COVID-19

Trends and Insights Report

Updated 23 June 2022

Please note that 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, morbidity and mortality. The report relies on data that may be subject to change or are incomplete.

Key insights from past 7 days

Infection Trends

- **Nationally, the weekly case rate was 7.0 per 1,000** population for the week ending 19 June. This rate has decreased from 8.3 per 1,000 population in the previous week.
- **For the week ending 19 June**, estimates suggest that **1.5% (462/30,997) of healthcare workers** and **1.1% (220/20,706) 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 (1.1% [11 per 1,000] versus 6.5 per 1,000**, respectively).
- Levels of viral RNA in **wastewater have plateaued in Northern, Auckland Metro, and Southern with slight decreases in all other regions,** 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 the underlying level of new infections for the past 2 months.**
- In the past week, **two out of 19 DHBs experienced an increase in case rates.** There was a 15% increase in Tairawhiti and a 6% increase in Wairarapa.

Demographic Trends in Case Rates

- The **lowest case rates** are in **Pacific Peoples (3.3 per 1,000)**; case rates in this group have decreased by **23% in the past week. Māori case rates have also declined** and are now at **4.4 per 1,000.**
- **For the 65+ age group,** case rates in the Northern region decreased by 10.0%, Te Manawa Taki decreased by 15.3%, Central decreased by 12.5% and Southern decreased by 12.6% 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 8.5 per 1,000 and 65+ at 6.7 per 1,000). **Cases rates for all ethnicities aged 65+ have been stable in the past month, but have decreased slightly in the past week**.

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Whole Genome Sequencing

- 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 92% of sequenced community cases** in the past two weeks.
- This week, **all three watchlist variants (BA.2.12.1, BA.4 and BA.5) were again detected** in community samples. Wastewater data also continues to detect BA.4/5 and BA.2.12.1 in a number of sites. The upward rise of the BA.4/5 variant of Omicron is a key observation – it now makes up approximately 7-8% of community cases. ESR estimates that **BA.5 will likely become the dominant variant around mid-July.**
- As of 19 June, ESR received samples from, and had processed, 74 of the 306 PCR positive hospital cases with a report date in the two weeks to 17 June 2022. Of these, 87% had a BA.2 genome, 1% were BA.5, 11% failed WGS and 1% were Omicron unassigned.

Border Surveillance

- In the week ending 12 June, there were 40,940 border arrivals, of which **90.0% (36,851) uploaded a RAT result upon arrival.** This is slightly higher than the 89.6% from the week prior.
- In the week ending 12 June, **about 2-3% of arrivals tested positive** on RAT. Both the number and rate of active cases are falling, even while total arrivals are increasing.
- In the week ending 12 June, the percentage of PCR positive border arrivals with WGS complete was 51.7%. However, please note that WGS can be incomplete for recent cases. This percentage was **69.5% for the week ending 05 June** and **60.3% for the week ending 29 May.**

Hospitalisation and Mortality

- For the week ending 19 June, the national hospital occupancy rate was 7.4 per 100,000 population, **with no significant change in the past week.** Hospital occupancy rates have continued to vary across regions in the past week. Southern region (6.5 per 100,000) decreased by 18.1% and Northern (7.8 per 100,000) decreased by 1%, while Te Manawa Taki (5.9 per 100,000) increased by 3.6% and the **Central region (9.2 per 100,000) increased by 25.8% in the past week.**
- As of 19 June 2022, there were 1,358 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, **52% had COVID-19 as the main underlying cause**, and **COVID-19 contributed to 27%** of deaths. The remaining **21% were found to be due to unrelated causes**, such as accidents.

International and Scientific Insights

- Globally, the **number of new weekly cases has continued to decline since the peak in January 2022.** In the week ending 19 June 2022, over 3.3 million cases were reported, a 4% decrease as compared to the previous week. The number of **new weekly deaths declined by 16% as compared to the previous week**, with over 7,500 fatalities reported.
- The scientific insights section includes studies on outbreak management, economic evaluations, transmission dynamics and modelling studies.

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Health System Capacity

- For the week ending 16 June, **19% of the 656 Aged Residential Care (ARC) facilities have at least one active COVID-19 case** (125 of 656 facilities).
- **ED attendance for the week ending 12 June increased further by 4.2%.** All three Auckland DHBs noted further increases, with Auckland DHB as much as 12%.
- **Hospitals are at capacity across the motu. All regions have reported high levels of acute care, impacting planned care delivery.** For the week ending 16 June, hospital occupancy over 90% continued to increase. 13 hospitals reported significant pressure with at least 15 of 21 censuses over 90% occupancy. Wellington, Hutt Valley, Tauranga, Palmerston North, and Rotorua were continuously above this threshold.

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Domestic epidemic outlook

Infection outlook

- Since the March peak, case rates were declining leading up to the week of 17 April, after which cases overall have continued to decline, but at a slower pace.
- The overall national picture shows a continued decrease in cases after the plateau observed from late April to late May. However, cases in Central region 12% and Southern 28% are higher than overall national case rates.
- Infection levels are likely to be higher than the self-reported cases indicate as wastewater RNA has not decreased substantially despite an overall substantial decrease in case rates since the March peak. **There is potential indication of a divergence between wastewater trends and case rates as community case rates were higher at similar wastewater levels earlier in the year.**
- 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 adherence to public health measures, which may be increasing risk of infection, especially among vulnerable populations.
- While in all other age groups there has been steady decline, overall cases have decreased only slightly in the past 4 weeks among those aged 65+. This could be due to infections moving from younger age groups to older age groups over time, with people aged 65+ having previously much lower rates than younger age groups. Furthermore, cases rates are higher in older age groups 44-64 and 65+ for Pacific People and Māori compared to other ethnicities.
- The prevalence of BA.4 and BA.5 have been increasing in the community compared to previous weeks. Due to the immune evasion characteristic of BA.5 and BA.5, it is likely that there will be an increase in infections in the coming weeks. However, the actual impact on new infections and hospitalisations are still unclear, at this stage.

Tertiary Care outlook

- There continues to be a substantial risk for the at-risk and elderly as infection has not reduced in 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.

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Infection Trends

Summary of evidence for infection and case ascertainment trends

Currently, **the national border workforce case rates in the past week (10.6 per 1,000) were higher than the general population (7.0 per 1,000);** these rates were similar when comparing border workforce rates in the Northern region among 25-44 year-olds at 9.4 per 1000 (where the greatest proportion of the workforce is concentrated). This continues to suggest the **underlying level of infection could be higher than diagnosed rates**. Consistent with the trend in both border and health care workers, **general population case rates have continued decreasing in all regions.** This decrease is consistent at a national level across all ethnicities and age groups.

Levels of viral RNA in **wastewater have plateaued in the past week in Auckland metro, Northern and Southern regions** except for **Te Manawa Taki and Central, which have decreased.** However, **levels in all regions remain similar to those seen in mid- to late-February** (early March for Southern). Contradictory to other evidence, the overall relatively small decrease (when compared with reported cases) **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 modelled scenario '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 remains at 0.9** (90% Credible Interval [CI]: 0.8-1.0) for cases to 18 June, suggesting that cases are likely to remain at current levels for the next week.

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 19 June, estimates suggest that 1.5% (462/30,997) of healthcare workers (**Figure 1**) and 1.1% (220/20,706) 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 0.9%.

[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.

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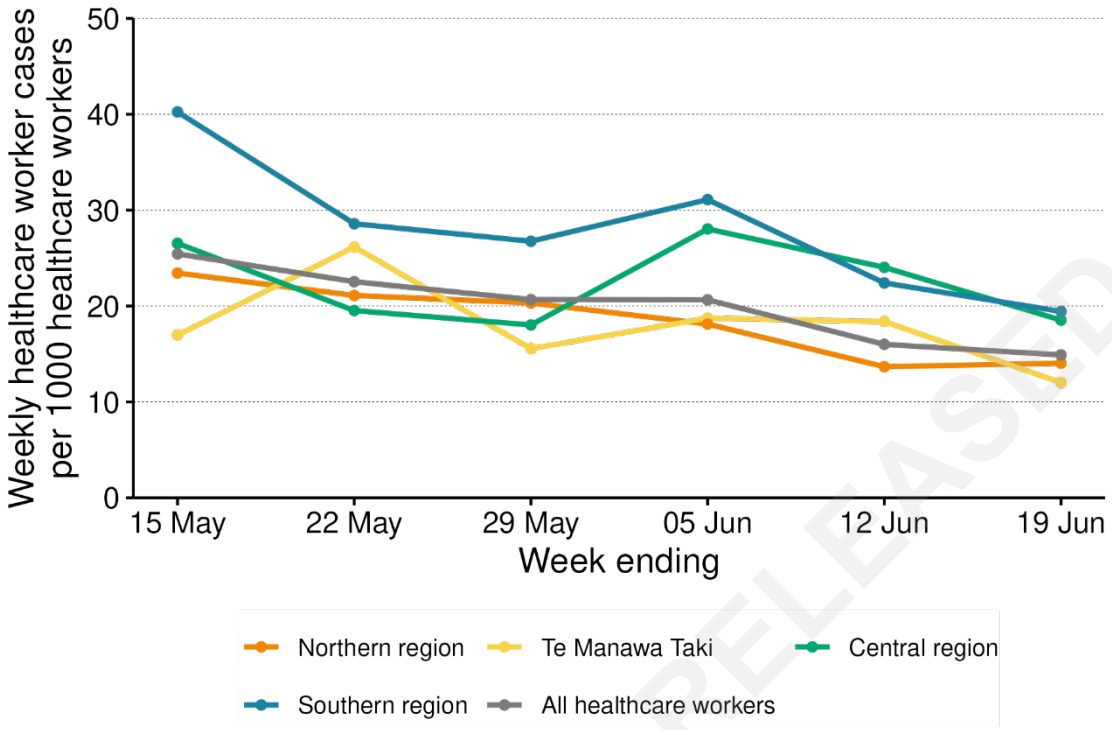
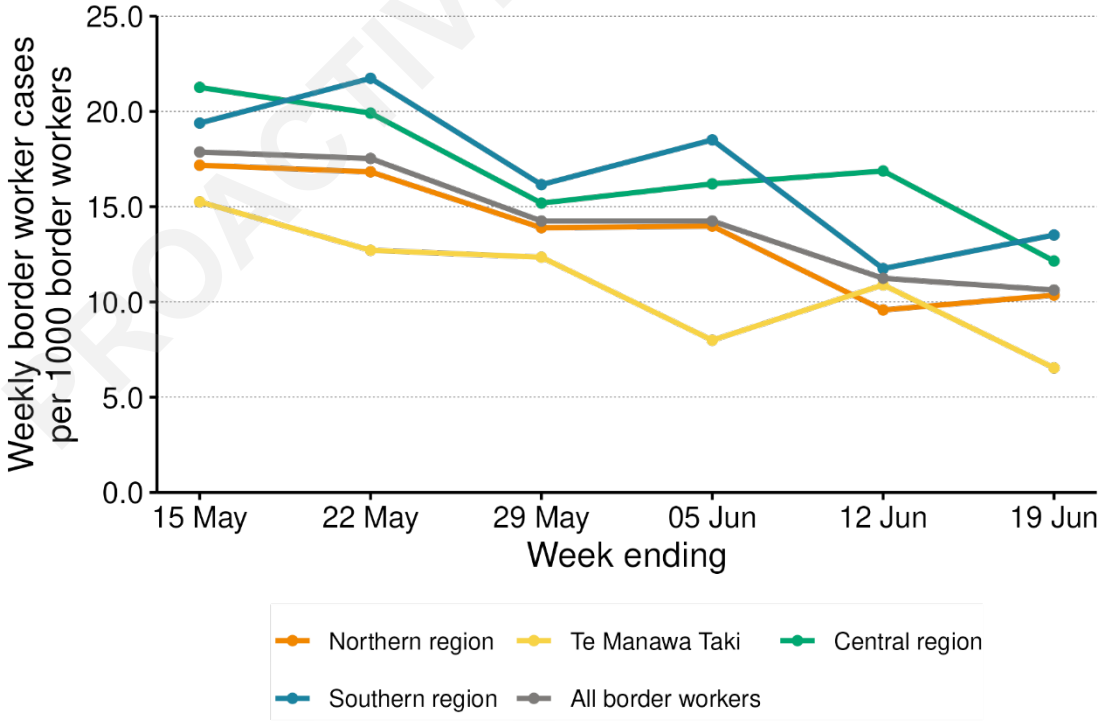
Figure 1: Regional weekly case rates of health care workers for weeks 05 May – 19 June 2022



Source: Éclair/Episurv, 2359hrs 19 June 2022

Figure 2: Regional weekly case rates of border workers for weeks 15 May – 19 June 2022



Source: Éclair/Episurv, 2359hrs 19 June 2022

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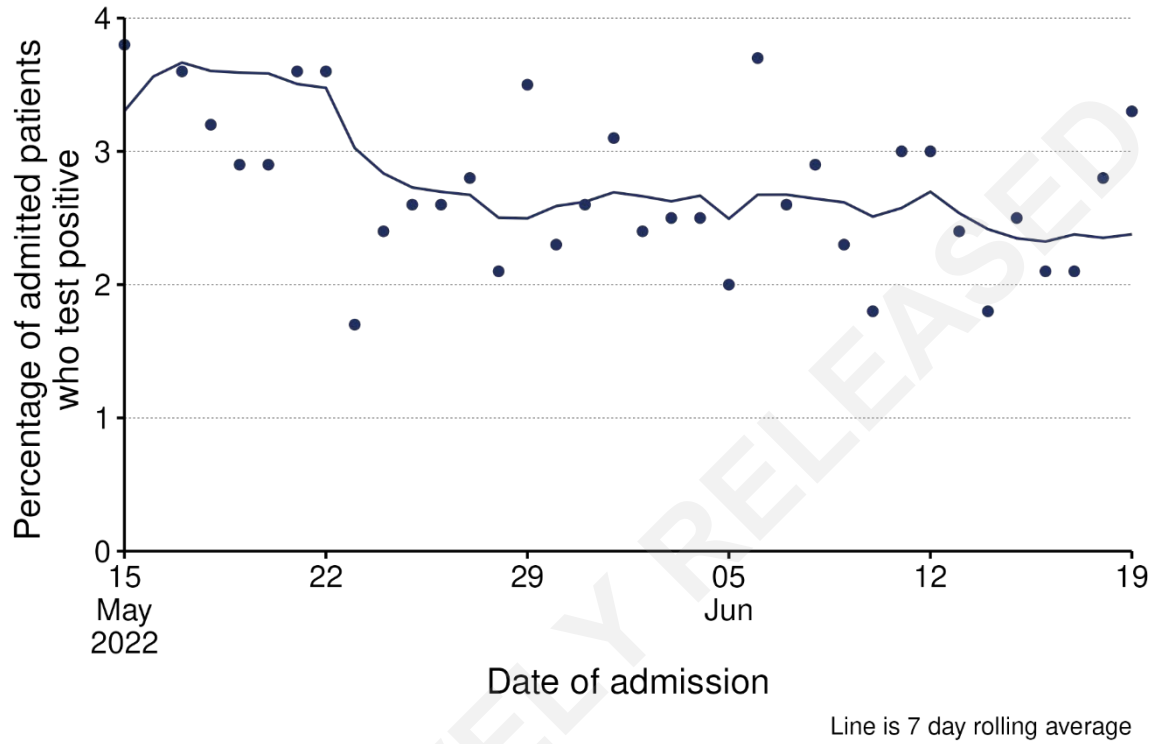
Test positivity trends among tertiary hospital admissions

Inpatient test positivity trend for tertiary hospital admissions[3] is shown in **Figure 3**. Tertiary hospital admission **positivity has plateaued** in the past week, with a 7-day rolling average of 2.4% (299/12,575) for the week ending 19 June.

Figure 3: Percent of tests positive among tertiary hospital admissions



Source: Tertiary hospitalisation data, NCTS & EpiSurv as at 2359hrs 19 June 2022

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

Wastewater quantification

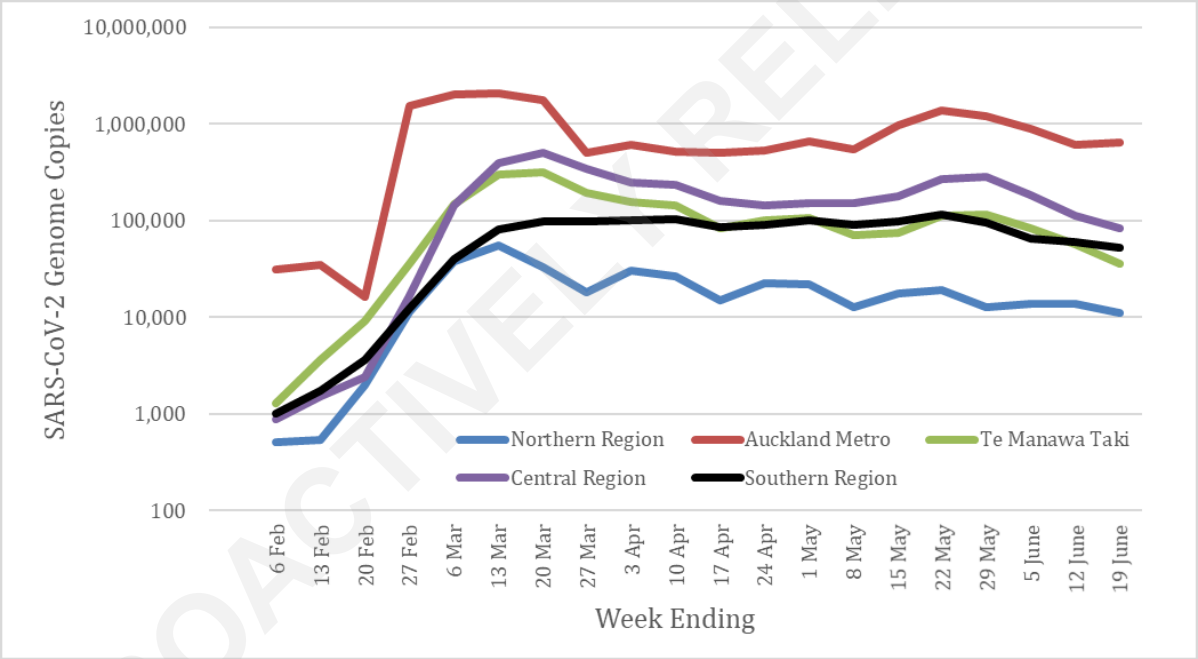
Figure 4 provides an overview of wastewater results by region. Please note that it is not appropriate to compare SARS-CoV-2 absolute levels by region; this figure can only be used to assess the trends *within* each region.

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 plateaued in the past two weeks.** Auckland Metro rates peaked in mid-May and **were decreasing but now have plateaued in the week ending June 19.**

Te Manawa Taki and Central regions have been trending similarly and have **both decreased in the past three weeks**. Southern region wastewater trends have been stable for the past two months **but have decreased slightly in the past few 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 – 19 June 2022



Source: ESR SARS-CoV-2 in Wastewater update for week ending 19 June 2022

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Trends in diagnosed cases

Overall, **the weekly case rate was 7.0 per 1,000** population for the week ending 19 June. This is a **decrease from the previous week,** which was 8.3 per 1,000.

Figure 5 shows that case rates have decreased across all regions in the past week. Northern region (5.9 per 1,000) and Te Manawa Taki (5.5 per 1,000) decreased by 15% and 20% respectively. Southern region (9.0 per 1,000) decreased by 19% and Central region (7.9 per 1,000) decreased by 33%.

In the past week, **two out of 19 DHBs experienced an increase in case rates**. There was a 15% increase in Tairawhiti and a 6% increase in Wairarapa.

In the Northern region, the weekly case rate was highest for **Waitematā (7.0 per 1,000)** followed by Auckland DHB (6.5 per 1,000).

In Te Manawa Taki, weekly case rates were highest in **Taranaki (8.5 per 1,000)**, followed by Waikato DHB (5.4 per 1,000). Other DHBs in Te Manawa Taki had weekly case rates below 5 per 1,000.

The highest weekly case rates in the Central region were in **Capital and Coast (9.6 per 1,000)** followed by Hutt Valley (9.3 per 1,000). Other DHBs in the Central region had weekly case rates between 5 and 8 per 1,000.

In the Southern region, the highest case rates were in **Nelson Marlborough (9.2 per 1,000)** followed by Canterbury DHB (9.1 per 1,000) and Southern DHB (8.9 per 1,000).

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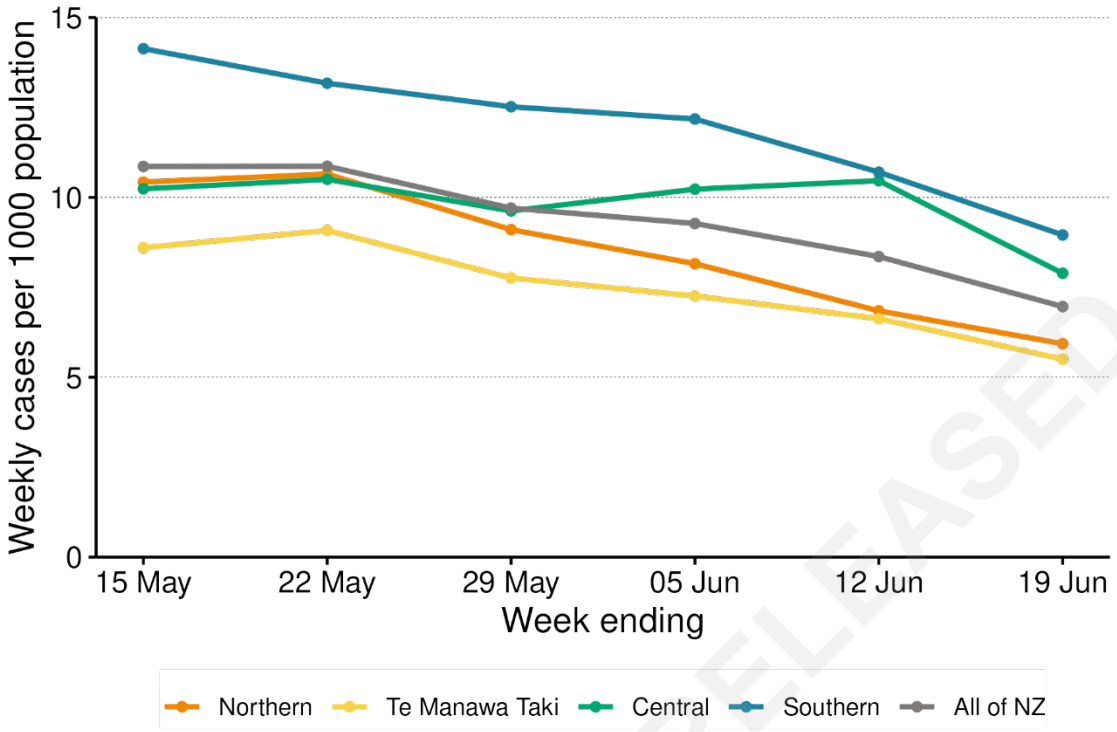
Figure 5: Regional weekly case rates for weeks 15 May – 19 June 2022



Source: NCTS/EpiSurv as at 2359hrs 19 June 2022

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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.

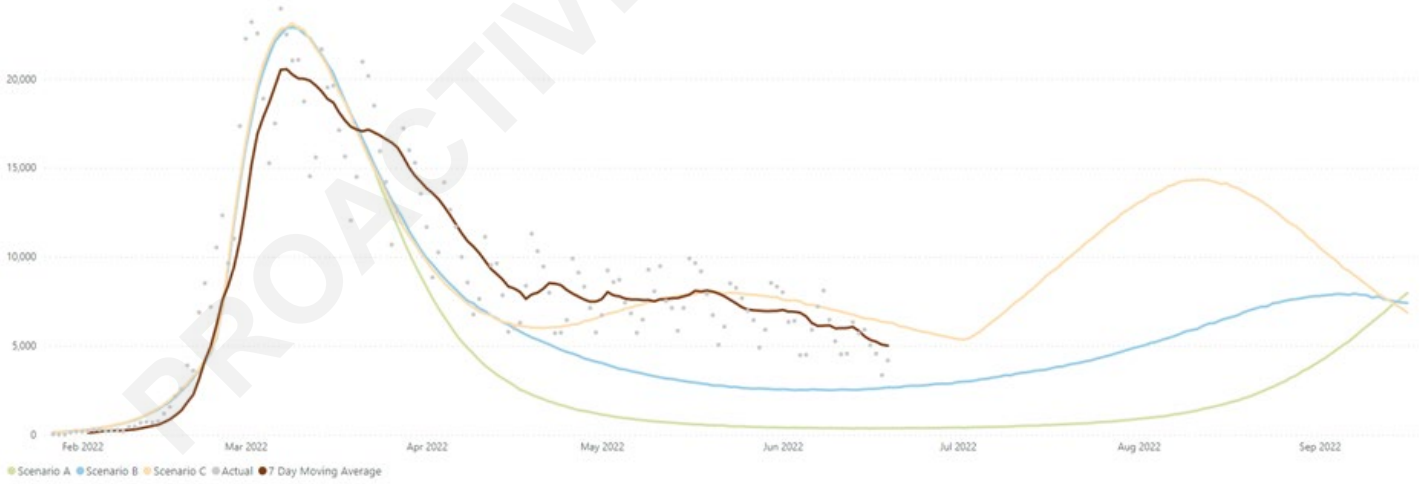
All three scenarios feature waning immunity after vaccination and/or infection, which leads to a "winter wave" beginning as early as July (Scenario C).

The size and timing of a second wave will be affected by any 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.

These scenarios are based on the current Omicron BA.2 variant. Any significant changes in the virus could cause drastically 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 19 June 2022

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Effective reproduction rate, and forecasts of cases and infections

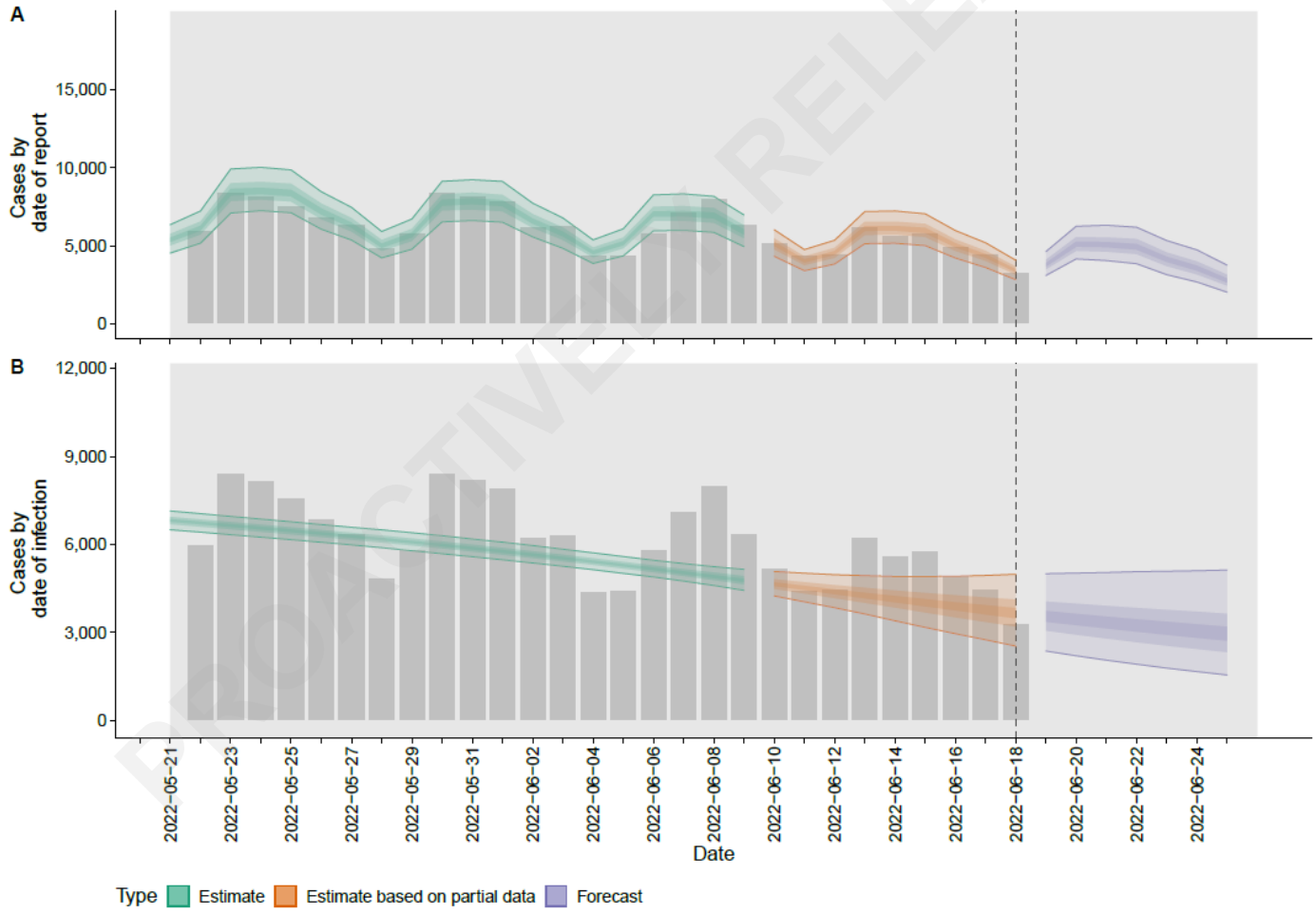
These estimates used the *EpiNow* package[2] on 20 June using data to 18 June.[4] The median estimate of **effective R (R_{eff}) nationally is 0.9** (90% Credible Interval [CI]: 0.8-1.0) for cases to 18 June, after adjusting for data lags; this is **below the previous week**. The confidence interval indicates a low to moderate level of uncertainty for this estimate.

Figure 7 compares the previous week's model median estimate for 18 June 2022 of 4,051 cases per day with a 50% credible interval of 3,611 – 4,525 to the actual reported cases of 4,704. This estimate was a 16% underestimate well outside of the 50% credible interval.

For all Public Health Units (PHUs), the model is estimating a **median R_{eff} between 0.7 – 1.1.**

The model's median estimate is that national reported cases could be 2,773 cases per day by 25 June (50% credible interval: 2,449 – 3,146). However, the credible intervals for the projected cases would be even wider if the possibility of continuing trend changes in effective R were included.

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



Source: EpiNow 20 June 2022, based on NCTS and EpiSurv cases

[4] 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.

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 7.8 per 1,000** (down from last week's 9.6 per 1,000). The **lowest case rate continues to be in Pacific Peoples (3.3 per 1,000),** which is a 23% decrease from last week (4.2 per 1,000). Māori have decreased by 16.1%, from 5.2 per 1,000 in the previous week to 4.4 per 1,000.

Case rates in the Northern region for European or Other were 7.0 per 1,000 and rates for Asian were 6.5 per 1,000. Māori had the second lowest case rate at 3.9 per 1,000. Pacific Peoples (2.8 per 1,000) continued to have the lowest case rates in this region.

Case rates for Te Manawa Taki were highest for Asian (7.2 per 1,000), comparable to European or Other (6.3 per 1,000). Māori had the second lowest case rate at 3.3 per 1,000 followed closely by Pacific Peoples who had the lowest case rates in this region at 3.2 per 1,000.

Case rates in the Central region have decreased in the past week after increases largely driven by Asian and Pacific Peoples ethnicities, were observed in the week prior. The rate for Asian (8.9 per 1,000) has decreased by 25% compared to the previous week and the rate for Pacific Peoples (4.5 per 1,000) has decreased by 32.7%. Central region rates for European or Other (8.8 per 1,000), have decreased from last week's 11.6 per 1,000, and Māori case rates have decreased from 6.6 per 1,000 in the previous week to 4.9 per 1,000.

In the Southern region, case rates were highest for Asian (9.8 per 1,000) and European or Other (9.2 per 1,000). Pacific Peoples continue to have the lowest case rate at 5.1 per 1,000. Māori have the next lowest case rate at 7.0 per 1,000.

Figure 9 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 of European or Other ethnicity (9.2 per 1,000)** whilst the lowest case rates were in those aged 0-4 of Pacific Peoples ethnicity (1.4 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, **though have continued to decrease** across most ethnicities. In the week ending 19 June, case rates for Asians aged 65+ were 5.5 per 1,000 (8.2% decrease from week prior). Case rates for European or Other aged 65+ were 6.7 per 1,000 (14.1% decrease from week prior). Case rates in Pacific People aged 65+ were 5.2 per 1,000 (6.1% increase from week prior). Case rates in Māori aged 65+ were 5.5 per 1,000 (3.5% decrease from week prior).

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 8.5 per 1,000 and 65+ at 6.7 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.

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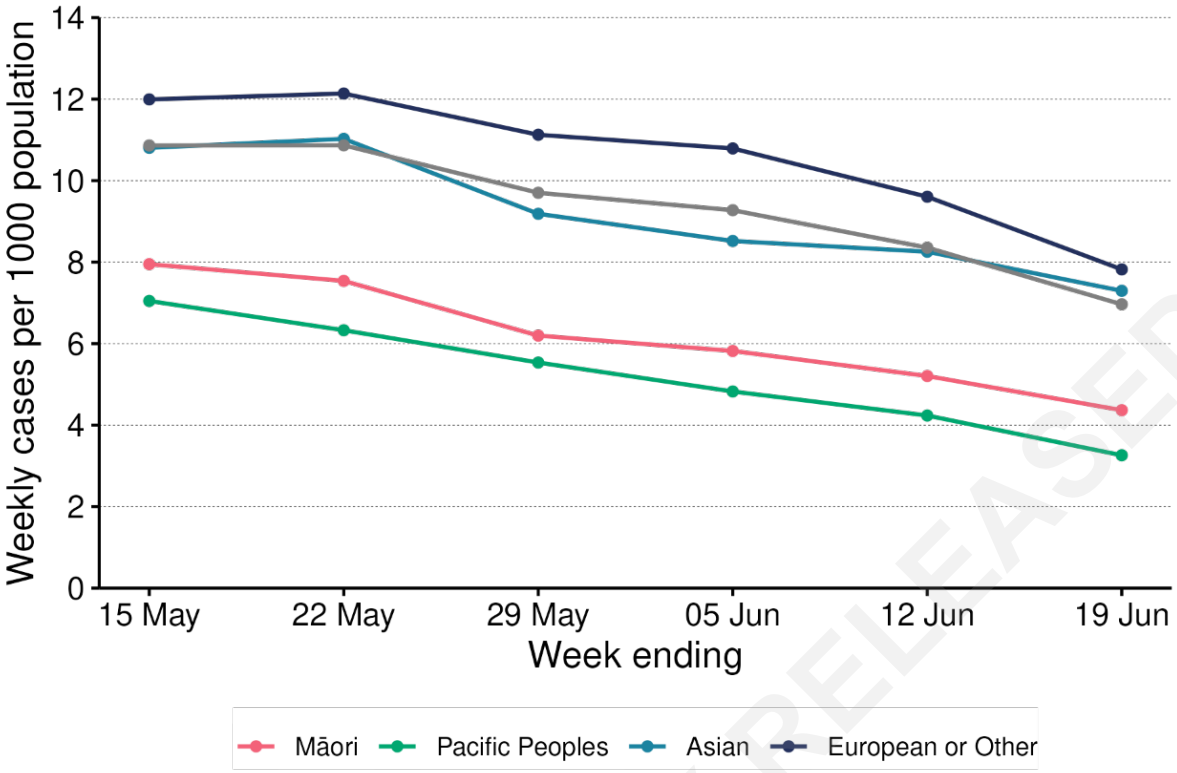
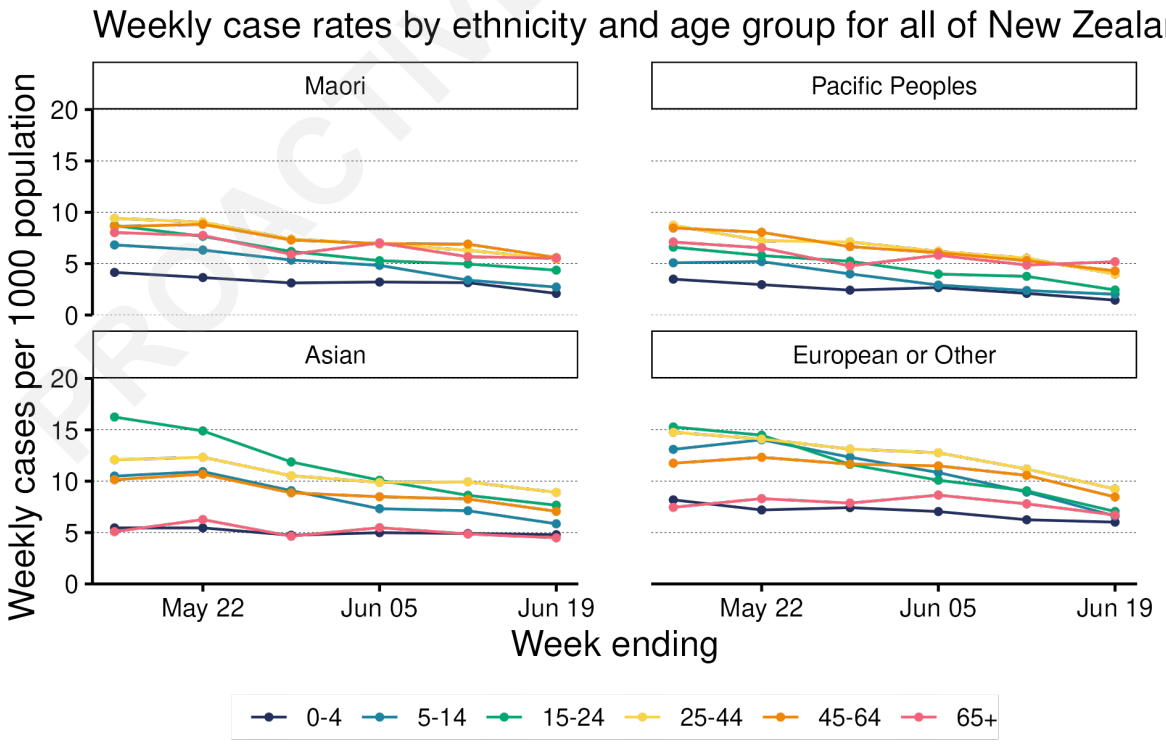
Figure 8: National weekly case rates by ethnicity for weeks 15 May – 19 June 2022



Source: NCTS/EpiSurv as at 2359hrs 19 June 2022

Figure 9: National ethnicity-specific weekly case rates by age group for weeks 15 May – 19 June 2022



Source: NCTS/EpiSurv as at 2359hrs 19 June 2022

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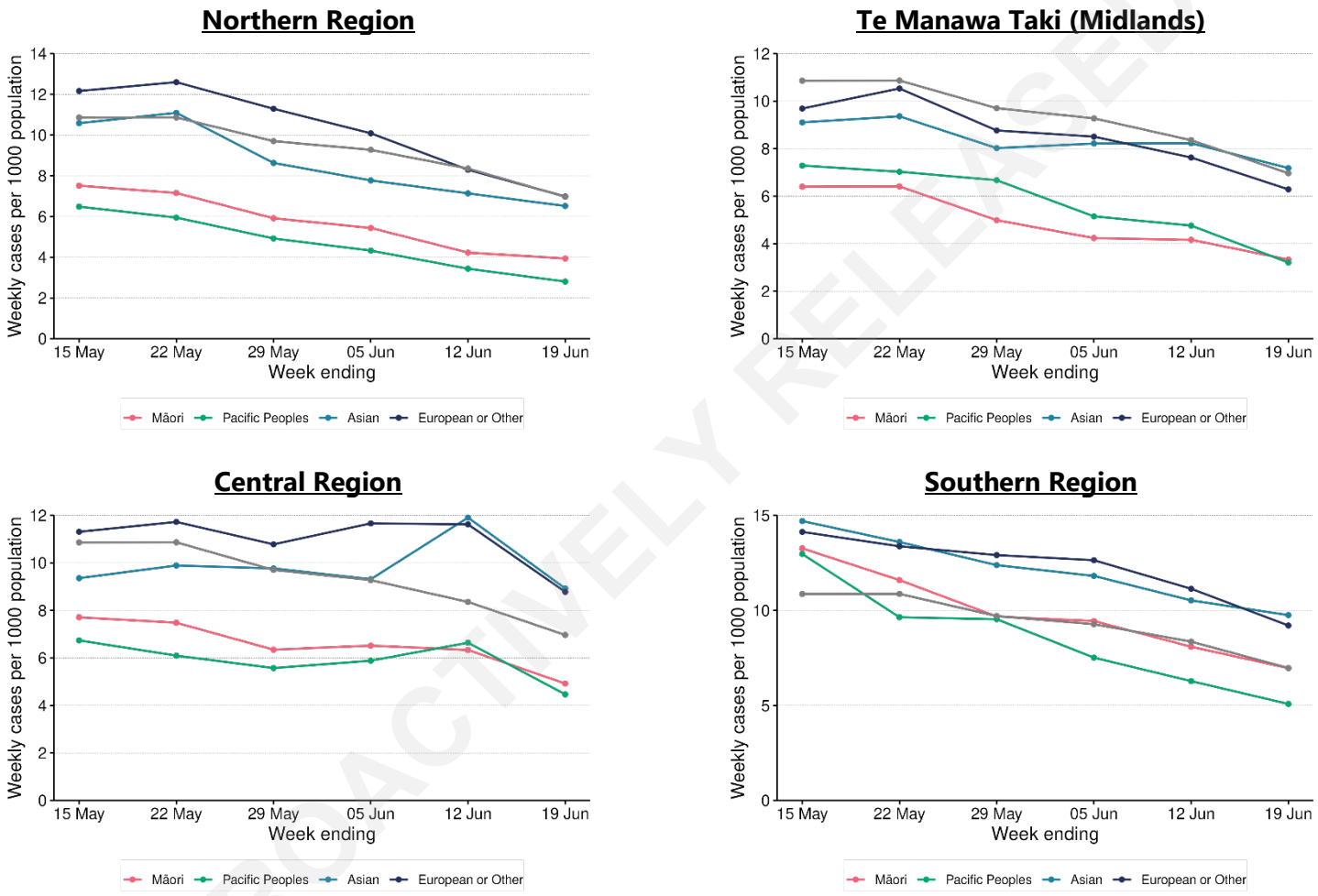
Figure 10: Regional weekly case rates by ethnicity for weeks 15 May – 19 June 2022



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Source: NCTS/EpiSurv as at 2359hrs 19 June 2022

Age trends over time and by region

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

Nationally, **case rates were relatively similar for 5-14, 15-24 and 65+ age groups (5.2, 6.1 and 6.5 per 1,000 respectively)** in the past week. Those aged 0-4 continued to have the lowest weekly case rate at 4.4 per 1,000. The 25-44 and 45-64 age groups had the highest case rates at 8.3 per 1,000 and 7.8 per 1,000 respectively in the past week.

For the 0-4 age group, case rates in the Northern region decreased by 16.9%, Te Manawa Taki decreased by 10.9%, Central decreased by 8.2% and Southern increased by 0.2% in the past week.

For the 5-14 age group, case rates in the Northern region decreased by 14.8%, Te Manawa Taki decreased by 19.9%, Central decreased by 31.6% and Southern decreased by 28.0% in the past week.

For the 15-24 age group, case rates in the Northern region decreased by 15.9%, Te Manawa Taki decreased by 24.4%, Central decreased by 19.7% and Southern decreased by 18.6% in the past week.

For the 25-44 age group, case rates in the Northern region decreased by 10.1%, Te Manawa Taki decreased by 14.9%, Central decreased by 26.0% and Southern decreased by 15.9% in the past week.

For the 45-64 age group, case rates in the Northern region decreased by 16.7%, Te Manawa Taki decreased by 19.4%, Central decreased by 29.0% and Southern decreased by 15.5% in the past week.

For the 65+ age group, case rates in the Northern region decreased by 10.0%, Te Manawa Taki decreased by 15.3%, Central decreased by 12.5% and Southern decreased by 12.6% in the past week.

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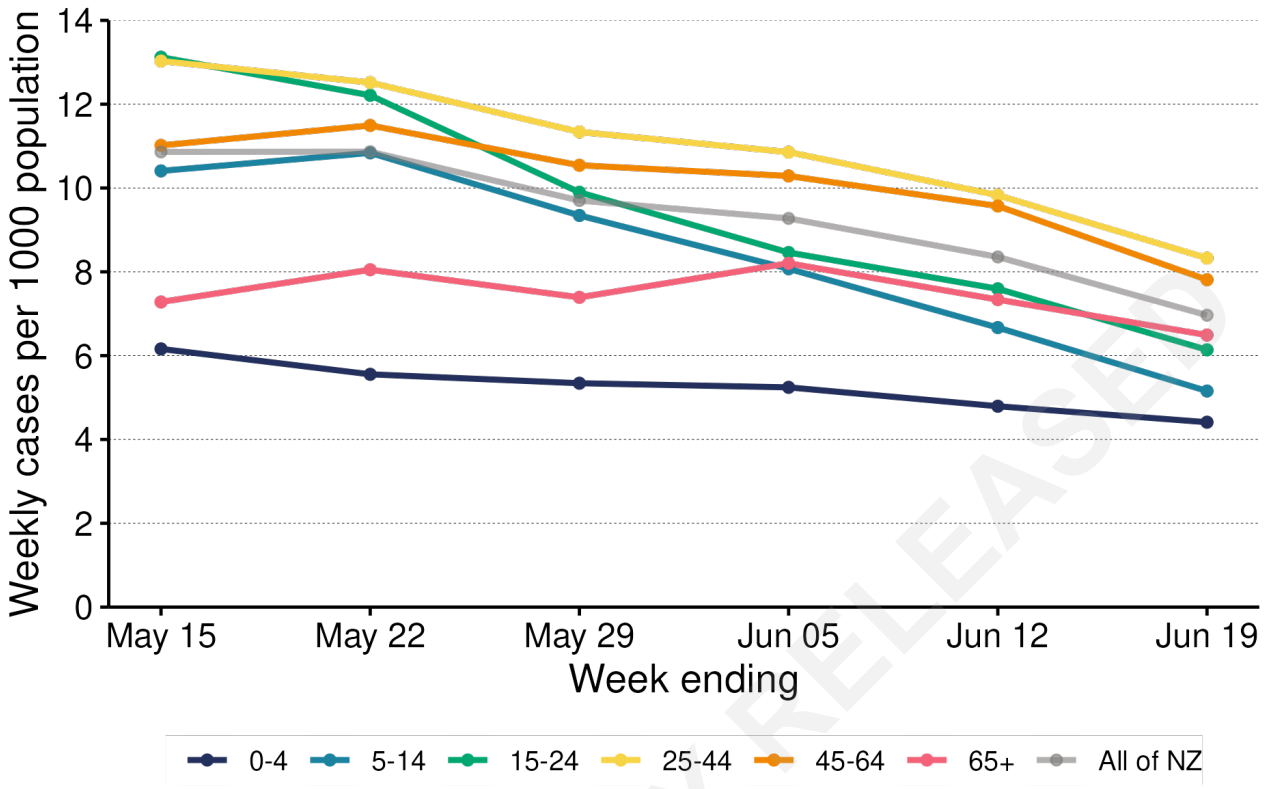
Figure 11: National weekly case rates by age for weeks 15 May – 19 June 2022



Source: NCTS/EpiSurv as at 2359hrs 19 June 2022

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Deprivation trends over time, by ethnicity and by region

Figure 12 shows case rates based on the NZDep2018.[5] 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 continue to be highest in the areas of least deprivation (8.5 per 1,000 population),** followed by areas of mid-range deprivation (7.2 per 1,000) and areas most deprived (5.2 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 (6.9 and 6.6 per 1,000 respectively). Cases in Pacific Peoples were the lowest in areas most deprived (2.6 per 1,000) and the lowest in areas least deprived (6.1 per 1,000). European or Other had the highest case rates in areas least deprived at 8.8 per 1,000 followed by Asian (7.9 per 1,000).

For the most deprived areas, cases in Māori made up 18% of cases. The proportion of cases in the most deprived areas for Pacific Peoples was 8%, for Asian 17% and for European and Other, 57%. Following this, 80% of cases in areas of least deprivation were European and Other compared with 12% Asian, 5% Māori and 2% Pacific Peoples.

In the Northern region, case rates were highest in the least deprived areas (7.3 per 1,000 population) followed by areas of mid-range deprivation (6.5 per 1,000) and areas most deprived (4.1 per 1,000).

In Te Manawa Taki region, case rates were highest in the least deprived areas (7.0 per 1,000) followed by areas of mid-range deprivation (5.9 per 1,000) and areas most deprived (4.4 per 1,000).

In the Central region, case rates were highest in the least deprived areas (9.7 per 1,000) followed by areas of mid-range deprivation (8.1 per 1,000) and areas most deprived (6.0 per 1,000).

In the Southern region, case rates were highest in the least deprived areas (10.1 per 1,000) followed by areas of mid-range deprivation (8.6 per 1,000) and areas most deprived (8.0 per 1,000).

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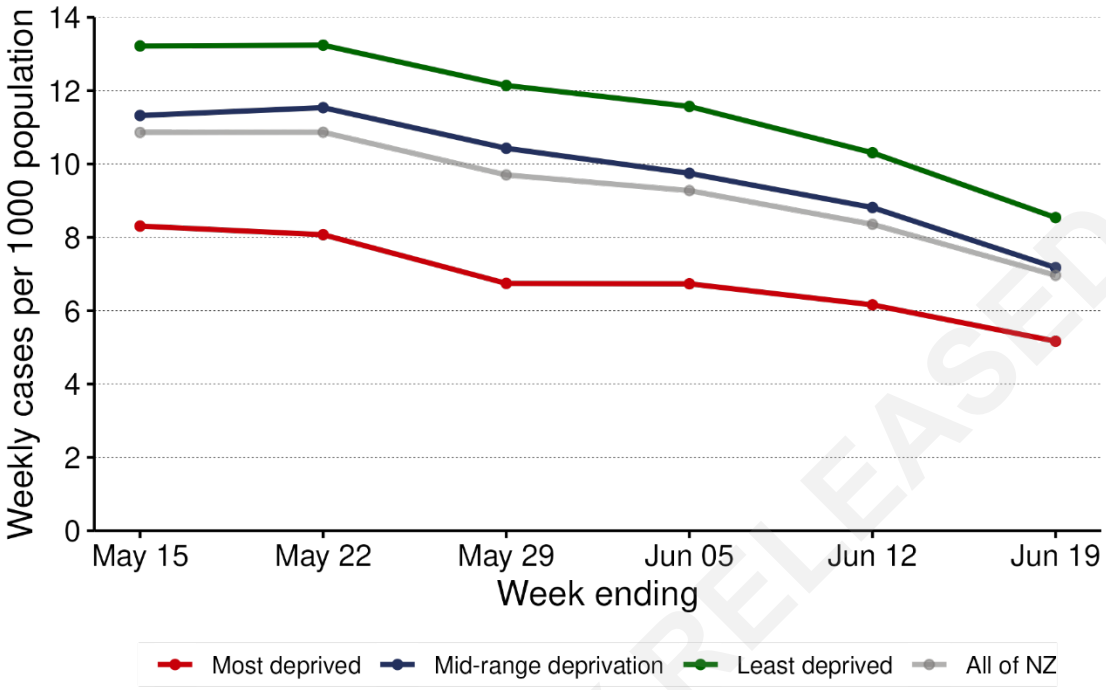
[5] Contents (otago.ac.nz)

Figure 12: National weekly COVID-19 case rates by deprivation status for weeks 15 May – 19 June 2022



Source: NCTS/EpiSurv as at 2359hrs 19 June 2022

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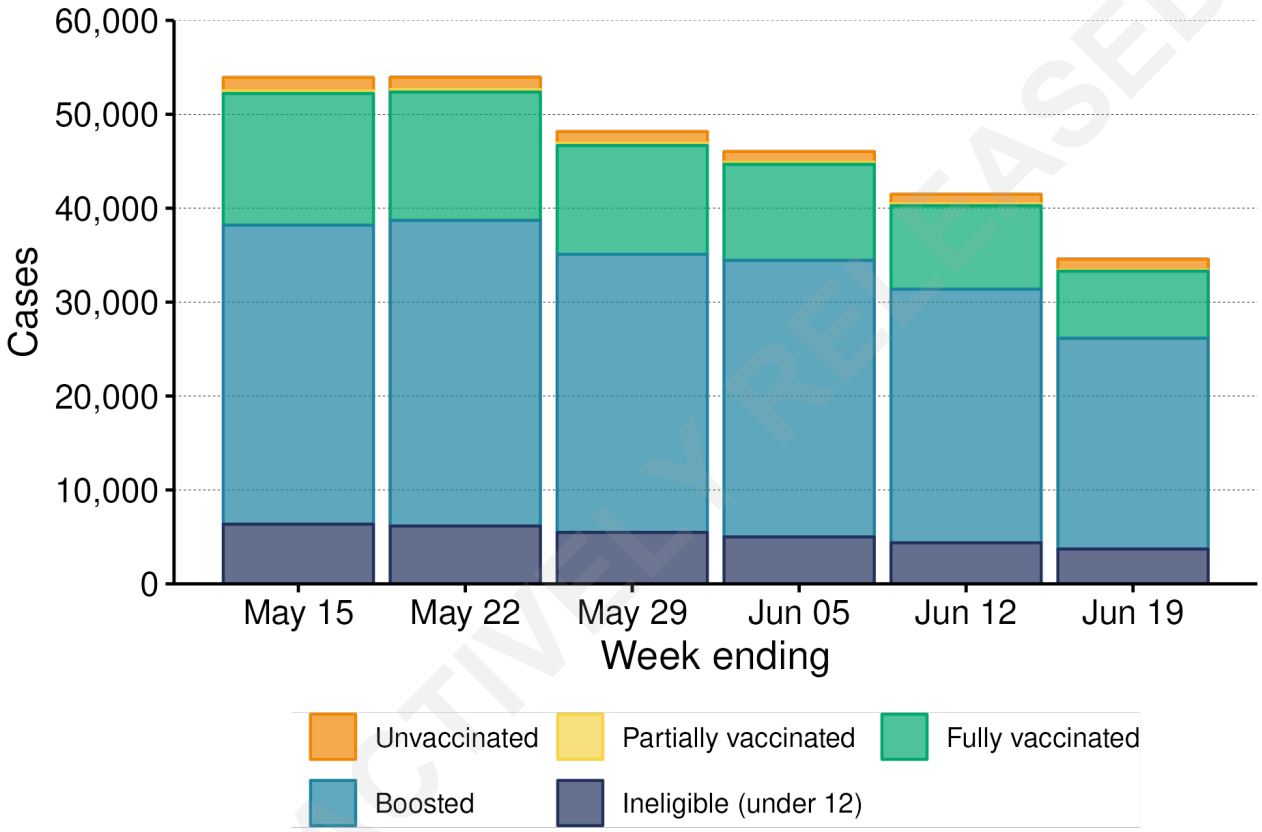
Vaccination trends over time

Figure 13 shows community case numbers by vaccination status nationally. The proportion of boosted cases is the same as the week prior at 65% of all cases in the week ending 19 June. The proportion reported as fully vaccinated is also the same as the week prior at 21% 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[6] is 10.7%. The proportion of cases reported as partially vaccinated remains constant at 0.4%, while cases reported in those unvaccinated is similar to the week prior at 3.3%.

Figure 13: National weekly case numbers by vaccination status for weeks 15 May – 19 June 2022



Source: NCTS/EpiSurv as at 2359hrs 19 June 2022

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[6] 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, all three watchlist variants (BA.2.12.1, BA.4 and BA.5) were again detected in community samples (first detected in late May/early June), with increasing frequency. Wastewater data also continues to detect BA.4/5 and BA.2.12.1 at a number of sites. Wastewater data coupled with community case WGS results strongly suggest that BA.4/5 and BA.2.12.1 are circulating within the wider NZ population. The upward rise of the BA.4/5 variant of Omicron is a key observation – it now makes up approximately 7-8% of community cases. **ESR estimates that BA.5 will likely become the dominant variant around mid-July.** It is still uncertain how this will translate into case numbers.

Figure 14 shows that 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.

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 92% 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. **Figure 14 also shows the increasing frequency of BA.4/5 and BA.2.12.1 in community samples over the past few weeks.** As expected, in NZ we see a (relative) growth advantage of BA.5 over other variants. We expect BA.5 to outcompete BA.2 – as mentioned above, ESR expect this will happen around mid-July.

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

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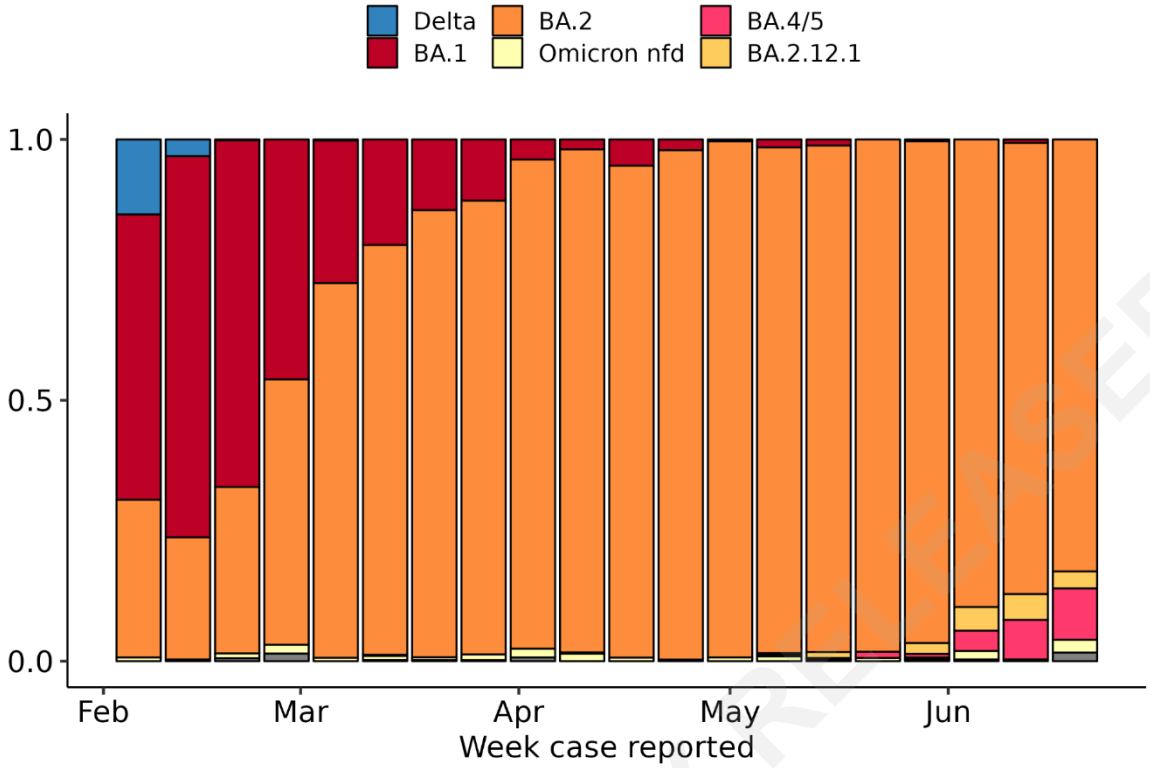
Figure 14: ***Frequency of Variants of Concern in community cases in New Zealand***



Source: ESR COVID-19 Genomics Insights Report #12, EpiSurv/Microreact 0900hrs 20 June 2022

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Border Surveillance

Cases detected at the Air Border

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

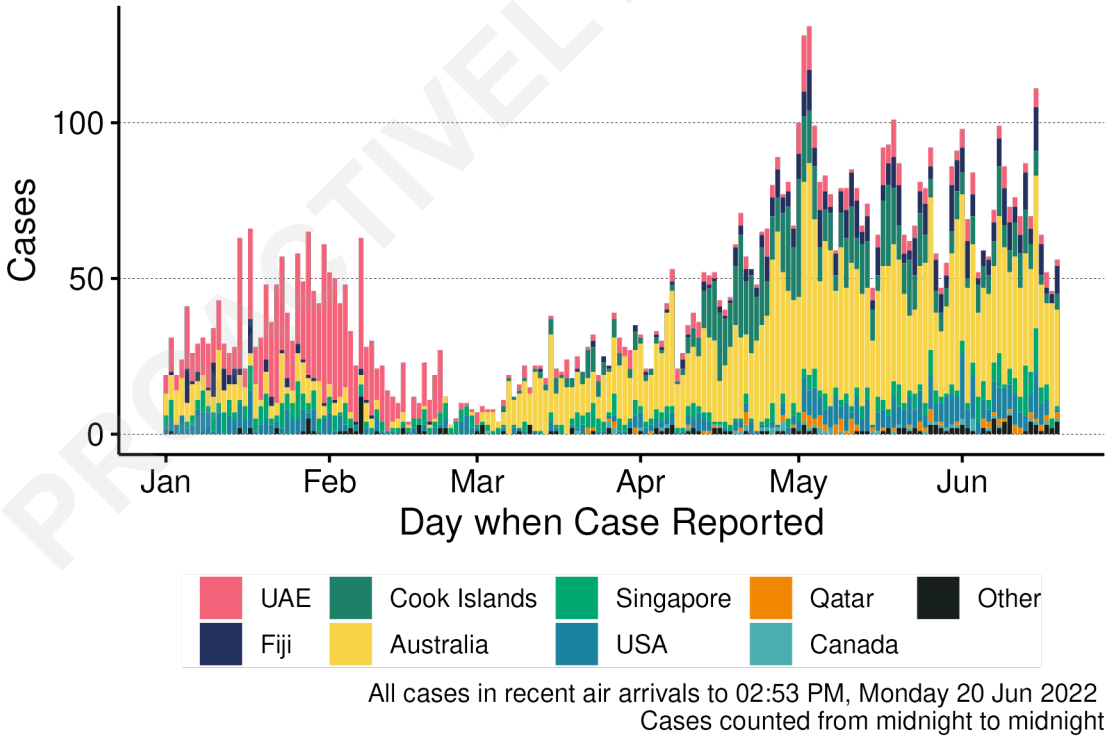
More than 2% of recent arrivals were reported as cases. This is similar to the rates seen in arrivals from Australia during quarantine-free travel in 2021, and above the 1% estimate used for planning Reconnecting New Zealand.

Figure 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. 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 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.

Figure 15: Cases reported in post-arrival testing by country of flight departure, 01 January – 19 June 2022



Source: NCTS/EpiSurv as at 2359hrs 19 June 2022

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Testing of Border arrivals

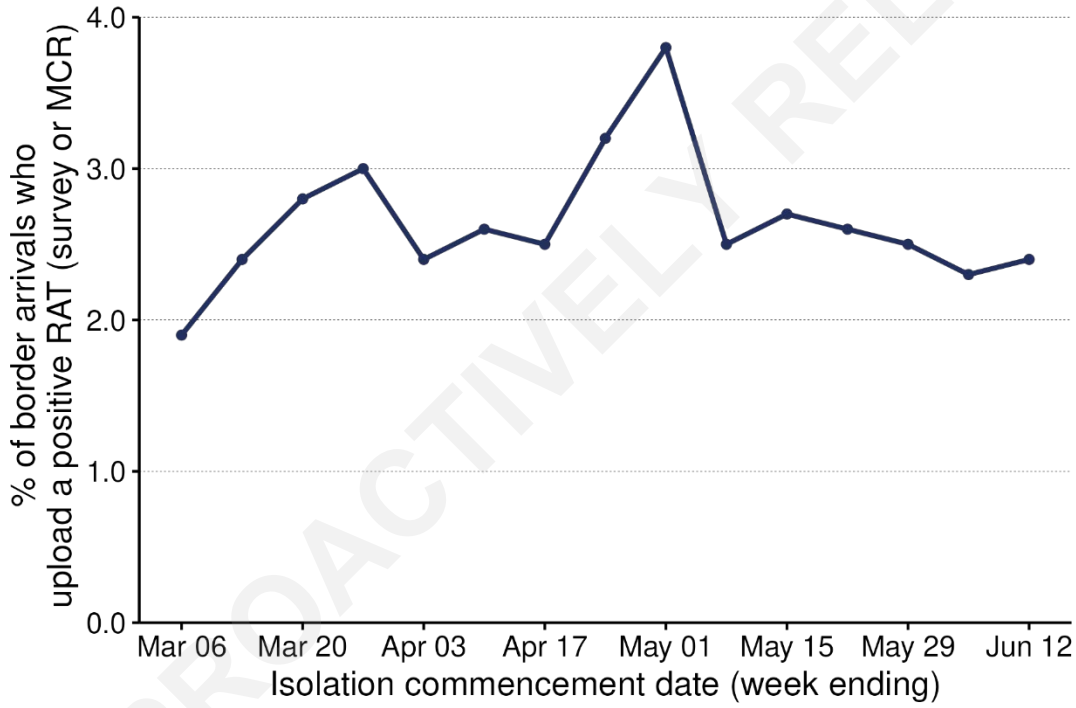
Figure 16 shows that the percentage of positive RAT tests among border arrivals (who reported a test) was mostly between 2 - 4% for the period 06 March – 12 June 2022. From mid-May to the week ending 12 June, the percentage of border arrivals returning positive RATs through either the survey or My COVID Record has been holding steady between 2-3%. In the week ending 12 June, 974 of 40,940 arrivals returned a positive RAT.

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

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.

The border arrival data is lagged by approximately 1-2 weeks because there is a delay between the date that people arrive in the country and the dates when they test positive (via RAT), get a PCR, and finally acquire WGS results.

Figure 16: Percentage of positive tests from border arrivals who complete RAT tests, 06 March – 12 June 2022



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Sources: NCTS/EpiSurv/Éclair as at 2359hrs 12 June 2022

Whole Genomic Sequencing of Imported cases

Figure 17 shows the completion metrics for border returnee testing and WGS. For the period 07 March – 12 June 2022, the percentage of arrivals uploading a RAT has been constant with an average of 91%. In the week ending 12 June, there were 40,940 border arrivals, of which 90.0% (36,851) uploaded a RAT result upon arrival. This is similar to 89.7% from the week prior.

Figure 18 shows the border returnee testing and WGS metrics for arrivals. In the week ending 12 June, 34.5% of border arrivals who returned a positive RAT had a follow-up PCR test. This is similar to 34.1% the week prior.

In the week ending 12 June, the percentage of PCR positive border arrivals with WGS complete was 51.7%. However, please note that **WGS can be incomplete for recent cases.** This percentage was 69.5% for the week ending 05 June and 60.3% for the week ending 29 May.

Over the most recent 5-day window (until Friday 17th June), 24% of border-related genomes were BA.5. As at 8pm, 19 June, ESR had received samples from 359 of the 540 PCR positive border cases with a report date in the two weeks to 17 June. 1% were BA.1, 51% were BA.2, 5% were BA.2.12.1, 4% were BA.4, 14% were BA.5, and 2% were Omicron (unassigned). The rest either failed WGS or had not yet been sequenced.

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.

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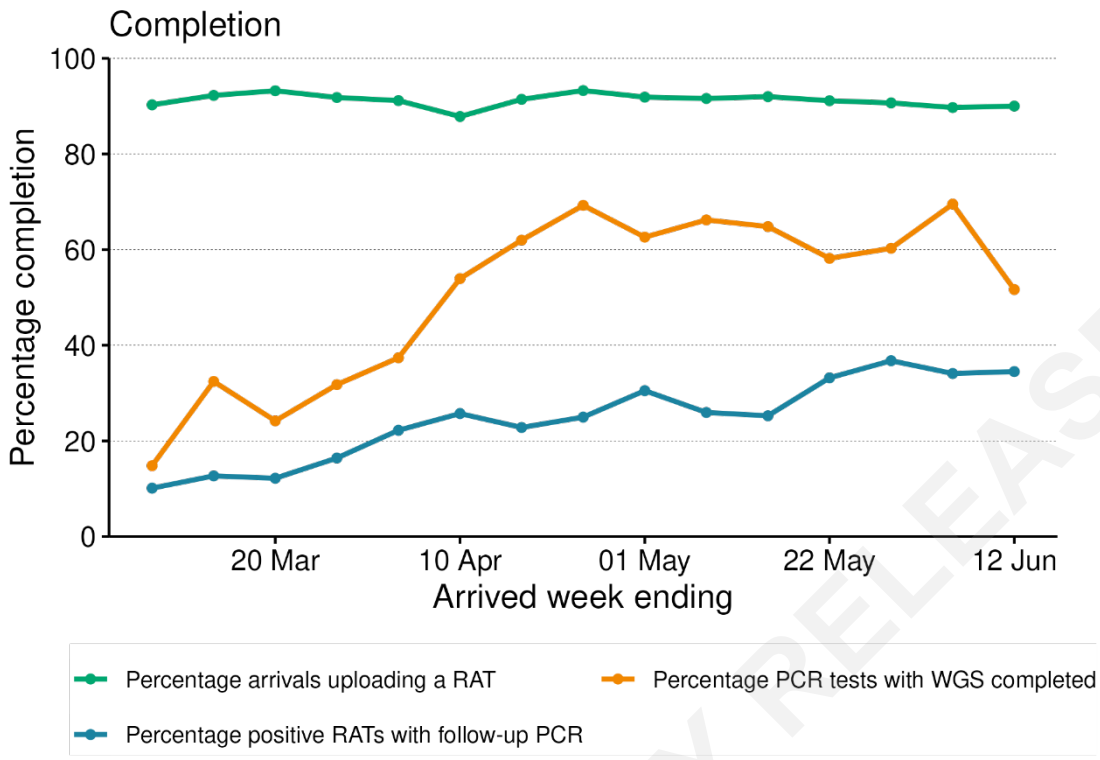
Figure 17: Completion metrics for border returnee testing and WGS for arrivals, 06 March – 12 June 2022



Sources: NCTS/EpiSurv/Éclair as at 2359hrs 12 June 2022, ESR WGS 12 June 2022[7]

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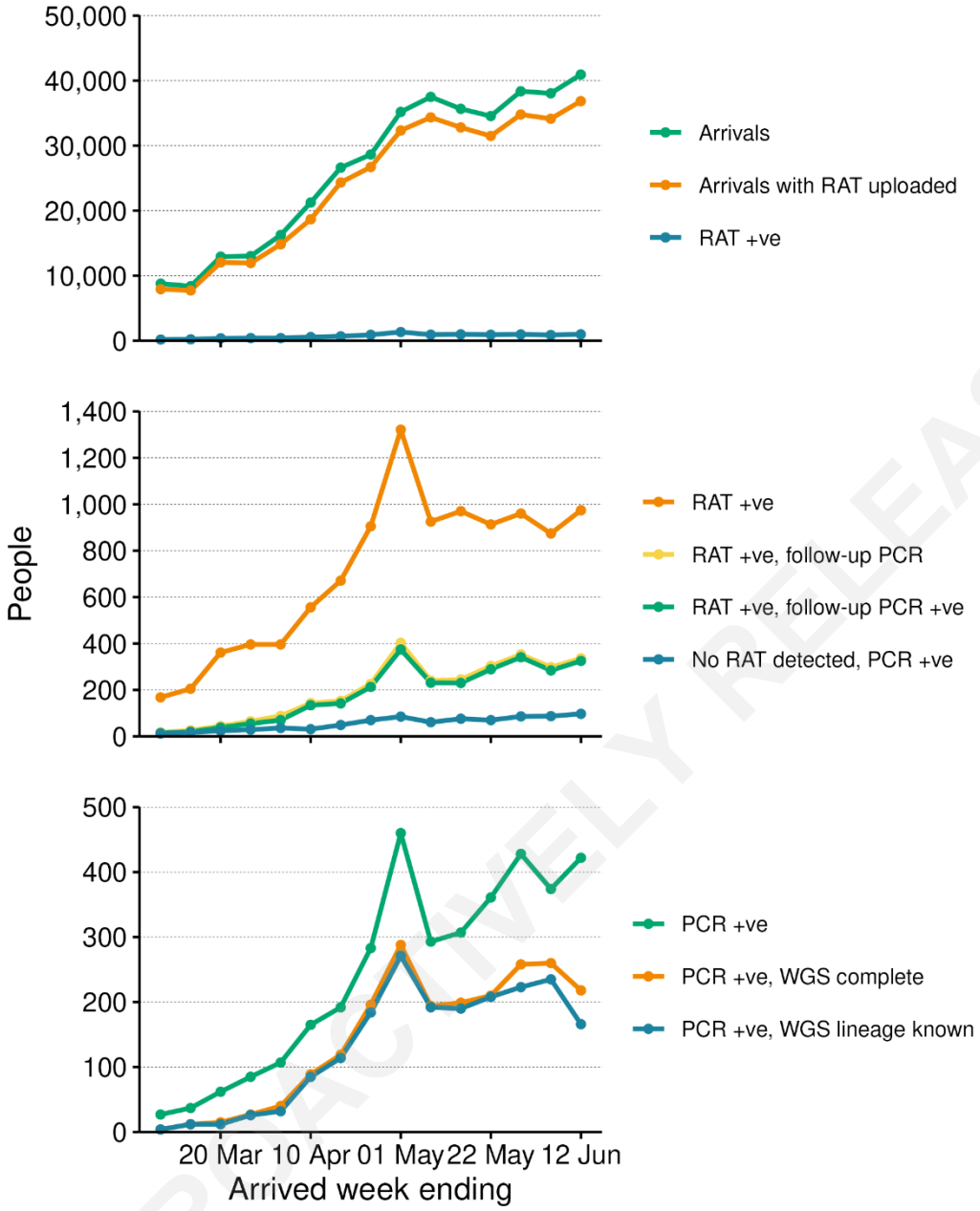
[7] Please note that WGS may not be completed/uploaded yet for more recent cases

Figure 18: Border returnee testing and WGS metrics for arrivals, 06 March – 12 June 2022



PROACTIVELY RELEASED

Sources: NCTS/EpiSurv/Éclair as at 2359hrs 12 June 2022, ESR WGS 12 June 2022[8]

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

Hospitalisation and Mortality

Hospitalisation Rates

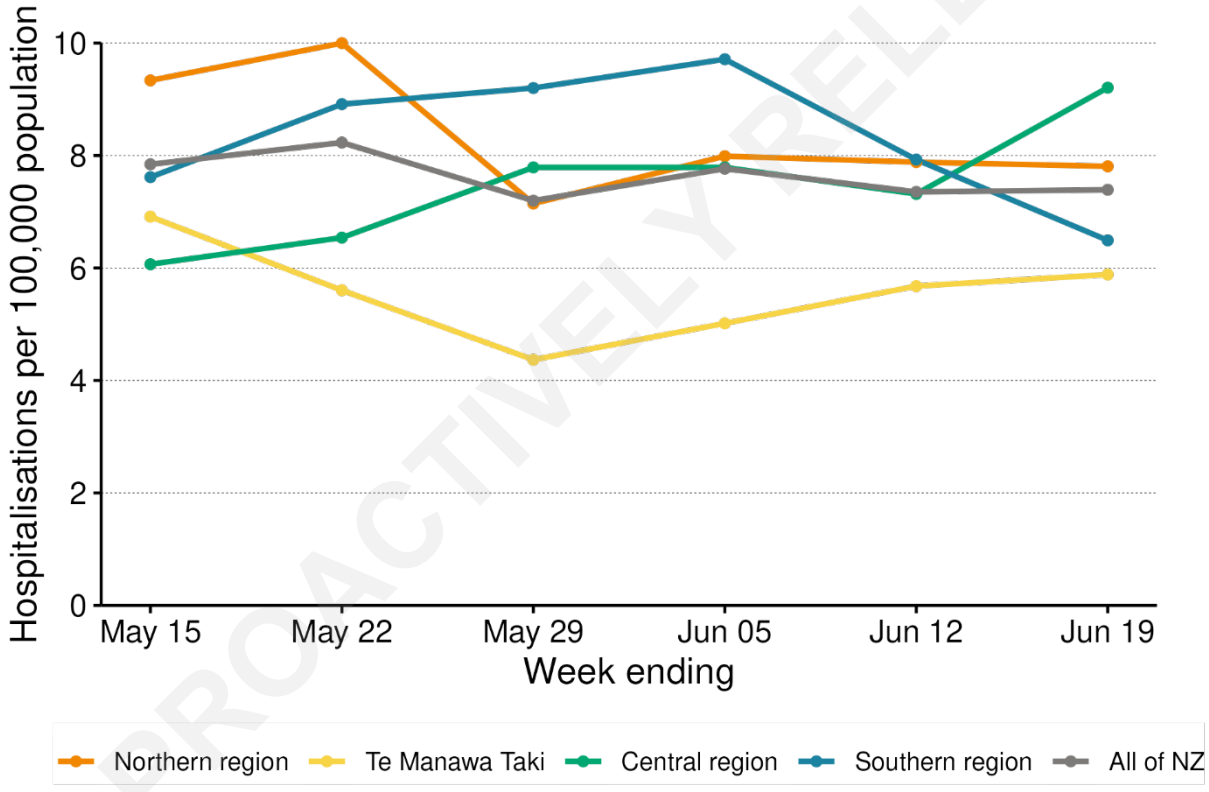
Due to varying definitions of an active case, there may be regional differences in the coding of COVID-19 infection status for hospitalisations.

Hospital Occupancy

For the week ending 19 June, the national hospital occupancy rate has remained the same at 7.4 per 100,000 population, **with no significant change in the past week (Figure 19).**

Hospital occupancy rates have continued to vary across regions in the past week. Southern region (6.5 per 100,000) decreased by 18.1% and Northern (7.8 per 100,000) decreased by 1%, while Te Manawa Taki (5.9 per 100,000) increased by 3.6% and the Central region (9.2 per 100,000) increased by 25.8% in the past week.

Figure 19: Regional weekly hospital occupancy rate per 100,000 population, 15 May – 19 June 2022



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Source: Daily hospital questionnaire as of 19 June 2022

Whole Genomic Sequencing of hospitalised cases

As of 19 June, ESR received samples from, and had processed, 74 of the 306 PCR positive hospital cases with a report date in the two weeks to 17 June 2022. Of these, 87% had a BA.2 genome, 1% were BA.5, 11% failed WGS and 1% were Omicron unassigned.

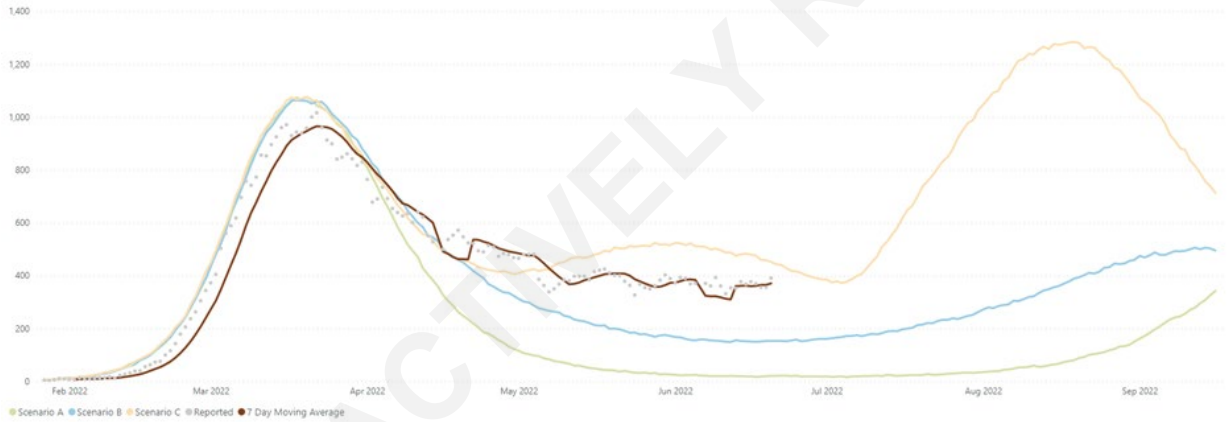
ESR now receives a daily list of active COVID-19 cases who tested positive in the past 14 days and were hospitalised in the past 7 days. ESR is working with the Ministry of Health to receive information on which cases have been admitted to ICU/HDU.

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 20**). The very high hospital occupancy in Scenario C shows how sensitive the models are to an increase in infections in older and more at-risk populations.

The number of hospital beds occupied by people with confirmed COVID-19 infections was approximately 8 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* – both of which expect an increase in hospitalisations.

Figure 20: 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 20 June 2022.

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Mortality

Figure 21 shows the 7-day rolling average of deaths by date of death, which was 10 as of 19 June 2022. Under-ascertainment of COVID-19 cases in the community could mean that the true 7-day rolling average of deaths is slightly higher than reported.

Figure 22 shows **COVID-19 related deaths by cause over time**. From March 2020 to 19 June 2022, there were 1,358 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, 585 **(52%) were determined to have COVID-19 as the main underlying cause**. COVID-19 contributed to a further 310 deaths (27%). Another 236 people died of a separate, unrelated cause (21%).

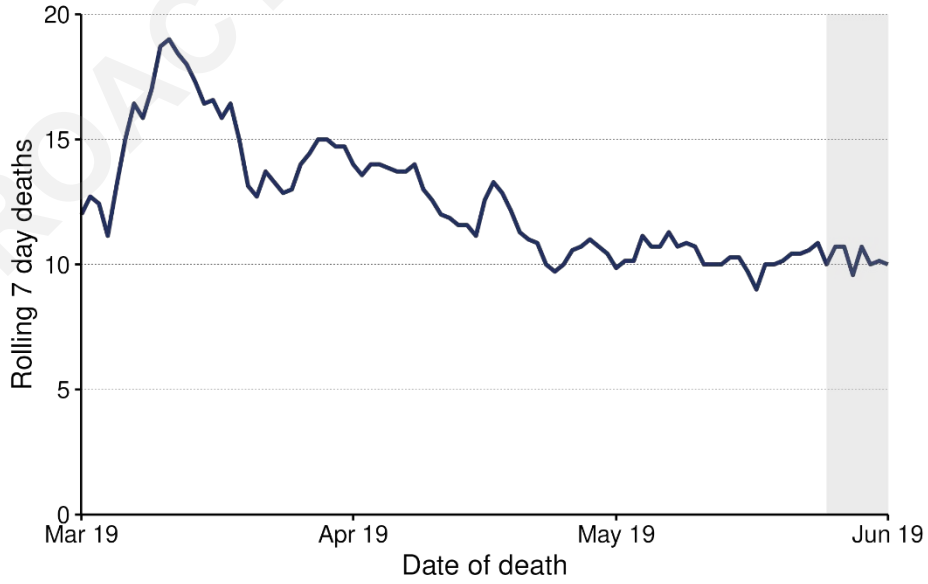
Figure 23 shows mortality by age and ethnicity from 01 March 2022 – 19 June 2022, the period when most cases were due to the Omicron variants. The trend is as expected across all age groups, with the older population dying with COVID-19 at a higher rate than the younger population. The mortality rate for those aged 90+ is highest at 14.6 per 1,000 population. The mortality rate for those aged 80-89 is 3.7 per 1,000; and for those aged 70-79 is 0.9 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 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 and are not statistically reliable.

Of people aged 90+, Pacific Peoples have the highest mortality rate at 58.4 per 1,000 population (95% exact Poisson CI: 32.7 – 96.3 per 1,000), while Asian is the lowest at 9.3 per 1,000 (95% CI: 3.4 – 20.2).

For people aged 80-89, Pacific Peoples have the highest mortality rate at 15.1 per 1,000 population (95% CI: 10.9 – 20.3), while Asian is again the lowest at 2.0 per 1,000 (95% CI: 1.1 – 3.3).

Figure 21: 7-day rolling average of deaths within 28 days of being reported as a COVID-19 case, by date of death, 19 March – 19 June 2022



Source: NCTS/EpiSurv as of 18 June 2022[9]

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

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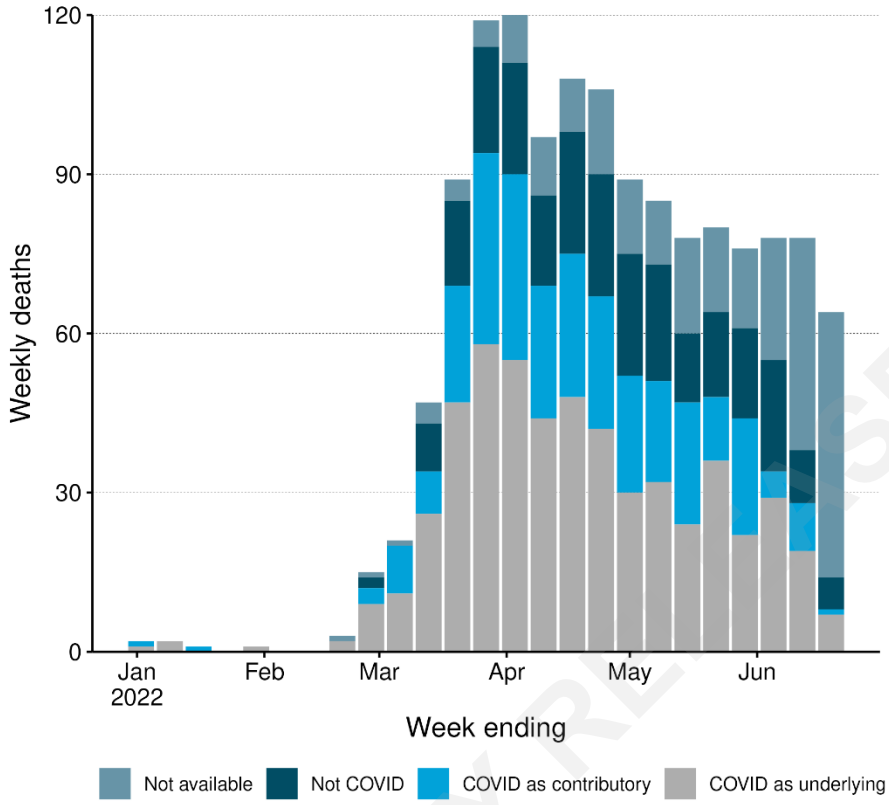
Figure 22: Deaths by cause, 01 January – 19 June 2022



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.

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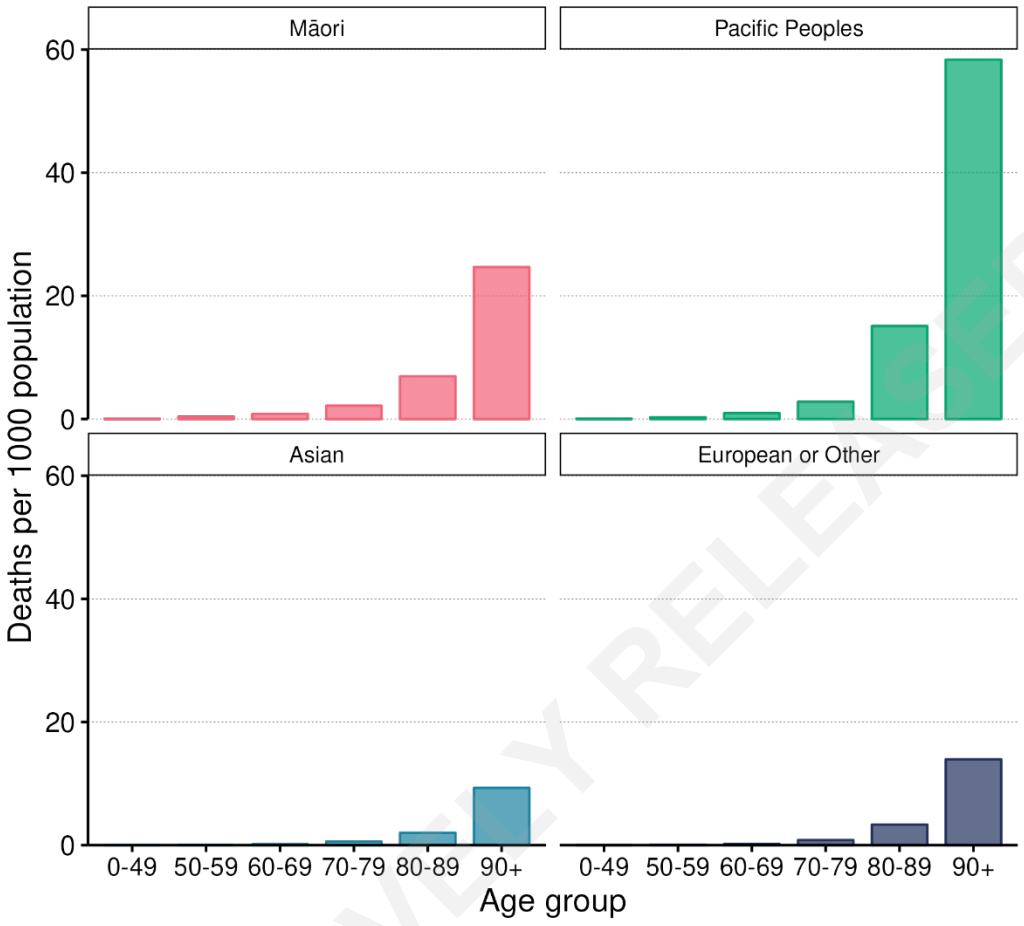
Figure 23: Rates of all deaths with or after COVID-19 infection per 1000 population, by age and ethnicity, 01 March – 19 June 2022



Source: NCTS/EpiSurv as of 19 June 2022

All cause death rates

This section is under review.

Details 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.

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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 the peak in January 2022. In the week ending 19 June 2022, over 3.3 million cases were reported, a 4% decrease as compared to the previous week. The number of new weekly deaths declined by 16% as compared to the previous week, with over 7,500 fatalities reported.

At the regional level, the number of new weekly cases increased in the South-East Asia Region (+46%), the Eastern Mediterranean Region (+45%), and the European Region (+6%), while it decreased in the other three WHO regions. The number of new weekly deaths increased in the South-East Asia Region (+4%), while decreasing trends were observed in the other five regions. As of 19 June 2022, over 536 million confirmed cases and over 6.3 million deaths have been reported globally.

The Omicron VOC continues to be the dominant variant circulating globally, accounting for nearly all sequences reported. Among Omicron lineages, the proportions of BA.2 and its descendent lineages (pooled lineages named BA.2.X) are declining but nonetheless remain dominant, accounting for 36% and 12% respectively. Globally, BA.5 and BA.4 lineages continue to rise in prevalence and have been detected in 62 and 58 countries respectively. BA.2.12.1, which has now been detected in 69 countries, has decreased in prevalence since the previous week.

Ireland

There are concerns that Ireland is facing a new wave of the pandemic, with the BA.4 and BA.5 subvariants now accounting for over 40% of cases in the country.

It is likely that the BA.4 and BA.5 subvariants are contributing to a rise in hospitilisations observed over the past two weeks. As of 19 June 2022, Ireland reported 574 patients in hospital, a 46% increase of those reported a week prior. While the introduction of new public health restrictions are not currently under consideration, there is apprehension over the likely impact on hospital waiting lists. A €350 million Waiting List Action Plan was released earlier this year with the goal to provide additional capacity in the hospital system, and to stabilise and reduce waiting lists and waiting times for elective care.

United Kingdom

The latest Office for National Statistics (ONS) infection survey shows infection rates have increased in all four UK countries.[10] Scotland saw the largest weekly increase in the proportion of its population testing positive for COVID-19 out of the UK countries, with its positivity increasing from 1% to 3.36%. Infections increased in all age groups and across all regions in England except the North-East. Growing prevalence of BA.4 and BA.5 variants are thought to be responsible for the increases, with these variants now accounting for almost 50% of sequenced cases across the UK.

[10] ONS Survey

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The UK Heath Security Agency (UKHSA) has found poliovirus in sewage samples collected from North and East London in a statement released 22 June 2022. Investigations are underway after several closely-related viruses were found in sewage samples taken between February and May. The virus has continued to evolve and is now classified as a 'vaccine-derived' poliovirus type 2 (VDPV2), which on rare occasions can cause serious illness, such as paralysis, in people who are not fully vaccinated.

Australia

A case of measles has been identified in a returned traveller from the United Kingdom and Italy. This is the first case reported in the State of Victoria since March 2020. Outbreaks of measles have been recently reported in Asia, Africa, and Europe.

USA

In the week ending 22 June 2022, the 7-day rolling average of daily hospital admissions (4,352) increased by 1.5% compared to the week prior (4,289). This number has been trending upwards since 06 April 2022, when the United States reported a 7-day rolling average of 1,422, their lowest since reporting began in August 2020.

CDC Nowcast projections for the week ending 18 June 2022 estimate the combined national proportion of lineages designated as Omicron to be 100%. The predominant Omicron lineage in the United States is BA.2.12.1, with the national proportion of BA.2.12.1 projected to be 56.0%; BA.5 is projected to be 23.4%; BA.4 is projected to be 11.4%; BA.4 is projected to be 9.1%.

Excess mortality data for the United States[9] is only available up to 3 April when it was 3.34% below the projected number of deaths for the same period based on previous years.

France

The BA.4 and BA.5 sub variants are now estimated to account for around 19% of new COVID cases in France and are thought to be contributing to a moderate increase in overall new case numbers.

Over 90% of the French population is fully vaccinated, while over half the population has already been infected by the Omicron variant – in particular, the population has experienced a wave of sub-variant BA.2. However, Public Health France recently confirmed that levels of circulation of the new sub variants are still too low to provide any robust data or insight into protection due to vaccination or prior infection.

Excess mortality data for France[9] is only available up to April 17 when it was 4.31% above the projected number of deaths for the same period based on previous years.

South Africa

Mortality data suggests that the number of excess deaths in South Africa increased by 146% between 19 March – 28 May 2022. There were 750 excess deaths in the week ending 19 March compared with 1,844 in the week ending 28 May.

Reported cases in South Africa have been declining since 11 May 2022.

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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 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. Noting the absence of a quantitative framework in Aotearoa, work is underway at ESR, Massey University, and University of Auckland to build models that use historical data and standardisation approaches to reliably determine active case numbers from measures of viral wastewater RNA in catchments. The aim of this programme is to transition wastewater based surveillance (WBS) from a monitoring tool to one that has predictive potential.
- 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, with the highest risk among individuals living in the most deprived areas and a negative social gradient for testing rate. The findings indicate structural barriers to health-access in France and lower capacity of deprived populations to benefit from protective measures.
- 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).

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- 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.

Evidence brief on Masking mandates

Please note this section had an error in the data for Figure 24 in previous week which has now been corrected.

The evidence that mask wearing decreases the rate of transmission of SARS-CoV-2 (and other airborne respiratory viruses) is substantial. Masks are effective at preventing transmission of SARS-CoV-2 to a contact (protection) or preventing transmission of SARS-CoV-2 from a case (source control). Mask wearing becomes more efficacious when combined with other public health measures that reduce the risk of transmission.

Trends suggest that masking reduced the risk of acquiring COVID-19 in school settings as there were no other substantial changes in factors that predict risk that would be limited to school-aged children only. In addition, comparing rates in teachers who were absent due to COVID-19 with the general population suggests an increase in transmission in the school environment in Term 2.

A study was published in May 2022 assessing the relationship between local mask wearing policies and the adherence to mask wearing in 126 cities in the United States.[11] **Having a local mask mandate increased the odds of wearing a mask 3-fold (OR = 2.99, P = .0003) compared to no recommendation.** People observed in rural areas were least likely to wear masks. Correct mask use was greatest in December 2020 and remained high until June 2021 (P < .0001).

It is difficult to determine from the available data if the removal of mask mandates from schools after the move from CPF (COVID-19 Protection Framework) Red level to Orange impacted on the rate of transmission within schools for several reasons. Most importantly, the removal of mask mandates was associated with changes to other measures such as capacity limits used to control the transmission of COVID-19 infection. However, some indirect evidence regarding any varying risk of infection within schools may be obtained by a comparing the rate of infection in school age children and in teachers over

11 Eric J. Puttock, et al Association of masking policies with mask adherence and distancing during the SARS-COV-2 pandemic, American Journal of Infection Control, 2022.

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time and with similar cohorts. This could indicate that schools are a potential "engine" of transmission of COVID-19 within the community.

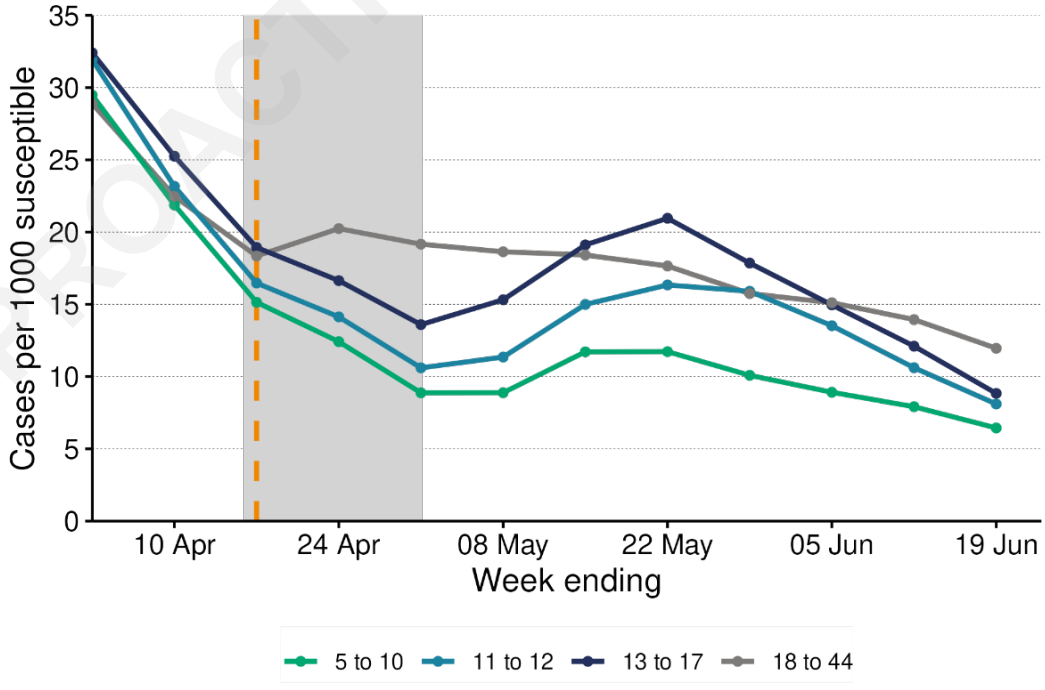
Therefore, we have provided an analysis of case rates in school aged children comparing with adults over the period 03 April to 05 June, which encompasses school term break and changes to the mandates. The weekly incidence rate among susceptible populations (defined as those who have not had a previous infection, vaccination status was not considered) are shown in Figure 24. Age breakdowns within children are chosen to match different school settings; primary, intermediate, and high school. The grey block represents school holidays. Term 1 finished 14 April and Term 2 began 2 May. The dashed orange line marks the change to CPF from Red to Orange.

Initially there was a steady decline in rates among susceptible school aged children and adults during school Term 1; in the two weeks to 17 April (the first Sunday of school holidays), there was a 53% decrease in the rate in all school aged children (5-17 years) and a 41% decrease among adults. The decline in cases among school aged children continued during school term break as well (a 38% decrease to Sunday 1 May), after which there were sudden substantial increases in rates after their return to school (an increase of 35% in the first 2 weeks, which continued in the following week as well). However, for adults during school holidays, overall, the rate changed little, and then continued to decrease after school holidays (however at a slower rate, with ~20% decrease from 1 to 19 June).

In general, prevalence drives incidence and given adult rates were falling, this would not appear to be the explanation for school aged children having increased rates in mid-May. Furthermore, rates were declining before school holidays, when there was school-based transmission risk for children; with the return of children to school the trend reversed.

These trends could suggest that masking reduced the risk of acquiring COVID-19 in school settings as there were no other substantial changes in factors that predict risk that would be limited to school-aged children only.

Figure 24: COVID-19 case rates in school aged children and adults aged 18-44



School terms are indicated in white, school holidays in grey shading. Rates in children declined before and during the holidays but increased when school resumed. Rates in adults (grey) were not impacted as markedly during and after the school holidays.

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The Ministry of Education collects information on teacher absences due to COVID-19, as special arrangements for sick leave are provided for teachers due to COVID-19 infection.

A comparison between the case rates in teachers and the total population would indicate their rate of infection is higher than that of the general population [refer to Figure 25]; however, it also possible that their case ascertainment is higher than the general population, although teachers are not required to undertake regular asymptomatic screening.

The evidence suggests an increase in transmission in the school environment in Term 2 as:

a. there was a similar pattern of decreasing rates at the end of Term 1 and increasing at the start of Term 3 as seen in school-aged children, and

b. trends in the total population were of continued decreasing rates, unlike the increase seen in teachers.

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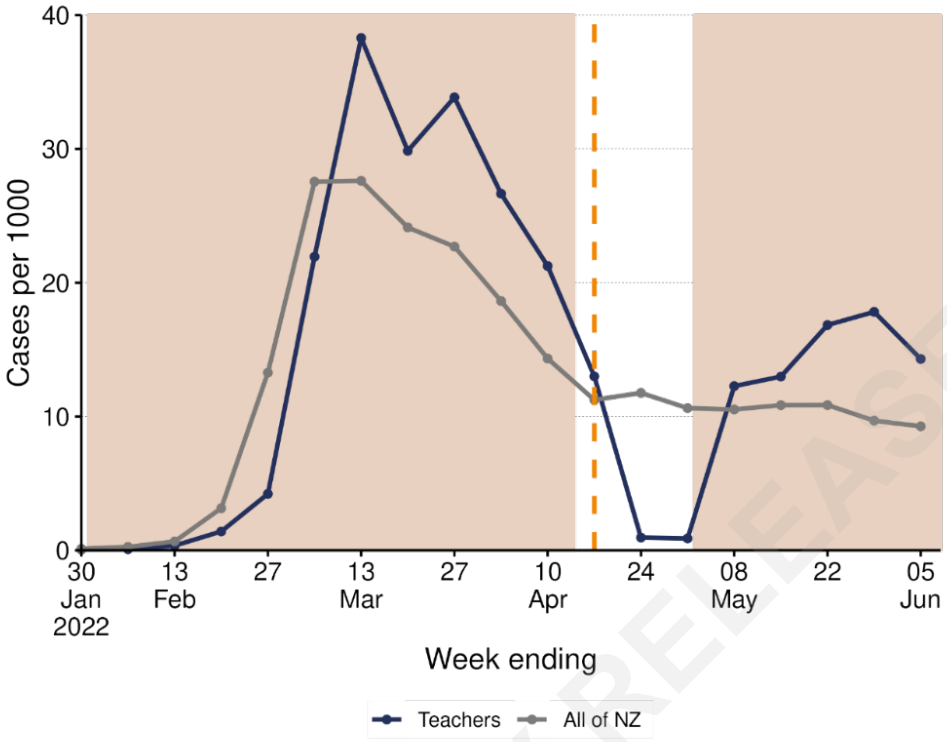
Figure 25: The rate of infection in teachers compared to all of NZ. cases per 1000 per day, week



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Health System Capacity

Omicron Dashboard

The Omicron dashboard (**Figure 26**) 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 16 June 2022.

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Figure 26: Omicron Health Sector Clinical Indicators Dashboard summary, week ending 16 June 2022

Sector	Summary of data
General Practice	There has been a reduction in the number of General Practice Qualifying Encounter Daily (GPQED) rates over the past week due to the impact of Queen's Birthday, which is consistent with reductions seen during public holiday periods. GPQED rates for under 5-13 year olds have risen further over the last week, and are currently up 27.4% compared to the same time last year.
Flu Tracking	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. This percentage is inversely related to age–that is, the highest percentages of ILI are observed in the youngest groups and the lowest percentages are in the oldest groups.
Aged Residential Care	There has been little change since last week in the number of Aged Residential Care facilities with COVID-19 cases. There has been a small reduction from 127 facilities impacted last week, down to 125 this week (19%). The DHB regions where the number of ARC facilities impacted (as a percentage of total facilities) the most are Northland, South Canterbury and Taranaki.
Pacific Health	Providers are continuing to promote and deliver COVID-19 and Flu vaccinations alongside messaging on where families can access hardship and other supports, if required. Pacific providers continue to provide large volumes of RATs to Pacific communities and continue to support families who are isolating.
Emergency Ambulance Service	111 call volumes and EAS incident volumes have continued to be high during the last four weeks. This is putting additional pressure on the ambulance sector. St John has stood up its Emergency Operations Centre to help manage its response to the demand increase
Disability	93% of disabled people aged 18+ years who receive Disability Support funding have been double vaccinated and over 12,000 new face mask exemption passes have been issued since the new system was officially launched on 31 May 2022.
ED	Nationally ED attendance volumes for the week ended 12 June increased further by 4.2% to 24,369. All three Auckland metro DHBs noted further increases, with Auckland DHB as much as 12%. Wellington hospital continues to report occupancy of over 90% at all 21 census points. Middlemore, Christchurch, Palmerston North and Rotorua all with high numbers of instances of ED occupancy being over 90%.
Hospital	Hospitals are at capacity across the motu, all regions have reported high levels of acute care, impacting planned care delivery. Hospital occupancy of over 90% continued to increase. 13 hospitals reported significant pressure with at least 15 of the 21 censuses over 90% occupancy. Wellington, Hutt Valley, Tauranga, Palmerston North and Rotorua were continuously above this threshold
Planned Care (Hospital)	No DHB has currently fully resumed planned care due to acute demand, COVID-19 hospitalisations and workforce constraints. 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	Pharmacies have reduced their operating hours (on a temporary and permanent basis) to maintain core pharmacy services. Workloads are high, staff are significantly fatigued, and patients are experiencing longer wait times for service provision.
Home and Community Services	We continue to see a reduction in total numbers of employees compared with Oct-Dec last year (10% decline) and a decline in total services delivered compared with Oct-Dec last year (5% decline).
Health Workforce	The Health workforce team are working on multiple initiatives to respond to workforce shortages across the sector. Southern and Central regions reporting workforce shortages in ARC causing pressure within the system.
Hospital Workforce	There continues to be absenteeism across the hospital workforce – with consistent reductions seen in Wellington Hospital and Christchurch Hospital. All regions are reporting workforce shortages impacting on care delivery.
COVID care in the community	The percentage of cases contacted has remained consistent in the past week and has been constantly over 98%. Assessments completed within 24 hours has remained consistent for the past week (between 50% to 58% completions each day), following a significant decrease since 18 May 2022. This may be due to pressure on the healthcare system.

Sources: Omicron Health Sector Clinical Indicators Dashboard, 16 June 2022

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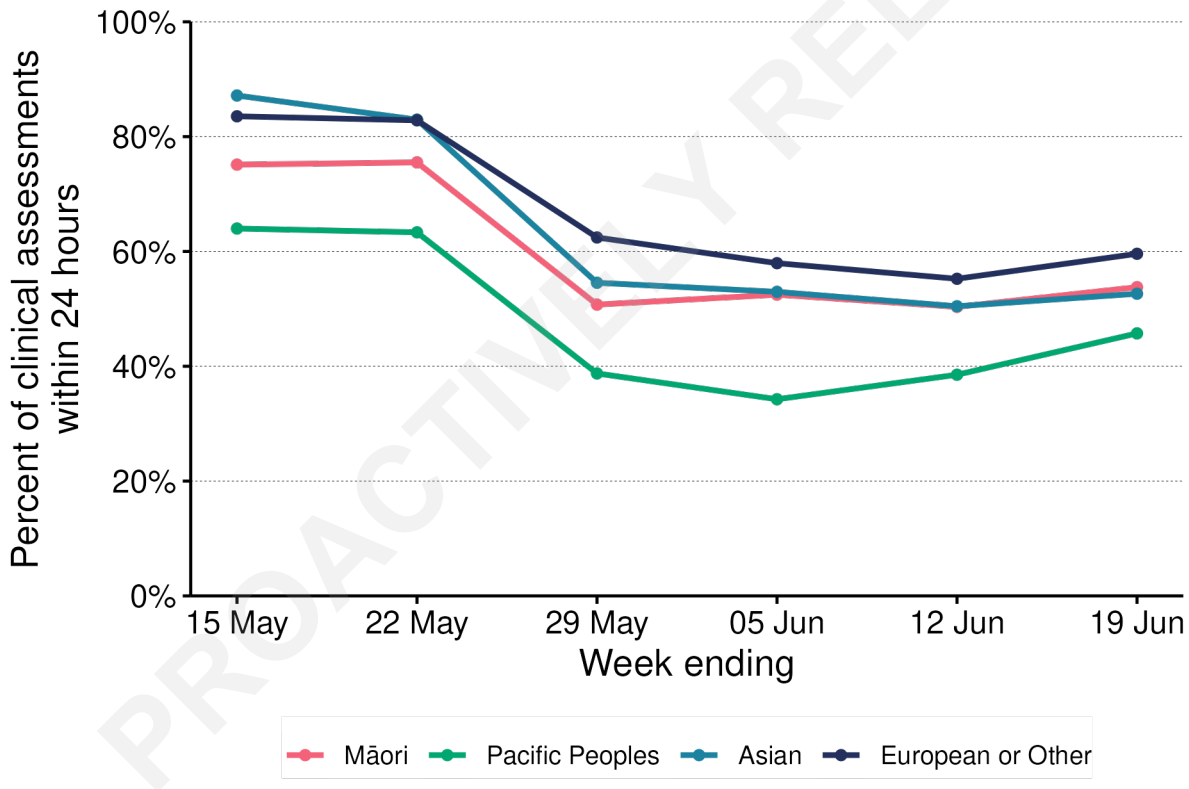
Care in the Community

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 27 shows the percentage of clinical assessment completed within 24 hours by Ethnicity. In the week ending 12 June 54% of Māori, 46% of Pacific Peoples, 53% of Asians and 60% 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 28 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 1,144.

Figure 27: Percent of initial clinical assessment completed within 24 hours of positive case by ethnicity



Sources: CCCM/QLIK, Socrates 19 June 2022

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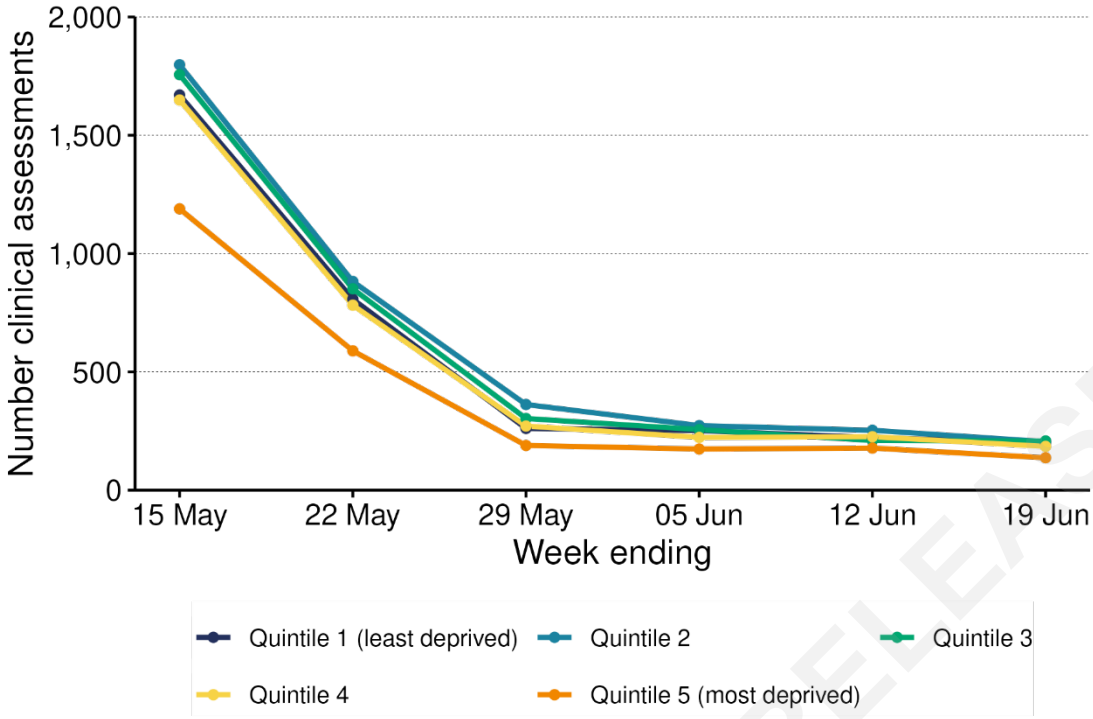
Figure 28: Number of clinical assessments by deprivation



Sources: NCTS, 19 June 2022

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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 big 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.

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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.

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