2018.[4] Deprivation is a structural determinant of COVID-19 both in terms of risk and protection. 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 continue to be highest in the areas of least deprivation (11.6 per 1,000 population),** followed by areas of mid-range deprivation (9.7 per 1,000) and areas most deprived (6.7 per 1,000).

Access to RATs and to an internet connection to report RAT results is likely associated with lower levels of deprivation. Thus, it is unlikely that as large a difference in case rates exists between those of low and high deprivation and that a higher level of case under-ascertainment exists in areas of higher deprivation. Furthermore, it is likely that high infection rates in deprived areas earlier in the outbreak could be impacting current trends in deprived groups.

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 followed by Asian ethnicity (9.0 and 7.7 per 1,000 respectively). Cases in Pacific Peoples were the lowest in areas most deprived (3.6 per 1,000) and lowest in areas least deprived alongside Asian ethnicity (9.2 per 1,000). European or Other had the highest case rates in areas least deprived at 12.2 per 1,000 followed by Māori (9.6 per 1,000).

For the most deprived areas, cases in Māori made up 19% of cases. The proportion of cases in the most deprived areas for Pacific Peoples was 9%, for Asian 15% and for European and Other, 57%. Following this, 81% of cases in areas of least deprivation were European and Other compared with 11% Asian, 5% Māori and 2% Pacific Peoples.

In the Northern region, case rates were highest in the least deprived areas (10.0 per 1,000 population) followed by areas of mid-range deprivation (9.1 per 1,000) and areas most deprived (5.4 per 1,000).

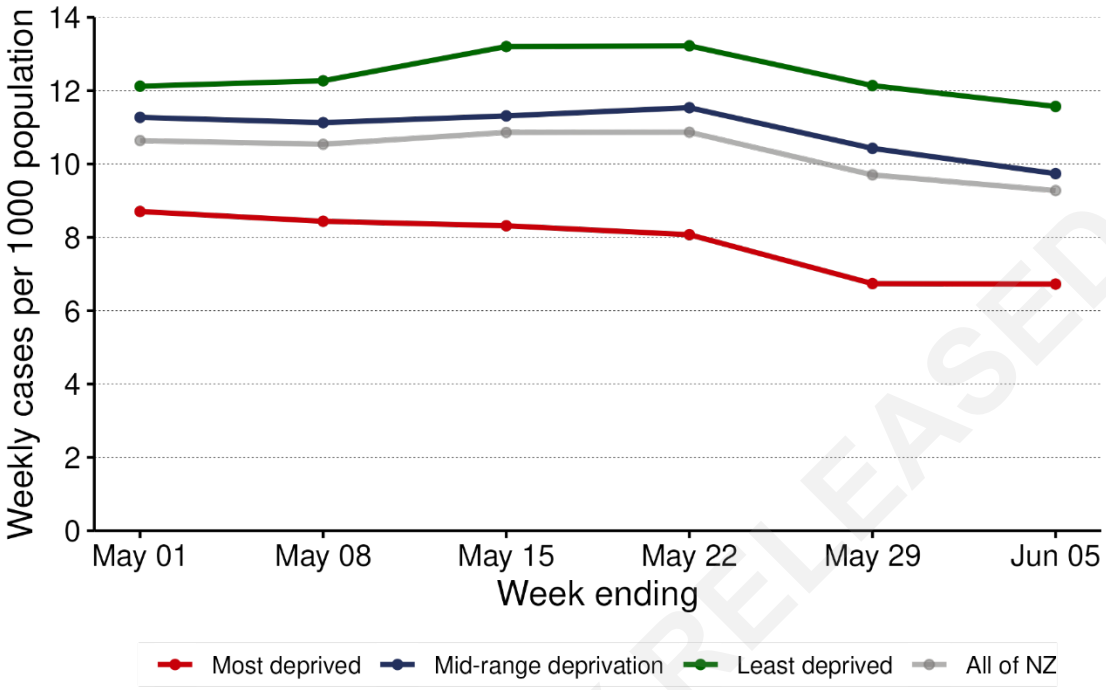
In Te Manawa Taki region, case rates were highest in the least deprived areas (9.3 per 1,000) followed by areas of mid-range deprivation (7.6 per 1,000) and areas most deprived (5.9 per 1,000).

In the Central region, case rates were highest in the least deprived areas (13.1 per 1,000) followed by areas of mid-range deprivation (10.5 per 1,000) and areas most deprived (7.2 per 1,000).

In the Southern region, case rates were highest in the least deprived areas (13.8 per 1,000) followed by areas of mid-range deprivation (11.9 per 1,000) and areas most deprived (10.5 per 1,000).

[4] Contents (otago.ac.nz)

Figure 12: ***National weekly COVID-19 case rates by deprivation status for weeks 01 May – 05 June 2022***



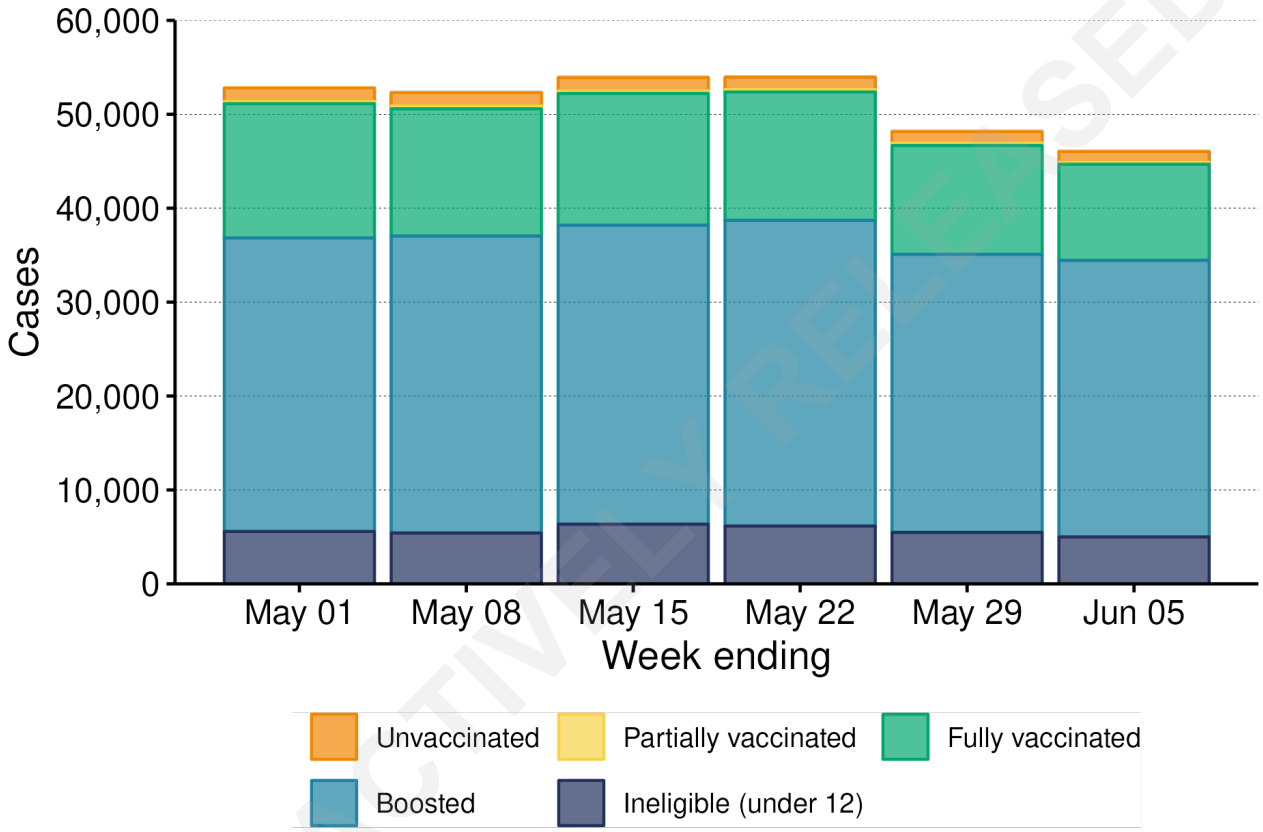
Source: NCTS/EpiSurv as at 2359hrs 05 June 2022

Vaccination trends over time

Figure 13 shows community case numbers by vaccination status nationally. The proportion of boosted cases is slightly higher than the week prior at 64% of all cases in the week ending 05 June. The proportion reported as fully vaccinated is slightly lower than the week prior at 22% of all cases in the past week.

The proportion of cases amongst those who are categorised as ineligible due to being under 12 years old[5] is 10.8%. The proportion of cases reported as partially vaccinated remains constant at 0.5%, while cases reported in those unvaccinated remains similar to the week prior at 2.5%.

Figure 13: ***National weekly case numbers by vaccination status for weeks 01 May – 05 June 2022***



Source: NCTS/EpiSurv as at 2359hrs 05 June 2022

[5] Cases deemed Ineligible (under 12) are currently all cases that fall under the age of 12. Modifications to vaccination categories are being developed, which will include under 12s.

PCR and RAT testing trends

Since New Zealand entered Phase 3 of the Omicron response, most testing is 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 a 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 marks the detection of all three watchlist variants (BA.2.12.1, BA.4 and BA.5) in community samples. Wastewater data continues to detect BA.4/5 and BA.2.12.1 in a number of sites.

As the BA.4/5 and BA.2.12.1 lineages have been detected in community samples; given the relatively small proportion of community samples referred for sequencing, this result suggests that these lineages have a foothold across the country and will likely grow in proportion in coming weeks. Wastewater data coupled with community case WGS results, strongly suggests that BA.4/5 and BA.2.12.1 are circulating within the wider NZ population.

Figure 14 shows that Omicron is the dominant variant in New Zealand, having outcompeted Delta which made up ~70% of all sequenced cases in the start of January 2022 but fell to less than 10% of sequenced cases by the end of January 2022.

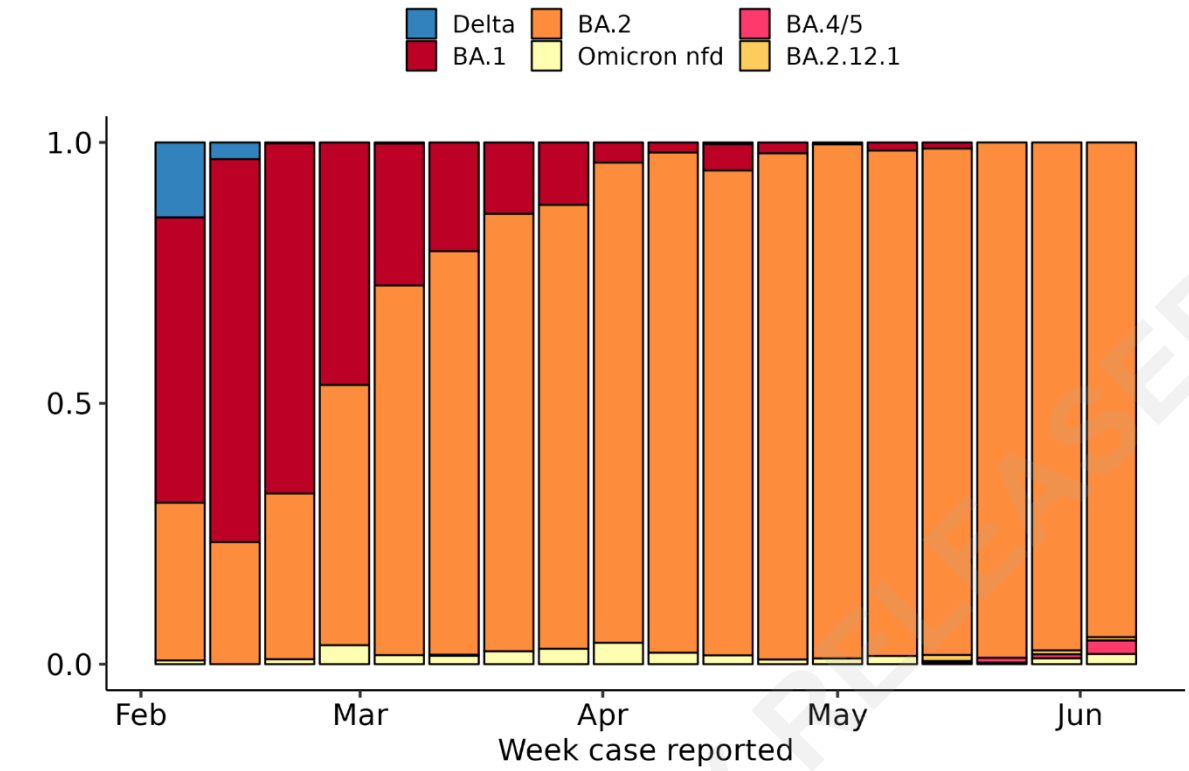
Among Omicron cases, BA.1 was the dominant subvariant (~60% at the start of February 2022) but has since been outcompeted by BA.2, which made up about 98% of sequenced community cases in the past two weeks. This matches international phylodynamic trends as BA.2 has enhanced transmission advantage compared to the BA.1 subvariant.

Based on WGS data generated over the course of the Omicron wave, ESR estimate that 84% of all community cases (~1.18 million cases) reported since 20 January 2022 have been the BA.2 variant (**Figure 15**).

This places New Zealand in a different position to many other countries that are currently experiencing BA.4, BA.5, XE or BA.2.12.1 waves. BA.2 is closer to this most recent group of subvariants than BA.1. Therefore, due to a different variant history, it is not a given that waves seen overseas will necessarily translate to a wave of similar magnitude in New Zealand.

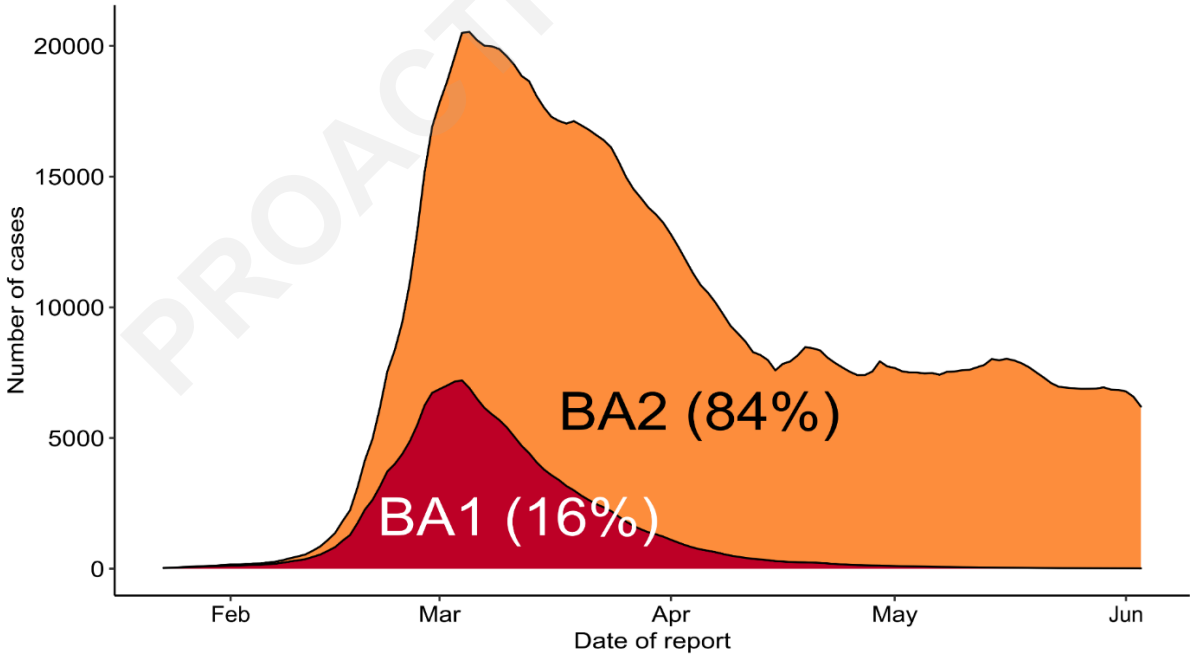
Please see the caveats in the **Glossary at the end of this document.**

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



Source: ESR COVID-19 Genomics Insights Report #10, EpiSurv/Microreact 0900hrs 07 June 2022

Figure 15: ***Estimated contribution of BA.1 and BA.2 community cases in New Zealand since 20 January 2022***



Source: ESR COVID-19 Genomics Insights Report #10, 0900hrs 07 June 2022

Border Surveillance

Cases detected at the Air Border

Imported cases initially increased as travel volumes increased, but have been reducing since early May.

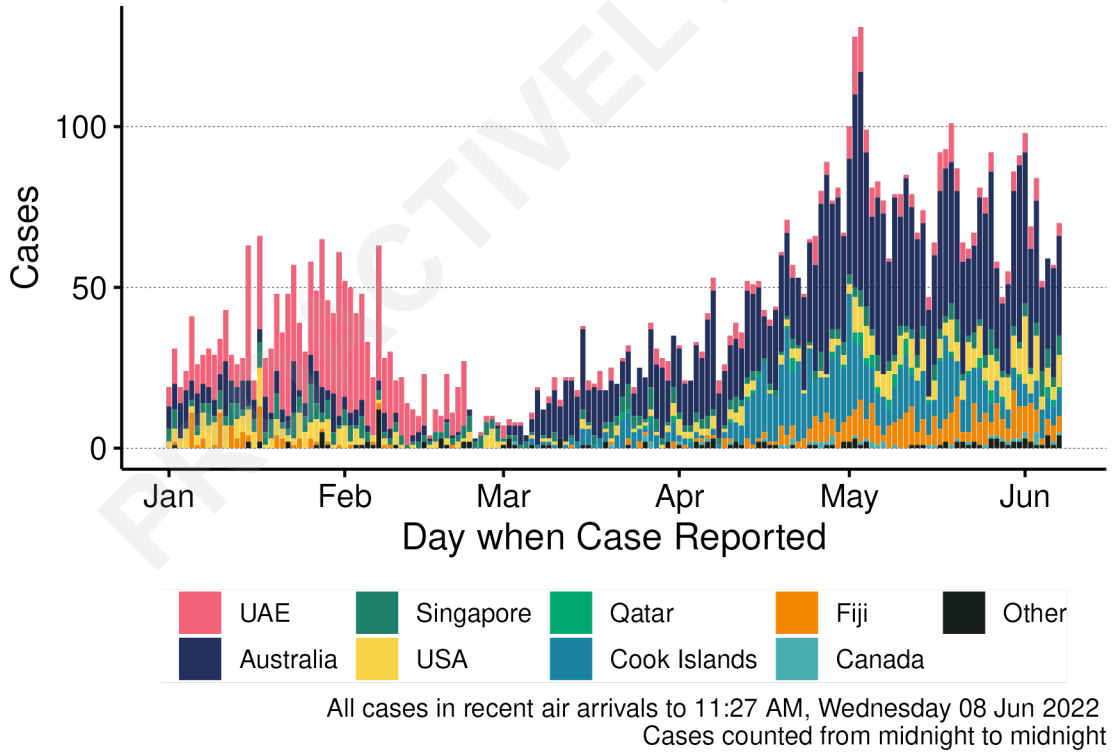
More than 1.5% of recent arrivals were reported as cases. This is similar to the rates seen in arrivals from Australia during quarantine-free travel in 2021, and above the 1% estimate used for planning Reconnecting New Zealand.

Figure 16 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. Since early March, most cases have arrived on flights from Australia, followed by the Cook Islands and Fiji, then the USA.

The spike in cases on 2 May was on the first day that citizens of visa-waiver countries could enter without quarantine.

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 flight, as arrival cards are no longer scanned and data in the New Zealand Traveller Declaration system is incomplete.

Figure 16: ***Cases reported in post-arrival testing by country of flight departure, 01 January – 8 June 2022***



Source: NCTS/EpiSurv as at 2359hrs 8 June 2022

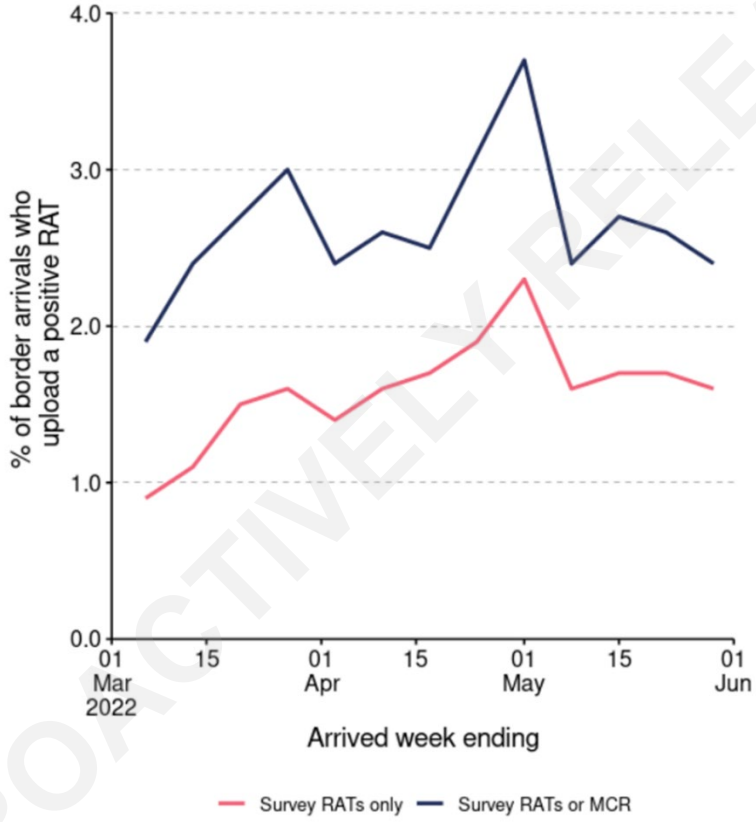
Testing of Border arrivals

Figure 17 shows that the percentage of positive Survey RAT tests among border arrivals (who reported a test) was mostly between 1 and 2.5% for the period 13 March – 29 May 2022. However, not all border arrivals record a survey RAT result; some arrivals record their test result in My Covid Record (MCR). From early May to the week ending 29 May, the percentage of border arrivals returning positive RATs through either the survey or MCR has been holding steady or declining, between 2-3% each week.

About 10% of arriving passengers leave the country before they are due to take a Day 5 test.

It is important to note that testing and reporting of RATs at the border relies heavily on a 'high-trust' model and as such, it is not expected that there will be 100% compliance with testing amongst travellers.

Figure 17: ***Percentage of positive tests from border arrivals who complete RAT tests, 06 March – 29 May 2022***



Sources: NCTS/EpiSurv/Éclair as at 2359hrs 02 June 2022

Whole Genomic Sequencing of Imported cases

Figure 18 shows the completion metrics for border returnee testing and WGS. For the period 07 March – 29 May 2022, the percentage of arrivals uploading a RAT test has been constant with an average of 91.4%.

Figure 19 shows the border returnee testing and WGS metrics for arrivals. In the week ending 29 May, there were 38,369 border arrivals, of which 90.6% (34,753) uploaded a RAT result upon arrival. This is slightly lower than the 91.8% from the week prior.

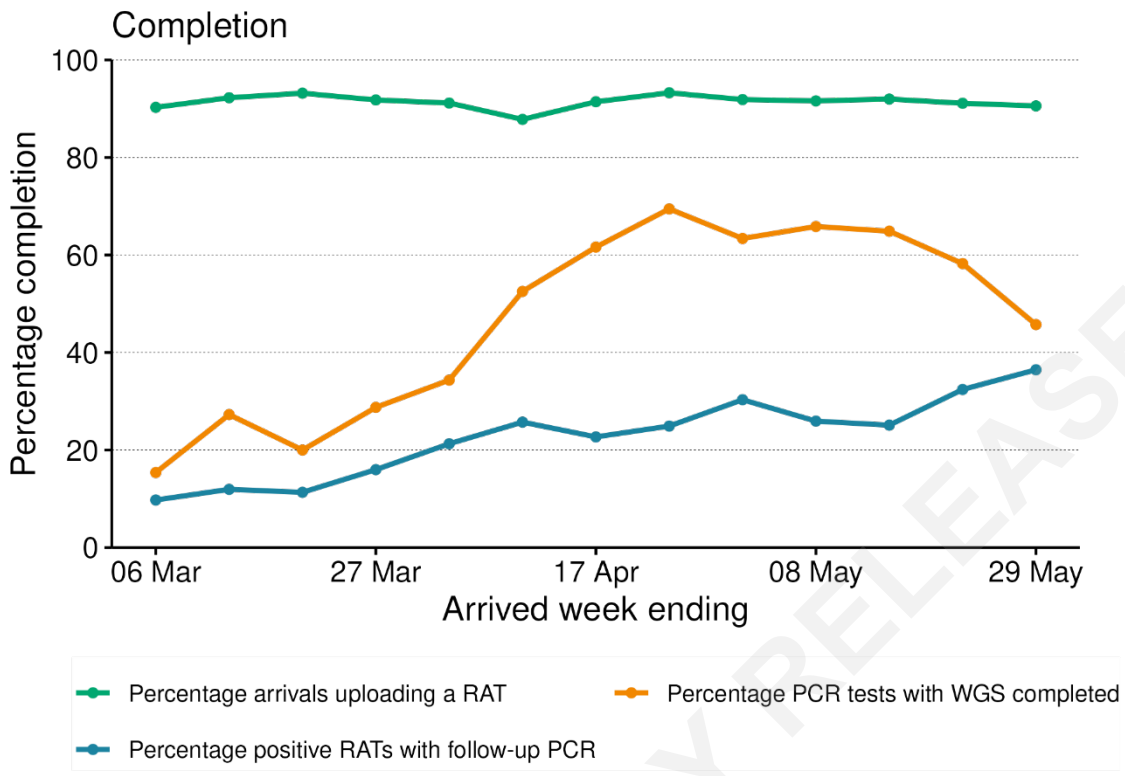
In the week ending 29 May, 36.4% of border arrivals who returned a positive RAT had a follow-up PCR test. This has increased from 32.3% the week prior.

In the week ending 29 May, the percentage of PCR positive border arrivals with WGS complete was 45.7%. However, please note that **WGS can be incomplete for recent cases.** This percentage was 58.2% for the week ending 22 May and 64.9% for the week ending 15 May.

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

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.

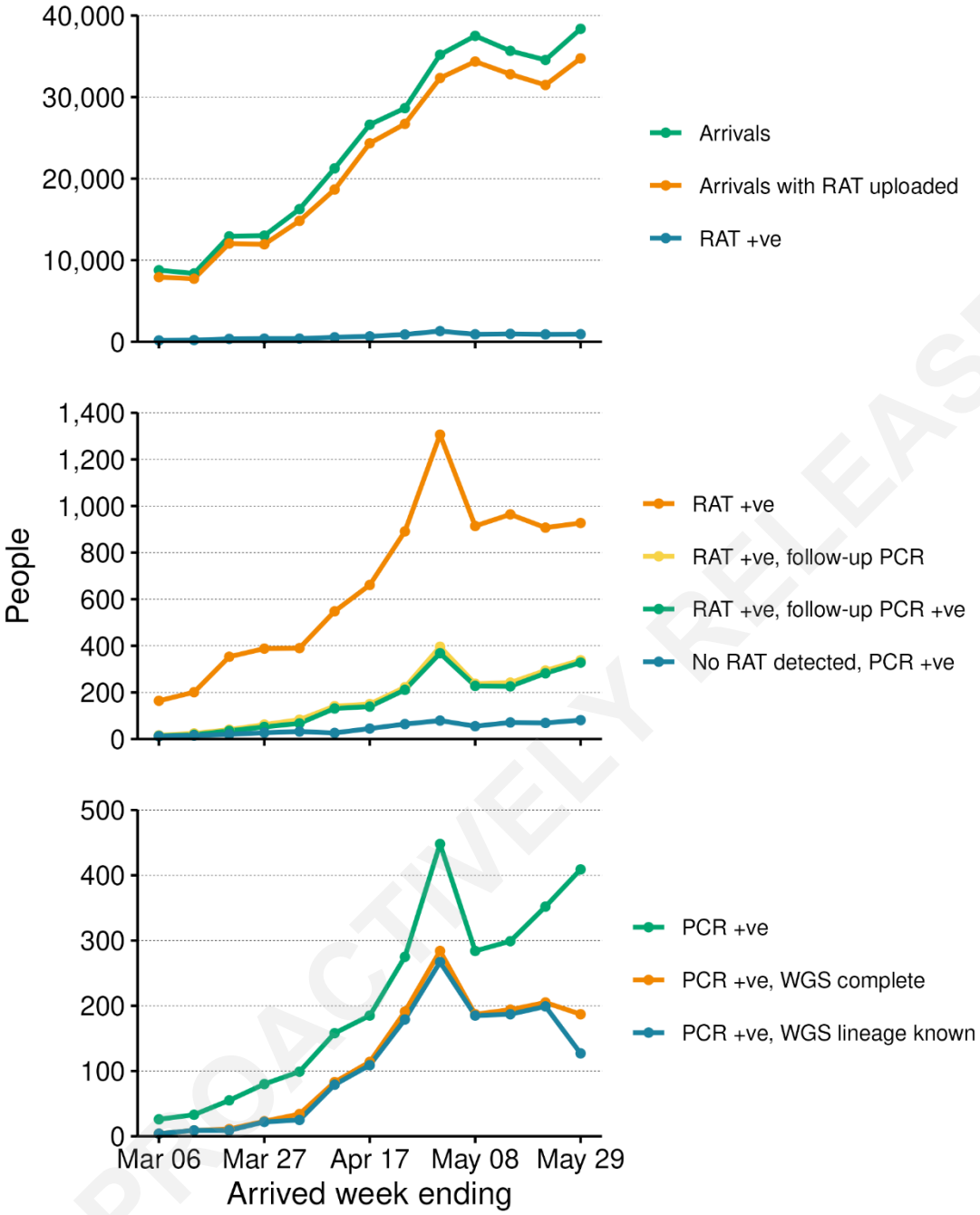
Figure 18: ***Completion metrics for border returnee testing and WGS for arrivals, 07 March – 29 May 2022***



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

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

Figure 19: ***Border returnee testing and WGS metrics for arrivals, 07 March – 29 May 2022***



Sources: NCTS/EpiSurv/Éclair as at 2359hrs 03 June 2022, ESR WGS 03 June 2022[7]

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

Hospitalisation and Mortality

Hospitalisation Rates

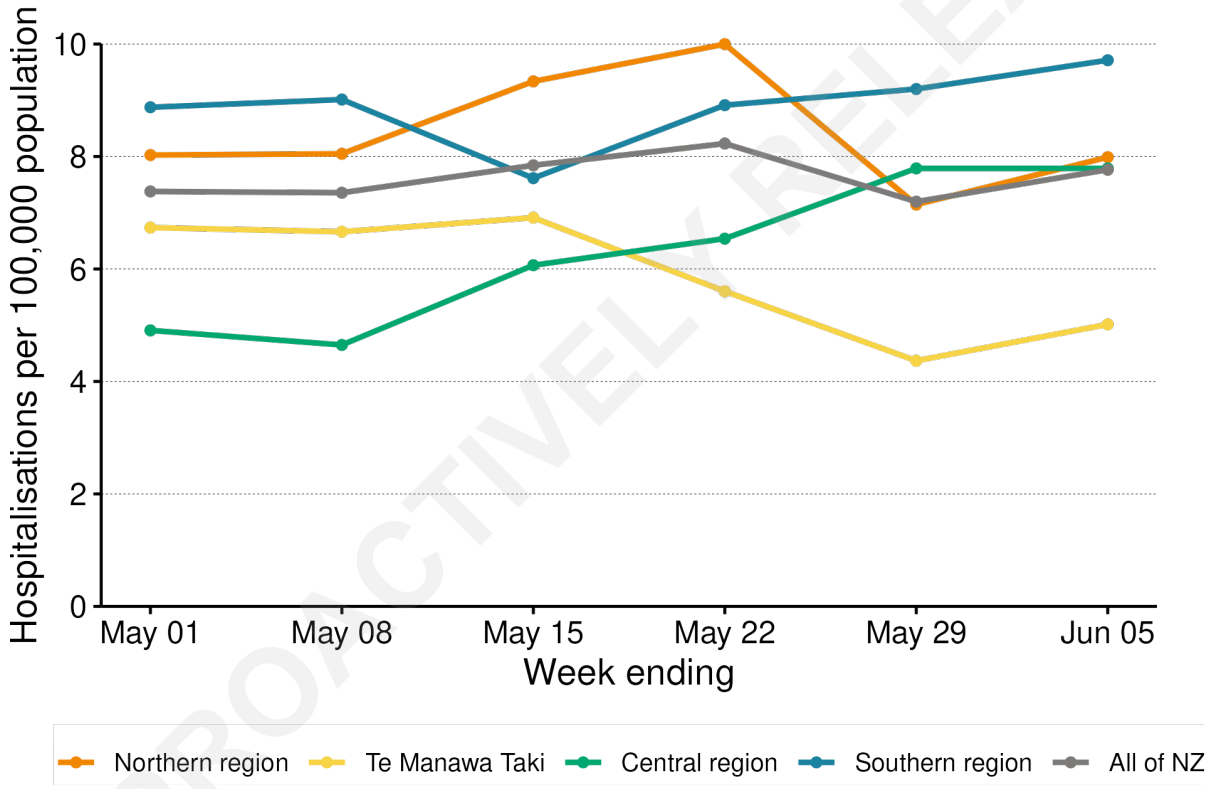
Due to varying definitions of an active case, there may be regional differences in the coding of COVID-19 infection status for hospitalisations.

Hospital Occupancy

For the week ending 05 June, the **national hospital occupancy rate was 7.8 per 100,000 population, an increase of 7% in the past week** (**Figure 20**).

Hospital occupancy rates have continued to vary across regions in the past week. Central region (7.8 per 100,000) remained the same and Southern (9.7 per 100,000) increased by 5%, while the Northern region (8.0 per 100,000) increased by 11% and Te Manawa Taki (5.0 per 100,000) increased by 13% in the past week.

Figure 20: ***Regional weekly hospital occupancy rate per 100,000 population, 01 May – 05 June 2022***



Source: Daily hospital questionnaire as of 05 June 2022

Whole Genomic Sequencing of hospitalised cases

As of 05 June, ESR received samples from 100 of the 259 PCR positive cases who were hospitalised in the two weeks to 03 June 2022. Of these, 88% had a BA.2 genome, 2% were BA.3, 9% failed WGS and 1% were BA.5.

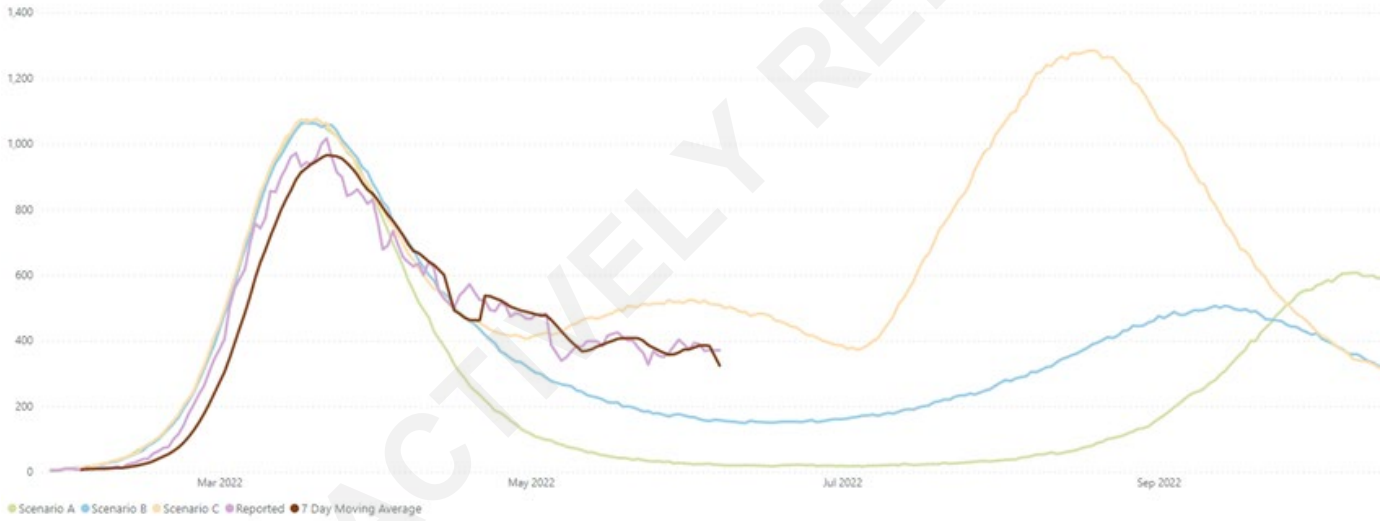
ESR now receives a daily list of active COVID-19 cases who tested positive in the past 14 days and were hospitalised in the past 7 days. ESR is working with the Ministry of Health to receive information on which cases have been admitted to ICU/HDU.

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**).

The number of hospital beds occupied by people with confirmed COVID-19 infections is approximately 4 per 100,000 population. This count includes infected people hospitalised for any reason, and at a national level is tracking between the modelled scenarios *B* and *C*.

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



Sources: COVID-19 Modelling Aotearoa (CMA) Branching Process Model April 2022, and DHB reports to TAS of daily hospital occupancy (all COVID-19 positive people admitted as inpatients) as of 07 June 2022.

Mortality

As of 08 June 2022, 1,294 people are suspected to have died with or from COVID-19 infection. Of these, 1,240 have died within 28 days of being reported as a case. Error! Reference source not found. shows the 7-day rolling average of deaths by date of death, which is 8 as of 05 June 2022.

Deaths are tracking closely to the worst-case planning scenario "C".

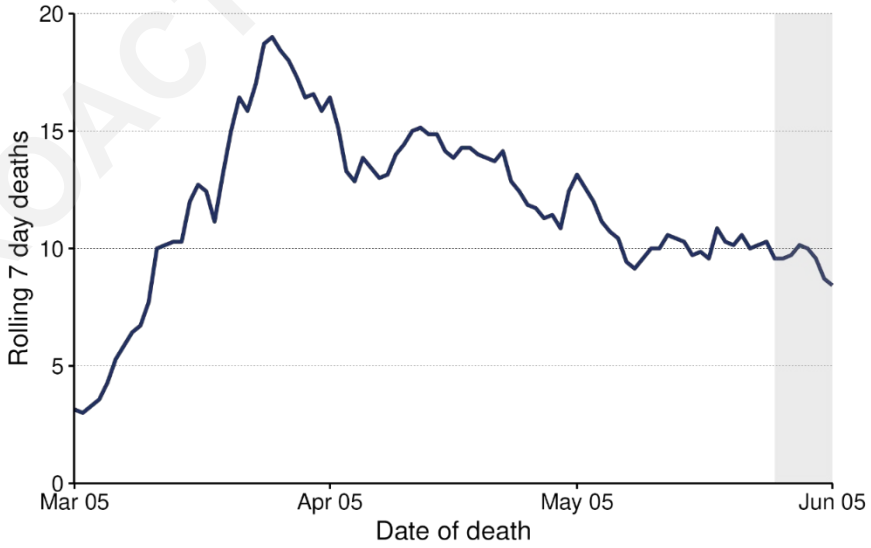
Figure 23 shows **COVID-19 related deaths by cause over time**. By 20 May 2022, there were 997 deaths with Covid-19 infection who died within 28 days of being reported as a case. Of the deaths that have been formally coded by cause of death, 459 deaths (52%) have been determined to have COVID-19 as the main underlying cause. COVID-19 contributed to a further 237 deaths (27%). Another 183 people died of a separate, unrelated cause (21%).

Figure 24 shows mortality by age and ethnicity from 01 March 2022 to 05 June 2022. The trend is as expected across all age groups, with the older population dying with COVID-19 at a higher rate than the younger population. The mortality rate for those aged 90+ is highest at 12.9 per 1,000 population. The mortality rate for those aged 80-89 is 3.2 per 1,000; and for those aged 70-79 is 0.8 per 1,000. The mortality rate for younger age groups is far below 1 per 1,000 population.

Across age groups Pacific and Māori have consistently higher mortality than Asian and other; however, these age-stratified deaths by ethnicity have small numbers of events to use for estimating rates and for comparison, so these data need to be interpreted with caution.

For people aged 90+, Pacific Peoples have the highest mortality rate at 54.5 per 1,000 population, while Asian is the lowest at 7.8 per 1,000. For people aged 80-89, Pacific Peoples have the highest mortality rate at 14.7 per 1,000 population, while Asian is again the lowest at 2.0 per 1,000. However, these results should be interpreted with caution due to the issue of small numbers of events.

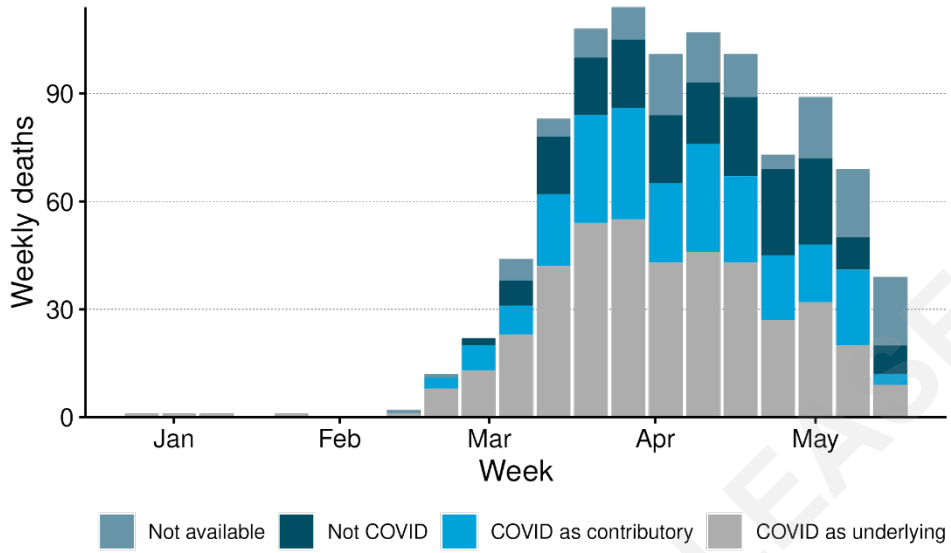
Figure 22: ***7-day rolling average of deaths within 28 days of COVID-19, by date of death, 05 March – 05 June 2022***



Source: NCTS/EpiSurv as of 05 June 2022[8]

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

Figure 23: ***Deaths by cause, 1 January to 20 May 2022***

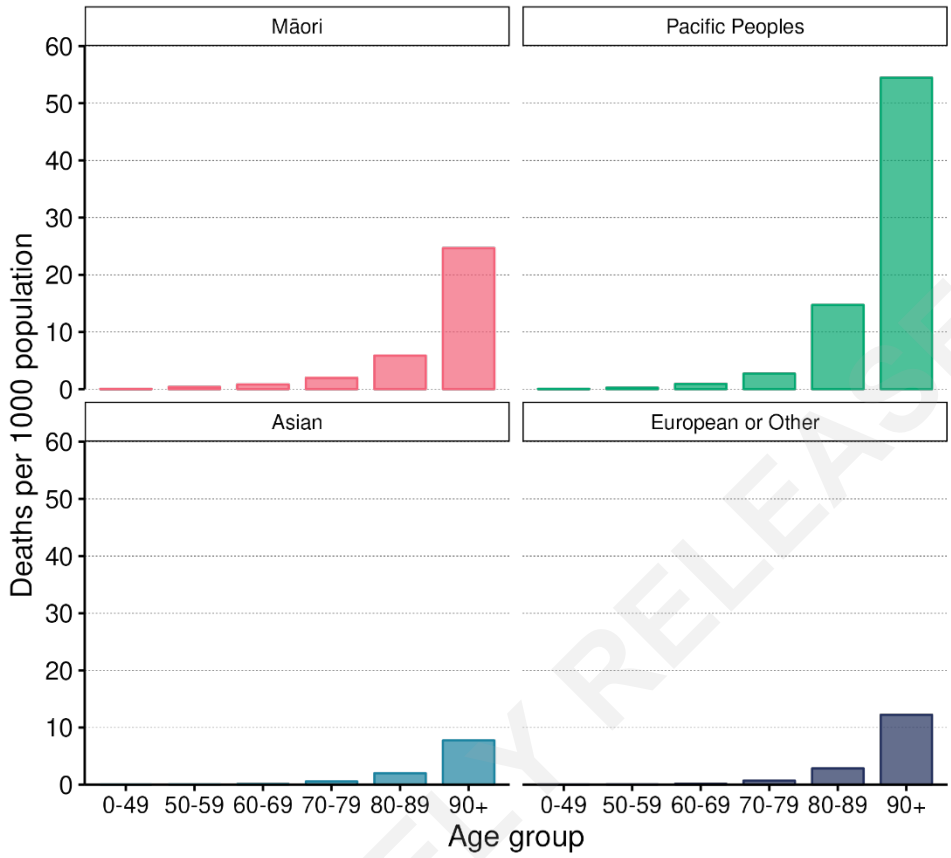


Source: Ministry of Health, all 2022 deaths by date of death within 28 days of report as COVID-19 case, and all other 2022 deaths where COVID-19 was the underlying or a contributory cause, to 20 May 2022

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.

Figure 24: Rates of all deaths with or after COVID-19 infection per 1000 population, by Age and Ethnicity, 01 March 2022 to 05 June 2022



Source: NCTS/EpiSurv as of 05 June 2022

All cause death rates

This section is under review and we have removed it from this week's edition of the Trends and Insights report.

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 and waning immunity

Globally, the number of new weekly cases has continued to decline since a peak in January 2022. In the week ending 5 June 2022, over 3.3 million cases were reported, a 12% decrease as compared to the previous week. The number of new weekly deaths also continues to decline, with over 7,600 fatalities reported, a 22% decrease as compared to the previous week.

At the regional level, the number of new weekly cases increased in the Eastern Mediterranean Region (+19%) and the South-East Asia Region (+1%), while they decreased in the other four WHO regions. The number of new weekly deaths increased in the Western Pacific Region (+7%), while decreasing trends were observed in the other five regions. As of 5 June 2022, over 529 million confirmed cases and over six million deaths have been reported globally.

The Omicron VOC remains the dominant variant circulating globally, accounting for nearly all sequences reported. Among the Omicron lineages, BA.2 and its descendent lineages (pooled lineages named BA.2.X) are declining but remain dominant, accounting for 44% and 19% respectively, of Omicron sequences submitted in the last 30 days. Globally, BA.2.12.1, BA.5, and BA.4 variants are rising in prevalence. In the last 30 days, BA.2.12.1 has reached a prevalence of 28%. BA.5 and BA.4 account for 4% and 2% or circulating variants, respectively.

USA and Canada

The BA.2.12.1 variant continues to increase in prevalence in the US, making up around 59.1% of all sequenced cases in the US. However, cases have remained relatively stable in the past fortnight to an average of around 106,000 cases per day. Though the number of COVID-19 patients hospitalised nationwide remains far below peak levels observed in January 2022, it has increased by 9% in the past week to an average of more than 24,400 per day.

The variant is also growing quickly in prevalence in Canada, making up around 20% of sequenced cases currently, though this does not yet appear to be leading to an increase in cases, which have been declining since mid-April.

Australia

Overall, the number of cases continues to decline in Australia as the Western Australia outbreak peaks. In the two weeks ending 30 May, 80% of sequences have been identified as BA.2, though BA.4 (3%), BA.5 (9%) and BA.2.12.1 (5%) have all been reported at low levels and are increasingly prevalent. Note data points may have low levels of sequencing data and may change as more sequences are included.

Portugal

Portugal has seen a spike in cases, primarily driven by the BA.5 Omicron subvariant. PCR S-gene target failure (SGTF) data indicates that BA.5 makes up 87% of sequences in Portugal, however the delay in genomic sequencing and reporting prevents confirmation of this at this stage.

The number of COVID-19 patients hospitalised nationwide has increased, reaching levels previously observed in the most recent peak in February 2022.

Primary evidence on effectiveness of infection prevention and control measures

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

- A mathematical modelling study assessing the impact of public compliance on non-pharmaceutical interventions with a cost-effectiveness analysis to measure the effectiveness of curtailing the spread of the virus found that control involving both adherence and compliance to COVID-19 rules and sanitation prove to be the most cost-effective strategies.
- An evaluation of COVID-19 policies in 50 different countries and territories has been released. The analysis considers both pharmaceutical and non-pharmaceutical interventions and assesses a jurisdiction's success at containing COVID-19 both prior to and after vaccination. New Zealand was found to be one of the most successful due to early lockdowns and swift vaccination policies in response to the Delta variant. Singapore was also successful at containing the virus due to responding to what was initially rapid virus spread with increased health system policies, lockdown efficiency and vaccination. Taiwan was exemplary, managing to suppress cases after a surge during low vaccination coverage within 2-3 months. Overall, the study found rigorous policies and lockdowns, especially early in the pandemic, were key to top performing nations. Additionally, the ability to make lockdowns appropriate to the level of risk and flexible was key to avoiding damage to other areas of society.
- An observational study on the impact of contact tracing and testing on controlling COVID-19 without lockdown in Hong Kong found that i) restoring social distancing measures without maintaining tracing and testing efficiency was not enough to prevent growth of the outbreak; ii) a rise in number of daily cases increased the probability of confirmation delay among contact-traced cases; iii) testing at-risk groups reduced the probability and the duration of confirmation delay among contact-traced cases.
- 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. Further, because gathering size distributions are "heavy-tailed", a meaningful reduction in new cases only occurs once restrictions are set quite low (to achieve reduction in cases of 50% or more, restrictions must be set below 30 in most settings).

- An Australian study found that in the early phase of an outbreak, containing a wild type-dominant epidemic to a low level (≤10 cases/day) would require effective combinations of social distancing and face mask use interventions to be commenced before the number of daily reported cases reaches 6. Containing an Alpha-dominant epidemic would require more stringent interventions that commence earlier. For the Delta variant, public health interventions alone would not contain the epidemic unless the vaccination coverage was ≥70%.
- A systematic review of economic evaluations of COVID-19 interventions found that treatment, public information campaigns, quarantining identified contacts/cases, cancelling public events and social distancing were deemed highly cost-effective. The authors also concluded that accounting for broad non-health impacts and distributional effects is essential for a comprehensive assessment of interventions' values.

Health System Capacity

Omicron Dashboard

The Omicron dashboard (**Figure 25**) provides oversight of how the health system is being impacted by the Omicron outbreak. It uses data gathered from various clinical and health sector indicators. On the following page is the summary of indicators for the week ending 02 June 2022.

Figure 25: Omicron Health Sector Clinical Indicators Dashboard summary, week ending 02 June 2022

Sector	Summary of data
General Practice	Sector leaders have not raised any new items of concern over the past week. Changes in GPQED rates vary widely by geographical area, encounter rates are 3.6% higher than at the same time last year.
Childhood Immunisations	Rates of childhood immunisations have deteriorated between March/April 2020 and August 2021. Childhood immunisation coverage is lowest for tamariki Māori (0-4 years).
Flu Tracking	Severe Acute Respiratory Infection (SARI) incidence rates per 100,000 in the Auckland region rate of hospitalisations is now the highest in 2022 so far. This is the first time since 2019 that influenza has been the most commonly identified virus among these patients. Currently, Influenza vaccination rates are low. As of 27 May, only 18% of the population had received their flu vaccine.
Aged Residential Care	20% of the 656 Aged Residential Care (ARC) facilities have at least one active COVID-19 case (132 of 656 facilities). This is a reduction from last week which was 23% of facilities having a positive case.
Pacific Health	Pacific providers continue to use innovative ways to promote vaccination across community groups
Emergency Ambulance Service	111 calls and EAS incidents have increased significantly in the last three weeks. This is putting high pressure across the sector compounding the impact of long cycle times.
Disability providers	The Ministry continues to work with key stakeholders and communities within the disability system, across the wider Health sector and through interagency work, to ensure the Omicron response meets the needs of disabled people and continues to protect those at greater risk.
Hospital	Nationally occupancy of over 90% increased to 48% (previously 47%). Five hospitals reported 20 or 21 censuses: Wellington, Rotorua, Gisborne, Christchurch and Hutt. Number of admitted patients has gone up over the past eight weeks, which goes in line with the reported hospital occupancy of over 90% rising steadily.
ED	ED attendances this week are among the highest numbers since reporting commenced. Number of ED presentations shows the same pattern as number of admitted patients.
Planned Care (Hospital)	Planned care continues to be reduced across the motu however levels vary depending on region.
Pharmacy	Similar to last week, Pharmacies are experiencing staff shortages (locums and permanent), reduced operating hours for some and staff are fatigued
Home and Community Support	Continue to see a reduction in total numbers of employees compared with October-December last year (9% decline) and continue to see a decline in total services delivered compared with October-December last year (4% decline). Both of the above trends appear slightly improved from previous weeks.
COVID care in the community	The percentage of cases contacted has remained consistent in the past week and has been constantly over 98%. The last week shows a slight increase in both assessments completed within 24 and 48 hours. Assessments completed within 24 hours increased by 60.7% to 64.5%. Percentage of clinical assessments completed within 48 hours for Māori and Pacific Peoples has remained consistent over the past two weeks with on average Māori over 79% and Pacific over 75%.

Sources: Omicron Health Sector Clinical Indicators Dashboard, 02 June 2022

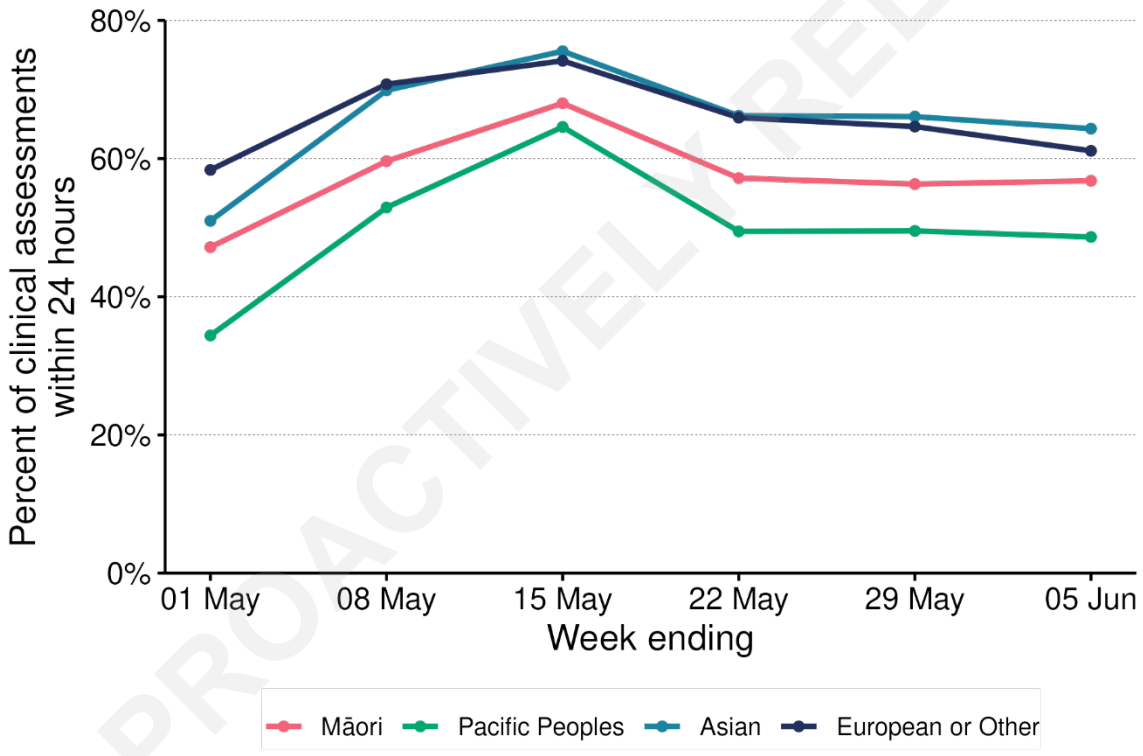
Care in the Community

The Ministry of Health and the Ministry of Social Development collaborated to develop COVID-19 Care the Community (CinC). 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 26 shows the percentage of clinical assessment completed within 24 hours by Ethnicity. In the week ending 05 June 57% of Māori, 47% of Pacific Peoples, 64% of Asians and 61% of European or other had clinical assessment completed within 24hrs. This trend has been similar for all ethnic groups for the past three weeks.

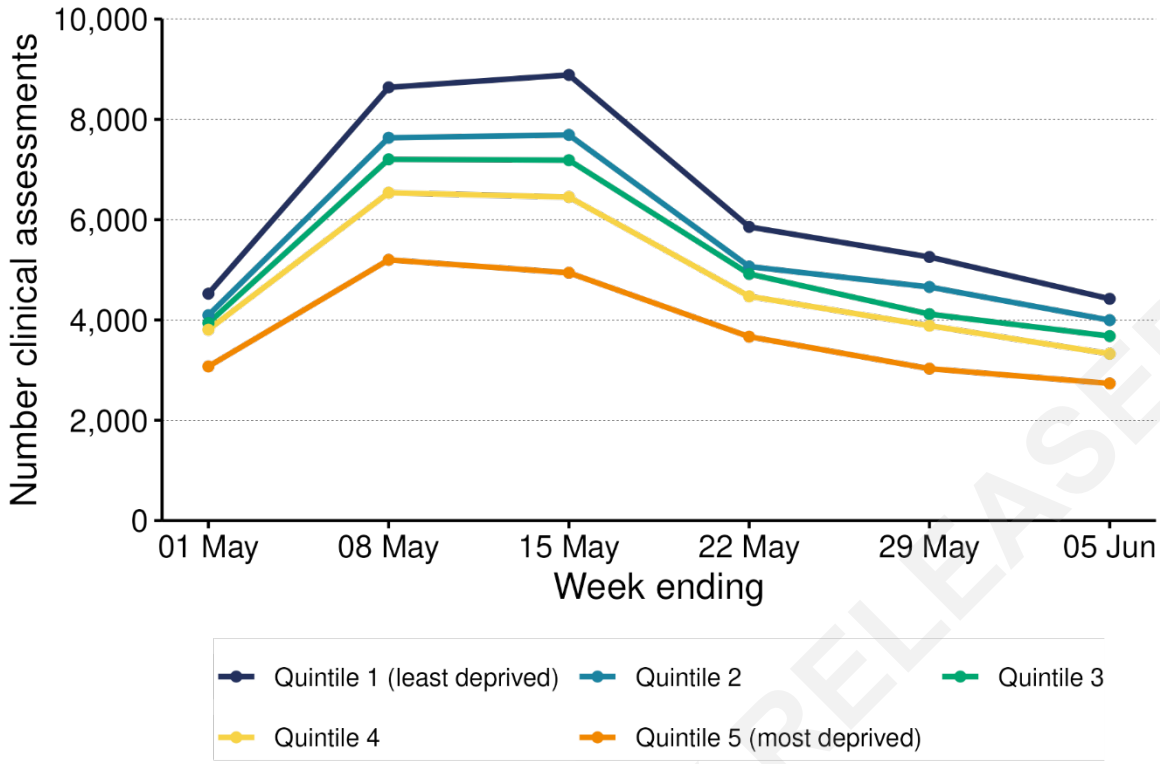
Figure 27 shows the number of clinical assessments by deprivation. People residing in the least deprived areas have a higher number of completed clinical assessments compared to those living in the most deprived areas, a difference of 1687.

Figure 26: Percent of initial clinical assessment completed within 24 hours of positive case by ethnicity



Sources: CCCM/QLIK, Socrates 05 June 2022

Figure 27: Number of clinical assessments by deprivation



Sources: NCTS, 05 June 2022

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, which provides 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 the Northern Region rather than identifying inpatients in the national testing database; they are therefore more accurate than the national figures. However, this data is currently only available for the Northern Region.

Wastewater quantification

The wastewater analysis has been undertaken at the ESR 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.
- Northern region 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 outside of the Northern Region
- 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.
- Recent changes to the way case data is collected and processed may have resulted in some uncertainties in the case counts and the catchments to which they are mapped. While this is being resolved, the case data presented in this report should be used as a guide only and is subject to change. ESR are continuing work to improve the algorithms for how cases are assigned to wastewater catchments, including integrating a new meshblock data feed recently made available from NCTS.